



United States
Department of
Agriculture

Forest
Service

April 2012



Final Environmental Impact Statement

Rubicon Trail Easement and Resource Improvement Project

Pacific Ranger District, Eldorado National Forest
El Dorado County, California



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Rubicon Trail Easement Final Environmental Impact Statement El Dorado County, California

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Abstract: The Final Environmental Impact Statement (FEIS) documents the analysis of six alternatives for issuing a National Forest Roads and Trails Act (FRTA) easement to El Dorado County for a right-of-way for the Rubicon Trail, where it crosses National Forest System (NFS) lands within the Eldorado National Forest (ENF). Alternative 1 proposes issuing an easement to El Dorado County, construction of a bridge at Ellis Creek, replacement of the Friends of the Rubicon (FOTR) bridge, installation of a vault toilet, installation and maintenance of erosion control features, rehabilitation and closure of specified unauthorized routes, construction of a bridge at Buck Island Lake Outlet, and addition of unauthorized motor vehicle routes to the National Forest Transportation System (NFTS). Alternative 2 proposes no action. Modified Alternative 3 proposes the same activities as Alternative 1 except additional vault toilets would be installed, an elevated rock ford would be constructed at the Buck Island Lake Outlet, and a saturated soil management strategy for wet season use would be included. Alternative 4 proposes the same activities as Alternative 1 except additional vault toilets would be constructed and installed, additional routes would be added, and the crossing at Buck Island Lake Outlet would be an elevated rock ford. Alternative 5 proposes the same activities as Alternative 1 except the easement would be a single route without variants, a seasonal operating period (for public use) from July 1 to November 1 would be included, the bridge at Ellis Creek would be constructed to a width of 12 feet, no vault toilets would be constructed, and no additional routes or motor vehicle use areas would be added. Alternative 6 proposes the same activities as Alternative 1 except the Rubicon Trail would be defined by rocks and logs, the easement width would be reduced to 25 feet of centerline at Post Pile, the bridge at Ellis Creek would be constructed to a width of 12 feet, the dispersed area at Soup Bowl would not be designated, dispersed camping would be eliminated at Winter Camp and within the RCA at the Little Rubicon by a forest order, routes

NSRELD-63-H and NSRELD-63-HA would not be added, four vault toilets would be constructed, and a seasonal operating period (for public use) from July 1 to November 1 would be included.

Summary

PROPOSED ACTION

The Eldorado National Forest (ENF) proposes to issue a National Forest Roads and Trails Act (FRTA) easement to El Dorado County for a specified right-of-way for the Rubicon Trail where it crosses National Forest System (NFS) lands within the Eldorado National Forest, which will allow the County to conduct maintenance within the right-of-way and ensure County responsibility for actions within the easement. The Environmental Impact Statement (EIS) will also analyze and disclose the effects of other authorizations to El Dorado County as necessary for the following actions: the construction of a new bridge at Ellis Creek, replacement of the Friends of the Rubicon (FOTR) bridge, construction and installation of a vault toilet, installation of erosion control features as described in El Dorado County's Rubicon Trail Saturated Soil Water Quality Protection Plan (El Dorado County Department of Transportation, January 2011), and rehabilitation and closure of specified unauthorized routes. The proposal will also analyze the construction of a new bridge at Buck Island Lake Outlet, the designation of areas for motor vehicle use and the addition of specified unauthorized routes to the National Forest Transportation System (NFTS) to provide permanent access to important dispersed recreation areas for camping and other purposes.

SIGNIFICANT ISSUES

Internal and external scoping identified the following significant issues and these issues were used to develop the action alternatives. The significant issues include the following:

Table S-1: List of significant issues.

Issue Topic	Cause and Effect
Wet Season Closure	1. Use during the wet season causes damage to resources.
Spectator Parking Problems Not Addressed	2. The proposed action fails to address spectator parking by large numbers of people concentrated at Soup Bowl and Little Sluice causing damage to resources.
Resource Impacts from Trail Use	3. Use on and off the trail, including camping, is impacting riparian areas, riparian species, and adjacent forests.
Ellis Creek Bridge is Too Big	4. Overly large bridge proposed at Ellis Creek will cause adverse impacts to riparian areas and species and is inconsistent with the historic nature of the trail.

Issue Topic	Cause and Effect
Proposed Buck Island Lake Outlet Bridge will Degrade Visual Quality	5. The proposed Buck Island bridge will degrade the view and setting and there is no environmental basis for building it.
Insufficient Number of Vault Toilets in Proposal	6. One toilet located in the Little Sluice area is inadequate to address dispersed use along the length of the trail.
Buck Island Lake Outlet Bridge could Restricted Access	7. Requiring a bridge at the Buck Island Lake Outlet will be expensive and the funding may not be available, so without construction of the bridge, vehicle use across the creek could be restricted.

ALTERNATIVES CONSIDERED IN DETAIL

The ENF developed six alternatives: the Proposed Action, the No Action, and 4 other action alternatives generated to meet the purpose and need and respond to public comments. The six alternatives considered in detail for this analysis are listed in Table S-2 below. Complete details of the alternatives, including project design criteria, are found in Chapter 2 of this document.

Table S-2: List of alternatives considered in detail.

Alternative	Actions Proposed
Alternative 1: Proposed Action	The Proposed Action is to issue an FRTA easement to El Dorado County for a specified right-of-way for the Rubicon Trail, where it crosses NFS lands within the ENF, which will allow the County to conduct ongoing maintenance within the right-of-way and ensure County responsibility for actions within the easement. The EIS will also analyze and disclose the effects of other authorizations to El Dorado County as necessary for the following actions; the construction of a new bridge at Ellis Creek, replacement of the FOTR bridge, construction and installation of a vault toilet, installation of erosion control features, and rehabilitate and close specified unauthorized routes. The proposal will also analyze the construction of a new bridge at Buck Island Lake Outlet, the designation of areas for motor vehicle use and the addition of some unauthorized routes to the NFTS to provide permanent access to important dispersed recreation areas for camping and other purposes.
Alternative 2: No Action Alternative	The status quo would continue. El Dorado County would continue to assert its RS 2477 claims, and there would continue to be a lack of clarity regarding responsibility for management of the trail. No easement would be issued to El Dorado County; the Rubicon Trail would stay in the current alignment across Ellis Creek and no bridge built; the FOTR bridge would not be replaced with a culvert and vehicles would continue to cross the bridge and downstream ford; Buck Island Lake Outlet bridge would not be built; additional erosion control features would be constructed out to the Little Rubicon River but not through the Fawn Lake IRA; no additional toilet would be installed, and no additional routes would be added to the NFTS.

Alternative	Actions Proposed
Modified Alternative 3:	Modified Alternative 3 responds to the concerns about visual degradation from construction of the Buck Island Lake Outlet bridge, inadequate human waste disposal methods, impacts to aquatic resources at Little Sluice, impacts from wet season use by: installing an elevated rock ford at the crossing at Buck Island Lake Outlet, constructing five additional toilets, moving the toilet at Wentworth Springs Campground out of the Gerle Creek floodplain, reducing the easement at Little Sluice to 75 feet and including a saturated soil management strategy for wet season use.
Alternative 4:	Alternative 4 responds to the concerns about visual degradation from construction of the Buck Island Lake Outlet bridge, inadequate human waste disposal methods, and access to dispersed recreation near Ellis Creek, Spider Lake, and Buck Island by: installing an elevated rock ford at the crossing at Buck Island Lake Outlet, constructing four additional toilets, moving the toilet at Wentworth Springs Campground out of the Gerle Creek floodplain, and adding three additional routes into the NFTS located near Ellis Creek (14N34B), Spider Lake (NSRELD-63-V), and Buck Island (NSRELD-63-U).
Alternative 5	Alternative 5 responds to concerns about impacts from wet season use, resource impacts from spectator parking and trail use, and construction of an overly large bridge at Ellis Creek by: including a seasonal operating period for public use; issuing an easement for a single route to a width of 25 feet of centerline either side; reducing the width of the Ellis Creek bridge to 12 feet; and eliminating motor vehicle use areas, unauthorized routes, and construction of new toilets.
Alternative 6	Alternative 6 was submitted for consideration during the comment period. Alternative 6 is the same as Alternative 1 except for the Rubicon Trail would be defined by rocks and logs, the easement width would be reduced to 25 feet of centerline at Post Pile, the bridge at Ellis Creek would be constructed to a width of 12 feet, the dispersed area at Soup Bowl would not be designated, reducing the easement at Little Sluice to 75 feet, dispersed camping would be eliminated at Winter Camp and within the RCA at the Little Rubicon by a forest order, routes NSRELD-63-H and NSRELD-63-HA would not be added, four vault toilets would be constructed, and a seasonal operating period (for public use) from July 1 to November 1 would be included.

Table S-3: Summary of actions proposed by alternative.

	Alt 1	Alt 2	Mod. Alt 3	Alt 4	Alt 5	Alt 6
Easement Mileage on NFS lands	6.26		6.26	6.26	5.38	6.09
Variants included in easement	7		7	7	1	6
Easement Width	25 feet from centerline except at Post Pile and Little Sluice		25 feet from centerline except at Post Pile and Little Sluice	25 feet from centerline except at Post Pile and Little Sluice	25 feet from centerline	25 feet from centerline except at Little Sluice
Construct Ellis Bridge	Yes	No	Yes	Yes	Yes, 12 foot wide	Yes, 12 foot wide
Replace FOTR bridge	Yes	No	Yes	Yes	Yes	Yes
Construct Buck Island Bridge	Yes	No	Elevated rock ford	Elevated rock ford	Yes	Yes
Number of Vault Toilets to be constructed	1	0	6	5	0	4
Seasonal Operating Period	No	No	Saturated Soil Management	No	July 1 to November 1	July 1 to November 1
Mileage of NFTS routes to be closed	0	0	0	0	.89	.17
Mileage of unauthorized routes to be closed	2.55	0	2.55	1.98	2.99	2.63
Mileage of unauthorized routes to be added	.43	0	.43	1.0	0	.37

Table S-4: Summary of environmental effects.

	Alt 1	Alt 2	Mod. Alt 3	Alt 4	Alt 5	Alt 6
Soils: Acres of Trail Widening	2.5	19.3	4.1	2.5	2.5	.3
Soils: Acres of Wet Soils	2.6	3.4	2.6	2.6	2.4	1.5
Soils: Miles of Trail Incision	0	.43	0	0	0	0
Hydrologic Resources	Improved from current conditions	Sediment and petroleum product delivery to streams	Improved from current conditions			
Risk of CWE	Low	Low	Low	Low	Low	Low
Consistency with RCOs 1-6	Not likely to meet all of the objectives	Not likely to meet all of the objectives	Likely to meet all	Not likely to meet all of the objectives	Likely to meet all	Likely to meet all
Sierra Nevada Yellow-legged frog	May affect individuals but not likely to result in a trend toward listing	May affect individuals but not likely to result in a trend toward listing	No effect	May affect individuals but not likely to result in a trend toward listing	No effect	No effect
Terrestrial Wildlife	Minimal impacts to habitat, potential impacts to species from noise and use of trail	Impacts to habitat, potential impacts to species from noise and use of trail	Minimal impacts to habitat, potential impacts to species from noise and use of trail	Minimal impacts to habitat, potential impacts to species from noise and use of trail	Minimal impacts to habitat, potential impacts to species from noise and use of trail	Minimal impacts to habitat, potential impacts to species from noise and use of trail

	Alt 1	Alt 2	Mod. Alt 3	Alt 4	Alt 5	Alt 6
Sensitive Plants	Potential effects to 4 occurrences	Potential effects to 5 occurrences	Potential effects to 4 occurrences	Potential effects to 4 occurrences	Potential effects to 4 occurrences	Potential effects to 4 occurrences
Risk of Spread of Invasive Plants	Low to Moderate	Moderate	Low	Low to Moderate	Low	Low
Recreation: Facilities and site management	Adding trails conforms to ROS, toilets and FOTR bridge maybe inconsistent but not unacceptable with ROS, Bridges unacceptable	No change	Adding trails conforms to ROS, toilets and FOTR bridge maybe inconsistent but not unacceptable with ROS, Bridge unacceptable	Adding trails conforms to , toilets and FOTR bridge maybe inconsistent but not unacceptable with ROS, Bridge unacceptable	FOTR bridge maybe inconsistent but not unacceptable, Bridges unacceptable	Adding trails conforms, toilets and FOTR bridge maybe inconsistent but not unacceptable, Bridges unacceptable
Recreation: Visitor Management	Conforms with ROS for semi-primitive motorized	No change	Conforms with ROS	Conforms with ROS	Conforms with ROS	Unacceptable with ROS
IRA	Improved overall from current conditions. Slightly improved potential for future wilderness designation	Greatest semi-primitive motorized recreation but greatest impacts to other IRA characteristics	Improved overall from current conditions. Slightly improved potential for future wilderness designation	Improved overall from current conditions. Slightly improved potential for future wilderness designation	Improved overall from current conditions. Improved potential for future wilderness designation	Improved overall from current conditions. Slightly improved potential for future wilderness designation
Cultural Resources: Total Number of Resources at Risk	8	12	8	9	8	9

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Chapter 1. Purpose of and Need for Action

Document Structure

The Forest Service has prepared this Environmental Impact Statement in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Impact Statement discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four chapters:

- **Chapter 1. Purpose and Need for Action:** This chapter briefly describes the proposed action, the need for that action, and other purposes to be achieved by the proposal. This section also details how the Forest Service informed the public of the proposed action and how the public responded.
- **Chapter 2. Alternatives, including the Proposed Action:** This chapter provides a detailed description of the agency's proposed action as well as alternative actions that were developed in response to comments raised by the public during scoping. The end of the chapter includes a summary table comparing the proposed action and alternatives with respect to their environmental impacts.
- **Chapter 3. Affected Environment and Environmental Consequences:** This chapter describes the environmental impacts of the proposed action and alternatives.
- **Chapter 4. Consultation and Coordination:** This chapter provides a list of preparers and agencies consulted during the development of the environmental impact statement.
- **Appendices:** The appendices provide more detailed information to support the analyses presented in the environmental impact statement.
- **Index:** The index provides page numbers by document topic.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the Eldorado National Forest Supervisors Office, 100 Forni Road, Placerville, CA 95667.

Background

The Rubicon Trail is located due west of Lake Tahoe, approximately 80 miles east of Sacramento, and 35 miles east of Placerville. The Rubicon Trail originally started at Georgetown (at California Highway 193) and went all the way to Lake Tahoe (near Tahoma), a total distance of 58 miles. The section of road from Georgetown to Wentworth Springs Campground is now a County

maintained road that is paved to Ice House Road. The Rubicon Trail, as it is known today and for the scope of this project is approximately 8.5 miles long from Wentworth Springs Campground to the El Dorado/Placer County line. Parts of the trail pass through the Eldorado National Forest, Tahoe National Forest, and the Lake Tahoe Basin Management Unit and portions of private lands. This project is limited to the portion of the trail which crosses National Forest System lands within the Eldorado National Forest, within El Dorado County, which is not already part of El Dorado County's maintained road system.

Elevations run from approximately 5,400 to over 7,000 feet. There are three access points to the Rubicon Trail. The historic access originates at Georgetown and extends easterly through the Wentworth Springs Campground to Ellis Creek. A second access, known as the Ellis Creek intertie, starts at the Loon Lake Dam and extends in a northerly direction to its intersection with the trail near Ellis Creek. From that point, the trail runs easterly to the Little Sluice Box-Spider Lake area and the Buck Island Reservoir area, then northerly through the Rubicon Springs area to the El Dorado/Placer county line. The third access point lies in Placer County near Lake Tahoe. The portion of the trail from Loon Lake to Lake Tahoe is about 12 miles (19 kilometers) long and winds through the trees and rugged granite common to the area.

Originally a Native American trail connecting the Sacramento Valley and Lake Tahoe, the Rubicon Trail was re-discovered by European immigrants in the 1840s. On August 3, 1887, the El Dorado County Board of Supervisors declared the Rubicon Trail as a public road. By then the trail had become an actual road (by the standards of the day) and was used to reach the Rubicon Mineral Springs Resort and Hotel. The first motor vehicle into Rubicon Springs arrived in 1908, driven by a woman from Lake Tahoe. This historic drive received quite a bit of publicity from the San Francisco newspapers.

Throughout the 1920s, the Rubicon Springs road was being promoted as the best route from Georgetown to Lake Tahoe. To encourage travel along the route, a promotional automobile trip was organized; complete with photographs in the local papers. The write-up included mention of a survey party that would make plans for improving the road. However, when the Rubicon Springs Hotel closed in the late 1920s, the road fell into disrepair. The route has been used by 4-wheel drive vehicles since the early 1950s and has become one of the most famed, 4-wheel drive trails in the world. In 1989, El Dorado County reaffirmed the status of the Rubicon Trail as a non-maintained public road.

An alternative access to the Rubicon Trail known as the Ellis Creek intertie was formally recognized through the issuance of an easement for this route to El

Dorado County on September 3, 2004. This easement made clear the location of the route and the responsible party for this route.

While the current trail travels the same route from Wentworth Springs to Rubicon Springs that has been used since the 1860s, it changes a little each season, due to erosion and vehicle traffic. As vehicles bypass “bad spots”, the trail has deviated in some locations from the original route. Sections of the original road are still visible where it was cut into the solid granite and have not changed location at all. Many of the rock formations along the route are unique, allowing identification from historic photos of the original route, which is crisscrossed in some areas by the 4-wheel drive road. The 4-wheel drive road also crosses a spillway built by Sacramento Municipal Utility District (SMUD) in the 1960s.

The Rubicon Trail is now widely recognized as the premiere OHV route in the United States and has been called the “crown jewel of all off highway trails.” The trail has been revered as the most difficult, rated 10 on a scale of one to 10, due to its narrow passages, rocky climbs, and occasional mud hole. Because of its difficulty, the trail is recommended for short wheelbase vehicles with all skid plates in place.

The Rubicon Trail attracts both highway legal and non-highway legal “green sticker” off-road motor vehicles. As a result, recreationists travel the trail via a wide range of vehicles, including all-terrain vehicles, dirt bikes and a variety of 4-wheel drive vehicles, from highway legal SUVs to custom vehicles built for the sole purpose of driving the trail. Because the trail lies adjacent to the Desolation Wilderness, the Rubicon Trail is also used as an access route by hikers, backpackers, bicyclists, and anglers.

Cleanup and Abatement Order: On April 23, 2009 the Central Valley Regional Water Quality Control Board (Central Valley Regional Board) adopted a Cleanup and Abatement Order (CAO) No. R5-2009-0030 for the Rubicon Trail and issued it to El Dorado County and the Eldorado National Forest. The CAO addresses impacts to water quality and orders actions to be taken to stop water pollution. The Order named both parties and requires them to clarify who has responsibility for the trail maintenance and traffic control. Additionally, the CAO requires that the location and the width of the trail be documented.

Purpose and Need for Action

There is a need for a clearly defined right-of-way for the Rubicon Trail along with clearly defined authority and responsibility for its upkeep.

There is uncertainty about the authority and responsibility for management and maintenance of the Rubicon Trail. At times this has allowed conditions

along the trail to deteriorate resulting in resource damage. This problem culminated in 2009 with issuance of a “Cleanup and Abatement Order” (CAO) from the Central Valley Regional Water Quality Control Board (Central Valley Regional Board). The order required the Forest Service and El Dorado County to address ongoing impacts to water quality due to soil erosion, human waste deposits and oil-based pollution. The CAO requires both agencies to address these problems or face stiff fines for Clean Water Act violations.

Confusion over management of the Rubicon Trail dates back to 1866 when Congress passed federal Revised Statute (RS) 2477. RS 2477 provided “that the right-of-way for the construction of highways over public lands, not reserved for public uses, is hereby granted.” In other words, if a public road existed on public lands, public use of the road may continue. A RS 2477 right-of-way is generally granted to a government body, not to the public. Due to its well-known history as a public thoroughfare, it is generally accepted by the Forest Service and others that the Rubicon Trail qualifies as a public right-of-way in accordance with RS 2477. For many years, El Dorado County endeavored to maintain portions of the Rubicon Trail with Forest Service consent.

El Dorado County, through its Department of Transportation (DOT), currently conducts maintenance operations and is planning improvements to the Rubicon Trail, while the United States is the major landowner and holds title to most of the land underlying it. El Dorado County seeks to address the concerns raised in the CAO by constructing a bridge over Ellis Creek and making minor improvements along the trail to address soil erosion and stream sedimentation. Some of the maintenance and improvement projects proposed by El Dorado County would occur on National Forest System (NFS) lands outside the roadway and clearly exceed any rights pursuant to RS 2477.

El Dorado County does not have a legal recorded easement from the United States for the portion of the Rubicon Trail within the Eldorado National Forest, except for the portion from the Loon Lake Dam to near Ellis Creek (known as the Ellis Creek Intertie). In addition, it is unclear what jurisdiction El Dorado County has and to what specific roadway. Similarly, the Forest Service is unclear of their authority given the RS 2477 status of the Rubicon Trail.

As a result, El Dorado County has submitted an application for an easement for a right-of-way for the Rubicon Trail on NFS lands within the Eldorado National Forest guided by current use of the trail. Issuance of this easement to El Dorado County would clearly define a right of way known as the Rubicon Trail, and El Dorado County as the responsible party for its operation and maintenance.

There is a need for reduced sediment delivery to Ellis Creek.

The Rubicon Trail intersects the headwaters of Ellis Creek. The CAO asserts the Ellis Creek crossing on the Rubicon Trail is degraded and requires that the crossing be replaced with a bridge. The channel has widened at this location and contains fine sediments deposited from eroding streambanks and denuded surfaces. Sediment is being delivered from multiple sources including the Rubicon Trail. Vehicles crossing Ellis creek at this location can cause siltation of the water in the vicinity when they drive through. In addition to sediment, petroleum and other contaminants are likely being delivered both from runoff and from vehicles crossing the creek. Dispersed camping sites that are encroaching on Ellis Creek have resulted in compacted, denuded surfaces and dispersed recreation use has resulted in human fecal matter accumulation near Ellis Creek.

There is a need for reduced discharge of sediment and other waste into waters of the state due to several problems associated with run-off along the Rubicon Trail.

Sediment Discharge from the Rubicon Trail: The Rubicon Trail is open to Off-Highway Vehicle (OHV) use throughout the year. The highest OHV use is during weekends and holidays between Memorial Day and Labor Day; however, OHV use also occurs when the trail is covered by snow and at times when saturated soil conditions exist during spring snowmelt and fall rains. Although OHV volunteer groups hold workdays to maintain the trail and El Dorado County has completed maintenance on a portion of the trail; segments of the trail are eroded, allowing runoff from rainfall and snowmelt events to discharge sediment to the adjacent forest. The trail has become incised in places due to decades of use, and water from rainfall and snowmelt events is intercepted and transported, along with sediment, onto the adjacent forest floor or into intermittent stream channels. Water also collects in large puddles and depressions in many locations along the trail. Motor vehicles are driven through these low spots thereby accelerating trail erosion. El Dorado County and OHV volunteer groups have been improving and maintaining the Rubicon trail over the last couple of years and will continue to focus on these areas.

FOTR Bridge: To the east of Ellis Creek, the trail crosses an unnamed intermittent drainage that contains alders and shows evidence of recent scour and deposition. The Friends of the Rubicon (FOTR) reconstructed a wooden bridge at a location that showed evidence of a crude abutment in the recent past. FOTR constructed the bridge to span the drainage and to discourage use of the downstream native surface low-water crossing. While some debris, undercut banks, and sediment deposition were observed upstream of the bridge, it does appear to be functional at this time. High flow events and

continued deposition of debris and sediment could lead to bank failures above the bridge or failure of the bridge in the future. The low-water crossing downstream of the bridge is degraded and over several decades has altered channel characteristics at this location, resulting in a widened depositional zone. The approaches are incised and continually deliver sediment to the drainage during runoff events. There is a need for replacement of the bridge due to bank failures and to prevent additional stream crossings elsewhere along the stream.

Buck Island Lake Outlet: The Rubicon Trail crosses the outlet of Buck Island Lake at the northwest corner of the lake. This perennial dam-controlled stream is a tributary to the Rubicon River to the north. The existing crossing is a low-water crossing that consists of bedrock and rock material. Immediately downstream of the crossing is a large ponded area that is likely the result of vehicles crossing the stream to access the nearby granite parking area and dispersed campsites. Downstream from these areas, there is another rock lined low-water crossing that has resulted in bank failures, ponding of flows upstream, and channel widening. In addition, nearby dispersed camping is encroaching on the creek as is vehicular use.

Runoff events could result in delivery of sediment, contaminants (petroleum, solvents), and human fecal material to the channel. Water temperatures appear to be relatively warm and some algal growth has been observed. The increased water temperatures can be attributed to ponded flows caused by changes in geomorphology along with decreased vegetative cover and solar exposure. There is a need for a suitable stream crossing that will address resource impacts associated with motor vehicle use and dispersed recreation activity in the vicinity of Buck Island Lake Outlet.

Wetlands: East of the FOTR Bridge and before the Little Sluice Box area, a wetland is located just south of the trail that contains perennial water and riparian/wetland vegetation. The inlet stream contains a dense willow thicket and lily pads, sedges, and rushes throughout the wetted area. While located some distance from the trail, the outlet stream flows north intersecting the trail and then southeast through the Soup Bowl and Winter Camp areas, eventually reaching another wetland (Winter Camp Wetland) via a sandy highly disturbed tributary channel.

The tributary channel to the Winter Camp Wetland originates at Soup Bowl Wetland and flows through the Soup Bowl and Winter Camp areas. The areas it flows through are severely incised and consist of exposed banks and fines available for transport during runoff events. This area is likely saturated during spring and flows during spring snowmelt, contributing sediment to the Winter Camp Wetland. Where this channel heads north to the Winter Camp Wetland,

it contains an excessive amount of fine grained material. This area is highly disturbed and experiences dispersed camping, vehicular disturbance, and concentrated human defecation and urination.

Just east and upstream of the Winter Camp Wetland is Little Sluice Wetland. It is in close proximity to the Little Sluice Long Bypass which crosses in the drainage depression between the two wetlands. Of particular concern in this area is the likelihood of petroleum products and contaminants being delivered to the wetland during runoff events. Staining on the rocks was observed as was evidence of vehicular use in close proximity to the wetland.

There is a need for safe and sanitary conditions due to the prevalence of human waste disposal at popular locations along the Rubicon Trail.

In July 2004, the area around Spider Lake was closed for 120 days by El Dorado County and the Forest Service due to sanitation issues from human waste. Currently, restroom facilities exist at each of the three trailheads, Ellis Creek, and Rubicon Springs but there are no public sanitation facilities along the Rubicon Trail at Spider Lake or Buck Island Lake dispersed recreation areas. Once in the backcountry, trail users must rely on individual human waste disposal methods.

There is a need for limited additions to the Eldorado National Forest Transportation System (NFTS)

At the time the Eldorado National Forest was designating roads and trails across the Forest where public motorized use would be allowed, El Dorado County had started the Master Planning effort for the Rubicon Trail. During the forestwide travel management analysis, the Forest Service shared with the public that management of the Rubicon would be determined by El Dorado County and the forest would address routes adjacent to the Rubicon following completion of the Rubicon Trail Master Plan. Therefore, no routes were designated adjacent to the Rubicon Trail to provide access for camping, hunting, fishing, hiking, etc. even though this use was occurring.

It is important to maintain motor vehicle access to existing dispersed recreation opportunities that have historically been accessed by motor vehicles from the Rubicon Trail. If unauthorized routes are not added to the NFTS and designated, motor vehicle use on these routes would be prohibited (36 CFR 261.13) and motor vehicle access to dispersed recreation activities would be precluded.

In order to add routes to the NFTS the following criteria must be considered (36 CFR 212.55(a) through (e)): Cultural Resources; safety; access to public and private lands; availability of resources for maintenance and administration of

roads, trails, and areas that would arise if the uses under consideration are designated; minimizing damage to soils, watershed, vegetation and other forest resources; minimizing harassment of wildlife and significant disruption of wildlife habitat; minimizing conflicts among different classes of motor vehicles and existing or proposed recreational uses of NFS lands; minimizing conflicts among different classes of motor vehicle uses of NFS lands or neighboring federal lands; and compatibility of motor vehicle use with existing conditions in populated areas, taking into account sound, and emissions.

Proposed Action

The action proposed by the Forest Service to meet the purpose and need is:

The Eldorado National Forest proposes to issue a FRTA easement to El Dorado County for a specified right-of-way for the Rubicon Trail, where it crosses National Forest System lands within the Eldorado National Forest, which will allow the County to conduct ongoing maintenance within the right-of-way and ensure County responsibility for actions within the easement. The EIS will also analyze and disclose the effects of other authorizations to El Dorado County as necessary for the following actions: the construction of a new bridge at Ellis Creek, replacement of the FOTR bridge, construction and installation of a vault toilet, installation of erosion control features as described in El Dorado County's Rubicon Trail Saturated Soil Water Quality Protection Plan (El Dorado County Department of Transportation, January 2011), and rehabilitating and closing specified unauthorized routes. The proposal will also analyze the construction of a new bridge at Buck Island Lake Outlet, the designation of areas for motor vehicle use and the addition of specified unauthorized routes to the NFTS to provide permanent designated access to important dispersed recreation.

Decision Framework

Given the purpose and need, the deciding official reviews the proposed action, the other alternatives, and their environmental consequences, in order to determine whether to implement the proposed action as described, select a different alternative or take no action at this time.

Forest Plan Direction

The Proposed Action and alternatives are guided by the Eldorado National Forest Land and Resource Management Plan (LRMP), as amended by the 2004 Sierra Nevada Forest Plan Amendment. The Forest is subdivided into land allocations (management areas) with established desired conditions and associated management direction (standards and guidelines). Land allocations that apply to this proposal include: Semi-Primitive Motorized Management Area (MA) 7 and Special Areas (Rubicon Springs ORV Candidate National Recreation Trail) MA 4.

The Rubicon Trail is listed as a Candidate National Recreation Trail. The management emphasis for MA 4 is to give recognition to geological, botanical, archaeological and National Trails Special Areas. The LRMP states “Manage the areas principally for their recreation use substantially in their natural condition. Preserve the integrity of the special interest features for which the areas were established.” (LRMP p. 4-142)

Public Involvement

A Notice of Intent (NOI) to prepare an Environmental Impact Statement for the Rubicon Trail Easement and Resource Improvement Project was published in the Federal Register on September 2, 2011. The notice asked that comments on the proposed action be received by October 3, 2011. In addition, as part of the public involvement process, the Forest Service mailed a scoping letter on September 2, 2011 to approximately 137 adjacent property owners; potentially affected federal, state, and local agencies; special interest groups; and other interested parties. The scoping letter was posted on the Eldorado National Forest web site. An Open House was held on September 28, 2011 to provide an opportunity for the public to ask questions about the proposal and provide feedback concerning the project. Approximately 27 comment letters and verbal comments on the proposed action were received.

The Notice of Availability of the Draft Environmental Impact Statement (DEIS) was published in the Federal Register on December 16, 2011 and copies of the DEIS were mailed to approximately 84 individuals, organizations, tribes, and government agencies. The comment period ended on January 30, 2011. Fifteen individuals responded during the comment period. Appendix C contains the comment letters and Appendix D contains the response to comments. Two open houses were held, one on December 14, 2011 and one on January 11, 2012 to discuss the DEIS.

Issues

Comments from the public and other agencies were used to formulate issues concerning the proposed action. The Forest Service separated the issues into two groups: significant and non-significant. Significant issues were defined as those directly or indirectly caused by implementing the proposed action. Non-significant issues were identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations explain this delineation in Sec. 1501.7, “...identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)...”. A list of non-significant issues and reasons why they were found

non-significant may be found in the Scoping Comment Summary in the project record located at Eldorado National Forest Supervisors Office located at 100 Forni Road, Placerville, CA, 95667.

As for significant issues, the Forest Service identified the following issues during scoping:

1. Use during the wet season causes damage to resources.
2. The proposed action does not address spectator parking by large numbers of people concentrated at Soup Bowl and Little Sluice causing damage to resources.
3. Use on and off the trail, including camping, is impacting riparian areas, riparian species, and adjacent forests.
4. Overly large bridge proposed at Ellis Creek will cause adverse impacts to riparian areas and species and is inconsistent with the historic nature of the trail.
5. Buck Island bridge will degrade the view and setting and there is no environmental basis for building it.
6. One toilet located in the Little Sluice area is inadequate to address dispersed use along the length of the trail.
7. Requiring a bridge at the Buck Island Lake Outlet will be expensive and the funding may not be available, so without construction of the bridge, vehicle use across the creek could be restricted.

Chapter 2. Alternatives, Including the Proposed Action

Introduction

This chapter describes and compares the alternatives considered for the Rubicon Trail Easement and Resource Improvement Project. It describes both alternatives considered in detail and those eliminated from detailed study. The end of this chapter presents the alternatives in tabular format so that the alternatives and their environmental impacts can be readily compared.

Changes Between DEIS and FEIS

Between the development of the Draft EIS (DEIS) and the Final EIS (FEIS), changes have been made based on comments from the public and corrections to the EIS. In summary, design criteria (mitigation measures) were added to all action alternatives, wet season use was clarified by alternative, Alternative 3 was modified to include a saturated soil management strategy, Alternative 6 was added, and factual clarifications were made based on comments from the public. The analysis in Chapter 3 was modified to address the changes listed above and to address the comments from the public.

Alternatives Considered in Detail

Based on the issues identified through public comment on the proposed action and public comments received on the DEIS, the Forest Service developed four alternative proposals that achieve the purpose and need differently than the proposed action. In addition, the Forest Service is required to analyze a No Action alternative. The proposed action, alternatives and no action alternative are described in detail below.

Alternative 1 – Proposed Action

The Eldorado National Forest proposes to issue an FRTA easement to El Dorado County for a right-of-way for the Rubicon Trail, where it crosses National Forest System lands within the Eldorado National Forest, which will allow the County to conduct maintenance within the right-of-way and ensure County responsibility for actions within the easement. The EIS will also analyze and disclose the effects of other authorizations to El Dorado County as necessary for the following actions; the construction of a new bridge at Ellis Creek, replacement of the FOTR bridge, construction and installation of a vault toilet, installation of erosion control features as described in El Dorado County's Rubicon Trail Saturated Soil Water Quality Protection Plan (El Dorado County Department of Transportation, January 2011), and the rehabilitation and closing of specified unauthorized routes. The proposal will also analyze the

construction of a new bridge at Buck Island Lake Outlet, the designation of areas for motor vehicle use and addition of selected unauthorized routes to the NFTS and designated for public use to provide access to important dispersed recreation areas. All items listed below are displayed on the attached maps.

Easement: El Dorado County has requested an easement for the Rubicon Trail where it crosses NFS lands within the Eldorado National Forest. The easement would generally be 25 feet from centerline with larger widths identified at Post Pile and Little Sluice. The easement would originate at Wentworth Springs Campground and heads in a northeast direction through T 14N, R 15 E, Section 32 into Section 33 at Ellis Creek where the easement turns east along the boundary between Sections 32 and 28. The easement crosses into Section 34 and continues east along the upper portion of Section 34 then it drops southeast near Little Sluice where it eventually crosses into Section 35 which is on private property. The easement starts back onto National Forest System lands at the end of the Old Sluice Box in T13N, R 15E, Section 2 heading in a southeast direction where it crosses into T 13N, R16E, Section 6. The easement continues in an easterly direction across the top of Buck Island Lake heading east up to Buck Island Overlook. At Buck Island Overlook the easement drops down to the 6400 elevation level and turns due north heading all the way up to T 14N, R16E Section 31 where the trail crosses onto private property and where the easement would end. The easement will allow El Dorado County to operate and maintain the Rubicon Trail. The location of the requested easement is displayed on the maps for Alternative 1.

The FRTA easement issued would consist of the Rubicon Trail (ELD-63) and parallel variants (ELD-63-A, ELD-63-B, ELD-63-C, ELD-63-D, ELD-63-E, ELD-63-F, and ELD-63-H). The following table displays the mileage of the Rubicon Trail and mileage of parallel variants that would be a part of the easement.

Table 2-1: Mileage for Rubicon Trail and Variants

Rubicon Trail and Variants	Mileage
ELD-63 Rubicon Trail	5.33
ELD - 63-A	0.13
ELD - 63-B	0.06
ELD - 63-C	0.25
ELD - 63-D	0.17
ELD - 63-E	0.06
ELD - 63-F	0.21
ELD - 63-H	0.05
Total	6.26

Ellis Bridge: Construct a new 16 foot wide, 70 foot long prefabricated steel truss bridge approximately 60 feet downstream of the existing Ellis Creek ford. A bridge width of 16 feet is necessary to meet Federal Highways Safety Act standards because the Federal Highways Administration (administered through the California Department of Transportation Highway Bridge Project) is funding the bridge construction. Bridge abutments would be located in the uplands outside the ordinary high watermark of Ellis Creek. The foundation type for the bridge abutments would be spread footings. Rock slope protection would be placed around the bridge abutments and upstream of the proposed bridge along the outside curve of Ellis Creek to prevent scour. The rock slope protection would extend from the bridge abutments to the toe of the Ellis Creek bank below the high watermark. Large boulders would be placed at both bridge approaches to guide vehicles to the bridge and protect the bridge from being damaged.

Construction staging would occur in the existing landing at the end of road 14N05 and in clearings southwest of the proposed bridge used for dispersed camping. Construction vehicles would use the service road at the end of 14N05 to reach the bridge site. Construction vehicles might use the existing crossing to access the west side of the creek. The Rubicon Trail would be re-aligned to access the new bridge. The Rubicon Trail would remain open to the public during construction. The new bridge would be transported in segments and would be assembled on-site and set into place by a crane.

Construction of the bridge may require water diversions on Ellis Creek. Temporary diversions systems would be constructed, maintained, and removed at the locations on the Storm Water Pollution Prevention Plan in conformance with water pollution control practices for non-storm water management. Stream flow would be directed through diversion dams to allow for access into the creek for the bridge construction. The diversion would be constructed using methods such as water pillows, rock, sandbags, sheet piling, pipes or coffer dams, or other structural methods approved by the County and Forest Service Engineers. Groundwater and seepage in excavated areas would be removed in accordance with Section 401 of the Clean Water Act. Pumps might be used to pump water from within the work area. Clean non-turbid water would be returned to the creek. Turbid water would be detained until it has settled, at which time it would be returned to the creek channel.

Upon completion of construction activities within the creek bed, the temporary diversion structures would be removed. The dam would be removed, beginning downstream and progressing upstream. All gravel bags would be removed in their entirety from the project site, and the creek bed returned to its pre-project conditions. The existing crossing would be abandoned after completion of the bridge. The upland approaches would be covered with logs and branches,

erosion control materials would be installed along the margin of Ellis Creek, and upland and riparian areas would be planted, upon abandonment of the existing crossing to discourage use. Portions of the creek bank temporarily impacted would be revegetated for erosion control. (See Initial Study/Mitigated Negative Declaration for the Rubicon Trail at Ellis Creek Bridge Low Water Crossing Conversion Project located in the project file)

FOTR Bridge: Remove the existing timber structure and replace with a three sided bottomless arch. Remove existing rock ford crossing downstream of the existing crossing structure and install erosion control features including rock slope protection, rock lined channel, rock fill, and delineate trail with rock boulders and logs. Reconfigure channel and stabilize banks with rip-rap, matting, wattles, and riparian vegetation.

Buck Island Lake Outlet Bridge: Construct a new bridge approximately 12 feet wide and 48 feet long just upstream of the existing crossing. The east end would not require an abutment, just minor leveling pad work. The west end would require either fill or a ramp to build-up the approach about 4 feet. Minimal soil disturbance would be necessary for foundation work due to the prevalence of bedrock on both sides of the stream. A pre-fabricated super structure (such as a truss or beams) would be used for the bridge.

Installation of Erosion Control Features: Install and maintain erosion control features along the Rubicon Trail from Wentworth Springs Campground to the county line as described in El Dorado County's Rubicon Trail Saturated Soil Water Quality Protection Plan (SSWQPP) Technical Report (attached in Appendix A) and as displayed in the project plans for implementation. The erosion control features include: (1) log barriers, (2) rock barriers, (3) rock fill, (4) rock check crossings/waterbars, (5) rock ditch crossings/water dips, (6) rock aprons, (7) rock inlet protection, (8) rock outlet protection, (9) rock energy dissipaters, (10) rock slope protection, (11) rock-lined channels, (12) rock berm, (13) rock breast wall, (14) rock gabion, (15) rock ford/low stream crossings, (16) minor culvert replacement, (17) re-surfacing, (18) spot rock, and (19) minor grading.

Vault Toilet: Construct and maintain a vault toilet located north of the Rubicon Trail west of Soup Bowl on Walker Hill. The toilet would be maintained by Rubicon Trail Foundation (RTF) using a modified Unimog pump truck funded by the California State Parks OHV Division.

Rehabilitation and closure of unauthorized routes: Approximately 2.55 miles of unauthorized routes (listed below) would be closed and rehabilitated. These routes would be closed using logs and boulders to block entrance. Rehabilitation methods include pulling natural barriers across closed routes, installing waterbars, posting signs, and scattering forest debris.

Table 2-2: Mileage unauthorized routes to be closed.

Unauthorized Routes to be Closed	Mileage
NSRELD-63-A	0.06
NSRELD-63-AA	0.05
NSRELD-63-B	0.02
NSRELD-63B-A	0.11
NSRELD-63B-B	0.07
NSRELD-63B-C	0.03
NSRELD-63B-D	0.04
NSRELD-63-C	0.03
NSRELD-63-CA	0.10
NSRELD-63-CC	0.01
NSRELD-63-CD	0
NSRELD-63-D	0.02
NSRELD-63-DA	0.11
NSRELD-63-E	0.08
NSRELD-63-EB	0.01
NSRELD-63-EC	0.01
NSRELD-63-F	0.07
NSRELD-63-FA	0.02
NSRELD-63-FAC	0.02
NSRELD-63-FB	0.06
NSRELD-63-FBA	0.04
NSRELD-63-FBB	0.03
NSRELD-63-FBC	0.05
NSRELD-63-FBD	0.01
NSRELD-63-FBE	0
NSRELD-63-G	0.07
NSRELD-63-GB	0.01
NSRELD-63-H	0.17
NSRELD-63-HB	0.06
NSRELD-63-N	0.04
NSRELD-63-P	0.05
NSRELD-63-Q	0.15
NSRELD-63-R	0.11
NSRELD-63-RA	0.19
NSRELD-63-S	0.04
NSRELD-63-T	0.15

Unauthorized Routes to be Closed	Mileage
NSRELD-63-U	0.14
NSRELD-63-V	0.18
14N34B*	0.14
Total	2.55

*Route 14N34B is a system route not designated for public use.

Wetlands: Fill in the incised areas of the tributary to Winter Camp Wetland with large rock and coarse material. Restrict vehicle use within 100 feet of the wetlands by defining the route with large boulders and yellow trail markers.

Winter Camp: Install logs perpendicular to water flow to catch sediment.

Limited Trail Additions to the NFTS and Designation of Areas for Motor Vehicle Access: Less than half a mile of unauthorized routes listed below would be added to the NFTS as motorized 4WD trails open to high clearance vehicles. These trails will be designated for motor vehicle use by vehicle class (e.g., high-clearance 4WD, motorcycle, all-terrain vehicle, etc.). Designated motor vehicle trails would follow the seasonal restrictions established in the 2008 Travel Management Record of Decision and be shown on the Motor Vehicle Use Map following the final decision. Limited additions are considered in order to respond to the need to provide motor vehicle access to dispersed recreation opportunities. For purposes of this analysis, each of these trails is identified by a unique number. Each trail addition is individually listed below.

The width of the trail surface is approximately 12 feet, the necessary width for vehicles to pass safely without damaging resources or facilities. The designation also allows for parking a motor vehicle on the side of the road within one vehicle length of the road edge when it is safe to do so without causing damage to NFS resources or facilities, unless prohibited by state law, a traffic sign, or an order.

Table 2-3: Unauthorized routes to be added.

Unauthorized Routes to be added	Mileage
NSRELD-63-C	0.05
NSRELD-63-CA	0.05
NSRELD-63-CB	0.01
NSRELD-63-E	0.02
NSRELD-63-EA	0.05

Unauthorized Routes to be added	Mileage
NSRELD-63-FA	0.05
NSRELD-63-FAA	0.02
NSRELD-63-FAB	0.02
NSRELD-63-FAC	0.04
NSRELD-63-FB	0.02
NSRELD-63-G	0.02
NSRELD-63-GA	0.02
NSRELD-63-H	0.02
NSRELD-63-HA	0.04
Total	0.43

In addition to the designation of specific routes, designated areas would be added for motor vehicle use in order to provide locations where vehicles may travel and park. The following table includes a list of areas where parking limits would be defined and the areas are displayed on maps below.

Table 2-4: Areas designated for motor vehicle use.

Location	Activity Planned	Size	Acres
East Wentworth	Rock and log barriers, signs	30' X 30'	0.02
Granite 1	Rock and log barriers, signs	50' x 50'	0.06
Granite 2	Rock and log barriers, signs	50' x 100'	0.11
Ellis South	Rock and log barriers, signs	100' x 100'	0.23
Ellis North	Rock and log barriers, signs	100' x 100'	0.23
West FOTR	Rock and log barriers, signs	50' x 50'	0.06
Walker Hill Lower	Rock and log barriers, signs	25' x 50'	0.03
Walker Hill Upper	Rock and log barriers, signs	25' x 50'	0.03
Soup Bowl	Rock and log barriers, signs	25' x 50'	0.03
North and South Little Rubicon	Rock and log barriers, signs	50' x 1000'	2.30
Dam Site	Rock and log barriers, signs	50' x 50'	0.06
North Shore Buck Island Spur	Rock and log barriers, signs	50' x 50'	0.06

Design Criteria

Construction and maintenance equipment would be cleaned per standard guidelines to insure it is free of soil, seeds, vegetative matter or other debris prior to entering the project area to avoid the introduction of invasive plant species.

Rock, gravel, or other fill imported from outside the analysis area would be weed-free, if available.

Mulch or straw used for erosion control would be certified weed free. A certificate from the county of origin stating the material was inspected is required. On site weed free material is acceptable.

Post construction monitoring for invasive plant species would be conducted at the Ellis bridge site, FOTR bridge site, and the Little Rubicon elevated rock ford the first two summers after construction. If results are negative in both years, monitoring would not continue. If invasive plants are found, they would be documented, treated by hand if appropriate for the species, and reported to the Invasive Plant Coordinator for future treatment. Annual monitoring in the summer would continue until monitoring in three consecutive years yield negative results.

New infestations of invasive plant species would be documented for continued monitoring and hand pulling.

Rock or log barriers would be used to block access off of the Rubicon Trail within 100 feet of the Little Rubicon River.

Rock or log barriers would be used to block access to eight sensitive plant occurrences.

Rock or log barriers would be installed to restrict public motor vehicle access into archaeological sites 55-443, 55-699, 55-700, 55-701, and 55-710.

Archaeological sites 55-443, 55-699, and 55-703 would be flagged for avoidance during project implementation. Flagging would be removed promptly afterwards to avoid drawing public attention to site locations.

Archaeological sites 55-443, 55-579, 55-700, 55-701, 55-703, 55-710, and 55-712 would be monitored during project implementation.

Hazard trees would be felled and left in place or used for barriers.

The County's and the ENF's educational efforts concerning human waste disposal, use of WAG bags, oil spills, use of spill kits, sediment, and safety would continue as described in the Draft Rubicon Trail Operating Agreement between the County of El Dorado and the ENF (Appendix F) and El Dorado County's Rubicon Trail SSWQPP Technical Report. Page 88 of the Rubicon Trail SSWQPP Technical Report describes El Dorado County's extensive educational campaign which includes an educational video (It's in your hands), a bandana campaign, trail signage, the Rubicon Oversight Committee (ROC) and a County website.

Monitoring and enforcement along the Rubicon Trail, as discussed on pages 86 and 89 of the Rubicon Trail SSWQPP Technical Report and the Draft Rubicon Trail Operating Agreement between the County of El Dorado and the ENF (Appendix F) would continue.

Alternative 2 - No Action

The status quo would continue. El Dorado County would continue to assert its RS 2477 claims, and there would continue to be a lack of clarity regarding responsibility for management of the trail. No easement would be issued to El Dorado County; the Rubicon Trail would stay in the current alignment across Ellis Creek and no bridge built; the FOTR bridge would not be replaced with a culvert and vehicles would continue to cross the bridge and downstream ford; Buck Island bridge would not be built; additional erosion control features would be constructed out to the Little Rubicon River but not through the Fawn Lake IRA; no additional toilet would be installed, and no additional routes would be added to the NFTS.

Modified Alternative 3

This alternative was developed to address concerns (significant issues 1, 2, 5, 6, and 7) about visual degradation from construction of the Buck Island Lake Outlet bridge, inadequate human waste disposal methods, impacts to aquatic resources at Little Sluice, impacts from wet season use by: installing an elevated rock ford at the crossing at Buck Island Lake Outlet, constructing five additional toilets, moving the toilet at Wentworth Springs Campground out of the Gerle Creek floodplain, reducing the easement at Little Sluice to 75 feet and including a saturated soil management strategy for wet season use. Modified Alternative 3 is the same as Alternative 1 except for:

The motor vehicle use area at Soup Bowl would not be designated or defined on the ground.

The easement width of Little Sluice would be reduced to 75 feet from 200 feet.

The crossing at Buck Island Lake Outlet would be an elevated rock ford as described in El Dorado County's Rubicon Trail Saturated Soil Water Quality Protection Plan (SSWQPP) Technical Report and as displayed in the project plans for implementation and a bridge would not be built. The downstream crossing would be closed and rehabilitated.

Additional toilets would be installed along the Rubicon Trail in areas where concentrated use is occurring (see Modified Alternative 3 maps). Some toilets would be designed with a smaller vault to provide flexibility in placement. The toilets would be installed close enough to the Rubicon Trail to accommodate maintenance by Rubicon Trails Foundation using a modified Unimog pump

truck. The toilet at Wentworth Springs would be moved and installed outside of the Gerle Creek floodplain.

A saturated soil management strategy would be used to address motor vehicle use during the wet season.

The County will perform annual monitoring on the Rubicon Trail during spring peak runoff conditions to assess the effectiveness of the Saturated Soil Water Quality Protection Plan (SSWQPP) in meeting its goals of minimizing Trail erosion, capturing vehicle-caused sediment, and conveying runoff. The annual monitoring shall be documented and the results will be analyzed and assessed by the County. An annual monitoring report including the documentation and assessment shall be provided to the California Regional Water Quality Control Board for the Central Valley Region and to the ENF. If the annual monitoring demonstrates that the erosion control features applied pursuant to the SSWQPP are reasonably effective at achieving the goals of the SSWQPP, then the County will continue its maintenance and monitoring. If the annual monitoring repeatedly demonstrate that the erosion control features applied pursuant to the SSWQPP are not reasonably effective at achieving the goals of the SSWQPP, then the County will close the Rubicon Trail to public motorized vehicle use during spring peak runoff conditions. If periodic closure during spring peak runoff conditions is ineffective at achieving the goals of the SSWQPP, the County will impose a seasonal closure of the Rubicon Trail from March 1 to May 15. The County may consider modifications to its SSWQPP, and may submit the modified SSWQPP to the California Central Valley Regional Water Quality Control Board and the ENF. If the modifications provide an indication that the goals of the SSWQPP will be met, then the closure can be lifted while annual monitoring continues.

Alternative 4

This alternative was developed to address concerns (significant issues 5 and 6) about visual degradation from construction of the Buck Island Lake Outlet bridge, inadequate human waste disposal methods, and access to dispersed recreation near Ellis Creek, Spider Lake, and Buck Island by: installing an elevated rock ford at the crossing at Buck Island Lake Outlet, constructing four additional toilets, moving the toilet at Wentworth Springs Campground out of the Gerle Creek floodplain, and adding three additional routes into the NFTS located near Ellis Creek (14N34B), Spider Lake (NSRELD-63-V), and Buck Island (NSRELD-63-U). Alternative 4 is the same as Alternative 1 except for:

The crossing at Buck Island Lake Outlet would be an elevated rock ford as described in El Dorado County's Rubicon Trail Saturated Soil Water Quality Protection Plan (SSWQPP) Technical Report and as displayed in the project plans for implementation and a bridge would not be built.

Additional toilets would be installed along the Rubicon Trail in areas where concentrated use is occurring. Both large and small restrooms would be installed including a large restroom near the Buck Island dam and multiple smaller restrooms near Little Sluice and Buck Island. The toilets would be installed close enough to the Rubicon Trail to accommodate maintenance by Rubicon Trails Foundation using a modified Unimog pump truck. The toilet at Wentworth Springs would be moved and installed outside of the Gerle Creek floodplain.

Approximately .32 miles of unauthorized routes would be added to the NFTS as 4WD trails open to high clearance vehicles. These routes are located near Spider Lake (NSRELD-63-V) and Buck Island (NSRELD-63-U). A portion of 14N34B, .14 miles, would be authorized for public motor vehicle use.

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Alternative 4 maps**

Alternative 5

This alternative was developed to address concerns (significant issues 1, 2, 3, and 4) about impacts from wet season use, resource impacts from spectator parking and trail use, and construction of an overly large bridge at Ellis Creek by: including a seasonal operating period; issuing an easement for a single route; reducing the width of the Ellis Creek bridge to 12 feet; and eliminating motor vehicle use areas, unauthorized routes, and construction of new toilets. Alternative 5 is the same as Alternative 1 except for:

The FRTA easement issued would be a single route (ELD-63 and ELD-63-H Ellis Bridge reroute), to a width of 25 feet from centerline starting at Wentworth Springs Campground and extending to the county line. The following table displays the mileage of the single route easement.

Table 2-5: Mileage for Rubicon Trail and variants for alternative 5.

Rubicon Trail and variant	Mileage
ELD - 63 Rubicon Trail	5.33
ELD - 63-H Ellis Bridge reroute	0.05
Total	5.38

The bridge at Ellis Creek would be constructed to a width of 12 feet.

No toilets would be constructed. The toilet at Wentworth Springs would be moved and installed outside of the Gerle Creek floodplain.

No additional motor vehicle use areas would be designated and no routes would be added to the NFTS.

The easement issued would include a seasonal operating period for public use from July 1 to November 1.

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Alternative 5 maps**

Alternative 6

This alternative was developed to respond to comments received during the comment period for the DEIS: Alternative 6 is the same as Alternative 1 except for:

The authorized travel way and turnouts would be defined on the ground, with barrier rocks and logs, supported by signs and trail markers. The easement would be clearly marked and maintained with identifiable signage along the outer boundaries of the easement.

The width of the easement would be reduced to 25 feet from centerline in the area from East Wentworth through Post Pile. The Easement would be located to include the historic trail and the single variant as shown on the map.

The width of the Ellis Creek Bridge would be reduced to 12 feet.

An area proposed for motor vehicle use would not be designated at Soup Bowl. Permanent barriers (boulders and logs) supported by signing would be installed. Vehicles would be restricted to a single 12 foot wide travel way along the base of the Soup Bowl. Areas damaged from past rock crawling activities would be restored.

Dispersed camping at Winter Camp and east to the beginning of the Little Sluice Box would be eliminated using a forest order. Areas damaged from past dispersed camping activities would be restored.

The easement width of the Little Sluice would be reduced to 75 feet from 200 feet. This area would be defined with permanent rock barriers and markers. The trail tread at Little Sluice would be restored to a drivable condition for all motor vehicles. The long bypass (ELD-63-D) would be eliminated and restored to a natural condition.

The area designated for motor vehicle use west of Little Rubicon River would be defined by installing permanent barriers (boulders and logs) supported by signing.

Dispersed camping would be eliminated inside the little Rubicon RCA (300 feet along each side of the creek) using a forest order. Areas damaged from past disperse recreation activities would be restored.

Routes NSRELD-63-HA and NSRELD-63-H would be closed and rehabilitated.

Additional toilets would be installed along the Rubicon Trail in areas where concentrated use is occurring (Walker Hill Upper and the vicinity of Buck island Lake). Some toilets would be designed with a smaller vault to provide flexibility

in placement. The toilet at Wentworth Springs would be moved and installed outside of the Gerle Creek flood plain.

The easement issued would include a seasonal operating period for public use from July 1 to November 1.

Alternatives Considered but Eliminated from Detailed Study _____

Federal agencies are required to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Public comments received in response to the Proposed Action provided suggestions for alternative methods for achieving the purpose and need, which are summarized below. Some of these alternatives may have been outside the scope of the need for the proposal, duplicative of the alternatives considered in detail, or determined to be components that would cause unnecessary environmental harm. Therefore, a number of alternatives were considered, but dismissed from detailed consideration for reasons summarized below:

Forest Service would manage the trail and an easement would not be issued.

This alternative was proposed by the public during scoping to eliminate the need to issue an easement. However, the purpose and need for action is to respond to El Dorado County's request for an easement for operation and maintenance of the Rubicon Trail including building a bridge at Ellis Creek and construction of erosion control features as described in the Rubicon Trail Saturated Soil Water Quality Protection Plan. This proposed alternative does not address the purpose and need and would not resolve the ambiguity that currently exists regarding management of the trail or address El Dorado County's assertion of a right-of-way over NFS lands for the Rubicon Trail pursuant to RS 2477; therefore, the alternative was eliminated from detailed study.

Rubicon Trail would have a wet season closure consistent with all other native surface roads on the Eldorado National Forest.

This alternative was proposed by the public during scoping to provide a seasonal closure for the Rubicon Trail that is consistent with the management of the native surface roads across the forest. The Rubicon Trail ranges in elevations from 5400 feet to close to 7000 feet from Wentworth Springs Campground to the county line, reaching saturated soil conditions earlier in the year and retaining such conditions later in the year than other areas of the forest. The wet season closure for the other native surface roads on the Eldorado National Forest is January 1 to April 1.

Alternative 5 was created to address the public's concern that use during the wet season causes damage to resources along the Rubicon Trail. Alternative 5 includes a wet season closure for the Rubicon Trail that extends from November 1 through to July 1 and addresses the concerns expressed by the public during scoping.

Do not replace the FOTR bridge.

This alternative was proposed by the public during scoping because they feel the bridge doesn't need to be replaced. The No Action alternative represents this alternative proposal.

Part of the purpose and need is to "...reduce runoff from the Rubicon Trail that has the potential to discharge sediment and other waste into waters of the state". Leaving the FOTR bridge as it is fails to meet the purpose and need for reducing runoff from the Rubicon Trail into an unnamed drainage and was therefore eliminated from detailed study.

Issue an easement with variable widths not narrower than 50 feet off centerline of the trail and variants.

This alternative was proposed by the public during scoping to increase the width of the easement for operation and maintenance by El Dorado County. The easement proposed includes areas where the width is greater than 25 feet either side in order to accommodate the existing facilities and maintenance needs. Generally the Forest Service increases the width of an easement to accommodate the existing facilities or facilities planned in the future. The proposed easement route and width are based on a request received from El Dorado County which takes into consideration the existing facilities. An alternative to issue an easement with variable widths not narrower than 50 feet off centerline was not considered because a variable width easement is already proposed that accommodates for the existing facilities.

Minimize resource impacts from dispersed camping.

This alternative was proposed by the public during scoping to minimize the effects of dispersed camping on the resources. The scope of this project is to define the right-of-way for the Rubicon Trail along with the authority and responsibility for its upkeep; reduce sediment delivery to Ellis Creek; reduce runoff from the Rubicon Trail that has potential to discharge sediment and other waste into waters of the state; address human waste disposal; and limit addition of routes to the NFTS. Alternative 6 addresses minimizing impacts to resources from dispersed camping in several areas by eliminating camping near Soup Bowl, Winter Camp, and the Little Rubicon River. Therefore, a separate alternative was not analyzed in detail because dispersed camping has been limited in Alternative 6.

Limit the number of trail users on weekends and holidays.

This alternative was proposed by the public during scoping to minimize the effects of trail use on the resources. The scope of this project is to define the

right-of-way for the Rubicon Trail along with the authority and responsibility for its upkeep; reduce sediment delivery to Ellis Creek; reduce runoff from the Rubicon Trail that has potential to discharge sediment and other waste into waters of the state; address human waste disposal; and limit addition of routes to the NFTS. Limiting the number of trail users is outside the scope of the project. Implementing and enforcing a trail quota would be difficult and costly. Installation of erosion control features, bridge construction, closure and rehabilitation of routes, and continued education and law enforcement are expected to be effective at protecting the resources. As a consequence, it is not clear that a trail use quota is needed or would be effective. Therefore, it was eliminated from detailed study.

Require WAG bags for all motorized camping associated with the trail.

This alternative was proposed by the public during scoping to minimize the effects of human waste disposal. The analysis for this project was completed with the assumption that education concerning use of WAG bags would continue in addition to construction of vault toilets. Alternative 5 incorporates the use of WAG bags to address human waste disposal since no additional toilets would be constructed. Therefore, a separate alternative was not analyzed in detail because use of WAG bags is addressed in all action alternatives.

Initiate a “Quiet Time” requirement.

This alternative was proposed by the public during scoping to minimize the effects of motorized recreation on non-motorized recreation. The scope of this project is to define the right-of-way for the Rubicon Trail along with the authority and responsibility for its upkeep; reduce sediment delivery to Ellis Creek; reduce runoff from the Rubicon Trail that has potential to discharge sediment and other waste into waters of the state; address human waste disposal; and limit addition of routes to the NFTS. Initiation of a “Quiet Time” doesn’t address any elements of the purpose and need and is outside the scope of the project; therefore it was eliminated from detailed study.

Limit use of the Trail to street legal vehicles only.

This alternative was proposed by the public during scoping to reduce the trail to one route and eliminate the need for variants to bypass the areas that are difficult to maneuver. Alternative 5 addresses this concern by issuing an easement for one route without variants and Alternative 6 addresses it by restoring Little Sluice so that it is passable by all motorized vehicles, therefore, a separate alternative was not considered.

Develop a monitoring and enforcement plan.

This alternative was proposed by the public during scoping and it was part of an alternative proposal brought forward during the public comment period. Monitoring and enforcement have been added to the design criteria for all of the action alternatives. Therefore, a separate alternative was not analyzed in detail because monitoring and enforcement are addressed in all action alternatives.

Limit spectator viewing.

This alternative was proposed by the public during scoping to limit concentrated use on the trail and impacts associated with concentrated use. Alternative 5 addresses this concern by issuing an easement for one route without variants or designated motor vehicle use areas where people might concentrate parking for spectator viewing; therefore a separate alternative was not considered.

Adjust the Fawn Lake IRA to exclude the Rubicon Trail corridor.

This alternative was proposed by the public during scoping to address potential conflicts with continued use and maintenance of the Rubicon Trail within the IRA. Continued use and maintenance of the Rubicon Trail is consistent with the management direction for the IRA. The Forest Supervisor doesn't have the authority to change the boundaries of the IRA; therefore, this alternative was eliminated from detailed study.

Comparison of Alternatives

The following tables provide a brief summary of the alternatives and their environmental impacts in comparative format.

Table 2-6: Summary of actions proposed by alternative.

	Alt 1	Alt 2	Mod. Alt 3	Alt 4	Alt 5	Alt 6
Easement Mileage on NFS lands	6.26		6.26	6.26	5.38	6.09
Variants included in easement	7		7	7	1	6
Easement Width	25 feet from centerline except for Post Pile and Little Sluice		25 feet from centerline except for Post Pile and Little Sluice	25 feet from centerline except for Post Pile and Little Sluice	25 feet from centerline	25 feet from centerline except for Little Sluice
Construct Ellis Bridge	Yes	No	Yes	Yes	Yes, 12 foot wide	Yes, 12 foot wide
Replace FOTR bridge	Yes	No	Yes	Yes	Yes	Yes
Construct Buck Island Bridge	Yes	No	Elevated rock ford	Elevated rock ford	Yes	Yes
Number of Vault Toilets to be constructed	1	0	6	5	0	4
Seasonal Operating Period	No	No	Saturated Soil Management	No	July 1 to November 1	July 1 to November 1
Mileage of NFTS routes to be closed	0	0	0	0	.89	.17
Mileage of unauthorized routes to be closed	2.55	0	2.55	1.98	2.99	2.63
Mileage of unauthorized routes to be added	.43	0	.43	1.0	0	.37

Table 2-7: Displays by alternative the parallel variants to the Rubicon Trail that would be included in the easement.

Rubicon Trail and variants	Alt 1	Mod. Alt 3	Alt 4	Alt 5	Alt 6
ELD - 63 Rubicon Trail	5.33	5.33	5.33	5.33	5.33
ELD – 63 -A	0.13	0.13	0.13		0.13
ELD – 63 -B	0.06	0.06	0.06		0.06
ELD – 63 -C	0.25	0.25	0.25		0.25
ELD – 63 -D	0.17	0.17	0.17		
ELD – 63 -E	0.06	0.06	0.06		0.06
ELD – 63 -F	0.21	0.21	0.21		0.21
ELD – 63 -H	0.05	0.05	0.05	0.05	0.05
Total	6.26	6.26	6.26	5.38	6.09

Table 2-8: Unauthorized routes to be added or closed by alternative.

Un-authorized Routes	Alt 1 add	Alt 1 close	Mod. Alt 3 add	Mod. Alt 3 close	Alt 4 add	Alt 4 close	Alt 5 add	Alt 5 close	Alt 6 add	Alt 6 close
NSRELD-63-A		0.06		0.06		0.06		0.06		0.06
NSRELD-63-AA		0.05		0.05		0.05		0.05		0.05
NSRELD-63-B		0.02		0.02		0.02		0.02		0.02
NSRELD-63B-A		0.11		0.11		0.11		0.11		0.11
NSRELD-63B-B		0.07		0.07		0.07		0.07		0.07
NSRELD-63B-C		0.03		0.03		0.03		0.03		0.03
NSRELD-63B-D		0.04		0.04		0.04		0.04		0.04
NSRELD-63-C	0.05	0.03	0.05	0.03	0.05	0.03		0.08	0.05	0.03
NSRELD-63-CA	0.05	0.1	0.05	0.1	0.05	0.1		0.15	0.05	0.1
NSRELD-63-CB	0.01		0.01		0.01			0.01	0.01	0.01
NSRELD-63-CC		0.01		0.01		0.01		0.01		0.01
NSRELD-63-CD	0	0	0	0	0	0		0.01	0	0
NSRELD-63-D		0.02		0.02		0.02		0.02		0.02
NSRELD-63-DA		0.11		0.11	0.11			0.11		0.11
NSRELD-63-E	0.02	0.08	0.02	0.08	0.02	0.08		0.1	0.02	0.08
NSRELD-63-EA	0.05		0.05		0.05			0.05	0.05	
NSRELD-63-EB		0.01		0.01		0.01		0.01		0.01
NSRELD-63-EC		0.01		0.01		0.01		0.01		0.01
NSRELD-63-F		0.07		0.07		0.07		0.07		0.07

Un-authorized Routes	Alt 1 add	Alt 1 close	Mod. Alt 3 add	Mod. Alt 3 close	Alt 4 add	Alt 4 close	Alt 5 add	Alt 5 close	Alt 6 add	Alt 6 close
NSRELD-63-FA	0.05	0.02	0.05	0.02	0.05	0.02		0.06	0.05	0.02
NSRELD-63-FAA	0.02		0.02		0.02			0.02	0.02	
NSRELD-63-FAB	0.02		0.02		0.02			0.02	0.02	
NSRELD-63-FAC	0.04	0.02	0.04	0.02	0.04	0.02		0.06	0.04	0.02
NSRELD-63-FB	0.02	0.06	0.02	0.06	0.02	0.06		0.08	0.02	0.06
NSRELD-63-FBA		0.04		0.04		0.04		0.04		0.04
NSRELD-63-FBB		0.03		0.03		0.03		0.03		0.03
NSRELD-63-FBC		0.05		0.05		0.05		0.05		0.05
NSRELD-63-FBD		0.01		0.01		0.01		0.01		0.01
NSRELD-63-FBE		0		0		0		0		0
NSRELD-63-G	0.02	0.07	0.02	0.07	0.02	0.07		0.09	0.02	0.07
NSRELD-63-GA	0.02		0.02		0.02			0.02	0.02	
NSRELD-63-GB		0.01		0.01		0.01		0.01		0.01
NSRELD-63-H	0.02	0.17	0.02	0.17	0.02	0.17		0.2		0.2
NSRELD-63-HA	0.04		0.04		0.04			0.04		0.04
NSRELD-63-HB		0.06		0.06		0.06		0.06		0.06
NSRELD-63-N		0.04		0.04		0.04		0.04		0.04
NSRELD-63-P		0.05		0.05		0.05		0.05		0.05
NSRELD-63-Q		0.15		0.15		0.15		0.15		0.15
NSRELD-63-R		0.11		0.11		0.11		0.11		0.11
NSRELD-63-RA		0.19		0.19		0.19		0.19		0.19
NSRELD-63-S		0.04		0.04		0.04		0.04		0.04
NSRELD-63-T		0.15		0.15		0.15		0.15		0.15
NSRELD-63-U		0.14		0.14	0.14			0-14		0.14
NSRELD-63-V		0.18		0.18	0.18			0-18		0.18
14N34B*		0.14		0.14	0.14			0.14		0.14
Total	0.43	2.55	0.43	2.55	1	1.98		2.98	0.37	2.61

*14N34B is a system route not designated for public use currently.

Table 2-9: Summary of environmental effects.

	Alt 1	Alt 2	Mod. Alt 3	Alt 4	Alt 5	Alt 6
Soils: Acres of Trail Widening	2.5	19.3	4.1	2.5	2.5	.3
Soils: Acres of Wet Soils	2.6	3.4	2.6	2.6	2.4	1.5
Soils: Miles of Trail Incision	0	.43	0	0	0	0
Hydrologic Resources	Improved from current conditions	Sediment and petroleum product delivery to streams	Improved from current conditions			
Risk of CWE	Low	Low	Low	Low	Low	Low
Consistency with RCOs 1-6	Not likely to meet all of the objectives	Not likely to meet all of the objectives	Likely to meet all	Not likely to meet all of the objectives	Likely to meet all	Likely to meet all
Sierra Nevada Yellow-legged frog	May affect individuals but not likely to result in a trend toward listing	May affect individuals but not likely to result in a trend toward listing	No effect	May affect individuals but not likely to result in a trend toward listing	No effect	No effect
Terrestrial Wildlife	Minimal impacts to habitat, potential impacts to species from noise and use of trail	Impacts to habitat, potential impacts to species from noise and use of trail	Minimal impacts to habitat, potential impacts to species from noise and use of trail	Minimal impacts to habitat, potential impacts to species from noise and use of trail	Minimal impacts to habitat, potential impacts to species from noise and use of trail	Minimal impacts to habitat, potential impacts to species from noise and use of trail
Sensitive Plants	Potential effects to 4 occurrences	Potential effects to 5 occurrences	Potential effects to 4 occurrences	Potential effects to 4 occurrences	Potential effects to 4 occurrences	Potential effects to 4 occurrences
Risk of Spread of Invasive Plants	Low to Moderate	Moderate	Low	Low to Moderate	Low	Low

	Alt 1	Alt 2	Mod. Alt 3	Alt 4	Alt 5	Alt 6
Recreation: Facilities and site management	Adding trails conforms to ROS, toilets and FOTR bridge maybe inconsistent but not unacceptable with ROS, Bridges unacceptable	No change	Adding trails conforms to ROS, toilets and FOTR bridge maybe inconsistent but not unacceptable with ROS, Bridge unacceptable	Adding trails conforms to , toilets and FOTR bridge maybe inconsistent but not unacceptable with ROS, Bridge unacceptable	FOTR bridge maybe inconsistent but not unacceptable, Bridges unacceptable	Adding trails conforms, toilets and FOTR bridge maybe inconsistent but not unacceptable, Bridges unacceptable
Recreation: Visitor Management	Conforms with ROS for semi-primitive motorized	No change	Conforms with ROS	Conforms with ROS	Conforms with ROS	Unacceptable with ROS
IRA	Improved overall from current conditions. Slightly improved potential for future wilderness designation	Greatest semi-primitive motorized recreation but greatest impacts to other IRA characteristics	Improved overall from current conditions. Slightly improved potential for future wilderness designation	Improved overall from current conditions. Slightly improved potential for future wilderness designation	Improved overall from current conditions. Improved potential for future wilderness designation	Improved overall from current conditions. Slightly improved potential for future wilderness designation
Cultural Resources: Total Number of Resources at Risk	8	12	8	9	8	9

Chapter 3. Affected Environment and Environmental Consequences

This Chapter describes aspects of the environment likely to be affected by the proposed action and alternatives. Also described are the environmental effects (direct, indirect, and cumulative) that would result from undertaking the proposed action or alternative. Together, these descriptions form the scientific and analytical basis for the comparison of effects in Chapter 2.

Introduction

Analysis Framework

For comparison purposes, the baseline against which changes to the environment will be analyzed is characterized in Alternative 2, Chapter 2, and the No Action Alternative. The status quo would continue. El Dorado County would continue to assert its RS 2477 claims, and there would continue to be a lack of clarity regarding responsibility for management of the trail. No easement would be issued to El Dorado County; the Rubicon Trail would stay in the current alignment across Ellis Creek and no bridge built; the FOTR bridge would not be replaced with a culvert and vehicles would continue to cross the bridge and downstream ford; Buck Island bridge would not be built; additional erosion control features would not be constructed from Wentworth Springs Campground to the county line; no additional toilet would be installed, and no additional routes would be added to the NFTS to accomplish the purpose and need. Trail use would continue to occur throughout the year, including over-the-snow travel.

Project Area

The project area includes the NFS lands along the Rubicon Trail from Wentworth Springs to the El Dorado County line. The project area map is located in the Executive Summary at the beginning of the FEIS.

Data and Analysis Methods

The data sources used for this analysis originated from Forest Service and El Dorado County surveys and inventories over the last few years. The Eldorado National Forest has numerous GIS layers that contribute to conducting an effective analysis, such as: spotted owl protected activity centers, northern goshawk protected activity centers, riparian conservation area boundaries, hydrologic watersheds, inventoried roadless areas, easement, erosion control features, soils, sensitive plant occurrences, and recorded cultural resource sites.

Several visits were made by the Interdisciplinary Team (IDT) to monitor the condition of the trail, identify locations for motor vehicle use areas and toilets, consider stream crossing methods and locations, and to review non-authorized trails to add to the NFTS or close and rehabilitate. Field visits by the core IDT were conducted on September 27-29, 2010 and again on September 20, 2011. Field visits were also done by smaller groups of the core team in June through October 2011 to gather additional information.

Cumulative Effects Analysis

According to the Council on Environmental Quality (CEQ) NEPA regulations, “cumulative impact” is the impact on the environment which results 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 actions (40 CFR 1508.7).

In order to understand the contribution of past actions to the cumulative effects of the proposed action and alternatives, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects.

This cumulative effects analysis does not attempt to quantify the effects of past human actions by adding up all prior actions on an action-by-action basis. There are several reasons for not taking this approach. First, a catalog and analysis of all past actions would be impractical to compile and unduly costly to obtain. Current conditions have been impacted by innumerable actions over the last century (and beyond), and trying to isolate the individual actions that continue to have residual impacts would be nearly impossible. Second, providing the details of past actions on an individual basis would not be useful to predict the cumulative effects of the proposed action or alternatives. In fact, focusing on individual actions would be less accurate than looking at existing conditions, because there is limited information on the environmental impacts of individual past actions, and one cannot reasonably identify each and every action over the last century that has contributed to current conditions. Additionally, focusing on the impacts of past human actions creates a risk of ignoring the important residual effects of past natural events, which may contribute to cumulative effects as much as human actions. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or event contributed those effects. Third, public scoping for this project did not identify any public interest or need for detailed information on individual past actions. Finally, the Council on Environmental Quality issued an interpretive memorandum on June 24, 2005 regarding analysis of past actions, which

states, “agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions.

The cumulative effects analysis in this (EA or EIS) is also consistent with Forest Service National Environmental Policy Act (NEPA) Regulations (36 CFR 220.4(f)) (July 24, 2008), which state, in part:

“CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions. Once the agency has identified those present effects of past actions that warrant consideration, the agency assesses the extent that the effects of the proposal for agency action or its alternatives will add to, modify, or mitigate those effects. The final analysis documents an agency assessment of the cumulative effects of the actions considered (including past, present, and reasonable foreseeable future actions) on the affected environment. With respect to past actions, during the scoping process and subsequent preparation of the analysis, the agency must determine what information regarding past actions is useful and relevant to the required analysis of cumulative effects. Cataloging past actions and specific information about the direct and indirect effects of their design and implementation could in some contexts be useful to predict the cumulative effects of the proposal. The CEQ regulations, however, do not require agencies to catalogue or exhaustively list and analyze all individual past actions. Simply because information about past actions may be available or obtained with reasonable effort does not mean that it is relevant and necessary to inform decision making. (40 CFR 1508.7)”

Soils

Affected Environment

Environmental Setting:

The Rubicon Trail is a motor vehicle trail corridor that winds through both federal and private land. Approximately 17 miles of the trail are situated in El Dorado County. The trail segment being analyzed for the easement begins at the Wentworth Springs Campground along Gerle Creek and ends at the Placer-El Dorado County line.

The geology and climate strongly influence the soil types that are formed within the analysis area.

Geology

The bedrock geology is intrusive igneous plutons formed as a result of continental subduction to the west. The rocks that were formed under the marine derived basement rock consist of jointed Cretaceous granodiorite. It is in the joints, or fractures, where small wetlands and soil accumulations provide some of the most productive soils in the area. The larger wetlands associated with the trail are formed in glacial till derived alluvium. During the Quaternary Period, several glacial advances and retreats dominated the area. The last documented widespread glacial event ended 10,000 years ago. Glacial retreat is the moment of soil genesis in a glaciated landscape. The soils along the Rubicon Trail are very young and at most 10,000 years old. Much of the area is devoid of soil and consists of granite slabs where glacial scratches are still evident. Granitic rocks weather to soil dominated by sands and little time has occurred for fines weathered from sand to accumulate. This has important management implications as the soils are well drained because of low water holding capacity. Less available water suppresses soil productivity. Soil structure in young soils is inherently weak making the soil susceptible to mechanical disturbance and accelerated erosion. Also, the fine (silt and clay) portion of soil is directly related to the ability of soil to hold plant available nutrients and moisture. Sandy soils have a poor plant nutrient base.

Climate

Elevations range from approximately 5400 feet to approximately 7000 feet. The precipitation range is approximately 59-61 inches per year. The precipitation at the project elevation occurs primarily as snow falling from Pacific winter storms. The snow generally does not melt on the entire trail until late May or June. The number of frost free days is between 50 and 90 days which indicate a short growing season. Deep snow accumulations can insulate the soil from the

freezing atmospheric temperatures. This phenomenon accelerates organic based ground cover decomposition contributing to higher susceptibility to erosion.

Soils

With the combination of high elevation cold soils, short growing season, low organic matter accumulation, and coarse soil texture, the soils within the Rubicon Trail system are low productivity soils with high sensitivities to disturbance.

The soils along the trail are mapped according to the Soil Survey, Eldorado National Forest (USDA 1985). The dominant map units within the easement are mapped with Rock Outcrop as the only component and comprise 60 percent of the easement. Another 17 percent of the soil map units have rock outcrop as a major component. Only one soil map unit at 6 percent of the easement area is mapped as a wet association and is located near Wentworth Springs Campground. The remaining soils are derived from material weathered from glacial till, glacial outwash, and alluvium composed of granitic rock.

The Eldorado Soil Survey is an Order 2, 3, and 4 soil survey. The soil order determines the intensity and resolution of the survey with order 2 being highest resolution and order 4 being the lowest resolution. The soils supporting the Rubicon Trail are mapped at order 4, meaning that minimum size mapping delineation is between 16 and 252 acres. This resolution is particularly problematic in assessing wetlands too small to map. Also not captured in the soil survey are the inclusions of soils that fill the jointed cracks in the extensively mapped rock outcrops. These soil accumulations are important as hydrologic features and as refuge areas for vegetation.

Data and Analysis Methods

The scope of the analysis area for evaluating existing soil conditions and effects of the alternatives includes the easement for the trail, the soils that are directly affected by sediment deposition regardless of the distance to the trail center line, and soils being affected by unauthorized use.

The data for analysis was collected by traversing the length of the trail and all proposed alignments and unauthorized routes identifying those areas where a problem with an indicator measure exists. Those areas were delineated using a field tablet PC with mapping capabilities. Visual indicators for soils include:

- Trail widening – Indicators include exposed roots, leafless stems of shrubs, devegetated soil surfaces, steep banks, and soil rinds (resulting from differential weathering patterns). Trail widening results in increased

compaction, reduced organic surface cover and reduced vegetation which are essential to soil productivity and soil hydrologic function. Trail widening is considered where vegetation is receding and the soil is generally revegetated. Removal of vegetation disrupts nutrient cycling, decreases soil strength, and reduces infiltration. Trail widening is only considered where active widening is evident and includes 25 feet off of the Rubicon Trail tread, turnouts, wide spots, and unauthorized use areas. Wentworth Springs Campground is also included for cumulative effects. An area is considered if it is greater than 400 square feet. Areas where traffic controls have contributed to soil and vegetation recovery are not considered.

- Wet soil effects – Indicators include accelerated sediment deposition on wet soils, exposed soil properties indicating soil wetness, dark soil colors, and soil saturation. Much of soil productivity and soil hydrologic function is related to the quality of wet soils. Wet soils are important for long-term water storage and moderation of water discharge rates. Wet soils are also important for hydrophytic vegetation and animal habitat. The wet soil indicator is analyzed for both soil loss and soil deposition. Soil loss results in wetland soils that are downcut and ground water tables that are dissected. Ground water table dissection results in wet soil dewatering. Soil deposition results from hydrologic transport of soil particles originating from an eroding soil and accumulating at a lower energy segment of a drainage. Deposition of coarse sediment on a native wet soil surface reduces plant available moisture (reduced hydrologic function) and reduced plant vigor (reduced soil productivity).
- Trail incision – Indicators include the relative elevation difference between original soil surface and trail tread. A primary source of sediment related to the analysis area is incised trails with little opportunity for water diversion off the trail tread. Deep trail incisement also creates steep slopes adjacent to the trail which causes soil to move downslope with gravity. This unraveling of the soil increases availability of soil for sediment transport and widens the trail. This indicator measure was applied only to those areas where trail incisement is ongoing, banks are steep, and little to no opportunity exists for water diversion off of the trail. Currently installed erosion control features appear to be effective in controlling trail deepening on flat areas but have less success mitigating the effects of trail incision on steep segments of the trail. Only the deep incisions on steep slopes are included in the Soil Indicators summarized in Table 3-1.

Indicator Measures

Management of soils on the Eldorado National Forest is generally related to soil productivity and soil hydrologic function. Soil productivity is related to the

ability of soils to grow vegetation and can be affected by above and below ground processes. Hydrologic function is “the inherent capacities of a soil to intake, retain, and transmit water”. Three indicator measures that affect soil productivity and soil hydrologic function were evaluated in this analysis. These measures include: trail widening, wet soil effects, and trail incision.

Indicator Measure 1: Trail Widening measured in acres

Indicator Measure 2: Wet Soil effects measured in acres.

Indicator Measure 3: Trail incision measured in miles.

Existing Condition

The majority of the activities associated with the Rubicon Trail have little effect on the soil indicators beyond the trail tread. Of the 6.7 miles of Rubicon Trail within the Eldorado National Forest, only 1.2 miles have direct or indirect effects to the indicators.

It must be noted that where vehicle and pedestrian use has been uncontrolled by the lack of either natural or placed barriers, negative effects to soils are clearly evident. The basic assumption for predicting effects of the alternatives is that the methods for closing off areas of affected soils would be effective. The existing conditions on the trail in a few areas indicate that physical barriers that redirect access are effective in both limiting negative effects to soils and allowing for natural recovery to occur. A good example of the effectiveness of barriers can be observed immediately east of Wentworth Springs Campground north of the trail. This bowl area shows signs of unrestricted past use with severe relict erosional features. In the 1990s, barriers were placed to limit access to this area. The natural recovery has been rapid in this area considering the sensitivities of the soil due to climate and soil properties. Soil structure is returning, compaction is diminishing, and increasing soil vegetative cover is evident even on primary access routes to this area.

Currently, wet season use is unrestricted. The existing condition of the following areas is exacerbated when trails and soils are saturated primarily on soils off of the trail tread. Soils are more prone to compaction when saturated. Compaction also reduces plant root vigor and, subsequently, is less able to provide ground cover. The existing condition of compaction and lack of soil cover on the trail tread would likely occur regardless of wet season use, however, it is likely that the existing condition of the soil indicators off the trail tread are more negatively affected when the soil is wet.

There are notable areas where soil problems were identified as affecting soil qualities. Locations are displayed on the Soil Indicator Location maps on the following pages. General locations are listed in parenthesis.

These areas include:

Wentworth Springs Campground (Wentworth Springs Campground): Use in this campground and picnic area is unrestricted. It is difficult to distinguish where the trail width ends and where the picnic area facilities begin. Past and current mechanical and pedestrian activities have nearly devegetated the site. The soil is heavily compacted increasing runoff to the hydrologic features running through the picnic area. Vegetation on the leading edge of the affected area is continuing to see mechanical disturbance and, consequently, the area of disturbance is expanding. The site is approximately 0.3 acres.

Wet soils east of Wentworth Springs (Gerle Creek Wetland): The trail bisects an edge of Gerle Creek Wetlands. The Rubicon Trail is down-cut through the wet soils but the road tread is supported above the wet soils by road fill. The trail has artificially drained that portion of the wet soils. The affected area does not appear to be expanding and the effects appear to be static. The approximate extent of wet soil effects is 0.25 acres.

East Wentworth trail incision (East Wentworth): This is a short segment of trail that is incised. The trail tread is stabilized but the banks are not and continue to erode and soil cover cannot presently establish. The length of this segment is 0.02 miles long.

East Wentworth dispersed camping (East Wentworth): This is a 0.11 acre dispersed vehicle camping area adjacent to ELD-63-A that appears to be enlarging. The soils are compacted, soil cover cannot reestablish with the current use, and the area appears to be expanding.

Postpile trail incision (Postpile): This is a short segment of climb (0.04 miles) where BMP structures are inadequate and beginning to fail. Water is beginning to concentrate in tread where cobbles are displaced.

Postpile dispersed area (Postpile): This area is a highly impacted area of approximately 2.2 acres mostly due to numerous unauthorized routes and the associated off trail use. The area is identified on the map as three polygons adjacent to ELD-63 and ELD-63-C (Rubicon Trail and variant) at the top of Postpile. Much of this area has lost significant amounts of the existing soil and vegetation and widening of the area is expected because of soil loss.

Granite trail incision (Granite): This is a short segment of eroding incised trail approximately .02 miles (120 feet). Trail banks are eroding and eroded material is being transported as sediment.

Auburn Jeep Club road dispersed site (Auburn Jeep Club): This is a small dispersed camping site located approximately 300 feet west of the Auburn Jeep Club road. The soils are compacted, soil cover cannot reestablish with the current use, and the area appears to be expanding. The site is 0.1 acres in size.

Ellis Creek crossing (Ellis Creek crossing): All three soil indicators show negatively affected soil quality at the Ellis Creek crossing. Dispersed camping is very popular on both sides of the trail with both foot traffic and vehicular travel causing soil compaction and denuding the vegetation. Rills are common and gullies are present. The extent of effects is continuing to expand. Available ground cover and coarse woody debris are likely being consumed as firewood faster than that material can accumulate on the ground. The approaches to the low water crossing are deeply incised with cut bank erosion occurring, the water table is incised, and ground-stabilizing vegetation is not present at the crossing. The extent of trail widening is approximately 0.4 acres on both sides of the road, the trail incision is approximately 150 feet, and the amount of wet soil affected is 0.1 acres.

Walker Hill incision (Devil's Peak): This trail is located on the southern flank of Devil's Peak and is approximately 0.08 miles (425 feet) long. The eastern portion is on relatively flat ground. The trail tread on this segment is relatively stable; however, the cut-bank of the trail is vertical and actively eroding and widening. A rock breast wall was recently installed but is unlikely to mitigate the effect of erosion due to the over-steepened slope. The western portion of the incision is steep and actively eroding. In one place, the incision has cut into two feet of weathering granitic bedrock. Trail sidewalls are steep and see frequent traffic.

Soup Bowl (Soup Bowl): The Soup Bowl is a heavily impacted area with both trail widening and wet soil effects on both sides of the trail. The site is on relatively flat ground without adequate natural barriers to prevent off trail use. The area where off trail use has denuded the soil and accelerated erosion is occurring on approximately 1.5 acres. The area seems to be expanding. With a moderately incised trail capturing sediment from the impacted widened area, soil deposits are being transported to the adjacent drainage and wetland south of the soup bowl. Deposits of sediment were measured at approximately 20 inches. Deposits this thick are affecting soil water holding capacity and vegetative cover. The affected area of wet soil effects are approximately 0.7 acres.

Winter Camp (Winter Camp): Winter Camp is heavily impacted by both vehicular and pedestrian traffic. This area consists of a downcut historically perennially wet soil in which the perennial water table has drained and converted to a seasonal saturated soil. The trail is incised approximately 0.07 miles to a depth of approximately 3 feet. On the resulting terrace adjacent to the trail prism, nearly all vegetation except for residual trees is absent due to traffic and the soils are highly compacted. Downstream of the down-cut terrace, large amounts of sediment are being deposited at the Winter Camp wetland converting much of the site from wet soils, to droughty alluvium. Up to 40 inches of recent sandy deposits were noted adjacent to the Winter Camp wetland. The amount of trail widening at Winter Camp is approximately 1.32 acres and the wet soils affected are approximately 1.25 acres.

Long Bypass wet soils: This area consists of the drainage that terminated at the Winter Camp wetland and is approximately 0.18 acres. Where the trail crosses this wet area, all vegetation is absent. The wet soils are being affected by vehicles crushing soil stabilizing vegetation and compacting the soil.

Buck Island Outlet (trail widening and wet soils) (Buck Island Outlet): This area is popular as both a camping and vehicle use area. There is a dispersed camping area south of the trail where much of the ground is denuded of vegetation, available down wood or forest debris (organic soil cover) is consumed for fires, and the ground is heavily compacted. The area of affected soil continues to expand. Accelerated runoff and erosion is common in this area. The dispersed camping area is approximately 0.6 acres. North of the trail, the route of travel is not well defined and the site is a popular vehicle travel area. Accelerated runoff and erosion has led to soil loss, often times to bedrock. This dispersed recreation area is approximately 6.1 acres. Wet soils are also affected at the Buck Island Outlet area. Unauthorized crossings through organic soil have led to complete loss of vegetation and soils. The areas of affected wet soils are approximately 0.6 acres.

Buck Island dispersed vehicle use (Buck Island Outlet, north): The north side of Buck Island Lake contains many unauthorized trails that are primarily used for dispersed camping and lake access. These routes are actively widening due to uncontrolled high use from dispersed camping. The total area impacted is approximately 4.2 acres.

Buck Island Overlook (Buck Island overlook): This overlook provides an expansive view of Buck Island Lake and the high Sierras and is a popular stopping place. There are several unauthorized routes originating at the overlook; off trail use and trail widening is associated with these unauthorized routes. The area affected by trail widening is approximately 1.5 acres.

Big Sluice Spring (Big Sluice): This is a small area of wet soils fed by a small hillslope spring. The wet soils are situated in the Rubicon Trail tread. Rutting and shearing of plant roots results in damage to the wet soils. Vehicles are driving around the site to avoid the wet soil and consequently affecting the soil on the uphill side of this site. The area of affected soils is approximately 0.25 acres.

Big Sluice incisement (Big Sluice): This is a segment of approximately 0.13 miles located at the upper portions of the Big Sluice. Although not completely incised, there are large steep cutbanks which are currently eroding. These banks are unstable and because of their steepness in a coarse-textured soil, these banks will continue to erode until stabilized.

Table 3-1: Soil indicator summary by alternative.

	Indicator 1 Trail widening (acres)	Indicator 2 Wet Soils Affected (acres)	Indicator 3 Incised Trail (miles)
Alternative 1	2.5	2.6	0
Alternative 2	19.3	3.4	0.43
Modified Alternative 3	4.1	2.6	0
Alternative 4	2.5	2.6	0
Alternative 5	4.1	2.4	0
Alternative 6	0.3	1.5	0

Environmental Consequences

Direct and Indirect Effects of Alternative 1

Indicator 1: Trail Widening – Under Alternative 1 the extent of trail widening is expected to be reduced from 19.35 acres to 2.5 acres. When considering where trail widening would be reduced or continue, designated motor vehicle use areas would be considered as reduced trail widening because barriers would be installed to define the area and according to Forest Service Manual (FSM 2551.3, Pg. 14) "*Generally, soil management standards and guidelines are not applied to administrative sites or dedicated use areas (such as roads, recreation sites). Standards and guidelines may apply to off-site impacts related to these sites and areas.*"-

All unauthorized routes considered for addition to the NFTS in Alternatives 1 are located in near Buck Island Lake Outlet, Buck Island Lake dispersed area, and Buck Island Lake Overlook. All but five of the routes to be added to the NFTS (NSRELD-63-FAA, NSRELD-63-FA, NSRELD-63-FAB, NSRELD-63-FB, and NSRELD-63-FAC) are contained within the delineated trail widening polygons. Because barriers would be installed to define the routes and limit access to those areas identified as trail widening, the effects to soil would be reduced and the soil condition would improve where these routes travel through areas of trail widening. The five routes not contained within the trail widening polygons have minimal disturbance associated with them outside the travel way.

Areas where Indicator 1 would be mitigated by Proposed Action items:

- East Wentworth, Auburn Jeep Club dispersed camping: The primary mechanism for impacts to this site is camping involving vehicle access. Impacts to this site will be mitigated with future maintenance to comply with travel management restrictions on cross-country travel. The site is not heavily used and is likely to recover with pedestrian only use.
- Postpile and Soup Bowl: Trail widening would be reduced in these areas due to proposed installation of barriers and signs. Soil compaction would be expected to be reduced with natural recovery such as freeze/thaw. Root penetration and plant cover would be expected to recover due to barrier placement.
- Ellis Creek crossing trail widening. Several proposed action items would limit and decrease the effects to the trail widening soil indicator. Two areas designated for motor vehicle use are proposed for both sides of Ellis Creek. To prevent vehicle use outside of the designated areas, rock barriers and signs would be installed. Rehabilitation of the site would

reestablish vegetation and begin natural restoration of those areas affected by current use.

- Buck Island dispersed vehicle use area: The trail widening at this location is due to unrestricted vehicle access associated with 0.19 miles of unauthorized routes. Approximately 0.12 miles of unauthorized routes would be closed and rehabilitated. Routes that are not being closed and rehabilitated under the proposed action would be added to the NFTS and, therefore, considered part of the road system. Proposed barriers would prevent trail widening at these locations.
- Buck Island Overlook (trail widening): The trail widening is due to unrestricted vehicle access associated with 0.15 miles of unauthorized routes. Approximately 0.08 miles of unauthorized routes would be closed and rehabilitated. Routes that are not being closed and rehabilitated under the proposed action would be added to the NFTS and, therefore, considered part of the road system. Proposed barriers would prevent trail widening at these locations.

Areas where Indicator 1 would not be mitigated by Proposed Action items:

- Wentworth Springs Campground (Wentworth Springs Campground): Alternative 1 does not propose any actions in this area. The current condition would be maintained at this site.
- Winter Camp: No barriers would be installed around Winter Camp and use would be expected to continue. Although vehicles would be restricted to the trail in this area, it would still remain a popular camping area and the impacts from pedestrian traffic would continue. Although elimination of vehicles use in this area would reduce the intensity of the effects, effects to vegetation from trampling, collection of ground cover for fires, and continued compaction of the soil would likely continue.
- Buck Island Outlet dispersed camping area: The site is highly impacted by decades of vehicle camping and remains very popular. Although barriers would be placed to limit vehicle access, it is expected that the impacts from pedestrian traffic would continue. Effects to this site would likely include effects to vegetation from trampling, collection of ground cover for fires, and continued compaction of the soil. Although elimination of vehicles use in this area would reduce the intensity of the effects, effects to vegetation from trampling, collection of ground cover for fires, and continued compaction of the soil would likely continue.

Indicator 2: Wet Soils Affected – The effects to wet soils in Alternatives 1 would be similar to the existing condition except the amount of wet soil effects would be reduced from 3.4 acres to 2.6 acres.

Areas where Indicator 2 would be mitigated by Proposed Action items:

- Ellis Creek wet soils: The Ellis Creek bridge, barriers, signage, and streamside restoration would allow recovery of the wet soils adjacent to the current crossing.
- Buck Island Outlet wet soils: Rock and log barriers and signage would restrict vehicle access and prevent crossings of the Little Rubicon River west of the proposed crossing. With vehicle traffic eliminated, hydrophytic vegetation would likely rapidly stabilize the wet soils in this location.

Areas where Indicator 2 would not be mitigated by Proposed Action items:

- Wet soils east of Wentworth Springs: Because the trail bisects these wet soils, drainage is accelerated. No change in alignment is proposed for this area; therefore, the current condition would be maintained at this site.
- Soup Bowl and Winter Camp wet soils: Several of the proposed erosion control features would likely reduce the intensity of effects to wet soils around the Soup Bowl and Winter Camp, but the extent of the affected area is likely to remain unchanged. In both cases, the trail has intercepted the natural ground water table and has artificially drained the soils. Rock fill on the trail tread is likely to prevent the depth of interception from increasing, however, without active restoration that includes re-alignment and strategies to raise the water table, the wet soils would likely remain in the existing condition. Alternative 1 proposes filling in the incised areas of the wet soil area of winter camp. This would likely reduce further impacts to the Winter Camp wet soils, but the site would continue to drain freely and not regain the perennial water table. Also, for both Soup Bowl and Winter Camp, downstream effects including sediment deposition would likely continue but at a lower intensity. Without removal of the sediment currently deposited, existing sediment overburden would continue to make the soil surface drier.
- Long Bypass wet soils: The trail alignment is expected to cross the drainage and wet soils. No mitigations are planned so this area is expected to remain in the existing condition.
- Big Sluice Spring: The trail would continue through the wet soils resulting from the spring. The wet soils would continue to be affected by vehicles.

Indicator 3: Trail Incisement – Some erosion control features have been installed to address this issue. Under Alternative 1, additional erosion control features would be installed and monitoring and maintenance of all erosion control features would occur to ensure they are functioning. Installed erosion

control features which primarily include rock fill have been temporarily successful but may be inadequate in the long term if maintenance doesn't occur. Future maintenance would maintain the rock fill and continue to protect the trail tread from incision. Although rock fill erosion control features would inhibit future trail incising, the measures proposed under Alternative 1 are not expected to bring the trail tread to the original surface. The bridge at Ellis Creek and streamside restoration would end trail incision at the crossing.

Cumulative Effects of Alternatives 1

No actions are proposed within the analysis area in the foreseeable future so there would be no cumulative effects.

Direct and Indirect Effects of Alternative 2 – No Action

Under Alternative 2, the current and past use that created the existing conditions is expected to continue. Those areas identified as indicator measures in the Affected Environment would continue to degrade and affect soil quality.

Indicator 1: Fifteen areas of approximately 19.35 acres of denuded and actively widening trail and associated sites were recorded during surveys. The most significant areas of trail widening are occurring at a dispersed vehicle use area north of the Buck Island Outlet (6.1 acres), the unauthorized trail network on the north shore of Buck Island Lake (4.24 acres), the Postpile dispersed vehicle use area, Soup Bowl (1.54 acres), Buck Island Overlook (1.53 acres), and the Winter Camp area (1.33 acres). With the current patterns of use, these areas will continue to see a recession of ground stabilizing vegetation, reduced soil productivity, and sediment generation to stream channels and meadows.

Indicator 2: Seven areas of wet soils being directly or indirectly affected by current trail use patterns were recorded during surveys. The most significant wet soil areas include the wet soils associated with Winter Camp (1.25 acres), Soup Bowl (0.67 acres), the floodplain downstream of the Buck Island Outlet (0.62 acres), and Big Sluice Spring (0.25 acres). The extent of wetland effects is not expected to increase with continued use, however, trail induced drainage of soil water and sediment deposition would continue to occur in those areas already identified. The perennial water table is significantly affected at Winter Camp, where the road crosses near Gerle Creek wetlands east of Wentworth Springs Campground, Soup Bowl, and Ellis Creek. Under Alternative 2, these water tables would continue to rapidly drain following the end of the wet season. With the lost storage capacity, hydrophytic vegetation would be suppressed and moderation of peak flows would be lost. Significant sedimentation is occurring on the downstream portion of the Winter Camp wet soils and the wet soils associated with the primary drainage downstream of the

Soup Bowl. This sediment deposit would have the effect of drying the soil and affecting vegetation dependent on surface moisture. The other wet soils that would be affected under Alternative 2 would be the small area crossed by the Long Bypass. In all cases, the current patterns of use under Alternative 2 would see continued disturbance of the wet soil which would include damage to plants, reduction in soil strength provided by the roots, and continued rutting of the wet soil surface.

Indicator 3: Seven segments totaling approximately 0.43 miles of deeply incised trail were recorded during surveys. The segments identified were generally greater than two feet deep, actively eroding with unstable steep cutbanks. The trail segments where trail incision is most severe are the Big Sluice section (0.2 miles), the Walker Hill section (0.08 miles) and the Postpile (0.04) miles. In these segments, trail incision was observed to depths of six feet and on the Walker Hill segment, two feet of weathered granite rock was observed.

Cumulative Effects of Alternative 2 – No Action

No actions are proposed within the analysis area in the foreseeable future so there would be no cumulative effects.

Direct and Indirect Effects of Modified Alternative 3

The direct and indirect effects of Modified Alternative 3 are similar to Alternative 1 except the establishment of a parking area and installed barriers at Soup Bowl would not occur. The trail widening in this area would likely continue due to continued vehicle access. Although the intensity of the effects would be reduced as a result of adherence to cross-country restrictions, incidental traffic would continue to occur without barrier installation. The amount of area where trail widening would occur would be 4.1 for Modified Alternative 3 compared to 2.5 for Alternative 1.

Cumulative Effects of Modified Alternative 3

No actions are proposed within the analysis area in the foreseeable future so there would be no cumulative effects.

Direct and Indirect Effects of Alternative 4

The direct and indirect effects of Alternative 4 are similar to Alternative 1 except three additional routes would be added to the NFTS. These routes include NSRELD-63-V, 14N34B, and NSRELD-63-U. The extent of soil impacts on routes NSRELD-63-U and 14N34B are confined to the road prism. These routes currently are well-travelled and adding them to the NFTS is not likely to

increase soil effects beyond the existing condition. Both routes NSRELD-63-V and NSRELD-63-U are located on granite slabs and were not considered areas with degraded soil conditions so no change would be expected with the addition.

Cumulative Effects of Alternative 4

No actions are proposed within the analysis area in the foreseeable future so there would be no cumulative effects.

Direct and Indirect Effects of Alternative 5

Alternative 5 includes a seasonal operating period. Installation of erosion control features and authorization of the easement would decrease the effects to soil when wet. There would be very little difference in effects expected under Alternative 5 to trail incision, wet soils and trail widening because the primary effects to soil when the soil is wet is deformation expressed as rutting, mechanical disturbance of fine soil particles at the same time flowing water can transport the soil, and increased compaction resulting when soil are wet. On the trail tread, erosion control features would greatly reduce direct contact to the soil surface, primarily by placement of coarse rock material on the trail tread. Areas that are not controlled by barriers would be affected regardless of the moisture status of the soil. The soils in these areas are at maximum compaction and rutting is not apparent in the existing condition. In those areas where barriers are successful in limiting vehicle access, the seasonal operating period is irrelevant. Limited use may occur by private property owners allowed reasonable access to their in-holdings, providing this access does not cause resource damage.

Indicator 1: The effects to trail widening under Alternative 5 would be the same as Modified Alternative 3.

Indicator 2: The effects to wet soils under Alternative 5 would be similar to Alternatives 1, 3, and 4 except that elimination of the Long bypass would eliminate the effects of the crossing upstream of the Little Sluice wetland. The vegetation in this area would be expected to quickly recover without regular vehicle traffic. The acreage of wet soils affected would decrease from 2.63 acres in Alternative 1 to 2.45 acres for Alternative 5.

Indicator 3: The effects to trail incision under Alternative 5 would be the same as Alternative 1.

Cumulative Effects of Alternative 5

No actions are proposed within the analysis area in the foreseeable future so there would be no cumulative effects.

Direct and Indirect Effects of Alternative 6

The direct and indirect effects of Alternative 6 are similar to Modified Alternative 3 except for the dispersed camping areas around Buck Island Outlet would be eliminated using a forest order and defining the Rubicon trail limits with barriers. Without the pedestrian traffic, compaction would begin to recover and soil cover would begin to re-establish on the soil surface. The amount of trail widening would decrease to 0.3 acres for Alternative 6 compared to 1.5 acres for Alternative 5.

Cumulative Effects of Alternative 6

No actions are proposed within the analysis area in the foreseeable future so there would be no cumulative effects.

Hydrology and Riparian Resources

Introduction

Increased vehicle use and dispersed camping on the Rubicon Trail has resulted in degraded trail conditions that have led to increases in sediment, fecal coliform levels, and petroleum products in nearby water bodies. Streambank failures and riparian vegetation loss have occurred as a result of increased use in close proximity to water bodies and have resulted in changes in water quality, geomorphic characteristics and aquatic habitat. In response to these conditions, the California Regional Water Quality Control Board, Central Valley Region (CRWQCB, CVR), adopted a Cleanup and Abatement Order (CAO; No. R5-2009-0300) on April 23, 2009 requiring El Dorado County and the Eldorado National Forest to cease the discharge of sediment and other wastes due to motorized use of the Rubicon Trail.

As a result of degraded trail conditions and in response to the CAO, the El Dorado County Department of Transportation (DOT) and the Eldorado National Forest (ENF) are addressing existing conditions to provide better management of the trail while accounting for resource protection. This section analyzes the environmental impacts of the six alternatives with regards to hydrology and riparian resources. It focuses primarily on watershed conditions such as water quality and cumulative watershed effects (CWEs), and compliance with Riparian Conservation Objectives (RCOs).

Affected Environment

Geology and Soils

The project area primarily consists of low to moderately sloping terrain with slopes ranging from 0.5 to 25 percent within the trail prism while the surrounding landscape consists of many areas with slopes greater than 50%. In some areas, the trail traverses along the contour and therefore intercepts many drainage features and topographic depressions. Elevations in the project area range from approximately 5,400 feet above sea level to approximately 7,000 feet. Mean annual precipitation for the project area ranges from approximately 45 inches at the lower elevations to 60 inches at the higher elevations. The majority of the precipitation is in the form of snow with occasional fall rain storms, summer convective thunderstorms, and rain-on-snow events which produce major floods such as those experienced in the winter of 1997.

The project area is underlain primarily by Cretaceous age granitic rocks and Jurassic age metamorphic rocks, with some volcanic outcrops of the Jurassic age Sailor Canyon formation (CGS, 2009). The majority of the Rubicon Trail

within the project area traverses over plutonic rock types from the Mesozoic Era that includes: granite, quartz monzonite, granodiorite, and quartz diorite (CGS, 2009). These rock types are often relatively resistant to erosion due to their mineral composition that consists of high contents of quartz and feldspar. Eroded sediment often has a sandy appearance due to the presence of coarse granular size particles that weather over time to finer particles. These rocks and the existing landscape have experienced several glacial cycles. Most recently was the Tahoe stage (~ 160,000 years ago) and the Tioga stage (~20,000 years ago) (CGS, 2009). These glacial events are responsible for many of the area lakes, river valleys, and bare rock slopes observed today.

According to the *Soil Survey of Eldorado National Forest Area, California: Parts of Alpine, Amador, El Dorado and Placer Counties* (USDA, 1985) the project area consists of eight primary soil types that include: Cryumbrepts association (Soil Map Unit 120), Gerle-Notned complex (127), Rock outcrop (198), Rock outcrop-Tinker association (200), Tallac very cobbly sandy loam (202), Tallac-Cryumbrepts, wet association (203), and Tinker-Tallac-Rock outcrop association (208, 209). These soils formed in landforms that include mountains, moraines, and outwash plains. Parent material for these soils include alluvium derived from granite, till derived from granite, and outwash derived from granite.

Slopes for these soils range from 2 to 75 percent with the majority of soil types occurring on slopes in the 5 to 30 percent range. The upper soil profile (0 to 12 inches) of non-bedrock soil types consist of sandy loams that are often described as gravelly, very cobbly, and boulder. These soil types range from poorly drained to well drained with most soils rated as moderately well drained. Available water capacity ranges from very low (2.5 inches) to moderate (6.2 inches). Capacity of the most limiting layer to transmit water (Ksat) is either very low (0.0 in/hr.) or high (1.98 to 5.95 in/hr.). Most were rated as high with the very low ratings likely reflecting bedrock or a varying degree of weathered bedrock.

Watershed Description

The project area is within the Rubicon River 5th field watershed which contains the Rubicon River and its tributaries. Major tributaries in the project area include the perennial Gerle Creek, the perennial Ellis Creek, and the perennial Little Rubicon River at Buck Island outlet. These major tributaries along with other significant hydrologic features fall within four major 7th field watersheds as follows from west to east: Upper Gerle Creek, Loon Lake, Rockbound Lake-Rubicon River, and Rubicon River-Long Lake (see Table 3-2).

Table 3-2: 7th field watershed description

5th Field Watershed	7th Field Watershed			Ownership	
USGS Hydrologic Unit Code - Name - Acres	USGS Hydrologic Unit Code	Name	Acres	% USFS	% private
1802012802 Rubicon River 201,987 acres	18020128020302	Upper Gerle Creek	7,940	55	45
	18020128020301	Loon Lake	5,126	84	16
	18020128020103	Rockbound Lake - Rubicon River	5,815	85	15
	18020128020102	Rubicon River-Long Lake	12,720	95	5

The Upper Gerle Creek 7th field watershed contains the perennial Gerle Creek which originates at the Loon Lake outlet and flows roughly east to west throughout the project area. Outside of and southwest of the project area, Gerle Creek joins the South Fork Rubicon River which eventually converges with the Rubicon River farther to the west. Within this watershed is the Rubicon Trail segment from Wentworth Springs Campground in the west to an area just southwest of the Rubicon Trail intersection with the Ellis Intertie in the east. This segment including trail variants and unauthorized routes represents a total of approximately 2.6 miles of trail all of which are on National Forest System lands. The western portion of the trail within this watershed parallels Gerle Creek and its associated wetland complex located to the south. Several intermittent and ephemeral tributaries to Gerle Creek intersect the trail, the most notable of which flows through the post-pile area.

The Loon Lake 7th field watershed contains the perennial Ellis Creek and the intermittent drainage where the Friends of the Rubicon (FOTR) Bridge are located. Ellis Creek flows generally southeast and is directly tributary to Loon Lake. In 1975, the Sacramento Municipal Utility District (SMUD) installed a stream gauge on Ellis Creek just above the inlet to Loon Lake and maintained this gauge until 2001. From 1980 to 1997, this gauge recorded several large events that ranged from 137 cubic feet per second (cfs) in 1983 to 413 cfs in 1997 (El Dorado County, 2011). However, the average annual peak flows ranged from approximately 10 to 100 cfs from fall through spring. Summer flows were much lower ranging from approximately 0.1 to 10 cfs with an

occasional increase from approximately 15 to 20 cfs following convective thunderstorms (El Dorado County, 2011).

The intermittent drainage in the FOTR bridge area flows almost south and may be tributary to Loon Lake during high runoff years. Within this watershed is the Rubicon Trail segment from roughly the intersection with the Ellis Intertie in the west to the Soup Bowl area in the east. This segment including unauthorized routes represents a total of approximately 2 miles of trail all of which are on NFS lands. Currently, the Rubicon Trail crosses Ellis Creek and its tributaries by way of hardened low-water crossings and crosses the intermittent drainage where the FOTR Bridge is located with a log bridge and a native surface low-water crossing just downstream.

The Rockbound Lake-Rubicon River 7th field watershed contains several major hydrologic features in close proximity to the Rubicon Trail that include: the three hydrologically connected wetlands in the Winter Camp area; Spider Lake; the perennial Little Rubicon River at the Buck Island Lake outlet; Buck Island Lake; and a small wetland just north of the trail and the Buck Island Lake area. For communication and referencing purposes, these wetlands have been given internal names from west to east as follows: the Soup Bowl Wetland refers to the wetland just south of the trail in the Soup Bowl area, the Winter Camp Wetland refers to the wetland just north of the trail in the Winter Camp area, the Little Sluice Wetland refers to the wetland just north of the trail in the Little Sluice area and adjacent to the Long Bypass, and the Eagle View Wetland refers to the wetland just north of the trail and Buck Island Lake.

Within the Rockbound Lake-Rubicon River watershed is the Rubicon Trail segment from the Soup Bowl area in the west to the Buck Island Overlook in the east. This segment including trail variants and unauthorized routes represents a total of approximately 5 miles of trail which crosses both NFS lands and privately owned land. Trail segments on NFS lands include a section from the Soup Bowl area to private land in the Mud Lake area, a section along the ELD-63-D route (County C Variant or Long Bypass), a section from the Old Big Sluice Box to the Buck Island Overlook, and a section along the ELD-63-F route (County D Variant). Trail segments on privately owned lands include a section from the Mud Lake area to the Old Big Sluice Box and a section along the ELD-63-F route (County D Variant) through the Old Big Sluice Box.

The Rubicon River-Long Lake 7th field watershed contains three wetland features, two of which originate at springs in and adjacent to the trail in the Big Sluice Box area and the third of which is located along the USFS boundary at the T13N R16E Section 6 and T14N R16E Section 31 line. For communication and referencing purposes, these wetlands have been given internal names from south to north as follows: the Big Sluice Spring refers to a spring just below and

east of the trail that feeds a wetland feature, the Big Sluice Wetland refers to a spring in the trail surface that flows down the trail and feeds a pond in the trail, and the USFS Boundary Wetland refers to a wetland feature located adjacent to the trail in the vicinity of the USFS boundary at the T13N R16E S6 and T14N R16E S31 line.

Within the Rubicon River-Long Lake watershed is the Rubicon Trail segment from the Buck Island Overlook in the west to the El Dorado County and Placer County line in the north. This segment represents a total of approximately 2.1 miles of trail and includes both NFS lands and privately owned land. The trail segment on NFS lands extends from the Buck Island Overlook to the USFS boundary at the T13N R16E Section 6 and T14N R16E Section 31 line. The trail segment on privately owned lands extends from the USFS boundary to the El Dorado County and Placer County line.

Water Quality and Beneficial Uses

The CRWQCB, CVR has established and adopted beneficial uses for surface water bodies in the *Fourth Edition of the Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins* (2007). Water bodies within the project area are tributary to the Rubicon River which is ultimately tributary to the Middle Fork American River. Loon Lake and its tributaries are tributary to the South Fork American River via the Loon Lake diversions that route flows from Loon Lake to Gerle Creek Reservoir to Union Valley Reservoir. The Middle Fork American River from its source to Folsom Lake has been designated by the State as a municipal and domestic supply, for irrigation, for stock watering, for power, for contact and other noncontact recreation, for canoeing and rafting, as a cold freshwater habitat, as a potential warm freshwater habitat, for cold spawning, and for wildlife habitat. The South Fork American River from its source to Placerville has the same designations as the Middle Fork with the exception of irrigation and stock watering. These designations would apply to all water bodies within the project area which are ultimately tributary to either the Middle Fork American River or the South Fork American River.

The CRWQCB, CVR has established water quality objectives for inland surface waters in the Sacramento and San Joaquin River Basins. The list of applicable standards can be found in Appendix B (Hydrology Appendices, Appendix A). Parameters of particular concern with regards to the Rubicon Trail would be sediment, bacteria, settle-able materials, suspended material, oil and grease, and turbidity. Of these parameters, sediment, bacteria and petroleum products have the greatest potential to adversely impact water quality and aquatic habitat which could in turn affect beneficial uses for surface waters. Currently, few water quality data are available for water bodies within the project area.

Nonetheless, visual evidence suggests that erosion and sedimentation associated with the trail and trail use have resulted in water quality impacts in the form of increased sediment, nutrient, bacteria, and contaminant delivery to nearby hydrologic features. These effects are likely greatest during and following runoff events.

The Section 303(d) List of Water Quality Limited Segments (2006) was created by the CRWQCB, CVR to comply with Section 303(d) of the Clean Water Act of 1972 which requires each state to identify water bodies that fail to meet applicable water quality standards for surface waters established by the Environmental Protection Agency (EPA). At this time, no water bodies within the project area are listed as impaired and the nearest impaired water body is the South Fork American River below Slab Creek Reservoir which is listed for mercury.

From fall 2002 to fall 2003, SMUD collected water quality parameters for Buck Island Lake, Loon Lake, and Gerle Creek as part of the Upper American River Project (FERC No.2101). Parameters included: Secchi disk depth, temperature, dissolved oxygen, pH, specific conductance, nutrient data, turbidity, total suspended sediments, total dissolved solids, total alkalinity, metals (aluminum, arsenic, barium, iron, manganese, mercury, and selenium), hardness (cadmium, copper, lead, nickel, silver, zinc), and coliform (*E. coli*, fecal coliform). The result was that all samples were within an acceptable range and at times below the reporting and detectable limits (SMUD, 2004).

The CRWQCB, CVR standard for fecal coliform states that “based on a minimum of not less than five samples for any 30-day period shall not exceed a geometric mean of 200/100ml, nor shall more than ten percent of the total number of samples taken during the 30-day period exceed 400 organisms/100ml (CRWQCB, CVR, 2007).” During the five sampling dates, Loon Lake and Buck Island Lake had less than 25 organisms/100 ml while Gerle Creek had results that ranged from <1-350 organisms/100ml (SMUD, 2004).

In July 2004, the area around Spider Lake was closed by El Dorado County and the USFS due to sanitation issues from human waste. Once the area was cleaned up it was reopened. Currently, restroom facilities exist at the three trailheads, Ellis Creek, and Rubicon Springs; but there are no public sanitation facilities along the Rubicon Trail at Spider Lake or Buck Island Reservoir primitive camping areas. Once in the backcountry, trail users must rely on individual human waste disposal methods.

From June 2005 to November 2005, the Center for Regional Environmental Science and Technology (CREST) conducted water and soil sampling on the Rubicon Trail. In areas such as Little Sluice, puddles of oil, drip paths, and

grease spots were observed on the rocks and surrounding soil. Human excrement, litter, and vehicle based contaminants were also observed around Spider Lake. Despite strong visual evidence of contamination, oil and grease samples taken at Ellis Creek and Spider Lake were below the EPA maximum concentration limits for oil and grease in water. Only one sample from Spider Lake following a special event was contaminated with *E-coli*. The *E-coli* results however only suggests that levels in the water are not significant, while visual observations suggest a sanitation problem along the shoreline surrounding Spider Lake (Crawford, 2006).

In contrast to the water samples taken, soil samples more frequently revealed contamination by petroleum products. Sediment samples taken at Ellis Creek, Walker Hill, and Little Sluice showed significant increases in contamination levels as the season of use progressed and when taken following trail events. Core samples taken at Little Sluice, Spider Lake, Ellis Creek, and Walker Hill generally showed the greatest concentration of petroleum products close to the surface (2 to 4 inches deep). Core samples that contained petroleum based contamination also showed evidence of copper and cadmium during the heavy metals analysis (Crawford, 2006).

During the summer of 2009, USFS Recreation Technicians performed trail use and sanitation monitoring along the trail in which 1,274 incidents of toilet paper were observed and 550 piles of human waste. The Ellis Tie and Little Sluice trail segments along with dispersed camping areas at Ellis Creek, Soup Bowl, Little Sluice, and Buck Island Lake had the greatest impacts in the form of toilet paper and unburied human waste (USDA, 2009).

Riparian Resources

The Rubicon Trail in the project area is crossed by several ephemeral, intermittent, and perennial streams and adjacent to several wetland features and lakes/reservoirs. Smaller wetland and hydrologic features vary from containing no riparian/wetland vegetation to supporting small herbaceous communities that contain primarily sedges (*Carex spp.*), self-heal (*Prunella vulgaris*), and spiraea (*Spiraea splendens*). Larger wetlands and hydrologic features contain the herbaceous communities mentioned above along with small to large thickets of riparian shrubs such as mountain alder (*Alnus incana*), red osier dogwood (*Cornus sericea*), and willows (*Salix spp.*). The size and scale of the riparian/wetland communities present are a direct function of the soil type, underlying geologic conditions, and water availability.

Eight major wetlands that support riparian/wetland vegetation and contain perennial water were identified in the project area on NFS lands that occur adjacent to the trail and in many cases receive runoff from the trail. These wetlands have been named internally for this project for ease of identification

and referencing. The names are often associated with a nearby trail or geographic feature. Other major hydrologic features identified in the project area on NFS lands that support riparian/wetland vegetation include the perennial Gerle Creek, the perennial Ellis Creek, the intermittent stream at the FOTR bridge, the shoreline environment of Spider Lake, the Little Rubicon River at the Buck Island Lake outlet, and the shoreline environment of Buck Island Lake. Many of these features either cross the Rubicon Trail or are in close proximity to the trail.

As mentioned above, many hydrologic and riparian features were observed along the Rubicon Trail from Wentworth Springs Campground in the west to the Eldorado National Forest and private land boundary in the east at the T13N R16E Section 6 and T14N R16E Section 31 line. This analysis focuses on seven primary areas of concern that include many of the other features that are within the general geographic area or that are hydrologically connected. Below is a brief description of these seven key areas which are analyzed in the Environment Consequences section with regards to the alternatives and the six RCOs and their applicable standards and guidelines. These areas are organized and discussed from west to east as one travels along the Rubicon Trail from Wentworth Springs Campground to the Eldorado National Forest and private land boundary.

Gerle Creek Wetland Complex: The Gerle Creek Wetland Complex refers to hydrologic and riparian features along and adjacent to the trail from Wentworth Springs Campground in the west to where the trail begins to climb onto the granite slabs in the east. This trail section represents one of the topographically lowest areas along the Rubicon Trail and is adjacent to the perennial Gerle Creek and its associated wetland complex. Dispersed use is common in the area primarily in the form of camping and unauthorized routes. This wetland complex is approximately 35 feet south of the trail in areas just east of Wentworth Springs Campground (measurement is based on field observations using a range finder).

In 2003, SMUD conducted riparian vegetation and wetland studies in which physical and biological characteristics of these features were described. During that time, 9.3 miles of Gerle Creek were assessed from Loon Lake Dam downstream to Gerle Creek Reservoir. The mean gradient of the channel was approximately 2.2 percent with riparian corridor widths ranging from 5 to 200 feet; which likely included the nearby wetland complex in the vicinity of the Wentworth Springs Campground. Channel types in this area were primarily classified as Rosgen type A, B, and C and were at times confined by granite bedrock while in other instances the stream had cut through glacial till and alluvium (SMUD, 2004). Riparian vegetation of diverse age classes was present throughout this section and primarily included lodge pole pine (*Pinus contorta*),

mountain alder (*Alnus incana*), several species of willow (*Salix spp*), red osier dogwood (*Cornus sericea*), and aspen (*Populus tremuloides*). In addition, a diversity of herbaceous species was observed throughout this section.

Ellis Creek Area: The Ellis Creek Area refers to hydrologic and riparian features along and adjacent to the trail in the vicinity of the existing Ellis Creek low-water stream crossing and the proposed bridge location. Included in this area are the nearby dispersed camping areas and numerous intermittent tributaries to the perennial Ellis Creek. Downstream of the project area, Ellis Creek is directly tributary to Loon Lake.

FOTR Bridge: The FOTR Bridge refers to hydrologic and riparian features along and adjacent to the trail in the vicinity of the existing FOTR Bridge. The existing bridge is a small wooden bridge constructed with logs that crosses an intermittent drainage. Downstream of the project area, this intermittent drainage may be tributary to Loon Lake during high runoff years or events.

Winter Camp Wetland Complex: The Winter Camp Wetland Complex refers to hydrologic and riparian features along and adjacent to the trail in the vicinity of the Soup Bowl and Winter Camp areas. Of particular concern are three hydrologically connected wetlands that are referred to from west to east as the Soup Bowl Wetland, the Winter Camp Wetland, and the Little Sluice Wetland. The Soup Bowl Wetland is located approximately 100 feet south of the trail in the Soup Bowl area, while the outlet of the wetland is approximately 190 feet south of the trail in the Winter Camp area (measurements are based on Global Positioning System (GPS) coordinates taken in the field and projected in Geographic Information Systems (GIS)). This wetland receives snowmelt and runoff from the Walker Hill area to the west. Water flows easterly down the trail from the Walker Hill area and through the Soup Bowl area and eventually leaves the trail to the south where it flows directly into the Soup Bowl Wetland.

From the Soup Bowl Wetland outlet, runoff flows north and hits the trail in the Winter Camp area and is then routed east along the incised trail before joining westerly flows from the Little Sluice area. At the convergence of the easterly and westerly flows, a sandy channel heads north leaving the trail and conveying flows to the Winter Camp Wetland, the inlet of which is characterized by thickets of lodgepole pine and willow. The Winter Camp Wetland inlet is approximately 222 feet north of the trail in the Winter Camp area, while the eastern edge of the wetland is approximately 150 feet north of the ELD-63-D route (County C Variant or Long Bypass) (measurements are based on GPS coordinates taken in the field and projected in GIS). Not far from the inlet to this wetland is its outlet which conveys flows north towards the Rubicon River during periods of high runoff, such as snowmelt periods in the early summer. At this time it is uncertain whether runoff from this wetland reaches the

Rubicon River. If so, it would likely occur for a short duration following snowmelt in the early summer. During the remainder of the year the water level of this wetland drops and the inlet and outlet of the wetland do not convey flows.

To the east of the Winter Camp Wetland, north of the trail and in close proximity to the ELD-63-D route (County C Variant or Long Bypass); is the Little Sluice Wetland. This wetland is approximately 90 feet south of the ELD-63-D route (County C Variant or Long Bypass) and approximately 85 feet north of the Rubicon Trail (measurements are based on GPS coordinates taken in the field and projected in GIS). It is connected to the Winter Camp Wetland by a small drainage feature that is crossed by the ELD-63-D route (County C Variant or Long Bypass). This wetland is located in a somewhat confined depression surrounded by granitic bedrock with no inlet and one outlet. All three wetland features are characterized by perennial water and riparian vegetation that includes yellow pond lily (*Nuphar polysepala*), sedges (*Carex spp.*), rushes (*Juncus spp.*), and willows (*Salix spp.*).

Spider Lake: Spider Lake refers to hydrologic and riparian features along and adjacent to the trail in the vicinity of Spider Lake. This includes the lake shoreline environment and wetlands created by high water. Dispersed camping is common in the area on both privately owned lands and NFS lands.

Buck Island Lake Area: The Buck Island Lake Area refers to hydrologic and riparian features along and adjacent to the trail in the vicinity of Buck Island Lake. Of particular concern from west to east is the low-water crossing on the Little Rubicon River at the Buck Island Lake outlet and an unauthorized downstream crossing, a wetland just north of the trail and east of the Buck Island Lake outlet which is referred to in this report as the Eagle View Wetland, and the spurs and dispersed camping areas in close proximity to Buck Island Lake. The Eagle View Wetland is approximately 25 feet west of the NSRELD-63-CD spur (measurement is based on field observation using a range finder) and some of the unauthorized routes in the area are likely inundated by Buck Island Lake in the spring and early summer. Buck Island Lake is actually a reservoir which is tributary to the Rubicon River via the Little Rubicon River.

In 2003, SMUD conducted riparian vegetation and wetland studies in which physical and biological characteristics of these features were described. During that time, 2.8 miles of the Little Rubicon River were assessed from Buck Island Lake downstream to the confluence with the Rubicon River. This section of stream was characterized by reaches confined by granitic bedrock that were classified as primarily Rosgen type A and B channels with high gradient reaches up to 14 percent (SMUD, 2004). Narrow riparian corridor widths ranging from 5 to 20 feet on either side of the stream were observed and primarily consisted

of mountain alder (*Alnus incana*). At Buck Island Lake, small isolated wetlands were observed along the west, north, and south shores that are influenced by seasonal flooding and fluctuations in lake level. Along the water level in areas flooded earlier in the season, needle spike rush or spikesedge (*Eleocharis acicularis*) is sometimes present in a 40 to 60 foot wide zone. Where present blister sedge (*Carex vesicaria*) occupies a zone from the water surface to about one foot above the high water mark where it is then replaced by lodgepole pine (SMUD, 2004).

Big Sluice Box Area: The Big Sluice Box Area refers to hydrologic and riparian features along and adjacent to the trail in the vicinity of the Big Sluice Box. Of particular concern from south to north is a spring and associated wetland just below and to the east of the trail north of the large incised switchback, a spring that originates in the trail and flows north where water is ponding on the trail, and a wetland/wet meadow just east of the trail along the Eldorado National Forest and private land boundary. These features are referred to in this report as Big Sluice Spring, Big Sluice Spring Wetland, Big Sluice Wetland, and USFS Boundary Wetland respectively. The Big Sluice Spring Wetland is located approximately 60 feet east of the trail (measurement is based on field observation using a range finder), the Big Sluice Wetland is in the trail, and the USFS Boundary Wetland is approximately 45 feet east of the trail (measurement is based on GIS data).

Analysis Framework

The area of analysis for direct and indirect effects includes all hydrologic and riparian features within the project area, surrounding environments which have the potential to contribute runoff, sediment, and contaminants to these features, and hydrologic features downstream of the project area such as Loon Lake and the Rubicon River that may be affected by activities within the project area. The analysis of riparian resources relies primarily on the assessment of RCOs with regards to the five alternatives while the watershed analysis uses CWEs to distinguish the level of disturbance between the six alternatives.

As defined in the Sierra Nevada Forest Plan Amendment Record of Decision (SNFPA ROD) of 2004, Riparian Conservation Areas (RCAs) “are land allocations that are managed to maintain or restore the structure and function of aquatic, riparian, and meadow ecosystems. The intent of management direction for Riparian Conservation Areas (RCAs) is to (1) preserve, enhance, and restore habitat for riparian- and aquatic-dependent species, (2) ensure that water quality is maintained or restored, (3) enhance habitat conservation for species associated with the transition zone between upslope and riparian areas, and (4) provide greater connectivity within the watershed”. RCAs are delineated and managed consistent with the RCOs defined in the SNFPA ROD (see Appendix B,

Hydrology Appendices, Appendix D for RCA & RCO desired condition and background).

The SNFPA ROD defines standards and guidelines associated with RCAs and the six RCOs that address the types of management activities that are allowed within RCAs. RCOs essentially provide a checklist for evaluating whether a proposed activity is consistent with the desired conditions described in the Aquatic Management Strategy (AMS). For projects that include activities within RCAs, all applicable RCOs and their associated standards and guidelines must be analyzed (see Appendix B, Hydrology Appendices, Appendix F for standards and guidelines).

Where applicable the potential impacts from the alternatives are analyzed with respect to each RCO and account for specific standards and guidelines (see Appendix B, Hydrology Appendices, Appendix E for RCO consistency). Note that some standards and guidelines apply to specific land allocations while others apply forest-wide (i.e. across all land allocations). At the project level, these standards and guidelines are used in conjunction with desired conditions, management intents, and management objectives for the relevant land allocation to determine appropriate mitigation measures and operating procedures that could occur within RCAs.

Cumulative watershed effects (CWEs) for this project were analyzed using the Equivalent Routed Acre (ERA) method which was initially developed by the Pacific Southwest Region (USDA, 1987) as a model used to quantify changes in flow regimes and delivery of sediment loads to water bodies within a given watershed. This model was adopted by the ENF (Kuehn and Coburn, 1989) and then further refined by the ENF (Carlson and Christiansen, 1993) for current use as a means to evaluate the susceptibility of a watershed for adverse CWEs.

The CWEs analysis assesses the potential for adverse CWEs by comparing the current level of watershed disturbance to an estimate of "the upper limit of watershed tolerance to externally applied factors such as climate and land use" called the Threshold of Concern (TOC). The TOC does not represent the exact point at which CWEs will occur, but serves as an indicator of increasing susceptibility for significant adverse effects. The TOC of a watershed is set based on an index called the Natural Sensitivity Index (NSI). The NSI is computed by weighting various soils, geologic, hydrologic, geomorphic, and climatic characteristics of a watershed according to how they affect runoff processes, sediment delivery and sediment routing. A watershed which has a high NSI, such as one with a large proportion of highly erodible soils on steep slopes in a rain-on-snow precipitation regime, has a low tolerance to watershed disturbance and thus a low TOC. The TOC for a watershed is expressed as a percent of the watershed, typically ranging from approximately 10 to 16

percent. See Appendix B, Hydrology Appendices, Appendix B for a further explanation of the ERA method of assessing the risk of CWEs.

The current level of watershed disturbance is expressed as "percent ERA". The ERA is used as the standardized unit of measure for land disturbance. A road prism is considered to be the reference by which other types of land disturbing activities are measured. The types of effects associated with this reference disturbance unit are increases or concentration of runoff and sediment production. A road is given an ERA coefficient of 1.0. Other types of disturbance such as logging, site preparation and wildfires are equated to a road surface by ERA coefficients that reflect their relative level of contribution to changes in runoff and sediment regimes in the watershed. The "percent ERA" of a watershed is the sum of the ERA for all past disturbance in the watershed divided by the watershed area. The current "percent ERA" of a watershed is then compared to the TOC to provide an initial assessment of CWEs potential or risk of CWEs.

Data and Analysis Methods

The following section presents data and analysis methods specific to hydrology and riparian resources that were used for this analysis.

This analysis is largely based on the following sources of information:

- Attributes contained in GIS concerning the spatial relationships between hydrologic features and the Rubicon Trail and its associated disturbances.
- Field surveys and visual observations concerning the condition of the Rubicon Trail including variants and unauthorized routes and their relationship with nearby hydrologic features.
- Personal knowledge of hydrologic features and the Rubicon Trail uses by resource specialists on the ENF.
- Available water quality data and field observations by SMUD (2004), CREST (Crawford, 2006), the USFS (USDA, 2009), and El Dorado County DOT (2011).

The following data and analysis methods are specific to CWEs.

- Under all alternatives, an average disturbed corridor width of 20 feet was assumed when determining the acres of Riparian Conservation Areas (RCAs) impacted by the trail, trail variants, and unauthorized routes. This analysis was performed using GIS layers for RCAs and the trail. GIS layers for RCAs are based on the RCA widths defined in the SNFPA

ROD (see Appendix B, Hydrology Appendices, Appendix D for RCA & RCO desired condition and background).

The following data and analysis methods are specific to CWEs.

- Cumulative watershed effects (CWEs) analysis performed on April 12, 2012 at the 7th field watershed level using the ENF's CWEs methodology and available data contained in the following spreadsheets: 4335!HdwtrsGerleCr_fut.xls, 4345!_Loon_lake_fut_.xls, 4465!_RockboundLake_RubiconR_fut.xls, and 4475!_URubiconR_fut.xls. These spreadsheets take into account all past, present, and future disturbances within a given 7th field watershed. The risk of CWEs is based on calculations using the lower TOC value rather than a range of values.
- For consistency and the comparison of alternatives, CWEs calculations for all alternatives were performed for the year 2012 and assume that implementation of activities could occur in summer 2012.
- Under all alternatives, the CWEs analysis accounts for all ongoing activities and approved activities within the watershed that have not yet been implemented or completed, including activities on adjacent private lands.
- The CWEs model is based on the presence of roads and trails, which would not change based on season of use, and therefore many of the results look similar across the alternatives.
- Under all alternatives an average disturbed corridor width of 20 feet was applied to the main trail, trail variants, unauthorized routes, and proposed new routes. It was assumed that a width of 20 feet would account for the average trail running surface width, toilet installation, bridge installation, pullouts, motor vehicle use areas, and erosion control features such as flow conveyance and sediment catchment structures that extend beyond the trail surface running width.
- Under Alternatives 1, 3, 4, 5, and 6 an average disturbed corridor width of 10 feet was applied to unauthorized routes proposed to be closed. Since closure and rehabilitation does not involve immediate recovery of a route feature, it was assumed that a width of 10 feet would account for natural recovery and proactive rehabilitation measures designed to reduce the effects of runoff and erosion.
- Average disturbed corridor widths are somewhat subjective and difficult to estimate based on the varying widths of the existing trail, the

uncertainty of recovery and vegetation establishment on closed routes, and the location of activities that could occur within the proposed easements under Alternatives 1, 3, 4, 5, and 6.

Indicator Measures

Indicator Measure 1: The potential for impacts to water quality.

Indicator Measure 2: Riparian area affected by Ellis Creek Bridge construction.

Indicator Measure 3: Acres and miles of trail including the main trail, trail variants, and unauthorized routes within RCAs.

Indicator Measure 4: Consistency with RCOs in the SNFPA.

- **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.
- **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.
- **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.
- **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.
- **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.
- **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.

Environmental Consequences

Direct and Indirect Effects – Alternative 1

Indicator Measure 1: Under Alternative 1, there would be no seasonal operating period and wet season use of the trail would occur. During wet season use; vegetation loss, soil compaction, and soil displacement could occur on some segments of the trail and trail variants and the impacts would vary based on the soil type and depth, vegetation condition, and effective groundcover. These impacts would occur in areas where vehicles avoid obstacles such as snow drifts to continue, and where exposed soils lack effective groundcover in the form of rocks, vegetation, adequate snow cover, and downed woody debris. Soil compaction could accelerate hillslope runoff and erosion rates resulting in the delivery of sediment concentrated flow to nearby hydrologic features. In addition; nutrient, bacteria, and petroleum products where present attach to sediment particles and are delivered to nearby hydrologic features along with sediment.

Many of the impacts described above are expected to be minor under this alternative due to the installation and maintenance of erosion control features by El Dorado County DOT. These features are described in the Saturated Soil Water Quality Protection Plan (SSWQPP, El Dorado County, 2011) and are designed to effectively minimize soil and vegetation impacts, thereby benefitting water quality by reducing sediment availability and capturing sediment during runoff. These erosion control features are physical structures that are designed to meet State water quality objectives as well as USFS BMPs described in the Water Quality Management Handbook (USDA, December 2011).

Water quality impacts associated with wet season use include increased sediment delivery to nearby hydrologic features as a result of the impacts to soils mentioned above, increases in turbidity, and increases in contaminant delivery to nearby hydrologic features. Turbidity and concentrations of suspended sediments would likely increase when vehicles cross streams at high flow and from vehicles driving on the trail when it is conveying water. Mechanical disturbance to small cobbles and gravels during these conditions would result in the exposure and release of fine grained material, causing sediment plumes.

When the trail is conveying large quantities of water as described above, the water depth may actually be above the undercarriage of vehicles resulting in direct removal and transport of petroleum based products and other contaminants. These contaminants then immediately enter the flowing system and could be directly delivered to nearby hydrologic features during these high flow conditions and at stream crossings. These water quality impacts have the potential to negatively affect aquatic species and habitat, as well as alter the

geomorphic conditions of hydrologic features (e.g. sedimentation of wetlands, channel aggradation, filling in of pools). The timing, duration, and severity of these impacts are difficult to predict and would vary based on the amount and timing of wet season traffic. While erosion control feature installation and maintenance would minimize many direct soil impacts, it would not minimize turbidity and contaminant delivery associated with low-water stream crossings and vehicular use during flowing trail conditions.

Indicator Measure 2: Under Alternative 1, a 16 foot wide bridge is proposed on Ellis Creek. Installation of the Ellis Creek Bridge would impact approximately 0.03 acres of the streambanks and channel, and approximately 0.02 acres of riparian vegetation (El Dorado County, 2010). Following bridge completion, approximately 0.02 acres of the streambanks and channel would be rehabilitated along with approximately 0.01 acres of riparian vegetation. During installation activities, areas would be cleared of vegetation resulting in sediment available to be transported to Ellis Creek. Additionally, there could be some turbidity increases and sedimentation associated with instream activities if streambanks and channel substrate are altered. Bridge installation activities would occur in the summer months during dry conditions and low stream flow regimes thereby minimizing the potential for adverse impacts associated with proposed activities.

Under Alternative 1, the existing low-water crossing would be rehabilitated through closure, reshaping of the channel and approaches, and by planting vegetation thereby restoring degraded habitat, water quality, and geomorphic function at the existing crossing. Rehabilitation activities would involve planting approximately 0.04 acres of riparian vegetation and restoring approximately 0.01 acres of streambanks and channel at the existing crossing; which would stabilize these areas minimizing streambank failures and sediment delivery to Ellis Creek.

Indicator Measure 3: Table 3-3 below presents the acres and miles of trail by 7th field watershed that would be within RCAs under Alternative 1, and includes the main trail, trail variants, and unauthorized routes. Table 3-4 below presents the acres of routes by 7th field watershed to be closed and rehabilitated or added to the NFTS that would be within RCAs under Alternative 1, and includes the main trail, trail variants, and unauthorized routes. Table 3-5 below presents miles of routes by 7th field watershed that to be closed and rehabilitated or added to the NFTS that would be within RCAs under Alternative 1, and includes the main trail, trail variants, and unauthorized routes.

Table 3-3: Acres and miles of trail by 7th field watershed and within RCAs.

7th Field Watershed	Acres of Trail ^{1, 2, 3}		Miles of Trail ^{1, 3}	
	Total by Watershed	within RCAs	Total by Watershed	within RCAs
Upper Gerle Creek	6.3	3.3	2.6	1.4
Loon Lake	5.2	1.5	2.1	0.6
Rockbound Lake - Rubicon River	13.0	6.5	5.3	2.8
Rubicon River-Long Lake	5.0	3.5	2.1	1.5
TOTAL	29.5	14.8	12.1	6.3

¹Values account for the trail, trail variants, and routes.

²Values are based on an assumed trail width of 20 feet.

³Values include both privately owned lands and NFS lands.

Table 3-4: Acres of routes within RCAs by alternative to be closed or added.

7th Field Watershed	Action ¹	Acres of Routes within RCAs ²			
		Alt. 1 & Mod. Alt. 3	Alt. 4	Alt. 5	Alt. 6
Upper Gerle Creek	Closed & Rehabilitated	1.21	1.21	1.70	1.21
	Added to NFS	0	0	0	0
Loon Lake	Closed & Rehabilitated	0.34	0	0.34	0.34
	Added to NFS	0	0.34	0	0
Rockbound Lake - Rubicon River	Closed & Rehabilitated	2.01	1.54	3.39	2.19
	Added to NFS	0.78	1.25	0	0.78
Rubicon River-Long Lake	Closed & Rehabilitated	0	0	0.04	0.04
	Added to NFS	0.04	0.04	0	0
Total Acres Of Routes Closed^{3, 4}		3.56	2.75	5.47	3.78
Total Acres Of Routes Added^{3, 4}		0.82	1.63	0	0.78

¹This column refers to routes that would be closed and rehabilitated, and routes that would be added to the NFS.

²Values in these columns represent the acres of routes within RCAs by alternative. Alternative 2 is not included because no routes are proposed to be closed or added under that alternative. For a representation of Alternative 2 by watershed see Table 3-3.

³The total acres of routes within RCAs differ by alternative because Alternatives 5 and 6 include closure and rehabilitation of authorized routes within the Rockbound Lake-Rubicon River 7th field watershed.

⁴These rows refer to the total acres of routes within RCAs that are proposed to be closed or added by alternative.

Table 3-5: Miles of routes within RCAs by alternative to be closed or added.

7th Field Watershed	Action ¹	Miles of Routes within RCAs ²			
		Alt. 1 & Mod. Alt. 3	Alt. 4	Alt. 5	Alt. 6
Upper Gerle Creek	Closed & Rehabilitated	0.53	0.53	0.74	0.53
	Added to NFS	0	0	0	0
Loon Lake	Closed & Rehabilitated	0.14	0	0.14	0.14
	Added to NFS	0	0.14	0	0
Rockbound Lake - Rubicon River	Closed & Rehabilitated	0.91	0.71	1.40	0.99
	Added to NFS	0.36	0.56	0	0.36
Rubicon River-Long Lake	Closed & Rehabilitated	0	0	0.02	0.02
	Added to NFS	0.02	0.02	0	0
Total Acres Of Routes Closed^{3, 4}		1.58	1.24	2.30	1.68
Total Acres Of Routes Added^{3, 4}		0.38	0.72	0.00	0.36

¹This column refers to routes that would be closed and rehabilitated, and routes that would be added to the NFS.

²Values in these columns represent the miles of routes within RCAs by alternative. Alternative 2 is not included because no routes are proposed to be closed or added under that alternative. For a representation of Alternative 2 by watershed see Table 3-3.

³The total miles of routes within RCAs differ by alternative because Alternatives 5 and 6 include closure and rehabilitation of authorized routes within the Rockbound Lake-Rubicon River 7th field watershed.

⁴These rows refer to the total miles of routes within RCAs that are proposed to be closed or added by alternative.

Indicator Measure 4: Consistency with RCOs in the SNFPA.

The following narrative presents the six RCOs and a discussion of how they are affected by Alternative 1 (see Appendix B, Hydrology Appendices, Appendix E for RCO consistency). In addition, the RCOs and their associated standards and guidelines are discussed in Appendix B, Hydrology Appendices, Appendix F. Evaluation of the six RCOs and their standards and guidelines was an interdisciplinary process for this project that involved hydrology, fisheries biology, and botany.

Riparian Conservation Objective #1:

Water bodies within the project area have been designated by the State of California as a municipal and domestic supply, for irrigation, for stock watering, for power, for contact and other noncontact recreation, for canoeing and rafting, as cold freshwater habitat, as potential warm freshwater habitat, for coldwater spawning, and for wildlife habitat. Perennial hydrologic features within the project area such as Gerle Creek, Ellis Creek, Little Rubicon River, Spider Lake, Loon Lake, and Buck Island Lake are coldwater fisheries for brown

and rainbow trout and some areas provide Sierra Nevada yellow-legged frog habitat. In addition, many of the lakes and isolated wetlands provide habitat for the Pacific tree frog and long toed salamander. Water quality parameters of concern in the project area include sediment, bacteria, settle-able materials, suspended material, oil and grease, and turbidity.

Under Alternative 1, the installation and maintenance of erosion control features by El Dorado County DOT along the trail would minimize soil compaction and displacement, and would effectively convey runoff and capture sediment and contaminants, thereby reducing sediment and contaminant delivery potential to nearby hydrologic features. El Dorado County DOT estimated that these erosion control features would reduce soil loss by approximately 25 percent within the Phase I portion of the County's project that includes Wentworth Springs Campground to Little Sluice and the Ellis Intertie. The estimated soil loss in these areas would be approximately 51.19 tons/year following erosion control feature installation (El Dorado County, 2011).

The closure and rehabilitation of unauthorized routes would also reduce water quality impacts associated with unmaintained and degrading routes in close proximity to hydrologic features. In addition, approximately 0.4 miles or 0.8 acres of routes are proposed to be added to the NFTS within RCAs, primarily in close proximity to Buck Island Lake. These routes are existing and would occur outside of the saturated zone or high water level of Buck Island Lake and would therefore have a minimal impact on RCA conditions. The installation of a toilet at Spider Lake would reduce sanitation problems in that area thereby improving water quality along the shoreline zone as it relates to fecal coliform. This toilet may also improve some of the sanitation problems in the Winter Camp area as well, but would not likely meet all demands during high use periods. Sanitation problems in the Gerle Creek area would not likely change because there are no sanitation improvements proposed for that area under this alternative. However, during periods of snowmelt and saturated soil conditions, the current Wentworth Springs toilet could in fact overflow resulting in bacteria delivery to nearby Gerle Creek.

Installation and replacement of bridges at Ellis Creek, the FOTR Bridge, and on the Little Rubicon River at Buck Island Lake outlet would minimize turbidity increases and contaminant (petroleum products and solvents) delivery associated with low-water crossings that negatively impact fisheries, macroinvertebrates, and other aquatic species. The use of bridges would also allow for the restoration and re-vegetation of the existing low-water crossing at Ellis Creek, the low-water crossing below the FOTR Bridge, and the unauthorized downstream crossing on the Little Rubicon River. This would improve water quality and fisheries habitat locally and immediately downstream through decreases in sedimentation, turbidity, and contaminants. These

activities would occur primarily within previously disturbed areas and during dry conditions as well as low flow regimes. Therefore, it is anticipated that negative impacts such as vegetation removal, soil displacement and compaction, and increases in turbidity are expected to be negligible throughout and following project implementation.

In the Winter Camp area, continued sediment and contaminant delivery to the nearby wetlands has been an ongoing problem as well as sanitation issues in the area. Under Alternative 1, the installation and maintenance of erosion control features would reduce sediment and contaminant delivery to these wetland features but would not prevent sediment and contaminant delivery altogether as a result of degrading conditions and historic soil loss. Installation of additional features in the sandy tributary to Winter Camp Wetland would help to capture sediment and reduce sedimentation of this wetland. Route delineation and access restriction along the Long Bypass would also decrease the likelihood of contaminant delivery to the Little Sluice Wetland.

Under Alternative 1, motor vehicle use area at the Little Rubicon River and the easement near Spider Lake would be within the RCAs. However, the motor vehicle use area is designed to reduce dispersed uses in close proximity to the Little Rubicon River and could therefore have some benefits to water quality and beneficial uses. The easement near Spider Lake is wide enough (200 feet) to permit vehicle access to the Lake and could lead to adverse impacts to Spider Lake associated with visitation which could be inconsistent with RCOs.

While Alternative 1 would improve conditions on the trail, there is still the potential for short-term impacts to beneficial uses associated with wet season use. As described in Indicator 1 for this alternative, increases in turbidity and contaminant delivery are expected to occur during low-water stream crossings and through vehicular use when the trail is conveying flow. These impacts are however difficult to predict and at this time are expected to be localized and of short-duration.

Riparian Conservation Objective #2:

Under Alternative 1, the geomorphic and biological characteristics of aquatic features and streams would be maintained or restored and hydrologic connectivity in areas would be improved. The installation and maintenance of erosion control features along the trail would more effectively convey flows, slow runoff velocities, and capture sediment; thereby reducing sediment delivery to nearby hydrologic features and decreasing the erosion potential of runoff. By decreasing the erosion potential of runoff, some channel scour and incision which can cause lateral and vertical instabilities would be reduced. High sediment loads associated with the degrading trail and routes that have the potential to fill in pools and alter aquatic habitat and geomorphic processes

would also be reduced. These improvements would maintain or allow for recovery of riparian and aquatic vegetation associated with special aquatic features and streams.

Unauthorized routes and degrading trail segments would be closed allowing for vegetation reestablishment which in turn improves groundcover and reduces sediment delivery potential to the nearby hydrologic features. Geomorphic and biological conditions of the nearby hydrologic features would be maintained and improved through decreased sediment delivery.

Rehabilitation of spurs would promote infiltration, intercept runoff slowing scouring velocities; and maintain or enhance hydrologic connectivity and geomorphic conditions. Sediment and contaminant delivery associated with degrading spurs and motor vehicle use areas would be reduced as groundcover improves and vegetation becomes reestablished; thereby maintaining or enhancing habitat for aquatic and riparian dependent species.

Bridge installation at Ellis Creek and the rehabilitation of the existing low-water crossing would restore riparian and fisheries habitat at the existing low-water crossing where habitat and geomorphology have been affected by channel widening, sedimentation, and loss of vegetation. Replacement of the FOTR Bridge and rehabilitation of the downstream low-water crossing would reduce sediment delivery associated with streambank failures, and allow for riparian vegetation re-establishment. Bridge installation on the Little Rubicon River at Buck Island Lake outlet should improve aquatic passage once channel deepening at the crossing occurs as channel substrate scours following spill releases from Buck Island Lake. Having a bridge and rehabilitation of the downstream crossing in this area would also eliminate use of the unauthorized downstream crossing which has degraded aquatic and riparian habitat and affected geomorphic processes through streambank failures and sediment delivery.

In the Winter Camp area, hydrologic connectivity would be improved through erosion control feature installation and geomorphic characteristics of the wetlands maintained through the reduction of sediment delivery. The proposed 200 foot easement between Little Sluice and Spider Lake however would be within the RCA of Spider Lake and could increase use in close proximity to the lake. Increased disturbance such as trampling of the shoreline would likely degrade aquatic shoreline habitat and alter shoreline geomorphic processes. Disturbances to shallow water habitat essential for young fish and amphibian larval stages (e.g. Pacific chorus frog tadpoles) would likely increase from increased visitation by the public at Spider Lake and the associated wetlands.

Under this alternative, access to the Eagle View Wetland and the shoreline environment of Buck Island Lake would be restricted by closing unauthorized

routes. This would reduce shoreline disturbance and trampling of riparian vegetation which negatively impact shoreline habitat and geomorphic processes. In the Big Sluice Box area, hydrologic connectivity would be improved through erosion control feature installation, thereby minimizing sediment delivery to the nearby wetlands. Decreases in sediment delivery would in turn improve geomorphic and biological characteristics of these features.

While Alternative 1 would improve conditions on the trail, there is still the potential for short-term impacts to geomorphic and biological characteristics of aquatic features and streams associated with wet season use. As described in Indicator 1 for this alternative, increases in turbidity and contaminant delivery are expected to occur during low-water stream crossings and through vehicular use when the trail is conveying flow. These impacts are however difficult to predict and at this time are expected to be localized and of short-duration. Overall, it is expected that the geomorphic and biological characteristics of aquatic features and streams would be maintained or restored and hydrologic connectivity in areas would be improved through activities proposed under Alternative 1.

Riparian Conservation Objective #3:

Under Alternative 1, proposed activities would not involve any large woody debris additions or removal and therefore would have no effect on RCO #3. Currently, stream channels within the project area are surrounded by lodgepole pine, white fir, red fir, mountain alder, red osier dogwood, aspen, and willow species. Size classes are sufficient to provide bank stability and aquatic habitat, and are available for recruitment into the channel. Therefore, under this alternative large down logs are within the range of natural variability.

Riparian Conservation Objective #4:

Under Alternative 1, proposed activities are designed to improve water quality, aquatic habitat, riparian vegetation, and geomorphic shape and function by slowing runoff velocities, reducing trail erosion, and reducing sediment and contaminant delivery potential. Short-term impacts within RCAs could occur during implementation that would likely result in long-term benefits (e.g. bridge installation). As described in RCO #1 and RCO #2 under this alternative; improvements such as trail work, erosion control feature installation, route closures, toilet installation, and bridge installation would maintain and enhance the physical and biological characteristics of nearby hydrologic features. While many of these activities would occur within close proximity to hydrologic features such as streams, wetlands, and lakes; they would result in improved hydrologic connectivity and reduce adverse impacts to geomorphic processes and aquatic habitat thereby benefitting aquatic- and riparian-dependent species.

Under Alternative 1, the closure and rehabilitation of unauthorized routes would also reduce water quality impacts associated with unmaintained and degrading routes in close proximity to hydrologic features. In addition, approximately 0.4 miles or 0.8 acres of routes are proposed to be added to the NFTS within RCAs, primarily in close proximity to Buck Island Lake (see Table 3-4 and Table 3-5). These routes are existing and would occur outside of the saturated zone or high water level of Buck Island Lake and would therefore have a minimal impact on RCA conditions.

Riparian Conservation Objective #5:

Under Alternative 1, proposed activities are designed to improve water quality, aquatic habitat, riparian vegetation, and geomorphic shape and function by slowing runoff velocities, reducing trail erosion, and reducing sediment and contaminant delivery potential. These activities would at times occur within close proximity to meadows, lakes, and wetlands and could have associated short-term impacts such as removal of groundcover, soil compaction, and sediment delivery to nearby water bodies during construction activities. Overall however, these activities would likely result in long-term benefits to nearby water bodies by reducing sediment and contaminant delivery. As described in RCO #1 and RCO #2 under this alternative; improvements such as trail work, erosion control feature installation, route closures, and toilet installation would preserve, maintain, and in some cases restore lakes and wetlands; thereby providing the ecological conditions and processes needed to recover or enhance the viability of species that rely on these areas. In some cases however, such as the 200 foot easement between Little Sluice and Spider Lake; it is anticipated that adverse impacts to aquatic species that reside in Spider Lake and the associated wetlands could occur from shoreline disturbance by public access. In addition, the use of the Long Bypass would also allow contaminants such as petroleum products to be delivered to the two nearby wetlands.

Riparian Conservation Objective #6:

As described in RCO #1 and RCO #2 under this alternative, the proposed activities are designed to maintain and restore water quality conditions and to maintain and restore habitat for riparian and aquatic species. The proposed activities involve installing, maintaining, and improving erosion control features designed to slow runoff velocities, reduce trail erosion, and reduce sediment and contaminant delivery to nearby water bodies. In addition, the removal of fine sediment from sediment basins would occur that would otherwise be transported to nearby water bodies in future storm and snowmelt events.

Cumulative Watershed Effects (CWEs) – Alternative 1

Cumulative effects consider all past, present, and reasonable foreseeable future land disturbances that affect the project area. The major potential cumulative effects of concern with regards to hydrology and riparian resources would be the degradation of water quality, alteration of geomorphic characteristics and processes, disruptions in hydrologic connectivity, riparian vegetation loss, and the degradation or loss of aquatic habitat. Cumulative effects with regards to each alternative are discussed somewhat qualitatively due to a lack of data and rely on CWEs for a quantitative measure of disturbance. Cumulative Watershed Effects (CWEs) analysis is used to distinguish the amount of disturbances between alternatives and measures effects in the form of ERAs.

Past land disturbances of significance within and adjacent to the project area include primarily road building, water diversions and reservoirs, timber harvest activities, and OHV use. Water diversions and reservoirs have been in place for some time and have little effect on water quality, geomorphic processes, and habitat at this time. Cut tree stumps, historic landings, skid trails, and roads are evident adjacent to the project area on both private and public lands, but have recovered somewhat at this time. Ongoing OHV use is evident within the project area and has resulted in degradation of water quality, alterations of geomorphic characteristics and processes, changes in hydrologic connectivity, and degradation or loss of riparian and aquatic habitat.

Present and foreseeable future land disturbances of concern are primarily OHV use and associated dispersed uses. Other future land disturbances include mechanical treatment of approximately 0.5 acres associated with the Pacific Hazard Tree Project within the Upper Gerle Creek watershed, mechanical treatment of approximately 5 acres within the Loon Lake watershed associated with the Pacific Hazard Tree Project, and mastication and herbicide treatment of approximately 4 acres along the SMUD transmission line in the Loon Lake watershed.

Under Alternative 1, OHV use and associated dispersed uses are expected to continue into the future. Activities proposed in Alternative 1 such as erosion control feature installation and maintenance would likely reduce the amount of sediment and contaminants delivered to nearby hydrologic features following spring snowmelt. Therefore, it is expected that sediment generated and delivered to hydrologic features along with contaminants would be reduced. In addition, impacts to channel morphology and riparian vegetation would be reduced through bridge installation and sanitation problems would be improved through toilet installation. However, it is expected that some increases in turbidity and contaminant delivery would still occur associated with wet season use. During high flow conditions, when the trail is conveying flow and at low-

water crossings, it is expected that contaminants such as petroleum products and solvents could be washed from the undercarriage of vehicles; thereby impacting water quality and aquatic habitat. Mechanical disturbance of small cobbles and gravels along the trail when flowing and at low-water crossings could expose and release fine particles, thereby creating sediment plumes and increasing turbidity.

For CWEs, Table 3-3, Table 3-6, and Table 3-7 were used and represent a summary of acres and miles of trail, trail variants, and routes to be added or closed by 7th field watershed. These figures vary slightly based on the amount of routes to be added or closed by alternative. The CWEs analysis is based on the presence of linear features and disturbances and does not account for the amount of use or fluctuations during seasonal use.

Table 3-6: Acres of routes by alternative to be closed or added.

7 th Field Watershed	Action ¹	Acres of Routes ²			
		Alt. 1 & Mod. Alt. 3	Alt. 4	Alt. 5	Alt. 6
Upper Gerle Creek	Closed & Rehabilitated	2.35	2.35	3.44	2.35
	Added to NFS	0	0	0	0
Loon Lake	Closed & Rehabilitated	0.36	0.02	0.36	0.36
	Added to NFS	0	0.34	0	0
Rockbound Lake - Rubicon River	Closed & Rehabilitated	3.27	2.23	5.28	3.76
	Added to NFS	0.95	1.99	0	0.87
Rubicon River-Long Lake	Closed & Rehabilitated	0.15	0.15	0.24	0.24
	Added to NFS	0.10	0.10	0	0
Total Acres Of Routes Closed^{3, 4}		6.13	4.75	9.32	6.71
Total Acres Of Routes Added^{3, 4}		1.05	3.0	0	0.87

¹This column refers to routes that would be closed and rehabilitated, and routes that would be added to the NFTS.

²Values in these columns represent the acres of routes by alternative. Alternative 2 is not included because no routes are proposed to be closed or added under that alternative. For a representation of Alternative 2 by watershed see Table 3-3.

³The total acres of routes differ by alternative because Alternatives 5 and 6 include closure and rehabilitation of authorized routes within the Rockbound Lake-Rubicon River and Upper Gerle 7th field watersheds.

⁴These rows refer to the total acres of routes that are proposed to be closed or added by alternative.

Table 3-7: Miles of routes by alternative to be closed or added.

7th Field Watershed	Action ¹	Miles of Routes ²			
		Alt. 1 & Mod. Alt. 3	Alt. 4	Alt. 5	Alt. 6
Upper Gerle Creek	Closed & Rehabilitated	0.97	0.97	1.42	0.97
	Added to NFS	0	0	0	0
Loon Lake	Closed & Rehabilitated	0.15	0.01	0.15	0.15
	Added to NFS	0	0.14	0	0
Rockbound Lake - Rubicon River	Closed & Rehabilitated	1.35	0.92	2.18	1.55
	Added to NFS	0.39	0.82	0	0.36
Rubicon River-Long Lake	Closed & Rehabilitated	0.06	0.06	0.10	0.10
	Added to NFS	0.04	0.04	0	0
Total Acres Of Routes Closed⁴		2.53	1.96	3.85	2.77
Total Acres Of Routes Added^{3,4}		0.43	1.00	0	0.36

¹This column refers to routes that would be closed and rehabilitated, and routes that would be added to the NFS.

²Values in these columns represent the miles of routes by alternative. Alternative 2 is not included because no routes are proposed to be closed or added under that alternative. For a representation of Alternative 2 by watershed see Table 3-3.

³The total miles of routes differ by alternative because Alternatives 5 and 6 include closure and rehabilitation of authorized routes within the Rockbound Lake-Rubicon River and Upper Gerle 7th field watersheds.

⁴These rows refer to the total miles of routes that are proposed to be closed or added by alternative.

Under Alternative 1, a 50 foot easement would be granted allowing for the installation and maintenance of erosion control features such as flow conveyance and sediment catchment structures. Within the Upper Gerle Creek watershed approximately 1 mile of unauthorized routes is proposed to be closed (see Table 3-7). Within the Rockbound Lake-Rubicon River watershed approximately 1.4 mile of unauthorized routes is proposed to be closed while approximately 0.4 miles of unauthorized routes are proposed to be added. Under this alternative, there would be a low risk of CWEs in the four 7th field watersheds within the project area. The maximum amount of ERAs associated with the Rubicon Trail, trail variants, and unauthorized routes in any watershed would be approximately 11.3; accounting for approximately 0.20% of that watershed (see Table 3-8). Therefore under Alternative 1, proposed activities along with the closure and addition of routes would have minor impacts on the watersheds within the project area.

Table 3-8: Risk of CWEs for the Rubicon Trail Easement and Resource Improvement Project.

2012 Equivalent Roaded Acres (ERA) by 7th Field Watershed								
7th Field Watershed	Threshold of Concern (TOC)	Action ¹	All Watershed Activities				Rubicon Trail ⁶	
			Total ERA	% of watershed ²	% of TOC ³	Risk of CWE ⁴	ERA ⁵	% of watershed
Upper Gerle Creek	14-16	Alternatives 1, 3, 4, and 6	470	5.9	42	Low	5.2	0.07
		Alternative 2 - No Action	470				6.3	0.08
		Alternative 5	468				4.6	0.06
Loon Lake	14-16	Alternatives 1, 3, 5, and 6	140	2.7	20	Low	5.0	0.10
		Alternatives 2 and 4	141				5.2	
Rockbound Lake - Rubicon River	10-12	Alternatives 1 and 3	18	0.3	3	Low	11.3	0.20
		Alternative 2 - No Action	20				12.9	0.22
		Alternative 4	19				11.8	0.20
		Alternative 5	17				10.3	0.17
		Alternative 6	18				11.1	0.19
Rubicon River-Long Lake	12-14	Alternatives 1, 3, 4, 5, and 6	17	0.1	1	Low	4.9	0.04
		Alternative 2 - No Action					5.0	

¹All activities in this table include other approved activities within the watershed that have not yet been implemented or completed, including activities on adjacent private lands.

²ERAs as a percentage of the watershed refers to the percentage of a given watershed that the calculated ERA in a given year represents. E.g. Upper Gerle Creek No Action % of watershed = 470 acres / 7,940 acres x 100

³ERAs as a percentage of TOC was calculated using the lower TOC limit. E.g. Upper Gerle Creek ERA % of TOC = ERA % of watershed / 14 x 100

⁴Risk is based on the ERA value as a percentage of the TOC. See Appendix B for Risk Categories.

⁵ERA values for all alternatives are based on an average disturbed trail corridor width of 20 feet. Additional routes with no easement to be added were assigned an average width of 20 feet, while routes to be closed were assigned an average width of 10 feet to account for natural recovery and proactive rehabilitation measures designed to reduce the effects of runoff and erosion.

⁶Calculated ERA values in these columns are for the Rubicon Trail only and include recognized trail segments, trail variants, unauthorized routes to be added or closed, and proposed new routes.

Direct and Indirect Effects – Alternative 2

Indicator Measure 1: Under Alternative 2, there would be no seasonal operating period and wet season use of the trail would occur. During wet season use; trail widening, vegetation loss, soil compaction, and soil displacement could occur on some segments of the trail and trail variants and the impacts would vary based on the soil type and depth, vegetation condition, and effective groundcover. These impacts would occur in areas where vehicles avoid obstacles such as snow drifts to continue, and where exposed soils lack effective groundcover in the form of rocks, vegetation, adequate snow cover, and downed woody debris. Impacts to soil conditions could lead to the formation of ruts, rills, gullies, and compacted surfaces. Ruts, rills, and gullies channel runoff increasing hillslope erosion rates and delivering sediment concentrated flow to nearby hydrologic features while compacted surfaces have decreased infiltration rates and thereby accelerate hillslope runoff and erosion rates. In addition; nutrients, bacteria, and petroleum products where present attach to sediment particles and are delivered to nearby hydrologic features along with sediment.

These impacts are expected to be substantial under this alternative given the uncertainty of continued trail maintenance and erosion control feature installation by El Dorado County DOT. Erosion control features where properly installed and maintained would effectively minimize soil and vegetation impacts mentioned above. Under this alternative, it is expected at this time that erosion control feature installation beyond the Little Rubicon River would not occur and little to no future maintenance of previously installed erosion control features would occur.

Water quality impacts associated with wet season use include increased sediment delivery to nearby hydrologic features as a result of the impacts to soils mentioned above, increases in turbidity, and increases in contaminant delivery to nearby hydrologic features. Turbidity and concentrations of suspended sediments would likely increase when vehicles cross streams at high flow and from vehicles driving on the trail when it is conveying water. Mechanical disturbance to small cobbles and gravels during these conditions would result in the exposure and release of fine grained material, causing sediment plumes.

When the trail is conveying large quantities of water as described above, the water depth may actually be above the undercarriage of vehicles resulting in direct removal and transport of petroleum based products and other contaminants. These contaminants then immediately enter the flowing system and could be directly delivered to nearby hydrologic features during these high flow conditions and at stream crossings. These water quality impacts have the

potential to negatively affect aquatic species and habitat, as well as alter the geomorphic conditions of hydrologic features (e.g. sedimentation of wetlands, channel aggradation, filling in of pools). The timing, duration, and severity of these impacts are difficult to predict and would vary based on the amount and timing of wet season traffic.

Alternative 2 would likely involve the installation of erosion control features designed to convey flows and capture sediment during summer 2012. It would not involve continued maintenance of previously installed erosion control features, the installation of bridges at Ellis Creek and Buck Island Lake outlet, or the closure and rehabilitation of unauthorized routes. Therefore, the trail surface would continue to degrade, concentrate runoff during snowmelt conditions, and transport high sediment loads. In areas susceptible to soil impacts, soil conditions would continue to degrade thereby impacting water quality, aquatic species and habitat, and geomorphic characteristics of nearby hydrologic features. Low-water crossings on perennial streams would continue at high flow increasing the likelihood of turbidity increases and contaminant delivery to hydrologic features. Contaminants such as petroleum based products and other solvents could be directly delivered to nearby hydrologic features during stream crossings at high flow and when the trail is transporting a considerable amount of water. These water quality impacts have the potential to negatively affect aquatic species and habitat, as well as alter the geomorphic conditions of hydrologic features (e.g. sedimentation of wetlands, channel aggradation, filling in of pools). In addition, unauthorized routes with exposed soils in close proximity to hydrologic features would continue to deliver high sediment loads during wet season use.

Indicator Measure 2: Under Alternative 2, bridge installation and rehabilitation of the existing low-water crossing are not proposed. Therefore, adverse impacts to water quality, aquatic species and habitat, and geomorphic function would continue at the existing low-water crossing. Existing conditions at the low-water crossing have resulted in increased sediment and contaminant delivery (e.g. petroleum products and solvents) to Ellis Creek from the degraded approaches and from vehicles crossing during high flow conditions. Aquatic habitat at and immediately below the crossing has been impacted by the filling in of pools, channel widening, and riparian vegetation loss. These habitat impacts in turn raise water temperature and decrease dissolved oxygen content thereby affecting aquatic species. In addition, geomorphic functions at the crossing have been altered by streambank failures, sedimentation, and channel widening.

Indicator Measure 3: Under Alternative 2, the total acres and miles of trail, trail variants, and unauthorized routes within RCAs would be similar to Alternative 1 (see Table 3-5). However, the management of the trail, routes, and

variants would be different under Alternative 2. Under this alternative, no changes to the existing trail conditions are proposed and therefore there would be no closure and rehabilitation of unauthorized routes as proposed under Alternative 1 and no routes would be added to the NFTS as proposed under Alternative 1. All existing authorized and unauthorized routes would continue to be used in a similar manner as previous years leading to continued sediment and contaminant delivery to nearby water bodies in degraded areas.

Indicator Measure 4: Consistency with RCOs in the SNFPA.

Riparian Conservation Objective #1:

Under Alternative 2, ongoing and current uses of the Rubicon Trail would continue. No trail improvements, closures, bridges, toilets, or erosion control features are currently proposed under this alternative. However, El Dorado County DOT would likely continue the installation of erosion control features during summer 2012 to Buck Island Lake outlet. El Dorado County DOT estimated that soil loss within the Phase I portion of the County's project that includes Wentworth Springs Campground to Little Sluice and the Ellis Intertie prior to the installation of erosion control features; was approximately 68.31 tons/year (El Dorado County, 2011). This figure would likely be reduced by installation of erosion control features that occurred during summer 2010 and 2011. However, continued maintenance of features may or may not occur under this alternative and adverse impacts to water quality and aquatic habitat would occur, affecting beneficial uses.

Native surface roads and OHV trails in close proximity to stream channels can have adverse impacts on channel morphology and water quality through the introduction of fine sediment. OHV trails can adversely affect hydrologic conditions through compacted trail surfaces, interception of subsurface runoff by trail cutbanks, interception of surface flow at stream crossings, and by the dispersion or concentration of runoff by trail surfaces. These impacts accelerate erosional processes on the landscape and sediment delivery to nearby water bodies.

Wet season trail use without properly maintained erosion control features would likely result in trail widening, rut formation, compacted surfaces, and vegetation loss; thereby accelerating erosion and sediment delivery associated with the trail. Sediment and contaminant delivery to nearby hydrologic features would continue during runoff events and water quality impacts associated with low-water crossings at high flows would continue. Sanitation problems at notable areas such as Spider Lake, Winter Camp, and Buck Island Lake would continue. However, the installation of a new restroom at Ellis Creek and increased wag bag usage would help decrease these impacts. The introduction of bacteria and nutrients have the potential to increase algal blooms (e.g.

eutrophication), which increases water temperatures and decreases dissolved oxygen levels.

The Ellis Creek crossing on the Rubicon Trail is severely degraded and has resulted in changes in local geomorphology and water quality. The channel has widened at this location and contains fines from deposition from eroding streambanks and denuded surfaces. Sediment is being delivered both from upstream streambank failures and runoff, as well as from the approaches along the trail that channel water during runoff events. Vehicles crossing noticeably increase turbidity when they drive through. In addition to sediment; petroleum and other contaminants have been observed as sheen on the water surface and are being delivered both from runoff and when vehicles drive across the low-water crossing. It is important to note that very few fish and macroinvertebrates were observed below the low-water crossing. This is likely due to excessive fine grained material being contributed from the native surface trail approaches to the crossing and increases in turbidity during vehicular crossings of Ellis Creek. Research shows that excessive fine grained material has the potential to adversely impact spawning gravel for rainbow trout, brook trout, and brown trout (Kondolf and Wolman, 1993).

To the east of Ellis Creek, the trail crosses an unnamed intermittent drainage that contains alders and shows evidence of recent scour and deposition. During high runoff events, this drainage may be tributary to Loon Lake. At this location the FOTR Bridge spans the drainage and discourages use of the downstream native surface low-water crossing. While some debris, undercut banks, and sediment deposition were observed upstream of the existing wood bridge; it does appear to be functional at this time when it is used. High flow events and continued deposition of debris and sediment could lead to streambank failures above the bridge or failure of the bridge in the future. The low-water crossing downstream of the bridge is severely degraded and has altered channel characteristics at this location, resulting in a widened depositional zone rather than a natural confined, moderate gradient transport channel reach. The approaches are incised and continually deliver sediment to the drainage during runoff events.

In the Winter Camp area, the Winter Camp Wetland is quickly being filled with fine sediment from the trail. This sediment primarily originates in the Soup Bowl and Winter Camp areas with some additional sediment input coming from the Little Sluice area. In addition to sediment, this area has known sanitation issues and often contains high concentrations of petroleum products and solvents. The primary tributary channel to the Winter Camp Wetland originates just west of the Soup Bowl Wetland. This channel receives much of its runoff from the trail prior to reaching the Soup Bowl Wetland. From the Soup Bowl Wetland this channel flows through the Winter Camp area on its way to Winter

Camp Wetland. Flowing through the highly degraded and incised Winter Camp area, this channel is concentrated with fine sediment and contaminants. Just east and upstream of the Winter Camp Wetland is the Little Sluice Wetland. It is in close proximity to the Little Sluice Long Bypass which crosses in the drainage depression between the two wetlands. Of particular concern in this area is the likelihood of petroleum products and contaminants being delivered to the wetland during runoff events. Staining on the rocks was observed as was evidence of vehicular use in close proximity to the wetland.

The Rubicon Trail crosses the Little Rubicon River below the outlet of Buck Island Lake in the northwest corner of the lake. The existing crossing is a low-water crossing that consists of bedrock and coarse rock material. Here the channel has been widened by the crossing and altered by in-channel vehicular use. Contaminant delivery (e.g. petroleum products) associated with the low-water crossing could still occur if vehicle undercarriages are submerged, which would negatively impact water quality and aquatic species immediately downstream. Immediately downstream of the crossing is a large ponded area that is likely the result of vehicles driving in the stream to access the nearby granite parking area and dispersed campsites. Downstream from these areas, there is another rock lined low-water crossing that has resulted in streambank failures, ponding of flows upstream, and channel widening. In addition, nearby dispersed camping is encroaching on the Little Rubicon River as is vehicular use.

Other observed impacts associated with existing conditions include sanitation problems near Gerle Creek, Buck Island Lake, and the Eagle View Wetland. Unauthorized use has also encroached on these hydrologic features resulting in loss of some riparian habitat. In addition, soil loss and vehicular use in the Big Sluice Box area is continuing to deliver contaminants and excessive amounts of sediment to the nearby Big Sluice Spring, Big Sluice Wetland, and USFS Boundary Wetland.

Riparian Conservation Objective #2:

Under Alternative 2, runoff would continue to flow long distances on the trail in the spring increasing the erosion potential of the flow and delivering high sediment loads to nearby hydrologic features. Channel scour, incision, and streambank failures associated with increased runoff would continue. Accumulation of excessive amounts of sediment in channels and other hydrologic features would continue, thereby adversely impacting aquatic habitat and geomorphic processes.

Low-water crossings would continue to directly impact streambanks and channel substrate, which in turn affect geomorphic processes and aquatic habitat. The introduction of petroleum products and solvents at low-water

crossings and in areas of contaminant accumulation would adversely affect biological characteristics of water bodies. Dispersed uses in close proximity to wetlands and lakes are adversely impacting shoreline biological characteristics and geomorphic processes through direct shoreline trampling and by introducing contaminants.

Riparian Conservation Objective #3:

The effects under this alternative would be similar to those under Alternative 1 because this alternative would not involve any large woody debris additions or removal and therefore would have no effect on RCO #3.

Riparian Conservation Objective #4:

Under Alternative 2, no management activities within RCAs and CARs are proposed. Degrading trail conditions, impacted stream crossings, and sanitation problems would continue as described in RCO #1 and RCO #2 under this alternative. As a result, adverse impacts to water quality and beneficial uses, aquatic habitat, hydrologic connectivity, and geomorphic processes would continue. Therefore, under this alternative, the lack of management activities would not enhance or maintain the physical and biological characteristics associated with aquatic- and riparian-dependent species; but would likely contribute to the continued degradation of these characteristics.

Riparian Conservation Objective #5:

This alternative would not preserve, restore, or enhance meadows, lakes, and wetlands; and therefore would not provide the ecological conditions and processes needed to recover or enhance the viability of species that rely on these areas. As described in RCO #1 and RCO #2 under this alternative; water quality degradation, alteration of geomorphic processes, disruption of hydrologic connectivity, and aquatic habitat loss and degradation would continue.

Riparian Conservation Objective #6:

Adverse impacts to water quality, aquatic habitat, geomorphic processes, and hydrologic connectivity would continue as described in RCO #1 and RCO #2 under this alternative. This alternative would not maintain, restore, or enhance water quality and habitat for riparian and aquatic species; and would likely contribute to the continued degradation of these resources.

Cumulative Watershed Effects (CWEs) – Alternative 2

Under Alternative 2, past, present, and other foreseeable future land disturbances in the project area watersheds would be similar to Alternative 1.

The primary distinction between Alternative 2 and Alternative 1 is that all authorized and unauthorized routes would remain open in this alternative and that continued maintenance of erosion control features may or may not occur in the future. Cumulative effects associated with water quality degradation, alterations to geomorphic processes, disruptions in hydrologic connectivity, and loss of aquatic habitat and riparian vegetation would continue. Soil compaction, soil displacement, vegetation cover loss, and the development of water flow patterns would continue to occur during wet season vehicular use. The result would be accelerated erosion and sediment delivery to nearby hydrologic features during spring snowmelt. Stream channel morphology would continue to be altered at low-water crossings associated with sediment delivery and streambank failures from mechanical erosion and riparian vegetation loss. Petroleum products and solvents would continue to be delivered to nearby hydrologic features during wet season use, low-water crossings, and dispersed vehicular use on unauthorized routes. In addition, human waste is prevalent in areas along the trail and is often in close proximity to hydrologic features contributing to degrading water quality conditions.

Cumulative watershed effects (CWEs) under this alternative would increase slightly for the four watersheds within the project area (see Table 3-8). This slight increase in ERAs from Alternative 1 would range from 0.1 to 1.6 additional ERAs associated with the Rubicon Trail project. This increase is the result of no unauthorized routes being proposed to be closed and rehabilitated under this alternative. Under Alternative 2, there would be a low risk of CWEs in the four 7th field watersheds within the project area.

It is important to note that while the ERA values appear similar across alternatives, CWEs would likely decrease in the long-term in all alternatives except for Alternative 2. Alternatives 1, 3, 4, 5, and 6 include some route closures and the installation and maintenance of erosion control features. As vegetation becomes reestablished in closed areas and as structures more efficiently capture sediment and convey runoff, the ERA values under those alternatives would likely be reduced over time. Since this model is based on the presence of roads and trails, it does not capture the amount of sediment being generated and delivered through the currently degrading trail conditions and how this could be reduced through the trail improvements proposed in Alternatives 1, 3, 4, 5, and 6.

Direct and Indirect Effects – Modified Alternative 3

Indicator Measure 1: Modified Alternative 3 involves the use of a saturated soil management strategy for addressing vehicle use during the wet season. Effectiveness monitoring of erosion control features from the SSWQPP would occur annually during peak runoff conditions. If monitoring demonstrates

inadequate or ineffective erosion control features, then a seasonal closure would be implemented from March 1st to May 15th. This strategy would be adequate for addressing vegetation removal, soil displacement, and soil compaction; thereby improving water quality conditions associated with sediment delivery and increases in turbidity. In addition, more routes would be closed and rehabilitated under this alternative which would mean there would be less routes to convey runoff during snowmelt and high flow conditions.

While this alternative addresses soil impacts and sedimentation associated with wet season use, it does not address potential contaminant (e.g. petroleum products and solvents) delivery to nearby hydrologic features associated with vehicular trail use during runoff conditions. During spring snowmelt, the trail surface as well as intersected drainages, convey large quantities of water. Vehicular use during this period would result in wet intermittent stream crossings and portions of the vehicle being submerged not only at these crossings but on the trail during high flows. The result would be the rinsing of contaminants from the undercarriage of vehicles and the transport of these contaminants to nearby hydrologic features. These impacts would be reduced in the event that erosion control features are ineffective and a seasonal closure is implemented from March 1st to May 15th. At this time, the impact of contaminant delivery associated with wet season use is somewhat unknown but expected to be minor and of short duration.

Indicator Measure 2: The effects under this alternative would be similar to those under Alternative 1.

Indicator Measure 3: The effects under this alternative would be similar to those under Alternative 1.

Indicator Measure 4: Consistency with RCOs in the SNFPA.

Riparian Conservation Objective #1:

The effects to beneficial uses under this alternative would be similar to those under Alternative 1, with the following exceptions. The use of a saturated soil management strategy would ensure that soil impacts, turbidity increases, and sedimentation are reduced, thereby improving water quality with regards to sediment. Under this alternative however, contaminant (e.g. petroleum products and solvents) delivery to nearby hydrologic features associated with wet crossings and vehicular use of the trail during flowing conditions would still occur except in the event that erosion control features are ineffective and a seasonal closure is implemented from March 1st to May 15th. Impacts associated with contaminant delivery during runoff conditions however are expected to be minor and of short duration.

The 75 foot easement between Little Sluice and Spider Lake would be outside of the RCA of Spider Lake, thereby minimizing vehicle access within the RCA. This alternative would not include a bridge on the Little Rubicon River but would have an elevated rock ford which would be an improvement over the existing low-water crossing because it would reduce the contact between flowing water and the undercarriage of vehicles during wet crossings. This would essentially reduce the potential for contaminant delivery to the Little Rubicon River. Only the tires of vehicles would be expected to be submerged during the wet crossing. There is however, a slight potential for increases in turbidity during wet crossings if material shifts from the mechanical action of vehicle tires. These increases are expected to be negligible and short-lived in duration.

Riparian Conservation Objective #2:

The effects to the geomorphic and biological characteristics of aquatic features and streams under this alternative would be similar to those under Alternative 1, with the following exceptions: The use of a saturated soil management strategy would ensure that soil impacts, turbidity increases, and sedimentation are reduced, thereby improving water quality with regards to sediment. Under this alternative however, contaminant (e.g. petroleum products and solvents) delivery to nearby hydrologic features associated with wet crossings and vehicular use of the trail during flowing conditions would still occur except in the event that erosion control features are ineffective and a seasonal closure is implemented from March 1st to May 15th. Impacts associated with contaminant delivery during runoff conditions however are expected to be minor and of short duration.

The reduced easement width at Little Sluice would minimize vehicle access within the RCA of Spider Lake, thereby reducing potential degradation of biological characteristics that could be associated with the introduction of fecal coliform bacteria to the lake and reducing geomorphic alterations that could be associated with shoreline bank disturbances.

The elevated rock ford, if properly designed, would reduce contact between the undercarriage of vehicles and flowing water having a minimal impact on biological characteristics in the Little Rubicon River. In addition, this design should have a minimal impact on geomorphic characteristics and aquatic passage at the crossing even during low flow conditions. Rehabilitation of the downstream crossing would stabilize banks and allow riparian vegetation to recover, thereby reducing impacts to aquatic habitat and geomorphic processes in that area.

Riparian Conservation Objective #3:

The effects under this alternative would be similar to those under Alternative 1 because this alternative would not involve any large woody debris additions or removal and therefore would have no effect on RCO #3.

Riparian Conservation Objective #4:

The effects to physical and biological characteristics associated with aquatic- and riparian-dependent species under this alternative would be similar to those under Alternative 1, with the following exceptions: The use of a saturated soil management strategy would ensure that soil impacts, turbidity increases, and sedimentation are reduced, thereby improving water quality with regards to sediment. Under this alternative however, contaminant (e.g. petroleum products and solvents) delivery to nearby hydrologic features associated with wet crossings and vehicular use of the trail during flowing conditions would still occur except in the event that erosion control features are ineffective and a seasonal closure is implemented from March 1st to May 15th. Impacts associated with contaminant delivery during runoff conditions however are expected to be minor and of short duration.

Moving the toilet at the Wentworth Springs Campground and by decreasing the easement between Little Sluice and Spider Lake, the RCA conditions in these areas would be improved through these actions by minimizing the probability of human waste delivery to Gerle Creek during saturated conditions and by minimizing vehicle access within the RCA of Spider Lake.

Riparian Conservation Objective #5:

The effects under this alternative would be similar to those under Alternative 1 with a few exceptions. As described in RCO #1 and RCO #2 under this alternative, reducing the easement at Little Sluice and moving the toilet at Wentworth Springs Campground would primarily benefit water quality conditions and aquatic habitat which would preserve, maintain, and in some cases restore lakes and wetlands; thereby providing the ecological conditions and processes needed to recover or enhance the viability of species that rely on these areas.

The use of a saturated soil management strategy would ensure that soil impacts, turbidity increases, and sedimentation are reduced, thereby improving water quality with regards to sediment. Under this alternative however, contaminant (e.g. petroleum products and solvents) delivery to nearby hydrologic features associated with wet crossings and vehicular use of the trail during flowing conditions would still occur except in the event that erosion control features are ineffective and a seasonal closure is implemented from

March 1st to May 15th. Impacts associated with contaminant delivery during runoff conditions however are expected to be minor and of short duration.

Riparian Conservation Objective #6:

The effects under this alternative would be similar to those under Alternative 1 with a few exceptions. As described in RCO #1 and RCO #2 under this alternative, reducing the easement width at Little Sluice and moving the toilet at Wentworth Springs Campground would primarily benefit water quality conditions, aquatic habitat, and riparian vegetation; thus maintaining and restoring water quality and habitat for riparian and aquatic species.

The use of a saturated soil management strategy would ensure that soil impacts, turbidity increases, and sedimentation are reduced, thereby improving water quality with regards to sediment. Under this alternative however, contaminant (e.g. petroleum products and solvents) delivery to nearby hydrologic features associated with wet crossings and vehicular use of the trail during flowing conditions would still occur except in the event that erosion control features are ineffective and a seasonal closure is implemented from March 1st to May 15th. Impacts associated with contaminant delivery during runoff conditions however are expected to be minor and of short duration.

Cumulative Watershed Effects (CWEs) – Modified Alternative 3

Under Modified Alternative 3, past, present, and foreseeable future activities would be similar to Alternative 1, with a few exceptions. The use of a saturated soil management strategy would ensure that soil impacts, turbidity increases, and sedimentation are reduced, thereby improving water quality with regards to sediment. Under this alternative however, contaminant (e.g. petroleum products and solvents) delivery to nearby hydrologic features associated with wet crossings and vehicular use of the trail during flowing conditions would still occur except in the event that erosion control features are ineffective and a seasonal closure is implemented from March 1st to May 15th. Impacts associated with contaminant delivery during runoff conditions however are expected to be minor and of short duration.

Cumulative watershed effects (CWEs) under this alternative would be similar to those under Alternative 1 (see Table 3-8). This alternative involves closure and rehabilitation of the same routes proposed in Alternative 1 along with the addition of the same routes proposed in Alternative 1.

Direct and Indirect Effects - Alternative 4

Indicator Measure 1: The effects of wet season use under this alternative would be similar to those under Alternative 1, except that wet season use could

potentially occur on approximately 1 mile of unauthorized routes added in Alternative 4 (0.6 miles more than Alternative 1). This alternative involves additional routes as mentioned below in Indicator 3. The addition and use of these routes under Alternative 4 could potentially result in some increases in turbidity and contaminant delivery beyond that expected in Alternative 1 because some of these additional routes would be within RCAs. At this time, this increase is difficult to quantify and it is expected to be minor.

Indicator Measure 2: The effects under this alternative would be similar to those under Alternative 1.

Indicator Measure 3: Under Alternative 4, there would be approximately 0.34 acres or 0.14 miles of additional routes within RCAs in the Loon Lake watershed when compared to Alternatives 1 (see Table 3-4 and Table 3-5). In addition there would be approximately 0.5 acres or 0.2 miles of additional routes within RCAs in the Rockbound Lake-Rubicon River watershed under this alternative when compared to Alternative 1 (see Table 3-4 and Table 3-5). There would be a slight increase in acres or miles of routes to be added in these two watersheds outside of RCAs as well when compared to Alternative 1 (see Tables 3-6 and 3-7). The addition of routes within RCAs in these two watersheds could increase the likelihood of sediment and contaminant delivery to nearby water bodies thereby adversely impacting water quality, geomorphic processes, and aquatic habitat.

Indicator Measure 4: Consistency with RCOs in the SNFPA.

Riparian Conservation Objective #1:

The effects under this alternative would be similar to those under Alternative 1, except this alternative would involve the addition of routes in close proximity to water bodies that account for approximately 0.7 miles or 1.6 acres of routes within RCAs (see Table 3-4 and Table 3-5). The use of the 14N34B spur may continue to degrade road conditions leading to sediment delivery to Ellis Creek. Use of NSRELD-63-V near Spider Lake could lead to sediment and contaminant delivery to Spider Lake and associated wetlands. Proposed route NSRELD-63-U is within the RCA of the Little Rubicon River and could result in new disturbances that increase sediment and contaminant delivery potential thereby adversely impacting water quality and fisheries habitat.

While this alternative does not include a bridge over the Little Rubicon River as proposed in Alternative 1, it does include the use of an elevated rock ford. An elevated rock ford would be an improvement over the existing low-water crossing because it would reduce the contact between flowing water and the undercarriage of vehicles during wet crossings. This would essentially reduce the potential for contaminant delivery to the Little Rubicon River. Only the tires

of vehicles would be expected to be submerged during the wet crossing. There is however, a slight potential for increases in turbidity during wet crossings if material shifts from the mechanical action of vehicle tires. These increases are expected to be negligible and short-lived in duration.

Riparian Conservation Objective #2:

The effects under this alternative would be similar to those under Alternative 1, except this alternative would involve the use of some additional spurs and variants in close proximity to water bodies. Under Alternative 4, route 14N34B would be added in close proximity to Ellis Creek, NSRELD-63-V would be in close proximity to Spider Lake, and NSRELD-63-U would be in close proximity to the Little Rubicon River. Use of 14N34B could degrade road conditions leading to sediment delivery to Ellis Creek and the filling in of pools which would alter aquatic habitat and geomorphic conditions. NSRELD-63-V would be within the RCA of Spider Lake and its associated wetland and pond habitat that could lead to increased use along the shoreline resulting in a reduction of riparian vegetation, and compaction and bank failures. These impacts would degrade shoreline habitat, alter shoreline geomorphic processes, and disturb young fish and larval amphibians that use these shallow water areas. NSRELD-63-U is within the RCA of the Little Rubicon River and could result in new disturbances that increase sediment and contaminant delivery potentially degrading biological and geomorphic conditions and impacting the aquatic species that reside there.

Riparian Conservation Objective #3:

The effects under this alternative would be similar to those under Alternative 1 because this alternative would not involve any large woody debris additions or removal and therefore would have no effect on RCO #3.

Riparian Conservation Objective #4:

The effects to physical and biological characteristics associated with aquatic- and riparian-dependent species under this alternative would be similar to those under Alternative 1 with some exceptions. This alternative would involve the addition of routes in close proximity to water bodies that account for approximately 0.7 miles or 1.6 acres of routes within RCAs (see Table 3-4 and Table 3-5). The use of the 14N34B spur may continue to degrade road conditions leading to sediment delivery to Ellis Creek. Use of NSRELD-63-V near Spider Lake could lead to sediment and contaminant delivery to Spider Lake and associated wetlands. Proposed route NSRELD-63-U is within the RCA of the Little Rubicon River and could result in new disturbances that increase sediment and contaminant delivery potential thereby adversely impacting water quality and fisheries habitat. As described in RCO #1 and RCO #2 under this

alternative, these routes would likely be within the RCAs of Ellis Creek, the Winter Camp Wetland, Spider Lake, and the Little Rubicon River and have the potential to adversely impact water quality, geomorphic processes, and aquatic and riparian habitat.

Riparian Conservation Objective #5:

The effects under this alternative would be similar to those under Alternative 1. While many of the activities proposed in this alternative occur within RCAs and would maintain, preserve and restore meadows, lakes and ponds; the new route providing access to Spider Lake would not. Therefore, the new route providing access to Spider Lake would not provide the ecological conditions and processes needed to recover or enhance the viability of species that rely on Spider Lake.

Riparian Conservation Objective #6:

The effects under this alternative would be similar to those under Alternative 1 with a few exceptions. Under Alternative 4, route 14N34B would be added in close proximity to Ellis Creek, NSRELD-63-V would be in close proximity to Spider Lake, and NSRELD-63-U would be in close proximity to the Little Rubicon River. While many of the activities proposed under Alternative 4 would improve water quality, aquatic habitat, geomorphic processes, and hydrologic connectivity; the allowed use of 14N34B, use of NSRELD-63-V and NSRELD-63-U would not. As described in RCO #1 and RCO #2 under this alternative, these additional activities would not maintain, restore, or enhance water quality and habitat for riparian and aquatic species.

Cumulative Watershed Effects (CWEs) – Alternative 4

Under Alternative 4, past, present, and foreseeable future activities would be similar to Alternative 1 with some exceptions. This alternative includes the addition of NSRELD-63-V and NSRELD-63-U within the RCAs of the Little Rubicon River and Spider Lake, which could ultimately lead to increased use in close proximity to these water bodies and an increase in human waste, sediment, and contaminant delivery. It is expected that during high flows, contaminants such as petroleum products and solvents could be washed from the undercarriage of vehicles crossing the Little Rubicon River and delivered downstream; impacting water quality and aquatic habitat.

Cumulative watershed effects (CWEs) under this alternative for the Upper Gerle Creek and Rubicon River-Long Lake watersheds would be the same as those under Alternative 1, but would vary slightly for the Loon Lake and Rockbound Lake-Rubicon River watersheds (see Table 3-8). There would be a slight increase in ERAs from Alternative 1 within the Loon Lake and Rockbound Lake-Rubicon River watersheds. This slight increase is due to the proposed addition

of approximately 0.14 miles of unauthorized routes within the Loon Lake watershed and the proposed addition of approximately 0.82 miles of unauthorized routes within the Rockbound Lake-Rubicon River watershed (see Table 3-7). Under Alternative 4, there would be a low risk of CWEs in the four 7th field watersheds within the project area.

Direct and Indirect Effects – Alternative 5

Indicator Measure 1: This alternative involves implementation of a seasonal operating period from July 1 to November 1. In addition to erosion control feature installation and maintenance, this seasonal operating period would further minimize sediment and contaminant delivery to nearby water bodies. Soil impacts, vegetation loss, turbidity increases, and contaminant delivery associated with wet season use as described in Alternative 1 would not occur. In addition, more routes would be closed and rehabilitated under this alternative which would mean there would be fewer routes to convey runoff during snowmelt and high flow conditions.

Indicator Measure 2: The effects under this alternative would be similar to Alternative 1 except installation of the 12 foot wide bridge would impact approximately 0.02 acres of streambank and channel, and approximately 0.01 acres of riparian vegetation. Under this alternative there would be approximately 0.01 less acres of streambank and channel disturbed, and approximately 0.01 less acres of riparian vegetation removed compared to Alternative 1 (based on measurements in El Dorado County, 2010). This difference in effects to water quality, aquatic species and habitat, and geomorphic function would be negligible.

Indicator Measure 3: Under Alternative 5, approximately 0.5 acres or 0.2 miles of routes within RCAs in the Upper Gerle Creek watershed would be closed and rehabilitated when compared to Alternative 1 (see Tables 3-4 and 3-5). Approximately 1.4 acres or 0.5 miles of additional routes within RCAs in the Rockbound Lake-Rubicon River watershed would also be closed and rehabilitated under this alternative when compared to Alternative 1 (see Tables 3-4 and 3-5). In addition, approximately 0.4 acres or 0.02 miles of routes within RCAs in the Rubicon River-Long Lake watershed would be closed and rehabilitated under this alternative which are proposed to be added under Alternative 1 (see Tables 3-4 and 3-5). The closure and rehabilitation of routes within RCAs would likely benefit water quality, geomorphic processes, and aquatic habitat by decreasing sediment and contaminant delivery potential to nearby water bodies.

Indicator Measure 4: Consistency with RCOs in the SNFPA.

Riparian Conservation Objective #1:

Under this alternative, there would be a seasonal operating period that would reduce soil displacement, vegetation loss, and soil compaction associated with wet season use; thereby reducing wet weather soil impacts which in turn could affect water quality. Direct water quality effects from turbidity and petroleum products associated with driving through standing water on the trail, driving through flowing trail segments, and low-water crossings would be reduced. Closure of unauthorized routes and trail variants could lead to natural recovery over time as groundcover increases and vegetation becomes reestablished; which would eventually reduce soil loss and sediment delivery to nearby hydrologic features.

The single route easement would reduce water quality degradation associated with petroleum products being delivered to Spider Lake, and the Little Sluice and Winter Camp wetlands from the long bypass. Sediment and contaminant delivery potential to hydrologic features near Little Sluice and the Little Rubicon River would be reduced.

Riparian Conservation Objective #2:

The effects to geomorphic and biological characteristics of aquatic features and streams under this alternative would be similar to those under Alternative 1, except there would be a seasonal operating period that would reduce soil displacement, vegetation loss, and soil compaction associated with wet season use; thereby reducing wet weather soil impacts which in turn could affect water quality. It is expected that during runoff and snowmelt conditions, the seasonal operating period along with effective erosion control features would result in less sedimentation thereby benefiting the geomorphic and biological characteristics of aquatic features and streams. In addition, contaminant delivery associated with the washing of vehicle undercarriages that occurs during wet season use when the trail is flowing would not occur.

Riparian Conservation Objective #3:

The effects under this alternative would be similar to those under Alternative 1 because this alternative would not involve any large woody debris additions or removal and therefore would have no effect on RCO #3.

Riparian Conservation Objective #4:

The effects under this alternative would be similar to those under Alternative 1, except there would be a seasonal operating period that would reduce soil displacement, vegetation loss, and soil compaction associated with wet season use; thereby reducing wet weather soil impacts which in turn could affect water

quality. In addition unauthorized routes and some trail variants would be closed allowing for vegetation reestablishment and improved groundcover. As mentioned in RCO #1 and RCO #2 under this alternative, activities within RCAs would be reduced through route closures and a seasonal operating period which would in some cases improve RCA conditions; thereby maintaining the physical and biological characteristics associated with aquatic- and riparian-dependent species through improved water quality, hydrologic connectivity, geomorphic processes, and aquatic and riparian habitat.

Riparian Conservation Objective #5:

The effects under this alternative would be similar to those under Alternative 1 with some exceptions. As described in RCO #1 and RCO #2 under this alternative, these activities would improve water quality, aquatic habitat, geomorphic processes, and hydrologic connectivity. Activities proposed under Alternative 5 would preserve, restore, and in some cases enhance meadows, lakes, and wetlands; thereby providing the ecological conditions and processes needed to recover or enhance the viability of species that rely on these areas.

Riparian Conservation Objective #6:

The effects under this alternative would be similar to those under Alternative 1 with some exceptions. As described in RCO #1 and RCO #2 under this alternative, these activities would improve water quality, aquatic habitat, geomorphic processes, and hydrologic connectivity. This alternative would maintain, restore, and in some cases enhance water quality and habitat for riparian and aquatic species.

Cumulative Watershed Effects (CWEs) – Alternative 5

Under Alternative 5, past, present, and other foreseeable future activities would be similar to Alternative 1, but would include a seasonal operating period during wet weather conditions. Water quality degradation, sediment and contaminant delivery, and aquatic and riparian habitat loss would be reduced in the future under this alternative. These activities would reduce sediment and contaminant delivery associated with wet season use and would reduce dispersed uses in close proximity to hydrologic features by closing unauthorized routes. What this alternative would not address is the continued sanitation issues associated with human waste along the trail. These issues that degrade water quality would likely only be reduced under this alternative through increased education and compliance.

Cumulative watershed effects (CWEs) under this alternative for the Loon Lake and Rubicon River-Long Lake watersheds would be the same as those under Alternative 1, but would vary slightly for the Upper Gerle Creek and Rockbound

Lake-Rubicon River watersheds (see Table 3-8). There would be a slight decrease in ERAs from Alternative 1 within the Upper Gerle Creek and Rockbound Lake-Rubicon River watersheds. This slight decrease is due to the proposed closure of approximately 1.42 miles of authorized and unauthorized routes within the Upper Gerle Creek watershed and the proposed closure of approximately 2.18 miles of authorized and unauthorized routes within the Rockbound Lake-Rubicon River watershed (see Table 3-7). Under Alternative 5 there would be a low risk of CWEs in the four 7th field watersheds within the project area.

Direct and Indirect Effects – Alternative 6

Indicator Measure 1: The effects under this alternative would be similar to those under Alternative 5.

Indicator Measure 2: The effects under this alternative would be similar to Alternative 5.

Indicator Measure 3: Under Alternative 6, the amount of acres and miles of routes by 7th field watershed to be closed and rehabilitated or added to the NFTS that would be within RCAs would be similar to Alternative 1 but would vary slightly. Under this alternative, approximately .08 additional miles of routes would be closed and rehabilitated in the Rockbound Lake-Rubicon River watershed when compared to Alternative 1 and approximately 0.02 miles of routes within the Rubicon River-Long Lake watershed would be closed (see Table 3-4 and Table 3-5).

Indicator Measure 4: Consistency with RCOs in the SNFPA.

Riparian Conservation Objective #1:

The effects under this alternative to beneficial uses would be similar to those under Alternative 5. Under this alternative, the seasonal operating period would reduce soil displacement, vegetation loss, and soil compaction associated with wet season use; thereby reducing wet weather soil impacts which in turn could affect water quality. Direct water quality effects from turbidity and petroleum products associated with driving through standing water on the trail, driving through flowing trail segments, and low-water crossings would be reduced. Closure of unauthorized routes and trail variants could lead to natural recovery over time as groundcover increases and vegetation becomes reestablished; which would eventually reduce soil loss and sediment delivery to nearby hydrologic features. In addition, approximately 0.4 miles or 0.8 acres of routes are proposed to be added within RCAs, primarily in close proximity to Buck Island Lake. These routes are existing and would occur outside of the

saturated zone or high water level of Buck Island Lake and would therefore have a minimal impact on RCA conditions.

Under Alternative 6, implementation of motor vehicle use areas and route delineation in the Soup Bowl area as well as the dispersed camping in the Winter Camp area would be eliminated. The Long Bypass (ELD-63-D) and dispersed uses within the Little Rubicon RCA would also be eliminated. These actions would minimize the potential for sediment and contaminant delivery to nearby water bodies of concern and would benefit water quality, aquatic habitat, and riparian resources by reducing vegetation loss, soil impacts, petroleum deposition, and sanitation problems in these areas.

Riparian Conservation Objective #2:

The effects to geomorphic and biological characteristics of aquatic features and streams under this alternative would be similar to those under Alternative 5. Under this alternative, the seasonal operating period would reduce soil displacement, vegetation loss, and soil compaction associated with wet season use; thereby reducing wet weather soil impacts which in turn could affect water quality. It is expected that during runoff and snowmelt conditions, there would be less sedimentation thereby benefiting the geomorphic and biological characteristics of aquatic features and streams. In addition, contaminant delivery associated with the washing of vehicle undercarriages that occurs during wet season use when the trail is flowing would not occur.

Under Alternative 6, implementation of motor vehicle use areas and route delineation in the Soup Bowl area as well as the dispersed camping in the Winter Camp area would be eliminated. The Long Bypass (ELD-63-D) and dispersed uses within the Little Rubicon RCA would also be eliminated. These actions would minimize the potential for sediment and contaminant delivery to nearby water bodies of concern and would benefit water quality, aquatic habitat, and riparian resources by reducing vegetation loss, soil impacts, petroleum deposition, and sanitation problems in these areas.

Riparian Conservation Objective #3:

The effects under this alternative would be similar to those under Alternative 1 because this alternative would not involve any large woody debris additions or removal and therefore would have no effect on RCO #3.

Riparian Conservation Objective #4:

The effects under this alternative would be similar to those under Alternative 5. As described in RCO #1 and RCO #2 under this alternative, activities within RCAs would be reduced and in some cases RCA conditions improved thereby

maintaining the physical and biological characteristics associated with aquatic- and riparian-dependent species through improved water quality, hydrologic connectivity, geomorphic processes, and aquatic and riparian habitat.

Under Alternative 6, the closure and rehabilitation of unauthorized routes would also reduce water quality impacts associated with unmaintained and degrading routes in close proximity to hydrologic features. In addition, approximately 0.4 miles or 0.8 acres of routes are proposed to be added within RCAs, primarily in close proximity to Buck Island Lake. These routes are existing and would occur outside of the saturated zone or high water level of Buck Island Lake and would therefore have a minimal impact on RCA conditions.

Riparian Conservation Objective #5:

The effects under this alternative would be similar to those under Alternative 5. As described in RCO #1 and RCO #2 under this alternative, these activities would improve water quality, aquatic habitat, geomorphic processes, and hydrologic connectivity. Activities proposed under Alternative 6 would preserve, restore, and in some cases enhance meadows, lakes, and wetlands; thereby providing the ecological conditions and processes needed to recover or enhance the viability of species that rely on these areas.

Riparian Conservation Objective #6:

The effects under this alternative would be similar to those under Alternative 5. As described in RCO #1 and RCO #2 under this alternative, these activities would improve water quality, aquatic habitat, geomorphic processes, and hydrologic connectivity. This alternative would maintain, restore, and in some cases enhance water quality and habitat for riparian and aquatic species.

Cumulative Watershed Effects (CWEs) – Alternative 6

Under Alternative 6, past, present, and other foreseeable future activities would be similar to Alternative 5. Water quality degradation, sediment and contaminant delivery, and aquatic and riparian habitat loss would be reduced in the future under this alternative. These activities would reduce sediment and contaminant delivery associated with wet season use and would reduce dispersed uses in close proximity to hydrologic features by closing unauthorized routes.

Cumulative watershed effects (CWEs) under this alternative for the Upper Gerle Creek, Loon Lake, and Rubicon River-Long Lake watersheds would be the same as those under Alternative 1, but would vary slightly for the Rockbound Lake-Rubicon River watersheds (see Table 3-8). There would be a slight decrease in

ERA value in the Rockbound Lake-Rubicon River watershed as a result of the closure and rehabilitation of approximately 0.20 additional miles of routes when compared to Alternative 1 (see Table 3-7).

Aquatic Resources

Affected Environment

Over the last 150 years, there were many anthropogenic disturbances in the 4 watersheds affecting the perennial and seasonal streams of the Rubicon Trail (Table 3-7). Riparian areas along the Rubicon Trail have been changed by dams, roads, and recreational activities. Dam construction occurred at Buck Island Lake, Loon Lake, and Spider Lake affecting water temperature, water volume, stream-flow patterns, and quantities of organic matter and nutrients of their streams (Kattelman and Shilling 2004). Amphibians, insects, and small invertebrates such as fresh-water shrimp (*Syncaris pacifica*) dominated these high-elevation aquatic ecosystems. Directly associated with recreational use along the Rubicon Trail, golden shiners were introduced into Little Rubicon River and mosquitofish (*Gambusia affinis*) were introduced to the ponds and wetlands. These non-native aquatic species have changed the existing composition of native species. Historically, the waterbodies and streams along the Rubicon Trail were, with a few exceptions, fishless.

Introduction of non-native fish into streams above 6,000 feet in elevation that were historically fishless has altered many aquatic systems (Knapp 1996), including trout stocking at Buck Island Lake and Spider Lake. The Sierra Nevada Ecosystem Project (SNEP 1996a) noted that across the Sierra Nevada bioregion, aquatic/riparian systems are the most altered and impaired habitats. Amphibian and reptile populations have severely declined throughout the Sierra Nevada at all elevations. Local degradation of habitats has likely also led to effects on aquatic macroinvertebrates, which are one of the best indicators of the health in Sierran aquatic systems.

Table 3-9: Perennial and seasonal stream miles by 7th field watershed.

7th Field Watershed			
USGS Hydrologic Unit Code	Watershed Name	Forest Service Stream Miles	Private Stream Miles
18020128020301	Loon Lake	0.97 perennial 16.26 seasonal	1.13 perennial 3.54 seasonal
18020128020103	Rockbound Lake - Rubicon River	7.24 perennial 32.32 seasonal	2.89 perennial 3.84 seasonal
18020128020102	Rubicon River-Long Lake	3.39 perennial 21.86 seasonal	0.29 perennial 4.50 seasonal
18020128020302	Upper Gerle Creek	4.47 perennial 22.40 seasonal	13.00 perennial 17.68

The elevations range from approximately 5400 feet to approximately 7000 feet. Aquatic features found along the Rubicon Trail include both lotic (moving water) and lentic (still water) systems. Stream miles and acres of water bodies and meadows within a quarter mile of the Rubicon Trail are shown on Table 3-8. Named water bodies within a quarter mile of the trail include Mud lakes, Spider Lake, Buck Island Lake, and Fawn Lake; named streams within a quarter mile of the trail include Gerle Creek, Ellis Creek, Little Rubicon River, and Rubicon River. Loon Lake is more than a quarter mile downstream from the Rubicon Trail (0.39 miles), but is hydrologically connected by the seasonal streams that flow to Loon Lake during the spring runoff period.

Table 3-10: Stream miles and acres of water bodies, meadows, and swamp/marsh within a quarter mile of the Rubicon Trail, according to GIS.

Aquatic Feature	NFS Land	Total NFS Land and Private
Perennial streams	2.96 miles	4.46 miles
Seasonal streams	14.02 miles	19.15 miles
Water bodies	64.60 acres	71.02 acres
Meadows	49.80 acres	63.94 acres
Swamp/marsh	2.56 acres	2.56 acres

The lakes, ponds and wetlands which had aquatic species habitat most affected by the Rubicon Trail were Gerle Creek wetland, Winter Camp ponds and wetland, Spider Lake and associated wetlands, Buck Island Lake, and Big Sluice spring and wetland. For a further description of unnamed water bodies and wetlands, see the hydrology section.

Amphibians, aquatic reptiles, and fish have been observed in the area of the Rubicon Trail. The amphibian species, primarily observed in the small waterbodies and wetlands, include: western toad (*Bufo boreas*), Pacific tree frog (*Hyla regilla*), long-toed salamander (*Ambystoma macrodactylum*), and California newt (*Taricha torosa*). Past observations of aquatic reptiles include: mountain garter snake (*Thamnophis elegans*), Sierra garter snake (*Thamnophis couchii*) and Valley garter snake (*Thamnophis sirtalis*).

Aquatic Threatened, Endangered, and Sensitive Species

The Sierra Nevada yellow-legged frog (*Rana sierrae*), is the only aquatic threatened, endangered, or sensitive species that could potentially be residing in the area of the Rubicon Trail. The Rubicon Trail is outside the known range of the Yosemite toad (*Bufo canorus*), which lies south of Highway 88.

The Sierra Nevada yellow-legged frog, an aquatic Forest Service Sensitive species and Federal Candidate for listing, had been sighted within 1.7 miles of the Ellis Creek crossing (2 adults observed by USFS fishery biologist George Elliott in 1997 in a different watershed).

Potential suitable Sierra Nevada yellow-legged frog habitat within 1/4 mile of the Rubicon Trail was found to be about 8 acres of perennial wetlands and ponds without trout or mosquitofish. These likely suitable perennial wetlands and ponds were the fishless edges of Gerle Creek wetland, Eagle View wetland, and Big Sluice spring and wetland. Trout have been shown to eat all life stages of Sierra Nevada yellow-legged frogs (Knapp and Matthews 2000). Mosquitofish adversely affect the native Pacific tree frog early life stages (Goodsell and Kats 1999), and is presumed that mosquitofish would also adversely affect Sierra Nevada yellow-legged frog early life stages. Ellis Creek, Gerle Creek, Buck Island Lake, Spider Lake, and Little Rubicon River have trout which makes these streams and lakes unsuitable for Sierra Nevada yellow-legged frogs. Perennial wetlands and ponds at or near Winter Camp, Little Sluice and Spider Lake had mosquitofish, a non-native fish planted by recreationists for reducing mosquitoes. Surveys in these habitats have not found Sierra Nevada yellow-legged frogs.

If Sierra Nevada yellow-legged frogs had resided along the Rubicon Trail in the past, it is likely that they had been collected and removed by recreationists. Little Rubicon River is not suitable habitat for Sierra Nevada yellow-legged frogs for several reasons: the presence of trout and golden shiners, the heavy recreational use in that area, and the higher fluctuating flows that occur in some years from the Buck Island Lake spilling. For instance, during June of 2011 the flows reached 200 cfs from spillage, and during the fall of 2011 overtopping at the dam occurred again.

Management Indicator Species

Pacific tree frogs and aquatic macroinvertebrates are Management Indicator Species (MIS) for the Forest Service. Aquatic macroinvertebrates are indicators of aquatic ecosystem health and found in most all aquatic habitats; Pacific tree frogs are found in many wetlands, waterbodies, and side pools/edgewater areas of streams where mosquitofish do not reside. Mosquitofish are known to consume the early life stages of the native Pacific tree frog and California newt (Goodsell and Kats 1999). For the MIS analysis, each alternative is analyzed for effects to wet meadows as habitat for the Pacific tree frog, and effects to lakes and streams as habitat for aquatic macroinvertebrates. Specific to Pacific tree frog, the attribute analyzed is change in herbaceous composition and area of wet meadows. Specific to aquatic macroinvertebrates, attributes analyzed are streamflow, sedimentation, and water surface shade. The amount of wet meadow habitat for Pacific tree frog within ¼ mile of the Rubicon Trail on NFS land is 49.80 acres. For aquatic macroinvertebrates, the amount of lake habitat is 64.60 acres and perennial stream habitat is 2.96 acres, both on NFS land.

SMUD (2004) assessed water quality in the Rubicon River and Little Rubicon River using aquatic macroinvertebrates as aquatic habitat indicators. On the Rubicon River, samples were taken about a mile upstream of the Rubicon River trail bridge and about 0.5 miles below. Results showed obvious trends, with the upstream samples showing consistently above average scores and the downstream samples showing consistently lower scores. There is a noticeable amount of sedimentation in the Rubicon River near the bridge at Rubicon Springs which has likely affected macroinvertebrate assemblages. On the Little Rubicon River (Buck Island area), samples were taken in the location of the Rubicon Trail stream crossing and about a mile downstream. Results showed obvious trends; with the upstream samples showing consistently low scores and the downstream samples showing higher scores (4 out of 6 were higher). On the Little Rubicon River, it is likely that the concentrated recreational use and the wet stream crossing contributed to effects to the aquatic invertebrates, whereas downstream from this use, the populations are trending toward recovery. Other contributing effects to macroinvertebrates are the extra cold water coming out of Buck Island Lake and the spills that occur during spring runoff in some years.

Fish

Fish known to reside in the perennial streams along or downstream of this portion of the Rubicon Trail are shown in Table 3-11. Spider Lake is presently stocked annually with rainbow trout by California Dept. of Fish and Game (CDFG). Brook trout was stocked at Buck Island Lake by CDFG between 1954 and 1969, with rainbow trout and crosses stocked until 1976. In 1977, the

stocking allotment was cancelled and does not appear to have been stocked since then (SMUD 2005a). Loon Lake is stocked annually with rainbow trout by CDFG.

Table 3- 11: Fish known to reside in the perennial streams of the NFS portion along the Rubicon Trail (Information taken from SMUD 2005 or known sightings).

Fish species	Scientific Name	Stream or Waterbody	Native or Non-native
brook trout	<i>Salvelinus fontinalis</i>	Buck Island Lake, Loon Lake	non-native
brown trout	<i>Salmo trutta</i>	Buck Island Lake, Gerle Creek, Loon Lake, Rubicon River	non-native
California roach	<i>Hesperoleucus symmetricus</i>	Little Rubicon River, Loon Lake, Rubicon River,	native
chubs	<i>Gila</i> sp.	Loon Lake	likely native
golden shiner	<i>Notemigonus crysoleucas</i>	Little Rubicon River	non-native
green sunfish	<i>Lepomis cyanellus</i>	Loon Lake	non-native
mosquitofish	<i>Gambusia affinis</i>	Wetlands/ponds near Spider Lake and Little Sluice	non-native
rainbow trout	<i>Oncorhynchus mykiss</i>	Buck Island Lake, Ellis Creek, Gerle Creek, Little Rubicon River, Loon Lake Rubicon River, Spider Lake,	native
Sacramento sucker	<i>Catostomus occidentalis</i>	Loon Lake, Rubicon River	native
speckled dace	<i>Rhinichthys osculus</i>	Rubicon River	native
tuleperch	<i>Hysterocarpus traski</i>	Loon Lake	native

The Little Rubicon River was surveyed 1.5 miles downstream from the Buck Island Lake dam in 2002 and 2003 (SMUD 2005b). Trout biomass was 1.1 lbs. /acre in 2002 and 0.7 lbs. /acre in 2003. These biomass numbers were the lowest numbers for all the streams surveyed in the Upper American River Project. There are several likely reasons for these low trout numbers. Spills from Buck Island Lake, along with reduced macroinvertebrate assemblages, which could be caused by the spills, result with less food for trout. The habitat downstream is comprised of bedrock chutes which tend to be poor habitat structure for trout species, as well as very little spawning gravel (DTA and Stillwater 2005). Fishing pressure from the recreational visitors is very high. The aquatic habitat downstream has been degraded as a result of the close association of the off-highway vehicles and recreationists. Competition from golden shiners may not be a significant factor, though, as trout will eat golden shiners (D. Hanson, 2012, pers. comm.), although they do compete for other available food, such as small surface invertebrates.

The physical aspects of aquatic habitats along the Rubicon Trail are described in the Hydrology section. Aquatic habitats and species that are the most impacted by the Rubicon Trail where it travels on NFS lands are further described in Environmental Consequences below, including: Gerle Creek and associated wetlands, Ellis Creek, Winter Camp ponds, Spider Lake, Buck Island Lake, and the Little Rubicon River.

Analysis Framework

The geographic extent of the direct, indirect, and cumulative effects analysis is generally confined to the aquatic features of the four HUC 7 watersheds: Rubicon River-Long Lake, Rockbound Lake-Rubicon River, Loon Lake, and Upper Gerle Creek. The direct and indirect effects were focused on the area within $\frac{1}{4}$ mile of both sides of the Rubicon Trail, since this area would have the most influence on effects to individuals, although downstream effects to aquatic habitat can reach as much as a mile or more.

Data and Analysis Methods

This analysis was based on the following data:

- Field visits by the aquatic biologist to the Rubicon Trail on September 27-29, 2010, July 18, 2011, August 11, 2011, and September 20, 2011. Aquatic surveys occurred within $\frac{1}{4}$ mile of Rubicon Trail using Visual Encounter Survey methodology.
- Data queried from GIS databases of the Eldorado National Forest – past aquatic species sightings, stream lengths and waterbody acres within $\frac{1}{4}$ mile distance from Rubicon Trail, and miles of RCA within proposed trail easement.
- Group participation in development of the Riparian Conservation Objectives Analysis by aquatic biologist, botanist, and hydrologist (in Hydrology section).
- Existing water quality and aquatic species reports from El Dorado County (Crawford 2006), SMUD, and CRWQB.
- The visual encounter herpetofauna surveys used in developing the Forest herpetofauna database had a probability of detection of approximately 75 percent when the species is present, depending on the surveyor's experience and the species in question (USDA FS 2008). Even though the probability of detection increases with multiple surveys, failure to detect a species does not mean the species is not present.

- Habitats for the species being analyzed were assumed to be occupied if they contained the necessary life history elements. The distance of ¼ mile from the Rubicon Trail is most likely affecting aquatic species in their habitats.
- The Riparian Conservation Area is 300 feet on perennial streams, lakes, ponds, wetlands, and other special aquatic features, and 150 feet on seasonal streams (SNFPA 2004).
- For species that have declined substantially (such as the Sierra Nevada yellow-legged frog), any management actions that could affect local population dynamics are considered high risk for the species as a whole (SNFPA 2001).
- When local populations are lost or compromised through changes in habitat suitability the larger metapopulation structure is also jeopardized (SNFPA 2001).
- It is assumed that all meadows mapped in GIS are wet meadows for the Management Indicator Species analysis of Pacific tree frog habitat.
- Human-caused disturbances near small streams in mountainous terrain disrupt natural biological processes and have the potential to adversely affect biological characteristics and fragment habitats.
- Research has concluded that sediment from roads can result in adverse effects to streams and aquatic habitats (Dissmeyer 2000, Gucinski and others 2001, Meahan 1991).
- The elimination of vehicle traffic on a road near a stream during periods of wet road conditions will result in less sediment being delivered from the road to the stream.
- Vehicle use on wet roads has the potential to cause ruts and widen roads with a resultant increase in erosion of sediment from the road that may reach stream courses (see the Hydrology and Aquatic Resources section of this document).

Indicator Measures

Indicator Measure 1: The potential for impacts to water quality.

Indicator Measure 2: Acres and miles of trail including the main trail, trail variants, and unauthorized routes within RCAs.

Indicator Measure 3: Consistency with RCOs in the SNFPA.

Indicator Measure 4: Recreational/OHV use on the Rubicon Trail has the potential to directly or indirectly impact habitat of the Sierra Nevada yellow-legged frog.

Indicator Measure 5: The potential for wet crossings to elevate in-channel sediment or in-channel petroleum products.

Environmental Consequences

Aquatic species are susceptible to both terrestrial and aquatic changes caused by roads and recreational use. Sediment delivery and petroleum effluent from roads affect the water quality of streams that may flow into ponds and lakes where aquatic species reside. The effects of elevated sediment and petroleum discharges in aquatic systems can influence stream primary production and macroinvertebrate assemblages (Clinton and Vose, 2003), which in turn affect downstream fish, amphibians, and aquatic reptiles.

Fecal contamination, streamside/lakeshore trampling, and riparian disturbance can result from heavy use by recreationists. Fecal coliform bacteria in a waterbody can affect the oxygen supply of aquatic species (Liken 2010). Streamside/lakeshore trampling and riparian disturbance can reduce cover for fish; amphibians and reptiles; crush individuals; reduce food supply; or reduce suitability of micro-habitat characteristics for rearing, spawning, etc.

Of the various aquatic species affected by high use recreational areas, amphibians in particular tend to exhibit high habitat specificity and low mobility, further reducing their ability to adapt to disturbance (USDA FS, 2001).

Direct and Indirect Effects – Alternative 1

Indicator Measure 1: Sedimentation is expected to improve from existing conditions, although, water quality objectives may be impacted by trail use during spring runoff periods causing sedimentation into stream courses. Bridges will maintain water quality at the stream crossings.

Water flowing across the trail during the high spring and early summer runoff from snow melt connects ephemeral channels with Loon Lake and Gerle Creek. The erosion control features installed by the county in their ongoing maintenance will help reduce this runoff and catch much of the sedimentation with an improvement from existing conditions, yet some will still occur. Vehicles traveling on the wet trail increase the potential for petroleum products to be washed from the undercarriages of these vehicles downstream to Loon Lake and Gerle Creek. Metal ions from these petroleum products can be soluble in water with the propensity to concentrate or build up to reach toxic levels (Crawford,

2006). These runoff contaminants impact the fisheries in Gerle Creek and Loon Lake reducing water quality for the fish and their food, the macroinvertebrates.

Perennial wetlands that are suitable for Sierra Nevada yellow-legged frogs could be impacted by sedimentation from vehicle use during wet trail conditions during spring runoff, if they are there.

Indicator Measure 2: See the discussion in the Hydrology section. This alternative would add 0.38 miles of trail and close 1.58 miles of trail within the RCA; this closure of 1.58 miles of trail within the RCA would likely benefit aquatic species by reducing sediment delivery. The trails in the RCA to be closed are in the Gerle Creek watershed and above Buck Island Lake. Closing the roads next to Buck Island Lake will improve water quality by reducing impacts to the sensitive lakeshore habitat. Closing and rehabilitating 14N34B would reduce sedimentation to Ellis Creek.

Alternative 1 includes the Long Bypass next to Little Sluice. This variant is composed of primarily granite bedrock slabs with drainage pathways between slabs. Oil spots left on the rocks by vehicles could drain oil pollutants into the Winter Camp ponds causing petroleum effluents to settle on the surface of the water, potentially affecting aquatic species swimming there. The effects on the ponds below are expected to be minor though, thus meeting SNFPA guidelines.

Indicator Measure 3: The six biological aspects that were considered in evaluating Riparian Conservation Objectives include: water quality, sediment, bacteria, oil and grease, and turbidity which ensure that aquatic species and their habitat will be maintained or enhanced. Connectivity between habitats, riparian vegetation, and aquatic habitat protection and enhancement are also considered. Refer to a complete discussion in the Riparian Conservation Objectives analysis in the Hydrology section.

Wet season trail use would continue to result in compacted surfaces and vegetation loss; thereby accelerating erosion and sediment delivery associated with the trail. Vehicle use during wet conditions would cause additional sedimentation and petroleum discharge into Winter Camp pond, Loon Lake and Gerle Creek which would degrade aquatic habitat downstream impacting aquatic species. The Winter Camp pond overflow eventually ends up in Little Rubicon River. The erosion control features installed by the county in their ongoing maintenance will help reduce this runoff and catch much of the sedimentation, yet some will still occur, especially during spring runoff periods.

The bridges at Ellis Creek, Little Rubicon River, and the FOTR bridge would ensure aquatic species would not be crushed and water quality of the streams would be maintained. Continued trail maintenance would restore degraded trail conditions by creating and maintaining catchment basins and adding rock to

harden the trail surface (El Dorado County, 2011). Closing and rehabilitating 14N34B would reduce sedimentation into Ellis Creek.

The 100 foot vehicle restriction area along the Little Rubicon River at the Buck Island crossing would ensure good water quality for native trout and macroinvertebrates. Camping would still occur next to the rivers and aquatic features, regardless of vehicle buffers, thus other effects to aquatic systems could still occur from this dispersed use, such as fecal coliform (*e-coli*) in the water and trampling of riparian vegetation along streams or wetlands.

Installation of signs, marking of routes, installation of rock and log barriers would encourage vehicle travel on designated routes and reduce potential adverse effects to aquatic resources.

Three locations of concern in Alternative 1 with regards to maintaining water quality for healthy habitat for aquatic species include: the toilet at Wentworth Springs Campground, the Long Bypass near Little Sluice, and the 175 foot wide easement on the south side of Little Sluice.

1. The existing toilet at Wentworth Spring Campground lies in the floodplain and becomes flooded during snowmelt periods; the runoff flows to Gerle Creek, a stream with a rainbow and brown trout fisheries.
2. The Long Bypass next to Little Sluice is composed primarily of granite bedrock slabs with drainage pathways between slabs. Oil spots left on the rocks by vehicles using this variant could drain oil pollutants into the Winter Camp ponds. The effects on the ponds below are expected to be minor, thus meeting SNFPA RCO guidelines.
3. The 175 foot easement proposed at Little Sluice would attract more users to the north shore of Spider Lake and it encroaches into the RCA of Spider Lake. The increased use increases the likelihood of potential impacts to the shoreline environment and effects to aquatic species from trampling. Disturbance to the young fish and amphibian larval stages, such as Pacific tree frog tadpoles, which use these shallow water habitats, would increase from a slight increase in visitation by the public. A toilet is planned to be placed near Little Sluice which should help control the fecal wastes seen around the lake and wetlands.

Indicator Measure 4: Perennial wetlands that are suitable habitat for Sierra Nevada yellow-legged frogs could be impacted by petroleum products from vehicle use during wet trail conditions during spring runoff, if Sierra Nevada yellow-legged frogs are present.

Indicator Measure 5: In Alternative 1, the wet crossings at both Ellis Creek and Little Rubicon River (Buck Island Outlet) would have bridges. Water quality in aquatic species habitat below these stream crossings would be maintained. There would be no expected changes to sedimentation or stream flow for MIS aquatic macroinvertebrate habitat and very minor changes to shade from the removal of some trees at Ellis Creek.

Cumulative Effects – Alternative 1

Analysis of cumulative effects to aquatic species will consider the impacts of this alternative when combined with past, present, and foreseeable future actions and events that occurred with the four HUC 7 watersheds: Upper Gerle Creek, Loon Lake, Rockbound Lake-Rubicon River, and Rubicon River-Long Lake.

In order to understand the contribution of past actions to the cumulative effects of the alternatives, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. The existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects.

Foreseeable future projects include approximately 0.5 acres associated with Pacific Hazard Tree within the Upper Gerle watershed, 5 acres associated with the Pacific Hazard Tree in the Loon Lake watershed, and 4 acres along the SMUD transmission line in the Loon Lake watershed. All of these projects have design criteria to avoid causing cumulative effects. When combined with the activities proposed for this project on NFS land, the expected effects are low.

Spills from the Buck Island Dam occur during the wetter water years. In June 2011, there was a spill of approx. 200 cfs, and another spill occurred during the fall of 2011. Spills can displace aquatic species, especially if they occur during a sensitive reproductive phase, such as after egg-laying or during the early life stages of fish or amphibians. Cumulatively this can cause some localized impacts to species in the years where untimely spills occur, and may take additional years without spills for species to recover.

Similar to other amphibians, the SNYLF exhibits high habitat specificity which reduces their ability to adapt to disturbance (USDA FS, 2001). SNYLFs have been affected in some locations by a fungal pathogen, *Batrachochytrium dendrobatidis* (Bd), although in the northern Sierras they seem to be able to survive where the disease is present. SNYLFs have also been consumed by trout when trout were planted in lakes or streams they inhabited. Exotic species are most likely to occur along roads with heavy recreational use (Tromulak and Frissell, 2000), such as the Rubicon Trail. These non-native species have adversely affected native species in the area. Mosquitofish are

common in ponds and wetlands to the west and south of the popular Little Sluice area, and can adversely affect the native Pacific tree frog early life stages (Goodsell and Kats, 1999). Golden shiners are more common than trout in the Little Rubicon River, introduced there as a bait fish. Cumulatively, the presence of trout has contributed to the non-existence of SNYLF where trout occur.

Direct and Indirect Effects – Alternative 2

Indicator Measure 1: Additional erosion control structures would only be installed out to the Little Rubicon River, otherwise, the status quo would continue. Water flowing across the trail during the high spring and early summer runoff from snow melt connects ephemeral channels with Loon Lake and Gerle Creek. Vehicles traveling on the wet trail increase the potential for trail widening and the potential for petroleum products to be washed from the undercarriages of these vehicles downstream to Loon Lake and Gerle Creek. Trail widening causes suspended sediments to enter the water as turbidity and move downstream into aquatic habitats. Vehicle travel during times of water movement across the trail cause metal ions in soil to be suspended back into the water column and carried downstream. Metal ions can be soluble in water with the propensity to concentrate or build up to reach toxic levels (Crawford, 2006). Operation of vehicles on native-surface sections of the trail with flowing water would result in elevated turbidities that likely exceed Basin Plan objectives (Hill, 2010). These runoff contaminants are impacting the fisheries in Gerle Creek, Ellis Creek, and Little Rubicon River (Buck Island Outlet) by reducing water quality for the fish and their food, the macroinvertebrates.

Aquatic macroinvertebrate habitat would likely be affected by sedimentation to streams. Sediment in streams and lakes can smother most macroinvertebrates species. The extent of this sedimentation could be locally substantial, affecting habitat downstream of the trail approximately 1.5 miles. For Pacific tree frog habitat, a change in herbaceous composition and area of wet meadows could occur slightly from siltation by seasonal flows carrying sediment from the trail. Some vegetation could be covered in silt, and the size of some wet areas could be reduced by filling in of sedimentation. These changes are expected to be minor.

Indicator Measure 2: There is a potential that unauthorized routes would be used, some within the RCA (near Buck Island Lake), allowing vehicle use within 100 feet of the shoreline which could cause riparian disturbance, sedimentation, and/or petroleum effluents.

Indicator Measure 3: Wet season trail use would continue to result in trail widening, rut formation, compacted surfaces, and vegetation loss; thereby accelerating erosion and sediment delivery associated with the trail. Wet stream crossings would continue to be used at Ellis Creek and at the Little

Rubicon River (Buck Island Outlet) contributing sediment and/or petroleum products into streams and water bodies.

Sanitation problems at Wentworth Spring Campground would continue. The toilet becomes flooded during snowmelt periods, and the runoff flows to Gerle Creek, a stream with a rainbow and brown trout fisheries. Fecal contamination at Spider Lake and Winter Camp would continue, adversely affecting the small fish and amphibians in those special aquatic features.

The Long Bypass next to Little Sluice would continue to be used in Alternative 2. This variant is composed of primarily granite bedrock slabs with drainage pathways between slabs. Oil spots left on the rocks by vehicles using this variant could drain oil pollutants into the two water lily ponds west of Little Sluice.

Presently at the popular Little Sluice overlook, vehicles can drive off the road within 75 feet of Spider Lake, although fallen carsonite signs and decaying hay bales limit parking outside the RCA of Spider Lake. During a field visit in 2011, observations of toilet paper were frequent around the wetlands next to Spider Lake, showing there is some use near the lake and wetlands by recreationists. Toilet paper and fecal matter could reduce water quality by creating an algal bloom which can reduce available dissolved oxygen for aquatic species in Spider Lake and associated wetlands.

Since the lack of clarity over the management of the Rubicon Trail would continue, the effects to aquatic species would likely increase because of a progressive reduction of water quality, streambank disturbance, and increased sedimentation.

Indicator Measure 4: Perennial wetlands that are suitable habitat for Sierra Nevada yellow-legged frogs could be impacted by sedimentation and petroleum products from vehicle use during wet trail conditions during spring runoff, if Sierra Nevada yellow-legged frogs are present.

Indicator Measure 5: The existing wet crossing at Ellis Creek has been determined by the Central Valley Water Board to be “causing a fining of bed material downstream of the crossing. This increased sediment load has filled spawning gravels and reduced aquatic habitat, and has the potential to carry contaminants from vehicle operations on the trail into waters of the state” (CRWQCB, 2009). The Central Valley Water Board conducted pebble counts upstream and downstream from the crossing, including photographic documentation, and identified an influx of sediment downstream into the perennial trout-bearing reach of Ellis Creek caused by the vehicles crossing at the trail (CRWQCB, 2009). This has reduced aquatic habitat quality.

At both Ellis Creek and Little Rubicon River (Buck Island Outlet), the Rubicon trail has wet stream crossings that wash the undercarriages of vehicles, allowing water contamination from petroleum-based fluids. These compounds are mostly water insoluble and form a film on the surface of streams, and reside downstream in side eddies of rivers (D. Hanson, pers. comm.), like driftwood. Water quality samples taken in the central flowing part (thalweg) of the river are missing opportunities of detecting oil found at the quiet edges of the stream channel. Oil and grease can be toxic to aquatic wildlife (Crawford 2006). The aquatic species that reside here include rainbow trout, macroinvertebrates (food for trout), golden shiners, and California roach.

Rubicon Trail Foundation (RTF) conducted trail counts in 2009 and 2010 that included entry points, destination, exit locations, length of trip and mode of travel. Between May and September 2009 they reported counting 2,340 vehicles and 1,707 vehicles in 2010. By not having bridges over Little Rubicon River (Buck Island Outlet) or Ellis Creek, fisheries habitat is likely being adversely affected by petroleum products and sedimentation being washed downstream.

There would continue to be effects to MIS aquatic macroinvertebrate habitat by sedimentation at Ellis Creek and the Little Rubicon River. These effects at the localized level do change compositions of macroinvertebrate communities downstream from the wet crossings, as shown in the SMUD (2004) data on the Little Rubicon River.

Cumulative Effects - Alternative 2

The cumulative effects are the same as Alternative 1, except there would be more effects to stream water quality from sedimentation and petroleum products over time. Vehicle use during saturated soil conditions as well as vehicles crossing Ellis Creek and the Little Rubicon River contribute suspended sediments and oil products downstream where aquatic species reside.

Direct and Indirect Effects – Modified Alternative 3

Indicator Measure 1: Water quality within aquatic species habitat is expected to be maintained by a saturated soil management strategy for wet season vehicle use. Many species reside in streams and wetlands downstream from the trail as described in the Affected Environment above, and their aquatic habitat would be maintained by a saturated soil management strategy.

Indicator Measure 2: See the discussion in the Hydrology section. This alternative would add 0.38 miles of trail and close 1.58 miles of trail within the RCA. The closure of 1.58 miles of trail within the RCA would likely benefit aquatic species by reducing sediment delivery to streams. Closing and rehabilitating 14N34B would reduce sedimentation to Ellis Creek. Closing the

roads next to Buck Island Lake will improve water quality by reducing impacts to the sensitive lakeshore habitat.

The Long Bypass next to Little Sluice is composed primarily of granite bedrock slabs with drainage pathways between slabs. Oil spots left on the rocks by vehicles could drain oil pollutants into the Winter Camp ponds. The effects on the ponds below are expected to be minor though, thus meeting SNFPA guidelines.

Indicator Measure 3: The toilet at Wentworth Springs Campground would be moved out of the floodplain, maintaining water quality at Gerle Creek. The parking area at Little Sluice would be 75 feet wide instead of 200 feet wide reducing the number of visitors which would slightly reduce disturbance of small fish and amphibians and their larval stages at Spider Lake and associated ponds/wetlands. Six vault toilets would be constructed which would reduce water quality impacts from recreational visitors. The stream crossing at Little Rubicon would be an elevated rock ford, thus vehicles would primarily be above the waterline while crossing the stream, except for during high flow periods. Closing and rehabilitating 14N34B would reduce sedimentation into Ellis Creek. Water quality of aquatic species habitat is expected to be maintained by a saturated soil management strategy.

The construction and maintenance of the erosion control features by the County is effective mitigation for controlling sedimentation on the Rubicon Trail. These features installed under the SSWQPP are meeting the USFS Best Management Practices for sedimentation along the Rubicon Trail.

The 100 foot vehicle restriction area along Little Rubicon River at Buck Island crossing will ensure good water quality for native trout and macroinvertebrates. Camping will still occur next to the rivers and aquatic features, regardless of vehicle buffers. Other effects to aquatic systems could still occur from this dispersed use, such as fecal coliform (*e-coli*) in the water and trampling of riparian vegetation along streams or wetlands.

Indicator Measure 4: Perennial wetlands that are suitable habitat for Sierra Nevada yellow-legged frogs would not be impacted by Modified Alternative 3.

Indicator Measure 5: Installing an elevated rock ford at the Little Rubicon River to raise vehicles out of the water while crossing the river would maintain high quality downstream aquatic habitat. Oil and grease on the undercarriages of the vehicles would not be washed, ensuring good water quality downstream of the crossing for native trout and macroinvertebrates. During higher water levels, some petroleum based fluids may wash off the vehicles when crossing the Little Rubicon River, but the amount is expected to be minor, maintaining consistency with the SNFPA guidelines.

Cumulative Effects – Modified Alternative 3

Cumulative effects are the same as Alternative 1, except a saturated soil management strategy would reduce sedimentation and oil pollutants into the Winter Camp ponds, Loon Lake, and Gerle Creek.

Direct and Indirect Effects – Alternative 4

Indicator Measure 1: This indicator is the same as Alternative 1.

Indicator Measure 2: See the discussion in the Hydrology section. This alternative would add 0.72 miles of trail and close 1.24 miles of trail within the RCA; this closure of 1.24 miles of trail within the RCA would likely benefit aquatic species. Three routes to be added are within the RCAs; one at Spider Lake, one at Ellis Creek, and one at Little Rubicon River. All of these routes would cause an increase in adverse impacts to aquatic species from public use at these lakes and streams. Dispersed camping near Spider Lake would likely cause fecal contamination to the wetlands associated with Spider Lake and shoreline disturbance to aquatic species and their habitat.

Alternative 4 includes the Long Bypass next to Little Sluice, with effects to aquatic species similar to Alternative 1. A portion of 14N34B is contributing sediment into Ellis Creek where it travels alongside the creek. NSRELD-63-V would increase use alongside Spider Lake by adding this route as an official trail. Areas alongside the Rubicon Trail to the west of Little Rubicon River are being set aside for vehicle parking and camping; designating NSRELD-63-U as an authorized trail would encourage additional users to recreate alongside the length of the Little Rubicon River. All of these routes have portions within the RCA of streams and are inconsistent with SNFPA standard and guideline #116. Even though these routes may already exist, they are being added in Alternative 4 because they are not currently authorized trails. This use increases the likelihood of the introduction of fecal waste and petroleum products that would impact the aquatic species that live there.

Indicator Measure 3: This alternative is similar to Alternative 1, except for the following:

The 175 foot easement on the south side of the Little Sluice is within the RCA of Spider Lake which is inconsistent with SNFPA standard and guideline #116. This is discussed in Alt 1.

Addition of a portion of 14N34B, NSRELD-63-U and NSRELD-63-V, which are within the RCAs of Ellis Creek, Spider Lake and Little Rubicon River respectively, would likely contribute sediment to the these areas and cause impacts to aquatic species from fecal coliform (e-coli) and trampling of riparian

vegetation. Increased vehicle access would lead to camping closer to the RCA and a possible increase in fecal contamination to these riparian areas.

Five vault toilets would be constructed which would reduce water quality impacts from human waste.

Indicator Measure 4: Perennial wetlands that are suitable habitat for Sierra Nevada yellow-legged frogs could be impacted by petroleum products from vehicle use during wet trail conditions during spring runoff, if Sierra Nevada yellow-legged frogs are present.

Indicator Measure 5: Effects are the same as described in Modified Alternative 3.

Cumulative Effects – Alternative 4

Cumulative effects are the same as Alternative 1.

Direct and Indirect Effects – Alternative 5

Indicator Measure 1: Sedimentation and petroleum pollution entering aquatic species habitat would rarely occur and water quality would be expected to be maintained.

Indicator Measure 2: See the discussion in the Hydrology section. This alternative would not add routes to the NFTS and close 2.30 miles of trail within the RCA. This closure of trails within the RCA would benefit aquatic species in the Gerle Creek watershed and above Buck Island Lake by reducing sediment delivery and petroleum contaminants to streams.

Indicator Measure 3: Water quality would be maintained because shoreline disturbance would be reduced. During spring runoff it is more likely that clean water, free of turbidity and effluent, would flow into Loon Lake and Gerle Creek due to a seasonal operating period. Limited use may occur by private property owners allowed reasonable access to their in-holdings, providing this access does not cause resource damage. In Alternative 5, 2.3 miles of routes within RCAs would be closed versus 1.58 miles in Alternative 1. Closure of Buck Island Lake spurs would reduce shoreline disturbance from camping along the lake and reduce public trampling of streambanks. Disturbance to young fish and Pacific tree frog tadpoles and their shallow water habitat would be reduced.

Construction of the Ellis Creek and Little Rubicon bridges and replacement of the FOTR bridge would maintain water quality. There would be no motor vehicle use areas encroaching in the RCA. The toilet at Wentworth Springs would be moved out of the floodplain improving water quality in Gerle Creek.

No new toilets are proposed; fecal contaminants would likely impact water quality at the streams, lakes, and ponds.

Indicator Measure 4: Effects are the same as Modified Alternative 3.

Indicator Measure 5: Downstream water quality would be maintained because of the construction of the bridges at Ellis Creek and Little Rubicon. There would be no expected changes to sedimentation or stream flow for MIS aquatic macroinvertebrate habitat. Fewer trees would be removed than Alternative 1 for the construction of the 12 foot wide bridge at Ellis Creek resulting in very minor changes to shade at Ellis Creek.

Cumulative Effects – Alternative 5

Cumulative effects are the same as Alternative 1, except a seasonal operating period would reduce sediment and oil pollutant delivery into the Winter Camp ponds, Loon Lake, and Gerle Creek.

Direct and Indirect Effects – Alternative 6

Indicator Measure 1: Sedimentation and petroleum pollution entering aquatic species habitat would rarely occur and water quality would be expected to be maintained because of the seasonal operating period from July 1 to November 1. Limited use may occur by private property owners allowed reasonable access to their in-holdings, providing this access does not cause resource damage.

Indicator Measure 2: This alternative would close 1.68 miles of trail within the RCA. Closing and rehabilitating a portion of 14N34B would reduce sedimentation into Ellis Creek. Closing the roads next to Buck Island Lake would improve water quality by reducing impacts to the sensitive lakeshore habitat. This alternative would add 0.36 miles of trail at Buck Island where impacts from these routes to the lakeshore are not expected because of the distance.

Indicator Measure 3: Water quality would be maintained because shoreline disturbance would be reduced. During spring runoff clean water, free of turbidity and effluent, would flow into Loon Lake and Gerle Creek due to a seasonal operating period. Miles of routes within RCAs would be reduced.

Construction of the Ellis Creek and Little Rubicon bridges and replacement of the FOTR bridge would maintain water quality. There would be fewer vehicle motor vehicle use areas encroaching into RCAs. The installation of barriers and issuance of a forest order to eliminate dispersed camping within 300 feet of the Little Rubicon River would eliminate impacts from dispersed camping, maintaining water quality free of fecal contaminants. Both actions would also

reduce trampling impacts on riparian vegetation. The toilet at Wentworth Springs would be moved out of the floodplain improving water quality in Gerle Creek. Four vault toilets would be constructed which would reduce water quality impacts from human waste. Closing and rehabilitating a portion of 14N34B would reduce sedimentation to Ellis Creek.

Indicator Measure 4: Same as Alternative 5.

Cumulative Effects – Alternative 6

Cumulative effects are the same as Alternative 1, except a seasonal operating period from July 1 to November 1 would reduce sedimentation and oil pollutants delivery into the Winter Camp ponds, Loon Lake, and Gerle Creek.

Terrestrial Wildlife

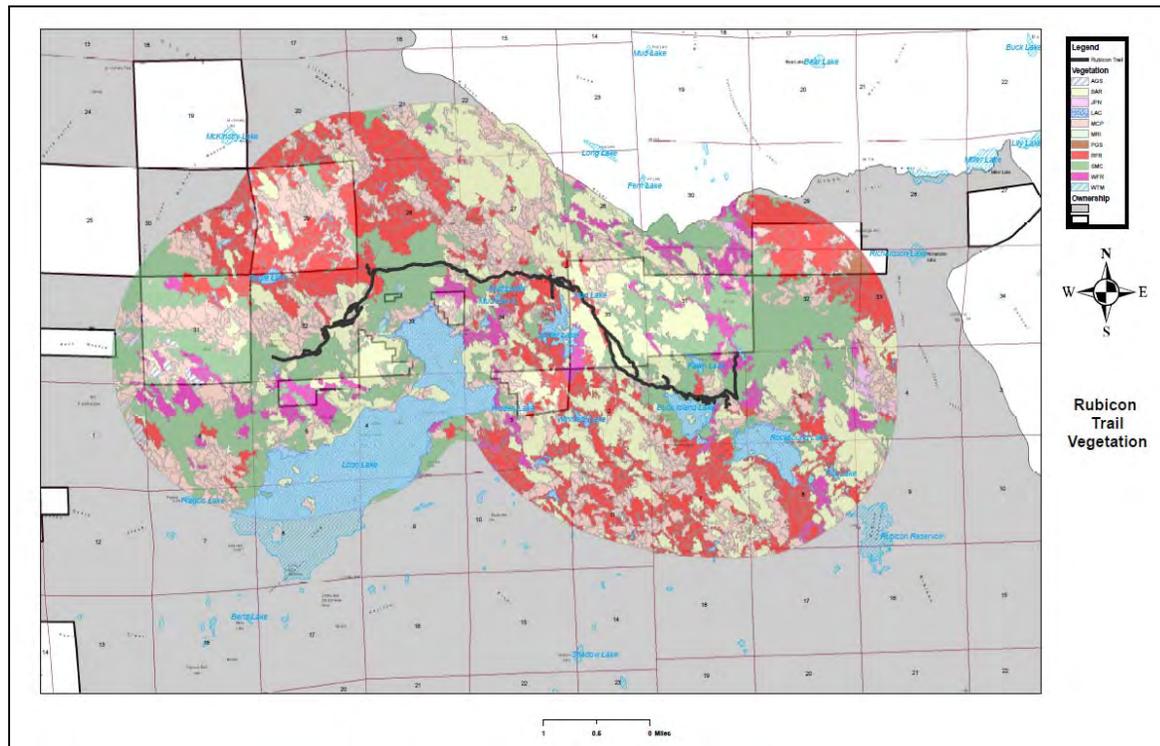
Affected Environment

Elevations along the Rubicon trail vary from 5,400 to 7,000 and habitat varies along this gradient from forested to shrubland to open granite faces. The analysis area has equally high amounts of montane chaparral, red fir and sierra mixed conifer. Equally, it has 20% of its habitat labeled as “barren”. This is most likely granite slab or outcrops. Habitat varies along the Trail and large contiguous habitat area is only found in sierra mixed conifer and red fir habitat types. This habitat diversity leads to a diversity of wildlife and use along the trail varies with this changing habitat and elevation. The high mountain creeks, wetlands, and lakes in the project area provide important drinking areas for wildlife that utilize them during reproduction, foraging or during migration.

Table 3-12: Wildlife habitat relationship type within analysis area (1.5 mile radius).

Wildlife Habitat Relationship Type	Acreage	Percent Acreage of Cumulative Effects Analysis Area
Agriculture	88	0.61%
Barron	3,163	21.90%
Jeffrey Pine	57	0.39%
Lacustrine	1,285	8.89%
Montane Chaparral	3,176	21.99%
Montane Riparian	9	0.06%
Perennial Grassland	27	0.19%
Red Fir	2,984	20.66%
Sierra Mixed Conifer	2,826	19.56%
White Fir	797	5.52%
Wet Meadow	34	0.24%
Annual Grassland	88	0.61%

Figure 3-1: Current Wildlife Habitat Relationship Habitat Types Within The Analysis Area.



Many avian species are supported by the forested lands within the project area and surrounding the Rubicon Trail. Conifer species such as red fir (*Abies magnifica*), incense cedar (*Calocedrus decurrens*), and Jeffrey pine (*Pinus jeffreyi*) trees are utilized for cover, forage and reproduction of these high elevation forested birds. Large diameter conifer trees (>20" dbh) are often preferred by many species of cavity nesters that utilize this high elevation habitat. Common cavity nesters such as the yellow-bellied sapsucker (*Sphyrapicus varius*), pileated woodpecker (*Dryocopus pileatus*), white-headed woodpecker (*Picoides albolarvatus*), hairy woodpecker (*Picoides villosus*), and northern flicker (*Colaptes auratus*) are likely to be found roosting or nesting in the larger conifer trees in the project area. Many of the common lower elevation Sierran forest birds are within the project area as well, such as mountain quail (*Oreortyx pictus*), Steller's jay (*Cyanocitta stelleri*), mountain bluebird (*Sialia currucoides*), wood warblers (*Dendroica* spp.), and mountain chickadees (*Parus gambeli*). This area also includes the flammulated owl, California spotted owl, rufus hummingbird, Williamson's sapsucker, and Cassin's finch, which may utilize habitat in the project area. Shrub species such as huckleberry oak or manzanita are utilized for cover and forage for all types of birds but especially important seral species such as fox sparrows (*Passerella iliaca*). Water loving birds such as osprey (*Pandion haliaetus*), common mergansers (*Mergus merganser*) and buffleheads (*Bucephala albeola*) are also common residents of the lakes and streams in the project area.

Mammal species are less obvious in the area, but still utilize the cover and forage provided by the forested and shrub habitat. The common species include chipmunks (*Tamias* spp.), western gray squirrel (*Sciurus griseus*), yellow-bellied marmot (*Marmota flaviventris*), striped skunk (*Mephitis mephitis*), gray fox (*Urocyon cinereoargenteus*), and coyote (*Canis latrans*). Large ranging mammals such as black bear (*Ursus americanus*), mountain lion (*Felis concolor*), and mule deer (*Odocoileus hemionus*) also occur in the project area. The project area is located within the Pacific Deer Herd migration corridor and provides critical fawning habitat at the eastern end of the project area, south of the Rubicon Trail.

Threatened, Endangered, Sensitive and Management Indicator Species

The ENF provides habitat for 320 species of birds, mammals, amphibians, and reptiles (Project file). Current management direction is guided by the Endangered Species Act of 1973, the National Forest Management Act and implementing regulations of 1982, and the Eldorado National Forest LRMP (as amended in 2004).

Threatened, Endangered, Sensitive: A number of species found on the Eldorado National Forest are listed as Endangered or Threatened under the Federal Endangered Species Act, or have been designated by the Forest Service, Region 5, as sensitive to management activities (“sensitive species”) (Table 3-13). These species and their habitats on the ENF are described in detail in the Biological Assessment or Biological Evaluation prepared for this project. The Rubicon Trail Easement and Resource Improvement project area has been evaluated for Proposed, Threatened, Endangered or Sensitive (PTES) wildlife by consulting the Forest geographic information system (GIS) and considering literature in the species information files (USDA Forest Service, 2007). Upon consideration of the PTES wildlife species potentially occurring on the Eldorado National Forest, the American bald eagle, California spotted owl, great gray owl, northern goshawk, Pacific fisher, American marten, peregrine falcon, Sierra Nevada red fox, pallid bat, Townsend's big-eared bat, willow flycatcher, California wolverine will be analyzed in detail. This report provides the rationale of TES species that have the potential to occur within Eldorado National Forest or vicinity, but eliminated from the need for detailed analysis based on criteria relating to the scope and intensity of the project, habitat requirements, and/or geographic range.

Table 3-13: Wildlife species considered for analysis.
 (FWS species list date: October 19, 2011, Last update: September 18, 2011)

Species	Status	Observations in Analysis Area	Description of Habitat	Habitat in Analysis Area	
				No	Yes
Valley Elderberry Longhorn Beetle (<i>Desmocerus californicus dimorphus</i>)	FT	No	Elderberry plants > 1" diameter at ground level within 100' of project. Below 3,000 feet elevation (USDI Fish and Wildlife Service 1999).	3	
Bald Eagle (<i>Haliaeetus leucocephalus</i>)	FSS	No	Habitats or areas identified in Draft Bald Eagle Management Plan, including nesting and wintering habitat (USDA Forest Service 1999b, 2001b).		X
Peregrine Falcon (<i>Falco peregrinus</i>)	FSS	No	Cliff sites identified as potential nesting habitat (Wilderness Research Institute 1980).		X
California Spotted Owl (<i>Strix occidentalis occidentalis</i>)	FSS	Yes	Forested habitats. Areas adjacent to known sightings or Spotted Owl Protected Activity Centers. (USDA Forest Service 2001a, 2001b)		X
Great Gray Owl (<i>Strix nebulosa</i>)	FSS	No	Large (>20 acres) meadows (USDA Forest Service 1999c)		X
Northern Goshawk (<i>Accipiter gentilis</i>)	FSS	Yes	Forested habitats. Areas adjacent to known sightings or Goshawk Protected Activity Centers. (USDA Forest Service 2001a, 2001b)		X
Willow Flycatcher (<i>Empidonax traillii</i>)	FSS	No	Meadows with a willow component identified as providing potential habitat (USDA Forest Service 1999c)		X
Pacific Fisher (<i>Martes pennanti</i>)	FSS	No	Forested habitats below 8,500 feet elevation, with fairly dense canopies and large trees, snags, and down logs. Hardwoods may also serve as an important habitat component (USDA Forest Service 2001a, 2001b).		X
American Marten (<i>Martes Americana</i>)	FSS	No	Forested habitats above 5,500 feet elevation, with large diameter trees, snags, and down logs, moderate-to-high canopy closure, and an interspersed of riparian areas and meadows. (USDA Forest Service 2000)		X

Species	Status	Observations in Analysis Area	Description of Habitat	Habitat in Analysis Area	
				No	Yes
Sierra Nevada Red Fox <i>(Vulpes vulpes necator)</i>	FSS	No	Red fir, Lodgepole Pine, meadows and riparian areas, and alpine and subalpine habitats above 5,000 feet elevation (USDA Forest Service 2000).		X
California Wolverine <i>(Gulo gulo luteus)</i>	FSS	No	Alpine and subalpine habitats within Desolation Wilderness.		X
Pallid Bat <i>(Antrozous pallidus)</i>	FSS	No	Rock crevices, tree hollows (particularly hardwoods), mines, caves and abandoned buildings below 6,000 feet elevation (Philpott 1997; Barbour and Davis 1969, USDA Forest Service 2001a, 2001b).		X
Townsend's Big-eared Bat <i>(Corynorhinus townsendii)</i>	FSS	No	Caves, mines or abandoned buildings and adjacent open, riparian and forest habitat to those features below 6,000 feet elevation (USDA Forest Service 2001a, 2001b).		x
Western Red Bat <i>(Lasuirus blossevillii)</i>	FSS	No	Riparian and deciduous wooded habitats (USDA Forest Service 2000).	3	
<p>FE = Federal Endangered; FT = Federal Threatened; (P) = Proposed Federal listing; FSS = Forest Service Sensitive</p> <p>Generic Rationale:</p> <ol style="list-style-type: none"> 1. No offsite sediment generated. No effect to downstream water quality or quantity. 2. Project does not affect suitable habitat. 3. Project does not occur within known or suspected species range. 4. Project does not affect identified management areas. 5. Project does not affect specific habitat features important to the species. 6. Project LOP or design avoids seasonal effects. 					

American Peregrine Falcon

The peregrine falcon was listed as a federally endangered species from 1970 through 1999. The final rule to de-list the Peregrine falcon was published in the Federal Register on August 25, 1999, at which time the species was added to the Regional Foresters list of sensitive species in Region 5. The most commonly occupied habitats contain cliffs, for nesting, with open gulfs of air (rather than in confined areas) and generally open landscapes for foraging. Peregrines forage upon many species of birds and sometimes mammals in a variety of open habitats; meadows, riparian areas or lakes may provide preferred foraging areas but are not essential (CWHR 2005). The analysis area consists of open granite, forested habitat, lakes, creeks and some riparian habitat which all would provide prey habitat for this species.

Breeding activity begins as early as February with pair bonding and territory reestablishment. Young fledge in June and July but remain in the territory until late August. Peregrines have relatively strict nesting requirements: Vertical cliff habitat with large potholes or ledges that are inaccessible to land predators and are preferentially located near habitat that has a high avian prey population (Monk and Walton 1988). Habitat mapping and surveys conducted in 1980 mapped 77 potential cliff nesting sites on the Eldorado National Forest; 47 of these sites were rated as having high or moderate potential (Boyce and White 1980). Two of these 77 sites are located within a half mile of the project area. The Devil's Peak and North Devil's Peak sites are within 1 mile of the north-eastern end of trail. They were not surveyed in the 1980 peregrine survey because they were deemed to have lower quality nesting habitat than other sites. However, they could be potential nesting habitat, but have never been surveyed.

No project specific surveys have been completed for this project. Surveys of suitable cliff nesting habitats occurred in 1980 and 1993-1994. Peregrine falcons were absent from the Eldorado National Forest for two decades prior to 2004, when a pair established an eyrie and successfully fledged young. This is the only active peregrine eyrie known to occur on the Forest at this time. Young have been fledged from this site during the past two breeding seasons, reflecting an increasing population trend on the ENF, as is occurring within other parts of the State. Another eyrie adjacent to the forest was last used in 1994.

Bald Eagle

The bald eagle was listed by the U.S. Fish and Wildlife Service (USFWS) as a federally endangered species in 1978 and was removed from the federal list of Threatened and Endangered Species on June 28, 2007. Since 1978 populations have increased nationwide as well as in the Sierra Nevada and on the ENF (USDA FS 2007). Management direction for the bald eagle is now

provided by the Bald and Golden Eagle Protection Act of 1940 and the Migratory Bird Treaty Act of 1972. Under these acts, disturbance that is likely to cause injury, substantial interference with normal breeding, feeding or sheltering behavior, or nest abandonment is prohibited (USDI Fish and Wildlife Service, 2007).

Bald eagles use habitat in proximity to major lakes and reservoirs on the ENF, both in summer and winter. Bald eagle nests are usually located in uneven-aged (multi-storied) stands with old growth components (Anthony and Isaacs 1989). Most nests in California are located in predominantly coniferous stands. Nest sites typically occur within a mile of open water, and trees selected for nesting are characteristically one of the largest in the stand or at least co-dominant with the overstory. The bald eagle analysis area is .5 miles surrounding the proposed Alternative activities (Terrestrial Wildlife Biological Evaluation: Appendix A). There is little high suitability nesting and foraging habitat for the bald eagle in the analysis area (Table 3-14). The majority of the analysis area is moderate suitability nesting and foraging habitat. Therefore, there is a lower probability that bald eagles would nest in this analysis area in the future. The bald eagle analysis area is .5 miles surrounding the proposed Alternative activities (Terrestrial Wildlife Biological Evaluation: Appendix A).

Table 3-14: Bald eagle habitat within 0.5 mile analysis area.

Habitat	Acres
High	1
Moderate	1,156
Grand Total	1,158

On the ENF, both wintering and summer nesting surveys have occurred annually since the early 1980s. The number of nesting bald eagles has increased on the ENF over the past couple of decades from a single nesting pair in the mid-1980s to three nesting pairs documented on NFS lands, and an additional pair on private land within the ENF boundary in 2004. Wintering bald eagles use all major reservoirs on the Forest that remain unfrozen, with the number of individuals fluctuating from year to year. Mid-winter bald eagle surveys are conducted annually on the ENF and nest success is monitored annually at all known nest sites.

Potential bald eagle nesting and wintering habitat has been mapped within a mile of the major lakes and reservoirs capable of supporting bald eagles. Nine reservoirs on the ENF provide potential nesting habitat for bald eagles, and four of these reservoirs currently support a nesting pair of bald eagles. Loon Lake, at the edge of the project area, has one of the current nesting sites for bald eagles on the forest. The lakes and creeks within the project area are utilized by this pair for foraging. The eagles have nested at Loon Lake for years. There is one

trail (16E30) that runs almost directly below the nest. There are no other roads or trail within 450 meters of the nest.

California Spotted Owl

The California spotted owl (CSO) is a Forest Service designated sensitive species and a management indicator species (MIS) on all Sierra Province National Forests in the Pacific Southwest Region. The ENF is located in the central portion of the species range and represents about 16 percent of the known population in the Sierra Nevada based upon data presented in Beck and Gould (1992). There is a relatively uniform distribution of owl sites across the forest and the adjoining Tahoe National Forest to the north and Stanislaus National Forest to the south.

Suitable CSO habitat in the Sierra Nevada consists of dense, multi-layered mature forested stands with greater than 70 percent canopy closure preferred for nesting and greater than 50 percent canopy closure for foraging (Verner et al. 1992). Sites selected for nesting, roosting and foraging also contain higher numbers of snags and down logs than random sites. For mapping and analysis purposes, this habitat has been represented by CWHR 4M, 4D, 5M, and 5D size and density classes in most coniferous forest types as displayed in the California Wildlife Habitat Relationships modeling of spotted owl habitat (CWHR 2005). Potential habitat is located within a mile and half of the project area, however habitat quality is considered low due to ecological potential of the sites and patchiness of habitat. Presence of owls in the area is unlikely.

Also important is the availability of large snags and down logs, which are utilized for nesting and support the owl's prey base of mainly flying squirrels and woodrats (Laymon 1988, Verner et al. 1992). On the ENF, spotted owls are known to occur between 2,000 ft. and 7,200 ft. in elevation, with most of the nesting pairs found in the Sierran mixed conifer habitat type. The reproductive season for spotted owls occurs between mid-February and August with most young fledging by August 31 (Verner et al. 1992). According to the current literature regarding productivity and survivorship of spotted owls, there is a direct relationship between the amount of high quality habitat (greater than 50 percent canopy closure) in close proximity to the nest stand and spotted owl occupancy and fitness (Verner et al. 1992:153-155, Bart 1995, Seamans 2005, Blakesly 2003).

The spotted owl analysis area is 1.5 miles surrounding the proposed Alternative activities (Terrestrial Wildlife Biological Evaluation: Appendix A).

Table 3-15: California Spotted Owl habitat within 1.5 mile analysis area.

Habitat	Acres
NON FOREST SERVICE	1,286
Foraging	1,278
Nesting	8
USDA FOREST SERVICE	4,620
Foraging	4,618
Nesting	2
Grand Total	5,905

The Eldorado National Forest has conducted surveys for spotted owl presence and reproductive status within project areas since 1989. Although not comprehensive, these surveys, combined with incidental sighting data, have covered the vast majority of National Forest land, especially during the early 1990s. Comprehensive surveys have occurred annually since 1987 within the 88,000 acre California Spotted Owl Demographic Study Area on the Georgetown and Pacific Ranger Districts. Based upon recorded occurrences since 1986, 201 spotted owl activity centers (territorial owl sites) have been identified on the Eldorado National Forest. Project specific surveys were not completed for spotted owl as no large patches of nesting habitat are currently available within a half mile of the Rubicon Trail and the project activities.

The best available habitat is maintained as 300-acre Protected Activity Centers (PACs) for these owl sites, surrounded by 700-acre home range core areas. No owl PACs are known within a 1.5 mile buffer of the project Alternatives. Desired conditions are specified in the LRMP for these land allocations.

Northern Goshawk

The northern goshawk is a Forest Service designated sensitive species and a management indicator species (MIS) on the Eldorado National Forest. Although northern goshawks remain widely distributed throughout their historic range, current sampling techniques are inadequate to determine population status or trends of this species (USDI Fish and Wildlife Service 1998). It is estimated that there are around 600 known goshawk territories on National Forest System lands in the Sierra Nevada, with about 70 territories occurring on the ENF (USDA Forest Service 2001).

Suitable goshawk habitat in the Sierra Nevada consists of dense, multi-layered mature forested stands with dense canopy cover for nesting. Dense to moderately open overstories and open understories interspersed with meadows, shrub patches, riparian area, or other openings are utilized for foraging. Goshawks use nest-sites with greater canopy cover, greater basal area, greater numbers of large diameter trees, and lower shrub/understory cover relative to

random sites. High canopy cover is the most consistent structural feature similar across studies of northern goshawk nesting habitat. Goshawks typically nest in stands with canopy cover between 60% and 80% (Keane 1999). For mapping and analysis purposes, northern goshawk habitat has been represented as high and moderate suitability types modeled in the California Wildlife Habitat Relationships program (the CWHR 4M, 4D, 5M, and 5D size and density classes in most coniferous forest types) (CWHR 2005). On the ENF, goshawks are known to occur between 4,000 and 7,000 feet in elevation. The reproductive season for goshawks (including courtship through the post-fledging period) lasts from mid-February through September. Potential habitat is located within a mile and a half of the project area, however habitat quality is considered low due to ecological potential of the sites and patchiness of habitat. Presence of goshawks in the area is unlikely.

The northern goshawk analysis area is 1.5 miles surrounding the proposed Alternative activities (Terrestrial Wildlife Biological Evaluation: Appendix A)

Table 3-16: Goshawk habitat within 1.5 mile analysis area.

Habitat	Acres
NON FOREST SERVICE	1,286
Foraging	1,271
Nesting	14
USDA FOREST SERVICE	4,620
Foraging	4,593
Nesting	27
Grand Total	5,905

The Eldorado national Forest has conducted surveys for goshawk presence and reproductive status within project areas since 1987. The spatial scale used has varied by project. Surveys conducted after 2000 used the current Goshawk survey protocol, but observations on the Forest have been recorded since the late 1980's. Although not comprehensive, surveys have occurred over much of the Forest over time and surveys as well as incidental sightings have identified 75 goshawk nest stands thought to be associated with differing territories. One year surveys were completed on a small patch of potential nesting habitat near Ellis Creek. No goshawks were observed.

Two hundred acres of nesting habitat is currently maintained for each of these sites in goshawk Protected Activity Centers (PACs). No goshawk PACs are known within a 1.5 mile buffer of the project Alternatives.

Great Gray Owl

The Sierra Nevada represents the southern range of the great gray owl in the western United States. Historic sightings are recorded for all counties in the Cascade range in California and the Sierra Nevada as far south as Tulare County, but the present known population is centered in Yosemite National Park. It includes nesting activity on the Stanislaus National Forest at five distinct locations, and several recent sightings on the Sierra National Forest.

In the Sierra Nevada, great gray owls are found in mixed coniferous forest from 2,400 to 9,000 feet elevation where such forests occur in combination with meadows or other vegetated openings. Meadows appear to be the most important hunting habitat for great gray owls, where approximately 93 percent of their prey is taken (Winter 1986). For analysis purposes, great gray owl habitat on the ENF has been mapped as occurring within and surrounding meadows. However, great gray owls require about 15 acres of meadow habitat. Nesting usually occurs within 600 feet of the forest edge and adjacent open foraging habitat. Males begin establishing nesting territories in March to early April and young will remain around the nest through August.

About 58 acres of great grey owl meadow habitat exists on the far western portion of the proposed Rubicon Trail easement at Gerle Creek Meadow. This meadow is surrounded completely by CWHR type 4M habitat with canopy cover between 40-55% within a quarter mile radius. Since nest trees are usually >24", within canopy cover >60% (Beck and Winter 2000), and within 150-300 yards of meadows this area is not likely to provide suitable nesting habitat currently. When canopy cover and mean tree diameter increase in the future, then it may become nesting habitat.

The great grey owl analysis area is .25 miles surrounding the proposed Alternative activities (Terrestrial Wildlife Biological Evaluation: Appendix A).

No project specific surveys were performed. At present great gray owls are not known to breed at any sites on the Eldorado National Forest, but the forest provides potential habitat for this sensitive species. A pair of great gray owls was detected early in the breeding season in 2002 on private land within the forest boundary, but did not remain after mid-June. Inventories for great gray owls have not been conducted on a large scale on the ENF, but the California Department of Fish and Game has surveyed some of the highest quality habitat in recent years. These owls are somewhat secretive and difficult to detect. There is a possibility that they will be found occupying additional locations where there is suitable habitat. The California population was estimated at 60 to 70 birds in 1984 (Winter 1986). Recent sightings in Yosemite National Park and on adjacent National Forests in the Sierra Nevada indicate the actual population could be higher. No project specific surveys were completed.

Willow Flycatcher

The willow flycatcher is ranked as “critically imperiled because of extreme rarity or other factor ... making it especially vulnerable to extirpation from the State” (NatureServe 2005). Historically, willow flycatchers nested throughout California wherever thickets of riparian deciduous shrubs, primarily willow, occurred (USDA Forest Service 2001). In the last four decades, however, willow flycatcher breeding populations have been extirpated from most of the lower elevation riparian areas in California and it appears that the species may no longer breed at elevations below 3,000 feet in the Sierra Nevada, in the Central Valley, and in the valleys of the central coast (Zeiner et al. 1990). Historic records combined with recent survey efforts indicate a long-term decline of willow flycatchers at elevations above 3,000 feet in the Sierra Nevada as well. Breeding populations occur on Forests surrounding the Eldorado (the Tahoe, Lake Tahoe Basin, and Humboldt-Toiyabe National Forests).

In the Sierra Nevada, willow flycatchers breed in shrubby vegetation in meadow and riparian communities. Fowler et al. (1991) observed that preferred habitat generally occurred in meadows larger than 10 acres in size, and willow flycatchers were consistently associated with meadows where high water tables resulted in standing water and riparian shrubs (specifically willow) were abundant. For analysis purposes, preferred willow flycatcher habitat on the ENF has been mapped as occurring within meadows larger than 10 acres in size, containing a willow shrub component. One hundred sixteen meadows have been mapped as providing preferred habitat.

The willow flycatcher analysis area is .25 miles surrounding the proposed Alternative activities (Terrestrial Wildlife Biological Evaluation: Appendix A). About 58 acres of willow flycatcher meadow habitat exists on the far western portion of the proposed Rubicon Trail easement at Gerle Creek Meadow.

The willow flycatcher breeding season occurs from late May or early June (territory establishment) to the middle of September (fledgling independence) in the Sierra Nevada.

No project specific surveys were performed. Surveys in 1992, 1997, and 1998 have occurred at historic breeding locations, and in emphasis habitat (suitable meadows greater than 10 acres in size), with mostly negative results. Willow flycatchers were detected in Indian Valley in 2003 and 2004. These are the only detections on the ENF in recent years, though willow flycatchers are known to occur adjacent to the ENF on the Lake Tahoe Basin Management Unit and at Red Lake.

Pallid Bat

The pallid bat is both a Forest Service sensitive species and a State of California Species of Special Concern. The species uses a variety of habitats, including grasslands, shrublands, woodlands, and coniferous forests. Pallid bats are most common in open, dry habitats that contain rocky areas for roosting. The species tends to be a roosting habitat generalist, using many different natural and man-made structures (USDA Forest Service 2001). Tree roosting has been documented in large conifer snags and bole cavities in oaks (Orr 1954). It is a yearlong resident in most of its range and hibernates in winter near its summer roost (Zeiner et al. 1990). Pallid bats are a gregarious species, often roosting in colonies of 20 to several hundred individuals. Young are born from April to July and are weaned in mid to late August (Zeiner et al. 1990).

Since pallid bats utilize a variety of habitats, the entire analysis area is considered pallid bat habitat. The home range analysis area for the pallid bat is 1.5 miles (13,161 acres).

No project specific surveys have been completed. In 2002 a multi-species monitoring program inventoried bats at several sites on the Eldorado NF and Lake Tahoe Basin Management Unit. A pallid bat was detected near the Silver Fork American River at about 5,500 feet in elevation (Holst, pers. comm. 2005). Although few bat surveys have occurred, the forest provides potential habitat for this sensitive species.

Townsend's Big-eared Bat

The Townsend's big-eared bat is both a Forest Service sensitive species and a State Species of Special Concern. Townsend's big-eared bat occurs throughout the west and is distributed from the southern portion of British Columbia south along the Pacific Coast to central Mexico and east into the Great Plains. In California, the species is found in a variety of habitats including mid-elevation mixed conifer, mixed hardwood-conifer forests, and riparian habitats (Zeiner et al. 1990). Distribution of this species is strongly correlated with the availability of caves and cave-like roosting habitat. Populations have incurred serious declines over the past 40 years in parts of California (Zeiner et al 1990).

Historically, maternal colonies may have contained several hundred individuals. At present they usually contain from 35 to 150 individuals (Brown 1996). Maternal colonies form between March and June (may vary by local climate conditions) with a single pup born between May and July (Zeiner 1990). Individuals are very loyal to their natal sites and usually do not move more than 10 kilometers from a roost site (Fellers and Pierson 2002). They roost within caves, abandoned mines, and buildings. Buildings must offer cave-like spaces in order to be suitable. This species is highly sensitive to roost disturbance

(Zeiner 1990). Night roosts may occur in more open settings (Fellers and Pierson 2002).

Since Townsend big-eared bats utilize a variety of habitats, the entire analysis area is considered Townsend bat habitat. The home range analysis area for the pallid bat is 1.5 miles (13,161 acres).

No project specific surveys have been completed. In 2002 a multi-species monitoring program inventoried bats at several sites on the Eldorado NF, and bat inventories have occurred at several abandoned mines and tunnel structures on the Forest. Townsend's big-eared bats have been detected in two locations on the forest. Maternal roost structures on the forest remain unknown but the Eldorado does provide potential habitat for this species.

American Marten

The American marten is found on all Sierra Nevada National Forests but, rangewide, the current distribution of marten is a small portion of their historic range (Zielinski et al. 1995). Habitat modification and fragmentation along with trapping and fire are major factors contributing to this contraction of historic range. Large home range sizes combined with low reproductive potential result in limited ability for populations to recover from natural or human caused disturbances.

On the Eldorado National Forest, marten have not been detected below 5,000 feet in elevation and predominantly occur above 6,000 feet in elevation. Preferred forest types include mature mesic forests of red fir, red fir/white fir mix, lodgepole pine, and Sierran mixed conifer. Preferred habitat is characterized by dense (60 to 100 percent canopy), multi storied, late seral coniferous forests with a high number of large snags and downed logs. Preferred habitat on the ENF has been mapped as CWHR 4D, 5M and 5D stand types occurring above 5,000 feet in elevation. These areas are often in close proximity to both dense riparian corridors (used as travelways), and include an interspersion of small (<1 acre) openings with good ground cover (used for foraging). Coarse woody debris is an important component of marten habitat, especially in winter, by providing structure that intercepts snowfall and creates subnivean tunnels, interstitial spaces, and access holes. Sherburne and Bissonette (1994) state that only older growth forests with accumulated coarse woody debris provide the forest floor structure necessary to enable marten to forage effectively during the winter.

No marten sightings are located within the 0.5 mile analysis area (Terrestrial Wildlife Biological Evaluation: Appendix A). Total Marten Habitat within 0.5 mile is 2,204 acres; 515 acres of this is located on private lands.

Table 3-17: Marten habitat within 0.5 mile analysis area.

Marten Habitat	Acres
NON FOREST SERVICE	515
Preferred	8
Suitable	507
USDA FOREST SERVICE	1,688
Preferred	2
Suitable	1,686
Grand Total	2,204

The analysis area consists mainly of Suitable habitat (99%) which is utilized mainly for foraging. Very little preferred habitat (<0.1%) exists within the analysis area. It is unlikely that marten would be occupying this area due to the low amount of Preferred Habitat and the high amount of habitat patches with less than 50% canopy cover within the analysis area.

No project specific surveys were completed. Incidental marten observations have been recorded on the Forest since the 1980's and systematic surveys designed to detect the presence of marten were conducted between 1996 and 2002 (Zielinski et al. 2000). From these observations and surveys, marten are known to occur most frequently above 6,000 feet in elevation on the ENF, and to be fairly well distributed in the red fir and lodgepole pine elevation zone.

Pacific Fisher

The Pacific fisher is a Forest Service sensitive species and a USFWS candidate species for listing as threatened or endangered. In 2004 the FWS determined that listing of the fisher as a threatened species was warranted, but that the listing process was precluded at this time. The southern Sierra Nevada and northwestern California populations may be the only naturally-occurring breeding populations of fishers in the Pacific region from southern British Columbia to California (Zielinski et al. 2004). Moreover, mortality rates of adult fishers in the southern sierra population appear to be high (Truex et al. 1998, in USFWS 2004).

Fisher predominantly occur in mid-elevation coniferous forest (3,000-5,000), but appear to now be absent from the Central Sierra Nevada, including the Eldorado National Forest (Zielinski et al. 2005). Fishers use large areas of primarily coniferous forests with fairly dense canopies and large trees, snags, and down logs. A vegetated understory and large woody debris appear important for their prey species. Riparian areas are important to fishers because they provide important concentrations of rest site elements, such as broken top trees, snags, and coarse woody debris (Zielinski 2004). It is assumed that fishers will use patches of quality habitat that are interconnected by other

forest types, whereas they will not likely use patches of habitat that are separated by large open areas lacking canopy cover (Powell and Zielinski 1994). Suitable fisher habitat on the ENF has been mapped as occurring in CWHR coniferous forest types in the 4 and 5 size classes, and the M and D density classes (trees greater than 12" dbh and canopy cover greater than 40%).

The analysis area for fisher is a radius of 1.5 miles from all project Alternative activities (Terrestrial Wildlife Biological Evaluation: Appendix A).

Table 3-18: Fisher habitat within 1.5 mile analysis area.

Fisher Habitat	Acres
NON FOREST SERVICE	1,286
Denning	5
High Quality	34
Suitable	1,247
USDA FOREST SERVICE	4,620
Denning	1
High Quality	265
Suitable	4,353
Grand Total	5,905

The analysis area consists mainly of High Quality habitat (5%) and Suitable habitat (95%) which are utilized mainly for foraging. Very little denning habitat (<0.1%) exists within the analysis area. It is unlikely that fishers will occupy this area if reintroduced due to the low amount of High Quality and Denning Habitat and the higher elevation of the project area which is outside of their preference (3,000-5,000ft).

No project specific surveys have occurred. Systematic surveys designed to detect the presence of fisher and marten have occurred in the Sierra Nevada, including on the Eldorado National Forest, between 1996 and 2002 (Zielinski et al.2000). These surveys detected marten but did not detect fisher on the forest. Additional surveys have occurred within some project areas but have not been systematic or comprehensive. Occasional, unconfirmed fisher observations have been reported within the past ten years, but for purposes of this analysis, fisher are assumed to be absent from the Forest and from the Central Sierra Nevada in general.

Wolverine

As described in Appendix A, the wolverine is a California State Threatened species in addition to being a Forest Service Sensitive species. The wolverine has been placed in the smallest population size class of Sierra Nevada species, with the most significantly declining trend and the most significantly contracted range (USDA Forest Service 2001).

Considered a scarce resident in California, the known habitat distribution occurs from northern California south through the Sierra Nevada (Zeiner et al. 1990). In the northern Sierra Nevada, most sightings fall between 4,300 to 7,300 feet, and in the southern Sierra Nevada, between 6,400 to 10,800 feet. (Zeiner et al. 1990). Wolverines readily use non-forest habitat above timberline, but a significant portion of their life history needs are met in forest (Banci 1994). Wolverines that occur in forested areas use dense forest cover for travel and resting. Habitats used in the Sierra Nevada include mixed conifer, red fir, lodgepole pine, subalpine conifer, alpine dwarf-shrub, wet meadows, and montane riparian habitats (Zeiner et al. 1990). The lack of human development was found to form a more important factor for home range location in Scandinavia than habitat (May 2006). They are suspected of having been negatively affected by the rise in popularity of winter recreation. Habitat requires that road densities are below 2 miles/sq. mile (Terrestrial Wildlife Biological Evaluation: Appendix A).

Studies indicate that home ranges in North America may vary from less than 38.6 square miles to over 347.5 square miles (Appendix A); giving a wide range of area to be analyzed. 3.5 square miles would be utilized for the home range analysis area. Since this is such a large area to analyze, half of a home range will be used and the analysis area of 1.5 miles from the proposed project Alternatives will be utilized. The entire analysis area is considered habitat for the wolverine since they utilize a wide range of vegetation types.

No project specific surveys were completed for this analysis. During the winter of 1991/1992, the California Dept. of Fish and Game, University of California Berkeley, and five National Forests conducted a cooperative wolverine study using baited infra-red camera systems at 57 camera stations. Forests involved were the Inyo, Lake Tahoe Basin Management Unit, Shasta-Trinity, Stanislaus, and the Tahoe. No wolverines were detected. Several incidental sightings of wolverine have been reported on the Eldorado National Forest since 1980, mostly from within the Desolation Wilderness, but none have been confirmed through track or photo identification. Until 2008, the lack of recent (1961 to present) verifiable wolverine records in California led researchers to speculate that the wolverine population in California had been extirpated (Aubry et al. 2007). A 2008 detection in the Central Sierra Nevada near Truckee and north of the project area, indicates otherwise, numbers are undoubtedly low. Reintroduction may be an appropriate management strategy since the factors that resulted in declines (trapping, poisoning, and shooting of wolverine) no longer pose a significant threat (Aubry et al. 2007).

Sierra Nevada Red Fox

The Sierra Nevada red fox is a California State Threatened species in addition to being a Forest Service Sensitive species. As of 1977, Sierra Nevada red fox populations were thought to be maintaining themselves at a low level or perhaps declining (Schempf and White 1977); their population density and distribution appear to have declined considerably in recent decades (Perrine, Campbell, & Greene, 2010). Currently, their status, distribution and population is uncertain (Perrine, Campbell, & Greene, 2010).

Sierra Nevada red fox inhabit forested areas interspersed with riparian and meadow habitat, and brush fields. Preferred forest types include red fir, lodgepole pine and sub alpine fir in the higher elevations of the Sierra Nevada (Schempf and White 1977). They occur mainly at elevations greater than 6,400 feet (Perrine, Campbell, & Greene, 2010), and seldom below 5,000 feet (Schempf and White 1977). Meadows are thought to be particularly important as foraging areas for the species (USDA Forest Service 2001). Perrine et al 2005 found that in the summer, radio-collared red foxes (one male and three females) all selected barren habitats and avoided mid-elevation conifer, hardwood and herbaceous community types; shrub and high-elevation conifer communities tended to be used in proportion to their availability. While in winter, detections were also positively associated with the extent of forest comprised of large trees (>60 cm DBH) with >40% canopy closure. Because Sierra Nevada red foxes utilize such varied habitats, the entire home range analysis area (1.5 miles) is considered Sierra Nevada red fox habitat.

Although no specific criteria for analyzing red fox habitat has been developed and little is known about this species, it is assumed that red fox may be more adaptable than other furbearers. Further, it is assumed that if the more restrictive habitat requirements of fisher, marten, willow flycatcher, and California spotted owls are provided, the habitat requirements will be met for red fox (Freel 1991).

No project specific surveys have been completed. Surveys to detect the presence of wolverines documented the presence of red fox on the Lassen National Forest in 1993, but more recent surveys using baited camera traps and track plates to detect fisher and marten presence failed to detect red fox anywhere in the Sierra Nevada (Zielinski et al. 2005). Occasional unconfirmed sighting have been reported on the Eldorado National Forest over the past decade.

Management Indicator Species: Management Indicator Species (MIS) are selected to represent the diversity of vegetation and special habitat components on the Eldorado National Forest (Table 3-17). Habitat goals and objectives are developed for MIS, standards and guidelines are applied to direct management,

and monitoring is conducted to assess effects. It is thereby assumed that habitat conditions are maintained to sustain viable populations of forest wildlife species. The habitat status for each of these MIS is described in an MIS Report prepared for this project. Management Indicator Species (MIS) for the Eldorado NF are identified in the 2007 Sierra Nevada Forests Management Indicator Species (SNF MIS) Amendment (USDA Forest Service 2007a). The habitats and ecosystem components and associated MIS analyzed for the project were selected from this list of MIS, as indicated in Table 3-17. In addition to identifying the habitat or ecosystem components (1st column), the CWHR type(s) defining each habitat/ecosystem component (2nd column), and the associated MIS (3rd column), the Table discloses whether or not the habitat of the MIS is potentially affected by the Rubicon Trail Easement and Resource Improvement Project (4th column).

Table 3-19: Selection of MIS for project-level habitat analysis for the Rubicon Trail Easement and Resource Improvement Project.

Habitat or Ecosystem Component	CWHR Type(s) defining the habitat or ecosystem component ¹	Sierra Nevada Forests Management Indicator Species Scientific Name	Category for Project Analysis ²
Shrubland (west-slope chaparral types)	montane chaparral (MCP), mixed chaparral (MCH), chamise-redshank chaparral (CRC)	fox sparrow <i>Passerella iliaca</i>	2
Sagebrush	Sagebrush (SGB)	greater sage-grouse <i>Centrocercus urophasianus</i>	1
Oak-associated Hardwood & Hardwood/conifer	montane hardwood (MHW), montane hardwood-conifer (MHC)	mule deer <i>Odocoileus hemionus</i>	1
Riparian	montane riparian (MRI), valley foothill riparian (VRI)	yellow warbler <i>Dendroica petechia</i>	2
Early Seral Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree sizes 1, 2, and 3, all canopy closures	Mountain quail <i>Oreortyx pictus</i>	2
Mid Seral Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree size 4, all canopy closures	Mountain quail <i>Oreortyx pictus</i>	2
Late Seral Open Canopy Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree size 5, canopy closures S and P	Sooty (blue) grouse <i>Dendragapus obscurus</i>	2
Late Seral Closed Canopy Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), tree size 5 (canopy closures M and D), and tree size 6.	California spotted owl <i>Strix occidentalis occidentalis</i>	2
		American marten <i>Martes americana</i>	2
		northern flying squirrel <i>Glaucomys sabrinus</i>	2
Snags in Green Forest	Medium and large snags in green forest	hairy woodpecker <i>Picoides villosus</i>	3
Snags in Burned Forest	Medium and large snags in burned forest (stand-replacing fire)	black-backed woodpecker <i>Picoides arcticus</i>	1

¹ All CWHR size classes and canopy closures are included unless otherwise specified; dbh = diameter at breast height; Canopy Closure classifications: S= Sparse Cover (10-24% canopy closure); P= Open cover (25-39% canopy closure); M= Moderate cover (40-59% canopy closure); D= Dense cover (60-100% canopy closure); Tree size classes: 1 (Seedling)(<1" dbh); 2 (Sapling)(1"-5.9" dbh); 3 (Pole)(6"-10.9" dbh); 4 (Small tree)(11"-23.9" dbh); 5 (Medium/Large tree)(≥24" dbh); 6 (Multi-layered Tree) [In PPN and SMC] (Mayer and Laudenslayer 1988).

²Category 1: MIS whose habitat is not in or adjacent to the project area and would not be affected by the project.

Category 2: MIS whose habitat is in or adjacent to project area, but would not be either directly or indirectly affected by the project.

Category 3: MIS whose habitat would be either directly or indirectly affected by the project.

Category 1 MIS greater sage-grouse, mule deer and black-backed woodpecker are not analyzed in detail because their MIS habitat is not present within the project area, nor adjacent to the project area. Thus there will be no effect to these MIS and their habitat. Category 2 MIS species fox sparrow, yellow warbler, mountain quail, sooty grouse, California spotted owl, American marten, and northern flying squirrel, have habitat within the project area or adjacent but habitat is not directly or indirectly impacted by project activities.

The MIS whose habitat would be either directly or indirectly affected by the Rubicon Trail Easement and Resource Improvement Project, identified as Category 3 in Table 3-19, will be carried forward in this analysis, which will evaluate the direct, indirect, and cumulative effects of the proposed action and alternatives on the habitat of these MIS. The MIS selected for project-level MIS analysis for the Rubicon Trail Easement and Resource Improvement Project is the hairy woodpecker.

Snags in Green Forest Ecosystem Component (Hairy woodpecker)

The hairy woodpecker was selected as the MIS for the ecosystem component of snags in green forests. Medium (diameter breast height between 15 to 30 inches) and large (diameter breast height greater than 30 inches) snags are most important. The hairy woodpecker uses stands of large, mature trees and snags of sparse to intermediate density; cover is also provided by tree cavities (CDFG 2005). Mature timber and dead snags or trees of moderate to large size are apparently more important than tree species (Siegel and DeSante 1999).

Habitat factors in the MIS analysis for hairy woodpecker area: (1) Medium (15-30 inches dbh) snags per acre. (2) Large (greater than 30 inches dbh) snags per acre. The project area has approximately 238 acres of forest with CWHR size class of 4 or larger. Although all forest types could have snag value for the hairy woodpecker, snags 15 inches or larger in CWHR size class stands 3 and smaller would be rare isolated instances, since trees are generally much smaller than 15 inches dbh. No snag surveys were completed along the trails.

Therefore, current snag levels are unknown from the immediate area. There are 2,204 acres of green snag habitat in the analysis area (Table 3-20).

Table 3-20: Project habitat by CWHR type within 1.5 mile analysis area.

CWHR Type	Existing Vegetation (acres)	
	Non Forest Service	Forest Service
1X	0	0
2D	0	0
2M	0	0
2P	0	0
2S	0	0
2X	0	0
3D	0	0
3M	102	89
3P	46	67
3S	3	0
4D	20	86
4M	481	1583
4P	19	58
4S	0	8
5D	14	16
5M	0	4
5P	0	0
5S	3	0
other ¹	0	0
SUM⁴	688	1911

CWHR Key	Tree size	Canopy Closure	
	1	< 1" dbh.	S
2	1" - 6" dbh.	P	25-39%
3	6" - 11" dbh.	M	40-59%
4	11" - 24" dbh.	D	60-100%
5	> 24" dbh.	X	plantation
6	class 5 trees over a distinct layer of class 4 or 3 trees		

¹Shrub, meadow, or barren habitat; generally lacking trees

²According to 2005 Forest Inventory GIS information. Post-project anticipated CWHR types follow the assumptions that canopy cover would be reduced to 50% and because the largest trees are retained, the size class would not change.

³Assumes a 20% decrease in canopy cover through thinning and follow up pre-scribed burning (Funari, Rubicon Trail Easement and Resource Improvement BE 2011).

⁴SUM acres may not add up exactly because of rounding.

The Eldorado NF Land and Resource Management Plan (LRMP) (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the hairy woodpecker; hence, the snag effects analysis for the Rubicon Trail Easement and Resource Improvement Project

must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the hairy woodpecker. This information is drawn from the detailed information on habitat and distribution population trends in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a), which is hereby incorporated by reference.

The current average number of medium-sized and large-sized snags (> 15" dbh, all decay classes) per acre across major coniferous and hardwood forest types (westside mixed conifer, ponderosa pine, white fir, productive hardwoods, red fir, eastside pine) in the Sierra Nevada ranges from 1.5 per acre in eastside pine to 9.1 per acre in white fir. In 2008, snags in these types ranged from 1.4 per acre in eastside pine to 8.3 per acre in white fir (USDA Forest Service 2008).

Data from the early-to-mid 2000s were compared with the current data to calculate the trend in total snags per acre by Regional forest type for the 10 Sierra Nevada national forests and indicate that, during this period, snags per acre increased within westside mixed conifer (+0.76), white fir (+2.66), productive hardwoods (+0.35), and red fir (+1.25) and decreased within ponderosa pine (-0.16) and eastside pine (-0.14). Detailed information by forest type, snag size, and snag decay class can be found in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a).

Monitoring of the hairy woodpecker across the ten National Forests in the Sierra Nevada has been conducted since 2009 in partnership with PRBO Conservation Science, as part of a monitoring effort that also includes mountain quail and fox sparrow (USDA Forest Service 2010a, <http://data.prbo.org/partners/usfs/snmis/>). Hairy woodpeckers were detected on 15.1% of 1659 point counts (and 25.2% of 424 playback points) in 2009 and 16.7% of 2266 point counts (and 25.6% of 492 playback points) in 2010, with detections on all 10 national forests in both years. The average abundance (number of individuals recorded on passive point count surveys) was 0.116 in 2009 and 0.107 in 2010. These data indicate that hairy woodpeckers continue to be distributed across the 10 Sierra Nevada National Forests. In addition, the hairy woodpeckers continue to be monitored and surveyed in the Sierra Nevada at various sample locations by avian point count and breeding bird survey protocols. These are summarized in the 2008 Bioregional Monitoring Report (USDA Forest Service 2008). Current data at the rangewide, California, and Sierra Nevada scales indicate that the distribution of hairy woodpecker populations in the Sierra Nevada is stable.

Migratory Birds

Under the National Forest Management Act (NFMA), the Forest Service is directed to “provide for diversity of plant and animal communities based on the

suitability and capability of the specific land area in order to meet overall multiple-use objectives.” (P.L. 94-588, Sec 6 (g) (3) (B)). The January 2000 USDA Forest Service (FS) Landbird Conservation Strategic Plan, followed by Executive Order 13186 in 2001, in addition to the Partners in Flight (PIF) specific habitat Conservation Plans for birds and the January 2004 PIF North American Landbird Conservation Plan all reference goals and objectives for integrating bird conservation into forest management and planning.

In late 2008, a Memorandum of Understanding between the USDA Forest Service and the US Fish and Wildlife Service to Promote the Conservation of Migratory Birds was signed. The intent of the MOU is to strengthen migratory bird conservation through enhanced collaboration and cooperation between the Forest Service and the Fish and Wildlife Service as well as other federal, state, tribal and local governments. Within the National Forests, conservation of migratory birds focuses on providing a diversity of habitat conditions at multiple spatial scales and ensuring that bird conservation is addressed when planning for land management activities.

The Eldorado National Forest proposes to improve public safety by eliminating human entry into several abandoned mine features located across the Forest. Proposed management is intended to implement direction contained within the Eldorado National Forest Land and Resource Management Plan (LRMP, USFS 1989, amended most recently in 2004). Opportunities to promote conservation of migratory birds and their habitats in the project area were considered during development and design of this project (MOU Section C: items 1 and 11 and Section D: items 1, 3, and 4). In particular, opportunities to enhance habitat for Birds of Conservation Concern identified by the U.S. Fish and Wildlife Service in the Sierra Nevada Bird Conservation Region (2008).

Analysis Framework

Direct and indirect effects are those impacts that occur as a result of those actions described above under the Description of the Project and they are generally limited to immediately around the project area. The 1.5 mile analysis area encompasses 14,446 acres as described above and includes the most common and largest home range of sensitive species analyzed in this report for which indirect effects could impact. Cumulative effects include the impacts of past, present, and reasonable foreseeable actions on private and NFS lands within an average home range buffer for each species surrounding the project area. Thus the area analyzed for each species will be different to accommodate the variety of home range sizes of each species (Terrestrial Wildlife Biological Evaluation, Appendix A).

Definitions of suitable habitat will be elaborated upon in individual species sections. The analysis area is the home range of each terrestrial species in

addition to the project boundary. The analysis area radius for terrestrial species is calculated from the home range utilizing the area of a circle mathematical formula: Radius = square root (home range \div π). Literature on home range gives a wide range of sizes and factors affecting the actual size of the home range. For species with current survey and occupancy data, home ranges were calculated based on known nest sites. For species without current occupancy data, the project area was assumed occupied; the analysis area was determined by assuming the largest or average extent of home range possible for species occupying the project area. More specific information will be described under the discussion for each individual species, particularly for cumulative effects due to the complexity of cumulative effects analysis and the variability in home ranges of the species under analysis.

Data and Analysis Methods

Data

This analysis is largely based on the following sources of information:

- Attributes contained in GIS concerning the spatial relationships between CWHR (California Wildlife Habitat Relationships) Habitat Typing 2005 Vegetation Layer and the Rubicon Trail and its associated disturbances.
- Field surveys and visual observations concerning the condition of the Rubicon Trail, wildlife habitat and the relationship between the two.
- Personal knowledge of wildlife in the area and the Rubicon Trail uses by resource specialists on the Eldorado National Forest.
- Available water quality data and field observations by other parties: Hydrology and Riparian Resource Analysis by Jeff O'Connell (O'Connell, 2011)

Indicator Measures- These measures are species specific and not all are applicable for evaluating effects to species and their habitats in Species Specific Section below.

- **Measure 1:** Wet Season Damage to Wildlife: Water Quality Impacts to Wildlife and Habitat
- **Measure 2:** Damage and Disturbance to Species from Trails/OHV Use/Motor Vehicle Use Areas – Mileage of Trails or Density of Trails
- **Measure 3:** Damage and Disturbance to Species from Trail Maintenance - Snag Removal and Habitat of Acres Disturbed
- **Measure 4:** Damage and Disturbance to Wildlife from Bridge Construction- Habitat of Acres Disturbed
- **Measure 5:** Damage and Disturbance to Habitat from Toilets – Number of Toilets

Environmental Consequences

General Effects to Terrestrial Wildlife

Substantial discussion of the environment of the Sierra Nevada mountain bioregion occurs in the Sierra Nevada Forest Plan Amendment (SNFPA) (USDA Forest Service, 2004; USDA Forest Service, 2001), which was considered in evaluating this project and is incorporated by reference. This section summarizes the existing environment specific to this project, as applicable for evaluating effects to species and their habitats in Species Specific Section below.

Additional life history, habitat, and species occurrence information is provided in a series of species accounts prepared for the Eldorado National Forest and was used in analyzing the effects upon individual species (Terrestrial Wildlife Biological Evaluation: Appendix A).

Direct and Indirect Effects – Alternative 1

Potential to Affect Species through Habitat Alteration

Vegetation - The project involves work within the existing road prism (generally 25ft from the center of road) of the Rubicon Trail including variants. This work involves trail and facility maintenance, rock stockpiling, construction of three bridges, installation of a vault toilet, and closure/rehabilitation of unauthorized trails as described in detail in Chapter 2. Ground disturbance would mainly be limited to previously disturbed or open sites and would not remove vegetation other than small trees, brush or herbaceous material within the road prism. Some small trees and vegetation would be removed for vault toilet installation, rehabilitation and bridge construction, but habitat quality for wildlife along these areas would not be impacted by this removal as it is minimal. As minimal vegetation would be impacted, the proposed work would not degrade habitat for most wildlife within the road prism and beyond.

Under Alternative 1, a 16 foot wide bridge is proposed on Ellis Creek. Installation of the Ellis Creek Bridge would impact approximately 0.03 acres of the streambanks and channel, and approximately 0.02 acres of riparian vegetation (O'Connell, 2011)). Following bridge completion, approximately 0.02 acres of the streambanks and channel would be rehabilitated along with approximately 0.01 acres of riparian vegetation. Minimal vegetation would be disturbed and this action should not affect wildlife habitat or use in the area.

Under Alternative 1, the existing low-water crossing would be rehabilitated through closure, reshaping of the channel and approaches, and by planting vegetation thereby restoring degraded habitat, water quality, and geomorphic

function at the existing crossing. Rehabilitation activities would involve planting approximately 0.04 acres of riparian vegetation and restoring approximately 0.01 acres of streambanks and channel at the existing crossing; which would stabilize these areas minimizing streambank failures and sediment delivery to Ellis Creek. Minimal vegetation would be disturbed and this action should not affect wildlife habitat or use in the area.

The proposed action also limits OHV use to the Rubicon Trail and the proposed NFTS authorized trails which would limit damage/removal of vegetation.

Hazard trees within 60 meters of the Rubicon Trail, vault toilet, structures and proposed motor vehicle use areas would be removed for public safety and would be part of normal trail maintenance. All trails added to National Forest Transportation System will not have snags or hazard trees removed. Hazard tree removal along the Rubicon Trail and near facilities would reduce numbers of snags within a distance of about 60 meters alongside the Rubicon Trail on approximately 242 acres (Table 3-20). However, downed snags would be left in the area as downed logs for wildlife use or for use as barriers. Authorized trails and camping also provide access to fire wood cutters, and these may reduce the amounts of down wood within roadside corridors. The snag habitat decrease is because most snags cut down to prevent user access are larger diameter snags and most hazard trees tend to be larger diameter. These larger diameter snags provide high quality habitat for cavity dependent species such as bats, cavity nesters and old forest species. It is unknown how many larger diameter snags would be cut down in the future, however cavity nesting or cavity obligate species would find less snags and less available habitat along the Rubicon Trail road prism and within 60m of the road prism as a result of these activities. These effects within 60 meters of roads may, however, be incidental to the displacement and avoidance factors that apparently influence old forest species use of habitat within a greater distance of motorized trails.

Under Alternative 1, proposed activities are designed to improve water quality, aquatic habitat, riparian vegetation, and geomorphic shape and function by slowing runoff velocities, reducing trail erosion, and reducing sediment and contaminant delivery potential. These activities would at times occur within close proximity to meadows, lakes, and wetlands and could have associated short-term impacts but would likely result in long-term benefits (O'Connell, 2011).

Improvements such as trail work, BMP feature installation, route closures, and toilet installation would preserve, maintain, and in some cases restore lakes and wetlands; thereby providing the ecological conditions and processes needed to recover or enhance the viability of species that rely on these areas. Sedimentation in water decreases the depth of water and could impact

vegetation along the stream. Wildlife habitat for migratory birds and other wildlife that depend on riparian vegetation could be impacted if important riparian vegetation is lost. Creation and regular maintenance of erosion control features should also help decrease the input sediment into the water resources and increase water quality. Additionally, the construction of bridges and rock/log barriers should also decrease the amount of fluids entering the waterways and wetlands.

Under Alternative 1, the installation and replacement of bridges at Ellis Creek, the FOTR Bridge, and on the Little Rubicon River at Buck Island Lake Outlet would minimize contaminant (petroleum products and solvents) delivery associated with low-water crossings. In some cases however, such as the 200 foot easement between Little Sluice and Spider Lake, it is anticipated that adverse impacts to aquatic species that reside in Spider Lake and the associated wetlands could occur from shoreline disturbance by public access; this could influence terrestrial wildlife species as well. Despite these cases, Alternative 1 enhances lake, wetland and meadow habitat overall for wildlife species within the analysis area.

Water Quality: Water quality along the trail in certain areas is considered degraded through sedimentation, erosion, human waste contamination and heavy metals from vehicle fluid (O'Connell, 2011) (Crawford, 2006). Poor water quality impacts wildlife that depends on the water for drinking or foraging. Alternative 1 should increase water quality for wildlife by decreasing the amount of vehicle and human contaminants as well as sediment being transported to water resources.

In Alternative 1, 0.43 miles are being added to the NFTS. The water quality around the proposed authorized trails should be improved by the addition of these trails into the NFTS as they would be managed using LRMP standards and guidelines and Best Management Practices. Under Alternative 1, the installation and maintenance of erosion control features along the trail would effectively convey runoff and capture sediment and contaminants, thereby reducing sediment and contaminant delivery potential to nearby hydrologic features. This is especially important in the Winter Camp area (O'Connell, 2011). If individuals are being impacted by this poor water quality, the proposed action would reduce this impact and habitat quality for these species would improve and increase wildlife use.

In Alternative 1, 2.55 miles are being closed and rehabilitated. The closure and rehabilitation of unauthorized routes would also reduce water quality impacts associated with unmaintained and degrading routes in close proximity to hydrologic features. Thus there would likely be less vehicle fluids on open granite to wash into waterways or dropped directly into waterways.

Of primary concern to wildlife is presence of heavy metals in the water resources within the project area. Water sources around the Little Sluice area and Spider Lake, Ellis Creek and seasonal water crossings were reported as places of concern in the Rubicon Trail Monitoring Plan- Preliminary Monitoring Results (Crawford 2006). Winter Camp and Little Sluice wetlands, Buck Island Outlet, and Ellis Creek are specific areas of concern (O'Connell, 2011). The closure and rehabilitation of unauthorized routes, the installation and replacement of Ellis Creek FOTR and Little Rubicon bridges and route delineation and access restriction would help reduce water quality impacts from contaminant delivery. In the Winter Camp area, erosion control features would reduce contaminates delivery, but not prevent it. The inclusion of the Long Bypass in the proposed action would reduce contamination, but still continue to allow contaminants such as petroleum products to be delivered to the two nearby wetlands. The majority of these problems come from wet season effects (O'Connell, 2011). Under Alternative 1, wet season use of the trail would continue to occur although on less ground than currently occurs. Under Alternative 1, vegetation loss, soil compaction, and soil displacement are predicted to occur during wet season use on some segments of the Rubicon trail, trail variants, and unauthorized routes and would vary based on the soil type and depth, vegetation condition, and effective groundcover. These water quality impacts have the potential to negatively affect aquatic species and habitat as well as alter the geomorphic conditions of hydrologic features (e.g. sedimentation of wetlands, channel aggradation, filling in of pools). Thus these impacts may potentially affect terrestrial species. Since the current condition would have increased impacts (because of use of unauthorized routes) than Alternative 1, this alternative while continuing to impact water quality, should reduce contaminant flow into water resources and increase water quality for wildlife use. The degree of this reduction is difficult to determine as well as the impacts to wildlife use. Thus overall, the proposed action should reduce chemical contaminant flow into water resources and increase water quality for wildlife use over the entire project area, although some areas may still be locally impacted as described above.

Not much is known about impacts from roads and the accumulation of heavy metals, such as zinc, cadmium, and nickel. Motor oil and tires contain zinc and cadmium; motor oil and gasoline contain nickel; tires contain lead. These roadside contaminants can be carried far from roads by wind and water. Plants are known to incorporate heavy metals into their tissue which can bio-accumulate to herbivores and omnivores that feed on them. Metal contaminants are introduced into food webs at the bottom of the food chain and reach earthworms and other invertebrates that live in the soil. When consumed by organisms such as small mammals, birds and snakes, the contaminants and their potential toxic effects accumulate within sensitive organs and tissues. Heavy metals are known to reduce survival and reproduction in terrestrial

mammals and birds if concentrations are high enough. The lack of frogs and invertebrates in some water sources along the Rubicon Trail suggests levels of heavy metals are impacting aquatic organisms (Williams, 2010). If aquatic organisms are being impacted, it is possible that levels could impact terrestrial species that use the water sources for drinking or foraging. Aquatic organisms are known to be more sensitive to water quality degradation than terrestrial organisms. Considering the water quality monitoring found levels below the EPA standards and no major mortalities of terrestrial animals have been observed, it is likely that any impacts to terrestrial animals are sub-lethal. Sub-lethal impacts from chemical pollutants often impact survival or reproduction through decreased organ or system functionality. Some sediment and contaminant delivery to nearby hydrologic features during wet season use associated with vehicular use on the Trail when it is conveying water could still occur from private property owners accessing their property. During extreme runoff conditions, the flowing trail could essentially wash petroleum products, solvents, and other toxic materials from the undercarriage of vehicles and deliver them to nearby hydrologic features. The majority of these problems come from wet season effects (O'Connell, 2011). Considering the water quality monitoring found levels below standards and no major mortalities of terrestrial animals have been observed, it is likely that any impacts to terrestrial wildlife from drinking contaminated water or eating contaminated prey would be sub-lethal if they exist at all.

Human waste (fecal matter) is another potential water quality threat. It is prevalent along and off the trail. It is a potential health threat as a source of disease exposure for wildlife populations and a source of pollution (Gilchrist 2002). In 2004, Spider Lake was closed for 120 days due to contamination from human waste. Since, then, contamination levels have lowered and no closures have been warranted. However, contamination is still occurring as *E-coli* contamination was found only in Spider Lake in the water quality monitoring report (Crawford, 2006) for the area around the Rubicon Trail. Waste accumulation breeds bacteria and is a good breeding area for vectors e.g. mosquitoes. Feces can be composed of many bacteria, viruses, and other parasitic micro-organisms - some of which can cause disease and illness in wildlife. When released into the environment, these microbes may be ingested, inhaled, or otherwise enter the host through breaks in the skin or mucous membranes to cause illness. It is a threat to wildlife through pathogen transmission along the Rubicon Trail and in water resources utilized by wildlife. In a brief literature search, no information could be found concerning research into the specific impacts of fecal contamination in water resources to wildlife. However, it is likely that impacts from human waste are impacting water quality for wildlife use and exposed waste could also be potential sources of pathogens or disease transmission to wildlife. Crawford 2006 only found one instance of *E-coli* in Spider Lake, but they suggest that it may be more prevalent in the area

and testing should be done on a continuous basis. The installation of a vault toilet west of soup bowl on Walker Hill should help decrease some human waste that runs into and contaminates water resources. This toilet may also improve some of the sanitation problems in the Winter Camp area as well, but would not likely meet all demands during high use periods. Therefore, water quality would improve near this toilet, but would not likely improve greatly across the project area to improve use of the area by wildlife. Sanitation problems in the Gerle Creek area would not likely change because no sanitation improvements are proposed for that area under this alternative. However, during periods of snowmelt and saturated soil conditions, the current Wentworth Springs toilet could in fact overflow resulting in bacteria delivery to nearby Gerle Creek. Any water quality impacts from human waste would likely continue to the detriment of wildlife dependent on other areas of water resources where sanitation is currently a problem. Since it is unknown how much the human waste is currently lowering water quality in the different water sources, it is unclear how much the lack of toilets would degrade habitat quality for animals that require open, standing water for survival and reproduction.

Species Disturbance or Displacement: Acute high noise levels associated with increased noise and activity due to road maintenance and construction of facilities proposed in Alternative 1 can disturb wildlife and result in temporary displacement from an area. Ambient noise and human activity is already present from routine vehicle use along the trails, and it is possible that acute project-related noise would exceed ambient noise levels to a degree that wildlife would experience further disturbance on a temporary basis from the maintenance work, installation of erosion control features, stockpiling of rock, construction of three bridges, installation of vault toilets, removal of snags and rehabilitation of unauthorized trails. These impacts would be temporary. Those species that have habituated to current use and noise levels may see some temporary impacts if reproductive sites are close to construction or maintenance areas. Those species that already avoid the habitat due to current noise levels would not be impacted. Most R-5 sensitive species including forest carnivores would likely avoid habitat in the vicinity of the Rubicon trail and likely not experience impacts from acute noise increase from project related activities. However, further analysis of disturbance impacts to these species is in the individual species analysis.

Routine noise from human activity is already present from regular vehicle use and use levels are not expected to increase with the proposed action (Gaynor, 2011). OHV use is limited to the easement and the proposed authorized trails. This would likely decrease the disturbance area from the current condition in which vehicles do not limit themselves to trails. In addition, the potential enforcement of trails through the proposed action should help maintain this decreased disturbance area. Those species that already avoid the habitat due

to current noise levels would see a decrease in impact from routine use. Most R-5 sensitive species including forest carnivores would likely avoid habitat in the vicinity of the Rubicon trail and likely would experience reduced impacts associated with the routine noise and disturbance due to the limiting trail use of Alternative 1. Therefore, authorizing trails in Alternative 1 would likely have little impact to those wildlife species that have habituated to the noise from current trail use, but some wildlife would be displaced by construction or road maintenance activities.

Collision with vehicles is known to be a source of mortality for animals on the forest. However, such losses are most likely to occur on higher speed surfaced roads with more traffic than on the native surface trails being analyzed in this project.

Cumulative Effects – Alternative 1

In the past, management activities within the cumulative effects analysis areas on National Forest System and private lands have impacted wildlife habitat. Activities that altered vegetation on NFS lands over the past 20 years generally followed the CASPO Interim Guidelines (USDA Forest Service, 1993) or the Sierra Nevada Forest Plan Amendment (USDA Forest Service, 2004), which retained large trees, snags, down woody debris, and canopy cover, maintaining future options for late-seral dependent wildlife by protecting important habitat components. Although these projects resulted in reductions in canopy cover and decreased structural diversity characteristic of old forest habitat, these effects are short-term and the stands have continued to recover some of these old forest characteristics since the initial treatment. Following the initial treatment, the treated stands were in various conditions/stages, but large trees were maintained and a minimum of 40 to 50 percent canopy cover was retained. Although habitat quality may have been degraded in the short-term, all of the stands maintained habitat that was within the range of habitats suitable for sensitive species, and habitat quality is expected to continue to improve. Activities for vegetation management on private lands are regulated by the state and are outside of the jurisdiction of the Forest Service, and may not retain those attributes believed important to sensitive wildlife species. Therefore, the maintenance of suitable wildlife habitat on lands managed by the Forest Service is particularly important in areas with intermixed private lands as private lands are not generally managed to provide habitat for sensitive species.

The project file provides a list and description of past, present, and reasonably foreseeable projects on the Eldorado National Forest and on private lands within the forest boundary. On the Eldorado National Forest past timber harvest and more recent hazardous fuels reduction projects have reduced large

trees, canopy cover, structural complexity and coarse woody material within treated units. Within the last 10 years (2001-2011), only 712 acres of fuels or timber treatments have occurred within the analysis area (1.5 miles); 424 acres of these are on private lands. No fuels treatments are likely to occur in the next few years based upon the projects listed in the Eldorado National Forest Schedule of Proposed Actions. Over time, fuels treatments are expected to alter 20 to 30 percent of the landscape, with a resulting expectation that the amount of habitat burned by stand replacing wildfires would decline in response to these treatments (USDA Forest Service 2004). No forest thinning or vegetation project are currently planned to occur in the future within the analysis area. The California Department of Forestry and Fire Protection does not currently list any timber harvest plans for the analysis area. Timber harvest on private lands is generally more intensive and does not typically maintain habitat suitability for spotted owls.

Hazard trees such as snags or diseased and dying trees are routinely removed along roads and near facilities such as transmission lines and campgrounds. Based on forest records there would be approximately 0.5 acres associated with Pacific Hazard Tree project within the Upper Gerle watershed, 4 acres along the SMUD transmission line in the Loon Lake watershed, 5 acres associated with the Pacific Hazard Tree in the Loon Lake watershed. In these projects, snags and downed logs would be reduced on about 9.5 acres within the analysis area. Alternative 1 would add cumulatively to this reduction of snags and downed logs within the analysis area along the road prism (see American marten section for more detail).

Past activities within the cumulative effects analysis areas on NFS and private lands that have caused disturbance for wildlife are mainly recreational uses such as camping, hiking, climbing, annual OHV events such as the Jeepers Jamboree. Some private lands in the area have commercial recreation uses in the area such as at Rubicon Springs. The Jeep Jamboree permits allowed in the area and the Rubicon Springs private outfit both utilize helicopters to mobilize resources from Loon Lake to Rubicon Springs for customers and emergencies. This disturbance is temporary and only in the summer, but causes noise disturbance for a week or two on either end of the season. In addition, the project area is well utilized by recreationists of all types mainly during summer, but recreationists use it in winter as well for skiing and snow mobile use. These activities are mainly during daytime and thus wildlife disturbance is generally limited to daytime hours. Although camping along the Rubicon trails, lakes, and reservoirs does cause some disturbance for nesting and foraging animals in those areas. It is likely that high use areas are known by sensitive wildlife and avoided. Future activities on ENF land include a continuation of recreational events that have occurred in the past (such as the Jeepers' Jamboree), hiking, skiing and other recreational activities as well as

continued forest stand management through thinning and prescribed burning in high fire risk areas.

The area surrounding the Rubicon Trail has been utilized by OHVs despite the fact that there are no trails authorized by the Forest Service. These areas have been subjected to the creation of new trails and OHV use on unauthorized trails. With the issuance of this easement and authorization of trails in Alternative 1, more money can be spent on enforcement and education (including signage) and more people will likely follow the rules resulting in less resource damage from user created trails and negative impacts to water quality.

Past grazing on public lands has degraded meadow and riparian habitats. 683 acres of the Sierra Crest allotment is located in the northern section within the 1.5 miles analysis area. The allotment has not been grazed for 10 years and is currently inactive. It is possible any wetland or riparian habitats that occur north of the Rubicon Trail in the area of overlap with the analysis area were degraded in the past by overgrazing.

Past, present and foreseeable future actions and projects on NFS and private lands are discussed in greater detail in individual species cumulative effects sections. However, in general, the high amounts of recreation surrounding the Rubicon trail have probably caused species sensitive to disturbance to avoid the area immediately around the trail as well as around known camping areas. Other wildlife species have probably adapted or even benefited from the presence of humans on the trails. The cumulative effects of the proposed action may benefit the use of the area by these wildlife species that have adjusted to, or are avoiding the past or present activities in the analysis area as it limits OHV use and resource damage. Temporary disturbance impacts from construction or road maintenance activities should not alter use of the area by those species that have habituated. The proposed action should provide better quality water for those wildlife species that do utilize the area by reducing petroleum and solvent contaminants and if species are being impacted should reduce this impact and improve habitat quality; although the degree of improvement is uncertain because of wet season use. If individuals are being impacted by this poor water quality, the proposed action would reduce this impact and habitat quality for these species would improve and increase wildlife use.

Direct and Indirect Effects – Alternative 2

The LRMP would continue to guide management of the project area. Under this alternative, no changes to the existing trail conditions are proposed and therefore there would be no closure and rehabilitation of unauthorized routes and no routes would be added to the NFTS. No easement would be issued to El Dorado County; El Dorado County would continue to assert their RS 2477 claims and use of unauthorized routes would continue although use of the unauthorized routes would not be authorized and these routes would not be shown on the Motor Vehicle Use Map.

Under Alternative 2, trail widening, vegetation loss, soil compaction, and soil displacement are predicted to occur during wet season use on some segments of the trail, trail variants, and unauthorized routes and would vary based on the soil type and depth, vegetation condition, and effective groundcover. This alternative does not involve the installation and maintenance of erosion control features designed to convey flows and capture sediment, the installation of bridges at Ellis Creek and Buck Island Reservoir, the rehabilitation of the FOTR bridge, or the closure and rehabilitation of unauthorized routes. Low-water crossings on perennial streams would continue at high flow increasing the likelihood of turbidity increases and contaminant delivery to hydrologic features. This alternative does not install any toilets for human waste control. Contaminants such as petroleum based products, other solvents and human waste could be directly delivered to nearby hydrologic features during stream crossings at high flow and when the trail is transporting a considerable amount of water. These water quality impacts have the potential to negatively affect species and habitat. Water quality around Winter Camp, Ellis Creek, Little Rubicon Creek (Buck Island Outlet), Gerle Creek, Big Sluice Spring Wetland, Big Sluice Wetland, and Eagle View wetlands would continue to be negatively impacted. Alternative 2 would continue the current degradation of water quality through human waste and petroleum products and would continue to provide poor quality water for those wildlife species that do utilize the area. If individuals are being impacted by this poor water quality, Alternative 2 would continue this impact and habitat quality for these species would continue to be degraded.

Since no new management activities would occur, there would be no construction or road maintenance related disturbance to the wildlife species that potentially occupy habitat within the analysis areas. A wide disturbance area for wildlife would continue. Given that use levels are expected to continue with little maintenance to the road, continued use of unauthorized trails, route creation and no toilets or bridges would be added, current levels of disturbance and resource damage as well as water quality impacts would continue to the detriment of wildlife.

Cumulative Effects – Alternative 2

Past, present and foreseeable future actions and projects on NFS and private lands are as described above for the proposed action. The no action alternative and any future activities should not cumulatively alter the current use of the area by these wildlife species that have adjusted to or are avoiding the past, present and future activities in the project area. However, the no action alternative would continue to provide negative impacts to water quality in the wetlands and the identified creeks for those wildlife species that do utilize the project area. If individuals are being impacted by this poor water quality, Alternative 2 would not reduce this impact and habitat quality for these species would continue to be poor.

Direct and Indirect Effects – Modified Alternative 3

The direct and indirect effects of Modified Alternative 3 would be very similar to what was described above for Alternative 1 except for the following: water quality would improve because of a reduction in petroleum products delivery to streams and a reduction in human waste delivery to stream.

The same amount of trails would be authorized and added to the NFTS as in Alternative 1. Modified Alternative 3 would also close and rehabilitate the same amount of unauthorized routes as Alternative 1. As a result, the same band of noise and visual disturbance would be present and would potentially disturb wildlife. As stated in the affects analysis for Alternative 1, the disturbance area would be reduced compared to the existing condition. The saturated soil management strategy would reduce impacts to water quality but likely not reduce human disturbance to wildlife in the winter from implementation of a seasonal operating period.

Wildlife is most susceptible during winter months to disturbance as they are generally stressed physically due to increased thermal requirements and fewer items on which to forage. When use of an area is inhibited by disturbance, foraging animals must expend needed energy to move around the disturbance; in winter, energy is a limiting resource. Use by OHVs is minimal in the area from November to June (Gaynor Pers. Comm. 2011). Starting from June to September use is high with more than 300 individuals in a weekend (Gaynor, 2011). No data is available on vehicle use during the fall and winter months, but forest service employees (Gaynor Pers. Comm. 2011) state that use dramatically decreases as winter approaches; with little to no use occurring after snowfall. With snowfall, vehicle use is normally limited in certain areas. The few weekend snowmobilers seems to be limited to areas west of Spider Lake; with no use around Buck Island (Gaynor Pers. Comm. 2011).

Snowmobile access would still occur and is allowed within the area during winter use; therefore, disturbance from snowmobile use will continue. Animals would still be impacted by recreationalists on foot or snowmobile, and noise disturbance is likely to be similar to Alternative 1 since the erosion control features implemented should reduce wet season impacts and implementation of a seasonal closure may not be unnecessary. If a seasonal closure is necessary then disturbance would be reduced during that time period.

The lack of a dispersed area and parking limits at Soup Bowl would decrease the amount of localized disturbance to wildlife in general as compared with Alternative 1. It could also decrease the amount of contaminants entering the wetlands surrounding Soup Bowl as people would be limited in their area of contact through non-dispersed use and parking.

Under Modified Alternative 3, the impacts from petroleum products entering streamcourses would be similar to Alternative 1 except for the Little Rubicon River because of the implementation of the elevated rock ford versus a bridge. Use of the saturated soil management strategy would reduce direct water quality effects from turbidity and petroleum products. The water quality for wildlife at the Buck Island Lake Outlet would probably have lower water quality from runoff events transporting contaminants (petroleum, solvents) into the water. The elevated rock ford should reduce contaminants washing into the Little Rubicon when vehicles cross; yet contaminant (e.g. petroleum products and solvents) delivery downstream during high water crossings could negatively impact water quality and aquatic habitat thereby affecting the physical and biological characteristics associated with aquatic- and riparian-dependent species. Therefore, water quality in the creek would not improve as with the proposed action, nor would the wildlife use of the creek. The lack of the Short Bypass would not allow contaminants into the two wetlands, and thus water quality from chemicals in that area would be more than in Alternative 1.

The additional 5 toilets, as compared to Alternative 1, would reduce the amount of human waste ending up in the water resources. By moving the toilet at the Wentworth Springs Campground and by decreasing the easement width between Little Sluice and Spider Lake, the RCA conditions in these areas would be improved by minimizing the probability of human waste delivery to Gerle Creek during saturated conditions and by minimizing disturbances in close proximity to Spider Lake. This would increase habitat quality for wildlife and thus wildlife use of the area greater than as compared to Alternative 1.

In summary, Modified Alternative 3 would likely have similar reduced chemical impacts to water resources and disturbance impacts for wildlife, and a more positive impact to water resources for wildlife from human waste when compared to Alternative 1. Chronic disturbance to wildlife is not expected to be significantly different than that of Alternatives 1, 4 and 6 because of similar mileage, but it would be less than Alternative 2 and it would be greater than Alternative 5 (Table 3-21). Acute disturbance to wildlife from construction and maintenance is not expected to be different than that of Alternatives 1, 4 and 6, but should be increased from Alternatives 2 and 5. The additional toilets should reduce the amount of human waste in the water resources more so than Alternatives 1, 2 and 5; and would be similar to Alternatives 4 and 6. If individuals are being impacted by the human waste effected water quality, Modified Alternative 3 would reduce this impact similar to Alternatives 4 and 6, but more than the other action alternatives.

Cumulative Effects – Modified Alternative 3

Past, present and foreseeable future actions and projects on NFS lands and private lands are as described above for the proposed action. Modified Alternative 3 and the described future activities should not cumulatively decrease the current use of the area or populations of the wildlife species that have adjusted to or are avoiding the past, present and future activities in the project area; limited activities should stabilize or reverse wildlife use trends in the area.

Direct and Indirect Effects – Alternative 4

The direct and indirect effects of Alternative 4 would be very similar to what was described above for Alternative 1 except for the following: a wider band of noise disturbance because of the additional trails, less improvement to water quality in the Buck Island Reservoir and from more runoff from more trail mileage, but a greater possible improvement in water quality from human waste because of the additional toilets.

There are 1.0 miles of trails being authorized and added to the NFTS; approximately 0.6 miles more than Alternative 1. Of this 1.0 mile added, 0.46 miles of trail would be constructed and some shrub and small tree vegetation would be removed. 1.98 miles of trails would be closed and rehabilitated; 0.57 miles less than Alternative 1. As a result, there would be a bigger band of noise and visual disturbance to wildlife with the additional authorized trails by Ellis Creek, Spider Lake, and Buck Island since OHV users would not be using those under Alternative 1. This bigger band should have minimal impact to wildlife and their use of the area as it is not a very large addition to the area impacted by noise and visual area around the main Rubicon Trail; there should be no significant difference in routine disturbance as compared to Alternative 1 from these additional routes.

Under Alternative 4, the impacts of runoff would be greater than Alternative 1 (O'Connell). Under Alternative 4, a new route providing access to Spider Lake is proposed within the RCA of Spider Lake and its associated wetland and pond habitats (NSRELD-63-V). Use of this route could lead to sediment and contaminant delivery to these hydrologic features. Alternative 4 also proposes a new route that heads north of the trail and parallels the east side of the Little Rubicon River and an additional toilet north of the trail and east of the Eagle View Wetland. The proposed new route (NSRELD-63-U) is within the RCA of the Little Rubicon River and could result in new disturbances that increase sediment and contaminant delivery potential thereby adversely impacting water quality and fisheries habitat. Also, route 12N34B would be added in close proximity to Ellis Creek and would increase sediment and contaminant delivery to Ellis Creek. Even though Alternative 4 involves construction of toilets, there is not one located at the end of the Spider Lake road, and a large proportion of water sources in the analysis area would result in fecal contamination. Also, Alternative 4 has more trail mileage in the RCAs than Alternative 1, includes these two route additions in the RCAs, and would lead to a higher contribution of sediment, chemicals and human waste into these water sources than in Alternative 1.

However, additional trails would be subject to wet season impacts that decrease water quality, increase erosion and reduce vegetation. As a result, impacts to water quality from heavy metals and erosion described in Alternative 1 in the wet season would be greater in Alternative 4 but still less than the existing condition. The additional 4 toilets, as compared to Alternative 1 and the existing condition, should reduce the amount of human waste ending up in the water resources which should increase wildlife habitat quality and use of the area.

So, while many of the activities proposed under Alternative 4 would improve water quality, the authorizing of 14N34B, NSRELD-63-V and NSRELD-63-U would not.

In summary, Alternative 4 would likely have more chemicals in water resources for wildlife around Buck Island and Spider Lake and from use of the trail during the wet season, a more positive impact to water resources for wildlife where additional toilets are placed, and similar noise disturbance from authorized alternative trails as compared to Alternative 1. Chronic disturbance to wildlife from the additional trails is not expected to be more than that of Alternative 1, 3 and 6 because of the negligible difference in mileage added, but would be more than Alternative 5 and less than Alternative 2. Acute disturbance to wildlife from construction and maintenance is not expected to be significantly different than that of Alternatives 1, 3 and 6 but should be more than Alternatives 2 and 5. If individuals are being impacted by the effected water quality, Alternative 4 would reduce this impact, but it reduces water quality the least of all Action alternatives.

Direct and Indirect Effects – Alternative 5

The direct and indirect effects of Alternative 5 would be very similar to what was described above for Alternative 1 except for the following: reduced wildlife disturbance due to less trail mileage, reduced wildlife disturbance due to a seasonal operating period from July 1 to November 1, an increase in water quality due to less trail mileage, increased water quality due to a seasonal operating period, and less snag habitat impacted.

There would be a narrower band of noise disturbance to wildlife with the rehabilitation of all unauthorized trails along the Trail. 2.98 miles of trails would be rehabilitated and closed to use. This narrower band may positively impact wildlife by improving wildlife use of the area through less visual or audible disturbance. Animals that avoid areas where unauthorized trails are located would likely return and utilize those areas. Since many of these removed trails or motor vehicle use areas are near water, the availability of these premiere wildlife areas would likely improve wildlife use of the area.

Alternative 5 would have snag habitat (CWHR size class 4 &5) reduced through Trail maintenance snag removal (204 acres); 13 acres less than Alternative 1. A greater amount of snag habitat would then be available for snag associated species.

The effects under this alternative would be similar to those under Alternative 1 except there would be a consistent seasonal operating period and a single designated route. 5.38 miles of trail would be authorized for use; 2.98 miles of trails would be closed. Limited use may occur by private property owners allowed reasonable access to their in-holdings, providing this access does not cause resource damage. The seasonal operating period would reduce wet weather soil impacts such as rutting, displacement, vegetation loss, soil compaction, and trail widening which in turn could affect water quality. Also,

direct water quality effects from turbidity and petroleum products associated with driving through standing water on the trail, driving through flowing trail segments, and low-water crossings would be reduced. The single route would reduce water quality degradation associated with petroleum products being delivered to the Little Sluice and Winter Camp wetlands from the long bypass. This alternative would not include the extended easement between Little Sluice and Spider Lake and would not include the dispersed use area west of the Little Rubicon River. In these areas, sediment and contaminant delivery potential to nearby hydrologic features would be reduced. Closure of unauthorized routes and trail variants could lead to natural recovery over time as groundcover increases and vegetation becomes reestablished; which would eventually reduce soil loss and sediment delivery to nearby hydrologic features. The water quality for wildlife use across the project area should improve through these actions.

Water quality for wildlife in areas where human waste is prevalent would improve minimally across the project area and only through education and compliance. With only one trail, there are less motor vehicle use areas for human waste and the waste would likely be more concentrated on the main trail; any contamination or ill effects to wildlife through use of the area would be lessened in terms of area impacted. However, no toilets would be constructed. Any water quality impacts as a result of lack of toilets on the main trail would continue to the detriment of wildlife dependent on those water resources. Since it is unknown how much the human waste is currently lowering water quality or how much it is impacting wildlife, it is unclear how much the lack of toilets would continue to degrade habitat quality for animals that require open, standing water for survival and reproduction.

Use by OHVs is minimal in the area from November to June (D. Gaynor pers. Comm. 2011). Starting from June to September use is high with more than 300 individuals in a weekend (Gaynor, 2011). No data is available on vehicle use during the fall and winter months, but forest service employees (D. Gaynor pers. Comm. 2011) state that use dramatically decreases as winter approaches; with little to no use occurring after snowfall. With snowfall, vehicle use is limited in certain areas. The few weekend snowmobilers seems to be limited to areas west of Spider Lake; with no use around Buck Island. Wildlife is most susceptible during winter months to disturbance as they are generally stressed physically due to increased thermal requirements and fewer items on which to forage. When use of an area is inhibited by disturbance, foraging animals must expend needed energy to move around the disturbance. Animals would still be impacted by recreationalists on foot or snowmobile, but noise disturbance would be less than the existing condition or Alternative 1. Since some animals are more impacted by the presence of humans rather than noise, this may not improve use of the area in winter. But those animals that are more sensitive to

noise disturbance would likely see their foraging areas expand and rates of survival could increase.

Alternative 5 would reduce noise disturbance in winter (less than the existing condition or Alternative 1) in a similar manner as that described in Modified Alternative 3. However, in warmer and less wet years, Alternative 5 might have a longer seasonal operating period which would reduce this disturbance for a longer period each year than Modified Alternative 3. This could allow for use during these years by animals that might not utilize the area for reproduction in the spring due to higher disturbance levels.

Under Alternative 5, a 12 foot wide bridge is being proposed and there would be a single route restricting vehicles to the easement. The effects under this alternative would be similar to Alternative 1 except installation of the 12 foot wide bridge would impact approximately 0.02 acres of streambank and channel, and approximately 0.01 acres of riparian vegetation. Therefore under this alternative there would be approximately 0.01 less acres of streambank and channel disturbed, and approximately 0.01 less acres of riparian vegetation removed compared to Alternative 1 (O'Connell, 2011). This difference in effects to water quality, species and habitat would be negligible.

In summary, Alternative 5 would likely reduce chemicals in water resources for wildlife and cause less wildlife disturbance than Alternative 1, but it would continue the potential human waste contamination to wildlife water sources as in Alternative 1. It would reduce sedimentation and chemicals in water resources for wildlife more than Alternatives 1, 2, 3, 4, and 6. Potential human waste contamination to wildlife water sources would be greater in this alternative than Alternatives 3, 4, and 6 and similar to Alternatives 1 and 2. Disturbance to wildlife would be the least in this alternative than any of the proposed alternatives.

Cumulative Effects – Alternative 5

Past, present and foreseeable future actions and projects on NFS lands and private lands are as described above for the proposed action. Alternative 5 and the described future activities should not cumulatively decrease the current use of the area or populations of the wildlife species that have adjusted to or are avoiding the past, present and future activities in the project area; lack of disturbance through this alternative should increase use. The complete reduction in unauthorized trails and seasonal operating period would allow more wildlife use of the area despite other recreational uses. It is unclear how the continuing impact of human waste contamination and the lessening of disturbance around the Trail would combine to alter quality or habitat use. If individuals are being impacted by the poor water quality, Alternative 5 would

reduce this impact for chemicals but not for human waste. Cumulative negative impacts for human waste would continue.

Direct and Indirect Effects – Alternative 6

The direct and indirect effects of Alternative 6 would be very similar to what was described above for Alternative 1 except for the following: a reduced wildlife disturbance from non-use between November 1-July 1 and from more signage, increased water quality due to less trail mileage especially within RCAs, and a greater possible improvement in water quality from human waste near the additional toilets.

There would be a slightly narrower band of noise disturbance to wildlife with the closure and rehabilitation of 2.61 miles of unauthorized trails along the Easement; 0.06 more miles of trail than Alternative 1. Overall, 0.2 less miles of trail would be open for use. This narrower band may positively impact wildlife by improving wildlife use of the area through less visual or audible disturbance. Animals that avoid areas where unauthorized trails are located would likely return and utilize those areas. Since many of these removed trails or motor vehicle use areas are near water, the availability of these premiere wildlife areas would likely improve wildlife use of the area. Additional signage should help to reduce the impact to these areas of disturbance. Additional signage and markers should help users stay on authorized trails as well as limit areas utilized by dispersed campers, thus decreasing the disturbance area.

Noise disturbance would also decrease seasonally as there would be a consistent seasonal operating period. It would likely allow wildlife to utilize the most habitats without disturbance impacts in winter months when survival can be more difficult due to weather and prey variability. Limited use may occur by private property owners allowed reasonable access to their in-holdings, providing this access does not cause resource damage. The seasonal operating period would reduce wet weather soil impacts such as soil displacement, vegetation loss, and soil compaction which in turn could affect water quality. Also, direct water quality effects from turbidity and petroleum products associated with driving through standing water on the trail, driving through flowing trail segments, and low-water crossings would be reduced.

Alternative 6 would reduce water quality degradation associated with petroleum products being delivered to the Little Sluice and Winter Camp wetlands from the long and short bypasses. The lack of the Long Bypass would not allow contaminants into the two wetlands, and thus water quality from chemicals in that area would be greater than in Alternative 1. This alternative would not include the extended easement between Little Sluice and Spider Lake and would not include a portion of the dispersed use area west of the Little Rubicon River and the dispersed use area at Soup Bowl. In these areas, sediment and

contaminant delivery potential to nearby hydrologic features would be reduced. The water quality for wildlife use across the project area should improve more through these actions than in Alternative 1.

The additional 3 toilets, as compared to Alternative 1, would reduce the amount of human waste ending up in the water resources. By moving the toilet at the Wentworth Springs Campground and by decreasing the easement width between Little Sluice and Spider Lake, the RCA conditions in these areas would be improved by minimizing the probability of human waste delivery to Gerle Creek during saturated conditions and by minimizing disturbances in close proximity to Spider Lake. This would increase habitat quality for wildlife and thus wildlife use of the area greater than as compared to Alternative 1.

In summary, Alternative 6 would likely reduce chemical impacts to water resources and disturbance impacts for wildlife, and a more positive impact to water resources for wildlife from human waste when compared to Alternative 1. Chronic disturbance to wildlife is less than Alternatives 1, 2, 3 and 4, but it would be increased from Alternative 5 (Table 3-21). Acute disturbance to wildlife from construction and maintenance is not expected to be significantly different than that of Alternatives 1, 4 and 3, but should be increased from Alternatives 2 and 5. The additional toilets should reduce the amount of human waste in the water resources more so than Alternatives 1, 2 and 5; and would be similar to Alternatives 3 and 4. Water quality effects from chemicals would be reduced through reduced trails and a seasonal operating period similar to Alternative 5 but more than Alternatives 1, 2, 3, and 4.

Cumulative Effects – Alternative 6

Past, present and foreseeable future actions and projects on NFS lands and private lands are as described above for the proposed action. Alternative 6 when added to the described future activities should not cumulatively decrease the current use of the area or populations of the wildlife species that have adjusted to or are avoiding the past, present and future activities in the project area; limited activities should stabilize or reverse wildlife use trends in the area.

Comparison of Alternatives

All alternatives could result in the potential for direct disturbance to wildlife. Acute disturbance to wildlife would be greatest in Alternatives 3, 4, and 6 and would decrease respectively in Alternatives 1 and 5 due to less toilet construction and maintenance as well as (in Alternative 5) less trail maintenance that is authorized. Alternative 2 would have the least amount of acute disturbance because no activities are proposed. Alternative 5 would have the least amount of routine noise disturbance and avoidance impacts to wildlife of all Alternatives since it has the least amount of mileage of trails and motor vehicle use areas associated with it as well as a seasonal operating

period (Table 3-21). It closes about all unauthorized trails and prohibits non-Trail use. It would likely allow wildlife to utilize the most habitats without disturbance impacts in the analysis area and especially winter months with the seasonal operating period. If wildlife is being impacted by noise disturbance or avoiding using areas due to presence of vehicles/recreationists, this alternative would improve wildlife habitat quality through reduced disturbance the most. Alternatives 1, 3, 4, and 6 would have some improvement over existing conditions to routine disturbance as trails would be authorized, enforced and about 2 miles less than the existing condition (Table 3-21). If wildlife habitat quality is being impacted by routine noise disturbance or presence of vehicles/recreationists, these alternatives would improve it almost equally through reduced disturbance off-Trail and reduced trail mileage as compared to the existing condition. Alternative 2 has no improvement to wildlife use from routine disturbance.

Water quality for wildlife use and habitat quality would improve in all Action alternatives with Alternatives 3, 5, and 6 having the greatest improvements due to the greatest reductions in sediment, chemicals, and human waste into water sources. All remove fecal contamination to Gerle Creek with the relocation of the Wentworth Springs campground toilet out of the floodplain and there is no 200 foot vehicle access between Little Sluice and Spider Lake as in Alternatives 1 and 4. The reduced disturbance off-Trail, reduced trail mileage and installation of 6 toilets in Alternatives 3 and 6, as compared to the existing condition, should help reduce any sub-lethal impacts to wildlife using the area from chemicals or human waste contamination. Alternative 5 would also reduce sediment, chemical and human waste by reducing use on 3.39 miles of trail that would be closed and would naturally rehabilitate. While Alternative 5 has the least amount of trails and thus impacts from runoff, Alternatives 5 and 6 do not have the Long or Short Bypasses and their associated contamination, or authorization of any trails in the RCAs, and includes construction of all the bridges. Alternative 5 would reduce associated contamination from petroleum chemicals the most in the area, but Alternative 6 would be a close second.

In Alternative 4, the road to Spider Lake would cause impacts to Spider Lake and the surrounding wetlands by fecal contamination. Alternative 4 has the most trails in the RCAs and thus has the most contribution of sediment, chemicals and human waste into water sources. Even though Alternative 4 has the most toilets, there is not one located at the end of the Spider Lake road, and a large proportion of contamination in the analysis area would result. In this sense, Alternative 4 is the worst of all Action alternatives for water quality. Alternative 2 would have the most contamination impacts to wildlife since no mitigations are occurring.

Habitat removal from construction activity is negligible in comparison between Alternatives and less than 1 acre of habitat would be removed throughout all Alternatives. While minimal vegetation alteration would occur, some large snags might be removed through hazard tree removal or log barrier creation within 60 meters of the Rubicon Trail. Alternatives 1, 3, 4, and 6 would have similar acreage of snag habitat quality reduction due to similar mileage proposed for the Rubicon Trail (217 acres); Alternative 5 would have the least amount of snag habitat reduced (204 acres). Alternative 2 would have no snag removal and would have the greatest amount of snags available for wildlife use.

Table 3-21: Comparison of alternatives.

	Alt1	Alt2	Alt3	Alt4	Alt5	Alt6
Additional Toilet Installation #	1	0	6	5	0	6
Motor Vehicle Use Areas	14	>14	13	14	0	13
Bridges	3	0	1	1	2	2
Rubicon Trail Mileage (FS)	6.27	6.27	6.27	6.27	5.38	6.1
Additional NFS Route # (FS)	22	0	22	26	0	20
Additional NFS Route Mileage (FS)	0.43	0	0.43	1.0	0	0.37
Unauthorized Mileage Closed (FS)	2.55	0	2.55	1.98	2.98	2.61
Total Trail Mileage Open for Use (all lands)	9.6	11.9	9.6	10.2	8.3	9.4
Snag Habitat Impacted*	217	0	217	217	204	217
*(CWHR Size Class 4 and 5 with 60m of the Rubicon Trail)						

Effects on TES and MIS species

American Peregrine Falcon

Direct and Indirect Effects – All Alternatives

A typical Peregrine falcon analysis area is a 2 mile radius around the project activities (Terrestrial Wildlife Biological Evaluation: Appendix A).

The entire analysis area would be Peregrine falcon habitat. The trail easement and resource improvement projects, as described in the project alternatives, has the potential to directly and/or indirectly affect peregrine falcons in the following ways:

Disturbance at a Specific Location (nest sites) and Displacement and Avoidance. Reported responses of peregrine falcons to human disturbances vary with their timing and proximity to the eyrie. In the early spring courtship phase, disturbed peregrines are liable to desert an area (USDI 1982). Birds that have been interrupted in their nest cycle by such factors as blasting, shooting, road construction, or rock climbing build up a cumulative nervousness to where a subsequent slight disturbance can cause abandonment of an eyrie (USDI 1982). Based upon incidental observations of peregrine falcon responses to disturbance, a spatial buffer of 0.5 to 1.0 miles has been recommended to avoid breeding disturbance (Ellis 1982, Hayes and Milner 2004). No known nest sites are located within 0.5 miles (800 meters) of the potential project activities in any alternatives. Therefore, no known nest sites would be disturbed.

However, if cliffs are high and nesting ledges are inaccessible, “the proximity to roads, buildings, recreational sites, and other human disturbances does not prevent peregrines from successfully breeding.” If cliffs are low with more easily accessible nest sites, such proximity to human activity affects the regularity of occupation and may determine whether a ledge is ever used by peregrines at all (USDI 1982).

Habitat Modification. The degraded water quality along the trails could be impacting some prey species that have smaller home ranges, but peregrine’s large home ranges and foraging areas make it unlikely that their prey species would all come from one area to ensure that levels of contamination would be high enough to impact them negatively or that a possible decline in prey abundance would impact habitat quality. The concern for heavy metals or human waste in the 3 wetlands and the small creeks should not impact a large enough amount of prey species to impact peregrine survival or reproduction.

Comparison of Alternatives

Displacement and Avoidance. The number of potential cliff nesting habitat sites occurring within 800 meters of authorized trails or the Rubicon Trail easement and any improvements proposed in any alternatives would illustrate the extent to which the project activities would impact nesting habitat. Only 2 potential cliff nesting sites identified on the Eldorado National Forest occurs within 2 miles of proposed authorized trails or any improvements proposed in any alternatives. The Devil’s Peak site is 0.5 miles north of the eastern end of the Rubicon trail and the North Devil’s Peak site is a half mile further north. They were not surveyed in the 1980 peregrine survey because it was deemed to have lower quality nesting habitat than other sites. However, it could be potential nesting habitat, but has never been surveyed. Since most cliff nesting ledges are high and inaccessible, motorized use on designated trails may have

little effect on nest site suitability and use. Trails above or within reasonable motorized vehicle access of the top of the potential nest sites pose a higher risk of disturbance than those below. Since no authorized trails and no resource improvement activities are proposed for any alternatives above the potential nesting habitat, it is unlikely that unknown nesting individuals would be disturbed. The access that trails may provide to rock climbers and other forest users may have a greater influence on peregrine nest site selection or occupancy than disturbance from the proposed alternatives acute and chronic activities.

Most peregrine falcons forage within 1-3 mile of their eyrie (USFWS 1982), making it likely that the project area would be used for foraging if an active eyrie were located at the Devil's Peak cliff. While nesting peregrines spend the majority of their time foraging near their eyrie, they have been found to forage 8-9 miles from their nest sites (Beebe 1974, Bird and Aubry 1982, Enderson and Kirven 1983, Hunter et al. 1988). Since numerous potential sites (all currently unoccupied) are located within that range, it is possible that the area could be part of the extended foraging area of individuals nesting further away than the Devil's Peak and North Devil's Peak sites. Therefore, if occupied, proposed activities in all alternatives may disturb more than one pair of foraging peregrines. Individuals may be temporarily displaced from certain foraging areas within a half mile of proposed improvements and authorized trails in all alternatives. However, disturbance from improvements should be temporary and would only affect small areas at a time. Ample foraging habitat is available outside a half mile of the disturbance area for foraging. Routine disturbance from OHV use could cause peregrine's to avoid foraging in areas directly around trails, thus reducing the amount of foraging habitat available to these birds. Since peregrine foraging areas are large and the entire analysis area could be utilized for foraging, it is unlikely that the routine disturbance around the limited areas of trails would impact foraging habitat.

Habitat Modification. Peregrine falcons forage on birds and mammals. Prey species impacts from the proposed activities would be minimal and temporary as very little habitat is being altered and disturbance from the proposed construction and maintenance is temporary. Also, future routine disturbance from the proposed authorized trails in all alternatives should be slightly less than the current disturbance. Therefore, impacts to prey species from any of the alternatives is not likely to impact foraging quality for peregrines.

Water quality improvement through all action alternatives may increase abundance of some prey species in the analysis area and thus improve some foraging habitat. Improved water quality would also reduce the amount of toxicity or pathogen levels in prey items. However, since only a few areas within the analysis area are considered of concern, and peregrine home ranges and

foraging areas are large and it is unlikely peregrines would eat enough contaminated prey items to prove fatal or have sub-lethal effects. No effects have been seen currently in the bald eagle pair at Loon Lake which feed primarily on aquatic species and should be more impacted than another raptor eating rodents, birds or fish. Therefore, improvement in water quality in all the Action alternatives should have, at most, a positive effect to foraging habitat. Foraging quality would remain the same under Alternative 2.

Cumulative Effects

Peregrine falcon numbers have increased substantially across the United States over the past two decades. Although numbers remain low in the Sierra Nevada, they appear to be increasing as suggested by the recent use of a new eyrie on the forest. The following risk factors have been identified for peregrine falcons: 1) collision with stationary structures and objects (particularly transmission lines), 2) illegal shooting or collection, 3) disturbance at eyries, 4) pesticides and contaminants, and 5) degradation of habitat.

Over the past two decades, peregrine falcons have successfully nested at one cliff site since 2004 and at another site adjacent to the Forest which was last used in 1994. Rock climbing at the active peregrine falcon eyrie is the greatest potential threat to nesting success. To date, closures at the site and the voluntary cooperation of climbers have prevented adverse effects. Since proposed project activities in any of the proposed project alternatives would not impact known nests or reduce foraging quality significantly, the effects of project alternatives combined with the effects of ongoing and future management activities, are unlikely to result in significant adverse effects to peregrine falcons on the ENF.

Determination

Project Alternatives may affect individuals but are not likely to result in a trend toward Federal listing or loss of viability on the Forest for the American peregrine falcon.

This determination is made based upon the following factors:

- Peregrine falcon numbers have increased substantially across the United States and California over the past two decades (USDI Fish and Wildlife Service 1999).
- No known nest sites would be disturbed by the proposed project activities in any of the alternatives.
- Foraging quality of the area would not be negatively impacted.

Bald Eagle

Direct and Indirect Effects - All Alternatives

The bald eagle analysis area is .5 miles surrounding the proposed Alternative activities (Terrestrial Wildlife Biological Evaluation: Appendix A). The trail easement and resource improvement projects, as described in the project alternatives, has the potential to directly and/or indirectly affect bald eagles in the following ways:

Displacement, Avoidance and Disturbance at Nest Sites: Reported responses of bald eagles to human activities have included spatial avoidance of activity and reproductive failure (Anthony et al 1995). Bald eagles seem to be more sensitive to humans afoot than to vehicular traffic (Grubb and King 1991, Hamann 1999). Anthony and Isaacs (1989) found that the mean productivity of bald eagle nests was negatively correlated with their proximity to main logging roads, and the most recently used nests were located in areas farther from all types of roads and recreational facilities when compared to older nests in the same territory. Grubb and King (1991) evaluated the influence of vehicle traffic on bald eagle nesting activities and recommended buffers of 450 meters for vehicles. The U.S. Fish and Wildlife Service, in its 2007 Bald Eagle Management Guidelines, recommended a 100 to 200-m nest site buffer for off-road vehicle use and timber harvest activities which include chainsaw use or road construction or maintenance. Nest site protection through area closures is one of the primary ways that the Forest Service and land management entities have implemented measures to avoid the potential for nest failures due to human disturbances.

No known nest sites are located within 200 meters of the potential project activities in any alternatives. Therefore, no known nest sites would be disturbed.

Habitat Modification. A productive foraging area is essential for eagles. Bald eagles forage mainly on fish during nesting season, but they would also forage on small mammals and birds. Fish are the preferred prey, and waterbirds are an important prey item, so most summer foraging is done at the main body of water near the nest site, although it has been found that eagles would forage at least several kilometers (about 1 mile) from their nest (Stalmaster, 1987). Habitat modification that reduced prey densities would negatively impact reproduction of bald eagles.

The degraded water quality along the trails could be impacting some terrestrial prey species that have smaller home ranges and depend on certain contaminated water sources. Also, fisheries in certain water sources may be high in contaminants and could concentrate in fish tissues. A potential high

risk area for fish contamination is the Little Rubicon River near Buck Island Outlet or Ellis Creek (Williams Pers. Comm. 2011). The eagle's large foraging areas and preference for fishing in larger lakes and reservoirs above small creeks, and the abundance of those large water bodies within close proximity of their nest site and the project area, make it unlikely that their prey species would have levels of contamination high enough to impact them negatively. In addition, the pair at Loon Lake has nested successfully almost every year for the past 5 years. If water quality in their foraging areas was poor enough to impact their health or reproduction, they would not have fledged young consistently. Therefore, it is unlikely that petroleum or human waste contamination is currently impacting them or their foraging items enough to reduce survival or reproduction.

Snag Reduction. Trees selected for nesting are characteristically one of the largest in the stand or at least co-dominant with the overstory. Nest trees usually provide an unobstructed view of the associated water body and are often prominently located on the topography. Live, mature trees with deformed tops are occasionally selected for nesting. Of the nest trees identified in California, about 71 percent were ponderosa pine, 16 percent were sugar pine, and 5 percent were incense cedar. The remaining 8 percent were distributed among five other coniferous species. Nest tree characteristics in California have been defined by Lehman (1980) as being 41 to 46 inches in diameter at breast height and in excess of 100 feet tall. Snags, trees with exposed lateral limbs, or trees with dead tops are often present in nesting territories and are used for perching or as points of access to and from the nest. Such trees also provide vantage points from which territories can be guarded and defended. The reduction in snag trees or potential diseased or dying hazard trees along the main Rubicon trail could remove potential nesting trees from an area.

Comparison of the Alternatives

Disturbance at Nest Sites. None of the alternatives directly impact the Loon Lake nest through noise disturbance because none of the alternatives have proposed activities, trails or authorized trails within 200 meters of a known nest site. However, if the bald eagles were to change nest sites and nest within 200-m of the proposed authorized trails or the Rubicon Trail, then it is possible that nesting would be disturbed through OHV use along the easement or through acute disturbance through maintenance or construction. Since use within the easement is not likely to change, these routine impacts from the vehicles are already occurring within the 200-meter disturbance area of the easement and project Alternatives' proposed actions. Therefore, any proposed action within project Alternatives is not likely to have more impact than current OHV use. Since the Action alternatives limit OHV use to varying degrees, they should reduce the amount of habitat that is currently being degraded by noise

and human presence associated with OHV use. Alternative 5 would reduce the most routine noise disturbance. Also, habitat around the trail is Moderate and not High Quality. Risk from temporary noise would be low due to the fact that eagles would be less likely to nest in the poorer quality Moderate habitat and the routine noise disturbance from trails would make habitat around the trails not suitable for nesting or foraging. Alternative 5 would have the least area impact with Alternative 1 & 3, 4 and 2 increasing this impact respectively. All action alternatives would decrease the area of impact from the current condition for temporary and routine noise disturbance and habitat degradation.

Vehicle noise from over the snow travel could disturb reproductive behavior during the early portion of the bald eagle nesting season. Under any of the alternatives, this effect is probably minor since proposed actions would not occur during winter due to limited accessibility. The difference in the influence on habitat use from authorized trails between alternatives is minimal or non-existent except with the seasonal operating period in Alternative 5 that would lessen vehicle disturbance during winter.

Habitat Avoidance or Modification: In California, 73 percent of the nest sites were within one-half mile of a body of water, and 89 percent within 1 mile. No nests were known to be over 2 miles from water. Bald eagles often construct several nests within a territory and alternate between them from year to year. Up to five alternative nests may be constructed within a single territory (U. S. Fish and Wildlife Service 1986). Therefore, bald eagle habitat that is 1 mile from Loon Lake is considered nesting habitat which could overlap the proposed actions. An analysis of bald eagle habitat located one mile from Loon Lake shows that 12% of this potential nesting habitat (445 acres out of 3,654 acres) is within the 200-m disturbance area of all project Alternatives. Therefore, impacts from any project alternatives would be to a small proportion of their potential nesting habitat.

Within this 200-m area around the easement, it is possible that nesting and foraging habitat is already unsuitable due to OHV use and any proposed actions within the Project Alternatives would only impact already minimally suitable nesting and foraging habitat. Since project alternatives limit disturbance areas and resource damage, they may actually increase the suitability of some nesting and foraging habitat. None of the Action alternatives currently result in direct or indirect effects to known nest sites, but they may influence the suitability of 10% of available nesting habitat (377 acres of 3,654 acres) around the easement and trails by increasing its availability through limiting OHV use in Alternatives 1, 3, 4, 5 and 6. Availability of habitat would be increased the most in Alternative 5 which would limit chronic and acute disturbance from OHV use and maintenance the most by not authorizing trails.

Terrestrial prey species impacts from the proposed maintenance and construction activities would be minimal and temporary because very little habitat is being altered and disturbed from the proposed activities. Chronic disturbance to the eagles from the proposed authorized trails and access points in all alternatives, except Alternative 5, should be similar to the current disturbance provided from the Rubicon Trail and shouldn't change prey abundance from the existing condition. Alternative 5 disturbance impacts would be less and abundance of prey species might increase slightly as a result. Therefore, negative impacts to terrestrial prey species from different trail use in the alternatives is not likely to negatively impact foraging quality for eagles from the existing condition.

The action alternatives would continue or improve the water quality to varying degrees and if some prey species are being impacted, their abundance should improve. If current degraded or contaminated water conditions are not adversely impacting the eagles as state above, then action alternatives would only improve their foraging quality from the current condition. Alternative 2 would continue this condition, which does not seem to be impacting the eagles.

Snag Reduction As stated previously, minimal vegetation alteration would occur but some large snags might be removed through hazard tree removal or log barrier creation. While nesting habitat may be present (although moderate) it is not likely to be utilized and consequently not available for use by eagles. While some potential nest trees might be removed through the proposed actions and easement maintenance, it is unlikely that eagles would nest within the area of activity around the Rubicon Trail. Therefore, no nesting habitat would be altered through any of the alternatives. Availability of nesting snags would be the greatest in Alternative 5 which would have the least trail maintenance mileage of all action alternatives. Alternative 2 would have no snag removal and would have the greatest amount of snags available for nesting use.

Cumulative Effects

On the ENF, increasing recreation use and associated disturbances at reservoirs, and habitat alteration associated with fuels reduction projects, are the primary factors influencing bald eagles or their habitat. Reservoirs on the ENF are small, and with existing levels of public use, do not provide large areas of undisturbed habitat. The number of nesting bald eagles on the Forest has continued to increase however, suggesting that eagles have been able to adapt to existing levels of public use.

Recreation disturbance at the known nest location at Loon Lake has been limited through the use of flight area closures for helicopter use. Hiking, boating and camping activity in the Loon Lake area may result in some degree of habitat avoidance by foraging eagles, or may result in avoidance of potential

nesting habitats. Future levels of OHV use along the trail should remain the same as current levels; keeping disturbance levels from OHV use similar along the trail with existing conditions. When combined with the effects of current and future recreation activity, the continued maintenance along the trail, and installation and construction of facilities should not add to an area of already high human disturbance surrounding the easement. Although proposed actions within all project Alternatives, except Alternative 2, could result in direct disturbance to a future bald eagle nest site location, proposed actions are unlikely to have a negative impact on nesting or foraging habitat since OHV use on the Rubicon Trail has already lowered nesting and foraging habitat quality within 200 meters. Action Alternatives would actually decrease cumulative effects from noise disturbance by limiting OHV use. Alternative 5 would decrease these adverse cumulative affects the most of all Action alternatives with the least disturbance area of trails and a seasonal operating period. Alternative 2 would continue with current levels of disturbance impacts to habitat quality.

Fuels reduction projects in the analysis area are not removing large trees or snags, they are generally not reducing the quality of nesting habitat, and treatments are expected to make habitat more sustainable in the event of a wildfire. Future hazard tree removal would reduce potential nesting trees in the analysis area on 9.5 acres. This should have minimal impact to eagles as it is less than 1% of the analysis area. Adding to potential nesting habitat impacted, 445 acres- 12.6% of potential nesting habitat would be impacted cumulatively in the analysis area. This addition of habitat impacted should not be for any eagles that would nest in the area, especially since the proposed actions impact Moderate Quality habitat and not High Quality.

Water quality in the area is considered degraded due to existing recreational use, but appears not to be impacting bald eagle reproduction or survival. All action alternatives which would improve cumulative effects to water quality would continue or improve the current eagle foraging condition.

The primary risks to the bald eagles have been identified as: (1) ingestion of poisonous substances; (2) collision with stationary or moving structures or objects; (3) degradation of wintering or breeding habitat through human development or habitat alteration; and (4) disturbance at nest and roost sites (Birds of North America). The direct and indirect effects of the project Alternatives should not contribute to any of the risk factors as described above (water quality, disturbance or foraging quality) for eagles within the analysis area. Bald eagle populations are increasing range-wide on the Forest. Therefore, project alternatives are not likely to result in a trend toward Federal listing or loss of viability on the Forest for the bald eagle.

Determination

Project Alternatives may affect individuals but are not likely to result in a trend toward Federal listing or loss of viability on the Forest for the bald eagle.

This determination is made based upon the following factors:

Bald eagle populations are estimated to be increasing range-wide, statewide, and on the ENF (USDA FS 2007).

- The direct and indirect effects of the project Alternatives should not contribute to any of the risk factors as described above (toxins, disturbance or degradation of habitat) for eagles within the analysis area. Cumulative effects of disturbance may actually be lessened through authorization of trails for all alternatives except Alternative 2.
- No known nest sites would be disturbed by the proposed project activities in any of the alternatives
- Foraging quality of the area would not be negatively impacted.

California Spotted Owl

Direct and Indirect Effects - All Alternatives

The spotted owl analysis area is 1.5 miles surrounding the proposed Alternative activities (Terrestrial Wildlife Biological Evaluation: Appendix A).

The trail easement and resource improvement projects, as described in the project alternatives, has the potential to directly and/or indirectly affect California spotted owls in the following ways:

Disturbance Effects. The effect of motorized trails or vehicles upon spotted owl populations and spotted owl habitats was not identified as a significant risk factor by either the U.S. Forest Service (USDA Forest Service, 2004) or by the USFWS (2006a), when considering risks to the species. The issue of elevated sound and visual disturbance of forest wildlife species remains a complex and poorly understood subject. Site-specific factors such as background noise levels, traffic type, traffic levels, cover, and topography affect the likelihood that visual disturbance or noise from a road or trail would affect spotted owl behavior. These factors vary considerably and consequently are likely to make actual disturbance distances highly variable. The Forest Service, Region 5, has generally assumed that activities (including road and trail use) occurring farther than 0.25 miles from a spotted owl nest site have little potential to affect spotted owl nesting (USDA Forest Service, 2004). This distance corresponds to the mean distance at which Mexican spotted owls were found to show an alert response to noise disturbance from chainsaws (Delaney et al. 1999). In addition, Wasser et al. (1997) found that stress hormone levels were

significantly higher in male northern spotted owls (but not females) when they were located less than 0.25 miles from a major logging road compared to spotted owls in areas greater than 0.25 miles from a major logging road. Similarly, Hayward et al. 2011 found that stress hormones were significantly higher in male northern spotted owls in May and closer to noisy roads. Hormone level effects appeared to be more significant in May when the chicks are still in the nest than in July when they have fledged and have some ability to escape the disturbance. Chronic high levels of stress hormones may have negative consequences on reproduction or physical condition of birds though these effects are not well understood (Marra and Holberton 1998, Gaines et al. 2003, USDI Fish and Wildlife Service 2006b). However, the Hayward study found that reproduction was indeed impacted negatively by road noise. Owls close to loud roads fledged significantly fewer young than owls close to quiet roads – suggesting that routine traffic exposure may decrease NSO reproductive success over the long-term (Hayward et al 2011).

The implication of behavioral disruptions still remains uncertain as other studies show little immediate reproductive effects. Damiani et al. (2007) compared reproductive success between disturbed and non-disturbed territories over a 19 year timeframe. Their results indicated that noise from management activities (primarily timber harvest) occurring during the breeding season did not have immediate effects on the reproductive output of northern spotted owls but that “disturbance may result in cumulative negative effects on reproductive output over the long-term (observable after a decade).”

The U.S. Fish and Wildlife Service prepared an exhaustive review of the available literature in 2006 to develop guidance on evaluating the effects of auditory and visual disturbance to northern spotted owls (USFWS 2006b). Although not developed specifically for the California spotted owl, there is no reason to assume that the information presented would not apply to the California subspecies. A flush response near active nests during the reproductive period was considered as a reliable indicator of harassment by the U.S. Fish and Wildlife Service since it indicated a significant disruption of normal behavior patterns which might increase the rate of predation upon adult or juvenile spotted owls. The Fish and Wildlife Service felt that other behaviors or responses, such as an alert response or elevated levels of corticosteroid, did not provide a reliable indication of harassment. Studies reviewed by the Fish and Wildlife Service observed the distance at which spotted owls typically flush from branches to generally be less than 60 meters from the noise source. Delaney et al. (1999) reported that 30 percent of Mexican spotted owls flushed from branches during the fledging period (though not during the incubation or nestling period) when a person and operating chainsaw were within 60 meters of the owls. Swarthout and Steidl (2001) found that a 55-m buffer “would eliminate virtually all behavioral responses of Mexican spotted owls to hikers.”

Based upon its review of the literature, the U.S. Fish and Wildlife Service concluded that behavior indicating “harassment” may occur when the action-generated sound level exceeds ambient conditions by 20 to 25 dB as experienced by a spotted owl, or when the visual proximity of human activities occurs less than 40-m from an active nest site. The Service created categories for action-generated sound ranging from “natural ambient” to “extreme” within which they placed similar sound sources. They acknowledged considerable variability within and among these categories but attempted to address the variability by “establishing a conservative approach to estimating distances at which harassment behaviors may manifest.” Sound levels associated with motorized use of roads and trails typically fell within the “moderate” range, although some actions, such as use of heavy equipment for road grading, would fall into the “high” sound level category. By calculating attenuation rates of sound across habitat conditions representative of the forest habitat occupied by spotted owls, the Fish and Wildlife Service estimated likely harassment distances due to action-generated sound levels. These distances were 50 meters for most road and trail use and 150 meters for road grading activity, where natural ambient sound levels are not substantially influenced by human activities or natural sources. Distances were less where ambient sound levels were higher.

Standards and guidelines in the ENF LRMP direct that impacts be mitigated where there is documented evidence of disturbance to the nest site from existing road or motorized trail use, and that, “proposals for new roads or trails be evaluated for their potential to disturb nests (USDA FS 2004b, pg. 61).” The ENF has not monitored nest sites in proximity to roads and specific instances of disturbance have not, therefore, been documented. Even if monitoring were to be conducted, however, the behaviors associated with disturbance are difficult to witness or quantify under field conditions (USDI FWS 2006b). In this assessment trails have been evaluated for their potential to disturb nesting spotted owls by considering the number of spotted owl activity centers occurring within 60 meters of motorized trails. This distance is slightly greater than the average 50-m estimated harassment distance estimated by the U.S. Fish and Wildlife Service. Increasing this distance from 50 to 60 meters provides a slightly more conservative estimate, taking into account the fact that the exact location of a nest or roost tree within a stand generally remains unknown from spotted owl surveys; disturbance effects are probably a low risk beyond the 60 meter distance. No owl activity centers occur within 60 meters of the proposed easement and project activities. 0.25 miles (400 meters) around spotted owl activity centers represents the area within which activities on the Forest are generally limited to avoid disturbance to nesting spotted owls (USDA Forest Service 2004). Currently, there are no known spotted owl activity centers within a quarter mile of the proposed easement and project activities.

Routine disturbance could occur on nesting owls if they were located within 50-60 meters of the Rubicon Trail and authorized trails. The Action alternatives would limit use in the area surrounding the Rubicon Trail and any disturbance occurring that might impact owl reproduction or nesting habitat quality would likely be reduced. Alternative 2 would not limit disturbance. Disturbance from proposed maintenance, rehabilitation, construction and installation activities might disturb nesting if owls were present between 60 meters to a quarter mile of the activities. However, since no nests are currently known within this buffer no direct or indirect impacts would occur from any alternatives. Also, habitat within that buffer, if considered nesting habitat is unlikely to be quality nesting habitat. Canopy levels, tree sizes and quality habitat patch sizes are unlikely to reach levels of use for owls within that area due to ecological potential.

Habitat Loss, Fragmentation and Edge Effects. Roads and trails dissect larger patches of old forest habitat into smaller fragments, creating edge habitat along both sides of the road and reducing the amount of interior old forest habitat (Reed et al. 1996). Species associated with old forest habitats are often vulnerable to the effects of forest fragmentation and increased edge, where changes in predator occurrence or predator success may affect populations. The area surrounding the Rubicon Trail is currently utilized by OHVs despite the fact that there are no authorized trails. These areas are currently subjected to the creation of new trails and OHV use on unauthorized trails. The NFS land surrounding the Rubicon Trail is closed to cross-country travel from Travel Management, due to very little law enforcement and little user education in past years, trails have continued to be used and created. As is stated in the document, the last couple years have seen a decline in the use due to more law enforcement and user education. With the delegation of this easement and authorization of trails, more money can be spent on enforcement and education (including signage). The Action alternatives would limit use in the area surrounding the Rubicon Trail and any habitat fragmentation or edge effects occurring that might impact owl habitat quality would likely be reduced. Alternative 2 would not limit these and any fragmentation currently occurring would continue.

Three hundred-acre Protected Activity Centers (PACs) surrounding known spotted owl nest or roost stands are managed with the objective of providing the habitat conditions for spotted owl nesting. PACs are intended to provide the largest, best available habitat patches. Authorized trails within the PAC land allocation may reduce nest or roost stand suitability. There are no PACs impacted by any of the project alternatives, so proposed alternatives would not disturb individual owls.

Water quality improvement through all action alternatives may increase abundance of some prey species in the analysis area and thus improve some

foraging habitat. However, foraging habitat in the area is poor quality for the same reason as described above for nesting habitat. As a result, any improvement in prey abundance would not significantly change foraging quality of the habitat. Improved water quality would also reduce the amount of toxicity or pathogen levels in prey items. However, since only a few areas within the analysis area are considered of concern, and owl home ranges and foraging areas are large (1.5 mile radius) and it is unlikely that owls would eat enough contaminated prey items to prove fatal or have sub-lethal effects. No effects have been seen currently in the bald eagle pair at Loon Lake which feed primarily on aquatic species and should be more impacted than another raptor eating rodents or birds. Therefore, improvement in water quality in all the Action alternatives should have at most positive effects to any owls that might utilize the area. Alternative 2 would continue the trend of poor foraging quality habitat.

Snag and Log Reduction. Reduction of snags (and eventually of fallen snags or logs) is expected to occur along the easement as a result of removing hazard trees (trees which pose a risk of falling upon a road or facility) or barrier log creation. In order to manage roadside hazards, few snags would be expected to be retained within an area of about 60 meters (200 feet) alongside the easement. Since snags are important habitat components for many of the species associated with old forest habitats, including spotted owls, old forest habitat and owl habitat quality would decline within this area. 204 acres or 3.5% of spotted owl habitat in the analysis area would be impacted.

Comparison of the Alternatives

Disturbance at Nest Sites: Currently, there are no known spotted owl activity centers within a quarter mile of the proposed easement and project activities. While nesting habitat may be present in the analysis area, the potential for nesting is low due to low habitat potential. Therefore, potential disturbance from construction, installation, maintenance activities or routine OHV use to unknown nesting owls is unlikely.

Habitat Loss or Modification: The action alternatives would reduce the area of routine disturbance, habitat fragmentation, edge effects, or water quality impacts occurring that might impact owl habitat quality from the existing condition. Alternative 2 would not limit current negative impacts and any habitat quality degradation currently occurring would continue.

Alternative 5 would reduce disturbance impacts the most with the least amount of authorized trails and the least construction and maintenance activities. Alternatives 1, 3, 4, and 6 would have similar disturbances as stated in the general effects section.

Owl habitat quality would be reduced through snag removal similarly in Alternatives 1, 3, 4, and 6 (204 Acres) and just slightly reduced in Alternatives 5 (191 acres). No nesting habitat would be altered. No snags would be removed under Alternative 2.

The action alternatives would continue or improve the water quality to varying degrees and if some prey species are being impacted, their abundance should improve. If current degraded or contaminated water conditions are not harmfully impacting the owls as state above, then action alternative would only improve their foraging quality from the current condition. Alternative 2 would continue this condition, which does not seem to be impacting the owls.

Cumulative Effects

The project file provides a list and description of past, present, and reasonably foreseeable projects on the Eldorado National Forest and on private lands within the forest boundary. Some, but not all of these activities would contribute to effects upon California spotted owls. In its Notice of Finding on a petition to list the California spotted owl, the U.S. Fish and Wildlife Service identified that loss of habitat to stand replacing fires, and habitat modification for fuels reduction were the primary risk factors to California spotted owls occurring on NFS lands (USDI Fish and Wildlife Service 2006a). At present the spotted owl population on the Eldorado National Forest is estimated to be declining (USFS 2011).

Within the last 10 years (2001-2011), only 441 acres of fuels or timber treatments have occurred in marten habitat within the analysis area (1.5 miles); 229 acres of these are on private lands. No preferred habitat was treated. No goshawk land allocations (PACs and HRCAs) were affected. These fuels treatment projects have resulted in an overall reduction in the amount and quality of spotted owl habitat on the Eldorado National Forest since 2001. The combined past, present and future impacts of on owl habitat would negatively impact 11% of owl habitat in the analysis area.

Fuels reduction projects would continue to be the primary activity affecting spotted owl habitat on the Eldorado National Forest (Terrestrial Wildlife Biological Evaluation: Appendix A). Forest thinning projects would occur on an estimated 5,000 acres per year, based upon the acreage treated in the last 10 years. Although these treatments would degrade habitat, it is anticipated that, over time, the amount of habitat removed in stand replacing wildfires would be reduced as a result of these treatments (USDA Forest Service 2004). No fuels treatments are likely to occur in the next few years based upon the projects listed in the Eldorado National Forest Schedule of Proposed Actions. Over time, fuels treatments are expected to alter 20 to 30 percent of the landscape, with a resulting expectation that the amount of habitat burned by stand replacing

wildfires would decline in response to these treatments (USDA Forest Service 2004). The California Department of Forestry and Fire Protection does not list any timber harvest plans as submitted for the analysis area. Timber harvest on private lands is generally more intensive and does not typically maintain habitat suitability for spotted owls.

Given that all action alternatives have no nest sites potentially subject to disturbance, a maximum of 11% of spotted owl habitat negatively impacted cumulatively, and a reduction in the amount of spotted owl habitat disturbed by OHV use, cumulative effects to spotted owls should add to the declining trend on the Forest. The existing condition, or Alternative 2, has more impact to owl habitat than any of the Action alternatives. However, given the limited spotted owl nesting habitat and the lack of owls in the analysis area, adverse impacts from Alternative 2 should have no significant impacts the owl population on the forest.

Determination

The project alternatives may affect individual California spotted owls but are not likely to result in a trend toward Federal listing or loss of species viability on the Forest.

This determination is based upon the following factors:

- The effect of motorized trails or vehicles upon spotted owl populations and spotted owl habitats was not identified as a significant risk factor by either the U.S. Forest Service (USDA Forest Service, 2004) or by the USFWS (2006a), when considering risks to the species.
- The direct and indirect effects of the project Alternatives should not contribute to habitat loss or alteration. Cumulative effects of disturbance would likely be lessened through authorization of trails.
- No known nest sites would be disturbed by the proposed project activities in any of the alternatives
- Foraging quality of the area would not be negatively impacted.

Northern Goshawk

Direct and Indirect Effects – All Alternatives

The northern goshawk analysis area is 1.5 miles surrounding the proposed Alternative activities (Terrestrial Wildlife Biological Evaluation: Appendix A)

The trail easement and resource improvement projects, as described in the project alternatives, has the potential to directly and/or indirectly affect goshawks in the following ways:

Disturbance Effects. Some types of human disturbances to goshawk nests have been a suspected cause of nest abandonment. Critical times for human disturbance are through the nesting and post fledging period (February 15 through September 15). Because northern goshawks initiate breeding when the ground is still covered with snow and roads and trails are not in use, nests are sometimes directly located along roads and trails that provide flight access. Following melt out these sites can be prime candidates for conflict as humans begin using the roads and trails (USDA Forest Service, 2001). Northern goshawks are aggressive nest defenders that would attack humans that venture into active nest stands. The potential for visual disturbance to result in goshawk defensive behavior increases where motorized trails or dispersed campsites are in proximity to goshawk nest stands (USDA Forest Service 2001). Dunk et al 2011 found that female goshawks that were directly approached by hikers spent more time off nests than they otherwise did.

The Forest Service, Region 5, has generally assumed that activities (including road and trail use) occurring farther than 0.25 miles from a goshawk nest site have little potential to affect goshawk nesting (USDA Forest Service, 2004). Grubb et al. (1998) reported that vehicle traffic from roads caused no discernible behavioral response by goshawks at distances greater than 400 meters (0.25 miles) from nests. Little information is available on the distance at which sound or visual disturbances are likely to disrupt behavior of nesting goshawks but, as with other raptors, the likelihood of flushing from the nest or nest abandonment is expected to increase as the distance from the disturbance decreases (USDI Fish and Wildlife Service 2006b). One recent study done on the Mendocino National Forest (Dunk et al 2011) confirms some impacts to goshawks from only intense recreational use around goshawk nest sites; routine or normal recreational use was found to be innocuous. They found that female goshawks on nests spent more time off the nest during a one hour intense OHV use within a half mile of their next than they did during the pre-treatment hour. Also, fledglings used areas of slightly lower habitat suitability during sustained-ATV (1-hour) treatments than before or after treatments; possibly influencing survivability.

The action alternatives would limit use in the area surrounding the Rubicon Trail and any disturbance occurring that might impact goshawk reproduction or nesting habitat quality would likely be reduced. Disturbance from proposed maintenance, rehabilitation, construction and installation activities might disturb nesting if goshawks were present within a quarter mile of the activities. However, since no nests are currently known within this buffer no direct or

indirect impacts would occur from any alternatives. Also, habitat within the quarter mile buffer, if considered nesting habitat is unlikely to be quality nesting habitat. Canopy levels, tree sizes and quality habitat patch sizes are unlikely to reach levels of use for goshawks within that area due to ecological potential.

Habitat Loss, Fragmentation and Edge Effects. Goshawk have been shown to be sensitive to changes in canopy closure and habitat fragmentation (Beier and Drennan 1997, Daw and DeStefano 2001) such as could result from a road network. Roads and motorized trails can result in a decrease in interior forest patch size, decreasing the amount of suitable nesting habitat and increasing the distance between suitable interior forest patches, for goshawks. The habitat surrounding the Rubicon Trail is currently fragmented with a plethora of trails. The action alternatives would limit use in the area surrounding the Rubicon Trail and any habitat fragmentation or edge effects occurring that might impact goshawk habitat quality would likely be reduced. Alternative 2 would not limit these and any fragmentation currently occurring would continue.

Goshawk nesting habitat is managed within 200-acre Protected Activity Centers (PACs) surrounding a known goshawk nest stands with the intent of providing habitat conditions to support goshawk nesting. PACs are intended to provide the largest, best available habitat patches. Authorized trails within the PAC land allocation may reduce nest stand suitability. There are no PACs impacted by any of the project alternatives, so proposed alternatives would not disturb known goshawks.

Water quality improvement through all action alternatives may increase abundance of some prey species in the analysis area and thus improve some foraging habitat. However, foraging habitat in the area is poor quality for the same reason as described above for nesting habitat. As a result, any improvement in prey abundance would not significantly change foraging quality of the habitat. Improved water quality would also reduce the amount of toxicity or pathogen levels in prey items. However, since only a few areas within the analysis area are considered of concern, and goshawk home ranges and foraging areas are large (1.5 mile radius) , it is unlikely that goshawks would eat enough contaminated prey items to prove fatal or have sub-lethal effects. No effects have been seen currently in the bald eagle pair at Loon Lake which feed primarily on aquatic species and should be more impacted than another raptor eating rodents or birds. Therefore, improvement in water quality in all the Action alternatives should have at most positive effects to any goshawks that might utilize the area. Alternative 2 would continue the trend of poor foraging quality habitat.

Snag and Log Reduction. Reduction of snags (and eventually of fallen snags or logs) is expected to occur along designated roads as a result of removing hazard trees (trees which pose a risk of falling upon a road or facility). In order to manage roadside hazards, few snags would be expected to be retained within an area of about 60 meters (200 feet) alongside roads open for public use. Since snags are valuable habitat components for goshawks, habitat quality within these trailside corridors generally declines. 204 acres or 3.5% of goshawk habitat in the analysis area would be impacted.

Comparison of Alternatives

Disturbance at Nest Sites: Currently, there are no known goshawk activity centers within a quarter mile of the proposed easement and project activities. While nesting habitat may be present in the analysis area, the potential for nesting is low due to low habitat potential. Therefore, potential disturbance from construction, installation, maintenance activities and routine disturbance to unknown nesting goshawks is unlikely.

Habitat Loss or Modification: The action alternatives would reduce the area of routine disturbance, habitat fragmentation, edge effects, or water quality impacts occurring that might impact goshawk habitat quality from the existing condition. Alternative 2 would not limit current negative impacts and any habitat quality degradation currently occurring would continue.

Alternative 5 would reduce disturbance impacts the most with the least amount of authorized trails and the least construction and maintenance activities. Alternatives 1, 3, 4, and 6 would have similar disturbances as stated in the general effects section.

Snag habitat and old forest habitat would be reduced similarly in Alternatives 1, 3, 4, and 6 (204 Acres) and just slightly reduced in Alternatives 5 (191 acres). No nesting habitat would be altered. No snags would be removed under Alternative 2.

The action alternatives would continue or improve the water quality to varying degrees and if some prey species are being impacted, their abundance should improve. If current degraded or contaminated water conditions are not harmfully impacting the goshawks as state above, then action alternative would only improve their foraging quality from the current condition. Alternative 2 would continue this condition, which does not seem to be impacting the goshawks.

Cumulative Effects

The project file provides a list and description of past, present, and reasonably foreseeable projects on the Eldorado National Forest and on private lands within the forest boundary. Some, but not all of these activities would contribute to effects upon goshawks.

Within the last 10 years (2001-2011), only 441 acres of fuels or timber treatments have occurred in goshawk habitat within the analysis area (1.5 miles); 229 acres of these are on private lands. No preferred habitat was treated. No goshawk land allocations (PACs and HRCAs) were affected. These fuels treatment projects have resulted in an overall reduction in the amount and quality of goshawk habitat on the Eldorado National Forest since 2001.

Fuels reduction projects would continue to be the primary activity affecting goshawk habitat on the Eldorado National Forest (Terrestrial Wildlife Biological Evaluation: Appendix A). Forest thinning projects would occur on an estimated 5,000 acres per year, based upon the acreage treated in the last 10 years. Although these treatments would degrade habitat, it is anticipated that, over time, the amount of habitat removed in stand replacing wildfires would be reduced as a result of these treatments (USDA Forest Service 2004). No fuels treatments are likely to occur in the next few years based upon the projects listed in the Eldorado National Forest Schedule of Proposed Actions. Over time, fuels treatments are expected to alter 20 to 30 percent of the landscape, with a resulting expectation that the amount of habitat burned by stand replacing wildfires would decline in response to these treatments (USDA Forest Service 2004). The California Department of Forestry and Fire Protection does not list any timber harvest plans submitted within the analysis area. Timber harvest on private lands is generally more intensive and does not typically maintain habitat suitability for northern goshawk.

Given that all action alternatives have no nest sites potentially subject to disturbance, a maximum of 11% of goshawk habitat negatively impacted cumulatively, and a reduction in the amount of spotted goshawk habitat disturbed by OHV use, cumulative effects to goshawks should not be significant. The existing condition, or Alternative 2, has more impact to goshawk habitat than any of the Action alternatives. However, given the limited goshawk nesting habitat and the lack of goshawks in the analysis area, adverse impacts from Alternative 2 should have no significant impacts the goshawk population on the forest.

Determination

The project alternatives may affect individual northern goshawks, but are not likely to result in a trend toward Federal listing or loss of species viability on the Forest.

This determination is based upon the following factors:

- In its 1998 status review of the northern goshawk, the Fish and Wildlife Service concluded that goshawks remain widely distributed throughout their historic range in the western U.S. and found no evidence that goshawk habitat is limiting the population, or that a significant curtailment of the species' habitat is occurring.
- The effect of motorized trails or vehicles upon goshawk populations and habitats was not identified as a significant risk factor by either the U.S. Forest Service (2004) or by the USFWS (1998), when considering risks to the species.
- The direct and indirect effects of the project Alternatives should not contribute to habitat loss or alteration. Cumulative effects of disturbance would likely be lessened through authorization of trails.
- No known nest sites would be disturbed by the proposed project activities in any of the alternatives
- Foraging quality of the area would not be negatively impacted.

Great Gray Owl

Direct and Indirect Effects – All Alternatives

The trail easement and resource improvement projects, as described in the project alternatives, has the potential to directly and/or indirectly affect great gray owls in the following ways:

Since current nest locations are unknown on the ENF, the direct and indirect effects displayed are limited to changes to habitats. If undiscovered nest sites occur on the forest, however, or if great gray owls establish nest sites in the future, disturbance effects, similar to those described for spotted owls and goshawks, could also occur.

Disturbance Effects. No known nests or potential nesting habitat exists within a quarter mile of any of the project Alternatives. Since no nests are currently known within this buffer no direct or indirect impacts would occur. If unknown owls are present in the future, the Action alternatives would limit use in the

area surrounding the Rubicon Trail and any disturbance occurring that might impact owl reproduction or nesting habitat quality would likely be reduced. Disturbance from proposed maintenance, rehabilitation, construction and installation activities might disturb nesting if owls were present within a quarter mile of the activities.

Habitat Modification. As described above, there is currently no nesting habitat located within a quarter mile of the proposed project Alternatives. Therefore, no nesting habitat would be impacted by the proposed Activities. However, the potential for great gray owls to occupy future nesting habitat may be affected by factors influencing the quality of adjacent meadow foraging habitat. Roads and trails within meadows intercept surface and subsurface hydrological flow (Kattlemann 1996). When flows are intercepted and redirected, meadow drying occurs, reducing standing water and the cover of herbaceous vegetation that is important for vole populations and great gray owl foraging (Green 1995). In addition, the likelihood of illegal off-route motorized use occurring and damaging meadow vegetation and hydrology increases as greater numbers of meadows are accessed by open trails. Such use can have profound effects upon the suitability of meadow habitats by increasing bare soil, and creating ruts and gullies. The access that motorized trails provide into meadows can also increase the risk of illegal off-road motorized travel which has been documented in some meadows, and which can result in removal of vegetative cover and further disturbance to meadow hydrology.

Water Quality: Primary prey items include voles and pocket gophers which occur in these meadow sites. These animals forage on vegetation within the meadow that could be impacted by contaminated water from Trail runoff and human waste. Great Grey owls forage mainly on the meadows surrounding their nest sites. Their foraging areas are small and concentrated. If contamination in a meadow were high enough to impact prey populations or bio-accumulate to become toxic to the owls, foraging habitat would continue to be negatively impacted. Since none of the water quality testing showed Gerle Creek Meadow or Gerle Creek as having high levels of toxicity or human waste contamination, this would likely not be an issue in this meadow complex. However, O'Connell (2011) states that sanitation problems he observed in the Gerle Creek area would not likely change under Alternative 1, because no sanitation improvements are proposed for that area under this Alternative. He states that during periods of snowmelt and saturated soil conditions, the current Wentworth Springs toilet could overflow resulting in bacteria delivery to nearby Gerle Creek. A high bacteria overflow might result in contamination of prey items or a reduced amount of prey. If this were the case, foraging habitat in the area would continue to be negatively impacted under Alternative 1.

Comparison of Alternatives

Modification of Occupied Habitat: No modification of occupied habitat would occur under any alternatives.

Modification of Potential Habitat: None of the potential meadow sites would have authorized trails running through it in any project Alternatives. However, currently some unauthorized riding is occurring within the Gerle Creek Meadow and some trails have required rehabilitation. Alternative 2 would have no maintenance performed to remove these trails. All other Action alternatives would remove these trails by blocking access to them.

The presence of motorized trails in meadows increases the likelihood for detrimental impacts to meadow hydrology and vegetation. This influence could affect great gray owl use of this meadow foraging habitat in the future if nesting habitat occurs in the future. All Action alternatives would reduce and/or remove this impact; Alternative 2 would continue this impact.

In Alternative 1, foraging quality impacts in Gerle Creek and its meadow would improve through water quality improvement from the reduced petroleum contamination by proposed trail erosion control features, but not from human waste contamination. Foraging quality would improve through water quality improvement from the reduction in contaminants in Alternatives 3, 4 and 5 due to the sanitation improvement action of relocating the Wentworth Springs toilet as well as the trail erosion control features. Alternative 2 would have no improvement in water quality and therefore, foraging quality, in the Gerle Creek meadow complex from the existing condition.

Cumulative Effects

During the past century, the widespread removal of large trees from mature and old-growth forest has reduced the abundance of potential nest trees, fire suppression has allowed meadow foraging habitats to decrease in size, and livestock grazing altered meadow hydrology potentially reducing prey abundance for great gray owls (Hayward, 1994).

The direct and indirect effects of all Action alternatives do not contribute negatively to impacts upon meadow vegetation and great gray owl foraging habitat. Illegal motorized riding within meadows combined with the effects of past livestock grazing may adversely affect meadow habitats and associated species (as described for the willow flycatcher). Alternative 2 would continue this impact, while all other Action alternatives would reduce or remove it.

Monitoring of the ecological condition of meadows indicates stable and upward trends in meadow vegetation across the majority of sites monitored on the

forest. Water quality would improve over the whole project area in all Alternatives, but potential foraging habitat would only really be improved with Alternatives 3, 4, 5, and 6. Alternatives 3, 4, 5, and 6 combined with this upward trend in meadow vegetation would improve great grey owl habitat on the Forest. The potential foraging area would remain in poor current condition by Alternatives 1 and 2, but since the area is unlikely to be utilized as nesting habitat by the great grey owl, then impacts to the Forest great grey owl population is unlikely. These Action alternatives would not add to this upward trend in meadow vegetation and are not likely to alter the Forest great grey owl population since the area is so limited.

Determination

Project alternatives may affect individuals but are not likely to result in a trend toward Federal listing or loss of viability on the Forest for the great gray owl.

This determination is based upon the following factors:

- Great gray owl breeding territories are not currently known to occur on the Eldorado National Forest.
- Since great gray owls are not known to occupy existing high quality meadow habitats within the project area, there is little indication that impacts of project alternatives are likely to result in a trend toward Federal listing.
- No known nest sites or habitat would be impacted by the proposed project activities in any of the alternatives.
- The direct and indirect effects of the project alternatives should not contribute to significant habitat loss or alteration. Those Alternatives that may negatively impact foraging habitat quality (1 and 2) are not likely to alter the upward trend in foraging habitat because this project has a limited area of impact of 58 acres of meadow habitat.
- Foraging quality of the area would either increase from or would remain as current conditions; trends in meadow vegetation across the forest would not be altered by any of the alternatives.

Willow Flycatcher

Direct and Indirect Effects – All Alternatives

The willow flycatcher analysis area is .25 miles surrounding the proposed Alternative activities (Terrestrial Wildlife Biological: Appendix A). The trail easement and resource improvement projects, as described in the project

alternatives, has the potential to directly and/or indirectly affect willow flycatchers in the following ways:

Disturbance Effects. No known nests exists within a quarter mile of any of the project Alternatives. Since no nests are currently known within the analysis area no direct or indirect impacts would occur to known nesting willow flycatchers.

Habitat Loss and Fragmentation, Edge Effects, Trails for Competitors. No meadow habitat would be directly affected by the project Alternatives. Indirect effects could occur where roads and trails within meadows intercept surface and subsurface hydrological flow (Kattlemann and Embury 1996, Tromulak and Frissell 2000). When flows are intercepted and redirected, meadow drying occurs, reducing standing water and the cover of herbaceous vegetation that is important for insect populations and willow flycatcher foraging (Green et al. 2003). As meadow stream channels become incised, the surrounding water table is lowered and flood events capable of inundating the surrounding meadow become increasingly rare. Substantial changes in vegetation, including loss of woody riparian vegetation (i.e. willows and alders), forest encroachment, and changes in graminoid community composition can then result (RHJV 2004).

These are changes documented to result in a lower probability for habitat occupancy by willow flycatchers (Bombay 1999). The access that motorized trails provide into meadows can also increase recreational activities and associated habitat disturbance, but much of the impact to meadow vegetation on the ENF has been the result of off-route motorized use within meadows. Illegal off-route use within the meadows accessed by motorized trails can substantially increase impacts beyond those created by the route itself. Off-route use has the potential to remove vegetation and disturb soil within large portions of meadows profoundly affecting the suitability of meadow habitats for wildlife.

Primary prey items occur in these meadow sites. These animals forage on insects within the meadow that could be impacted by contaminated water from Trail runoff and human waste. Their foraging areas are small and concentrated. If contamination in a meadow were high enough to impact prey populations or bio-accumulate to become toxic to the birds, foraging habitat would continue to be negatively impacted. Since none of the water quality testing showed Gerle Creek Meadow or Gerle Creek as having high levels of toxicity or human waste contamination, this will likely not be an issue in this meadow complex. Sanitation impacts to willow flycatcher habitat are the same as for great grey owl.

Comparison of Alternatives

Disturbance. If unknown flycatchers are present in the future, the Action alternatives would limit use in the area through designating routes surrounding the Rubicon Trail. Any disturbance occurring that might impact willow flycatcher reproduction or nesting habitat quality would likely be reduced. Disturbance from proposed improvement activities and routine OHV use near the Wentworth Springs Campground where meadow habitat is closest to the trail could disturb nesting if willow flycatchers nesting habitat were suitable. Since nesting habitat near the campground is probably unsuitable due to current high levels of disturbance from the campground, this area would not be impacted by any of the project alternatives.

Modification of Occupied Habitat: No modification of occupied habitat would occur under any alternatives.

Modification of Potential Habitat: None of the potential meadow sites (Gerle Creek Meadow) would have authorized trails running through it in any project Alternatives. However, currently some unauthorized riding is occurring within the meadow and some trails have required rehabilitation. Alternative 2 would have no maintenance performed to remove these trails. All other Action alternatives would remove these trails by blocking access to them. Affects to potential habitat are the same as for great grey owl.

Cumulative Effects

No other willow flycatcher meadow sites are located within the analysis area. The project file provides a list and description of past, present, and reasonably foreseeable projects on the Eldorado National Forest and on private lands within the forest boundary. Some, but not all of these activities would contribute to effects upon willow flycatchers and other meadow birds. The Conservation Assessment of the Willow Flycatcher in the Sierra Nevada (Green et al. 2003), identifies livestock management, recreation, water developments and roads as causative factors that have resulted in meadow drying, loss of nesting and foraging substrates (riparian shrubs), increased predator access to meadow interiors, and potentially cowbird parasitism. These are thought to be among the key factors likely responsible for the decline of the willow flycatcher.

The Sierra Crest Allotment is located within a quarter mile of the project Alternatives. Historic livestock grazing has severely impacted many meadows and is considered to be a primary factor that has influenced the suitability of willow flycatcher habitat, and meadow habitat for birds in general (Graber 1996, Green et al. 2003, Menke et al. 1996). Livestock grazing on montane meadows decreases the height and density of herbaceous growth. Many of the landbird species utilizing these meadows feed upon insects that decline in

response to removal of this herbaceous growth (Graber 1996). The willow flycatcher conservation assessment finds that there is strong evidence that densities of birds sensitive to the effects of grazing (such as the willow flycatcher) increase more on ungrazed pastures than on grazed pastures (such as presented by Stanley and Knopf, 2002). Livestock grazing on active allotments currently affects 29 percent of willow flycatcher meadow habitat on the forest. The condition of these meadows varies, but the majority of this meadow habitat occurs within Allotments that have completed, or are in the process of completing new Allotment Management Plans designed to alter livestock use to meet stricter LRMP Standards and Guidelines for meadow protection. Monitoring of ecological condition of grazed meadows over the past five years has shown the majority of sites to be in moderate or high ecological status and to have a stable or upward trend (data contained in ENF range allotment files), indicating that most meadows are recovering from the effects of past grazing.

Non-motorized trails allow for backcountry hiking and camping which may occur in meadows not accessed by motorized trails, and can adversely affect additional meadow habitat or disturb species. These activities are generally dispersed and of low impact to habitat, particularly in sites most suitable for willow flycatcher which are typically very wet. Foreseeable future actions listed in the project file do not indicate additional effects from future trails or recreation projects.

Factors responsible for the decline of willow flycatcher populations in the Sierra Nevada are thought to be largely an agent or result of habitat change, particularly the alteration of meadow hydrology (Green et al. 2003). The direct and indirect effects of the action alternatives do not contribute to adverse impacts upon meadow vegetation and flycatcher habitat. Illegal motorized riding within meadows combined with the effects of past and continued livestock grazing, may adversely affect meadow habitats and associated species. Alternative 2 would continue this impact, while all other action alternatives would reduce or remove it and decrease adverse cumulative impacts.

Monitoring of the ecological condition of meadows indicates stable and upward trends in meadow vegetation across the majority of sites monitored on the forest. Water quality would improve over the whole project area in all alternatives, but potential foraging habitat would only really be improved with Alternatives 3, 4, and 6. Alternatives 3, 4, and 6 combined with this upward trend in meadow vegetation would improve willow flycatcher habitat on the Forest. The potential foraging area would remain in poor current condition by any Alternatives 1, 2 and 5, but since the area is not utilized as nesting habitat by willow flycatcher, then impacts to the Forest flycatcher population is unlikely. These Action alternatives would not add to this upward trend in

meadow vegetation and are not likely to alter the Forest willow flycatcher population since the area is so limited.

Determination

Project alternatives may affect individuals but are not likely to result in a trend toward Federal listing or loss of viability for the willow flycatcher

This determination is based upon the following factors:

- Since willow flycatchers are not known to occupy existing high quality meadow habitats within the project area, there is little indication that impacts of project alternatives are likely to result in a trend toward Federal listing.
- The direct and indirect effects of the project Alternatives should not contribute to habitat loss or alteration. Cumulative effects of disturbance would likely be lessened through authorization of trails for all Alternatives except Alternative 2 for which associated disturbance would not impact suitable nesting or foraging habitat.
- No known nest sites would be disturbed by the proposed project activities in any of the alternatives
- Foraging quality of the area would either increase from or would remain as current conditions; trends in meadow vegetation across the forest would not be altered by any of the Alternatives.

Pallid Bat

Direct and Indirect Effects – All Alternatives

Since pallid bats utilize a variety of habitats, the entire analysis area is considered pallid bat habitat. The home range analysis area for the pallid bat is 1.5 miles (13,161 acres).

The trail easement and resource improvement projects, as described in the project alternatives, has the potential to directly and/or indirectly affect pallid bats in the following ways:

Habitat Modification: Snag and log reduction occurs as an indirect effect of managing the Trail, bridges, stockpiles, motor vehicle use areas and facilities along the Rubicon Trail. Trees posing a potential safety hazard (“hazard trees”) would be removed within about 60 meters of any of these areas. This safety policy results in a reduction in snags within a zone of about 60 meters from the edge of all authorized trails, bridges, stockpiles, motor vehicle use areas and facilities along the Rubicon Trail. In addition, proposed log barriers may need to remove snags nearby for use. This may reduce potential roost sites for pallid bats. Wisdom and Bate (2008) found that human access can have substantial

effects on snag density. In their study area on the Flathead National Forest in Montana, stands adjacent to roads had snag densities three times lower than the snag densities within stands not adjacent to roads. Since the pallid bat tends to be a roosting habitat generalist, using many different natural and man-made structures, the magnitude of effect may be slight, especially if roadside snag reductions are compensated for by retaining greater numbers of snags outside roadside corridors.

Since Pallid bats feed mainly on large terrestrial insects, any impacts from poor quality water on aquatic insects should not impact foraging habitat quality.

Bats require free standing water for drinking. Bats roosting near contaminated water could use those sources to drink. If petroleum or human waste contamination in water is high enough, sub-lethal impacts could occur to individuals since bats would drink immediately when they emerge from their roosts and drink at close water sources. Wetland ponds like the three wetlands near Little Sluice are ideal drinking areas because there is little water movement.

Disturbance. Activities associated with loud noises may disturb individuals that could be roosting in hardwoods, snags, or mines within or adjacent to the trail prism. There is very little literature about the effects of disturbance on bats. The only experimental study focusing specifically on this issue is by Speakman et. al. (1991). This measured the effect of stimuli such as noise, light, temperature change and tactile disturbance on hibernating bats in captivity and concluded that, in this situation, only tactile stimuli were significant as they invariably caused the bat to arouse, thus increasing its energy expenditure. This experimental result is supported by the studies of Krzanowski (1961), Stebbings (1969) and Fenton (1970) who all reported weight loss in hibernating bats that were handled. Speakman et. al. calculated that a single arousal event utilized sufficient stored fat to enable the bat to hibernate for as much as 500 hours. Bats are particularly vulnerable to disturbance during hibernation, when arousal affects their ability to survive the winter, and during the breeding season, when they are gathered in maternity colonies where disturbance may cause a decline in breeding success. Repeated disturbance may also cause the abandonment of traditional sites. Outside these times, bats are probably less vulnerable as they tend to be less colonial and any loss of weight caused by disturbance when they are torpid is probably replaceable, as insect food is available. Disturbance of swarming sites and harems during the mating season may fall somewhere between these two extremes.

A single disturbance of small groups of bats seems unlikely to affect the local distribution or abundance of the species, though it could have a small impact on the survival of the individuals involved. However, multiple disturbances of the same individuals at the same site are likely to have an additive impact in

either reducing individual survival or in causing the abandonment of traditional roost sites. Disturbing large numbers of bats could affect the survival or breeding success of a large number of individuals and have an impact on local distribution or abundance by causing the abandonment of maternity or hibernation roosts.

Disturbance from traffic is known to cause foraging bats to avoid areas around major roadways. This has not been shown for OHV trails and is unlikely to occur presently, since most OHV use is occurring during the daytime hours and not nighttime when bats would be foraging.

Comparison of Alternatives

Disturbance. Routine noise disturbance from OHV use is likely low due to low noise levels from slow moving vehicles. However, temporary noise disturbance from improvement activities could be high and might disturb roosting bats in the immediate area. Impacts to hibernating bats would be significant as roost numbers are generally larger and survival could be impacted by energy expenditure from arousal. Since improvement activities are not likely to occur during hibernation, this negative impact should not occur. Pallid bats are known to move to numerous roosts throughout the summer months when improvements would be implemented, as such, their breeding may not be impacted significantly from temporary noise disturbance near a roost as they have multiple roosts they can move to. Also, pallid roosts are often small and any disturbance from improvement activities is likely to impact only small groups of individuals at any one time. Large numbers of pallid bats should not be impacted if survival or reproduction is influenced by disturbance from the proposed activities in all Alternatives.

Since little is known about disturbance to bats, it is assumed that acute noise levels within the zone of influence of maintenance and construction activities (60m) could influence roosting bats. To determine how much pallid habitat might be impacted by acute disturbance, habitat within 60m of authorized trails and activities was analyzed. Within 60m of authorized trails for Alternatives 1, 3, 4, and 6, (406 acres in Alternatives 1 and 3, 425 acres in Alternative 4 and 401 acres of bat habitat could be impacted by acute disturbance in Alternative 6). Alternatives 1, 3, 4, and 6 have similar proportions; with 3% of bat roosting habitat would be influenced by the acute disturbance from proposed activities. These Alternatives are similar in effects although minimal toilet installation or maintenance would occur under Alternative 1 as compared with Alternatives 3, 4, and 6. Alternative 5 has the least amount of bat roosting habitat (363 acres) that would be impacted, 2.8% of habitat in the analysis area; although no toilet installation or maintenance would occur under this alternative. Therefore, decreasing acute disturbance impacts would be seen from Alternatives 4, 1&3, 6, and 5, respectively.

Alternative 2 would have no acute disturbance impacts because no activities are occurring.

Habitat Modification. To compare the effects of project Alternatives upon snag availability, the acres of forested habitat (trees larger than 12 inches dbh) occurring within 60 meters of the main Trail is evaluated. All Action Alternative activities such as bridge installation, facilities, and motor vehicle use areas are comparable in this analysis despite different numbers between alternatives since they are all along the main Trail. Therefore, a 60 meter buffer along the main Trail gives the amount of snag habitat impacted by all activities within each action Alternative.

Alternatives 1, 3, 4, and 6 have similar proportions (3.5%) of bat roosting habitat that would be influenced by the proposed easement snag removal (Table 3-22). Alternative 5 has the least amount of forest snag habitat that would be impacted, 13 acres less than the other action alternatives. These Alternatives have a relatively low level of influence on total amounts of habitat for bats or other snag-associated species. They represent 3-4% of all available snag habitat within the analysis area of 1.5 miles. Any direct impacts to lowering bat roosting habitat within the analysis area would be minimal to the population in the area. Alternative 2 would have the least impact of all alternatives as it would have few snags removed because little if any road maintenance would occur.

Table 3-22: Acres of snag habitat occurring within 60 Meters of project alternatives.

Analysis Area	Acres of Habitat **	Snag Habitat					
		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Habitat on NFS	4,849	157	157	157	157	153	157
Habitat on All Lands*	6,190	217	217	217	217	204	217

*Includes habitat on all lands occurring within the National Forest boundary.

**Total habitat (CWHR 4&5 Size Class) within a 1.5 mile radius

Water Quality Water quality for pallid bat use would improve in all action alternatives with the greatest improvement under Alternatives 3, 5, and 6 due to the greatest reductions in sediment, chemicals and human waste into water sources. Alternative 2 would have the most contamination impacts to pallid bats since no mitigations are occurring.

Cumulative Effects

Given the changes in forest vegetation that have been described within the Sierra Nevada over the last 100 years, it is likely that there are less mature

hardwoods and denser vegetative conditions between 0 and 8 feet high within mid-elevation stands than there were historically. This would suggest a historic reduction in foraging habitat availability and quality. It is unclear what the cumulative effect of past actions may have been on sensitive bat species in the analysis area. Historic mining in the area has created more potential roosting habitat for pallid bat than likely occurred prior to European settlement. Timber harvest may have removed existing and future large snags that could have been utilized by bats for roosting, however adjacent mechanical fuels treatments have enhanced future hardwood habitat, opened the understory for foraging opportunities, and reducing the risk of catastrophic fire. Clearcuts may have benefited bats as they are found more often in edges and open stands. These action alternatives and other projects in the area with the primary prescription of understory thinning and prescribed burning would likely improve habitat across the landscape for bats by improving foraging and roosting opportunities. The reduction in risk of future catastrophic fires, promotion of future hardwood habitat, and maintaining open understory over the long term meets several of the conservation measures suggested for bats in the SNFPA (USDA Forest Service 2004).

Future projects that would reduce snags are hazard tree projects that impact 9.5 acres of habitat.

A percentage of Forest Inventory Assessment (FIA) plots are measured annually and these plots provide data on snag abundance. Data collected from plots measured between 1998 and 2004 showed snag numbers varying across different vegetation types (Table 3-23). The Sierra Nevada Forest Plan Amendment provides the following general guidelines for snag retention, indicating that retention levels within individual projects must “sustain a continuous supply of snags and live decadent trees across the landscape, avoiding uniformity across large areas.”

- Westside mixed conifer and ponderosa pine types –four of the largest snags per acre
- Red fir forest types- six of the largest snags per acre
- Westside hardwood ecosystems – four of the largest snags (hardwood or conifer) per acre.

Table 3-23 indicates that LRMP guidelines for snags were being exceeded within the white fir, mixed conifer, and red fir types. Snag numbers were slightly below recommended retention levels in the ponderosa pine type.

Table 3-23: Average number of snags per acre within FIA plots (1998-2004).

Stratum	Diameter Class		
	15"-29.9"	30"+	Total
Sub alpine (3P)	1.23	0.62	1.85
White Fir (3N)	6.72	1.74	8.46
Lodgepole pine (3N)	1.07	0.80	1.87
Mixed Conifer (3N)	4.82	1.64	6.46
Ponderosa Pine(3N)	2.26	0.81	3.07
Red Fir (3P)	4.28	2.37	6.65

Based upon inventory data, LRMP guidance for snag densities on the forest are currently exceeded within the mixed conifer/white fir/red fir vegetation types which are located within the analysis area. Most of the project area is Sierra Mixed Conifer and Red Fir. Therefore, lowering snag density in 3-4% of habitat within the analysis area should not reduce snag densities below the LRMP guidance.

Table 3-24: Past projects within the analysis area impacting snag habitat.

Habitat	NON FOREST SERVICE	USDA FOREST SERVICE	Grand Total
4	231	226	457
5		5	5
Grand Total	231	230	461

The project alternatives would impact at most 217 acres of snag habitat (Alternative 1, 3, 4, 6). Actions in the past in the analysis areas include timber harvest (including clear cuts, fuels reduction harvests, fuels reduction and understory thinning, salvage, oak reduction), reforestation, precommercial thinning in plantations, roadside hazard tree removal, recreation use, grazing, and wildland fires. Salvage logging and hazard tree removal directly reduce snag densities by removing dead and dying trees, while thinning and other types of timber harvest remove trees and reduce competition that drives snag creation. Large stand-replacing fires in the area and in the project area created a large pulse in snags immediately after the fire, but now these areas are deficient in medium and large snags. Past fuels and timber projects have impacted 461 acres of snag habitat (Table 3-24). Fuels projects do not remove snags and would not impact number of snags per acre. However, non-forest timber projects do remove snags and would reduce the number of snags per acre in green snag habitat. Only 231 acres of timber projects would have negatively impacted snags in the past within the analysis area. Future hazard tree projects would impact 9.5 acres of snag habitat. Combined with these past, present and future foreseeable projects, approximately 458 acres of green snag habitat would have been cumulatively impacted by Alternatives 1, 3, 4 and 6; 445 acres would be impacted by Alternative 5. Of 6,190 acres of snag habitat in the

analysis area, 7% of habitat would have been impacted by snag removal for all Action alternatives. This leaves 93% of bat snag roosting habitat within the analysis area available for pallid bat use. Therefore, cumulative negative impacts from proposed activities of all Action alternatives that impact snag habitat is not likely to impact the population of bats in the analysis area.

Including the 9.5 acres of future and the 712 acres of past timber and fuels projects, cumulative effects of acute disturbance would occur on at most 1,147 acres in the analysis area; 9% of the analysis area. Therefore, cumulative negative impacts from proposed activities in all Action alternatives that cause acute disturbance to roosting bats is not likely to impact the population of bats in the analysis area with such a small proportion.

In summary, since pallid bats are roosting habitat generalists that use a number of different roost structures and water quality should improve with all Action alternatives, the magnitude of cumulative effects upon snags, disturbance potential, or water quality is not expected to substantially impact pallid bats within the analysis area or on the Forest. The combined effects of the project Alternatives and other activities are unlikely to result in substantial adverse effects to this species.

Alternative 2 would have the least impact of all alternatives since few if any snags would be removed due to little road maintenance but water quality would not improve. Additionally, Alternative 2 may have sub-lethal contamination impacts to pallid bats since no mitigations are occurring. However, any sub-lethal impacts to pallid bats from Alternative 2 would only impact a small portion of the forest population (about 13,161 acres of 596,724 acres of forested land). Therefore, the combined effects of the project Alternatives and other activities are unlikely to result in substantial adverse effects to this species.

Determination

Project alternatives may affect individuals, but are not likely to result in a loss of viability on the Forest or a trend toward Federal listing of the pallid bat.

This determination is based upon the following factors:

- The direct and indirect effects of the project Alternatives should not contribute to significant habitat loss or alteration.
- Only 9% of bat habitat cumulatively has had acute disturbance to roosting bat habitat
- 93% of bat roosting habitat within the analysis area is available for pallid bat use.
- Water quality impacts should improve with all Action alternatives

- Any sub-lethal impacts to pallid bats from Alternative 2 would impact only a small portion (7%) of the forest population.

Townsend's Big-eared Bat

Direct and Indirect Effects – All Alternatives

Since Townsend big-eared bats utilize a variety of habitats, the entire analysis area is considered Townsend bat habitat. The home range analysis area for the pallid bat is 1.5 miles (13,161 acres).

The trail easement and resource improvement projects, as described in the project alternatives, has the potential to directly and/or indirectly affect Townsend big-eared bats in the following ways:

Habitat Modification. Construction of facilities and bridges should not have any direct or indirect effects upon this species as no habitat is being altered or removed. No significant bat use (maternity colonies) was observed at current facilities and bridges; therefore it is highly unlikely that significant roosts would be disturbed by improvements in bridges or facilities.

Since Townsend bats feed mainly on moths, any impacts from poor quality on aquatic insects should not impact foraging habitat quality.

Bats require free standing water for drinking. Bats roosting near contaminated water could use those sources to drink. Wetland ponds like the three wetlands near Little Sluice are ideal drinking areas because there is little water movement.

If petroleum or human waste contamination in water is high enough, sub-lethal impacts could occur to individuals since bats would drink immediately when they emerge from their roosts and drink at close water sources.

Disturbance. Since these bats commonly roost under bridges, it is unlikely that noise disturbance from slow moving OHV traffic would disturb them. However, activities associated with loud noises may disturb individuals that could be roosting in mines or caves or rock crevices within or adjacent to the trail prism. There is no evidence in the literature that road noise disturbs Townsend big-eared bat roosts, but loud noises immediately near roost could cause bats to abandon the roost as is described for the pallid bat.

Like the pallid bat, a single disturbance of small groups of bats seems unlikely to affect the local distribution or abundance of the species, though it could have a small impact on the survival of the individuals involved. However, multiple disturbances of the same individuals at the same site are likely to have an additive impact in either reducing individual survival or in causing the

abandonment of traditional roost sites. Disturbing large numbers of Townsend bats could affect the survival or breeding success of a large number of individuals and have an impact on local distribution or abundance by causing the abandonment of maternity or hibernation roosts.

Disturbance from traffic is known to cause foraging bats to avoid areas around major roadways. This has not been shown for OHV trails and is unlikely to occur presently, since most OHV use is occurring during the daytime hours and not nighttime when bats would be foraging.

Comparison of Alternatives

Disturbance. There is little literature on disturbance effects to Townsend big-eared bat roosts. Routine noise disturbance from OHV use is likely low due to low noise levels. However, temporary noise disturbance from improvement activities could be high and might disturb roosting bats in the immediate area. Impacts to hibernating bats would be significant as roost numbers are generally larger and survival could be impacted by energy expenditure from arousal. Since improvement activities are not likely to occur during hibernation, this negative impact should not occur. Townsend big-eared bats are known to move to numerous roosts throughout the summer months when improvements would be implemented, as such, their breeding may not be impacted significantly from temporary noise disturbance near a roost as they have multiple roosts they can move to. Also, Townsend roosts are often small and any disturbance from improvement activities is likely to impact only small groups of individuals at any one time. Large numbers of Townsend bats should not be impacted if survival or reproduction is influenced by disturbance from the proposed activities in all Alternatives. Therefore, impacts to Townsend bats in the analysis area of 6,664 habitat acres should not be significant.

Since little is known about disturbance to bats, it is assumed that acute noise levels within the zone of influence of maintenance and construction activities (60m) could influence roosting bats. To determine how much Townsend big-eared bat habitat might be impacted by acute disturbance, habitat within 60m of authorized trails and activities was analyzed. Within 60m of authorized trails for Alternatives 1, 3, 4 and 6- 401 (Alt6), 406 (Alt 1&3) and 425 (Alt 4) acres of bat habitat could be impacted by acute disturbance. Alternatives 1, 3, 4 and 6 have similar proportions with 3% of bat roosting habitat would be influenced by the acute disturbance from proposed activities. These Alternatives are similar in effects although minimal toilet installation or maintenance would occur under Alternative 1 as compared with Alternatives 3, 4 and 6. Alternative 5 has the least amount of bat roosting habitat (363 acres) that would be impacted, 2.8% of habitat in the analysis area. Therefore, decreasing acute disturbance impacts

would be seen from Alternatives 4, 1&3, 6 and 5, respectively. Alternative 2 would have no acute disturbance impacts because no activities are occurring.

Water Quality. Water quality for Townsend big-eared bats use would improve in all action alternatives with the greatest improvement under Alternatives 3, 5, and 6 due to the greatest reductions in sediment, chemicals and human waste into water sources. Alternative 2 would have the most contamination impacts to Townsend big-eared bats since no mitigations are occurring.

Cumulative Effects

Given the changes in forest vegetation that have been described within the Sierra Nevada over the last 100 years, it is likely that there are less mature hardwoods and denser vegetative conditions between 0 and 8 feet high within mid-elevation stands than there were historically. This would suggest a historic reduction in foraging habitat availability and quality. It is unclear what the cumulative effect of past actions may have been on sensitive bat species in the analysis area. Historic mining in the area has created more potential roosting habitat for Townsend's big-eared bat than likely occurred prior to European settlement. Timber harvest may have removed existing and future large snags that could have been utilized by bats for roosting, however adjacent mechanical fuels treatments have enhanced future hardwood habitat, opened the understory for foraging opportunities, and reduced the risk of catastrophic fire. Clearcuts may have benefited bats as they are found more often in edges and open stands. These action alternatives and other projects in the area with the primary prescription of understory thinning and prescribed burning would likely improve habitat across the landscape for bats by improving foraging and roosting opportunities. The reduction in risk of future catastrophic fires, promotion of future hardwood habitat, and maintaining open understory over the long term meets several of the conservation measures suggested for bats in the SNFPA (USDA Forest Service 2004).

Including the 9.5 acres of future and the 712 acres of past timber and fuels projects, cumulative effects of acute disturbance would occur on at most 1,147 acres in the analysis area; 9% of the analysis area. Therefore, cumulative negative impacts from proposed activities in all Action alternatives that cause acute disturbance to roosting bats is not likely to impact the population of bats in the analysis area with such a small proportion.

Alternative 2 would have the most impact of all alternatives, water quality would not improve. Alternative 2 may have sub-lethal contamination impacts to Townsend bats since no mitigations are occurring. However, any sub-lethal impacts to Townsend bats from Alternative 2 would only impact a small portion of the forest population (13,161 acres of 596,724 acres of forested land).

Therefore, the combined effects of the project Alternatives and other activities are unlikely to result in substantial adverse effects to this species.

Determination

Project alternatives may affect individuals, but are not likely to result in a loss of viability on the Forest or a trend toward Federal listing of the Townsend big-eared bat.

This determination is based upon the following factors:

- The direct and indirect effects of the project Alternatives should not contribute to significant habitat loss or alteration.
- Only 9% of bat habitat cumulatively has had acute disturbance to roosting bat habitat
- Water quality impacts should improve with all action alternatives
- Any sub-lethal impacts to pallid bats from Alternative 2 would only impact a small portion of the forest population

American Marten

Direct and Indirect Effects (All Alternatives)

The analysis area for marten is a radius of 0.5 miles from all project Alternative activities (Terrestrial Wildlife Biological : Appendix A).

The trail easement and resource improvement projects, as described in the project alternatives, has the potential to directly and/or indirectly affect American marten in the following ways:

Human-caused mortality. Marten are known for their vulnerability to trapping in many parts of their range. In California, however, body-gripping traps have been banned since 1998 and, as a result, the likelihood of incidental capture of marten by legal fur trapping has been dramatically reduced. Illegal harvest threats remain and could increase in relation to greater human accessibility. At present, illegal trapping or shooting of marten is not known to be a substantial source of mortality (USDA Forest Service 2001). Collision with vehicles has been identified as a source of marten mortality (Buskirk and Ruggerio 1994). There is concern that major highways, such as Highway 50 and Highway 88 on the Eldorado National Forest, may become mortality sinks for traveling marten. Collisions are much less likely to occur along the slower-speed native surfaced trails that are being evaluated for authorization in this

project. Also, most marten activity is nocturnal and most OHV use along the trail is during the day.

Disturbance to Specific Sites. No known den sites or potential denning habitat exists within 0.5 miles of any of the project Alternatives. Since no dens are currently known within this buffer, no direct or indirect impacts would occur to known individuals.

Displacement or Avoidance. Robitaille and Aubrey (2000), studying marten in an area of low road density and traffic (primarily logging roads), found that marten use of habitat within 300 and 400 meters of roads (approx. 0.25 miles) was significantly less than habitat use at 700 or 800 meters distance. Although martens were detected in proximity to roads in their study, significantly less activity occurred within these zones. In a study conducted on the Lake Tahoe Basin Management Unit and Sierra National Forest, however, Zielinski and others (2007) found that marten occupancy or probability of detection did not change in relation to the presence or absence of OHV use. The study did not, however, measure behavioral changes or changes in use patterns and the study authors caution that application of their results to other locations would apply only if OHV/OSV use at the other locations is no greater than reported in their study.

Habitat Modification: *Habitat Loss and Fragmentation, Edge Effects, Movement Barriers.* Martens are known to be sensitive to changes in overhead cover, such as can result from roads or trails (Hargis and McCullough 1984, Buskirk and Ruggiero 1994). Roads and trails can fragment habitat, and could thus affect the ability of martens to use otherwise suitable habitat on either side of the route. At a landscape scale, patches of preferred habitat and the distribution of openings with respect to habitat patches may be critical to the distribution and abundance of martens (Buskirk and Ruggiero 1994). While marten use small openings, and particularly meadows for foraging, these openings must occupy a small percent of the landscape. Martens have not been found in landscapes with greater than 25 percent of the area in openings (Hargis et al. 1999; Potvin et al. 2000) and avoid stands with less than 50 percent canopy closure (Bull and Blumton 1999). Martens avoid habitats that lack overhead cover presumably because these areas do not provide protection from avian predators. As landscapes become fragmented, the combination of increasing isolation and decreasing patch size of suitable habitat compounds the results of simple habitat loss (Andren 1994).

Highways, such as 50 and 88, are suspected of creating movement barriers for marten. The extent to which movement patterns may also be affected by smaller forest roads or trails, such as those being authorized in this project, remains unknown but have been identified as a potentially significant risk to

Sierra Nevada martens (USDA Forest Service 2001). However it is unlikely that marten would utilize most of the project area due to the lower canopy cover and large patches of <50% canopy cover.

Trails for Competitors. Roads that are driven during the winter months may allow coyotes to enter into marten winter habitat, affecting marten through competition or direct mortality from predation. This has been identified as a significant threat within lynx habitat. Since both lynx and marten have unique morphologies that allow them to occupy deep snow habitats where they have a competitive advantage over carnivores such as coyotes and bobcats, human modifications of this habitat, such as winter road use, over-the-snow travel, and snowmobile trails, can eliminate this advantage, providing increased access for predators and competitors. This has been identified as a potentially significant risk factor in the Sierra Nevada, worthy of further investigation (draft Conservation Assessment).

Snag and Down Log Reduction. High levels of coarse woody debris (snags, downed logs, root masses, large branches) is an essential component of marten habitat, especially during the winter months when marten require subnival structures for cover and for hunting opportunities. In addition, large logs with cavities provide rest and den sites for marten. Activities that remove coarse woody debris are therefore likely to degrade marten habitat (Buskirk and Ruggiero 1994). As previously described, hazard tree removal along roads would reduce numbers of snags within a distance of about 60 meters alongside roads. However, downed snags would be left in the area. Authorized trails and camping also provide access to fire wood cutters, reducing amounts of down wood within roadside corridors. These effects within 60 meters of roads may, however, be incidental to the displacement and avoidance factors that apparently influence marten use of habitat within a greater distance of motorized trails.

Disturbance at a Specific Location (meadows). Various studies in the Sierra have shown marten to have a strong preference for meadows and forest-meadow edges for foraging (USDA Forest Service 2001). Because of the importance of microtine rodents in the marten diet, the quality of meadow habitat (especially meadows surrounded by mature lodgepole and red fir forests) influences the quality of marten habitat (Spencer et al. 1983). Roads through meadows, and the associated damage that can occur from off-road use within meadows, can alter meadow hydrology and vegetation, and have a negative effect on prey availability. The combination of road use and increased human activity, as well as the potential impacts of roads upon meadow vegetation, may result in loss of these more easily exploitable “prey patches.”

Water Quality: Considering that water quality monitoring found levels below the county standards and no major mortalities of terrestrial animals have been observed, it is likely that any impacts to marten from drinking contaminated water would be sub-lethal if they exist at all. High contamination levels are likely to be found in smaller bodies of water or places of shoreline nearest to OHV use; those areas not likely to be utilized by marten because of human presence, OHV disturbance, low amounts of preferred habitat and low quality of suitable habitat. Therefore, any current water quality impacts to the marten currently are unlikely since they are probably utilizing habitat farther from the Rubicon Trail and around large bodies of water that should not have high concentrations of contaminants.

However, Alternative 1 should increase water quality for wildlife by decreasing the amount of vehicle and human contaminants as well as sediment being transported to water resources; although human waste contamination would mostly remain the same. Thus overall, the proposed action should reduce contaminant flow into water resources and increase water quality for marten. If individuals are being impacted by this effected water quality, the proposed action would help reduce this impact and habitat quality should improve.

Comparison of Alternatives

Disturbance to Specific Sites. No dens sites are known from the analysis area. If unknown martens are present currently or in the future, the action alternatives would limit use through designating trails in the area surrounding the Rubicon Trail and any disturbance occurring that might impact marten reproduction or denning habitat quality would likely be reduced. Disturbance from proposed improvement activities might disturb nesting if marten were present within a quarter mile of the activities. However, since little preferred habitat is located within the analysis area, marten use and therefore disturbance of denning is unlikely. Foraging use in the area is unlikely to be impacted by noise disturbance since marten are nocturnal and usually forage at night when OHV use or improvement activities would not be occurring.

Habitat Modification and Displacement Effects. Robitaille and Aubrey (2000) found that marten habitat use declined within a distance exceeding 300 to 400 meters from roads. To display the extent to which marten use of preferred habitat may be influenced by the project alternatives, the proportion of habitat occurring within 274 meters (0.17 miles) of open trails is shown in Table 8. Relative changes in habitat effectiveness for marten can be evaluated and compared based on this analysis. Direct effects upon habitat, such as the reduction of snags and down wood and associated edge effects, would also occur but most likely be limited to a zone of about 60 meters adjacent to

motorized trails. The proportion of habitat affected in this manner is also displayed in Table 3-25.

Table 3-25: Comparison of marten habitat impacted by project alternatives.

	Alt1	Alt2	Alt3	Alt4	Alt5	Alt 6
Total Habitat within 274m*	796	800	796	826	779	795
Total Habitat within 60m	205	211	205	220	191	205
Preferred Habitat within 274m*	7	9	7	7	7	7
Preferred Habitat within 60m	0	0	0	0	0	0
Total Marten Habitat Within 0.5 miles	2,204					
Preferred Habitat Within 0.5 miles	10					
*Total Marten Habitat (.5 mile) = 2,204 miles; 515 miles on private lands.						

Alternative 2, with highest acreage impacted, results in 38 percent of marten habitat occurring within current trails' zone of influence (274m) (Table 3-25). Alternative 5 results in 35% of marten habitat impacted by the easement and authorized trails. The zone of influence between all Alternatives only differs by about 50 acres but access within the analysis area is limited with Action alternatives. Therefore, while effects are incrementally increasing in Alternatives 5, 6, 1 & 3, 4 and 2, the amount of habitat impacted in comparison is relatively similar with only a 2-3% difference between the highest impact Alternative (Alternative 2) and the least impact Alternative (Alternative 5). As described above, road and trail-associated factors within this zone are thought to affect marten in a variety of ways, including changes in behavior, and changes to habitat. Considering the variety of ways that road and trail-associated factors are suspected of affecting marten (habitat avoidance, habitat loss through fragmentation, increased competition and predation), current and proposed trail use may have a high degree of influence on marten habitat usage since 35-38% of marten habitat within the analysis area would be impacted.

Alternatives 6, 5, 4, 1 & 3, and 2 result in the same proportion of marten preferred habitat being influenced by authorization of trails. All of the Alternatives continue to influence a substantial proportion of marten preferred habitat, with 70 percent of preferred habitat within a half mile of the proposed activities being impacted within the 274 meter zone of influence (Table 3-25). Obviously there is limited preferred habitat available within the 0.5 mile analysis area, making it unlikely that marten are even utilizing the surrounding area for denning or reproduction. Therefore, impacts to the limited acreage would not likely effect marten on the forest.

A recent study of marten response to OHV use on the Lake Tahoe Basin and Sierra National Forest found, on the other hand, that the presence of motorized

trails had little effect on the probability of marten detection (Zielinski et al. 2007). This study found that marten occupancy or probability of detection did not change in relation to the presence or absence of motorized trails when the trails (plus a 50 meter buffer) did not exceed about 20 percent of a 50 square kilometer area, and traffic did not exceed one vehicle every 2 hours. None of the Alternatives have more than 20% of suitable marten habitat occurring within a 60 meter buffer from proposed authorized trails and the easement. If traffic levels are no greater than those measured in the Lake Tahoe Basin study area, the results of Zielinski et al (2007) suggest that the level of motorized trails in any of the alternatives are unlikely to cause marten individuals to relocate from the area, though behavior and habitat use might still be affected. Considering the high use that the Rubicon Trail sustains during weekends in the summer (>300 on weekends), it is likely that use is higher than measured in the study area and the likelihood of marten individuals in the area would be influenced in current use and use under any Action alternatives.

Trails for Competitors. All action alternatives would continue to provide trails for competitors within the analysis area to varying degrees but would limit trails within the analysis area for competitors. Incrementally, Alternatives 4, 1 & 3, 6, and 5 would increasingly limit trails and trail creation for competitors. Alternative 5 would benefit marten habitat the most of all alternatives with the least amount of trails and a seasonal operating period. Alternative 2 would continue all trail use, use of unauthorized routes would continue although use of the unauthorized routes would not be authorized and these routes would not be shown on the Motor Vehicle Use Map. This use would negatively impact habitat for marten.

Snag and Edge Effects. All Action alternatives would reduce snags and downed logs within 60 meters of the Rubicon Trail easement to varying degrees. Edge effects and snag reduction are limited to a smaller portion of habitat, but still affect 9 percent (Alternative 5) to 10 percent (Alternative 2) of marten habitat in the analysis area depending upon the alternative (Table 3-25). Overall habitat effects between alternatives appear to be similar with only a slight 1% difference between them. No preferred habitat would be impacted by edge effects or snag reduction.

Old Forest and IRA Fragmentation. Standards and guidelines in the ENF LRMP direct that projects “minimize old forest habitat fragmentation” and emphasize old forest habitat connectivity for fisher and marten. All proposed authorized trails are located completely within Old Forest Emphasis Area land allocation. All proposed authorized trails are currently causing fragmentation of the habitat and authorizing mileage would impact marten proportionally to mileage authorized. This is indicated by the fact that mileage of proposed authorized trails increases incrementally between Alternatives 5, 6, 3 & 1, 4 and 2 and the average size of the dissected old forest patch increases respectively as

well (Table 3-26). Alternative 5 results in the least amount of old forest land allocation fragmented and is therefore likely to provide greater habitat connectivity for marten. Fragmentation effects increase incrementally from Alternative 5, 6, 3&1, 4 and 2 up to 9% of habitat within the analysis area with the addition of authorized trails.

Table 3-26: Acres of Old Forest Land Allocation Fragmented by Proposed Authorized Trails.

Acres of Old Forest (0.5 miles)	Habitat Dissected*					
	Alt 1	Alt 2	Mod 3	Alt 4	Alt 5	Alt 6
4,890	409 (8%)	437 (9%)	409 (8%)	428 (8.7%)	365 (7.5%)	404 (8%)
*Old Forest land allocation acres within 60 meters of trails						

As route densities are reduced, habitat connectivity for marten is likely to be improved (Robitaille and Aubry 2000). Within the half mile analysis area is a small portion of an Inventoried Roadless Areas (IRAs, see IRA section). These areas include red fir and lodgepole pine types that are preferred habitat for marten in the Sierra Nevada (USDA FS 2001a) and increase the size and connectivity of undisturbed habitat that occurs in the wilderness areas. As a result, IRAs and adjacent wilderness areas may become increasingly important as the cumulative effect of recreation and fuels treatment activities expand within other portions of marten habitat. All Action alternatives limit the use and creation of trails in the IRA (Table 3-27). By designating the least amount of trails within the IRA, Alternative 5 provides for greater connectivity of marten habitat as compared to the other alternatives which are authorizing more mileage (Table 3-27).

Table 3-27: Comparison of Proposed Mileage in Project Alternatives Within Roadless Area.

	Alt1	Alt2	Alt3	Alt4	Alt5	Alt 6
Rubicon Trail Mileage	1.2	2.21	1.2	1.2	1.2	1.2
Additional NFS Route Mileage	.42	0	.42	.56	0	.36
Trails to Be Closed and Rehabilitated	.57	0	.57	.57	.99	.64

Effects to Meadows. None of the meadows within the analysis area would have authorized trails running through them in any Action alternatives. However, currently some unauthorized riding has occurred within the Gerle Creek meadow and some trails have required rehabilitation. All Action

alternatives should rehabilitate and limit roads through meadow vegetation. All other Action alternatives would remove these trails by blocking access to them. Alternative 2 would have no maintenance performed to remove these trails.

The presence of motorized trails in meadows increases the likelihood for detrimental impacts to meadow hydrology and vegetation, both from the route itself and from the potential for damage created by illegal off-road use. This influence could affect marten use of this meadow foraging habitat. All Action alternatives would reduce and/or remove this impact; Alternative 2 would continue this impact.

Primary prey items include voles and pocket gophers which occur in these meadow sites. These animals forage on vegetation within the meadow that could be impacted by contaminated water from Trail runoff and human waste. If contamination in a meadow were high enough to impact prey populations or bio-accumulate to become toxic to the marten, marten might be negatively impacted. Impact to prey is the same as discussed for great grey owls.

Access to Dispersed Recreation Sites and Over-the-Snow travel. Access to dispersed recreation sites in Alternatives 5, 6, 3, 1, 4, and 2 incrementally increases the magnitude of human disturbance in marten habitat, and may result in decreasing size of habitat patches. Alternative 5 which reduces authorized trails the most, reduces this potential the greatest.

Over-the-snow travel under the project alternatives may also affect marten populations through winter habitat changes (snow compaction). These changes can increase access into marten habitat for predators and competitors such as coyotes as well as displace marten directly. Alternatives 1, 2, 3, and 4 would have the greatest likelihood of affecting marten in this manner and may also allow for use of additional areas other than authorized trails by wheeled vehicle users. Alternatives 1, 2, 3, and 4 would be impacting marten through winter habitat changes the same as the existing condition. Currently, the area is open for snow-mobile and wheeled motor vehicle travel, and these alternatives would continue to allow for wheeled motor vehicle travel over-the-snow throughout the area as long as county water quality standards are met. A seasonal operating period due to water quality would likely decrease wheeled vehicle use in the area during winter. Snowmobile use would remain the same. Since use of the area by wheeled vehicles is considered “limited” by Forest Service employees (Gaynor 2011), it is unclear how much wheeled vehicle use would contribute to these winter habitat changes. Thus, it is unclear how any reduction in this use would impact marten. Alternatives 5 and 6 with their consistent seasonal operating period would remove this negative impact from wheeled motor vehicle users and thus reduce motorized use within marten habitat during winter months. However, it is unclear if this would benefit marten winter habitat quality since snowmobile access would still remain.

Water Quality: In Alternative 1, foraging habitat impacts in Gerle Creek and its meadow would improve through water quality improvement from the reduced petroleum contamination by proposed trail erosion control features, but not from human waste contamination. Foraging quality would improve through water quality improvement from the reduction in contaminants in Alternatives 3, 4, 5 and 6 due to the sanitation improvement action of relocating the Wentworth Springs toilet as well as the trail erosion control features. Alternative 2 would have no improvement in water quality and therefore, foraging quality, in the Gerle Creek meadow complex from the existing condition.

Summary. The Action alternatives would reduce the area of routine disturbance, habitat fragmentation, edge effects, or water quality impacts occurring that might be currently impacting marten habitat quality. Alternative 5 would reduce disturbance impacts, and Alternatives 3, 5, and 6 would reduce any water quality impacts the most. Alternative 2 would not limit current negative impacts and any habitat quality degradation currently occurring would continue.

Cumulative Effects

On the ENF, several activities have influenced habitat quality for marten. Past timber harvest and more recent fuel reduction treatments have reduced important components of marten habitat such as canopy cover, snags, and down wood. Within the last 10 years (2001-2011), only 441 acres of fuel or timber treatments have occurred in marten habitat within the analysis area (1.5 miles); 229 acres of these are on private lands. No preferred habitat was treated. Considering the projects listed in Travel Management Appendix F (USFS 2007), fuel treatments on NFS lands above 5,000 feet in elevation have occurred on about 1,500 acres a year, on average. These vegetation treatments have typically reduced habitat quality for marten by reducing canopy cover, structural complexity, and coarse woody material within treated units. At the larger landscape scale, these treatments may affect the size and connectivity of patches of high quality habitat. Over time, fuel treatments are expected to alter 20 to 30 percent of the landscape, with a resulting expectation that the amount of habitat removed by stand replacing wildfires would be reduced in response to these treatments (USDA FS 2004).

The CDF currently does not list any timber harvest plans on private land within the analysis area for which timber harvest plans have been submitted. Timber harvest on private lands is generally more intensive and does not typically maintain habitat suitability for martens.

Livestock grazing did occur within the Sierra Crest Allotment in 683 acres of the analysis area, but the allotment is not currently active and no grazing has occurred in 10 years. Past grazing pressure has probably impacted meadows within the allotment that are extremely sensitive to grazing. In meadows, livestock grazing has reduced the suitability of meadow vegetation for microtine

rodents and other marten prey (USDA FS 2001). On the ENF, the impact of livestock grazing on meadows has been steadily decreasing as fewer allotments are grazed and as forage utilization levels are being controlled by stricter standards established by the Sierra Nevada Forest Plan Amendment. Nonetheless, the past and present effects of livestock grazing contribute to the effects of the project Alternatives upon meadow habitat and condition.

Currently and in the future, the high levels of recreation as described previously during winter and summer reduce the suitability of some habitat due to disturbance by human presence.

A recent study by Moriarty (Moriarty, Zielinski, & Forsman, 2011) showed that marten numbers declined by 25% in an area on the Tahoe National Forest since the 1980s. Their findings suggested a substantial decline in the number of martens in their study area. Similar declines in marten populations have been inferred from reduced geographic distributions at other locations in the Sierra Nevada and Cascade mountain ranges of California (Zielinski W. J., 2005) (Kirk & Zielinski, 2009). These findings suggest that adverse impacts to preferred habitat would contribute to this trend.

Direct and indirect effects of the project alternatives, as described in the previous section, cumulatively contribute to each of the risk factors identified for marten (Alternative 2 to the greatest extent and Alternative 5 to the least extent). This influence, combined with other recreational uses, annual recreational events, fuel treatments and livestock grazing effects upon marten habitat, affects a substantial portion of marten suitable habitat within the analysis area. These Alternatives do not result in a loss of habitat, but may influence marten suitable habitat use within up to 35-38 percent of habitat within the analysis area, depending upon the alternative selected. Alternatives 4, 1, 3, 6, and 5 result in similar but progressively lesser impacts from disturbance and contaminants. Alternative 5 and 6 are the best alternatives for marten habitat quality, although, Alternative 6 has more trails and disturbance than Alternative 5. Alternative 5 would have the least impact on marten and old forest habitat, benefit habitat connectivity by authorizing the least amount of routes within IRAs, and does not designate motor vehicle use areas. As stated previously, the current impacts to habitat could result in displacement of marten from the zone of influence around the Trail (Zielinski et al. 2007) if the area had quality preferred or suitable habitat for marten. However, habitat quality in the area is probably poor due to large open patches and high amounts of lower quality suitable patches with canopy cover <50%. Therefore, it is unlikely that any marten would be negatively impacted from the project since either they are already displaced or their habitat is currently unsuitable; in addition, all action alternatives decrease the amount of impact from the current existing condition.

There is a high degree of uncertainty about future route proliferation and associated cumulative impacts upon marten habitat in the analysis area under Alternative 2. Alternative 2 would continue to contribute negatively to the adverse cumulative effects upon marten habitat and populations to the greatest extent (38% of habitat within the analysis area), and Alternatives 4, 1, 3, 6, and 5 result in similar, but progressively lower impacts. However, all Alternatives are unlikely to impact marten populations on the Forest because it is unlikely that they would impact individuals as habitat around the Rubicon is likely incapable of being occupied by reproductive individuals as described above due to high amounts of disturbance and low amounts of Preferred habitat.

Determination

All Project Alternatives should not affect individuals and are not likely to result in a trend toward Federal listing or loss of viability on the Forest for the American marten.

This determination is based upon the following factors:

- Only 10 acres of preferred habitat are located within the analysis area, therefore it is unlikely that denning and reproduction are occurring within the analysis area.
- Foraging habitat would be improved with Alternatives 3, 4, 5, and 6. It could be degraded from current condition by any Alternatives 1 and 2 (due to the Wentworth Springs Toilet), but since the area is unlikely to be utilized as denning habitat by marten, impacts to the Forest marten population is unlikely.
- It is assumed that marten no longer occupy the area directly around the Rubicon Trail due to current levels of disturbance and low quality suitable habitat.
- The American marten is well distributed on the ENF, though trends in populations or habitat on the ENF are not well known (Zielinski et al. 2000).

Pacific Fisher

Direct and Indirect Effects – All Alternatives

The current absence of fisher from the Eldorado National Forest eliminates direct and indirect effects of proposed activities for all Alternatives at present. This analysis, however, would evaluate impacts of the Alternatives to fisher if populations were to be re-established on the Eldorado National Forest, since this may be a goal for species recovery.

The analysis area for fisher is a radius of 1.5 miles from all project Alternative activities (Terrestrial Wildlife Biological Evaluation: Appendix A).

The trail easement and resource improvement projects, as described in the project alternatives, has the potential to directly and/or indirectly affect Pacific fisher in the following ways:

Disturbance to Specific Sites. No known den sites are known to exist within a 0.5 miles of any of the project Alternatives.

Trapping, Poaching and Collisions. Higher speed and traffic volume roads represent a substantial threat to fisher populations (USFWS 2004), and so collisions on OHV trails with slow moving vehicles would not be expected to present measurable risks (see discussion for American marten). As described for marten, new trapping regulations have eliminated most risk to fisher from legal trapping but, based upon findings in the southern Sierra Nevada, the increased opportunity for poaching provided by greater human access may represent a substantial risk for fisher. Of nine recently documented fisher mortalities in the southern Sierra Nevada, two were suspected of being the result of poaching (USDI Fish and Wildlife Service 2004).

Habitat Loss and Fragmentation, Displacement or Avoidance. The loss and fragmentation of suitable habitat by roads and development is thought to have played a significant role in both the loss of fishers from the central Sierra Nevada and its failure to re-colonize this area (USFWS 2004). Campbell (2004, in USFWS 2004) found that sample units within the central and southern Sierra Nevada region occupied by fishers were negatively associated with road density. This relationship was significant at multiple spatial scales (from 494 to 7,413 acres). The USFWS (2004) concluded that, “vehicle traffic during the breeding season in suitable habitat may impact foraging and breeding activity” and that “hiking, biking, off road vehicle and snowmobile trails, may adversely affect fishers.” Dark (1997) found that fishers in the Shasta-Trinity National Forest used landscapes with more contiguous, unfragmented forest and less human activity. Foraging habitat within the analysis area is probably poor quality within the area around the Rubicon Trail and its associated trails due to current noise levels, human presence and low suitable habitat quality.

Only 8 acres of denning habitat is located within 1.5 miles of any of the project Alternatives. This minimal amount of potential denning acreage dispersed over a greater than 5,905 acre area suggests that the analysis area is unlikely to have enough habitat for reproductive fishers.

Primary prey items include small mammals. Water quality improvement through Alternative 1 may increase abundance of some prey species in the analysis area and thus improve some foraging habitat. Improved water quality

would also reduce the amount of toxicity or pathogen levels in prey items. However, since only a few areas within the analysis area are considered of concern, and fisher home ranges and foraging areas are large (1.5 mile radius) and it is unlikely that fishers would eat enough contaminated prey items to prove fatal or have sub-lethal effects. No effects have been seen currently in the bald eagle pair at Loon Lake which feed primarily on aquatic species and should be more impacted than another raptor eating rodents or birds.

Old Forest Fragmentation. Standards and guidelines in the ENF LRMP direct that projects “minimize old forest habitat fragmentation” and emphasize old forest habitat connectivity for fisher and marten. All proposed authorized trails are located completely within Old Forest Emphasis Area land allocation. All proposed authorized trails are currently causing fragmentation of the habitat.

Snag and Down Log Reduction. Snags and large downed logs are important habitat components for fisher, creating resting and denning sites. Activities that remove coarse woody debris are likely to degrade fisher habitat (Powell and Zielinski 1994). As previously described, hazard tree removal along roads would reduce numbers of snags within a distance of about 60 meters alongside roads. This, however, is probably incidental to the human disturbance factors that are likely to influence fisher use of habitat within an even greater distance of motorized routes.

Water Quality. Considering the water quality monitoring found levels below the County standards and no major mortalities of terrestrial animals have been observed, it is likely that any impacts to fisher from drinking contaminated water would be sub-lethal if they exist at all. High contamination levels are likely to be found in smaller bodies of water or places of shoreline nearest to OHV use; those areas not likely to be utilized by fisher because of human presence, OHV disturbance, low amounts of high quality habitat and low quality of suitable habitat. Therefore, any water quality impacts to the fisher currently are unlikely since they are probably utilizing habitat farther from the Rubicon Trail and around large bodies of water that should not have high concentrations of contaminants.

However, Alternative 1 should increase water quality for wildlife by decreasing the amount of vehicle and human contaminants as well as sediment being transported to water resources. Thus overall, the proposed action should reduce contaminant flow into water resources and increase water quality for fisher. If individuals are being impacted by this poor water quality, the proposed action would help reduce this impact and habitat quality should improve.

Comparison of Alternatives

Disturbance to Specific Sites. If unknown fishers are present currently or in the future, the Action alternatives would limit use in the area surrounding the Rubicon Trail and any disturbance occurring that might impact fisher reproduction or denning habitat quality would likely be reduced. Disturbance from proposed improvement activities might disturb denning if fisher were denning within a 700 acre buffer (approx. 0.5 miles) of the activities (USDA FS 2004); but this is unlikely as described above since little denning habitat exists within the analysis area.

Habitat Loss, Fragmentation Displacement Effects. Although fisher are thought to be absent from the central Sierra Nevada at present, if the species were to re-colonize habitat on the Eldorado National Forest, areas with lower densities of trails and associated human disturbances, would be expected to present less risk to fisher. The density of trails proposed within the analysis area (1.5 miles) and in Old Forest Land Allocation within the Analysis Area has therefore been used as a measure of relative effects of the project Alternatives upon fisher (Table 3-28 and Table 3-29).

Alternative 2 results in about 2.05 sq. miles of trails in the analysis area and 2.07 sq. miles of trails in the Old Forest Land Allocation. Alternatives 1 & 3, 4, and 5 result in progressively less area with high road densities from 1.94 sq. miles to 2.01 within the analysis area and 1.94 sq. miles to 2.01 sq. miles in Old Forest Land Allocation. Alternative 5 provides the least amount of trails in both, as the only alternative in the analysis area to have a route density below two miles per square mile.

Table 3-28: Comparison of alternatives of the density of trails within the analysis area (1.5 mile buffer).

	Road Density in Analysis Area*					
Road Density (mi/mi ²)	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
	2.0	2.05	2.0	2.01	1.94	2.0
*14,446 acres (22.57 sq. miles) is located within 1.5 mile analysis area						

Table 3-29: Comparison of alternatives of the density of trails with old forest allocation within the analysis area (1.5 mile buffer).

Route Density (mi/mi ²)	Percentage of Old Forest Allocation (NFS Lands Only)					
	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
	2.01	2.07	2.01	2.01	1.94	2.01

*12,803 acres (20 sq. miles) of Old Forest Land Allocation is located within 1.5 mile analysis area

All proposed Alternatives are currently causing fragmentation of the habitat and authorizing trails which would impact fisher proportionally to mileage authorized. This is indicated by the fact that mileage of proposed authorized trails increases incrementally between Alternatives 5; 1, 3, and 6; 4 and 2 and the average size of a dissected old forest patch would decrease respectively (Table 3-28); Alternatives 1, 3, and 6 have the same amount of old forest patches impacted. This can be seen in Table 3-29 which shows that fragmentation effects increase incrementally from Alternative 5, 6, 3 & 1, 4 and 2 from 7.5% to 9% of Old Forest Land Allocation within the analysis area with the addition of authorized trails. Alternative 5 results in the least amount of Old Forest Land Allocation fragmented and is therefore likely to provide greater habitat connectivity for fisher. IRAs and adjacent wilderness areas may become increasingly important as the cumulative effect of recreation and fuels treatment activities expand within other portions of fisher habitat.

Human-caused disturbance would also be related to dispersed camping and motor vehicle use areas. Motor vehicle use areas to dispersed recreation sites are highest in Alternative 2 and progressively decreases in Alternatives 4, 1 & 3, 6 and 5. Human-caused disturbance and mortality risks would be expected to correspondingly decrease between these alternatives.

Over-the-Snow Travel. Effects of management of over-the-snow travel under the project alternatives are the same as those for marten.

Snag and Down Log Reduction. Fisher habitat occurs in the same vegetation types mapped for the California spotted owl and northern goshawk, and, as described for spotted owls and goshawks, the quality of fisher habitat would be reduced in proximity to authorized trails due to hazard tree snag reduction, wood cutting, and edge effects to habitat. Changes in fisher habitat use adjacent to roads and trails have not been studied, but it is likely that, similar to marten, routes may displace fisher or result in habitat avoidance for distances far greater than 60 meters. At minimum, habitat modification effects such as reduced snags and downed logs are likely to extend a distance of 60 meters from routes, affecting habitat quality as described for the California spotted owl or northern goshawk, and shown in Table 3-28.

Table 3-30: Comparison of alternatives of the proposed Rubicon easement on fisher habitat that occurs within 60 meters.

Analysis Area ^{1,4}	Acres of Vegetation ³	Percent of Fisher Habitat ²					
		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Habitat on NFS	342	152 (1.5 ac High Quality)	158 (2.3 ac High Quality)	152	166	148 (2.0 ac High Quality)	152
Habitat on All Lands*	456	205 (7 ac High Quality)	210 (7 ac High Quality)	205	219	192 (7 ac High Quality)	205
Snag Removal-Rubicon Trail on NFS	291	151 (1 ac High Quality)	-	151	151	147 (1 ac High Quality)	151
Snag Removal-Rubicon Trail on All Lands	404	204 (7 ac High Quality)	-	204	204	191 (7 ac High Quality)	204
¹ Includes habitat on all lands occurring within the National Forest boundary ² No Denning located with 60m of Trails. ³ Acres of Vegetation include all vegetation within 60m of all existing trails. ⁴ Total habitat within the analysis area is 4,620 (FS) and 5,905 (all lands) acres.							

About 3% of suitable fisher habitat out of 4,620 acres on forest service lands would have a reduced quality of habitat from snag and downed log reduction along the Rubicon Trail from Alternative 1, 3, 4, 6, and 5. Eight to nine acres of High Quality habitat would be impacted by snag or downed log reduction from wood cutting in all action alternatives; 3% of high quality habitat in the analysis area. Alternative 2 with no maintenance would have little habitat reduction from current condition as snag loss is not occurring and downed log reduction would continue from wood cutting. Any displacement that may occur due to disturbance within the 60m zone would also result in impacts to 3% of suitable and high quality fisher habitat.

Water Quality: Alternative 1 should increase water quality for wildlife by decreasing the amount of vehicle and human contaminants as well as sediment being transported to water resources. Thus overall, the proposed action should reduce contaminant flow into water resources and increase water quality for fisher. If individuals are being impacted by this poor water quality, the proposed action would help reduce this impact and habitat quality should improve.

Water quality for fisher use would improve in all action alternatives with the greatest improvement under Alternatives 3, 5, and 6 due to the greatest reductions in sediment, chemicals and human waste into water sources. Alternative 2 will have the most contamination impacts to fisher since no mitigations are occurring.

Cumulative Effects

The project file provides a list and description of past, present, and reasonably foreseeable projects on the Eldorado National Forest and on private lands within the forest boundary. On the Eldorado National Forest past timber harvest and more recent hazardous fuels reduction projects have reduced large trees, canopy cover, structural complexity and coarse woody material within treated units. Within the last 10 years (2001-2011), only 441 acres of fuels or timber treatments have occurred in fisher habitat within the analysis area (1.5 miles); 229 acres of these are on private lands. Only 15 acres of High Quality habitat was treated; all on Forest Service lands. These fuels reduction treatments have reduced habitat quality for fisher and potentially affected the size and connectivity of patches of high quality habitat. No fuels treatments are likely to occur in the next few years based upon the projects listed in the Eldorado National Forest Schedule of Proposed Actions. Over time, fuels treatments are expected to alter 20 to 30 percent of the landscape, with a resulting expectation that the amount of habitat burned by stand replacing wildfires will decline in response to these treatments (USDA Forest Service 2004).

Forest thinning projects will occur on an estimated 5,000 acres per year, based upon the acreage treated in the last 10 years. Although these treatments will degrade habitat, it is anticipated that, over time, the amount of habitat removed in stand replacing wildfires will be reduced as a result of these treatments (USDA Forest Service 2004). No fuels projects are planned for the analysis area within the foreseeable future. The California Department of Forestry and Fire Protection does not currently list any timber harvest plans for the analysis area. Timber harvest on private lands is generally more intensive and does not typically maintain habitat suitability for fisher.

Future hazard tree removal projects will decrease snags and downed logs on 9.5 acres of habitat within the analysis area. Combined with proposed snag removal, Alternative 4 would cumulatively have 175 acres of reduced quality habitat for fisher. This is 3% of suitable habitat available in the analysis area. This minimal amount of habitat degraded should not have significant cumulative effects of fisher use of habitat in the analysis area.

Much of the fisher's historical habitat and range have been lost and habitat continues to be threatened with further loss (USFWS 2004). In addressing the effects of roads upon fisher, the U.S. Fish and Wildlife Service concluded that

road-related effects on low density carnivores like fishers “are more severe than most other wildlife species due to their large home ranges, relatively low fecundity, and low natural population density.” Recreation use has increased and is expected to continue to increase on the ENF (Lipton, 2007), resulting in greater likelihood and magnitude of human disturbance to wildlife. OHV use has been increasing at an even more rapid pace than other forms of recreation, based upon State figures for OHV sales. Levels of OHV use of the Rubicon Trail are not expected to increase (Gaynor, 2011), but human use from hiking, biking, skiing, snowshoeing, and camping may. If fisher were to re-colonize or to be reintroduced on the ENF, Action alternatives would not contribute to these past, current and future adverse conditions by limiting displacement from noise and human activity, limiting fragmentation of habitat, and increasing water quality in the area. While less than the existing condition, Action alternatives would continue to create noise and human activity disturbance and fragmentation of habitat. Alternative 5 would contribute the least with Alternatives 6, 1 & 3, 4, 2 contributing incrementally more negative impacts. Alternative 2 would continue with the existing condition.

In 2004, the U.S. Fish and Wildlife Service determined that listing of the West Coast population of the fisher was warranted and identified the following primary threats from activities on NFS lands: 1) loss and fragmentation of habitat due to timber harvest and hazardous fuels reduction, 2) increased predation resulting from canopy cover reductions, 3) mortality from vehicle collisions, and 4) increased human disturbance (USDI Fish and Wildlife Service 2004). Direct and indirect effects of the project alternatives, as described in the previous section, cumulatively contribute to each of the risk factors identified for fisher (Alternative 2 to the greatest extent and Alternative 5 to the least extent). These Alternatives do not result in a loss of habitat, but may influence fisher habitat use within the analysis area. Alternatives 4, 1, 3, 6, and 5 would result in similar, but progressively lower impacts from disturbance and contaminants. This influence, combined with other recreational uses, annual recreational events, fuels treatment and livestock grazing effects upon fisher habitat, affect the quality of fisher habitat within the analysis area. Since fisher are currently considered absent from the Central Sierra Nevada, no individuals are presently being impacted within the analysis from current disturbance and contamination conditions. Therefore, it is unlikely that any fisher individuals would be negatively impacted from the project. If fisher were reintroduced, habitat suitability is low due to little breeding habitat and they would likely not occupy the area. While all action alternatives decrease the amount of disturbance and contamination impact from the current existing condition, present and future use of the area as an reintroduction site is unlikely with any of the Action alternatives except Alternative 5, because of the cumulatively high levels of human disturbance and the proposed authorized use of trails. Alternative 5 has the least impact on fisher and old forest habitat, benefits

habitat connectivity by authorizing the least amount of routes within IRAs, and does not authorize motor vehicle use areas.

There is a high degree of uncertainty about future route proliferation and associated cumulative impacts upon fisher habitat in the analysis area under Alternative 2. Alternative 2 will continue to contribute negatively to the adverse cumulative effects upon fisher habitat, and Alternatives 4, 1, 3, 6, and 5 results in similar, but progressively lower impacts. All Alternatives are unlikely to impact fisher reproductive individuals as habitat around the Rubicon is likely incapable of being occupied as described above due to high amounts of disturbance and low amounts of denning habitat, and thus not impact populations.

Determination

Project alternatives may affect habitat but are not likely to result in a trend toward Federal listing or loss of viability on the Forest for the Pacific fisher.

This determination is based upon the following factors:

Assuming fisher no longer occupy habitat within the analysis area, effects of the project alternatives will not result in a trend toward Federal listing for the species

Habitat suitability is already low as there is no denning habitat within zone of influence and minimal denning habitat within the 1.5 mile analysis area. It is unlikely fisher would occupy this area if reintroduced.

Foraging habitat would not be degraded by any Alternatives.

Wolverine

Direct and Indirect Effects – All Alternatives

Analysis area is 1.5 miles from the proposed project Alternatives (Terrestrial Wildlife Biological Evaluation: Appendix A).

The trail easement and resource improvement projects, as described in the project alternatives, has the potential to directly and/or indirectly affect California wolverine in the following ways:

Human-Caused Mortality. Limitations on body-gripping traps in California and slow moving vehicles on the Rubicon and proposed authorized trails make trapping or collisions on designated routes unlikely sources of mortality on the Eldorado National Forest.

Disturbance at Natal Dens. Locations of wolverine natal dens, or whether they exist on the Eldorado National Forest, are unknown, but such sites would most likely occur on talus slopes or rocky areas in deep snow above treeline (Banci 1994, USDA Forest Service 2001). Since the Rubicon Trail runs through areas of high amounts of granite slab and rock, these areas could hold potential natal den site habitat. However, since the area currently has high motorized use and high amounts of recreation disturbance, it is unlikely that wolverine would be currently using natal dens in the area.

Habitat Modification and Displacement or Avoidance. Human access is suspected of being a primary factor affecting use of habitat by wolverine (Banci 1994, May et al. 2006). Wolverines appear not to tolerate human presence and activity within habitats. May et al. (2006) found that the presence of human development formed a more important factor in home range selection than did vegetation or habitat type. On the Eldorado National Forest, subalpine and alpine areas provide some of the only large areas with low human development or activity. Unlimited access and recreation use in these areas is therefore likely to have the greatest impact on wolverine. The area surrounding the Rubicon Trail currently has high amounts of recreation use and is likely not suitable for wolverine use under the existing condition.

Primary prey items include small mammals. Water quality improvement through Alternative 1 may increase abundance of some prey species in the analysis area and thus improve some foraging habitat. Improved water quality would also reduce the amount of toxicity or pathogen levels in prey items. However, since only a few areas within the analysis area are considered of concern, and wolverine home ranges and foraging areas are large (1.5 mile radius) and it is unlikely that wolverines would eat enough contaminated prey items to prove fatal or have sub-lethal effects. No effects have been seen currently in the bald eagle pair at Loon Lake which feed primarily on aquatic species and should be more impacted than another raptor eating rodents or birds. Therefore, improvement in water quality should have at most positive effects to any wolverines that might utilize the area.

Water Quality. Effects to water quality are the same as those described for fisher.

Comparison of Alternatives

Habitat Modification and Displacement or Avoidance. Since wolverine display a strong preference for areas remote from human development or activity, the proportion of NFS land, and the road densities of the Old Forest Emphasis Area, provides a useful measure of relative benefits of the Alternatives for wolverine (Table 3-28 and Table 3-29).

The existing environment substantially influences wolverine habitat. Remote alpine and subalpine areas such as where the Rubicon Trail run through are the most likely to be occupied by wolverine on the ENF. Alternative 2 results in the most road densities in the analysis area and Old Forest land allocation with Alternative 2 having 2.05 sq. miles of trails in the analysis area and 2.07 sq. miles in Old Forest Land Allocation. Alternatives 4; 1, 3, and 6; and 5 result in progressively less area with high road densities from 2.05 to 1.94 sq. miles within the analysis area and 2.07 to 1.94 sq. miles in Old Forest Land Allocation. Alternative 5 has the least impact on wolverine with the only alternative in the analysis area to have a route density below two miles per square mile; 2 miles per square mile is required for suitable habitat. It also benefits habitat connectivity by authorizing the least amount of routes within IRAs and not authorizing motor vehicle use areas limits human presence and having a seasonal operating period benefits winter use of the area. The IRAs maintain the connectivity and effectiveness of habitat for wolverine the best under Alternative 5. As seen Tables 3-28 and 3-29, the density of routes are highest in Alternatives 2 and Modified 4, and progressively less in Alternatives 1, 3, and 6; and 5. The greater amount of motorized access that is provided to high country portions of the Forest will increase human presence and lower the likelihood for habitat to be occupied by wolverine.

Access to Dispersed Recreation Sites and Over-the-Snow travel. Access to dispersed recreation sites and over-the-snow travel under the project alternatives are the same as those described for marten.

Water Quality. Water quality impacts are the same as those described for fisher.

Cumulative Effects

When completing its status review of the Pacific fisher, the USFWS concluded that road-related effects on low density carnivores like fishers “are more severe than most other wildlife species due to their large home ranges, relatively low fecundity, and low natural population density.” These same concerns would appear to be applicable to the wolverine.

Assuming that the wolverine’s current range on the ENF is limited to all but the most minimally developed and roaded areas, land management activities other than human recreation are generally not affecting wolverine habitat. The Forest Service (2001a) described human presence and high country activity, including snowmobile use, backcountry hiking, and high country motorized use, as being the most substantial factors potentially limiting the recovery of wolverine. In addition, the effect of motorized routes or vehicles upon wolverine populations and habitats has been identified as a significant risk factor for the species (USDA Forest Service 2001). Along with this is the uncertainty concerning the

potential for wolverine persistence in the Sierra Nevada (Banci et al. 1984) due to existing human settlement and dispersal barriers, such as major highways. Thus, IRAs and adjacent wilderness areas may become increasingly important as the cumulative effect of recreation and fuels treatment activities expand within other portions of wolverine habitat. And the least fragmented areas from OHV roads and trails would be important to wolverine use.

Direct and indirect effects of the project alternatives, as described in the previous section, cumulatively contribute to each of the threat factors identified for wolverine (Alternative 2 to the greatest extent and Alternative 5 to the least extent). These Alternatives do not result in a loss of habitat, but may influence wolverine habitat use within the analysis area. The area surrounding the Rubicon Trail currently has high amounts of recreation use and is likely not currently suitable for wolverine use. All Action alternatives authorize trails, limit resource damage and disturbance, and limit route proliferation in the backcountry which should increase suitability of habitat for wolverine. Alternatives 4, 1, 3, 6, and 5 result in similar, but progressively lesser impacts from disturbance and contaminants as compared to Alternative 2. While all action alternatives decrease the amount of disturbance and contamination impact from the current existing condition, present and future use of the area is unlikely with any of the Action alternatives except Alternative 5, because of the cumulatively high levels of human disturbance and the proposed authorized use of trails. Alternative 5 contributes the most toward improved conditions for this species since larger areas would remain without motorized traffic (in particular the IRA), has the least impact on wolverine and old forest habitat, no winter access, benefits habitat connectivity, and does not authorize motor vehicle use areas. The proposed alternatives would continue the unsuitable status of the habitat in the area with Alternative 5 allowing for suitable habitat.

There is a high degree of uncertainty about future route proliferation and associated cumulative impacts upon wolverine habitat in the analysis area under Alternative 2. Alternative 2 will continue to contribute negatively to the adverse cumulative effects upon wolverine habitat, and Alternatives 4, 1, 3, 6, and 5 result in similar, but progressively lesser impacts. However, all Alternatives are unlikely to impact wolverine populations on the Forest because of the small amount of habitat being impacted. Studies indicate that home ranges in North America may vary from less than 38.6 square miles to over 347.5 square miles (Appendix A). Therefore, any impacts of disturbance or water quality should have little impact on such a large home range. For these reasons, the action alternatives are not likely to result in a trend toward Federal listing or loss of viability for the wolverine.

Determination

Project alternatives may affect individuals but are not likely to result in a trend toward Federal listing or loss of viability on the Forest for the wolverine.

This determination is based upon the following factors:

The Action alternatives do not contribute further to threats beyond the impacts that are already associated with current recreational use of the area, population growth and human developments surrounding the ENF.

All action alternatives reduce contamination, limit resource damage and disturbance, and limit route proliferation in the backcountry.

- Denning and foraging habitat should not be degraded from current condition by project alternatives.

The amount of habitat impacted is a small portion of the wolverine home range.

Sierra Nevada Red Fox

Direct and Indirect Effects – All Alternatives

The home range analysis area for the red fox is 1.5 miles (Terrestrial Wildlife Biological Evaluation: Appendix A).

The trail easement and resource improvement projects, as described in the project alternatives, has the potential to directly and/or indirectly affect Sierra Nevada red fox in the following ways:

Human caused-mortality. Trapping and effects from collisions have been addressed for other forest carnivores, and, for the same reasons discussed for the marten, fisher, and wolverine, these factors are unlikely to be a source of mortality associated with this project for the Sierra Nevada red fox.

Disturbance at a Specific Site. No known den sites exists within 1.5 miles of any of the project Alternatives. Since no dens are currently known within this buffer, no direct or indirect impacts would occur to known individuals.

Displacement or Avoidance. Sierra Nevada red fox are thought to be highly sensitive to human intrusion (Grinnell 1937), and, like wolverine are suspected of having been negatively affected by the rise in popularity of winter recreation. The species has probably always been scarce and studies determining the influence of motorized routes have not been conducted. It is suspected, however, that Sierra Nevada red fox are more sensitive to human disturbances than are marten (USDA Forest Service, 2001). However, nothing is known of how Sierra Nevada red foxes respond to increased human presence or

disturbance (Perrine, Campbell, & Greene, 2010). Marten were found to reduce their activity in areas within 300 feet of roads (Robitaille and Aubry 2000). Therefore, habitat within 300 feet or greater of current trails is likely currently unsuitable.

Habitat Modification. Knowledge of habitat requirements of Sierra Nevada red fox is limited, but available literature indicates that the species may be even more strongly associated with and dependent upon meadow habitats than the American marten. Increased concentration of human use in meadows (resulting from motorized access), may affect Sierra Nevada red fox. Habitat impacts are similar to marten as described previously. Much like marten habitat described earlier, this area is probably not occupied by red fox due to low quality foraging areas as a result of high human disturbance around the trails and low amounts of meadow habitat. Meadow areas provide important foraging habitat for Sierra Nevada red fox and increased human presence in meadows has been identified as a potential risk factor for the species (USDA Forest Service 2001). Impacts to meadow habitat are the same for Sierra Nevada red fox as for marten.

Impacts to prey species from project alternatives is the same as for marten, fisher and wolverine.

Water Quality. Impacts to water quality from project alternatives are the same as for marten, fisher and wolverine.

Comparison of Alternatives

Disturbance at a Specific Site. If unknown Sierra Nevada red foxes are present currently or in the future, the Action alternatives would limit use in the area surrounding the Rubicon Trail and any disturbance occurring that might impact Sierra Nevada red fox reproduction or denning habitat quality would likely be reduced. Disturbance from proposed improvement activities might disturb denning if Sierra Nevada red fox were denning close to project activities.

Displacement and Avoidance. Since Sierra Nevada red fox are thought to select areas that are remote from human development or activity, the proportion of National Forest land and the proportion of Old Forest emphasis area with zero route density provides a measure of relative effects of the Alternatives upon the Sierra Nevada red fox (Table 3-28 and Table 3-29). Direct and indirect effects of the project Alternatives are essentially the same as described for the wolverine and marten.

Habitat Modification. None of the potential meadow sites will have authorized trails running through it in any project Alternatives. However, currently some unauthorized riding is occurring within the Gerle Creek meadow and some trails have required rehabilitation. Alternative 2 would have no maintenance

performed to remove these trails. All other Action alternatives would remove these trails by blocking access to them. Direct and indirect effects of the project Alternatives are essentially the same as described for the marten.

Water Quality: Alternative 1 should increase water quality for wildlife by decreasing the amount of vehicle and human contaminants as well as sediment being transported to water resources. Thus overall, the proposed action should reduce contaminant flow into water resources and increase water quality for Sierra Nevada red fox. If individuals are being impacted by this poor water quality, the proposed action would help reduce this impact and habitat quality should improve.

Water quality for Sierra Nevada red fox use will improve in all action alternatives with the greatest improvement under Alternatives 3, 6, and 5 due to the greatest reductions in sediment, chemicals and human waste into water sources. Alternative 2 will have the most contamination impacts to Sierra Nevada red fox since no mitigations are occurring.

Cumulative Effects

The Sierra Nevada red fox is currently considered “extremely endangered” and its population size, extent, and trend are unknown (CDFG 1996). Cumulative effects are similar to those described for the wolverine. The EIS for the Sierra Nevada Forest Plan Amendment (USDA Forest Service 2001) concluded that, based upon historic descriptions of habitat and behavior, any actions taken to minimize new and open roads, to limit human encroachment into the higher elevations, and to improve conditions of high elevations meadows will likely benefit the Sierra Nevada red fox.

The Sierra Nevada Red Fox Conservation Assessment (Perrine et al. 2010) identifies six threats to the Sierra Nevada red fox: 1) expansion of non-native lowland red foxes or coyotes into high elevation areas, 2) development and recreation increase 3) Habituation and begging habits may increase risk of mortality at roads, campgrounds, etc., 4) fish poisoning disease mediated by stocking infected fish for recreational fisheries, 5) contact with rodenticides, and 6) climate change. All project Alternatives would contribute to the threat of development and recreation on Sierra Nevada red fox populations to varying degrees described above.

Direct and indirect effects of the Project Alternatives, as described in the previous section, cumulatively contribute to each of the risk factors identified for Sierra Nevada red fox (Alternative 2 to the greatest extent and Alternative 5 to the least extent). All Alternatives contribute cumulatively to the disturbance associated with habitat alteration from fuels treatments, recreation use and habitat alteration from livestock grazing in meadows. These Alternatives do not result in a loss of habitat, but may influence Sierra Nevada red fox habitat use

within the analysis area, depending upon the alternative selected. Alternatives 4, 1 & 3, 6, and 5 result in similar, but progressively lesser impacts from disturbance and contaminants. Alternatives 5 and 6 are the best alternatives for Sierra Nevada red fox habitat quality, although, Alternative 6 has more trails and disturbance than Alternative 5.

Alternative 5 has the least impact on Sierra Nevada red fox and old forest habitat, benefits habitat connectivity by authorizing the least amount of routes within IRAs, and does not authorize motor vehicle use areas. This influence, combined with other recreational uses, annual recreational events, fuels treatment and livestock grazing effects upon Sierra Nevada red fox habitat, affects a substantial portion of habitat within the analysis area. As stated previously, the current impacts to habitat have probably already resulted in displacement of Sierra Nevada red fox from the zone of influence around the Trail. Therefore, it is unlikely that any Sierra Nevada red fox would be negatively impacted from the project and all action alternatives decrease the amount of impact from the current existing condition. IRAs and adjacent wilderness areas may become increasingly important as the cumulative effect of recreation and fuels treatment activities expand within other portions of marten habitat.

There is a high degree of uncertainty about future route proliferation and associated cumulative impacts upon Sierra Nevada red fox under Alternative 2. Alternative 2 will continue to contribute negatively to the adverse cumulative effects upon habitat and populations to the greatest extent, and Alternatives 4, 1, 3, 6, and 5 result in similar, but progressively lesser impacts. However, all Alternatives are unlikely to impact Sierra Nevada red fox populations on the Forest because it is unlikely that they will impact individuals as described above.

Determination

Project Alternatives may affect individuals but are not likely to result in a trend toward Federal listing or loss of viability on the Forest for Sierra Nevada red fox.

This determination is based upon the following factors:

- There is insufficient knowledge of the status of and threats to, Sierra Nevada red fox to determine that use of motorized routes or associated human access is a factor influencing populations.
- All Action alternatives reduce contamination, limit resource damage and disturbance, and limit route proliferation in the backcountry.
- Denning and foraging habitat should not be degraded from current condition by project alternatives

- It is assumed that Sierra Nevada red fox no longer occupy the area directly around the Rubicon Trail due to current levels of disturbance.

Snags in Green Forest Ecosystem Component - Hairy Woodpecker

Direct and Indirect Effects – All Alternatives

Direct and Indirect Effects to Habitat. Snag reduction occurs as an indirect effect of managing the trails, bridges, stockpiles, motor vehicle use areas and facilities along the Rubicon Trail. Trees posing a potential safety hazard (“hazard trees”) would be removed within about 60 meters of any of these areas. This safety policy results in a reduction in snags within a zone of about 60 meters from the edge of all authorized trails, bridges, stockpiles, motor vehicle use areas and facilities along the Rubicon Trail. In addition, proposed log barriers may need to remove snags nearby for use. This may reduce potential habitat and foraging sites for hairy woodpeckers.

To compare the effects of project Alternatives upon snag availability, the proportion of forested habitat (trees larger than 12 inches dbh) occurring within 60 meters of the main Trail and the authorized trails of different alternatives is evaluated. All Action Alternative activities such as bridge installation, facilities, and motor vehicle use areas are comparable in this analysis despite different numbers between alternatives since they are all along the main Trail. Therefore, a 60 meter buffer along the main Trail and the authorized trails of different alternatives gives the amount of snag habitat impacted by all activities within each action Alternative.

Alternatives 1, 3, 4, and 6 have similar proportions of snag habitat (217 acres) that would be influenced by authorized trails and proposed activities (Table 3-31). Alternative 5 has the least amount of forest snag habitat that would be impacted, 13 acres less than the other action alternatives. The differences between these alternatives are negligible on a landscape basis. These Alternatives have a relatively low level of influence on total amounts of habitat for snag-associated species like the hairy woodpecker. They represent 3-4% of all available snag habitat within the analysis area of 1.5 miles. Any direct impacts to lowering snag habitat within the analysis area are minimal. Alternative 2 would have the least impact of all alternatives as it would have few snags removed because little if any road maintenance would occur.

Table 3-31: Acres of hairy woodpecker habitat occurring within 60 meters of project alternatives.

Analysis Area	Acres of Habitat **	Snag Habitat					
		Alt 1	Alt 2	Mod 3	Alt 4	Alt 5	Alt 6
Habitat on NFS	4,849	157	157	157	157	153	157
Habitat on All Lands*	6,190	217	217	217	217	204	217

*Includes habitat on all lands occurring within the National Forest boundary.

**Total habitat (CWHR 4&5 Size Class) within a 1.5 mile radius

Current snag levels are unknown from the immediate area, therefore, Forest Inventory Assessment (FIA) data will be used to judge current snag levels. A percentage of Forest Inventory Assessment (FIA) plots are measured annually and these plots provide data on snag abundance. Data collected from plots measured between 1998 and 2004 showed snag numbers varying across different vegetation types (Table 3-32).

The Sierra Nevada Forest Plan Amendment (SNFPA) provides the following general guidelines for snag retention, indicating that retention levels within individual projects must “sustain a continuous supply of snags and live decadent trees across the landscape, avoiding uniformity across large areas.” (USDA Forest Service 2004).

- Westside mixed conifer and ponderosa pine types –four of the largest snags per acre
- Red fir forest types- six of the largest snags per acre
- Westside hardwood ecosystems – four of the largest snags (hardwood or conifer) per acre.

Table 3 of the SNFPA indicates that LRMP guidelines for snags were being exceeded within the white fir, mixed conifer, and red fir types. Snag numbers were slightly below recommended retention levels in the ponderosa pine type.

Table 3-32: Average number of snags per acre within FIA plots (1998-2004).

Stratum	Diameter Class		
	15"-29.9"	30"+	Total
Sub alpine (3P)	1.23	0.62	1.85
White Fir (3N)	6.72	1.74	8.46
Lodgepole pine (3N)	1.07	0.80	1.87
Mixed Conifer (3N)	4.82	1.64	6.46
Ponderosa Pine(3N)	2.26	0.81	3.07
Red Fir (3P)	4.28	2.37	6.65

Most of the project area is Sierra Mixed Conifer and Red Fir. Therefore, lowering snag density in habitat within the analysis area should not reduce snag densities within below the LRMP guidance.

Cumulative Effects to Habitat in the Analysis Area. The cumulative effects analysis area is the project area and contains 6,190 acres of green snag habitat. Actions in the past in the analysis areas include timber harvest (including clear cuts, fuels reduction harvests, fuels reduction and understory thinning, salvage, oak reduction), reforestation, pre-commercial thinning in plantations, roadside hazard tree removal, recreation use, grazing, and wildland fires. Salvage logging and hazard tree removal directly reduce snag densities by removing dead and dying trees, while thinning and other types of timber harvest remove trees and reduce competition that drives snag creation. Large stand-replacing fires in the area and in the project area created a large pulse in snags immediately after the fire, but now these areas are deficient in medium and large snags. Past fuels and timber projects have impacted 461 acres of green snag habitat (Table 3-33). Fuels projects do not remove snags and would not impact number of snags per acre. However, non-forest timber projects do remove snags and would reduce the number of snags per acre in green snag habitat. Only 231 acres of timber projects negatively impacted snags in the past within the analysis area. Future hazard tree projects would impact 9.5 acres of green snag habitat. Combined, these past 231 acres, present 217 acres and future 9.5 acres, would result in approximately 458 acres of green snag habitat that will have been cumulatively impacted by Alternatives 1, 3 and 4. 445 acres would be impacted by Alternative 5. Of 6,190 acres of green snag habitat in the analysis area, 7% of habitat will have been impacted by snag removal for all Action alternatives. This leaves 93% of green snag habitat within the analysis area available for hairy woodpecker for all Action alternatives.

Table 3-33: Past projects within the analysis area.

Habitat	NON FOREST SERVICE	USDA FOREST SERVICE	Grand Total
4	231	226	457
D	1	10	11
M	211	214	425
P	20	1	21
5		5	5
D		5	5
Grand Total	231	230	461

Cumulative Effects Conclusion: Overall the Rubicon Trail Easement and Resource Improvement project increases snag levels, reducing the level of snag deficiency across the project area, and when combined with past and future projects, the project Action alternatives are expected to reduce snag habitat by 445 to 458 acres in 6,190 acres in green forest; 7% of green snag habitat in the analysis area.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Hairy Woodpecker Trend. The reduction in snag levels in the Rubicon Trail Easement and Resource Improvement project would not contribute to the increasing trend of snag levels in mixed conifer and red fir habitat. Reduction in snag levels for the hairy woodpecker on less than 1% of its range in the Sierra Nevada bioregion would not lead to a change in the distribution of hairy woodpecker across the Sierra Nevada bioregion.

Migratory Birds

A review of the literature shows that a number of forest bird species, such as the brown creeper and hermit thrush, are sensitive to human intrusion. These species are typically affected by the following road and trail-associated factors: Displacement or avoidance, snag reduction, habitat loss or fragmentation, edge effects, and routes for competitors or predators (Gaines et al. 2003).

Direct and Indirect Effects

Displacement or Avoidance. Human intrusion can be a serious problem for birds because it can cause displacement, prevent access to resources, and reduce reproduction and survival (Gutzwiller et al. 1998). Van der Zande et al. (1984 and 1980) found that the density of woodland bird species declined as recreation intensity increased, and that increases in traffic intensity had a larger disturbance effect where traffic intensity is low than where traffic intensity is high. Foppen and Reijnen (1994) found that motorized trails reduced forest bird reproduction within a distance of 200 meters from main

trails. Van der Zande (1980) documented lower numbers of field nesting birds within a distance of 450 meters from a low use road.

Habitat Loss and Fragmentation, Edge Effects, Route for Predators. Many forest bird species require a relatively closed canopy and a complex forest structure, including an abundance of trees of different age-classes as well as dead, dying, and downed trees (CalPIF 2002). Trails result in forest fragmentation by dividing large landscape patches into smaller patches, thereby decreasing the amount of interior forest habitat and increasing the amount of edge habitat. Interior forest bird species, such as brown creepers and hermit thrushes, are often sensitive to changes in canopy closure and habitat fragmentation (Keller and Anderson 1992, Rosenberg et al. 1999) such as could result from road networks. Miller et al. (1998) found that several forest bird species increased in abundance with increasing distance from trails. Hutto (1995) found that brown creepers were twice as likely to occur in habitats that were more than 100 m from a road.

Trails that bisect forest habitats create habitat edges which may often facilitate nest parasitism or predation. Miller et al. (1998) found that in forest ecosystems bird species composition was altered adjacent to trails, and that nest survival increased as distance from trails increased. Paton (1994) reviewed studies on the influence of edge habitat on nest predation and found that the majority of studies showed elevated levels of predation near habitat edges.

Snag Reduction. Dead trees are important to forest birds for a variety of reasons. Many birds require large snags (red breasted nuthatches, Pileated woodpecker) or dead trees (Brown Creeper, Hairy Woodpecker) for nesting. Others require downed wood or dead trees for foraging (Pileated Woodpecker) or require the presence of very tall, dead trees in their territories for perching (Olive-sided Flycatchers). Reduction of snags and down logs is expected to occur along designated trails as a result of removing hazard trees (trees which pose a risk of falling upon a road or facility), and as a result of woodcutting by the public. In order to manage trailside hazards, few snags would be expected to be retained within an area of about 60 meters (200 feet) alongside proposed Rubicon easement routes. Habitat quality within these trailside corridors would be reduced for cavity-dependent bird species associated with mature forest habitat. This may, however, be incidental to the displacement and avoidance factors that appear to influence some species' use of habitat within a distance greater than 60 meters from the proposed Rubicon easement routes.

Water Quality Birds species may require free standing water for drinking at certain times of the year. Birds which area roosting or nesting near contaminated water could use those sources to drink. If petroleum or human waste contamination in water is high enough, sub-lethal impacts could occur to individuals since birds likely drink water near their roosting or nesting areas.

Wetland ponds like the three wetlands near Little Sluice are ideal drinking areas because there is little water movement.

Comparison of Alternatives

Displacement and Habitat Modification. Since noted decreases in bird abundance may be due to the physical presence of a trail or to the disturbance associated with motorized use, the potential effects of displacement and avoidance, habitat loss and fragmentation, edge effects, and increased predation, upon birds associated with old forest habitats, limiting trails within the analysis area would benefit bird abundance in all Action alternatives with Alternative 5 having the greatest benefit. Alternatives 4, 1 & 3, and 5 result in progressively lesser proportions of habitat that would be influenced by authorized trails and proposed activities. Alternative 2 would have the least impact of all alternatives as it would not limit trail use and associated disturbance, but little if any road maintenance or improvements would occur. Based on available literature, a “zone of influence” of 200 meters from motorized routes is used to represent the maximum area within which interior forest-associated birds are likely to be influenced by any of these factors (Gaines et al 2003). Studies indicate varying effects within this zone, and the actual degree of negative impact is likely to be quite variable depending upon site-specific factors such as vegetative cover and the frequency of road use. With a high proportion of habitat influenced, however, migratory bird species that are sensitive to disturbance and edge effects, such as the brown creeper and hermit thrush, might experience lower abundance and productivity from routine and acute disturbance of project alternatives.

Snag Reduction To compare the effects of project Alternatives upon snag availability for cavity nesting birds, the proportion of forested habitat (trees larger than 12 inches dbh) occurring within 60 meters of the main Trail and the authorized trails of different alternatives is evaluated within the analysis area. All Action Alternative activities such as bridge installation, facilities, and motor vehicle use areas are comparable in this analysis despite different numbers between alternatives since they are all along the main Trail. Therefore, a 60 meter buffer along the main Trail and the authorized trails of different alternatives gives the amount of snag habitat impacted by all activities within each action Alternative.

Alternatives 1, 3, 4, and 6 have similar proportions of snag habitat (217 acres) that would be influenced by authorized trails and proposed activities (Table 3-34). Alternative 5 has the least amount of forest snag habitat that would be impacted, 13 acres less than the other action alternatives. The differences between these alternatives are negligible on a landscape basis. These Alternatives have a relatively low level of influence on total amounts of habitat for snag-associated species like the hairy woodpecker. They represent 3-4% of

all available snag habitat within the analysis area of 1.5 miles. Any direct impacts to lowering snag habitat within the analysis area are minimal. Alternative 2 would have the least impact of all alternatives as it would have few snags removed because little if any road maintenance would occur.

Table 3-34: Acres of snag habitat occurring within 60 meters of project alternatives.

Analysis Area	Acres of Habitat **	Snag Habitat					
		Alt 1	Alt 2	Mod 3	Alt 4	Alt 5	Alt 6
Habitat on NFS	4,849	157	157	157	157	153	157
Habitat on All Lands*	6,190	217	217	217	217	204	217

*Includes habitat on all lands occurring within the National Forest boundary.

Water Quality. Water quality for migratory bird use and habitat quality will improve in all Action alternatives as described in the General Effects section. Alternatives 3 and 5 would have the greatest improvements in water quality due to the greatest reductions in sediment, chemicals and human waste into water sources. Alternative 4 having the least impact of all Action alternatives for water quality. Alternative 2 will have the most contamination impacts to migratory birds since no mitigations are occurring.

Cumulative Effects

The project file provides a list and description of past, present, and reasonably foreseeable projects on the Eldorado National Forest and on private lands within the forest boundary. Some, but not all of these activities will contribute to effects upon forest bird species. The coniferous forest bird conservation plan prepared by California Partners in Flight (CalPIF) identifies fire exclusion and logging as the primary threats to birds in California's coniferous forests (CalPIF 2004). Fire suppression may reduce the abundance of open forest bird species as forests close in, as well as the abundance of ground or shrub-foragers. The plan suggests that past even aged logging practices, which have homogenized forest structure and increased edge, have decreased the abundance of almost all permanent residents and half the migrant bird species in coniferous forests (Hejl 1994).

Actions in the past in the analysis areas include: timber harvest (including clear cuts, fuels reduction harvests, fuels reduction and understory thinning, salvage, oak reduction), reforestation, precommercial thinning in plantations, trailside hazard tree removal, recreation use, grazing, and wildland fires. Salvage logging and hazard tree removal directly reduce snag densities by removing dead and dying trees, while thinning and other types of timber harvest remove trees and reduce competition that drives snag creation. Large

stand-replacing fires in the area and in the project area created a large pulse in snags immediately after the fire, but now these areas are deficient in medium and large snags. Past fuels and timber projects have impacted 461 acres of snag habitat (Table 3-34). Fuels projects do not remove snags and would not impact number of snags per acre. However, non-forest timber projects do remove snags and would reduce the number of snags per acre in green snag habitat. Only 231 acres of timber projects would negatively impact snags in the past within the analysis area. Forest thinning treatments are anticipated to be the primary activity that will alter mature forest habitat on the Eldorado National Forest. These treatments will reduce canopy cover and simplify forest structure, but will maintain at least 40 percent cover and, over time, it is anticipated that they will reduce the amount of habitat burned in stand replacing wildfires (USDA Forest Service 2004). There are no future thinning projects in the area based upon the Forest's Schedule of Proposed Actions. Future hazard tree projects that would remove snags would impact 9.5 acres of snag habitat.

A percentage of Forest Inventory Assessment (FIA) plots are measured annually and these plots provide data on snag abundance. Data collected from plots measured between 1998 and 2004 showed snag numbers varying across different vegetation types (Table 3-35). The Sierra Nevada Forest Plan Amendment provides the following general guidelines for snag retention, indicating that retention levels within individual projects must "sustain a continuous supply of snags and live decadent trees across the landscape, avoiding uniformity across large areas."

- Westside mixed conifer and ponderosa pine types – four of the largest snags per acre
- Red fir forest types- six of the largest snags per acre
- Westside hardwood ecosystems – four of the largest snags (hardwood or conifer) per acre.

Table 3 of the SNFPA indicates that LRMP guidelines for snags were being exceeded within the white fir, mixed conifer, and red fir types. Snag numbers were slightly below recommended retention levels in the ponderosa pine type.

Table 3-35: Average number of snags per acre within FIA plots (1998-2004).

Stratum	Diameter Class		
	15"-29.9"	30"+	Total
Sub alpine (3P)	1.23	0.62	1.85
White Fir (3N)	6.72	1.74	8.46
Lodgepole pine (3N)	1.07	0.80	1.87
Mixed Conifer (3N)	4.82	1.64	6.46

Stratum	Diameter Class		
	15"-29.9"	30"+	Total
Ponderosa Pine(3N)	2.26	0.81	3.07
Red Fir (3P)	4.28	2.37	6.65

Based upon inventory data, LRMP guidance for snag densities on the forest are currently exceeded within the mixed conifer/white fir/red fir vegetation types which are located within the analysis area. Most of the project area is Sierra Mixed Conifer and Red Fir. Therefore, lowering snag density in 3-4% of habitat within the analysis area should not reduce snag densities within the below the LRMP guidance.

Table 3-36: Past projects within the analysis area impacting snag habitat.

Habitat	NON FOREST SERVICE	USDA FOREST SERVICE	Grand Total
4	231	226	457
D	1	10	11
M	211	214	425
P	20	1	21
5		5	5
D		5	5
Grand Total	231	230	461

Only 231 acres of timber projects negatively impacted snags in the past within the analysis area. Future hazard tree projects would impact 9.5 acres of green snag habitat. Combined, these past 231 acres, present 217 acres and future 9.5 acres would result in, approximately 458 acres of green snag habitat that will have been cumulatively impacted by Alternatives 1, 3, 4, and 6. 445 acres would be impacted by Alternative 5. Of 6,190 acres of green snag habitat in the analysis area, 7% of habitat will have been impacted by snag removal for all Action alternatives. This leaves 93% of snag habitat within the analysis area available for snag associated migratory bird species for all Action alternatives.

Summary of Impacts to Migratory Birds

In summary, since cavity nesting/roosting habitat impacted is a small proportion of the analysis area and water quality should improve with all Action alternatives, the magnitude of cumulative effects upon snags, disturbance potential, or water quality is not expected to substantially impact migratory birds within the analysis area or on the Forest. The combined effects of the Action alternatives and other activities are unlikely to result in substantial adverse effects to this species.

Alternative 2 would have the least impact of all alternatives since few if any snags would be removed due to little trail maintenance but water quality would not improve. Additionally, Alternative 2 may have sub-lethal contamination impacts to migratory birds since no mitigations are occurring. However, any sub-lethal impacts to migratory birds from Alternative 2 will only impact a small portion of the forest population. Therefore, the combined effects of this Alternative and other activities are unlikely to result in substantial adverse effects to migratory bird species.

Botanical Resources

Affected Environment

Elevations within the analysis area range from approximately 5400 to 7000 feet. The trail traverses conifer forest, chaparral, granite slabs, and meadow and riparian habitats associated with streams, lakes, and ponds.

For descriptions of forested and chaparral communities, refer to the Vegetation Mapping Technical Report for SMUD Upper American River Project (UARP), FERC Project No. 2101(SMUD, 2004b) with additional discussion for riparian areas in the Riparian Vegetation and Wetlands Technical Report, SMUD UARP (FERC Project No. 2101) and PG&E Chili Bar Project (FERC Project No. 2155) (SMUD and PG&E, 2004).

Conifer forest within the analysis area includes mixed conifer forest with co-dominant tree species to types with one dominate or two co-dominate species. Forest may be dominated by Jeffrey pine, lodgepole pine, red fir, a combination of lodgepole pine and red fir, or western juniper. Chaparral may be dominated by huckleberry oak or by a combination of shrubs that include greenleaf manzanita and huckleberry oak.

Riparian habitat dominated by mountain alder or mountain alder and willow is present along streams and around ponds. Well-developed riparian communities consisting of trees, shrubs, graminoids, and forbs are present along Ellis Creek, Little Rubicon River, and the Gerle Creek Wetland Complex. Less diverse communities are associated with ponds and support shrubs and graminoids such as *Carex vesicaria*. Aspen was present within the analysis area north of the East Wentworth Access Area. Refer to the section on Hydrology and Riparian Resources for a full description of areas discussed in the Riparian Conservation Analysis.

Jointed bedrock, also referred to as granite slabs or rock outcrop, supports a diversity of communities. Often these areas consist of inclusions of other soil types. Vegetation is present in soil accumulation in the joints and in patches of soil on top of bedrock. Depending on the depth of soil or the presence of inclusions, vegetation can vary from small forbs and ferns to shrubs or trees in deeper pockets. These areas are highly susceptible to soil loss with associated vegetation loss. Refer also to the Soils section.

The present condition of native vegetation, potential habitat for Sensitive plant taxa, and the presence of Sensitive plant occurrences are the result of a combination of natural processes and anthropogenic uses. Sensitive plant habitat on the Eldorado National Forest occurs primarily in open areas, such as meadows and dry, open sites. These habitats tend not to provide natural

barriers to or limit movement; therefore, these sites have been more easily accessed for recreational use and with vehicles. Motor vehicle use on and off established routes has affected Sensitive plant populations, both directly by damage or death to individual plants and indirectly by altering the habitat through soil displacement, devegetation, changes in hydrologic functioning. For example, the Rubicon Trail has become incised in places due to decades of use, and water, from rainfall and snowmelt events, is intercepted and transported along with sediment, thereby altering habitat. Activities such as dispersed camping also have contributed to soil loss and devegetation. These past uses are reflected in the existing affected environment.

Sensitive Plant Taxa

Habitat for 11 Sensitive plant taxa exists along the Rubicon Trail and the affected adjacent area (Table 3-35). No Federal ESA-listed plant taxa have habitat within the analysis area.

Habitat is grouped into two broad types: 1) Upland and mid slope habitat, and 2) Moist to wet habitats – meadows, wetlands, and riparian areas. Most upland and midslope habitats within the analysis area that have the potential to support sensitive species consist of dry, rocky sites where edaphic (soil or substrate) limitations affect plant growth and species composition (e.g. shallow soils on granite slabs). Moist to wet habitats include streamside zones and associated forested habitats, meadows, and riparian habitats associated with seeps, springs, and ponds.

Upland and Mid Slope Habitats

Three Sensitive plant taxa have the potential to occur on upland and mid slope habitats within the analysis area. One taxon was identified within the analysis area. Because surveys occurred outside the time when *Lewisia kelloggii* would have been evident and identifiable, presence is assumed.

Two subspecies of *Lewisia kelloggii* were added to the R5 sensitive plant list for the ENF in 2006 only after researchers separated Kellogg's lewisia and Hutchison's lewisia from populations in Idaho (Wilson et al., 2005). Nineteen occurrences are documented on NFS land within the ENF. Eight occurrences have been assigned to a subspecies (*Lewisia kelloggii* ssp. *hutchisonii*); however, the taxa for eleven occurrences have not been confirmed (ENF, 2011c).

Hutchison's lewisia (*Lewisia kelloggii* ssp. *hutchisonii*) is endemic to California and is known from the northern and possibly central Sierra Nevada (Miller and Dempster, 2011). This taxon is found in openings in upper montane conifer forest. Habitat includes decomposed granite, slate, volcanic rubble, and open conifer forest from approximately 5,900 (5,100 unverified) to 7,000 feet in elevation. Eight occurrences have been documented on NFS land within the ENF (ENF, 2011c). None have been documented within the analysis area; however, surveys occurred outside the survey window. The remaining 11

Lewisia kelloggii occurrences on NFS land within the ENF have not been assigned to a subspecies.

Kellogg's lewisia (*Lewisia kelloggii* ssp. *kelloggii*) is endemic to California and is documented in the central and southern Sierra Nevada (Miller and Dempster, 2011). The range potentially would be extended if additional accessions are verified; this taxon has been reported as far north as Plumas NF (USDA FS, 2005j). Habitat includes decomposed granite, volcanic ash, rubble, and open conifer forest from approximately 4,500 to 7,750 (10,900 unverified) feet in elevation. The specialized habitat is found on ridgetops or relatively flat open areas (i.e., granitic and volcanic balds) with widely spaced trees in partial to full sun. Most soils are reported to be sandy granitic to erosive volcanic with granitic boulders. Eleven occurrences of *Lewisia kelloggii* on NFS land within the ENF have not been assigned to a subspecies; some potentially could be *Lewisia kelloggii* ssp. *kelloggii*. No occurrences of *Lewisia kelloggii* ssp. *kelloggii* have been documented within the analysis area; however, surveys occurred outside the survey window for this taxon.

Table 3-37: Habitat potential of the Rubicon Trail Project analysis area for the Threatened, Endangered, Proposed, or Sensitive (TEPS) plant taxa known or suspected to occur on the Eldorado National Forest.

Species	Status ¹	On ENF ²	Potential Habitat	Rationale For Determination Of No Effect
Vascular Plants				
Three-bracted onion (<i>Allium tribracteatum</i>)	S	P	No	Grows on gravelly lahar (volcanic mud flow soils) in chaparral and lower & upper montane coniferous forests from approximately 4,250 to 9,850 feet. No suitable habitat exists within the analysis area.
El Dorado manzanita (<i>Arctostaphylos nissenana</i>)	S	K	No	Grows on open, rocky shale ridges in chaparral and woodland, often associated with closed-cone conifer forest, from about 1,400 to 5,400 feet.
Big-scale balsamroot (<i>Balsamorhiza macrolepis</i> var. <i>macrolepis</i>)	S	P	No	Grows on open grassy or rocky slopes and valleys, generally at or below 4,600 feet. Found on a variety of substrates that include sandstone, serpentine, or basalt outcrops.
Upswept moonwort (<i>Botrychium ascendens</i>)	S	P	Yes	Grows in moist meadows and open woodland near streams or seeps from about 4,900 to 10,500 feet.

Species	Status ¹	On ENF ²	Potential Habitat	Rationale For Determination Of No Effect
Scalloped moonwort (<i>Botrychium crenulatum</i>)	S	P	Yes	Grows in saturated hard water seeps and stream margins from approximately 4,200 to 11,800 feet in elevation.
Common moonwort (<i>Botrychium lunaria</i>)	S	P	Yes	Grows in moist meadows in subalpine and upper montane coniferous forest from approximately 6,500 to over 11,000 feet in elevation.
Mingan moonwort (<i>Botrychium minganense</i>)	S	P	Yes	Grows in meadows and open forest along streams or around seeps from approximately 4,900 to over 10,000 feet in elevation.
Mountain moonwort (<i>Botrychium montanum</i>)	S	P (K on inholding)	Yes	Grows in shady conifer woodland, especially under <i>Calocedrus</i> along streams, from approximately 4,900 feet to 7,000 feet in elevation.
Pleasant Valley mariposa lily (<i>Calochortus clavatus</i> var. <i>avius</i>)	S	K	No	Grows in openings in mixed conifer & ponderosa pine forest, usually on ridgetops and south-facing slopes from 2,500 to 5,900 feet. Grows on a variety of soils, typically with surface rocks and cobbles. No suitable habitat exists within the analysis area.
Brandegee's clarkia (Clarkia biloba ssp. brandegeae)	S	K	No	Grows in foothill woodland, often on road cutbanks, up to approximately 2,000 feet in elevation
Mountain lady's slipper (<i>Cypripedium montanum</i>)	S	P (K on inholding)	No	Grows in moist areas and upland sites in mixed evergreen or conifer forest generally from 1,300 to 5,900 feet (up to 6,250 feet). No suitable habitat exists within the analysis area.
Tahoe draba (<i>Draba asterophora</i> var. <i>asterophora</i>)	S	H	No	Restricted to rocky ledges and talus slopes in subalpine and alpine habitats above 8,200 feet.
Cup Lake draba (<i>Draba asterophora</i> var. <i>macrocarpa</i>)	S	K	No	Restricted to sandy slopes, rocky ledges, and talus slopes in subalpine and alpine habitats above 8,200 ft.

Species	Status ¹	On ENF ²	Potential Habitat	Rationale For Determination Of No Effect
Subalpine fireweed (<i>Epilobium howellii</i>)	S	K	Yes	Grows in (seasonally) wet meadows and mossy seeps above 6,400 ft., often in subalpine coniferous forest.
Tripod buckwheat (<i>Eriogonum tripodum</i>)	S	K	No	Grows on serpentine soils in foothill and cismontane woodlands below 2,600 feet. No serpentine soils or suitable habitat occur within the analysis area.
Parry's horkelia (<i>Horkelia parryi</i>)	S	K	No	Grows on stony, disturbed, slightly acidic soils in open chaparral and cismontane woodland below 3,650 feet.
Hutchison's lewisia (<i>Lewisia kelloggii</i> ssp. <i>hutchisonii</i>)	S	P	Yes	Grows on decomposed granite, slate, and volcanic rubble within openings in conifer forest from 5,900 to 7,000 feet in elevation.
Kellogg's lewisia (<i>Lewisia kelloggii</i> ssp. <i>kelloggii</i>)	S	K	Yes	Grows on decomposed granite, volcanic ash, and rubble within openings in conifer forest from about 4,500 to 7,750 feet.
Long-petaled lewisia (<i>Lewisia longipetala</i>)	S	K	No	Restricted to subalpine & alpine slopes or basins with deep snow accumulations, above 8,200 feet.
Saw-toothed lewisia (<i>Lewisia serrata</i>)	S	K	No	Restricted to steep, nearly vertical cliffs in inner gorges of perennial streams and rarely near seeps and intermittent streams. Grows between 2,800 and 4,800 feet in the American River watershed.
Yellow bur navarretia (<i>Navarretia prolifera</i> ssp. <i>lutea</i>)	S	K	No	Grows in openings in or adjacent to mixed conifer forest or cismontane woodland on rocky ridgelines, saddles, or eroding ephemeral drainages from 2,300 to 5,000 feet.
Layne's ragwort (<i>Packera layneae</i>)	S, T	K	No	Grows on rocky, gabbroic or serpentinitic soils in chaparral and cismontane woodland below 3,000 feet.
Stebbins' phacelia (<i>Phacelia stebbinsii</i>)	S	K	Present	Grows on dry, open, rocky sites (bedrock outcrops, rubble or talus) on ledges or moderate to steep slopes and on damp, mossy inner gorges from 2,900 to 6,900 feet. Plants are present.

Species	Status ¹	On ENF ²	Potential Habitat	Rationale For Determination Of No Effect
Whitebark pine (<i>Pinus albicaulis</i>)	C	K	No	Grows on often rocky, poorly developed soils in to and above timberline, generally above 7,500 feet.
Mosses and Lichens				
Bolander's bruchia (<i>Bruchia bolanderi</i>)	S	K	Yes	Grows in meadows and fens in montane and subalpine communities from about 5,500 to 9,000 feet. Grows in ephemeral habitats such as erosional ditches or small streamlets through wet meadows.
Blandow's bog-moss (<i>Helodium blandowii</i>)	S	P	Yes	Grows in wet meadows, fens, & seeps in subalpine coniferous forest & alpine lakes from 6,100 to 9,000 ft.
Three-ranked hump-moss (<i>Meesia triquetra</i>)	S	K	No	Grows in cold, permanently saturated, spring-fed fens & meadows (usually acidic) in montane to subalpine conifer forest from 4,200 to 9,700 ft.
Broad-nerved hump-moss (<i>Meesia uliginosa</i>)	S	P	No	Grows in permanently wet, primarily spring-fed meadows and fens in montane to subalpine coniferous forest from 4,200 to 9,200 feet.
Veined water lichen (<i>Peltigera hydrothyria</i>)	S	P	No	Grows on rocks in cold, unpolluted spring-fed streams without marked seasonal fluctuation. Submerged most of year. Peak flows must not scour the rocks and gravels where this species attaches. No suitable habitat exists along the proposed routes.

¹ C = Federally Listed as Candidate; S = Forest Service Sensitive; T = Federally Listed as Threatened

² H = historic record; K = known to occur on ENF; P = suspected to occur on ENF
Sources: Baldwin et al. (2012); CNPS (2012); Farrar, D.R. (2011); Haller, J.R. and J.J. Vivrette (2011); Hoch, P.C. (2011); Jepson Flora Project, 2012 (v.1.0); Kaye and Cramer (2005); Keil, D.J. (2011); McNeal, D.W. (2011); Miller, J.M. and L.T. Dempster (2011); Parker, V.T. et al. (2011); Patterson, R. et al. (2011); USDA FS (2006, 2005a through 2005l, 2004a, 2004b, 2001); USFWS (2011, 1996).

Stebbins' phacelia (*Phacelia stebbinsii*) is found only in the American River Watershed between the North and South Forks of the American River, on the ENF and the Tahoe NF, at elevations between 2,900 and 6,900 feet. Habitat for Stebbin's phacelia generally consists of dry, open, rocky areas on moderate to steep slopes, or damp, mossy inner gorges (USDA, 2004). This annual herb is found on a wide variety of soil types, with the majority of ENF occurrences found on soils derived from metasedimentary rocks. Thirty-eight occurrences

are documented within NFS land on the Georgetown and Pacific Ranger Districts of the ENF. Six occurrences were documented within the analysis area; however, surveys occurred outside the time in which identifications could be confirmed. Although senescent, plants in these occurrences resembled a nearby reference population. One occurrence within the analysis area is bisected by the Rubicon Trail and no plants occur near the Trail. It is possible that historically the occurrence was more connected and that some area no longer supports plants. A second occurrence extends from upslope of the Trail to the trail prism.

Moist to Wet Habitats – Meadows and Riparian Areas

Eight Sensitive plant taxa are known or suspected to occur within the analysis area in moist to wet habitats such as meadows, fens, seeps, springs, streamside zones, and associated riparian habitats. Three taxa are known to occur on the ENF, at least one taxon within the genus *Botrychium* is known from private inholdings within the ENF administrative boundary, and seven have yet to be identified within the ENF. The watchlist *Botrychium simplex* is documented on the ENF, including at McKinstry Meadow. A *Botrychium* taxon tentatively identified as *B. paradoxum* was recently discovered within the ENF on the Pacific Ranger District, further indicating the possibility of additional *Botrychium* species.

The five Sensitive taxa in the **moonwort complex** occur infrequently in a variety of moist habitats throughout the Sierra Nevada and other portions of the state. Moonwort species are difficult to distinguish from each other and all have similar habitat preferences (wet or moist soils such as in meadows and fens or along the edges of lakes and streams). Habitat information (CNPS, 2011; Farrar, D.R., 2011) follows (NOTE: where discrepancies in elevation range exist, the most inclusive range was used):

Upswept moonwort (*Botrychium ascendens*) grows in moist meadows and open woodland near streams and seeps from approximately 4,900 to 10,500 feet in elevation. Upswept moonwort has not been identified within the ENF.

Scalloped moonwort (*Botrychium crenulatum*) is found in saturated hard water seeps and stream margins from approximately 4,200 to 11,800 feet in elevation. Scalloped moonwort has not been identified within the ENF.

Common moonwort (*Botrychium lunaria*) is found in moist meadows in subalpine and upper montane coniferous forest from approximately 6,500 to over 11,000 feet in elevation. Common moonwort has not been identified within the ENF.

Mingan moonwort (*Botrychium minganense*) grows in meadows and open forest along streams or around seeps from approximately 4,900 to over 10,000 feet in elevation. Common moonwort has not been identified within the ENF.

Mountain moonwort (*Botrychium montanum*) grows in shady conifer woodland, especially under incense-cedar along streams, from approximately 4,900 to 7,000 feet. One moonwort that was discovered on a private land inholding was tentatively identified as mountain moonwort. It grows near a small stream at a meadow opening. This occurrence is immediately adjacent to NFS land.

Subalpine fireweed (*Epilobium howellii*) has been found throughout much of the Sierra Nevada in the last several years as surveys for it have increased. In 2007 three occurrences (five sites) were discovered on the ENF from Schneider's Cow Camp east to the headwaters of Strawberry Creek, all above 8,000 feet in elevation. In general, subalpine fireweed grows in wet meadows and mossy seeps from approximately 6,400 to over 8,800 feet (Hoch, P.C., 2011). Habitat for known occurrences on the ENF includes seasonably wet to wet sites with partial shade in upper montane and subalpine coniferous forest, one with a nearby streamlet. Two sites are described as wet meadow and seep, both with organic soils and mosses. Sites often are disturbed (e.g., wheel ruts) and lack dense competing vegetation.

Bolander's bruchia (*Bruchia bolanderi*) was added to the R5 Sensitive plant list for the ENF in 2006. One occurrence was discovered on the ENF in a fen near the headwaters for Strawberry Creek. Habitat for this moss includes meadows, fens, springs, seeps, and damp soil in montane and subalpine coniferous forests from about 5,500 to 9,250 feet. It grows in ephemeral habitats such as erosional ditches or small streamlets through wet meadows (USDA FS, 2001) and at the edges of fens. Without sporophytes, it is difficult to locate.

Blandow's bog-moss (*Helodium blandowii*) is known from the Sierra Nevada, including an area near the Lake Tahoe Basin Management Unit. It grows in wet meadows, fens, and seeps in subalpine coniferous forests and in alpine lakes from 6,100 to 9,000 feet in elevation. Blandow's bog-moss was added to the R5 Sensitive plant list for the ENF in 2006 and, to date, no occurrences are known from the ENF.

Other Botanical Resources

No Botanical Special Interest Areas or Research Natural Areas are present within the analysis area.

Watchlist Plant Taxa

No watchlist plant taxa were identified within the analysis area. Potential habitat for *Ceanothus fresnensis* (Fresno mat), *Piperia leptopetala* (lace orchid), and *Piperia colemanii* (Coleman's rein orchid) is present in upland and mid slope habitats. Potential habitat for *Bolandra californica* (Sierra bolandera), *Drosera rotundifolia* (round-leaved sundew), and *Botrychium simplex* (least moonwort) is present in moist and wet habitats.

Invasive Plant Species

No invasive plant species were identified within the analysis area (ENF, 2011b). Four invasive plant species of concern to the ENF (Priority 1 to 3) were identified at the Gerle Creek Adit quarry where El Dorado County Department of Transportation acquires material for road work on the Rubicon Trail. The species are *Bromus tectorum* (cheatgrass), *Hypericum perforatum* (Klamathweed), *Melilotus officinalis* (yellow sweetclover), and *Cirsium vulgare* (bull thistle). Refer also to the Invasive Plant subsection at the end of the Botanical Resources section.

Invasive Plant Species Present In or Near Project Area (Low Risk)

No invasive plant species have been documented within the Rubicon Trail Project analysis area (ENF, 2011a) and none were identified during the botanical survey August 9-13, 2011 (ENF, 2011b). Note: Invasive plant species such as Klamathweed (*Hypericum perforatum*), cheatgrass (*Bromus tectorum*), and yellow sweet clover (*Melilotus officinalis*) are present at the Gerle Creek Adit, the source quarry for rock used for maintenance work; refer to Table 3-38.

Table 3-38: Invasive plant species identified at the Gerle Creek Adit quarry and the road into the quarry.

Invasive Plant Species	Common Name
<i>Bromus tectorum</i>	Cheatgrass
<i>Chenopodium botrys</i>	Jerusalem-oak goosefoot
<i>Cirsium vulgare</i>	Bull thistle
<i>Hypericum perforatum</i>	Klamathweed
<i>Melilotus officinalis</i>	Yellow sweet clover
<i>Verbascum thapsus</i>	Woolly mullein

Habitat Vulnerability to Invasive Plant Species (High Vulnerability)

The Rubicon Trail Project area has a high level of previous disturbance. Vehicle use has occurred within and outside the trail prism. Recreational use such as dispersed camping has occurred at several locations along the Rubicon Trail with concentrated use at a few locations such as Ellis Creek, which has resulted in devegetation.

Soils are derived from glacial deposits, poorly drained floodplains and meadows, and fluvial deposits (CGS, 2009). Portions of the Rubicon Trail have eroded substantially and, “where the Rubicon Trail crosses soils, much of the trail surface is entrenched below the original ground surface” (CGS, 2009). Sections of incised trail have functioned as secondary channels.

Habitat within the analysis area can be open naturally or by uses and processes mentioned above. Vegetation is primarily native and varies from conifer forest to low vegetation in rock joints and on shallow soils.

Non-project Invasive Plant Vectors (Moderate to High Vulnerability)

Invasive plant vectors that currently occur along the Rubicon Trail and within the analysis area include: jeeps and other OHVs including rock crawlers, mountain bikers, other recreationists, and wildlife. Flowing water and soil movement also can vector invasive plant propagules. Trail maintenance in 2010 and 2011 included the import of rock from a quarry that has invasive plant species (refer to section 1 and Table 3-38).

Analysis Framework

The analysis area for TEPS, watchlist, and invasive plant taxa includes the Rubicon Trail identified in the El Dorado County’s easement request, variants and unauthorized routes, motor vehicle use areas beyond the easement, and a buffer of 100 feet beyond the easement and motor vehicle use areas on NFS lands. Effects are analyzed within this boundary. To make determinations regarding trend toward Federal listing for Sensitive plant taxa that would be affected by the project, all occurrences on NFS land within the ENF are considered. Effects to riparian vegetation are addressed in the Hydrology and Riparian Resources section.

Data and Analysis Methods

Data

Data used in this analysis included the results of surveys within the analysis area and existing data. Surveys were conducted August 9 to 13, 2011.

Additionally on August 6, 2011, members and staff of the California Native Plant Society participated in a Rare Plant Treasure Hunt that included the Gerle Creek wetland complex. This analysis included review of the ENF sensitive plant, watchlist plant, and invasive plant GIS layers and ENF sensitive plant files dating from 1979 to 2011. Additional GIS layers used in analyses include soils and RCAs.

To determine the potential habitat for Sensitive plant taxa that occupy upland and mid slope habitats, queries of known occupied sites (*Lewisia kelloggii* ssp. *hutchisonii*, *Lewisia kelloggii* ssp. *kelloggii*, and *Phacelia stebbinsii*) across the ENF were run to determine the soil type. The acreage of suitable habitat potentially affected by alternative was calculated by overlaying soil types that were identified from the query of occupied sites and the analysis area in each alternative. The analysis area was defined by the Rubicon Trail Easement, routes, and motor vehicle use areas with a 100-foot buffer.

RCAs were used as a proxy for potential habitat for Sensitive plant taxa that occupy wet and moist habitats because the taxa with the potential to occur on the ENF may be found in meadows, fens, seeps, springs, streamside zones, and associated riparian areas including conifer forest. The acreage of suitable habitat potentially affected by alternative was calculated by overlaying RCAs and the analysis area in each alternative. The analysis area was defined by the Rubicon Trail Easement, routes, and motor vehicle use areas with a 100-foot buffer.

Data Gaps

The survey area identified at the time of the August surveys was based on the best available information at the time and included only those variants and unauthorized routes identified by July 20, 2011. Botanical surveys included the trail prism for the Rubicon Trail (inclusive of variants and unauthorized routes), a buffer area extending 100 feet from exterior edge of both sides of the trail prism (in consideration of indirect effects), and identified project features. Since that time, additional routes have been included in the project and motor vehicle use areas that extend outside the easement have been identified. Therefore, the surveys were conducted within a smaller area than the analysis area.

Botanical surveys were conducted August 9 to 13, 2011. These dates were optimal for *Botrychium* species and acceptable for invasive plant species, but were outside the window for *Lewisia kelloggii* ssp. *kelloggii* and *Lewisia kelloggii* ssp. *hutchisonii* and at the end of the window for positive identification of *Phacelia stebbinsii*. Although surveys occurred at the optimum time for *Botrychium* species, these taxa are difficult to locate and plants do not emerge aboveground every year.

Sensitive plant or other taxa may be present but undiscovered within the analysis area because surveys did not cover the entire analysis area, surveys did not occur at the optimal time for all taxa, or plants were not evident in a given year. The ENF has no history of projects for which botanical surveys would have been conducted within the analysis area.

The ENF soil survey mapping was used for the analysis (USDA FS, 1985). Soils were mapped to a low-intensity, Order 4 level and map units consist of geographically associated soils that may be very different in their characteristics. Using this coarse mapping may overestimate the area of potential habitat for Sensitive plant taxa from upland and mid slope habitats.

Indicator Measures

Indicator measures related to routes located in or near sensitive plant occurrences or habitats were used to assess the impacts of the six alternatives.

Indicator Measure 1: Distance from Sensitive plant occurrences (known occupied habitat) to the Rubicon Trail Easement, motor vehicle use areas, and other analyzed routes identified for each alternative.

Measures used to determine effects to sensitive plants

- Routes within 100 feet of a site/occurrence with documented impacts = direct effects.
- Routes adjacent to a site/occurrence (<10 feet) = direct effects.
- Routes within 50 feet of a site/occurrence = potential direct and indirect effects.
- Routes between 50 and 100 feet of a site/occurrence = potential indirect effects.

Indicator Measure 2: Acres of potential suitable upland and mid slope habitat within analysis area as defined by easement, variants, other routes, and motor vehicle use areas.

Indicator Measure 3: Acres of potential suitable moist and wet habitat for Sensitive plant taxa.

Indicator Measure 4: Miles of route within analysis area.

The miles of route reflects the potential for introduction and spread of invasive plant species through vehicle use (habitat alteration and vectoring of invasive plants) or from trail work that includes use of imported rock and gravel.

Environmental Consequences

The following tables display results of queries by alternative. Refer to these tables during discussion of effects for each alternative. Table 3-39 addresses Indicator Measure 1, Table 3-40 Indicator Measure 2, Table 3-41 Indicator Measure 3, and Table 3-42 Indicator Measure 4.

Table 3-39: Potential direct and indirect effects to documented sensitive plant (Stebbins' phacelia) occurrences by alternative.

Sensitive Plant Occurrence	Alt 1	Alt 2	Mod. Alt 3	Alt 4	Alt 5	Alt 6
PHST6_2	Potential Direct and Indirect Effects from NSRELD-63-HA (proposed addition to NFTS); Potential Indirect Effects from Rubicon Trail Easement; Reduced Potential Indirect Effects from closure of section of NSRELD-63-H.	Similar to Alt 1 except long section of NSRELD-63-H would not be closed; therefore greater risk of potential effects.	Same as Alt 1	Same as Alt 1	Similar to Alt 1 except NSRELD-63-HA and all of NSRELD-63-H would be closed and rehabilitated; thereby minimizing risk of potential indirect and direct effects.	Similar to Alt 1 except NSRELD-63-HA and all of NSRELD-63-H would be closed and rehabilitated; thereby minimizing risk of potential indirect and direct effects.
PHST6_3	Direct Effects from Rubicon Trail, which bisects occurrence.	Same as Alt 1	Same as Alt 1	Same as Alt 1	Same as Alt 1	Same as Alt 1
PHST6_4A & PHST6_4B	Greater than 100 feet from edge of Rubicon Trail Easement; therefore, no effects assumed.	Similar to Alt 1; however, fire rings at occurrence; risk of potential	Same as Alt 1	Same as Alt 1	Same as Alt 1	Same as Alt 1
PHST6_5	Potential Direct and Indirect Effects from Rubicon Trail Easement; Potential Indirect Effects from NSRELD-63-EA (proposed addition to NFTS); however, route is within and downslope of the easement and likely would have negligible contribution to effects.	Same as Alt 1	Same as Alt 1	Same as Alt 1	Similar to Alt 1 except NSRELD-63-EA would be closed and rehabilitated; therefore, reduced risk of potential indirect effects.	Same as Alt 1
PHST6_6A & PHST6_6B	Potential Direct and Indirect Effects from Rubicon Trail Easement	Same as Alt 1	Same as Alt 1	Same as Alt 1	Same as Alt 1	Same as Alt 1

Table 3-40: Acres of potential habitat for upland and mid-slope sensitive plant taxa within analysis area as defined by easement, routes, and motor vehicle use areas with a buffer of 100 feet¹.

Primary Soil Type	Potential Habitat		Acres ²					
	LEKE ³	PHST6	Alt 1	Alt 2	Mod. Alt 3	Alt 4	Alt 5	Alt 6
Rock Outcrop	X	X	97.6	107.2	96.0	104.3	75.0	91.8
Rock Outcrop -Tinker Association, 15 to 75 percent slopes		X	27.4	27.5	27.4	27.4	27.2	27.4
Tallac very cobbly sandy loam, 15 to 30 percent slopes, stony		X	18.1	17.9	18.1	18.4	17.5	18.1
Tinker-Tallac - Rock Outcrop Association, 5 to 30 percent slopes	X		3.3	3.3	3.3	3.3	3.3	3.3
Tinker-Tallac - Rock Outcrop Association, 30 to 75 percent slopes		X	14.0	15.2	14.0	14.0	11.0	11.6
Total NFS	X	X	160.4	171.1	157.9	167.4	134.0	152.2

¹Refer to narrative for discussion of analysis area and potential data gaps.

²Major differences in acreage based on easement at Little Sluice, motor vehicle use areas (particularly west of Little Rubicon River), closure of unauthorized routes, and addition of routes to NFTS.

³*Lewisia kelloggii* ssp. *hutchisonii* and/or *Lewisia kelloggii* ssp. *kelloggii*.

Table 3-41: Acres of potential moist and wet habitat for sensitive plant taxa within analysis area as defined by easement, routes, and motor vehicle use areas with a buffer of 100 feet¹.

Routes within RCAs ²	Acres					
	Alt 1	Alt 2	Mod, Alt 3	Alt 4	Alt 5	Alt 6
Total routes	84.8	94.6	82.9	90.8	73.0	80.7

¹Refer to narrative for discussion of analysis area and potential data gaps.

²RCAs were used as a proxy for potential moist and wet habitat for Sensitive plant taxa.

Table 3-42: Miles of route within analysis area.

Routes	Miles					
	Alt 1	Alt 2	Mod, Alt 3	Alt 4	Alt 5	Alt 6
Rubicon Trail	6.26	9.23	6.26	6.26	5.38	6.09
Unauthorized Routes Added to NFTS	0.43	0	0.43	1.00	0	0.36
Total Routes – Rubicon Trail & NFTS	6.69	9.23	6.69	7.26	5.38	6.45

Direct and Indirect Effects – Alternative 1

Direct effects to Sensitive and other native plant taxa may be lethal or less than lethal. Lethal effects occur when plants are broken or crushed by vehicles traveling or parking off road surfaces. Vehicles crush vegetation and root systems, killing seedlings and changing the composition of the vegetation (Cole and Bayfield, 1993). One known Sensitive plant occurrence (PHST6_3) is bisected by the Rubicon Trail. Bisecting occurrences can eliminate plants and alter habitat permanently. In the case of this occurrence, it is uncertain whether these are two disparate sites within the same occurrence or one site from which plants were eliminated.

Direct effects that are less than lethal may occur when branches or flowering stems are crushed or broken by vehicles. This damage reduces the reproductive and photosynthetic capacities of plants. Repeated damage of this type weakens the compensatory capabilities of Sensitive and other native plants, which can lead to the degradation of habitat and eventually to the replacement of native plant species with non-native species such as invasive plant species that are more adapted to frequent disturbances.

One known Sensitive plant occurrence (PHST6_3) is bisected by the Rubicon Trail. Bisecting occurrences can eliminate plants and alter habitat permanently. In the case of this occurrence, it is uncertain whether these are two disparate sites within the same occurrence or one site from which plants were eliminated.

Areas with low-growing vegetation are particularly susceptible to vehicle use. These areas may appear “barren” to many visitors. Within the analysis area, three Sensitive plant taxa have the potential to occur on such open, dry sites. Allowing parking anywhere within the 50-foot easement and parking within one vehicle length of NFTS routes as long as it does not damage resources places undiscovered occurrences at risk of negative direct effects. Most forest visitors

would not have the background to recognize the potential resource damage at these “barren” sites. Access to known occurrences would be blocked with rock or log barriers, which would minimize the risk of effects at those sites.

Indirect effects to Sensitive and other native plant taxa result from project activities that alter habitat, hydrology, water tables, erosion, sedimentation, or soil compaction, and that lead to the introduction and spread of invasive plant species. (Refer also to Hydrology and Riparian Resources section). Vehicle use of native surface routes, in general, results in mechanical erosion, displaced soils, compacted surfaces, and denuded areas, thereby potentially adversely affecting Sensitive plant habitat as well as other native vegetation. Vehicle use during periods of saturated soil conditions, in particular, results in indirect effects by increased sediment movement (erosion and deposition) associated with the creation of ruts, compaction, and from direct vehicular contact with flowing water bodies or flowing trail surfaces. Some of these concerns are evidenced by trail widening, which reflects loss of vegetation and altered potential habitat. In addition to vehicle use, dispersed recreation such as camping associated with the Rubicon Trail results in devegetation. The Soils section further discusses soil loss and receding vegetation and identifies impacted areas.

Examples of altered habitat that affects Sensitive and other native plants include the sedimentation occurring at Winter Camp Wetland, incised areas along the Rubicon Trail such as at Big Sluice, and devegetated areas such as the dispersed use areas at Ellis Creek. Soil loss is also evident at areas mapped as Rock Outcrop and these areas have the potential to support Sensitive plant taxa.

These effects have happened and will continue to happen, to some extent, with use of the Rubicon Trail. Trail maintenance activities would tend to reduce negative indirect effects by controlling water flows, reducing or eliminating erosive flows, controlling sediment delivery, and reducing soil displacement. Although negative indirect effects may be reduced from the current situation, they would not be eliminated. Where these negative indirect effects are eliminated or greatly reduced, trail maintenance may have beneficial indirect effects to potential habitat for Stebbins’ phacelia, Hutchison’s lewisia, Kellogg’s lewisia, upswept moonwort, scalloped moonwort, Mingan moonwort, mountain moonwort, or subalpine fireweed. Improvements would be evidenced by natural revegetation by native plants and potentially by establishment or expansion of Sensitive plant occurrences. In addition to trail maintenance, control of vehicle access would help to reduce vegetation loss or allow revegetation where access is prevented but negative effects likely would continue where vehicle access continues.

Without a seasonal operating period, potential indirect effects to Sensitive plant occurrences and to potential habitat due to soil displacement and soil compaction would be anticipated (refer to section on Hydrology and Riparian Resources). Vehicle use during the wet season when soils are most prone to erosion and compaction, unless the road is rocked, would result in continued habitat alteration (e.g., sedimentation in riparian/meadow habitat associated with ponds), thereby negatively affecting Sensitive plants and habitats located along the Rubicon Trail and other routes. The installation and maintenance of erosion control features is anticipated to reduce or minimize these effects.

Invasive plant species are highly competitive for sunlight and nutrients, often to the detriment of native species. Ground disturbance especially when soils are exposed can alter habitat to the benefit of invasive plant species. Many invasive species are adapted to occupy disturbed sites with exposed soil or compacted soil. Cheatgrass, for example, is adapted to open, disturbed sites and can be found in rocky, harsh sites. Frenkell (1970) reported that compaction by vehicles contributes to roadside invasions of invasive plants by reducing native plant vigor and creating areas of competition-free space that are open to invasion. Seeds and other propagules of invasive plant species can be imported with materials such as rock or gravel (a major source) or be introduced and dispersed by vehicles. The risk of introducing and spreading invasive plant species can be difficult to predict. With implementation of design criteria to prevent the introduction and spread of invasive plant species, a risk slightly greater than low; refer to Noxious Weed Risk Assessment. Because the spread of invasive plant species, if introduced, could affect potential habitat for Stebbins' phacelia, Hutchison's lewisia, Kellogg's lewisia, upswept moonwort, scalloped moonwort, minganense moonwort, or mountain moonwort, adverse indirect effects are assumed.

Some unauthorized routes would be closed and rehabilitated. Rehabilitation consists of pulling natural barriers (e.g., logs or boulders) across routes, installing water bars, posting signs, and scattering forest debris where available. As stated in the Hydrology and Riparian Resources section, the rehabilitation would promote infiltration, intercept runoff, slow scouring velocities, and allow vegetation to reestablish. These improvements would result in reduced indirect effects to Sensitive and other native plant taxa.

Defining motor vehicle use areas with natural barriers such as logs and rocks would reduce potential direct and indirect effects associated with vehicle use.

Conversely, addition of authorized routes to the NFTS would increase the risk of direct and indirect effects to Sensitive and other native plants and their habitat. This risk would be reduced where rock or log barriers define the limits of vehicle

travel. Potential undiscovered occurrences and habitat could be affected where routes are added to the NFTS.

Indicator Measure 1: One occurrence (PHST6_3) is bisected by the Rubicon Trail Easement with plants on either side of but not immediately adjacent to the road; direct effects are assumed. It is not known whether these are two disparate sites within the same occurrence or one site from which plants were eliminated. It is possible that historically the occurrence was more connected and that plants were eliminated from part of the occurrence.

The Rubicon Trail Easement could potentially negatively affect (directly and indirectly) three additional occurrences of Stebbins' phacelia (PHST6_2, PHST6_5, and PHST6_6 sites 6A and 6B); refer to Table 3-39.

Occurrence PHST6_2 also has potential direct and indirect effects from NSRELD-63-HA, which is proposed to be added to the NFTS and potential indirect effects from a section of NSRELD-63-H that is proposed for closure. The closure would reduce one source of potential indirect effects.

Occurrence PHST6_5 has potential indirect effects from NSRELD-63-EA, which is proposed for addition to the NFTS. NSRELD-63-EA is within and downslope of the Rubicon Trail Easement and downslope of the occurrence, so it likely would have only negligible contribution to effects.

Indicator Measure 2: One hundred sixty acres of potential upland and mid slope habitat could be directly or indirectly affected (Table 3-40). This habitat has the potential to support undiscovered occurrences of Sensitive plant taxa in addition to the documented occurrences.

Indicator Measure 3: Eighty-five acres of moist and wet habitat could be directly or indirectly affected (Table 3-41). This habitat has the potential to support undiscovered occurrences of Sensitive plant taxa.

Indicator Measure 4: In addition to the 6.26 miles of Rubicon Trail, Alternative 1 would add 0.43 miles of routes to the NFTS for a total of 6.69 miles of routes on NFS land (Table 3-42). The risk of introducing and spreading invasive plant species is assumed to increase with the length of route due to the risk of vehicles introducing and spreading invasive plants and altering habitat in a way that benefits establishment of invasive species. Additionally, there is a risk of introduced materials used for road maintenance containing invasive plant seeds or other propagules.

Cumulative Effects – Alternative 1

The Affected Environment serves as the proxy for past actions within the analysis area. Current and future actions within the analysis area include SMUD maintenance of their facilities and installation of a toilet near Buck Island Lake. No incremental effects to Sensitive plants are anticipated from other projects within the analysis area.

For determinations of trend toward Federal listing for Sensitive plant taxa potentially occurring within the analysis area, all known Sensitive plant occurrences on NFS land within the Eldorado National Forest administrative boundary were considered. For cumulative effects to Sensitive plant occurrences, the analysis area is expanded to include all Sensitive plant occurrences on NFS land within the Eldorado National Forest administrative boundary. Within the vicinity of the Rubicon Trail, planned projects include Pacific Hazard Tree Removal, O’Leary’s Cow, and maintenance of the SMUD Transmission Line. Potential effects to Sensitive plant occurrences (e.g., Stebbins’ phacelia or undiscovered *Botrychium* occurrences) could result from activities. Forestwide, occurrences of Stebbins’ phacelia may be negatively affected but likely not eliminated by activities associated with Placer County Water Agency facilities such as work on Brushy Canyon Adit Road, vegetation treatments at Hell Hole Reservoir, and recreation developments at Hell Hole Reservoir.

Although surveys for the two taxa of *Lewisia kelloggii* were negative, they occurred outside the appropriate time. Therefore, presence is assumed for suitable habitat and occurrences potentially could be affected directly or indirectly (and may have been affected in the past). Forestwide, seven occurrences have documented negative effects to at least some sites. Overall, no taxa were determined to be trending toward Federal listing due to project activities.

Climate change and changing environment is another potential effect to Sensitive plant taxa, one that would be difficult to predict. Changes in climate (e.g., duration of snowpack, timing of frosts or summer warming) can alter plant phenology, which can result in changes in reproduction and survival, and lead to altered species ranges (Cleland et al., 2007). Currently suitable habitat could alter in a manner that would no longer support particular Sensitive plant taxa, or too quickly for adaptation. This risk is greatest with taxa, such as Stebbins’ phacelia, that are restricted to a small geographic area.

Direct and Indirect Effects – Alternative 2

Direct and indirect effects to Sensitive and other native plants and potential habitat for Sensitive plants are anticipated to increase, and the increase would

include a larger land area. Unauthorized routes are not anticipated to be closed and rehabilitated. Parking for dispersed use may not be limited. Direct effects from visitors may result from visitors driving on known and on undiscovered Sensitive plant occurrences and within additional potential habitat being accessed. Additional erosion control features past Little Rubicon River may not be installed. Indirect effects may increase because trail maintenance activities likely would be limited and existing erosion control features may not be maintained. Only short-term improvements to beneficial effects from these erosion control features. Negative indirect effects to potential habitat likely would increase as erosion control features fail, runoff yields scouring velocities, and loss of soil continues or accelerates. Additional erosion control features past Little Rubicon River may not be installed. Bridges and elevated rock ford would not be constructed or replaced at stream crossings. Indirect effects from invasive plants may or may not occur, dependent on the introduction of these plants; however, habitat alteration that increases susceptibility to weed introduction would increase. A moderate risk was determined based on the Noxious Weed Risk Assessment.

Indicator Measure 1: Effects in Alternative 2 are similar to Alternative 1 with the following exceptions (Table 3-39):

The long section of NSRELD-63-H would not be closed and, therefore, this alternative has an increased risk of potential indirect effects to Occurrence PHST6_2.

Fire rings indicate dispersed use adjacent to Occurrence PHST6_4 (sites 4A and 4B). If vehicles are used to access the camping site, then the occurrence is subject to potential direct and indirect effects from crushing or from habitat alteration as well as effects from trampling and other disturbance from non-vehicle use.

Additional routes that have not been documented may exist near occurrences. These routes have not been surveyed and may result in additional negative effects to known or undiscovered occurrences.

Indicator Measure 2: No routes would be added or deleted under Alternative 2. One hundred seventy-one acres of potential upland and mid slope habitat could be directly or indirectly affected (Table 3-40), an increase of eleven acres from Alternative 1.

Indicator Measure 3: No routes would be added or deleted under Alternative 2. Ninety-five acres of moist and wet habitat could be directly or indirectly affected (Table 3-41), an increase of ten acres from Alternative 1.

Indicator Measure 4: No routes would be added or deleted under Alternative 2. The total mileage is 9.23 miles (Table 3-42), an increase of 2.97 miles from Alternative 1.

The intent of this indicator measure was to address the risk of introducing and spreading invasive plant species. Mileage would increase by 47%, thereby increasing the risk; however, trail maintenance is not anticipated and bridge construction would not occur, thereby reducing the risk of introducing weeds with equipment, rock, or fill.

Cumulative Effects – Alternative 2

No incremental effects are anticipated from other projects within the analysis area.

Direct and Indirect Effects – Modified Alternative 3

Under Modified Alternative 3, direct and indirect effects would be reduced from those under Alternative 1. Habitat and, potentially, undiscovered occurrences of Sensitive plant taxa would benefit by not creating a motor vehicle use area at Soup Bowl, by rehabilitating a portion of 14N34B, and by reducing the easement width on the south side of Little Sluice to 75 feet. By implementing and enforcing a saturated soil management strategy, potential indirect effects to Sensitive plant occurrences and to potential habitat due to soil displacement, soil compaction, and trail widening would be reduced and potentially greatly reduced (refer to sections on Soils and on Hydrology and Riparian Resources).

Indicator Measure 1: Same as Alternative 1.

Indicator Measure 2: Similar to Alternative 1 except that 2.5 fewer acres of upland and mid slope habitat potentially would be affected. The improvement resulted primarily by the reduction in the easement width at Little Sluice.

Indicator Measure 3: Similar to Alternative 1 except that 1.9 fewer acres of moist and wet habitat potentially would be affected.

Indicator Measure 4: Same as Alternative 1.

Cumulative Effects – Modified Alternative 3

No incremental effects are anticipated from other projects within the analysis area.

Direct and Indirect Effects – Alternative 4

Under Alternative 4, direct effects would be similar to but potentially greater than those under Alternative 1 due to addition of unsurveyed routes. The acreage of potential habitat directly and indirectly affected would be increased compared with Alternative 1.

Indicator Measure 1: Same as Alternative 1.

Indicator Measure 2: The area of potentially affected upland and mid slope habitat would increase by 7 acres from Alternative 1, primarily from the 200-foot easement at Little Sluice and the addition of NSRELD-63D-A, NSRELD-63-U, and NSRELD-63-V to NFTS.

Overall, Alternative 4, of all the action alternatives, has the greatest risk of negatively affecting potential upland and mid slope habitat.

Indicator Measure 3: The area of potentially affected moist and wet habitat would increase by 6 acres from Alternative 1.

Alternative 4, of all the action alternatives, has the greatest risk of negatively affecting potential habitat for Sensitive plant taxa associated with moist and wet habitats.

Indicator Measure 4: The mileage of routes through NFS land would increase by 0.57 miles over that in Alternative 1; thereby, increasing the risk of introducing and spreading invasive plant species.

Cumulative Effects – Alternative 4

No incremental effects are anticipated from other projects within the analysis area.

Direct and Indirect Effects – Alternative 5

Under Alternative 5 direct and indirect effects to Sensitive plant occurrences would be reduced. The acreage of potential habitat directly and indirectly affected would be reduced compared with Alternative 1. Improvements would result from the closure of unauthorized routes and some variants, not adding motor vehicle use areas, and by limiting the Rubicon Trail to a single route.

Direct effects to Sensitive plants would be reduced based on the smaller area covered by the routes although occurrence PHST6_3 would still have direct effects from being bisected by the Rubicon Trail Easement. Potential direct and indirect effects to PHST6_2 and PHST6_5 would be reduced due to closure of unauthorized routes.

Closing unauthorized routes and variants and not adding motor vehicle use areas would allow vegetation to recover, which improves groundcover and reduces soil displacement and sedimentation (refer to Hydrology and Riparian Resources section). Therefore, indirect effects to Sensitive plant occurrences and to potential habitat would be reduced.

In addition, the seasonal operating period would reduce potential indirect effects to Sensitive plant occurrences and to potential habitat because soil displacement and soil compaction would be reduced (refer to section on Hydrology and Riparian Resources).

Indicator Measure 1: Effects in Alternative 5 are similar to those in Alternative 1 with the following exceptions:

NSRELD-63-HA and all of NSRELD-63-H would be closed and rehabilitated, thereby reducing the risk of potential direct and indirect effects to Occurrence PHST6_2.

NSRELD-63-EA would be closed and rehabilitated, thereby reducing the risk of potential indirect effects to Occurrence PHST6_5.

Overall, the risk of directly or indirectly affecting occurrences of Stebbins' phacelia would be reduced in Alternative 5.

Indicator Measure 2: Alternative 5 has the least acreage (134 acres) of potentially affected upland and mid slope Sensitive plant habitat, a reduction of 26.4 acres from Alternative 1.

Overall, Alternative 5 has the least risk of negatively affecting potential habitat for Sensitive plant taxa associated with upland and mid slope habitat.

Indicator Measure 3: The area of potentially affected moist and wet habitat would decrease by 11.8 acres from Alternative 1.

Alternative 5 has the least risk of negatively affecting potential habitat for Sensitive plant taxa associated with moist and wet habitats.

Indicator Measure 4: The mileage of routes through NFS land would decrease by 1.31 miles compared with Alternative 1, a reduction of 20%; thereby, decreasing the risk of introducing and spreading invasive plant species.

Cumulative Effects – Alternative 5

No incremental effects are anticipated from other projects within the analysis area.

Direct and Indirect Effects – Alternative 6

Under Alternative 6 direct and indirect effects to Sensitive plant occurrences would be reduced. The acreage of potential habitat directly and indirectly affected would be reduced compared with Alternative 1. Improvements would result from the following actions: defining the authorized travel way and turnouts with barriers, markers, and signage; reducing the width of the Easement at the south side of Little Sluice (to 75 feet) and from East Wentworth through Post Pile (to 50 feet); restoring Little Sluice travel way to a drivable condition; eliminating the Long Bypass; restricting access at Soup Bowl; eliminating dispersed camping at Winter Camp and east to the beginning of the Little Sluice Box; eliminating vehicle use and dispersed camping inside the Little Rubicon River RCA; and restoring damaged areas.

In addition, the seasonal operating period would reduce potential indirect effects to Sensitive plant occurrences and to potential habitat because soil displacement and soil compaction would be reduced (refer to section on Hydrology and Riparian Resources).

Indicator Measure 1: Effects in Alternative 6 are similar to those in Alternative 1 with the following exceptions:

All of NSRELD-63-H and NSRELD-63-HA would be closed and rehabilitated, thereby reducing the risk of potential direct and indirect effects to Occurrence PHST6_2.

NSRELD-63-EA would be closed and rehabilitated, thereby reducing the risk of potential indirect effects to Occurrence PHST6_5.

Overall, the risk of directly or indirectly affecting occurrences of Stebbins' phacelia would be reduced in Alternative 6.

Indicator Measure 2: Similar to Alternative 1 except 8.2 fewer acres of upland and mid slope habitat potentially would be affected.

Indicator Measure 3: Similar to Alternative 1 except 4.1 fewer acres of moist to wet habitat potentially would be affected.

Indicator Measure 4: The mileage of routes through NFS land would decrease by 0.24 miles over that in Alternative 1; thereby, minimally reducing the risk of introducing and spreading invasive plant species.

Cumulative Effects – Alternative 6

No incremental effects are anticipated from other projects within the analysis area.

Invasive Plant Species

The Sierra Nevada Forest Plan Amendment (USDA FS, 2004b) and the Region 5 Noxious Weed Management Strategy (USDA FS, 2000b) require that a noxious weed risk assessment be conducted to “determine risks for weed spread ... associated with different types of proposed management activities”. Standards and guidelines for managing noxious weeds are found in the Sierra Nevada Forest Plan Amendment, Forest Service Manual (FSM) 2900, Invasive Species Management (USDA FS, 2011), sets forth National Forest System (NFS) policy, responsibilities, and direction for the prevention, detection, control, and restoration of effects from aquatic and terrestrial invasive species (including vertebrates, invertebrates, plants, and pathogens). Refer to the Noxious Weed Risk Assessment in the project record, which is largely repeated here.

The risk of introducing or spreading invasive plants within the Rubicon Trail Project analysis area from project activities is Low for Alternatives 5, 6, and Modified Alternative 3; slightly above Low for Alternatives 1 & 4; and Moderate for Alternative 2.

Table 3-43: Risk of introducing and spreading invasive plants due to the Rubicon Trail Project.

Factor of Weed Spread	Risk of Spread			
	Alts 1 & 4	Alt 2	Mod. Alt 3	Alts 5 & 6
1. Presence of noxious weeds in and adjacent to the analysis area	Low			
2. Habitat vulnerability	High			
3. Vectors unrelated to the proposed project	Moderate to High			
4. Habit alteration expected as a result of the project	Moderate	High	Low to Moderate	Low
5. Increased vectors as a result of the proposed project	Low to Moderate	Low	Low to Moderate	Low to Moderate
Average risk:	(Low to) Moderate	Moderate	Low to Moderate	Low (to Moderate)
6. Mitigation measures	Reduced	N/A	Reduced	
7. Anticipated weed response	Low (to Moderate)	Moderate	Low	Low

Habitat Alteration Expected as a Result of Project (Alternatives 1 and 4 – Moderate Risk; Modified Alternative 3 – Low to Moderate Risk; Alternatives 5 and 6 – Low Risk; No Action Alternative – High Risk)

Most of the project activities in Alternatives 1, 4, 5, 6, and Modified Alternative 3 are restricted to previously disturbed sites. El Dorado County would complete installation of erosion control features (refer to EDC DOT, 2010) and maintain existing and new erosion control features. Trail maintenance is anticipated to reduce or even minimize processes that previously have altered habitat. In some areas, natural revegetation would be expected.

Seasonal operating periods under Alternatives 5, and 6 and the saturated soil management strategy for Modified Alternative 3 would minimize habitat alteration due to soil compaction, erosion, and sedimentation. Under Alternatives 1 and 4, no seasonal operating period would be implemented; erosion and sedimentation would be expected as discussed in the Hydrology sections of the FEIS. Some level of erosion and sedimentation potentially could contribute to habitat alteration even with installation of erosion control features.

Under Alternatives 1, 4, 6, and Modified Alternative 3, routes would be added to the NFTS and maintained as needed. The greatest mileage would be added under Alternative 4 and the least under Alternatives 5 and 6. Under Alternative 5, the Easement would consist of a single route with no variants and no routes would be added to the NFTS. The degree of habitat alteration associated with routes is site-specific.

The width of the Easement would extend beyond 25 feet of centerline in some locations, with the width dependent on location and alternative. Motor vehicle use areas outside the Easement would be established. In newly defined motor vehicle use areas, concentrated use may continue or accelerate habitat alteration. Under Alternative 6 and Modified Alternative 3, the width of the Easement at Little Sluice would be reduced to 75 feet. Under Modified Alternative 3, a portion of 14N34B that may be contributing fine sediment upstream of the Ellis Creek Bridge would be closed and rehabilitated; under Alternatives 1, 5, and 6, that portion of 14N34B would also be closed. Under Alternative 5, the Easement would consist of a single route with no variants. Under Alternative 6, the Easement would be reduced to 50 feet in the area from East Wentworth through Post Pile, vehicles would be restricted to a single 12-foot wide travel way at Soup Bowl, dispersed camping would be eliminated at Winter Camp and east to the Little Sluice Box and damaged areas would be restored, Little Sluice would be restored to a drivable condition, vehicle use and

dispersed camping would be eliminated within the Little Rubicon River RCA, and the easement would be clearly defined with markers, signage, and barriers.

Under Alternatives 1, 4, 5, 6, and Modified Alternative 3 and after bridge construction at Ellis Creek, the disturbed areas and the existing low water crossing would be rehabilitated and planted. Under Alternatives 5 and 6, the Ellis Creek Bridge would be reduced to a 12-foot span, thus reducing the area altered (refer to section on Riparian Resources). Under Alternatives 1, 4, 5, 6, and Modified Alternative 3 and after replacement of the FOTR bridge with a three-sided bottomless arch, the downstream rock ford would be removed and the channel would be rehabilitated and planted. Under Alternatives 1, 5, and 6, a bridge at Buck Island Lake Outlet (i.e., Little Rubicon River) would be constructed with minimal soil disturbance. Under Modified Alternative 3, the crossing of the Little Rubicon River downstream of the elevated rock ford would be rehabilitated. In the long-term, the bridges and rehabilitation of channels with native vegetation lessens the risk of weed introduction and spread; however, during implementation, weeds could be introduced from equipment or imported material.

Under the No Action Alternative, further maintenance would be limited and vehicle use on unauthorized routes would continue. Habitat alteration, which would increase the likelihood of invasive plants becoming established if introduced, would continue and likely expand to additional areas.

Increased Vectors as a Result of Project Implementation (Alternatives 1, 4, 5, 6, and Modified Alternative 3 – Low to Moderate Risk; No Action Alternative – Low Risk)

Under Alternatives 1, 4, 5, 6, and Modified Alternative 3, installation of remaining erosion control features and continuing maintenance would temporarily increase potential weed vectors due to the short-term and small increase in project-related traffic. No new routes would be constructed; however, routes would be added to the NFTS and maintained as needed. The risk of introducing and spreading invasive plant species would increase incrementally with the increasing mileage of routes that would be used and maintained.

Trail improvements that could promote the introduction and spread of invasive plant species include importing rock for several erosion control features, re-surfacing, spot rocking, and minor grading. Invasive plant species could be introduced from imported rock or from vehicles. In the short-term, construction of bridges and rehabilitation of channels risks the introduction of weeds from equipment or imported material. Gerle Creek Adit, the source of rock material for previous work on the Rubicon Trail by El Dorado County, is weed-infested (e.g., sweet clover and Klamathweed). Continued use of this

material without treatment of invasive plant species risks the introduction and then spread of invasive plant species.

Vectors include:

- Equipment installing rock fill, rock check crossings, rock outlet protection, rock-lined channels, rock ditch crossings/water dips, rock barriers, or other erosion control features;
- Equipment re-surfacing or grading traveled way;
- Equipment used during bridge construction at Ellis Creek, during bridge construction or hardening at Little Rubicon River or bridge replacement of the FOTR bridge;
- Equipment used during rehabilitation of stream crossings at Ellis Creek and Little Rubicon River or other channels;
- Importation of rock or other material such as fill; and
- Straw or other erosion control material that is not weed-free.

The effectiveness of the design criteria at reducing risk would be dependent on the availability of weed-free material for project work. If only weed-free material is used for project work, the risk of introducing invasive plant species would be minimized.

If introduced, weed seeds and other propagules potentially would move with soil and water movement under Alternatives 1 and 4. Vectoring would be reduced or minimized under Alternatives 5 and 6, which would implement a seasonal operating period or Modified Alternative 3, which would implement a saturated soil management strategy, and, thereby, reduce soil and water movement within the analysis area.

No management requirements have been incorporated into the project to prevent the following possible vectors:

- Project workers transporting weed seed in their clothing or shoe soles, and
- Project workers vectoring seeds in their vehicle tire treads or undercarriages.

The risk of these potential vectors actually moving seed is low and no reasonable mitigation measure exists to prevent this potentially minimal seed movement.

Under the No Action Alternative, future maintenance would be limited. Use of unauthorized routes likely would continue. Bridge construction at Ellis Creek, bridge construction or hardening at Little Rubicon River, and replacement of the FOTR bridge would not occur.

Mitigation Measures (Moderately to Greatly Reduced)

Design criteria for preventing the introduction of invasive plant species are addressed under Item 5 (Increased Vectors as a Result of Project

Implementation). The following additional design criteria to monitor and treat invasive plant species are incorporated into the project:

- Post construction monitoring for invasive plant species would be conducted at the Ellis bridge site, FOTR bridge site, and the Little Rubicon ford the first two summers after construction. If results are negative in both years, monitoring would not continue. If invasive plants are found, they would be documented, treated by hand if appropriate for the species, and reported to the Invasive Plant Coordinator for future treatment. Annual monitoring in the summer would continue until monitoring in three consecutive years yield negative results.
- New infestations of invasive plant species would be documented for continued monitoring and hand pulling.

Anticipated weed response (Alternatives 1 and 4 – Risk greater than Low; Alternatives 5, 6, and Modified Alternative 3 – Low Risk; No Action Alternative – Moderate Risk)

No noxious weed or other invasive plant species were documented within the analysis area. The Gerle Creek Adit, a source quarry for rock material used on the Rubicon Trail in 2010 and 2011, has a weed infestation (e.g., Klamathweed, and sweet clover) with cheatgrass present at the loading site in 2011. The risk of introducing and spreading these weeds would depend on:

- whether weed-free rock, gravel or fill material is available, and
- the extent of monitoring for and treatment of invasive plant species

Some maintenance activities such as grading may increase the likelihood of introduced invasive plants becoming established as would ground disturbance during construction of bridges or installing the elevated rock ford crossing. The risk increases as the area of ground disturbance increases with the addition of routes to the NFTS, the increased width of the easement in some locations, or construction activities. Areas with route closures and rehabilitation (through passive restoration) or areas with active restoration would likely be less vulnerable to invasive plants becoming established. Activities such as installation of markers, barriers, and signage that help to define the route may help to reduce habitat alteration and the risk of introducing and spreading invasive plants.

Under the action alternatives, maintenance activities likely would occur within a relatively small area that includes the traveled way, vehicle use areas, erosion control features, and routes that would be closed and rehabilitated. Ground disturbance and increased vectors during bridge construction and replacement, in the short-term, would increase the risk of weed introduction, while associated rehabilitation (including revegetation) of these sites, in the long-term, would reduce the risk of introduced weed propagules becoming established. Design criteria to reduce the risk of introducing invasive plants have been incorporated into the action alternatives.

Without a seasonal operating period (Alternatives 1, 2, and 4), habitat alteration through soil displacement and soil compaction would occur as discussed in the Hydrology report; however, in Alternatives 1 and 4, erosion control features would reduce these effects. The potential for vectoring invasive plant propagules, if present, is a greater risk without a seasonal operating period due to soil and water movement.

Design criteria in the action alternatives reduce the risk of introducing invasive plants into the project area. The risk would depend on the availability of weed-free rock, gravel, and fill material. If weed-free material is available, the risk would be greatly reduced. If not available, the risk would be somewhat reduced based on the other design criteria. The risk would be mitigated with monitoring for invasive plants and hand treatments. The success of the mitigation would depend on the availability of funding for monitoring and the effectiveness of treatments. The action alternatives would meet the Standards and Guidelines for invasive plant species.

Under the No Action Alternative, future maintenance would be limited and use of unauthorized routes would continue. Some material for maintenance would be imported. Habitat alteration would continue, which increases the risk of weeds becoming established. Monitoring and treatment of weeds may not occur.

Recreation

Affected Environment

The Rubicon Trail is recognized as one of the most popular four wheel drive (4WD) routes in the nation. It is considered to be the “Granddaddy” or “Crown Jewel” of all off-highway vehicle routes in California, and has a trail rating of 10 as extremely difficult to traverse. The Rubicon Trail attracts both street legal and “green sticker” vehicles (ATV’s and UTV’s), but all require 4 wheel drive. Users also travel the Rubicon on dirt bikes, bicycles, and on foot. Much of the travel is done in groups of two or more vehicles for safety reasons.

During months when the trail is snow-covered, the Rubicon is travelled with snowmobiles, snowcats, ATV’s, 4WD vehicles, skis, and snowshoes. There is little traffic during snow months, as conditions make it very difficult to traverse the snow. Most use is day trips, although some overnight camping occurs at Wentworth Springs Campground and Ellis Creek. Private property owners at Spider Lake are regular users during winter months. There is little to no use as far as Buck Island during mid-winter heavy snow cover. Because of the difficulty crossing large snow banks, traffic from the Lake Tahoe entrance does not access the Eldorado until weeks after use begins on the west side in the spring.

Recreation Activities

Dispersed recreation use is concentrated at Spider Lake/Little Sluice, Buck Island Reservoir, and Ellis Creek, and includes camping, fishing, swimming, and hiking. Rubicon Springs, located on private property, is the most popular developed site along the trail. Other than “driving for pleasure,” the greatest recreational use in the area is dispersed camping. Some camping occurs in areas between those destinations, but the trend is to recreate near water features.

Rubicon Trail Foundation (RTF) conducted trail counts May through September in 2009 and 2010 that included entry points, destination, exit location, length of trip and mode of travel. The number of users dropped from 4494 in 2009 to 3188 in 2010, likely because of late snow conditions in the spring of 2010.

Table 3-44: Summary by mode of travel.

	4X4	ATV	HIKE	MCYCLE	2WD	UTV	OTHER
2009	2081	84	49	75	9	6	7
<i>2009%</i>	90	4	2	3	0.4	0.3	0.3
2010	1448	27	175	47	0	0	9
<i>2010%</i>	85	2	10	3	0	0	1

Access to the Rubicon Trail is most frequently from the Loon Lake Trailhead through the Ellis Inter-tie. The other access (10%) on the Eldorado NF is from Wentworth Springs Campground at the end of the County maintained road. The trail is also accessed from the east side (less than 8%) at a trailhead near Homewood (the Rubicon-McKinney Road) and from the Barker Pass entrance through Blackwood Canyon. It is expected that there will be a shift in access from Loon Lake trailhead to the Airport Flat and Wentworth Springs Campgrounds when a bridge is constructed across Gerle Creek on the county maintained road.

Approximately 80% of use is overnight/ multiple days, leaving 20% as day-use only. Users were asked their perception of quality of recreation on the Rubicon (value of 1-10, with 10 as the best) and the average response was over 9.

Jeep/Jeepers Jamboree events accounts for over 1000 visitors each year. These events have been conducted since 1955, and participation by family groups has increased. The events begin in Georgetown, travel up the Wentworth Springs Road to Ice House Road, and enter the 4WD trail at Loon Lake Trailhead. The participants travel the trail with the destination of Rubicon Springs for a few nights camping. Most participants exit on the Tahoe side of the trail.

Sanitation facilities on the Eldorado NF related to the Rubicon Trail include toilets at Loon Lake Trailhead, Wentworth Springs Campground, Airport Flat Campground, and Ellis Creek. Dumpsters are located at Airport Flat Campground and near Loon Lake at the second dam. Users have constructed pit toilets in several locations along the trail. There has been an educational program spearheaded by El Dorado County to reduce sanitation impacts on and adjacent to the trail, including an emphasis to pack out human waste and trash, and clean up vehicle spills. This “bandana campaign” is primarily funded by the California State Parks OHV Division, with bandanas, stickers, and spill kits provided by the County, and WAG bags provided by the Forest Service.

Analysis Framework

Data and Analysis Methods

- Users are reluctant to set up their camp very far from their vehicles.
- A 200 foot easement near Little Sluice will attract more users at Spider Lake.
- Travel speeds on the Rubicon are generally 3-5 miles per hour because of the difficult terrain.

ENF LRMP designation and direction:Semi-primitive motorized High Country (MA7):

Provide for low concentrations of use. Provide developed recreation opportunities that blend with the environment. Limit development to small, primitive sites, using native materials. Locate improvements near water. Provide facilities to accommodate off-road vehicle travel along designated routes.

Require user pack-out of all non-burnable trash. Emphasize visitor self-housekeeping.

New FS system roads will be managed with seasonal closures and according to MVUM.

Special areas (MA4) –Rubicon Springs ORV Candidate National Recreation Trail;

Favor recreation activities that do not require extensive facilities and are designed for short stays.

Use restricted access as a means of protection. Establish Rubicon Springs National Recreation Trail expressly for 4WD vehicles.

Indicator Measures:

Indicator Measure 1: Recreation Opportunity Spectrum (ROS) classification for the setting and activities/facilities (Reference ROS Primer and Field Guide and ROS Setting Indicator and Analysis Technique Guidelines in project file). There are 7 indicators used to determine the possible effects on ROS setting.

Desired condition – Semi-primitive motorized.

Access – Includes the mode of transport used within the area and service levels of roads. Motorized trails and primitive roads (Traffic service Level D) should provide challenge to 4-wheel drive and high clearance vehicles but discourage use by highway vehicles. By definition, they are “single-use controlled traffic roads, surface is rough, stable during dry weather, rutting is controlled for protection of water only.”

Remoteness – Addresses the extent to which individuals perceive themselves removed from the sights and sounds of human activity. Distant sight and/or sound of human activity should be more than a half-hour walk from any better-than-primitive roads.

Visual Characteristics – The key to managing landscape character is to use a compatible visual quality objective (VQO) and its corresponding guidelines, then describing varying degrees of allowable alteration. The VQO for this area is partial retention from sensitive roads and trail.

Facilities and site management – Consider the level of site development, extent of modification, apparentness of the modification, complexity and scale of modification, and purpose, including facilities or techniques that confine vehicles to planned roads and parking locations. Facilities should be rustic and rudimentary, primarily for site protection. Use undimensioned native materials rather than synthetic.

Visitor Management – Includes both regulation and control of the visitor as well as providing information and services. Outdoor recreation is a voluntary, self-selected behavior. A major reason underlying participation is to get away from the controls and constraints of the everyday world. There is a need for care and sensitivity in how visitor management is implemented. The presence of controls and the way in which they are implemented is as much a part of the recreation setting as the physical environment. People seek some developed settings for security and safety, but in more primitive settings, on-site controls would detract from desired experiences such as independence and self-reliance. Use subtle on-site regimentation and controls.

Social Encounters – The number and type of other recreationists met in the area, along travel ways, or camped within sight or sound. Normal range would be 6-15 parties met per day and 6 or less parties seen at campsite.

Visitor Impacts – Effects on resources such as soil, vegetation, air, water, and wildlife. Consider the amount of change allowed and which actions are appropriate for control. Impacts are subordinate, limited site hardening.

Environmental Consequences

Direct and Indirect Effects - Alternative 1:

Access – The Rubicon Trail and newly authorized FS system trails will remain primitive roads or trails providing challenge to 4-wheel drive and not accessible for use by standard highway vehicles. Ongoing maintenance will stabilize soil, but will not change the character of the road system or access.

Remoteness – Distant sight and/or sound of human activity will remain associated with the primitive road. Road 14N05, considered a primitive (Level 2) road is the only road located within a mile of the easement. Users will continue to feel they are in a remote area based on vehicle access rather than sounds of human activity (other trail users).

Visual Characteristics – There will be no change in visual quality of partial retention, as there is no plan for vegetation removal that will create large openings.

Facilities and site management – Addition of .43 miles of designated trails to access dispersed recreation would be managed by using native rock and log barriers, which conforms to the ROS class. Restricting vehicle access in areas around Buck Island Reservoir and Winter Camp would result in loss of some dispersed camping opportunity.

Addition of a toilet along the Rubicon Trail near Spider Lake and continuing with use of pack-it-out systems, is consistent with the ROS (Rustic and rudimentary facilities primarily for site protection). The toilet will be designed to blend with the landscape, using wood and log exterior rather than the traditional CXT concrete models. This could be inconsistent with the ROS, but not unacceptable (Facilities providing some comfort for the user as well as site protection, synthetic materials should not be evident.)

The bridges across Ellis Creek and the Buck Island Outlet will be a simple design with Corten finish. This would be unacceptable with the ROS class (Some synthetic but harmonious materials may be incorporated.)

The FOTR bridge would be replaced with a box culvert, but the exposed metal would be faced with rock to blend with the forest. This would be Inconsistent with the ROS, but not unacceptable (Facilities providing some comfort for the user as well as site protection, synthetic materials should not be evident.)

Visitor Management – Parking for dispersed use would be provided by defining motor vehicle use areas with natural barriers such as logs and rocks. There is no planned campground development so there is limited visitor controls. Information would continue to be provided at trailheads, kiosks, brochures, and web sites, which promotes the desired experience of self-discovery, challenge, and risk.

Social Encounters – There would continue to be the same number and type of encounters consistent with the ROS class. In some areas, moderate to high contact on main trails, and moderate to low contact on short, dead-end trails and developed sites would be inconsistent, but not unacceptable. There may be fewer dispersed camping encounters where routes are added to the NFTS, but an increase in encounters where barriers limit parking and vehicle travel adjacent to the Trail.

Visitor Impacts – Research has shown that a high percentage of site impacts occur at low levels of use, with further use producing only small amounts of additional change (ROS Setting Indicator and Analysis Technique Guidelines,

Pg. 21). This alternative would not increase impacts to the resources from visitor use, and would reduce impacts in areas where vehicle travel would be restricted and areas rehabilitated. Some riparian areas would be blocked, reducing recreation opportunities adjacent to water sources but improving water quality.

No new areas are expected to have increased site hardening, but increased use resulting from additional vehicle access at Little Sluice may increase impacts to soil and vegetation at the north shore of Spider Lake.

Cumulative Effects – Alternative 1

The area of analysis for cumulative effects for recreation includes the Semi-primitive motorized area (MA-7) east of Loon Lake and north of Desolation Wilderness that is designated in the ENF LRMP. No additional activities are proposed in the future that would add to the direct and indirect effects of Alternative 1. No cumulative effects would occur from implementation of Alternative 1.

Direct and Indirect Effects – Alternative 2

Access – The Rubicon Trail would remain a primitive road, providing challenge to 4-wheel drive and not accessible for use by standard highway vehicles. Maintenance from Wentworth Springs Campground to Little Sluice would stabilize soil, but would not change the character of the road system or access. Within the Fawn Lake Inventoried Roadless Area (IRA), maintenance would not occur, and erosion control features would not be installed, resulting in ongoing erosion and may lead to limited access by unmodified 4WD vehicles.

Remoteness – Same as Alternative 1

Visual Characteristics – Same as Alternative 1

Facilities and site management – No additional trails would be designated to access dispersed recreation. Because there would be no decision of inclusion/exclusion of user-created or unauthorized routes, vehicle use on those routes will likely continue until the Forest Service determines their status and the public is aware. There will be no clear direction about enforcement responsibilities because some of the routes are considered to be portions of the RS2477 road. Until that time, vehicle access in areas around Buck Island Reservoir and Winter Camp would likely continue, resulting in increased resource damage (soil erosion, sedimentation, and vegetation removal).

There would be no toilets installed, and users would continue to use the existing pit toilets and pack-it-out systems, compatible with the ROS (No facilities for user comfort), but not the norm.

The bridges across Ellis Creek and the Buck Island Outlet would not be constructed. The FOTR bridge and the downstream crossing would continue to be used.

Visitor Management – Responsibility for management would likely be shifted from the County, resulting in a reduction of education and enforcement along the Trail. There would be no physical controls added to manage vehicle and public access, resulting in areas of increased use off the Trail. Information would continue to be provided at trailheads, kiosks, and web sites, but may be decreased due to reduced sources of funding.

Social Encounters – There would likely be an increase in numbers and types of social encounters. If no easement is issued, law enforcement may be reduced, resulting in change of behaviors. Areas around Buck Island Reservoir would continue to have an increase in dispersed camping social encounters, resulting in inconsistency (unacceptable) with the ROS.

Visitor Impacts – There would be no areas managed for parking and travel, so impacts from visitors will continue. Vehicle travel and camping would continue to impact riparian areas including impacts on soil and vegetation.

Cumulative Effects – Alternative 2

No cumulative effects of taking no action.

Direct and Indirect Effects – Modified Alternative 3

Access – Same as Alternative 1

Remoteness – Same as Alternative 1

Visual Characteristics – Same as Alternative 1

Facilities and site management – The effects of Modified Alternative 3 are the same as Alternative 1 except for:

Addition of .54 miles of designated trail to access dispersed recreation would be managed by using native rock and log barriers, which conforms to the ROS class. Restricting vehicle access in areas around Buck Island Reservoir and Winter Camp would result in loss of some dispersed camping opportunity, but provide more than Alternative 1.

Addition of 6 toilets along the Rubicon Trail, removing user-constructed pit toilets, and continuing with use of pack-it-out systems, is consistent with the ROS (Rustic and rudimentary facilities primarily for site protection). Toilets would be designed to blend with the landscape, using wood and log exteriors rather than the traditional CXT concrete models. This could be inconsistent with the ROS if synthetic material is used, but not unacceptable (Facilities providing some comfort for the user as well as site protection, synthetic materials should not be evident.) This alternative would provide more facilities than Alternative 1, 2, 4 or 5.

Visitor Management – Same as Alternative 1

Social Encounters – Similar to Alternative 1

Visitor Impacts – This alternative would be the same as Alternative 1 except there would be no increased use at Spider Lake.

Cumulative Effects – Modified Alternative 3

Cumulative effects for Modified Alternative 3 are the same as described under Alternative 1.

Direct and Indirect Effects – Alternative 4

Access – Same as Alternative 1

Remoteness – Same as Alternative 1

Visual Characteristics – Same as Alternative 1

Facilities and site management – The effects of Alternative 4 are the same as Alternative 1 except for:

Addition of 1.0 miles of designated trail to access dispersed recreation would be managed by using native rock and log barriers, which conforms to the ROS class. Restricting vehicle access in areas around Buck Island Reservoir and Winter Camp would result in loss of some dispersed camping opportunity, but provide more than Alternative 1 or 3. Additional access would be provided by adding of a portion of 10N34B near Ellis Creek and a spur on the northwest side of Spider Lake, enhancing dispersed camping opportunities at those locations.

Addition of 5 toilets along the Rubicon Trail, removing user-constructed pit toilets, and continuing with use of pack-it-out systems, is consistent with the ROS (Rustic and rudimentary facilities primarily for site protection). Toilets would be designed to blend with the landscape, using wood and log exteriors

rather than the traditional CXT concrete models. This could be inconsistent with the ROS if synthetic material is used, but not unacceptable (Facilities providing some comfort for the user as well as site protection, synthetic materials should not be evident.) This alternative would provide more facilities than Alternative 1, 2, or 5.

Visitor Management – Same as Alternative 1

Social Encounters – Similar to Alternative 1

Visitor Impacts – This alternative would be the same as Alternative 1 except there would be no increased use at Spider Lake.

Cumulative Effects – Alternative 4

Cumulative effects for Alternative 4 are the same as described under Alternative 1.

Direct and Indirect Effects – Alternative 5

Access – The Rubicon Trail would remain primitive, providing challenge to 4WD vehicles and not accessible for use by standard highway vehicles. Ongoing maintenance would stabilize soil, but would not change the character of the **trail** system or access.

A single route with no variants (bypasses) may restrict use for unmodified 4WD vehicles and OHV's. Access by all vehicles would be prohibited from November 1 through July 1. Limited use may occur by private property owners allowed reasonable access to their in-holdings, providing this access does not cause resource damage.

Remoteness – Same as Alternative 1

Visual Characteristics – Same as Alternative 1

Facilities and site management – The effects of Alternative 5 are the same as Alternative 1 except for:

No additional trails would be designated to access dispersed recreation and existing routes currently used would be closed and restored. Vehicle access in areas around Buck Island Reservoir, Winter Camp, Ellis Creek, and Spider Lake would be limited, resulting in a decrease of dispersed recreation opportunities.

There would be no toilets installed, and users would continue to use the existing pit toilets and pack-it-out systems, compatible with the ROS (No facilities for user comfort), but not the norm.

Visitor Management – Parking for dispersed use or campground development would not be provided, so there are limited visitor controls. Responsibility for management would likely be increased by the County, resulting in an increase of education and enforcement along the Trail during the open season. There would be no physical controls added to manage vehicle and public access, resulting in areas of increased use on and off the Trail during seasonal operating period. Information would continue to be provided at trailheads, kiosks, and web sites.

Social Encounters – There would be an increase in numbers and types of social encounters because use would be concentrated during the open season. Areas around Buck Island Reservoir, Ellis Creek, and Spider Lake would continue to have an increase in dispersed camping during the summer, increasing social encounters, resulting in inconsistency (unacceptable) with the ROS. Social encounters between motorized and non-motorized users would be decreased during the winter because of the seasonal operating period.

Visitor Impacts – This alternative would concentrate use adjacent to the trail which may create additional impacts in areas previously not used for parking. There would be decreased parking available in areas previously used at Little Sluice, Buck Island, and Ellis Creek.

Cumulative Effects – Alternative 5

Cumulative effects for Alternative 5 are the same as described under Alternative 1.

Direct and Indirect Effects – Alternative 6

Access – The effects would be the same as Alternative 1 except access by all vehicles would be prohibited from November 1 through July 1. Limited use may occur by private property owners allowed reasonable access to their in-holdings, providing this access does not cause resource damage.

Remoteness – Same as Alternative 1

Visual Characteristics – Same as Alternative 1

Facilities and site management – The effects of Alternative 6 are the same as Alternative 1 except for:

Rock and log barriers would be placed along the trail for 300 feet on both sides of the Buck Island Reservoir Outlet (Little Rubicon River) and vehicle use and camping would be prohibited. In addition, dispersed camping at Winter Camp east to Little Sluice would be eliminated, resulting in a decrease in dispersed

recreation opportunity than Alternatives 1, 2, 3, and 4, but more than Alternative 5.

Addition of 4 toilets along the Rubicon Trail, removing user-constructed pit toilets, and continuing with use of pack-it-out systems, is consistent with the ROS (Rustic and rudimentary facilities primarily for site protection). Toilets would be designed to blend with the landscape, using wood and log exteriors rather than the traditional CXT concrete models. This could be inconsistent with the ROS if synthetic material is used, but not unacceptable (Facilities providing some comfort for the user as well as site protection, synthetic materials should not be evident.) This alternative would provide more facilities than Alternatives 1, 2, and 5.

Visitor Management – Placement of rocks, logs, and signs along the route to define the limits of the trail would be considered to be numerous and obvious, but would harmonize with the setting. This would be unacceptable for the ROS in the Semi-primitive motorized setting.

Social Encounters – Effects would be similar to those described in Alternative 1. Social encounters between motorized and non-motorized users would be decreased during the winter because of the seasonal operating period.

Visitor Impacts – Effects would be similar to those described in Modified Alternative 3.

Cumulative Effects – Alternative 6

Cumulative effects for Alternative 6 are the same as described under Alternative 1.

Inventoried Roadless Area _____

Affected Environment

The Fawn Lake Inventoried Roadless Area (IRA) is located in the eastern portion of the project area to the north of Buck Island reservoir, and extends eastward, along the northern border of Desolation Wilderness. This IRA is 1,160 acres in size. Elevations within the IRA range from just over 6,000 feet along the Rubicon River in the central portion of the IRA to nearly 8,000 feet near Lost Corner Mountain, in the easternmost portion of the IRA. The area displays a fairly rugged topography with large areas of exposed granite interspersed with subalpine and montane vegetation.

The Fawn Lake IRA is traversed in the eastern portion by the Pacific Crest National Scenic Trail, and is traversed in the western portion by the Rubicon OHV Trail. Recreational uses within the IRA consist of motorized recreation in the western portion and hiking and more limited equestrian use in the eastern portion. Some hiking and mountain biking does occur within the IRA along the Rubicon OHV Trail and some winter non-motorized recreation occurs within the IRA (see the Recreation section of this Chapter for additional information).

There are no live perennial stream crossings along the Rubicon Trail within the Fawn Lake IRA although the trail does cross a number of ephemeral streams. Additional information regarding the aquatic and hydrologic resources present within the Fawn Lake IRA, including the Buck Island Reservoir area and the Big Sluice area, are provided in the Hydrology and Riparian Resource section of this Chapter.

The Fawn Lake IRA was identified beginning with the Roadless Area Review and Evaluation (RARE) study completed in 1979. The RARE II study identified and evaluated roadless study areas for potential wilderness designation. The Fawn Lake IRA was not included for wilderness designation in the 1984 California Wilderness Act and so was made available for non-wilderness uses. The ENF Land and Resource Management Plan (1989) allocated the area of the Fawn Lake IRA and surrounding areas to Semi-primitive Motorized High Country (Management Area 7) and Special Areas (Management Area 4).

Analysis Framework

Introduction

Forest Service direction for management of IRAs is to provide lasting protection for IRAs. In particular, the direction is designed to maintain the roadless characteristics of the IRAs, which consist of: (1) high quality or undisturbed soil, water, and air; (2) sources of public drinking water; (3) diversity of plant

and animal communities; (4) habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land; (5) primitive, semi-primitive nonmotorized and semi-primitive motorized classes of dispersed recreation; (6) reference landscapes; (7) natural appearing landscapes with high scenic quality; (8) traditional cultural properties and sacred sites; and (9) other locally identified unique characteristics (Federal Register, 2001). A recent Ninth Circuit Court decision also directs the Forest Service to consider the effects of activities or improvements within roadless areas on the potential for designation as wilderness areas under the Wilderness Act (*Lands Council v Martin*, 2008). These qualities include untrammeled character, undeveloped, affected primarily by the forces of nature, and providing opportunities for solitude or a primitive and unconfined type of recreation. These characteristics are further described in Table 3-45.

Table 3-45: Description of the various characteristics of Roadless Areas.

Characteristics	Description
Roadless	
Soil, water and air resources	These three key resources are the foundation upon which other resource values and outputs depend. Healthy watersheds provide clean water for domestic, agricultural, and industrial uses; help maintain abundant and healthy fish and wildlife populations; and are the basis for many forms of outdoor recreation.
Sources of public drinking water	NFS lands contain watersheds that are important sources of public drinking water. Careful management of these watersheds is crucial in maintaining the flow of clean water to a growing population.
Diversity of plant and animal communities	Unroaded areas are more likely than roaded areas to support greater ecosystem health, including the diversity of native and desired nonnative plant and animal communities, due to the absence of disturbances caused by roads and accompanying activities. Inventoried roadless areas also conserve native biodiversity, by providing areas where nonnative invasive species are rare, uncommon, or absent.
Habitat for TES and species dependent on large undisturbed areas of land	Inventoried roadless areas function as biological strongholds and refuges for many species. Of the Nation's species currently listed as threatened, endangered, or proposed for listing under the Endangered Species Act, approximately 25% of animal species and 15% of plant species are likely to have habitat within IRAs on NFS lands.
Primitive, semi-primitive nonmotorized, and semi-primitive motorized classes of recreation	These areas often provide outstanding recreation opportunities such as hiking, camping, picnicking, wildlife viewing, hunting, fishing, cross-country skiing, and canoeing. While they may have many wilderness-like attributes, unlike wilderness, the use of mountain bikes and motorized means of travel is allowed.
Reference landscapes	The body of knowledge about the effects of management activities over long periods of time and on large landscapes is very limited. Reference landscapes can provide comparison areas for evaluation and monitoring. These areas provide a natural setting that may be useful as a comparison to study the effects of more intensely managed areas.

Characteristics	Description
Landscape character and integrity	High quality scenery, especially scenery with natural-appearing landscapes, is a primary reason that people choose to recreate. In addition, quality scenery contributes directly to real estate values in neighboring communities and residential areas.
Traditional cultural properties and sacred sites	Traditional cultural properties are places, sites, structures, art, or objects that have played an important role in the cultural history of a group. Sacred sites are places that have special religious significance to a group. Traditional cultural properties and sacred sites may be eligible for protection under the National Historic Preservation Act.
Wilderness	
Untrammeled	This quality monitors human activities that directly control or manipulate the components or processes of ecological systems.
Forces of Nature	This quality monitors both intended and unintended effects of modern people on ecological systems.
Undeveloped	This quality monitors the presence of permanent improvements such as structures, construction, habitations, and other evidence of modern human presence or occupation.
Outstanding opportunities for solitude or a primitive and unconfined type of recreation	This quality monitors conditions that affect the opportunity for people to experience solitude or primitive, unconfined recreation in a wilderness setting, rather than monitoring visitor experiences per se.

(Source; USDA Forest Service, 2000)

Forest Service regulations (36 CFR 294 Subpart B) prohibit road construction or reconstruction within IRAs, except in a limited number of circumstances. The regulations do recognize that road maintenance is permissible in IRAs. The preamble to the regulations clarifies that the regulations do not prohibit the authorized construction, reconstruction, or maintenance of motorized trails (Federal Register, 2001). Specific definitions for these terms are provided in these regulations and are included in the glossary of this EIS, Chapter 4. None of the Alternatives propose road construction or reconstruction, as defined in these regulations. The Action Alternatives do include maintenance of segments of the Rubicon Trail, including the portion of the Trail within the Fawn Lake IRA.

The analysis focuses on how each alternative would affect the Fawn Lake IRA and its roadless characteristics described above.

Data

Table 3-46 displays the number of miles of roads or trails that would be open for various types of public wheeled motor vehicle use in each of the alternatives considered, along with other factors relevant to the various alternatives. Semi-primitive motorized recreation is one of the dispersed recreation opportunities

which inventoried roadless areas provide, along with primitive and semi-primitive non-motorized recreation.

Table 3-46: Routes and Activities Within Fawn Lake IRA.

USE	Alt 1	Alt 2	Mod. Alt 3	Alt 4	Alt 5	Alt 6
Rubicon Trail	1.2 mi	1.2 mi	1.2 mi	1.2 mi	1.2 mi	1.2 mi
Unauthorized Routes to be added to the NFTS as motorized trails	0.43 mi	0 mi	0.43 mi	0.57 mi (one additional route on the N side, near Little Rubicon River)	0 mi	0.37 mi
Unauthorized routes where use may continue	0	1.4 miles	0	0	0	0
Unauthorized Routes to be rehabilitated and closed	0.71 mi	0 mi	0.71 mi	0.57 mi	1.4 mi	0.77 mi
Maintenance of the Rubicon Trail through construction of erosion control features and future maintenance.	41 sites	0	41 sites	41 sites	41 sites	41 sites
Number and size of areas where motor vehicle travel will be allowed to provide access for dispersed recreation such as camping	North Shore Buck Is Spur (0.05 acres) Dam Site (0.05 acres)	No sites	North Shore Buck Is Spur (0.05 acres) Dam Site (0.05 acres)	North Shore Buck Is Spur (0.05 acres) Dam Site (0.05 acres)	No sites	North Shore Buck Is Spur (0.05 acres) Dam Site (0.05 acres) ²
Number of Toilets to be installed within the IRA	0	0	2	3	0	2

Indicator Measures

To display the differences between the Alternatives, with respect to effects to the “roadless character” (as defined above) and potential for future wilderness designation, the following five indicator measures are used:

Indicator Measure 1: Opportunities for semi-primitive motorized and non-motorized recreation within the Fawn Lake IRA based on:

- **Indicator Measure 1-A:** miles of trails open to motor vehicle use. This includes routes to be managed by El Dorado County (the Rubicon Trail) and routes to be managed by the Forest Service (4WD trails to be added to the NFTS).
- **Indicator Measure 1-B:** number and size of areas to be designated for motor vehicle use to provide opportunities for vehicle travel and access for dispersed activities such as dispersed camping, day use, etc.

Indicator Measure 2: The potential for impacts to water quality based on:

- **Indicator Measure 2-A:** miles of trails open for motor vehicle use,
- **Indicator Measure 2-B:** miles of unauthorized routes to be closed or rehabilitated, and
- **Indicator Measure 2-C:** Number of sites along the Rubicon Trail where erosion control features would be installed.

Indicator Measure 3: The potential for impacts to water quality based on the implementation of a seasonal restriction of use.

Indicator Measure 4: Changes in habitat for TES and species dependent on large undisturbed areas of land.

Indicator Measure 5: Changes in potential for future wilderness designation, based on effects to untrammeled character and permanent developments.

These indicator measures were selected to best represent the eight elements defining the “roadless character” and the elements defining potential for future designation as a wilderness area.

Environmental Consequences

Direct and Indirect Effects

All of the alternatives allow for continued motor vehicle use of the Rubicon Trail (1.2 miles in length within the IRA), and so all have the same opportunities for semi-primitive motorized recreation along this trail. However, by providing opportunities for parking for dispersed camping or other dispersed recreation, the quality of opportunities for semi-primitive motorized recreation is improved where access is allowed near Buck Island Reservoir. Conversely, there is a minor change in opportunities for primitive and semi-primitive non-motorized

recreation between the different alternatives, with the greatest opportunity in Alternative 5, due to the prohibition of motor vehicle use near Buck Island Reservoir.

Trail segments allowing continued motor vehicle use either through issuance of an easement to El Dorado County or addition to the NFTS would not support native vegetation within the trail prism or wheel treads. Within the Fawn Lake IRA, there are many areas of barren rock, although there are also many segments of routes that did support native vegetation prior to vehicle use or route construction. Even areas that appear to be barren rock can support native vegetation in shallow pans or along fractures in the rock. Recovery of natural vegetation would occur within routes where motor vehicle use is prohibited or precluded. This would benefit the natural condition of the landscape, the health of soil and water resource, and plant and animal communities.

Table 3-47: Description of Effects.

Characteristics	Description of Effects
Roadless	
Soil, water and air resources	Roads are a primary human-caused source of soil and water disturbances in forested environments (USDA Forest Service 2000). Erosion from roadbeds of native surface roads may be significant and further contribute to sedimentation in stream channels (Kattelmann 1996). Roads may also lead to impacts to riparian habitat from vegetation loss, stream channel alteration, changes in surface and subsurface hydrology, increases in water temperature, and fragmentation of riparian vegetation (Kattelmann and Embury 1996). Motor vehicle use of native surface roads further contributes to soil and water disturbance in forested environments through erosion and tire throw (Sack and da Luz, 2003). Portions of routes proposed for rehabilitation, where soil is present, would revegetate over time, reducing erosion and sediment delivery into nearby streams or water bodies. Use of trails during the wet season can lead to trail widening, vegetation loss, soil compaction, and soil displacement, depending on the soil type and depth, vegetation condition, and effective groundcover. These impacts occur in areas where vehicles avoid obstacles such as snow drifts driving where exposed soils lack effective groundcover in the form of rocks, vegetation, adequate snow cover, and downed woody debris.
Sources of public drinking water	There are no direct sources of public drinking water within the Fawn Lake IRA. Buck Island Reservoir and the Rubicon River serve as a source of drinking water for downstream residents. Introduction of sediment, fecal matter, or petrochemicals impacts water quality for domestic uses and requires water treatment prior to use.

Characteristics	Description of Effects
Diversity of plant and animal communities	Designation of specific routes for vehicle use would confine habitat disturbance too immediately along those routes. Rehabilitation and closure of routes not designated for use would reduce habitat disturbance within the IRA. Barriers will be installed in the action alternatives in order to block access to sensitive plant occurrences in the vicinity of the Rubicon Trail. Additionally, where diversity of plant and animal communities is dependent on undisturbed areas, these communities would benefit from the action alternatives.
Habitat for TES and species dependent on large undisturbed areas of land	Designation of specific routes for vehicle use and rehabilitation of routes not designated for use would reduce habitat disturbance within the IRA and would benefit plant and animal communities dependent on undisturbed areas. As described more completely in the Terrestrial Wildlife section, fisher, marten, wolverine, and Sierra Nevada red fox are species dependent on large undisturbed areas. The Fawn Lake IRA lies adjacent to Desolation wilderness and creates a large undisturbed area. Those alternatives that designate fewer miles of routes or rehabilitate more miles of routes would benefit habitat for these species.
Primitive, semi-primitive nonmotorized, and semi-primitive motorized classes of recreation	Designation of the Rubicon Trail and specific routes along the trail, along with maintenance of those routes would provide a more well managed semi-primitive motorized recreation opportunity than currently exists and would provide access for dispersed activities along the Rubicon Trail. However, some forms of primitive and semi-primitive non-motorized recreation may be negatively impacted by the noise and presence of motor vehicles.
Reference landscapes	Gradual revegetation of rehabilitated and closed routes would reduce the number of routes on the landscape and increase the usefulness of the area as a reference landscape.
Landscape character and integrity	The action alternatives would all provide for maintaining or improving the scenic integrity and natural appearance of the IRA.
Traditional cultural properties and sacred sites	There are currently no known traditional cultural properties or sacred sites that would be affected by the proposed activities within the IRA.
Wilderness	
Untrammeled	The alternatives do not directly control or manipulate the components or processes of ecological systems to an extent that affects the untrammeled quality.
Forces of Nature	Ongoing maintenance, along with continued motor vehicle use, may have the unintended risk of the spread of noxious weeds, although no noxious weed occurrences have been observed within the IRA. Rehabilitation of routes and placement of traffic barriers would allow for revegetation and would allow for gradual recovery to a natural state in those areas.
Undeveloped	Alternatives 3 and 6 include installation of 2 restrooms in popular dispersed camping areas and Alternative 4 proposes installation of 3 restrooms. These developments would reduce the undeveloped character in these locations. No other alternatives include new developments within the IRA. All of the action alternatives rehabilitate some or all of the existing unauthorized routes which would improve the undeveloped character.

Characteristics	Description of Effects
Outstanding opportunities for solitude or a primitive and unconfined type of recreation	All of the alternatives allow for motor vehicle use along the Rubicon Trail, and so there is no measurable difference between the alternatives in relation to opportunities for people to experience solitude or primitive, unconfined recreation in a wilderness setting.

Direct and Indirect Effects - Alternative 1

Indicator Measure 1: In this alternative, current motorized use of the Rubicon Trail (1.2 miles in length within the IRA) and 0.43 miles of existing unauthorized routes would be authorized. This alternative would provide less access for dispersed camping and other associated recreation than Alternatives 2 and 4 (Table 3-46). This alternative also designates two areas, each 2,500 square feet (0.05 acres) in size, where motor vehicle use would be allowed in order to provide access to popular dispersed camping areas within the IRA. However, this alternative, along with Alternatives 3 and 4, would provide the second least opportunities for undisturbed primitive (non-motorized) recreation and there would likely continue to be conflicts between motorized and non-motorized recreationists due to vehicle noise and presence. The portion of the IRA adjacent to the Rubicon Trail does not receive much non-motorized recreation at this time, in comparison to the level of motorized recreation, and so the level of conflict is relatively low.

Indicator Measures 2-3: This alternative would have similar potential for impacts to the roadless character to Alternative 4 and would have additional impacts as compared to Alternatives 3, 5 and 6, from continued impacts to water quality through erosion of trail surfaces and subsequent sedimentation within stream channels, and delivery of petrochemicals to water bodies such as Buck Island Reservoir and the Rubicon River. The implementation of erosion control measures along the Rubicon Trail segment within the IRA would reduce erosion and sedimentation. This alternative does not propose the installation of any new toilets within the IRA. Therefore, inadequate disposal of human waste would continue to result in fecal matter being available for delivery to Buck Island Reservoir and downstream waters.

Under Alternative 1, wet season use of the trail may occur by recreationist using the trail. As described in the Hydrology and Riparian Resources section of this Chapter, trail widening, vegetation loss, soil compaction, and soil displacement could occur during wet season use on some segments of the trail and those routes designated for continued use, depending on soil type and depth, vegetation condition, and effective groundcover. These impacts are most likely to occur early and late in the wet season, when vehicles are able to access the Fawn Lake IRA. Water quality impacts associated with wet season use

include continued sediment delivery to nearby hydrologic features, periods of increased turbidity, contaminant delivery to nearby hydrologic features, and transport of contaminants such as petroleum based products and other solvents from vehicles crossing ephemeral streams or driving on the trail when it is conveying water. The implementation of the erosion control features called for in the El Dorado County SSWQPP would reduce the impacts from wet season use over those impacts that would occur in Alternative 2.

Indicator Measure 4: This alternative would have similar potential for impacts to the roadless character as Modified Alternative 3 and Alternative 6 through continued disturbance of habitat for TES plant and wildlife species and other species dependent on large undisturbed areas, as explained more completely in the Terrestrial Wildlife section of this Chapter. This alternative would have lower impacts on habitat for marten, fisher, wolverine and Sierra Nevada red fox than Alternatives 2 and 4, but greater impact on habitat for these species than Alternative 5. The installation of barriers will provide increased protection for sensitive plant occurrences in the vicinity of the Rubicon Trail by blocking access to these occurrences.

Indicator Measure 5: This alternative would slightly improve the potential for future wilderness designation in comparison to the current condition, by rehabilitating and closing 0.71 miles of unauthorized routes within the IRA. This alternative does not propose installation of any toilets, so there is no change in the undeveloped character of the IRA.

Direct and Indirect Effects - Alternative 2

Indicator Measure 1: In this alternative, current motorized use of the Rubicon Trail (1.2 miles in length within the IRA) will continue. Use on the 1.14 miles of existing unauthorized routes may continue but would not be authorized and these routes would not be shown on the Motor Vehicle Use Map. This alternative would provide the highest level of access for dispersed camping and other associated recreation (Table 3-46). However, this alternative would provide the least opportunities for undisturbed primitive (non-motorized) recreation and there would likely continue to be a low level of conflicts between motorized and non-motorized recreationists due to vehicle noise and presence.

Indicator Measures 2-3: This alternative would have the greatest potential for impacts to the roadless character due to continued impacts to water quality from erosion of trail surfaces and subsequent sedimentation within stream channels, delivery of petrochemicals to water bodies such as Buck Island Reservoir and the Rubicon River, the lack of implementation of erosion control measures along the Rubicon Trail segment within the IRA, and the lack of measures to address inadequate disposal of human waste, resulting in fecal matter being available for delivery to Buck Island Reservoir and downstream

waters. In addition, in this alternative use of unauthorized routes may continue, with sediment delivery from exposed soils in close proximity to Buck Island Reservoir and other hydrologic features. In this alternative, the lack of a seasonal restriction of use on the Rubicon Trail would lead to trail widening, vegetation loss, soil compaction, and soil displacement. Impacts to soil conditions could lead to the formation of ruts, rills, gullies, and compacted surfaces, which may increase hillslope erosion rates and deliver sediment laden flow to nearby hydrologic features, while compacted surfaces lead to decreased infiltration rates and thereby accelerated hillslope runoff and erosion rates.

As stated above, this alternative does not include the installation and maintenance of erosion control measures along the Rubicon Trail within the IRA. These erosion control features are designed to convey flows and capture sediment. Therefore, the trail surface would continue to degrade, concentrate runoff during snowmelt conditions, and transport high sediment loads. Contaminants such as petroleum based products and other solvents could be directly delivered to nearby hydrologic features at ephemeral stream crossings and when the trail is transporting a considerable amount of water.

Indicator Measure 4: This alternative would have the greatest potential for impacts to the roadless character through continued disturbance of habitat for marten, fisher, wolverine, Sierra Nevada red fox and other species dependent on large undisturbed areas, as explained more completely in the Terrestrial Wildlife section of this Chapter.

Indicator Measure 5: This alternative would not improve the potential for future wilderness designation since none of the unauthorized routes would be rehabilitated or closed. This alternative does not propose installation of any toilets, so there is no change in the undeveloped character of the IRA.

Direct and Indirect Effects - Modified Alternative 3

Indicator Measure 1: In this alternative, current motorized use of the Rubicon Trail (1.2 miles in length within the IRA) and 0.43 miles of existing unauthorized routes would be authorized and two areas, each 2,500 square feet (0.05 acres) in size are designated, where motor vehicle use would be allowed in order to provide access to popular dispersed camping areas within the IRA. Similar to Alternative 1, this alternative would provide less access for dispersed camping and other associated recreation than Alternatives 2 and 4 (Table 3-46). This alternative, along with Alternatives 1, 4, and 6 would provide the second least opportunities for undisturbed primitive (non-motorized) recreation and there would likely continue to be a low level of conflicts between motorized and non-motorized recreationists due to vehicle noise and presence.

Indicator Measures 2-3: This Alternative would have less impact to the roadless character than Alternatives 1, 2 and 4, through reduced impacts to water quality from erosion of trail surfaces and subsequent sedimentation within stream channels as trail surfaces not open to use are restored or revegetate naturally. This alternative proposes installation of two toilets within the inventoried roadless area, in proximity to popular dispersed camping areas. These toilets are expected to help reduce the improper disposal of human waste and reduce the potential for fecal material reaching water bodies such as Buck Island Reservoir. Future maintenance and cleaning of these toilets will be accomplished by vehicles capable of negotiating the Rubicon Trail or other appropriate means. The effects of the implementation of the erosion control features identified in the SSWQPP are similar to those described for Alternative 1 with regards to Indicator Measures 2 and 3. However, this alternative also includes a saturated soil management strategy that may lead to closure of the Rubicon Trail if the SSWQPP measures are not effective. Because of this strategy, this alternative would further minimize sediment and contaminant delivery to nearby water bodies. Soil impacts, vegetation loss, turbidity increases, and contaminant delivery associated with wet season use as described in Alternative 1 would not occur.

Indicator Measures 4: The effects of this alternative are similar to those described for Alternative 1 with regards to Indicator Measure 4.

Indicator Measure 5: This alternative proposes to rehabilitate and close 0.71 miles of unauthorized routes within the IRA, thus improving the potential for future wilderness designation in comparison to the current condition. This alternative proposes installation of two toilets within the inventoried roadless area, leading to a reduction in the undeveloped character of the IRA.

Direct and Indirect Effects - Alternative 4

Indicator Measure 1: In this alternative, current motorized use of the Rubicon Trail (1.2 miles in length within the IRA) and 0.57 miles of existing unauthorized routes would be authorized. This alternative includes the designation of one additional trail (NSRELD-63-U) not included in Alternatives 1, Modified 3 and 6, located just east of Little Rubicon River in the western portion of the IRA. This route provides access to a dispersed camping area. This alternative also designates two areas, each 2,500 square feet (0.05 acres) in size, where motor vehicle use would be allowed in order to provide access to popular dispersed camping areas within the IRA. This alternative would provide slightly more access for dispersed camping and other associated recreation than all other alternatives except Alternative 2 (Table 3-46). This alternative, along with Alternatives 1, Modified 3 and 6 would provide the second least opportunities for undisturbed primitive (non-motorized) recreation

and there would likely continue to be a low level of conflicts between motorized and non-motorized recreationists due to vehicle noise and presence.

Indicator Measures 2-3: This alternative would have less impacts to the roadless character than Alternative 2, but greater impacts than Alternatives Modified 3, 5 and 6 due to reduced impacts to water quality from erosion of road surfaces and subsequent sedimentation within stream channels, since this alternative does not include a seasonal operating period during wet conditions, should the SSWQPP measures not be effective, and rehabilitates and closes some unauthorized routes, but not as many as Alternatives Modified 3, 5 and 6. This alternative proposes installation of three toilets within the IRA, in proximity to popular dispersed camping areas. These toilets are expected to help reduce the improper disposal of human waste and reduce the potential for fecal material reaching water bodies such as Buck Island Reservoir. Future maintenance and cleaning of these toilets will be accomplished by vehicles capable of negotiating the Rubicon Trail or other appropriate means. The effects of the implementation of the erosion control features identified in the SSWQPP are similar to those described for Alternative 1 with regards to Indicator Measures 2 and 3.

Indicator Measures 4: This alternative would have increased impacts on habitat for marten, fisher, wolverine and Sierra Nevada red fox than Alternatives 1, Modified 3, 5 and 6, but less impact on habitat for these species than Alternative 2 through continued disturbance of habitat for these species, as explained more completely in the Terrestrial Wildlife section of this Chapter.

Indicator Measure 5: This alternative proposes to rehabilitate and close 0.57 miles of unauthorized routes within the IRA, thus improving the potential for future wilderness designation in comparison to the current condition. This alternative proposes installation of three toilets within the inventoried roadless area, leading to a reduction in the undeveloped character of the IRA.

Direct and Indirect Effects - Alternative 5

Indicator Measure 1: Current motorized use of the Rubicon Trail (1.2 miles in length within the IRA) would be authorized in this alternative but no unauthorized routes would be added to the NFTS, nor any areas where motor vehicle use would be allowed, thus leading to a reduction in access for dispersed recreation activities such as camping, in comparison to other alternatives (Table 3-46). This alternative would provide a marginally higher level of opportunities for undisturbed primitive (non-motorized) recreation, although these opportunities are in proximity to the Rubicon Trail. There would likely continue to be a low level of conflicts between motorized and non-motorized recreationists due to vehicle noise and presence.

Indicator Measures 2-3: This Alternative would have the least impact to the roadless character through reduced impacts to water quality from erosion of trail surfaces and subsequent sedimentation within stream channels as trail surfaces not open to use are restored or revegetate naturally. The effects of the implementation of the erosion control features identified in the SSWQPP are similar to those described for Alternative 1 with regards to Indicator Measures 2 and 3. This alternative does not propose the installation of any new toilets within the IRA. Therefore, inadequate disposal of human waste would continue to result in fecal matter being available for delivery to Buck Island Reservoir and downstream waters. By not designating trails to provide access for dispersed camping and other activities, there may be a reduction in the number of vehicles stopping in the vicinity of Buck Island Reservoir, thus reducing the amount of human waste being disposed in the area, although there would still be some amount of camping in the area.

Under Alternative 5 a seasonal operating period is proposed which would prevent wet season vehicular use except in the rare case of an early storm or late runoff conditions that occur during the season of use. A seasonal operating period would prevent trail widening, vegetation loss, soil compaction, and soil displacement resulting from wet season use, particularly early and late in the wet season, when vehicles are able to access the portion of the Rubicon Trail within the IRA. Limited use may occur by private property owners allowed reasonable access to their in-holdings, providing this access does not cause resource damage.

Indicator Measures 4: This alternative would have the least impacts on habitat for marten, fisher, wolverine and Sierra Nevada red fox within the Fawn Lake IRA due to designating the fewest miles of routes open for OHV use and rehabilitating the greatest number of miles of routes, as explained more completely in the Terrestrial Wildlife section of this Chapter.

Indicator Measure 5: This alternative proposes to rehabilitate and close 1.0 miles of unauthorized routes within the IRA, thus improving the potential for future wilderness designation in comparison to the current condition. This alternative does not propose installation of any toilets, so there is no change in the undeveloped character of the IRA.

Direct and Indirect Effects - Alternative 6

Indicator Measure 1: In this alternative, current motorized use of the Rubicon Trail (1.2 miles in length within the IRA) and 0.37 miles of existing unauthorized routes would be authorized and two areas, each 2,500 square feet (0.05 acres) in size are designated, where motor vehicle use would be allowed in order to provide access to popular dispersed camping areas within the IRA. Similar to Alternative 1, this alternative would provide less access for dispersed

camping and other associated recreation than Alternatives 2 and 4 (Table 3-46). This alternative eliminates motor vehicle access to one dispersed camping area east and above Buck Island Reservoir (at NSRELD-63-H and NSRELD-63-HA). This alternative, along with Alternatives 1, 3 and 4 would provide the second least opportunities for undisturbed primitive (non-motorized) recreation and there would likely continue to be a low level of conflicts between motorized and non-motorized recreationists due to vehicle noise and presence.

Indicator Measures 2-3: This Alternative would have less impact to the roadless character than Alternative 1, 2, 3 and 4, through reduced impacts to water quality from erosion of trail surfaces and subsequent sedimentation within stream channels as trail surfaces not open to use are restored or revegetate naturally. Defining the travel way and turnouts along the Rubicon trail and other authorized routes will reduce the unintentional travel off of the designated routes, thus reducing impacts to vegetation and subsequent erosion and soil loss. Eliminating vehicle use and dispersed camping within 300 feet of Little Rubicon River will reduce impacts in the westernmost portion of the IRA. This alternative proposes installation of two toilets within the inventoried roadless area, in proximity to popular dispersed camping areas. These toilets are expected to help reduce the improper disposal of human waste and reduce the potential for fecal material reaching water bodies such as Buck Island Reservoir. Future maintenance and cleaning of these toilets will be accomplished by vehicles capable of negotiating the Rubicon Trail or other appropriate means. The effects of the implementation of the erosion control features identified in the SSWQPP are similar to those described for Alternative 1 with regards to Indicator Measures 2 and 3. However, this alternative also includes a seasonal operating period for the Rubicon Trail which would further minimize sediment and contaminant delivery to nearby water bodies. Soil impacts, vegetation loss, turbidity increases, and contaminant delivery associated with wet season use as described in Alternative 1 would not occur. Limited use may occur by private property owners allowed reasonable access to their in-holdings, providing this access does not cause resource damage.

Indicator Measures 4: The effects of this alternative are similar to those described for Alternative 1 with regards to Indicator Measure 4.

Indicator Measure 5: This alternative proposes to rehabilitate and close 0.77 miles of unauthorized routes within the IRA, thus improving the potential for future wilderness designation in comparison to the current condition. This alternative proposes installation of two toilets within the inventoried roadless area, leading to a reduction in the undeveloped character of the IRA.

Cumulative Effects for all Alternatives

The greatest potential threats to maintaining the roadless characteristic of the Fawn Lake IRA is road construction, reconstruction and timber harvest within the IRA (USDA Forest Service 2000). Under all of the alternatives, no new road construction or reconstruction is proposed nor is any timber harvest proposed. Alternatives 1, 3 and 4 propose to add existing unauthorized routes to the NFTS as motorized trails.

Motor vehicle use has historically taken place within the Fawn Lake IRA, which has resulted in the existing network of 2.34 miles of motorized routes. This motorized use has occurred within the IRA since well before the establishment of the IRA in 1978. Therefore, adding existing unauthorized routes to the NFTS as motorized trails would have no cumulative effect on the roadless characteristic.

Cultural Resources

Affected Environment

Background

Cultural resources, the remains of past human activity, provide a record of human activity within the ecosystem and a meaningful context for resource managers to assess the existing condition of a landscape. The analysis area contains evidence of an extensive record of human activity, with the heaviest use occurring within the last 4,000 years. Materials discovered from the Eldorado National Forest indicate that people have been visiting this general vicinity for at least 7,000 years. Cultural resource sites in the analysis area are comprised of both historic and prehistoric properties that represent several thousand years of human occupation. Heritage input for this description of the affected environment draws from Eldorado National Forest Heritage Resource Report R2005-05-03-50013 by Krista Deal (Deal, 2005a), which looks at the influences of the earliest inhabitants on the environment of the Rubicon Landscape Analysis Area (RLA) in the northern and eastern sections of the Pacific Ranger District, an area that includes the Rubicon Trail.

The earliest Native American groups to use the area hunted large animals, such as deer, with darts propelled by a throwing stick (which was replaced by the bow and arrow around 1,500 years ago). Plant resources were exploited for tools, medicines and food (Anderson n.d.; Barrett and Gifford, 1933; d'Azevedo, 1986; Deal, 2001; Hill, 1972; Smith, 1993; Walter et. al., 1993). Seeds from a variety of plants were ground into flour or meal on millingstones (flat stone grinding slabs) or in bedrock mortars (grinding holes in boulders or outcrops). For a detailed discussion of the cultural materials, lifeways and climate associated with regionally-defined archaeological complexes, see Elston et al., 1977; Jackson and Ballard 1999; Jackson et al. 1994; Markley and Henton, 1985; and Tremaine and Jackson, 1995.

By 500 years ago, permanent villages were well established on the western Sierran slopes at elevations generally below 3,500 feet (or lower than the winter snowline), with most of the known villages occurring well below Forest lands. Inhabitants of these villages, as well as people from the east side of the Sierra, were visiting what is now the project area to procure resources not available at lower elevations. Archaeological evidence in the project vicinity points to the presence of a few permanent villages in the lower elevations (primarily on the Georgetown District) and numerous temporary and residential base camps where seeds were processed on millingstones or in bedrock mortars, and where stone tools were manufactured or refurbished.

By late prehistoric times, ethnographic data suggests the analysis area was used primarily by the Nisenan Maidu and the Washoe. Nisenan winter villages were below the snowline on the west slope of the Sierra. Washoe permanent villages were east of the Sierran Crest, near the present-day Reno to Markleeville area. The seasonal rounds of both groups brought them to the higher elevations during the warm months where they established base camps. Both groups would have used the analysis area as a travel corridor and locale to secure acorns, pine nuts, deer, fish, plants and other resources, and each would acquire a variety of items through trade with each other and the neighboring Northern Sierran Miwok.

One of the established Washoe “trek routes” used in late prehistoric times to ferry acorns across the mountains followed what is currently a portion of the Rubicon Trail (d’Azevedo, 1986; Freed, 1966). This route brought Washoe to the northern portions of Lake Tahoe to McKinney Creek, then up to Rubicon Springs where mineral waters were sought for ‘intestinal complaints’. The route then went to Bunker Lake, where ‘a few days were spent hunting deer’, then on to the Georgetown area where acorns were secured in the fall. Acorns were then relay-cached across the Sierras to winter villages at the base of the eastside of the Sierras, with some acorns cached in the mountains over winter.

The RLA has several unusual prehistoric resources including rock enclosures, rock rings, cairns, and petroglyphs. The petroglyphs represent the southernmost known location of the Style 7, High Sierra Abstract-Representational (Payen, 1966), a rock art style tentatively associated with the Middle Archaic time period and the Martis Archaeological Complex (as early as 4,000 years ago) (Foster et al., 2005; Elsasser and Gortner, 1991; Gortner, 1984, 1986). Deal (1990, 2008a) highlights the finding that the particular Washoe trek route along the modern Rubicon Trail overlays the location of petroglyph sites along the southern boundary of the known Style 7 petroglyphs. In synthesizing ethnographic information, archaeological evidence (i.e., lithic material types), and the belief among professional sources that the Style 7 petroglyphs were made by the Martis, Deal (1990, 2008a) goes on to suggest a likely ancestral relationship of the earlier Martis to the Washoe.

Eastern portions of the historic Georgetown-Tahoe Wagon Road, which would eventually become Wentworth Springs Road and the Rubicon Trail, were first used by Euroamerican immigrants from the Elisha Stevens party in 1844, who were shown the easternmost route out of the Lake Tahoe basin by the Washoe (Deal, 1997). The historic Georgetown-Tahoe wagon road and Rubicon Trail is shown on early maps as a pack trail, likely in use historically as early as the 1850s when the trail was developed across the mountains following the McKinney Creek – Gerle Meadow route to Georgetown (Supernowicz, 1982). Much of the historic use of the analysis area was concentrated within some of

the larger meadow systems, with a heavy focus on sheep and dairy ranching, which may have begun as early as the 1850s when the pack trail was developed. This route was further developed in the 1860s into the Georgetown-Tahoe Wagon Road.

Major historic use of the analysis area occurred in the 1870s, with the development of water distribution systems and the local growth of the ranch and dairy industries. In the early 1870s, the California Water Company began developing the local water resources, drawing water from Gerle Creek and Loon Lake, in order to provide water to Company mines, local ranches and dairies, and farms in the Georgetown area (Baker and Shoup, 1993). In the 1880s, the Company made improvements to western and southern portions of the Georgetown-Tahoe Wagon Road. In the late 1880s, El Dorado County made improvements and developed the eastern and northern portions of the road and declared that the Rubicon Trail was a non-maintained public road.

Weekly stages were running over the road in the late 1880s, often stopping over at the resorts at Wentworth Springs and Rubicon Springs, both famous for their healthy mineral waters and as vacation spots. Local news accounts between 1880 and 1930 mentioned the steady flow of visitors to the area (Presba, 1983), many of whom camped at and near the mineral springs and hotel at both locations. From the 1880's into the 1940s, the "Rubicon Trail" was used to herd cattle, hogs, sheep and turkeys from the western slope of the Sierras to the Meeks bay area for summer grazing (Deal, 2010). The modern, annual "Jeepers Jamboree / Rubicon Trail", which began in 1953, follows essentially the same route from Georgetown to Lake Tahoe, overlaying in most part the historic wagon road (Morris, 2011; Presba, 1983). Five different modes of travel/transportation have been used through history to traverse the area being considered in this analysis: (1) prehistoric foot traffic, (2) historic wagons and foot traffic, (3) pack animals, (4) historic and modern automobiles, and (5) contemporary rock crawlers. All of these modes of transportation have either necessitated or desired slightly different routes.

The Forest Service began administering the public lands of the analysis area around the turn of the century (Deal, 2005a). In 1910, the Eldorado National Forest was established from lands previously managed by the Tahoe and Stanislaus National Forests, in combination with newly acquired lands. Early Forest Service administrative uses included the construction of guard stations, one of which is shown on historic maps in the analysis area. Recreation developments in this vicinity included the establishment of public campgrounds, trails, and the setting aside of Desolation Wilderness in 1969.

Area of Potential Effects

The Rubicon Trail Easement Project meets the definition of an undertaking that has the potential to cause effects to historic properties [36 CFR 800.16(y)]. Since the requested easement would allow El Dorado County to operate the Rubicon Trail as a highway, this project component along with the construction of erosion control features and the rehabilitation and closure of authorized and unauthorized routes will result in ground disturbance within road prisms. Foreseeable road maintenance activities associated with the requested easement have the potential to cause ground disturbance within 25 feet of centerline of the current alignment of the Rubicon Trail and up to 200 feet from centerline depending on the alternative action, location, and maintenance needs. There is potential for ground disturbance up to 600 feet from the current alignment as a result of activities associated with the addition of unauthorized routes to the National Forest Transportation System (NFTS) as well as activities associated with the closure of authorized and unauthorized routes, which potentially could lead to changes in the character of the historic Rubicon Trail. The construction of Ellis Creek Bridge will cause ground disturbance as a result of new bridge abutments, placement of new barrier rocks, installation of temporary water diversion systems, re-alignment of the Rubicon Trail to access the new bridge, and replanting of vegetation. New vault toilet installations have the potential to cause new ground disturbance with the exception of those located on granite bedrock. Minimal new ground disturbance will occur during replacement of the FOTR Bridge and construction of the Buck Island Lake Outlet bridge, however, these activities have the potential to affect the historic character of the Rubicon Trail.

The Area of Potential Effects (APE) for the Rubicon Trail Easement Project was delineated to include all direct and indirect effects of the various project components, and to maximize the area in which a reasonable and good faith effort could be made to conduct a cultural resource inventory of all evidence of current and past uses of the Rubicon Trail.

The APE for the Rubicon Trail Easement Project is a corridor that includes the contemporary alignment of the route that crosses Forest Service (FS) lands from the private property boundary west of Wentworth Springs Campground to the El Dorado and Placer County Line, approximately 6.5 miles. The APE includes 0.89 miles of authorized routes proposed for closure and rehabilitation in Alternatives 5 and 6, and an additional 2.98 miles of unauthorized routes on FS lands that are proposed to be added to the NFTS or proposed for closure and rehabilitation depending on the alternative.

The width of the APE for cultural resources is generally 400 feet (200 feet from centerline) along contemporary alignments and unauthorized routes. The width

of the APE increases up to 1,200 feet to incorporate unauthorized routes and all areas between alternative, and oftentimes parallel, segments of the Rubicon Trail where the route splits to accommodate bypasses, such as at the Little Sluice and the Old Sluice Box. The width of the APE incorporates the area of the requested easement on FS lands, the area of the proposed Ellis Creek bridge, the Friends of the Rubicon Trail (FOTR) bridge, the area of the proposed Buck Island Outlet bridge, the locations of all proposed erosion control features on FS lands, the areas around various wetlands, the locations of all proposed vault toilets, all authorized and unauthorized routes proposed to be rehabilitated and closed on FS lands, and all unauthorized routes proposed to be added to the NFTS along with any additional designated motor vehicle use areas with defined parking limits. There are 350 acres inside the APE (Serin, 2011a).

Analysis Framework

Introduction

Activities associated with the alternatives of this project will comply with the National Historic Preservation Act (NHPA) of 1966, as amended, and in accordance with provisions of the Programmatic Agreement among the U.S.D.A. Forest Service, Pacific Southwest Region, the California State Historic Preservation Officer, the Advisory Council on Historic Preservation regarding the identification, evaluation, and treatment of historic properties managed by the National Forests of the Sierra Nevada, California (USDA FS 1996)(Sierra Nevada PA). The procedures and stipulations within the Sierra Nevada PA include the identification and treatment of at-risk historic properties. An “at-risk” historic property is a property that has been identified as susceptible to being adversely affected as a result of activities associated with this project. An adverse effect to cultural resources is found when an undertaking may alter the characteristics of a historic property that qualify it for inclusion in the National Register of Historic Places in a manner that would diminish the integrity of the property’s location, setting, materials, workmanship, feeling, or association. [36 CFR 800.5(a)(1)]. A property is identified as “at-risk” based on that property’s characteristics, proximity to project activities, and landscape features. Therefore, there may be a lower number of at-risk historic properties than the number of known cultural resource sites located within the project’s APE.

Activities associated with the alternatives of this project will also comply with the Programmatic Agreement Among the United States Forest Service Pacific Southwest Region, the United States Army Corps of Engineers Sacramento District, the California Department of Transportation, the California State Historic Preservation Officer, and Advisory Council on Historic Preservation (ACHP) Regarding Undertakings Affecting the Rubicon Trail, El Dorado County,

California (USDA FS 2011)(Rubicon Trail PA), which received final signature by the ACHP on November 9, 2011. The Rubicon Trail PA only applies to the effects of an undertaking on the Rubicon Trail (ENF heritage site 05-03-55-545). The Rubicon Trail PA states that “To maintain the Rubicon Trail as an actively used transportation corridor will result in effects to its historic significance, but failure to do so will adversely affect it by hindering its historic use.” The procedures and stipulations within the PA include definition of the APE for the undertaking and treatment of this at-risk historic transportation corridor. Treatment consists of conducting a cultural resources inventory of all evidence of current and past uses of the Rubicon Trail within the APE and recording these uses so that there is sufficient information to evaluate the periods of significance, boundaries, contributing and non-contributing elements, integrity, and, if eligible, an assessment of the characteristics of the Rubicon Trail important to maintaining the integrity of the trail as an historic property (Stipulation II.D). If the Rubicon Trail is determined eligible for the NRHP, the Forest Service will apply the criteria of adverse effect (36 CFR 800.5(a)(1)), in consultation with SHPO, to determine if the undertaking may result in adverse effects to the Rubicon Trail (Stipulation II.A.4), except for routine maintenance activities which will be reviewed as screened Undertakings in accordance with Stipulation II.C and Attachment B of the Rubicon Trail PA.

Direct effects to at-risk historic properties include effects from on-the-ground project implementation activities described in Chapter 2, plus any use of stockpile or staging areas, within site boundaries. Direct effects include any types of ground disturbance, such as excavating or gouging native soil, downcutting, erosion, and rutting within site boundaries.

Indirect effects will occur at a later time and include the same types of ground disturbance described above, plus vandalism and looting. Indirect effects will be the result of future ongoing road maintenance by the County associated with granting the easement, effects associated with public motor vehicle use, dispersed camping and concentration of vehicles in designated motor vehicle areas, and increased access to at-risk sites.

The geographic scope of the cumulative effects analysis is the APE. This area includes the historic properties and recorded segments of the Rubicon Trail whose characteristics and locations suggest there have been an accumulation of effects from past management activities, and where an accumulation of effects is foreseeable as a result of the current project alternatives and future actions and events, including consequences of the alternatives on public motor vehicle use. Heritage resource monitoring activities within the APE have documented effects to previously known archaeological sites from past management activities.

Data

An examination of ENF heritage resource site location and inventory maps revealed that 171 acres (49%) of the APE received prior adequate cultural resource survey coverage, as documented in FS heritage resource reports by the following authors: Alblinger (1994), Deal (2002, 2005b, 2008b, 2010), Serin (2010a, 2010b, 2011b), and Tarbell and Associates (2004). Prior to conducting a cultural resource inventory for this project, six cultural resource sites were known to exist within the APE, including the Rubicon Trail (ENF heritage site 55-545).

The entire APE was either resurveyed or received new survey coverage between July 11 and October 24, 2011 using Surface-Intensive (0-15 meter) and Surface-30 (15-30 meter) transects by a minimum of two and a maximum of four people at any one time. Refer to the Section 106 technical report for detailed documentation and maps of the APE, plus the larger study area that was analyzed beyond the APE (Serin, 2011a).

The inventory strategy consisted of one person walking along the current alignment(s) of the Rubicon Trail, and other individuals spread 15 to 30 meters apart walking parallel. Large areas between alternative routes and bypasses were surveyed as separate units when parallel transects along the roads did not cover these areas adequately. More intensive survey (5-15 meter transects) occurred along and adjacent to any road or trail segments outside of the current alignment in an effort to identify evidence of historic use. Nearly all isolated artifacts were noted during inventory efforts with a description in a field journal along with an occasional sketch, photographs, and a GPS waypoint. During inventory, field personnel identified and intensively surveyed the locations of the three proposed bridge projects, proposed vault toilet locations, wetland areas, and areas where unauthorized routes will be added to the NFTS. Unauthorized routes to be rehabilitated and closed were surveyed in the same fashion as the current Rubicon Trail alignment.

Background research included an examination of historic maps to identify areas where past locations of the Rubicon Trail (formerly the Georgetown-Tahoe Wagon Road and Wentworth Springs Road) were different from where it exists today. In addition, GIS (ENF road and trail layers) and GPS software (Garmin) were used as tools for identifying the locations where roads and trails formerly existed, but are not in use today. Field survey was intensified (5-15 meter transects) in these locations to ensure cultural resource inventory of all evidence of current and past uses of the Rubicon Trail within the APE.

The entire length of the current alignment of the Rubicon Trail on FS lands, along with any road or trail segments in these areas suspected of having historic ties to the Rubicon Trail (ENF heritage site 55-545), were recorded

using Department of Parks and Recreation (DPR) Linear Feature Record forms. All segments considered part of the Rubicon Trail were recorded using GPS, photography, measurements, and some sketches (in accordance with provisions of the Rubicon Trail PA, Stipulation II.A) (Serin et al., 2011). ENF heritage staff recorded the Rubicon Trail as a discontinuous linear site comprised of 13 segments (with associated subsegments) on FS lands, beginning at Airport Flat to the southwest and ending at the Eldorado NF and Tahoe NF boundary to the northeast. Recorded segments 5 through 11 and a portion of segment 12 are within the APE. The total length of recorded Rubicon Trail segments within the APE is 10.6 miles (55,946 feet). The following tables display the different lengths of at-risk segments and the at-risk key locations along the Rubicon Trail by alternative.

Table 3-48: Recorded length of at-risk segments and number of at-risk key locations along the Rubicon Trail (ENF Site 05-03-55-545) by alternative.

	Alternative					
	1	2	3	4	5	6
Length of At-Risk Rubicon Trail Segments (feet)	13,553 feet	55,946 feet	13,687 feet	13,822 feet	17,196 feet	15,408 feet
(miles)	2.57 miles	10.6 miles	2.59 miles	2.62 miles	3.26 miles	2.92 miles
Number of At-Risk Key Locations	5	10	4	4	6	5

Table 3-49: Specific at-risk key locations along the Rubicon Trail by alternative.

At-Risk Key RT Locations (west to east)	Alternative					
	1	2	3	4	5	6
Segment 6.3 historic route	X	X	X	X	X	X
Segment 6.6 historic route	X	X	X	X	X	X
Ellis Creek Crossing	X	X	X	X	X	X
Segment 8.9 historic route		X				
FOTR Bridge	X	X	X	X	X	X
Segment 9.10 historic route		X				
Little Sluice		X				
Old Sluice Box		X			X	
Buck Island Outlet Crossing	X	X			X	X
Big Sluice		X				

Inventory resulted in the identification of nine new historic properties within the APE, and these were recorded on DPR Primary Record forms along with GPS data, photographs, and site overview sketch maps. In total, there are 14 historic properties within the APE, of which seven are *prehistoric*, six are *historic* (including the Rubicon Trail), and one is *multicomponent*. There is one additional prehistoric archaeological site (05-03-55-688) that has been evaluated and determined ineligible for the National Register of Historic Places (NRHP). The following table displays the different number of at-risk historic properties within the APE by alternative.

Table 3-50: Resources at risk within the APE by alternative.

Total Recorded Sites Within APE	At-Risk Historic Properties by Alternative**					
	1	2	3	4	5	6
16*	8	12	8	9	8	9

*The number of at-risk historic properties in each alternative is less than the number of known cultural resource sites located within the project's APE.

**See Table 3-49

The seven at-risk archaeological sites with a prehistoric component contain lithic scatters with subsurface cultural deposits. Of these, three sites (55-443, 55-700, 55-701) are bisected by, or immediately adjacent to, the current alignment of the Rubicon Trail and are within the proposed easement corridor. The other four sites (55-699, 55-707, 55-708, 55-710) contain prehistoric lithic scatters located outside of the easement corridor, but they are either adjacent to the current alignment or may be easily accessed by project equipment or public motor vehicles due to their close proximity to unauthorized routes. Site 55-710 is at risk in Alternative 4 due to the proposed addition of an unauthorized route to the NFTS. Values associated with buried deposits can be damaged by ground disturbances such as erosion, rutting, and downcutting of the soil along motorized vehicle routes. Sub-surface testing of one prehistoric site (55-443) confirmed the presence of a buried deposit that extends to both sides of the Rubicon Trail. Boundaries of the other sites are ill-defined as they have been based solely on surface observations. Sub-surface testing of these sites will only confirm the true extent of their boundaries.

Six at-risk archaeological sites contain an historic component, and include the Rubicon Trail, the remains of former recreation sites, habitation sites, and trash and can scatters. One site with an historic component (55-579) is immediately adjacent to the current alignment of the Rubicon Trail within the proposed easement corridor and is near stockpile and staging areas; there is also a restroom at this site that is slated to be moved. Two other sites (55-703, 55-712) are bisected by or immediately adjacent to unauthorized routes slated to

be closed and rehabilitated. Lastly, two sites with historic components (55-702, 55-707) are accessible for public motor vehicles due to their close proximity to unauthorized routes proposed for addition. No sites with an historic component are at risk of being adversely affected by the addition of unauthorized routes to the NFTS. Enhanced survey involving the use of metal detectors and/or subsurface testing at three at-risk sites with historic components (55-579, 55-702, 55-703) confirmed the presence of buried deposits.

The following table displays the specific at-risk historic properties by alternative.

Table 3-51: Specific Resources at Risk by alternative.

Site Number (west to east)	Site Type	Alternative					
		1	2	3	4	5	6
05-03-55-545 (Rubicon Trail)	Historic	X	X	X	X	X	X
05-03-55-699	Prehistoric	X	X	X	X	X	X
05-03-55-702	Historic		X				
05-03-55-579	Historic	X	X	X	X	X	X
05-03-55-443	Prehistoric	X	X	X	X	X	X
05-03-55-703	Historic	X	X	X	X	X	X
05-03-55-707	Multicomponent		X				
05-03-55-708	Prehistoric		X				
05-03-55-700	Prehistoric	X	X	X	X	X	X
05-03-55-701	Prehistoric	X	X	X	X	X	X
05-03-55-710	Prehistoric		X		X		X
05-03-55-712	Historic	X	X	X	X	X	X

Given that the documentation requirements of Stipulation II.A of the Rubicon Trail PA have been completed (Serin et al., 2011), routine road maintenance activities will result in no adverse effects to the historic integrity of the Rubicon Trail (55-545) per Stipulation 11.C and Attachment B of the Rubicon Trail PA. The Forest Service will continue to carry out the terms of the Programmatic Agreement for recorded lengths of the Rubicon Trail. Treatment includes recording changes to the Rubicon Trail alignment as a result of route closures and consulting with SHPO to avoid, minimize, or mitigate any potential adverse effects based on the results of the National Register Evaluation.

Treatment for identified at-risk historic properties will include applying specialized resource protection measures such as flagging, fencing, rock and log barriers, and/or the placement of foreign, non-archaeological material (padding) within the traveled way of an existing road during implementation of the project

activities. One or more of these treatments will potentially be used at sites 55-443, 55-699, 55-700, 55-701, 55-703, and 55-710. Project implementation monitoring by an archaeologist will occur at sites 55-443, 55-579, 55-700, 55-701, 55-703, 55-710, and 55-712. Treatment may include site evaluation and data recovery if protection measures are ineffective.

Indicator Measures

Indicator Measure 1: The recorded length of *at-risk segments* of the Rubicon Trail (FS site 05-03-55-545) and the number of *at-risk key locations* along the Rubicon Trail.

Indicator Measure 2: Total number of Resources at Risk.

Environmental Consequences

Direct and Indirect Effects – Alternative 1

Indicator Measure 1: This alternative puts the shortest overall recorded length of Rubicon Trail segments (2.57 miles) at risk. Of the total recorded length of at-risk segments in this alternative, over one-half has the potential to be directly negatively affected due to closure and rehabilitation of unauthorized routes; approximately one-third has the potential to be directly and indirectly affected due to activities associated with the creation and use of motor vehicle use areas, including installation of rock barriers and signs; and less than one-tenth has the potential to be directly affected by access to and utilization of stockpile and staging areas.

This alternative has a low potential to negatively affect at-risk segments along the Rubicon Trail, and has a high potential to reduce the risk of indirect impacts as a result of: (1) issuance of the easement and subsequent ongoing maintenance within the right-of-way resulting in decreased erosion and decreased trail widening and (2) continued public education and enforcement of regulations limiting public travel off designated routes. Some recorded segments of the Rubicon Trail (55-545) that are currently unauthorized routes would be added to the NFTS in this alternative. The addition of these segments to the NFTS has the potential to benefit the resource because routine maintenance will allow historic use of this transportation system to continue.

Due to closure of unauthorized routes and bridge construction (Ellis Creek crossing, FOTR Bridge, and Buck Island Outlet crossing) this alternative has moderate potential to directly negatively affect at-risk key locations along the Rubicon Trail. Project activities in these locations may require heavy ground disturbance as a result of construction, route realignment, rehabilitation and restoration, and the installation of new road features, all of which have the

potential to affect the historic character and setting of the Rubicon Trail in specific locations. A portion of one recorded at-risk Rubicon Trail segment (55-545, Segment 6.3) with evidence of historic road construction is considered an unauthorized route to be closed. Another at-risk Rubicon Trail segment (55-545, Segment 6.6) that is considered an unauthorized route to be closed and rehabilitated appears to retain integrity of location according to early historic maps, plus other elements of integrity.

Maintenance through the Little Sluice has the potential to have a positive direct effect in this key location by restoring this segment to its historic conditions based on two periods of significance: 1920s automobile route and 1940s-1950s original jeepers route.

Indicator Measure 2: This alternative has moderate potential to negatively affect at-risk historic properties in addition to the historic Rubicon Trail due to the number of resources at risk within and adjacent to unauthorized and authorized routes. One resource at risk (55-703) is bisected by an unauthorized route to be closed and rehabilitated and has the potential to be directly negatively affected as a result of ground disturbance inside site boundaries while moving natural barriers and installing waterbars across the route. Another resource at risk of being directly negatively affected (55-712) is located immediately adjacent to an unauthorized route to be closed and rehabilitated, and is located in close proximity to the stockpile and staging areas at the Buck Island overlook.

The current alignment of the Rubicon Trail runs immediately adjacent to or bisects four resources at risk (55-579, 55-443, 55-700, and 55-701) all of which are inside the proposed easement corridor. These historic properties have the potential to be indirectly negatively affected by erosion, rutting, and downcutting due to the operation of project equipment and ground disturbance inside site boundaries while conducting ongoing future County maintenance. An additional historic property (55-699) outside of the easement corridor, but adjacent to the current road alignment, is at risk due to potential impacts from project equipment accessing the project area along the Rubicon Trail from the west; this site is also at risk due to indirect effects from public motor vehicle access and dispersed camping.

Cumulative Effects - Alternative 1

Cumulative impacts of varying degrees have occurred within the APE from various land management activities including road construction, hydroelectric development, recreation developments, and grazing. Natural environmental processes and unrestricted land uses have also contributed to effects to cultural resources, including OHV use, dispersed recreation, unauthorized road and trail construction and maintenance, erosion, and exposure to the elements.

Since the 1970s, heritage resources have been primarily protected using “flag and avoid measures” during all project activities.

It is anticipated that future project management activities will not affect cultural resources to a significant degree on FS lands as these projects will be subject to NHPA Section 106 compliance and will include protection measures in the design and implementation of these projects or will include treatment options agreed upon with SHPO to resolve or mitigate potential adverse effects. If protection measures are effective at preventing direct adverse effects to at-risk historic properties located along unauthorized routes during project implementation (i.e., closure and rehabilitation of routes), then this alternative will have an overall beneficial effect to known historic properties in these locations as a result of prohibitions on public motor vehicle cross-country travel and decreased public access. These beneficial effects would also apply to cultural resource sites not yet discovered on FS lands in these locations (due to such factors as dense vegetation).

If protection measures are effective at preventing direct adverse effects to NRHP contributing segments of the Rubicon Trail during project implementation (i.e., closure of unauthorized routes), then this alternative has the potential to contribute an overall beneficial effect to this historic transportation corridor by reducing erosion and trail widening, preventing motor vehicle use on contributing segments outside of the right-of-way, and restoring and maintaining historic characteristics and integrity. Per Stipulation II.C of the pending Rubicon Trail PA, “Maintenance activities are considered an ongoing effect necessary for continuing the Rubicon Trail as a functioning transportation system”. Long-term maintenance of Rubicon Trail segments along the right-of-way and protection of other recorded segments inside the APE will support future research and interpretation on a larger geographic scale. This larger scale would potentially include the following areas that will not be affected by this project: (1) recorded segments of the Rubicon Trail on ENF lands outside the APE boundary, (2) recorded segments of the Rubicon Trail on the Tahoe National Forest, and (3) portions of the Georgetown-Tahoe Wagon Road that are suspected of being intact but have not been field verified and recorded on private property in El Dorado County.

Direct, Indirect, and Cumulative Effects – Alternative 2

Indicator Measure 1: Alternative 2 has the potential to negatively affect the entire length of recorded Rubicon Trail segments within the APE (10.6 miles), due to indirect and cumulative effects of limited future road maintenance and an undefined right-of-way. Anticipated indirect negative effects include erosion, trail incisement, and trail widening. Combined with the effects of an increase in extreme vehicle use and the consequences of an anticipated decline in law

enforcement, including continued public motor vehicle use on unauthorized routes, increased cross-country travel, and unauthorized road maintenance and modifications by the public, this alternative has the greatest potential to reduce the historic character and integrity of the route and threaten continued use of the Rubicon Trail as a functioning transportation system.

All key Rubicon Trail locations are at high risk of being indirectly negatively affected. The consequences of this alternative are likely to indirectly affect recorded Rubicon Trail segments that retain evidence of historic use and/or appear to retain integrity of location based on historic maps. The current alignment across Ellis Creek will continue to degrade and widen, as will the downstream crossing at the Buck Island Outlet where continued use is anticipated to occur. The characteristics of the current Rubicon Trail alignment across the FOTR Bridge have the potential to be negatively impacted by environmental effects as well as by continued motor vehicle use of the downstream crossing. A combination of environmental factors and unauthorized activities by public motor vehicle users have resulted in past modifications to the character of the Little Sluice, Old Sluice Box, and Big Sluice. Continued modifications as a result of these factors have high potential to indirectly negatively affect these key Rubicon Trail locations into the future given the foreseeable consequences of the no action alternative. Approved maintenance through the Little Sluice has the potential to have a positive direct effect at this key location as described in Alternative 1; however, limited ongoing future maintenance, a decline in law enforcement, and increased extreme vehicle use are likely to contribute to continued modifications along this segment.

Overall, the no action alternative has high potential to adversely affect the Rubicon Trail by hindering its historic use and could result in the loss of historic integrity of the Rubicon Trail at all key locations inside the APE.

Indicator Measure 2: This alternative has the greatest potential to cause negative indirect and cumulative effects to at-risk historic properties due to the high number of cultural resource sites in locations accessible to public motor vehicles, and as a result of there being an undefined right-of-way, increased use of extreme vehicles, and declining law enforcement. Erosion, rutting, downcutting, and vandalism are the primary negative cumulative effects anticipated for cultural resources located immediately adjacent to or bisected by the right-of-way of the Rubicon Trail. In addition to the at-risk historic properties in Alternative 1, four additional ENF heritage resource sites (55-702, 55-707, 55-708, and 55-710) are at risk of being negatively affected in Alternative 2.

As described for Alternative 1, four historic properties (55-579, 55-443, 55-700, 55-701) are at risk due to direct negative effects of approved maintenance through the Little Sluice, and one historic property (55-699) is at risk due to indirect negative effects of this maintenance.

Direct and Indirect Effects – Modified Alternative 3

Indicator Measure 1: The effects are the same as those described for Alternative 1 except that:

- The recorded length of at-risk Rubicon Trail segments is 134 feet (0.02 mile) longer in Modified Alternative 3 than it is in Alternative 1 due to potential direct effects from installation of additional vault toilets (Soup Bowl, Buck Island Dam, East Buck Island), and potential indirect effects from concentrated use in these areas.
- The location of the Buck Island Outlet crossing would not be at-risk due to the use of rock fill in Modified Alternative 3 rather than the construction of a bridge as proposed in Alternative 1.
- The authorized travel way will be at lower risk of indirect effects from erosion, trail incisement, and trail widening caused by public motor vehicle use as a result of a saturated soil management strategy.

Indicator Measure 2: The effects are the same as those described for Alternative 1.

Cumulative Effects – Modified Alternative 3

The effects are the same as those described for Alternative 1.

Direct and Indirect Effects – Alternative 4

Indicator Measure 1: The effects are the same as those described for Alternative 1 except that:

- The recorded length of at-risk Rubicon Trail segments is 269 feet (0.05 mile) longer in Alternative 4 than it is in Alternative 1 due to potential direct effects from installation of additional vault toilets near Buck Island Lake, and potential indirect effects from concentrated use in these areas.
- The location of the Buck Island Outlet crossing would not be at-risk due to the use of rock fill in Alternative 4 rather than the construction of a bridge as proposed in Alternative 1.

Indicator Measure 2: The effects are the same as those described for Alternative 1 except that:

- One additional historic property (55-710) downstream from the Buck Island Outlet crossing is at risk due to potential indirect effects of adding an unauthorized route to the NFTS and increasing access for public motor vehicles to that area.

Cumulative Effects – Alternative 4

The effects are the same as those described for Alternative 1.

Direct and Indirect Effects – Alternative 5

Indicator Measure 1: The effects are the same as those described for Alternative 1 except that:

- Among the action alternatives, Alternative 5 puts the longest overall recorded length of Rubicon Trail segments (3.26 miles) at risk; the recorded length of at-risk Rubicon Trail segments is 3,643 feet (0.69 mile) longer in Alternative 5 than it is in Alternative 1.
- Of the total recorded length of at-risk Rubicon Trail segments in this alternative, over one-quarter has the potential to be directly negatively affected due to closure and rehabilitation of authorized routes. Alternative 5 also proposes to close and rehabilitate the unauthorized routes north of Buck Island Lake rather than to add some of them to the NFTS as proposed in Alternative 1.
- The entire length of an at-risk Rubicon Trail segment (55-545, Segment 6.3) with evidence of historic road construction will be closed and rehabilitated, whereas only a portion of this segment is at-risk in Alternative 1.
- The Old Sluice Box is an additional key location along the Rubicon Trail that is at-risk due to the direct effects of closing and rehabilitating this authorized route.
- The single authorized travel way along the Rubicon Trail will be at low risk of indirect effects from erosion, trail incisement, trail widening, and rutting as a result of a requirement that there be a seasonal operating period from July 1st to November 1st. Limited use may occur by private property owners allowed reasonable access to their in-holdings, providing this access does not cause resource damage.

Indicator Measure 2: The effects are the same as those described for Alternative 1.

Cumulative Effects – Alternative 5

The effects are the same as Alternative 1 except that:

- Due to the higher mileage of authorized and unauthorized routes to be closed and rehabilitated in Alternative 5 compared to Alternative 1, there is greater potential from Alternative 5 for an overall beneficial effect to cultural resource sites in these locations as a result of decreased public access (if protection measures are effective at preventing direct adverse effects to at-risk historic properties while implementing route closures). These increased beneficial effects would also apply to cultural resource sites not yet discovered in these locations (due to such factors as dense vegetation).

Direct and Indirect Effects – Alternative 6

Indicator Measure 1: The effects are the same as those described for Alternative 1 except that:

- The recorded length of at-risk Rubicon Trail segments is 1,855 feet (0.35 mile) longer in Alternative 6 than it is in Alternative 1 due to potential direct effects from installation of additional vault toilets (i.e., Buck Island Dam, East Buck Island) and potential indirect effects from concentrated use in these areas; due to potential direct effects from elimination and restoration of the Long Bypass north of the Little Sluice; and due to potential direct effects from restoration work in the Soup Bowl area.
- Of the total recorded length of at-risk Rubicon Trail segments in this alternative, over one-half has the potential to be directly negatively affected due to closure and rehabilitation of authorized and unauthorized routes; approximately one-third has the potential to be directly and indirectly affected due to activities associated with the creation and use of areas designated for motor vehicle use with defined parking limits, including installation of rock barriers and signs, plus the installation, use, and maintenance of toilets; and one-tenth has the potential to be directly affected by access to and utilization of stockpile and staging areas.
- Additional recorded lengths of Rubicon Trail segments not represented in Table 3-48 may be at-risk due to the direct effects of installing barrier rocks, logs, signs, and trail markers along the authorized travel way.
- The authorized travel way will be at lower risk of indirect effects from erosion, trail incisement, trail widening, and rutting caused by public motor vehicle use as a result of a more clearly defined right of way and the requirement that there be a seasonal

operating period from July 1st to November 1st. Limited use may occur by private property owners allowed reasonable access to their in-holdings, providing this access does not cause resource damage.

Indicator Measure 2: The effects are the same as those described for Alternative 1 except that:

- In addition to the at-risk historic properties in Alternative 1, one additional heritage resource site (55-710) is at risk of being negatively affected due to restoration activities in dispersed camping sites inside the Little Rubicon RCA (within 300 feet from the creek).

Cumulative Effects – Alternative 6

The effects are the same as Alternative 1 except that:

- Due to the installation of barrier rocks, logs, signs, and trail markers along the authorized travel way in Alternative 6, and due to an enforcement and monitoring plan, there is greater potential from this alternative for an overall beneficial effect to cultural resource sites along authorized and unauthorized routes (provided that protection measures are effective at preventing direct adverse effects to at-risk historic properties while implementing route closures); the anticipated positive consequences of such measures in this alternative are decreased public motor vehicle cross-country travel and reduced public access along unauthorized routes. These increased beneficial effects would also apply to cultural resource sites not yet discovered (due to such factors as dense vegetation).

Socioeconomic

Affected Environment

The Rubicon Trail is located within El Dorado County and accessed by a variety of communities: Georgetown to the west, Placerville to the southwest, and Tahoma (Lake Tahoe) to the east. The trail crosses onto private property at the eastern edge of Little Sluice and crosses back onto NFS lands near the southern end of Old Big Sluice. The trail remains on NFS lands until it crosses onto private property north of True Big Sluice heading north into Rubicon Springs.

The Rubicon Trail is within a reasonable drive from several metropolitan areas: including two hours from Sacramento, CA; three and a half hours from San Francisco, CA; and an hour from Reno, NV. The eastern end of the Rubicon Trail is within 25 miles of the vacation resort town of South Lake Tahoe, which attracts visitors from around the world.

Population, Race, and Gender

El Dorado County is currently home to 182,019 people, with a projected population of over 225,439 by 2020. This projection is supported by the fact that population increase has been steady for the last ten years, with an average annual increase of almost 2 percent. The racial distribution for El Dorado County in 2010 was 84 percent white, 11 percent Hispanic, 2 percent Asian, .4 percent Black, .7 percent American Indian and Alaska Native, and 2 percent other. The gender distribution for El Dorado County in 2010 was 50 percent male and 50 percent female. The largest age group in El Dorado County in 2010 was the 50-59 year-old range which represents 18 percent of the total county population. This group is followed by those ages 40-49 with 16 percent of the total county population (California Department of Finance, Demographic Research Unit).

Local Economy

The economy of the area is concentrated in the following areas: professional, scientific, and technical; government and public administration; retail trade, real estate, and construction. In 2008, businesses with an average of two to four employees were the most common in the area.

Tourism in El Dorado County is important due to a number of attractions including wilderness areas, camping, hiking, and fishing opportunities. El Dorado County's tourism industry generated \$224.8 million in 2008, which is a 1 percent decrease from the previous year, and \$42.1 million more than the county generated in 1998. Statewide, tourism earnings increased 2 percent in 2008. Between 1992 and 2008, El Dorado County's tourism earnings made up

an annual average of 0.8 percent of all the tourism earnings in California. (El Dorado County Economic and Demographic Profile 2010-2011). The per capita personal income in 2008 for El Dorado County was \$49,187.

Towns and cities throughout California located near popular national forest OHV and recreation areas profit economically due to the expenditures made by forest visitors. Towns such as Georgetown, Placerville, Pollock Pines, and South Lake Tahoe benefit from those using the Rubicon Trail. These towns benefit from motor vehicle users who sleep, eat, buy gas, shop, and have repairs done close to the Rubicon.

Visitors with Disabilities

Within the population of El Dorado County 14 percent of people ages 5 and up have a disability. Twelve percent of the population in El Dorado County ages 21 to 64 have a disability. This is slightly higher than the statistics for the state of California which are 12 percent and 10 percent respectively.

Tribes

Important considerations in the fulfillment of the Forest Service mission is the trust relationship the Forest Service has with American Indians and Alaska Natives (Tribes) and the potential impact Forest Service policy, program, and project decisions may have on Tribes. The Forest often serves as a source of traditional medicines, food, firewood, and basket making materials. Within the administrative boundaries of the ENF are important historical and spiritual areas that have cultural significance for Tribes. Certain areas may also be particularly sacred and valued for their importance in sustaining cultural traditions and beliefs. Native people utilize motorized roads and trails to access these areas.

Analysis Framework

Indicator Measures

Indicator Measure 1: Effects to local economies.

Indicator Measure 2: Effects to minority or low-income populations or communities.

Indicator Measure 3: Effects to visitors with disabilities.

Indicator Measure 4: Effects to Tribes.

Environmental Consequences

Direct, Indirect, and Cumulative Effects for All Alternatives

Indicator Measure 1: A review of potential economic impacts was conducted to determine if the action alternatives 1, 3, 4, 5, and 6 would result in impacts to the area's economy relative to Alternative 2. It is assumed that primary changes from no action would include clarification of the entity responsible for operation and maintenance of the Rubicon Trail, construction of a bridge at Ellis Creek, replacement of the FOTR bridge, installation of vault toilets, addition of unauthorized routes, and closure of unauthorized routes. These changes would have minimal effects on the local economy.

The National Visitor Use Monitoring (NVUM) study results from 2003 were used to identify the percentages of motorized and non-motorized users on the Forest. This study estimated that approximately 3.3 percent of the visitors on the Forest identified OHV travel as their primary recreational activity. This equates to 70,690 visits of the 2.12 million visits to the Forest. Approximately 7.4 percent of forest visitors identified OHV travel as a primary or secondary recreational activity, which equates to 155,985 of the forest visits.

The NVUM surveys included questions about where Forest visitors came from and how much visitors spent within fifty miles of the Forest during their recreation visit. Results from this monitoring show that approximately 50% of the Forest visitors came from the counties surrounding or very near the Forest, including Alpine, Amador, Calaveras, Carson City (NV), Douglas (NV), El Dorado, Lyon (NV), Placer, Sacramento, and Yuba counties. This monitoring also shows that overnight recreation visitors spent on average \$125 per party per trip and day-visitors spent an average of \$30 per party per trip (Stynes and White 2005). The average spending of visitors to the ENF was found to be below the national average, and is below the average spending of recreation visitors to the adjacent National Forests. Purchases of fuel and groceries make up over 50% of the total spent. Other market surveys of outdoor recreation visitation found comparable spending patterns. The information available regarding per-trip expenditures indicates that revenue generated from recreation visits to the ENF may be significant for individual businesses, but is only a small percentage of the overall local economy.

In 2009 and 2010, the Rubicon Trail Foundation (RTF) coordinated volunteers to conduct trail counts at Ellis Creek every weekend from late May through the end of September. The preliminary data shows 2,340 vehicles were surveyed in 2009 and 1,707 vehicles were surveyed in 2010. (RTF, 2011)

Predictions about changes in recreational use that may occur on the Rubicon Trail based upon which alternative is selected are difficult to make and would

be highly speculative. The Forest Service believes that under all action alternatives, levels of use would be relatively static although the use patterns may change. In addition, many Forest visitors are from the local area, and will continue to use the Forest under each of the action alternatives. For example, even though the overall number of available roads varies by alternative, the same level of use may continue but become more concentrated in areas that remain open to public wheeled motorized vehicle use. At some point, however, some users may no longer attain the experience they desire and would likely seek other areas off-forest, potentially impacting economies in the local area. The point at which this would occur is speculative.

Other ongoing and foreseeable future activities may provide short term economic benefits to local communities, such as the development of jobs and local tax revenue. The cumulative effect of implementation of any of the alternatives for this project, along with the potential socioeconomic effects of other past, present and foreseeable future actions is speculative, particularly since the effects of this project are not considered to vary considerably by alternative.

Indicator Measure 2: None of the alternatives show any identifiable effects or issues specific to any minority or low-income population or community. Based on Year 2010 U.S. Census Data, California consists of 42.4 percent minority and 14.2 percent low-income populations. El Dorado County consists of 13.7 percent minority and 7.6 percent low-income populations. Changes in road management would have the same effect on all groups of people including minorities and different cultures. No civil rights effects associated with age, race, creed, color, national origin, or gender have been identified.

Indicator Measure 3: Effects to visitors with disabilities are described in the Recreation section of Chapter 3. In general, those alternatives with fewer miles of roads open for public wheeled motor vehicle use (see Comparison of Alternatives in Chapter 2) will provide fewer opportunities for the general public, including visitors with disabilities to motor vehicle use areas off of the Rubicon Trail. The effects to individuals with disabilities will depend in part on the activities those individuals participate in and their mode of transportation.

Indicator Measure 4: Specific roads have been identified as important for access and are proposed to be open for motor vehicle use in each alternative. While each of the action alternatives provides increased protection of cultural resource sites important to Tribes in comparison to Alternative 2, there is a concern that the action alternatives may limit access to cultural or spiritual sites by restricting use of roads and the closure of certain unauthorized roads. However, if through monitoring or from new information provided by Tribal members, specific roads are identified in the future as needed for access to

specific cultural or spiritual sites, the ENF may authorize that access through a special use permit, or may determine whether to allow public wheeled motor vehicle use on the route. The potential impacts to Native American heritage sites or other natural resources are described in the Heritage, Wildlife, and other sections of this Chapter.

Air Resources

Introduction

This section describes the affected environment and environmental consequences for air quality. It describes the area potentially affected by the alternatives and existing conditions within that area. Measurement indicators are used to describe the existing air quality conditions for the project area.

The analysis examines area weather and meteorology and any potential for public wheeled motor vehicle travel and construction equipment to cause or contribute to violations of National and State Ambient Air Quality Standards (AAQS), to degrade air quality by more than any applicable Prevention of Significant Deterioration (PSD) increment, to affect Class I areas, or to cause or contribute to visibility impairment beyond any existing conditions.

Affected Environment

Topography and weather patterns determine the extent to which airborne particulate matter accumulates within a given area. Weather patterns strongly influence air quality through pollutant dispersion. The primary weather conditions that affect dispersion are atmospheric stability, mixing height, and transport wind speed. Atmospheric stability refers to the tendency for air to mix vertically through the atmosphere. Mixing height is the vertical distance through which air is able to mix. The transport wind speed is a measure of the ability to carry emissions away from a source horizontally. These factors determine the ability of the atmosphere to disperse and dilute the released emissions.

The general climate of the air basin varies considerably with elevation and proximity to the Sierra ridge. The terrain features of the air basin make it possible for various climates to exist in relatively close proximity. The pattern of mountains and hills causes a wide variation in rainfall, temperature, and localized winds throughout the basin. Temperature variations have an important influence on basin wind flow, dispersion along mountain ridges, vertical mixing. The Sierra Nevada receives large amounts of precipitation from storms moving in from the Pacific in the winter, with lighter amounts from intermittent “monsoonal” moisture flows from the south and cumulus buildup in the summer. Precipitation levels are high in the highest mountain elevations, but decline rapidly toward the western portion of the basin. Winter temperatures in the mountains can be below freezing for weeks at a time, and substantial depths of snow can accumulate. In the summer, temperatures in the mountains are mild, with daytime peaks in the 70s to low 80s F.

From an air quality perspective, the topography and meteorology of the air basin combine such that local conditions predominate in determining the effect of emissions in the basin. Regional airflows are affected by the mountains and hills, which direct surface air flows, cause shallow vertical mixing, and create areas of high pollutant concentrations by hindering dispersion. Inversion layers, where warm air overlays cooler air, frequently occur and trap pollutants close to the ground. In the winter, these conditions can lead to carbon monoxide (CO) “hotspots” along heavily traveled roads and at busy intersections. During longer daylight hours in summer, stagnant air, high temperatures, and plentiful sunshine provide the conditions and energy for the photochemical reaction between reactive organic compounds (ROG) and oxides of nitrogen (NO_x) that results in the formation of ozone (O₃). Because of its long formation time, ozone is a regional pollutant rather than a local hotspot problem.

In the summer, the strong upwind valley air flowing into the basin from the Central Valley to the west is an effective transport medium for ozone precursors and ozone generated in the Bay Area and the Sacramento and San Joaquin valleys. These transported pollutants predominate as the cause of ozone in the air basin and are largely responsible for exceeding state and federal ozone AAQS in the air basin. The CARB has officially designated the air basin as “ozone impacted” by transport from those areas.

Existing Conditions

The air quality across the Forest is fair, due to limited emission sources and vigorous wind dispersion. The project area is within a designated nonattainment area for state standards for PM¹⁰ and ozone. Ozone is a secondary pollutant formed by complex photochemical reactions of nitrogen oxides (NO_x) and reactive volatile organic compounds (VOC) in the presence of sunlight.

The 1990 amendment to the Clean Air Act included a list of 189 pollutants identified as hazardous to human health. These pollutants are known, or have the potential, to cause cancer, cause mutations, be toxic to nervous tissue, or cause reproductive dysfunction. Soils of concern are serpentine soils which may contain asbestos. There are no serpentine soils in the project area. Hazardous pollutants in burn emissions are very minor, and there are no hazardous pollutants in vehicle emissions. For these reasons, there are no known hazardous pollutants emitted in significant amounts in relation to this project.

The sources of emissions in the project area include vehicle exhaust, road dust, harvest activities, smoke from pile burning, broadcast burning, and wildfires. Air quality can be severely impacted by particulate matter and other pollutants during large wildfire events. Impacts from the 1992 Cleveland Fire on the ENF affected air quality 60 miles away in Reno, NV. Fugitive dust caused by

construction and use of native surface roads can produce PM¹⁰ in quantities great enough to impair the visual quality of the air.

Fugitive Dust

Atmospheric dust arises from the mechanical disturbance of granular material exposed to the air. Dust generated from these open sources is termed “fugitive” because it is not discharged to the atmosphere in a confined flow stream. Common sources of fugitive dust include native surface roads, agricultural tilling operations, aggregate storage piles, and heavy construction operations.

Fugitive road dust is a result of motor vehicle use when road surfaces are dry; the force of wheels moving across the native surfaces causes pulverization of surface material. Dust is lofted by the rolling wheels as well as by the turbulence caused by the vehicle itself. This air turbulence can persist for a period of time after the vehicle passes. The silt content of the road surface layer, the distance traveled, the weight and speed of the vehicle, as well as weather conditions, influence the amount of dust produced. Surfaced roads produce a relatively smaller amount of dust than do native surface roads, especially during dry weather (USDA 2002).

The quantity of dust emissions from a given segment of native surface road varies linearly with the volume of traffic. Variables which influence the amount of dust produced include the average vehicle speed, the average vehicle weight, the average number of wheels per vehicle, the road surface texture, the fraction of road surface material which is classified as silt (particles less than 75 microns in diameter), and the moisture content of the road surface (USDA 2002).

Inhalable Particles (PM₁₀)

The impact of a fugitive dust source on air pollution depends on the quantity and drift potential of the dust particles injected into the atmosphere. In addition to large dust particles that settle out near the source, considerable amounts of fine particles also are emitted and dispersed over much greater distances from the source. PM¹⁰ represents a relatively fine particle size range and, as such, is not overly susceptible to gravitational settling.

The potential drift distance of particles is governed by the initial injection height of the particle, the terminal settling velocity of the particle, and the degree of atmospheric turbulence. Theoretical drift distance, as a function of particle diameter and mean wind speed, has been computed for fugitive dust emissions. Results indicate that, for a typical mean wind speed of 10 mph, particles larger than about 100 microns in aerodynamic diameter are likely to settle out within 20 to 30 feet from the edge of the route or other point of emission. Particles that

are 30 to 100 microns in diameter are likely to undergo impeded settling. These particles, depending upon the extent of atmospheric turbulence, are likely to settle within a few hundred feet of the route. Smaller particles, (particularly Inhalable Particles, PM¹⁰, and Fine Particles), have much slower gravitational settling velocities and are much more likely to have their settling rate retarded by atmospheric turbulence.

Ozone

Concentrations are measured in parts per million. Sources include cars and trucks (especially diesels), industrial sources like neighborhood businesses, such as dry cleaners and service stations, and building materials and products. Overexposure to O₃ can cause breathing difficulties and lung damage. Ozone is an invisible pollutant formed by chemical reactions involving nitrogen oxides, reactive hydrocarbons, and sunlight. It is a powerful respiratory irritant that can cause coughing, shortness of breath, headaches, fatigue and lung damage, especially among children, the elderly, the ill, and people who exercise outdoors. Ozone also damages plants, including agricultural crops, and degrades manufactured materials such as rubber and paint.

Class 1 Airshed

The Clean Air Act Amendments of 1977 require that a program be established to prevent degradation of air quality in pristine areas and that Air Quality Related Values (AQRVs) of Class I areas be protected. Designation as a Class I area allows only very small increments of new pollution above already existing air pollution levels. Class I areas include national wildernesses greater than 5,000 acres in existence on August 7, 1977, when the amendments were signed into law. The closest Class I area to the project is Desolation Wildernesses. Within Class I areas, the AQRV that has the potential to be most affected by this project is visibility, especially by dust. Particulates that remain suspended in the atmosphere are efficient light scatterers, and therefore, contribute to regional haze problems. Cumulative particulate load may be the result of fire use only, urban/industrial sources only, or a combination of the two. The AQRV of visibility is considered good to excellent most of the time in this Class I airshed.

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

Federal Clean Air Act

The Federal Clean Air Act (CAA) is the federal law passed in 1970, and last amended in 1990, (42 U.S.C. 7401 et seq.) which is the basis for national control of air pollution.

Regional Haze Rule (1990 Clean Air Act Amendment), 40 CFR Part 51

The Regional Haze Rule requires states to demonstrate “reasonable progress” toward improving visibility in each Class I area over a sixty-year period (to 2064), during which visibility should be returned to natural conditions. Class I areas include wilderness or National Parks greater than 5,000 acres which existed as of August 7, 1977.

General Conformity Rule (1990 Clean Air Act Amendments) (Section 176© of the Clean Air Act (part 51, subpart W, and part 93, subpart B))

U.S. Environmental Protection Agency (EPA) passed the final General Conformity Rule in 1993. Under the rule, federal agencies must work with State and local governments in a non-attainment or maintenance area to ensure that federal actions conform to the initiatives established in the applicable state implementation plan (U.S. EPA, 2008).

California Clean Air Act (H&S 39660 et. seq.)

California adopted the California Clean Air Act (CCAA) in 1988. The Act provides the basis for air quality planning and regulation in California independent of federal regulation, and establishes ambient air quality standards for the same criteria pollutants as the federal clean air legislation (CARB, 2007).

California Air Resources Board (CARB) Off-Road Recreational Vehicle Emissions Standards Rulemaking

In 1994, the CARB approved new off-highway recreational vehicle regulations (since amended in 1998). The rulemaking established emission standards for off-highway vehicles (ATVs) (CARBc, 2006). OHV registration became contingent on vehicle compliance to California emission standards. Dirt bikes and ATVs that meet emission standards are eligible for OHV Green Sticker registration and have a year round operating period, while non-compliant vehicles fall under the OHV Red Sticker program and have a limited operational season.

Air quality is managed through the series of federal, state, and local laws and regulations described above, which are designed to assure compliance with the Clean Air Act.

AAQS define clean air, and are established to protect even the most sensitive individuals in our communities. An air quality standard defines the maximum amount of a pollutant that can be present in outdoor air without harm to the public’s health. Both the Air Resources Board (ARB) and the U.S. EPA are authorized to set ambient air quality standards (CARB 2007).

Air Pollution Control Districts

California is divided into 15 air basins whose boundaries are based on geographical and meteorological considerations and follow political boundaries to the extent practicable. This project is within El Dorado County and the Mountain Counties air basin. A small part of El Dorado County is in the Lake Tahoe air basin. This project is in the Mountain Counties air basin only. The population, area, and emissions for the State, air basin, and county are shown in the table below.

Table 3-52: Average Daily Emissions' (2008).

	California State	Mountain Counties Air Basin	El Dorado County
Population	37,253,956	447,754	181,058
Area (square miles)	156,850	12,500	1,805
Pollutant (from all sources in tons/day)			
Total Organic Gases (TOG)	5732	160	26
Reactive Organic Gases (ROG)	2215	82	12
Carbon Monoxide (CO)	11327	595	78
Nitrogen Oxides (NOx)	3210	58	6
Sulfur Oxides (SOx)	281	2.3	0.2
Particulate Matter 10 microns (PM ¹⁰)	2112	125	18

NOTE: The United States Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) each established standards for six pollutants: particulate matter less than 10 microns in diameter (PM¹⁰), Sulfur Dioxide (SO₂), Nitrogen Dioxide (NO₂), Ozone (O₂), Carbon Monoxide (CO), and Lead (Pb).

Eldorado National Forest Land and Resource Management Plan (1989) (LRMP)

The LRMP includes the following direction related to air quality management:

- Plan management activities so that the air quality will be equal to or better than that required by applicable Federal, State, and local standards or regulations.
- Prepare smoke management plans to coordinate and manage smoke dispersal with other agencies and with respect to meteorological conditions. Maintain close liaison with local air pollution control officers and obtain all required permits.

Indicator Measures

Indicator measure 1: Effects of fugitive dust produced by public wheeled motor vehicles and construction equipment operating on the Rubicon Trail and unauthorized routes added to the NFTS,

Indicator measure 2: Effects of vehicle emissions on air quality,

Indicator measure 3: Effects of public wheeled motor vehicles and construction equipment on air quality within wilderness areas.

Environmental Consequences

Direct and Indirect Effects – Alternative 1

Indicator Measure 1: The direct effects of fugitive dust are reduced visibility on and adjacent to roads and increased levels of small diameter particulates (specifically PM^{2.5} and PM¹⁰) of concern for human health reasons. Visibility is minimally reduced along the Rubicon Trail since vehicles are moving at very slow speeds.

The impact of a fugitive dust source on air pollution depends on the quantity and drift potential of the dust particles injected into the atmosphere. In addition to large dust particles that settle out near the source, considerable amounts of fine particles also are emitted and dispersed over much greater distances from the source. PM¹⁰ represents a relatively fine particle size range and, as such, is not overly susceptible to gravitational settling.

The potential drift distance of particles is governed by the initial injection height of the particle, the terminal settling velocity of the particle, and the degree of

atmospheric turbulence. Theoretical drift distance, as a function of particle diameter and mean wind speed, has been computed for fugitive dust emissions. Results indicate that for a typical mean wind speed of 10 mph, particles larger than about 100 microns in aerodynamic diameter are likely to settle out within 20 to 30 feet from the edge of the route or other point of emission. Particles that are 30 to 100 microns in diameter are likely to undergo impeded settling. These particles, depending upon the extent of atmospheric turbulence, are likely to settle within a few hundred feet of the route. Smaller particles, (particularly Inhalable Particles, PM¹⁰, and Fine Particles), have much slower gravitational settling velocities and are much more likely to have their settling rate retarded by atmospheric turbulence.

The indirect effects of fugitive dust produced by public wheeled motor vehicles would be related to the use. The use of the Rubicon trail is expected to remain the same as what is occurring now, approximately 1700 vehicles a season (RTF, 2010). Indirect effects are limited to the air quality degradation, as a result of PM^{2.5} and PM¹⁰ particulates, since the larger diameter materials would settle out near the point of production. PM^{2.5} and PM¹⁰ levels would rapidly disperse as they are carried by local and general winds.

Exposure to PM aggravates a number of respiratory illnesses and may even cause early death in people with existing heart and lung disease. Exposure to PM is expected to be minimal since the production of fugitive dust would be minimal. Both long-term and short-term exposure can have adverse health impacts. These finer particles pose an increased health risk because they can deposit deep in the lung and contain substances that are particularly harmful to human health.

Indicator Measure 2: The direct effects of vehicle emissions produced by public wheeled motor vehicles and construction equipment operating on the Rubicon Trail are: formation of PM 2.5, formation of CO, formation of VOCs and NO_x, and production of diesel engine PM.

The indirect effects of vehicle emissions produced by public wheeled motor vehicles and construction equipment operating on the Rubicon Trail are: air degradation as a result of PM^{2.5} and PM¹⁰ and formation of ozone in the atmosphere when hydrocarbons and NO_x precursor emissions react in the presence of sunlight. Ozone is a strong irritant that can constrict the airways, forcing the respiratory system to work harder to provide oxygen to the rest of the body.

Direct and indirect effects of vehicle emissions on air quality do not result in measurable variations from current conditions, since emissions from public wheeled motor vehicles are spread over much of the project area with generally good emission dispersion and vehicles are moving slowly along the Rubicon

Trail. Recreational travel within the project area will not cause or significantly contribute to violations of NAAQs or add to visibility impairment beyond the existing condition. The county emission trends and forecasts for NO_x, ROG, and CO are all projected to drop gradually by 2020. The trends and forecasts for PM_{2.5} and PM₁₀ are projected to go up gradually by 2020.

Indicator Measure 3: Public wheeled motor vehicles operating on gravel and native surface roads in the project area have the potential to negatively affect air quality within wilderness areas by reducing visibility, especially by dust. Particulates that remain suspended in the atmosphere are efficient light scatterers, and therefore, contribute to regional haze problems. Visibility in the wilderness is not expected to be reduced by dust from vehicles operating on the Rubicon Trail. It is possible dust from the Rubicon Trail would minimally contribute to regional haze problems.

The table below displays the total mileage of native surface roads in the project area within one mile of the wilderness boundary, which have the potential to contribute negatively to air quality due to dust. The table below displays the breakdown for each alternative. Alternative 4 has the greatest number of miles of native surface roads within one mile of the wilderness boundary and the greatest potential to affect visibility within Class I areas. Currently the AQRV of visibility is considered good to excellent most of the time in this Class I airsheds and is expected to remain good to excellent under this alternatives.

Table 3-53: Miles of native surface roads and trails open for public wheeled motor vehicle use within one mile of wilderness boundary.

Alternative	Miles of road within one mile of Desolation Wilderness
1	2.37
2	1.94
3	2.37
4	2.51
5	0.81
6	2.37

Cumulative Effects – Alternative 1

Indicator Measures 1 - 3: The cumulative effects of fugitive dust on air quality produced by public wheeled motor vehicles and construction equipment operating on open routes, would result in only negligible differences than those currently experienced, as PM^{2.5} and PM¹⁰ particles from road dust combine with other particles produced both by the implementation of other projects on the Forest such as prescribed burning and harvest operations. Implementation of prescribed burns and harvest operations on other federal, state, or private lands, would also contribute particles. It is not possible to predict the amount of particulates contributed by these other sources.

Cumulative effects of motorized travel on air resources are unique in that past impacts to air quality are not usually evident. The emissions associated with motorized travel would be cumulative only with local emission sources listed in the affected environment. Since motorized emission sources in the project area are localized and transient, actual cumulative combinations of emissions are minor and do not result in significant effects.

Fugitive dust produced by public wheeled motor vehicles operating on gravel and native surface roads in combination with fugitive dust created by harvest operations on Forest Service and other federal, state, or private lands, would reduce visibility within the Class 1 airsheds slightly.

Direct, Indirect, and Cumulative Effects – Alternative 2

Indicator Measures 1 - 3: Under Alternative 2 the effects are the same as described for Alternative 1, except that impacts from fugitive dust and vehicle emissions may be slightly reduced because the miles of roads open for public wheeled motor vehicle use are less and construction activities would not occur.

Direct, Indirect, and Cumulative Effects – Alternatives 3, 4, 5, and 6

Indicator Measures 1 - 3: Under Alternatives 3, 4, 5, and 6 the effects are the same as described for Alternative 1, except that impacts from fugitive dust and vehicle emissions may be slightly reduced or slightly increased because the miles of roads open for public wheeled motor vehicle use varies by alternative.

Climate Change

The Environmental Protection Agency (EPA) (2007) developed a “State of Knowledge” paper that outlines what is known and what is uncertain about global climate change. The following elements of climate change are known with near certainty:

1. Human activities are changing the composition of Earth’s atmosphere. Increasing levels of greenhouse gases like carbon dioxide (CO₂) in the atmosphere since pre-industrial times are well-documented and understood.
2. The atmospheric buildup of CO₂ and other greenhouse gases is largely the result of human activities such as the burning of fossil fuels.
3. An “unequivocal” warming trend of about 1.0 to 1.7 F occurred from 1906 to 2005. Warming occurred in both the Northern and Southern Hemispheres and over the oceans (IPGG, 2007).
4. The major greenhouse gases emitted by human activities remain in the atmosphere for periods ranging from decades to centuries. It is therefore virtually certain that atmospheric concentration of greenhouse gases will continue to rise over the next few decades.
5. Increasing greenhouse gas concentrations tend to warm the planet.

According to EPA (2007), however, it is uncertain how much warming will occur, how fast that warming will occur, and how the warming will affect the rest of the climate system including precipitation patterns.

Given what is and is not known about global climate change, the following discussion outlines the cumulative effects of this project on greenhouse gas emissions and effects of climate change on forest resources.

Carbon Dioxide (CO₂), Methane (CH₄), and Nitrous Oxide (N₂O) emissions generated by motorized vehicles and construction equipment traveling on NFTS facilities are expected to continue to contribute to global concentration of greenhouse gases that affect climate change. Projected climate change impacts include air temperature increases; sea level rise; changes in the timing, location, and quantity of precipitation; and increased frequency of extreme weather events such as heat waves, droughts, and floods. The intensity and severity of these effects are expected to vary regionally and even locally, making any discussion of potential site-specific effects of global climate change on forest resource speculative.

Because greenhouse gases from vehicle emissions mix readily into the global pool of greenhouse gases, it is not currently possible to discern the effects of this project from the effects of other greenhouse gas sources worldwide, nor is it expected that attempting to do so would provide a practical or meaningful analysis of project effects. Potential regional and local variability in climate change effects add to the uncertainty regarding the actual intensity of this project's effects on global climate change. Further, emissions associated with this project are extremely small in the global atmospheric CO₂ context, making it impossible to measure the incremental cumulative impact on global climate from emission associated with this project. In summary, the potential for cumulative effects is considered negligible for all alternatives because none of the alternatives would result in measureable direct or indirect effects on air quality or global climatic patterns.

Short-term Uses and Long-term Productivity

NEPA requires consideration of “the relationship between short-term uses of man’s environment and the maintenance and enhancement of long-term productivity” (40 CFR 1502.16). As declared by the Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101).

Unavoidable Adverse Effects _____

Implementation of any of the alternatives would result in some unavoidable adverse environmental effects. Although formations of the alternatives included avoidance of some potential adverse effects, some adverse effects could occur that cannot be completely mitigated. The environmental consequences section for each resource area discusses these effects.

Irreversible and Irretrievable Commitments of Resources _____

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas that are kept clear for use as a power line rights-of-way or road.

It is not anticipated that issuing an easement, constructing 2 bridges, replacing 1 bridge, installing erosion control features, constructing vault toilets, delineating vehicle use areas, closing and rehabilitating unauthorized routes, or adding unauthorized routes to the NFTS would cause an irreversible or irretrievable commitment of resources.

Legal and Regulatory Compliance _____

NEPA at 40 CFR 1502.25(a) directs “to the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with ...other environmental review laws and executive orders.” The proposed action and alternatives must comply with following:

Principle Environmental Laws

The following laws contain requirements for protection of the environment that apply to the proposed action and alternatives:

Endangered Species Act

Clean Water Act

Clean Air Act

National Historic Preservation Act

National Forest Management Act

- Soil Productivity
- Management Indicator Species
- Other Standards and Guidelines, especially those dealing with Water Quality

Executive Orders

The following executive orders provide direction to federal agencies that apply to the proposed action and alternatives:

Indian Sacred Sites, Executive Order 13007 of May 24, 1996
Invasive Species, Executive Order 13112 of February 3, 1999
Recreational Fisheries, Executive Order 12962 of June 6, 1995
Migratory Birds, Executive Order 13186 of January 10, 2001
Floodplain Management, Executive Order 11988 of May 24, 1977
Protection of Wetlands, Executive Order 11990 of May 24, 1977
Environmental Justice, Executive Order 12898 of February 11, 1994
Use of Off-Road Vehicles, Executive Order 11644, February 8, 1972

Special Area Designations

The selected alternative will need to comply with laws, regulations and policies that pertain to the following special areas:

Research Natural Areas
Inventoried Roadless Areas
Wilderness Areas
Wild and Scenic Rivers
Municipal Watersheds (FSM 2540)

Chapter 4. Consultation and Coordination

Preparers and Contributors

The Forest Service consulted the following individuals, Federal, State, and local agencies, tribes and non-Forest Service persons during the development of this environmental assessment:

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 El Dorado County Department of Transportation
 El Dorado County Board of Supervisors
 El Dorado County Sheriff’s Department
 California Department of Parks and Recreation, Off-Highway Motor Vehicle Recreation Division
 Central Valley Regional Water Quality Control Board
 California State Historic Preservation Office
 United States Army Corps of Engineers, Sacramento District
 Federal Highway Administration
 California Department of Transportation
 Advisory Council on Historic Preservation

Tribes:

Washoe Tribe of NV and CA

Distribution of the Environmental Impact Statement _____

This environmental impact statement has been distributed to individuals who specifically requested a copy of the document. In addition, copies have been sent to the following Federal agencies, federally recognized tribes, State and local governments, and organizations:

USDA Forest Service, Pacific Southwest Regional Office
El Dorado County Board of Supervisors
California Department of Parks and Recreation, Off-Highway Motor Vehicle Recreation Division
Central Valley Regional Water Quality Control Board
California State Historic Preservation Office
United States Army Corps of Engineers, Sacramento District
Federal Highway Administration
California Department of Transportation
Advisory Council on Historic Preservation

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Glossary

Terminology

The Forest Service uses the term “NFS road” and “NFS trail” (also referred to as NFS routes when combined) to refer to any road or trail that is listed on the forest transportation atlas other than a road or trail which has been authorized by a legally documented right-of-way held by a State, county, or other local public road authority. The NFS routes range from trails to arterial and collector roads, which may be paved or surfaced, to local roads that may be either improved or unimproved. The lower-level, unimproved roads are not actively maintained, but are primarily kept open by timber sale road reconstruction and vehicle use.

In addition to NFS routes on the transportation system, a number of other types of routes currently exist on the Forest. Some originated as temporary logging roads, skid trails, or firelines, which were never rehabilitated, and, over time, have remained open to use by the public, even though they are not maintained. Forest users created other roads and trails by driving cross-country through the Forest. These routes are not part of the forest transportation atlas, and, are therefore, referred to as “unauthorized routes.”

Definitions

All-terrain vehicle (ATV): A type of off-highway vehicle that travels on three or more low-pressure tires; has handle-bar steering; is less than or equal to 50 inches in width; and has a seat designed to be straddled by the operator.

Area: A discrete, specifically delineated space that is smaller, and in most cases much smaller, than a Ranger District (36 CFR 212.1).

Arterial road: An NFS road that provides service to large land areas and usually connects with other arterial roads or public highways.

Collector road: An NFS road that services smaller areas than an arterial road and that usually connects arterial roads to local roads or terminal facilities.

Designated road, trail, or area: A NFS road, NFS trail, or an area on NFS lands that is designated for motor vehicle use pursuant to 36 CFR part 212.51 on a motor vehicle use map (36 CFR 212.1).

Forest road or trail: A road or trail wholly or partially within or adjacent to and serving the NFS that the Forest Service determines is necessary for the protection, administration, and utilization of the NFS and the use and development of its resources (36 CFR 212.1).

Forest transportation atlas: A display of the system of roads, trails, and airfields of an administrative unit (36 CFR 212.1).

Forest transportation facility: A forest road or trail or an airfield that is displayed in a forest transportation atlas, including bridges, culverts, parking lots, marine access facilities, safety devices, and other improvements appurtenant to the forest transportation system (36 CFR 212.1).

Forest transportation system: The system of NFS roads, trails, and airfields on NFS lands (36 CFR 212.1).

Green-sticker Vehicle: A motor vehicle built since 2003 which is in compliance with the 1998 California Air Resources Board off-highway vehicle exhaust emission standards and registered pursuant to California Vehicle Code Book Division 16.5, Section 38160, in addition to those built prior to 2003 and also registered pursuant to California Vehicle Code Book Division 16.5, Section 38160. Currently, the registration identification for these vehicles in the State of California comes in the form of a green sticker. These vehicles may include: motorcycles, motor driven cycles, sand buggies, dune buggies, all-terrain vehicles (ATV), or any motor vehicle commonly referred to as a jeep or four-wheel drive (4WD).

Highway-licensed vehicle: Any motor vehicle that is licensed or certified under State law for general operation on all public roads within the State. Operators of highway legal vehicles are subject to State traffic law, including requirements for operator licensing.

Local road: A NFS road that connects a terminal facility with collector roads, arterial roads, or public highways and that usually serves a single purpose involving intermittent use.

Maintenance level (ML): Defined in FSH 7709.58, 10, 12. 3 as the level of service provided by, and maintenance required for, a specific road. Maintenance levels must be consistent with road management objectives, and maintenance criteria. Roads may be maintained at one level and planned to be maintained at a different level at some future date. The operational maintenance level is the maintenance level currently assigned to a road considering today's needs, road condition, budget constraints, and environmental concerns; in other words, it defines the standard to which the road is currently being maintained. The objective maintenance level is the maintenance level to be assigned at a future date considering future road management objectives, traffic needs, budget constraints, and environmental concerns.

Maintenance level 1 road: Defined in FSH 7709.58, 10, 12. 3 as intermittent service roads during the time they are closed to vehicular traffic. The closure period must exceed 1 year. Basic custodial maintenance is performed to keep damage to adjacent resources to an acceptable level and to perpetuate the road to facilitate future management activities. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this level. Appropriate traffic management strategies are "prohibit" and "eliminate." Roads receiving level 1 maintenance may be of any type, class, or construction standard,

and may be managed at any other maintenance level during the time they are open for traffic. However, while being maintained at level 1, they are closed to vehicular traffic, but may be open and suitable for non-motorized uses. These roads have the following attributes: (1) vehicular traffic is eliminated, including administrative traffic; (2) physically blocked or entrance is disguised; (3) not subject to the requirements of the Highway Safety Act; (4) maintenance is done only to minimize resource impacts; and (5) no maintenance other than a condition survey may be required so as long as no potential exists for resource damage.

Maintenance level 2 road: Defined in FSH 7709.58, 10, 12.3 as roads open for use by high-clearance vehicles. Passenger car traffic is not a consideration. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses. Log haul may occur at this level. Appropriate traffic management strategies are either (1) discourage or prohibit passenger cars or (2) accept or discourage high-clearance vehicles. These roads have the following attributes: (1) low traffic volume and low speed; (2) typically local roads; (3) typically connect collectors and other local roads; (4) dips are the preferred drainage treatment; (5) not subject to the requirements of the Highway Safety Act; (6) surface smoothness is not a consideration; and (7) not suitable for passenger cars.

Maintenance level 3 road: Defined in FSH 7709.58, 10, 12.3 as roads open and maintained for travel by prudent drivers in a standard passenger car. User comfort and convenience are low priorities. Roads in this maintenance level are typically low speed, single lane with turnouts, and spot surfacing. Some roads may be fully surfaced with either native or processed material. Appropriate traffic management strategies are either “encourage” or “accept.” “Discourage” or “prohibit” strategies may be employed for certain classes of vehicles or users. These roads have the following attributes: (1) subject to the requirements of the Highway Safety Act and Manual of Uniform Traffic Control Devices (MUTCD); (2) roads have low- to moderate-traffic volume; (3) typically connect arterial and collector roads; (4) a combination of dips and culverts provide drainage; (5) may include some dispersed recreation roads; and (6) potholing or washboarding may occur.

Maintenance level 4 road: Defined in FSH 7709.58, 10, 12.3 as roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane and aggregate surfaced. However, some roads may be single lane. Some roads may be paved and/or dust abated. The most appropriate traffic management strategy is “encourage.” However, the “prohibit” strategy may apply to specific classes of vehicles or users at certain times. These roads have the following attributes: (1) subject to requirements of the Highway Safety Act and MUTCD; (2) roads have moderate traffic volume and speeds; (3) may connect to county roads; (4) culverts provide drainage; (5) usually a collector; and (6) may include some developed recreation roads.

Maintenance level 5 road: Defined in FSH 7709.58, 10, 12.3 as roads that provide a high degree of user comfort and convenience. These roads are normally double-lane, paved facilities. Some may be aggregate surfaced and dust abated. The appropriate traffic management strategy is “encourage.” These roads have the following attributes: (1) subject to the requirements of the Highway Safety Act and MUTCD; (2) highest traffic volume and speeds; (3) typically connect State and county roads; (4) culverts provide drainage; (5) usually arterial and collector; (6) may include some developed recreation roads; and (7) usually paved or chip-sealed.

Motor vehicle: Any vehicle which is self-propelled, other than: (1) A vehicle operated on rails; and (2) Any wheelchair or mobility device that is designed solely for use by a mobility-impaired person for locomotion, and that is suitable for use in an indoor pedestrian area (36 CFR 212.1).

Motor vehicle use map: A map reflecting designated roads, trails, and areas on an administrative unit or a Ranger District of the NFS (36 CFR 212.1).

Motorized trail: A travel way usually, but not always, less than 50 inches in width usually, but not always, available for use by all-terrain vehicles (ATVs) and/or motorcycles. These travelways may also be made available to high-clearance four-wheel drive vehicles, and may also be used by bicycles, horses, and hikers.

National Forest System road: A forest road other than a road which has been authorized by a legally documented right-of-way by a State, county, or local public road authority (36 CFR 212.1).

National Forest System trail: A forest trail other than a trail which has been authorized by a legally documented right-of-way held by a State, county, or local public road authority (36 CFR 212.1).

Non-highway legal vehicle: Any motor vehicle that is not licensed or certified under State law for general operation on all public roads within the State. Operators of non-highway legal vehicles are subject to State requirements, if any, for licensing and operation of the vehicle in questions.

Off-highway vehicle (OHV): Any motor vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other natural terrain (36 CFR 212.1).

Private road: A road under private ownership authorized by an easement granted to a private party or a road that provides access pursuant to a reserved or outstanding right.

Public road: The road under the jurisdiction of and maintained by a public road authority and open to public travel (23 U.S.C. 101 (a)).

Qualified engineer: An engineer who by experience, certification, education, or license is technically trained and experienced to perform the engineering tasks specified and is designated by the Director of Engineering, Regional Office.

Red-sticker vehicle: Vehicles built since 2003 and registered pursuant to California Vehicle Code Book Division 16.5, Section 38160, which are not in compliance with the 1998 California Air Resources Board off-highway vehicle exhaust emission standards are issued a red sticker. Use of these vehicles may be restricted to specific days of the year and to specific areas in regions throughout the state. Areas on the Eldorado National Forest with red sticker restrictions include Mace Mill – Rock Creek and Barrett Lake.

Road: A motor vehicle route over 50 inches wide, unless identified and managed as a trail (36 CFR 212.1).

Road construction within an IRA. Activity that results in the addition of forest classified or temporary road miles **(36 CFR 294.11)**.

Road construction or reconstruction: Supervising, inspecting, actual building, and incurrence of all costs incidental to the construction or reconstruction of a road (36 CFR 212.1).

Road decommissioning: Activities that result in restoration of unneeded roads to a more natural state (FSM 7734).

Road maintenance: Ongoing upkeep of a road necessary to maintain or restore the road in accordance with its road management objectives (FSM 7714).

Road reconstruction within an IRA. Activity that results in improvement or realignment of an existing classified road defined as follows **(36 CFR 294.11)**:

(1) **Road improvement.** Activity that results in an increase of an existing road's traffic service level, expansion of its capacity, or a change in its original design function.

(2) **Road realignment.** Activity that results in a new location of an existing road or portions of an existing road, and treatment of the old roadway.

Road Subject to the Highway Safety Act: An NFS road that is open to public use in a standard passenger car, including a road with access restricted on a seasonal basis and a road closed during extreme weather conditions or for emergencies, but which is otherwise open to public travel.

Route: A road or trail.

Terminal facility: A transfer point between the forest transportation system and forest resources served by the system or between different transportation modes, including parking areas, boat ramps and docks, trailheads, marine access facilities, airfields, and heliports (FSM 7705).

Trail: A route 50 inches or less in width or a route over 50 inches wide that is identified and managed as a trail (36 CFR 212.1).

Travel management atlas: An atlas that consists of a forest transportation atlas and a motor vehicle use map or maps (36 CFR 212.1).

Unauthorized route: A route that is not a forest road or trail or a temporary road or trail and that is not included in a forest transportation atlas (36 CFR 212.1).

Wetland: The term “wetland” refers to areas that “are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” (USACE, 1987)

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A. El Dorado County's Saturated Soil Water Quality Protection Plan Summary and Monitoring Plan

B. Hydrology Appendices

C. Comment Letters

D. Response to Comments

E. California Regional Water Quality Control Board, Central Valley Region: Cleanup and Abatement Order (CAO) No. R5-2009-0030

F. Rubicon Trail Operating Agreement between El Dorado County and ENF

Appendix A: El Dorado County's Saturated Soil Water Quality Protection Plan

RUBICON TRAIL

PROJECT NUMBER 99426



SATURATED SOIL WATER QUALITY PROTECTION PLAN

TECHNICAL REPORT

December 2010

Addendum #1 – January 2011

El Dorado County



Department of Transportation



Prepared By: Steve P. Kooyman, P.E.

For: State Water Quality
Control Board Central
Valley Region

Clean-Up and Abatement
Order No. R5-2009-0030



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List of Acronyms and Abbreviations

Acronym/Abbreviation	Definition
ASTM	American Standard Testing Method
BMP	Best Management Practices
BOS	County of El Dorado Board of Supervisors
CAO	Clean-Up and Abatement Order
CGS	California Geological Survey
County	El Dorado County
CTC	California Tahoe Conservancy
DOT	El Dorado County Department of Transportation
Drainage Manual	El Dorado County Drainage Manual
ENF	Eldorado National Forest
FORT	Friends Of The Rubicon Trail
GLC	Grass Lined Channels
HPGN	High Precision Geodetic Network
OHV	Off Highway Vehicles
Plan	Saturated Soils Water Quality Protection Plan - SSWQPP
QP	Snow Melt
RED	Rock Energy Dissipator
Report	Technical Report
RLC	Rock Lined Channels
ROM	Rough Order of Magnitude
ROW	Right of Way
RSP	Rock Slope Protection
RUSLE	Revised Universal Soil Loss Equation
SM	Silting sand
SMUD	Sacramento Municipal Utility District
Trail	Rubicon Trail
TRPA	Tahoe Regional Planning Agency
TSS	Total Suspended Solids
USACOE	United States Army Corp of Engineers
USFS	United States Forest Service
USGS	United States Geographic Survey



1.0 Executive Summary

1. Introduction

This Saturated Soils Water Quality Protection Plan (Plan) has been developed by the El Dorado County, Department of Transportation (DOT) pursuant to Item 2 within the Clean-Up and Abatement Order (CAO) No. R5-2009-0030 issued to El Dorado County and the United States Department of Agriculture, Forest Service, Eldorado National Forest (ENF) on April 30, 2009. This Technical Report (Report) provides the technical information and civil engineering analysis, which supports the design of the proposed BMP's within the Plan.

2. Saturated Soil Water Quality Protection Plan (SSWQPP) Goal

The main goal of the SSWQPP is to comply with the CAO requirements under Item 2 as it relates to controlling existing erosion on the Trail and reducing sediment loss rates from the existing Trail to Type 1 and 2 streams.

3. Plan Development Methodologies

The DOT utilized the "Trail Condition Assessment, Phase 1, Rubicon Trail – East of Wentworth Springs Campground, El Dorado County, California, June 2009" as prepared by the California Geological Survey (CGS), the 2008 State Off-Highway Vehicle (OHV) Grant Soil Conservation Guidelines, the 2010 DOT Site Assessment, the 2010 Rubicon Trail Toolbox as developed by the Georgetown Divide Resource Conservation District, the DOT Standard Details for Erosion Control, and the United States Department of Agriculture Handbook for Forest and Ranch Roads as the main reference material to develop the proposed Best Management Practices (BMP's) within the Plan.

A. Erosion and Sediment Problems

In order to identify the solutions to the erosion and sedimentation problems along the trail the DOT used the 2008 Soil Conservation Guidelines, which provides a prioritization mythology by rating the Rubicon Trail (Trail) problems as high, medium, or low. Also, the DOT used a similar approach which is used in Lake Tahoe as part of the Erosion Control Program pursuant to the California Tahoe Conservancy (CTC) Guidelines, which uses a prioritization based on the hierarchy of controlling sediment and erosion from a watershed perspective.

The State Parks OHV Division developed a Trail Conditions Evaluation system which utilizes various trail condition codes, trail geometric input parameters, and topographic feature input parameters to rate the Trail under a Red, Yellow, and Green coding system. A trail rating of Red indicates the segment of the trail with the highest potential for soil loss, Yellow indicates medium potential for soil loss, and Green represents a trail segment that is stable for the intended OHV use.



Within the Phase 1 portion of the Plan the 2009 CGS Assessment identified 6,123 feet of trail segment rated as Red, 7,877 feet of trail rated as Yellow, and 10,395 feet of trail rated as Green.

As part of the 2010 DOT Field Assessment, the DOT completed an erosion problem category along the Phase 1 portion of the Trail segment in accordance with the CTC Erosion Control Guidelines. The CTC Guidelines present three (3) main categories as follows:

(1) Source Control – Areas that exhibit uncontrolled erosion (i.e. eroding banks, shoulders, etc.). Source controls are measures that prevent erosion from the source.

(2) Hydrologic Design – Areas that have concentrated flows from the upper watershed or from the Trail as sheet flow that are captured within trail area. Hydrologic Design BMP's maintain or create distributed flow patterns (e.g., flows which discharge from the Trail frequently, or from shoulders by un-concentrated "sheet flow") and avoid concentration or increases of flows where feasible.

(3) Treatment – Areas that don't capture the sediment prior to reaching a Type 1 or 2 watercourse. Treatment BMP's emphasizing removal of sediments prior to reaching the Type 1 and 2 watercourses.

The main focus of this evaluation system is based on a basic principal of natural sediment transport processes. First control the erosion and sediment from the source, second provide for distributed flow paths to reduce natural erosive forces along the Trail, and third capture/infiltrate/treat the sediment at key natural outfall areas.

In many cases, along the Trail the erosion problems exhibited several characteristics within each of the CTC erosion problem categories. Therefore, the BMP solutions at these specific locations were designed to mitigate several categorical erosion problems (i.e. Source Control BMP with a Hydrologic Design, BMP or a Hydrologic Design BMP outfall to a Treatment BMP, etc.).

Within the Phase 1 portion of the Plan, the DOT identified the following number of erosion problems in accordance with the CTC erosion problem categories:

Source Control – 133 sites

Hydrologic Design – 68 sites

Treatment – 63 sites

The number of site locations exhibiting the three (3) erosion problem categories compared well with the 2009 CGS Assessment.

B. Soil Characteristics

As part of the 2009 CGS assessment and 2010 DOT Site Assessment, various sections of the Trail were evaluated based on soil conditions during saturation. The majority of the soil types within the Phase 1 area have been classified under the American Standard Testing Method (ASTM) Classification system as silty sand (SM), which in essence is



decomposed granite. There are sections of the Trail around the Wentworth Springs Campground and near perennial streams and floodplains that have a soil classification of poorly graded sand with silt. Each Trail area exhibits different characteristics when the soil is considered saturated. For instance, within the majority of the Trail segments, the silty sand material functions fairly well under saturated conditions and has an ability to resemble a standard gravel road for structural compaction during OHV use. However, in the areas that have poorly graded sand with silt and some organics the Trail section shows signs of mechanical erosion from the OHV use (i.e. heavy rutting). There is large portion of the Trail segment that travels over solid granite slab formations. In these areas there is no evident mechanical erosion problem, hence, no BMP's have been proposed within these areas.

C. Hydrology

Within the Phase 1 portion of the Plan the DOT has identified the following sub-watersheds within each Drainage Basin that the Trail section passes through:

Gerle Creek Basin – Does not include Loon Lake

26 Sub-watersheds (1 acre to 60 acres)

Ellis Creek Basin

17 Sub-watersheds (4 acres to 850 acres)

The majority of the Rubicon Basin is within the Phase 2 portion Plan area which has the following sub-watersheds:

22 sub-watersheds (4 acres to 3,800 acres)

The majority of the watersheds drain directly into the Trail section, which either captures the off-site run off during storm and snow melt events or pass through the Trail sections at key sag points towards major ravine and/or creeks/streams.

The DOT has developed an extensive hydrologic analysis of these sub-watersheds to determine peak flows and volumes for the 2 year, 10 year, 25 year, average annual snow melt run-off, and 100 year (sub-watershed areas greater than 100 acres) pursuant to the County of El Dorado approved Drainage Manual. The peak flows and volumes from the 25 year -1 hour event were used to size the particular BMP's along the Trail at key drainage outfall points related to the sections of the Trail that are directly connected and in-directly connected to various Type 1 and 2 watercourses. Most of the BMP's that convey the Trail run-off were designed to convey the 25 year, 1 hour event as well as the 10 year, 6 hour event. The key element within the analysis was to determine the existing conditions and post-BMP conditions using the same frequency storm in order to provide a quantitative differential for peak and volume mitigation which satisfies the CAO requirements. The 25 year, 1 hour event was selected as the sediment transport storm which is the typical summer convective storm. This storm type happens on an annual basis, so the 25 year interval is somewhat misleading. The storm pattern



exhibits a large cell burst over a small area with a very high rainfall intensity which typically produces the largest sediment concentration during the dry summer months. The typical range of peak flows from the Sub-Watersheds up stream of the Trail using the 25 year, 1 hour event was 0.18 cubic feet per second (cfs) in the Gerle Creek sub-Watershed area to as high as 121.58 cfs in the Ellis Creek Sub-Watershed area. The peak flows from the Trail only were of magnitudes less based on the Trail Sub-Watershed area being much smaller. For simplicity, the DOT used a re-occurring ratio within each Sub-Watershed of approximately 0.23 cfs/acre for the Trail peak flow calculations related to the 25 year, 1 hour event. An additional ratio related to the 10 year, 6 hour was also used for a Trail volume analysis with a typical ratio range of 0.44 to 0.62 cfs/acre.

Even though the BMP's have been designed using this type of storm event for capturing run-off volumes, they will most likely continue to function through-out the water year (October to October) during various types of storms and during the spring snow melt season.

D. Erosion Potential Method – Soil Erosion Rates

In order to provide a qualitative/quantitative means to address the sediment differential from the existing Trail conditions to the post-BMP Trail conditions the DOT utilized an analytical model, which is based on a mathematical expression to predict erosion rates and is included within the State OHV 2008 Soil Conservation Guidelines. This analytical model is the Revised Universal Soil Loss Equation:

$$A = R * K * L * S * C * P$$

Where:

- A = annual soil loss in tons per acre per year
- R = rainfall erosivity factor
- K = soil erodibility factor
- L = slope length factor
- S = slope gradient factor
- C = cover management factor
- P = erosion control practice factor

This method has been used on many forest and OHV roads throughout the Country and is one of the most widely recognized methods to predict soil loss.

The key understanding in using this method to determine existing soil loss versus post-BMP soil loss is that, it is purely a comparison analysis to identify where the highest soil loss rates exist on the Trail and what types of BMP's will be able to reduce the rate to amenable levels to comply with the CAO requirements. From the existing Trail conditions map and existing data the soil loss rate within the Phase 1 portion of the Plan area was estimated at **68.31 Tns/Year**. This quantity represents the existing sediment loss from the Trail prism only which has an average width of 14 feet. There is a considerable amount of off-site or upper watershed sediment of magnitudes



greater than the Trail sediment loss that comes into the Trail; however, for this analysis the DOT calculated only the Trail portion.

4. Plan Overview

A. Typical Trail Maintenance BMP's

The DOT has developed the proposed BMP's within the Plan in accordance with the 2009 CGS Assessment, the 2010 DOT Site Assessment, the 2010 Rubicon Trail Toolbox as developed by the Georgetown Divide Resource Conservation District, the DOT Standard Details for Erosion Control, and the United States Department of Agriculture Handbook for Forest and Ranch Roads coupled with the hydrologic and sediment loss analysis. Each of the typical BMP's were categories in accordance with the CTC Erosion Control Guidelines (Source Control, Hydrologic Design, and Treatment) and were designed using specific topographic information on the Trail and civil engineering judgment.

Typical BMPs such as Rock Fill, Rock Slope Protection, and Rock Breast Walls are considered source control types of BMP's, where Rock Ditch and Check Xing's are considered hydrologic design types of BMP's, and Rock Outfall Protection and Rock Energy Dissipators are considered treatment types of BMPs.

In sum total the Plan depicts up to 300 proposed BMP's within the Phase 1 portion of the Trail. An additional 300+ BMP's are proposed within the Phase 2 portion of the Trail, however, this section of the Trail warrants an additional DOT site assessment, which will be completed in late spring early summer. Within the Phase 1 portion of the Plan the DOT proposes to place 88 linear feet (lf) of Log Barriers, 614 lf of Rock Barriers, 42,000 square feet (sf) of Rock Fill, 443 lf of Rock Check Crossings, 761 lf of Rock Ditch Crossings, 338 sf of Rock Aprons, 1,574 sf of Rock Inlet Protection, 673 lf of Rock Outlet Protection, 1,972 cubic feet (cf) of storm water storage in 31 Rock Energy Dissipators, 1,719 lf of Rock Slope Protection, 469 lf of Rock Lined Channels, 198 lf of Rock Berms, and 380 lf of Rock Breast Walls. Also, as part of the Plan to reduce sediment from the Trail, the DOT proposes to rehabilitate approximately 18,000 sf of non-approved variants along the Trail.

B. Season Closure

As part of this analysis, the DOT considered an additional type of BMP for controlling sedimentation on the Trail in the form of a seasonal closure. Based on the minimal Trail use during saturated soil conditions, the proactive maintenance strategies being programmed within the DOT Maintenance Division for Trail maintenance, and the installation of the BMP's for minimizing sediment from the Trail, the Trail will be able to be used year round and still meet the goals of the Plan.

C. Post BMP Soil Loss

Using the same soil loss methodologies for the existing Trail conditions, the DOT calculated the proposed soil loss rates from the Trail after the installation of the BMP's. The post-BMP soil loss rate within the Phase 1



portion of the Plan was estimated at **51.19 Tns/Year** which is a 25% decrease in the annual soil loss rate from the Trail. Furthermore, the DOT calculated the treatment capturing capacity of several BMP's (i.e. Rock Energy Dissipators and Rock Outfall Protection BMP's) with an estimated soil capturing capacity of **152.62 Tns/Year**. Therefore, based on the soil loss reduction from Trail BMP's and the additional sediment capturing capacity of the various BMP's, the proposed plan will reduce the sediment from the Trail by **169.74 Tns/Year** or greater than 4 times the existing Trail soil loss rate of 68.31 Tns/Year. This essential means that the proposed BMP's will be capturing a portion of the off-site sediment as well as the on-site sediment from the Trail prior to discharging into Type 1, 2, or 3 streams.

5. Plan Education

The DOT has embarked on an extensive Trail educational campaign that includes, but is not limited to, an educational video, a bandana campaign, trail signage, various trail committee meetings, and a County website.

6. Plan Enforcement

In order to comply with the CAO of "an enforcement component" as part of the Plan, the DOT has been actively engaged with the following Law Enforcement Agencies:

El Dorado County Sheriff's Department

State Parks OHV Rangers

United States Forest Service Law Enforcement Division

During the 2010 season, the law enforcement efforts were increased substantially from previous years. State Parks OHV division launched a pilot program with Rangers camped at Spider Lake every weekend July 1st through the Labor Day Weekend. This put officers on the Trail during the overnight hours every weekend. El Dorado County Sheriff's Department had officers on the Trail every weekend and several overnights. The Forest Service had two Forest Patrol Officers on the Trail every weekend.

This increased law enforcement was well received by the users and provided a good measure of the type of enforcement needed. El Dorado County is in discussions with State Parks regarding their continued presence on the Trail. El Dorado County Sheriff's Department will be on the Trail every weekend during the 2011 season. All rules of the road apply to this Trail and violators will be cited. Officers will cite for resource damage and keep Trail users on the Trail and prevent them from creating new variant routes.

El Dorado County will hold two Law Enforcement Summit meetings a year, one at the end of the season to debrief and one in February to coordinate efforts in the upcoming season. The coordinated effort works for all agencies and ensures that enforcement needs are met on the Rubicon Trail.



7. Plan Annual Maintenance

As part of the annual BMP monitoring efforts, the DOT will evaluate the installed BMP's along the Trail in the spring and fall. A BMP maintenance log will be created which will specify the location and maintenance needs at each of the BMP sites, which will be included within a Rubicon Trail maintenance work order. Most of the maintenance activities will be coordinated with ENF, private land owners, and user groups prior to initiating the work. It is anticipated that the routine maintenance work will cost approximately 50,000/year which will be funded through OHV grants, In-Lieu funds, and the SMUD funds, with volunteer user groups assisting where appropriate.

8. Plan Implementation

A. Budget

The costs associated with the Plan and implementation thereof is estimated to cost approximately \$1.9 million, which will be funded by OHV Grants, In-Lieu funds, and SMUD funds coupled with assistance from the various volunteer user groups.

B. Schedule

The DOT anticipates completing all the proposed BMP's within the Plan by the summer of 2012.

9. Monitoring

The DOT will provide an annual Monitoring Report as part of the BMP evaluation efforts using photographic documentation and some field measurements of sediment captured within the treatment BMP's.



13.0 Monitoring

In order to properly assess the installed BMP's within the Plan area the DOT will be completing field assessments on an annual basis which will be coordinated with the annual maintenance efforts. The protocols for the field assessments will be included within a Monitoring Plan.

13.1 Monitoring Plan

The DOT has developed a Monitoring Plan for the Phase 1 portion of the Plan area which includes visual and photographic documentation of BMP's before and after installation of the BMP's along the Trail (See Figure 16). In addition, the Monitoring Plan outlines methods which will be utilized to record the volume of sediment captured within each BMP. The pre-construction and post-construction results will be reported on an annual basis with technical memos summarizing the field observations.

The primary goal of the Monitoring Plan is to quantify the existing sediment load and determine the hydrologic reduction in runoff volumes to Type 1 and 2 Streams based on the sediment and volume load reduction benefits of the Plan. The monitoring results will also be used to calibrate and validate the BMP designs for reducing sediment from the existing Trail. The data collected as apart of the field assessments will be inputted into a GIS database system, which was originally developed by the CGS as part of the 2009 CGS Assessment. Field observations associated with the monitoring may include the following data fields as depicted within Table 26:

Table 26 – Monitoring Data Collection Table

Field 1	Field 2	Field 3	Field 4	Field 5	Field 6	Field 7	Field 8	Field 9
Point ID	Photo ID	GPS Coordinates	Description of Location	Purpose of the Photo	Date photo point was established	Date BMP's Installed	Number of Photo Points on Site	BMP Type

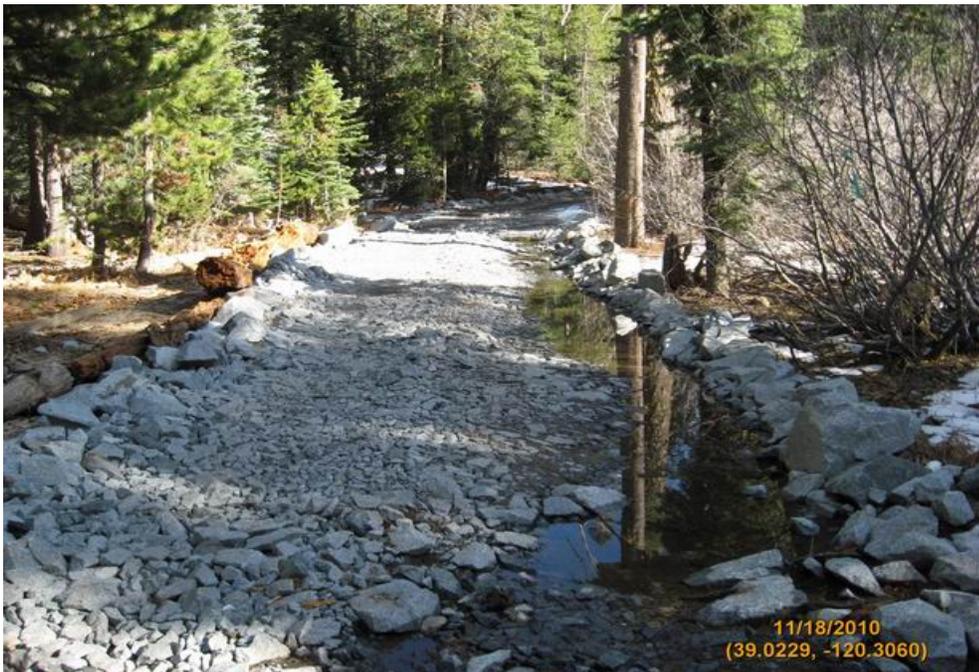


Photo Point # EC-02 – Station 117+18.21

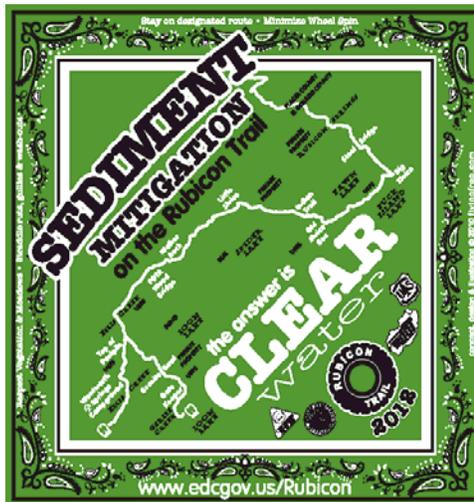
Rubicon Trail Route (1.0) Wentworth Springs looking East

Figure 16 - Typical BMP Photo Documentation



14.0 Education

The DOT has embarked on an extensive trail educational campaign that includes, but is not limited to, an educational video, a bandana campaign, trail signage, various trail committee meetings, and a County website. The following bandana campaign is ongoing and will be completed by the end of 2012:





15.0 Enforcement

In order to comply with the CAO of “an enforcement component” as part of the Plan, the DOT has been actively engaged with the following Law Enforcement Agencies:

El Dorado County Sheriff’s Department

State Parks OHV Rangers

United States Forest Service Law Enforcement Division

During the 2010 season, law enforcement efforts were increased substantially from previous years. State Parks OHV division launched a pilot program with Rangers camped at Spider Lake every weekend July 1st through Labor Day Weekend. This put officers on the Trail during the overnight hours every weekend. El Dorado County Sheriff’s Department had officers on the Trail every weekend and several overnights. The Forest Service had two Forest Patrol Officers on the Trail every weekend.

This increased law enforcement was well received by the users and provided a good measure of the type of enforcement needed. El Dorado County is in discussions with State Parks regarding their continued presence on the Trail. El Dorado County Sheriff’s Department will be on the Trail every weekend during the 2011 season. All rules of the road apply to this Trail and will be cited. Officers will cite for resource damage and keep Trail users on the Trail and not creating new variant routes.

El Dorado County will hold two Law Enforcement Summit meetings a year, one at the end of the season to debrief and one in February to coordinate efforts in the upcoming season. The coordinated effort works for all agencies and ensures that enforcement needs are met on the Rubicon Trail.



**COUNTY OF EL DORADO
DEPARTMENT OF TRANSPORTATION
INTEROFFICE MEMORANDUM**



Date: December 15, 2010

38

To: Board of Supervisors

LATE DISTRIBUTION

From: Steve Kooyman

Date 2:16 pm, Dec 16, 2010

Subject: Rubicon Trail Monitoring Plan

The County of El Dorado ("County"), Department of Transportation ("DOT") has completed the Monitoring Plan related to the DOT's Operations and Maintenance Plan for Phase I on the Rubicon Trail.

DOT's Ground Operations and Maintenance efforts have been divided into two sequential phases, and consequently the Monitoring Plan for the Rubicon Trail will have two phases. The Phase I Monitoring Plan, which was submitted to the California Regional Water Quality Control Board on September 30, 2010, is for the portion of the trail from Loon Lake and Wentworth Spring to Little Sluice. As noted in my presentation the small amount of usage that takes place during saturated soil conditions is on the portion of the trail covered by the Phase I monitoring plan. The Phase II Monitoring Plan will be completed as part of the Phase II Ground Operations and Maintenance Grant, in the 2011 season.

RECEIVED
BOARD OF SUPERVISORS
EL DORADO COUNTY
2:15 pm, Dec 16, 2010

COUNTY OF EL DORADO

DEPARTMENT OF TRANSPORTATION



MAINTENANCE DIVISION
2441 Headington Road
Placerville CA 95667
Phone: (530) 642-4909
Fax: (530) 642-9238

JAMES W. WARE, P.E.
Director of Transportation

Internet Web Site:
<http://edcgov.us>

MAIN OFFICE
2850 Fairlane Court
Placerville CA 95667
Phone: (530) 621-5900
Fax: (530) 626-0387



September 30, 2010

Wendy Wyels
California Regional Water Quality Board
Central Valley Region
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95760

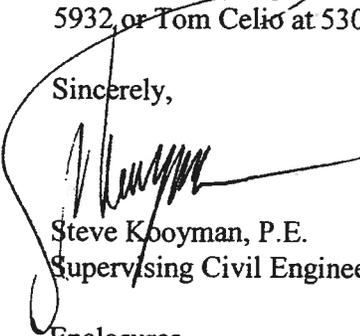
**RE: Cleanup and Abatement Order ("CAO") No. R5-2009-0030, Rubicon Trail 2010
Operations and Maintenance Plan – Monitoring Plan**

Dear Ms. Wyels:

The County of El Dorado ("County"), Department of Transportation ("DOT") has completed the Monitoring Plan related to the DOT's 2010 Operations and Maintenance Plan BMP activities for your review and comment pursuant to our meeting on September 9, 2010 between DOT/County staff and you and your staff.

The DOT appreciates the Water Board's time and effort on this item and looks forward to continuing our partnership as part of the CAO related work on the Rubicon Trail. Please contact me at 530-621-5932, or Tom Celio at 530-642-4905 if you have any questions.

Sincerely,



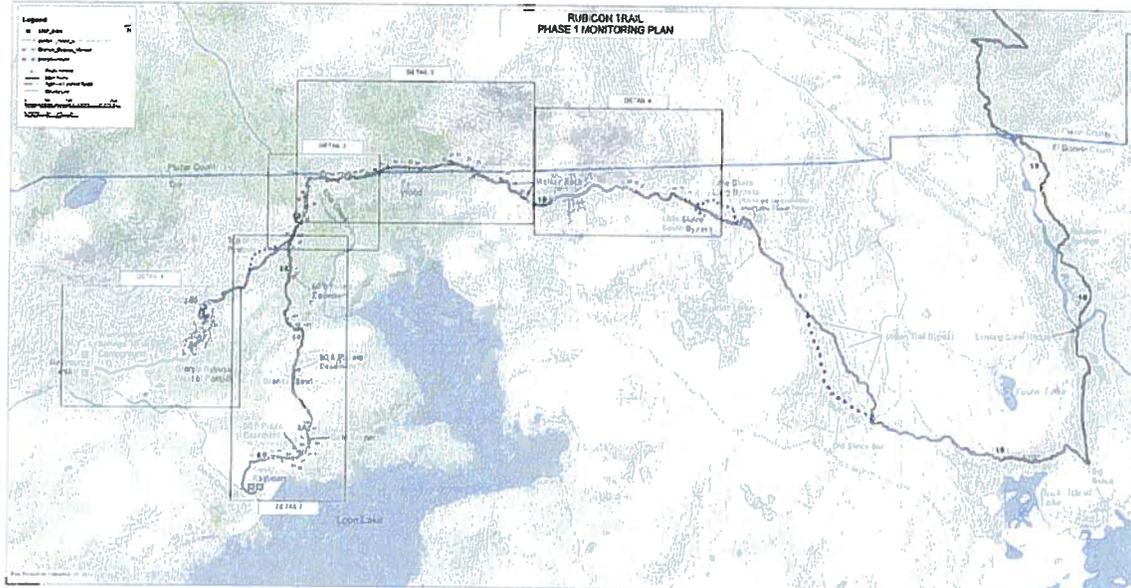
Steve Kooyman, P.E.
Supervising Civil Engineer

Enclosures

cc: Pamela Creedon, Central Valley Water Board
John Knight, Board of Supervisors, District I
Ray Nutting, Board of Supervisors, District II
Jack Sweeney, Board of Supervisors, District III
Ron Briggs, Board of Supervisors, District IV
Norma Santiago, Board of Supervisors, District V
Gayle Erbe-Hamlin, El Dorado County Chief Administrative Office
Ed Knapp, El Dorado County County Counsel
Jim Ware, El Dorado County Department of Transportation
Tom Celio, El Dorado County Department of Transportation
Diane Rubiaco, USDA ElDorado National Forest

10-1279.D.2

RUBICON TRAIL 2010 OPERATIONS AND MAINTENANCE PLAN PHASE 1 GROUND OPERATIONS



MONITORING PLAN

**THE COUNTY OF EL DORADO
DEPARTMENT OF TRANSPORTATION
2850 FAIRLANE COURT**

PLACERVILLE, CA 95667

OCTOBER 2010

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1.0 Introduction

1.1 BACKGROUND

The County of El Dorado, Department of Transportation ("DOT"), is currently implementing various Best Management Practices ("BMP's") along the section of the Rubicon Trail from Wentworth Springs Campground to Little Sluice (Main Trail Route 1.0) and from the Loon Lake Kiosk to the Intersection of Wentworth Springs Rd. (Intertie Route 2.0) (see Figure A). These two segments of the Rubicon Trail have been further defined with the 2010 DOT Operations and Maintenance Plan and within the 2010 California State Parks Off-Highway Motor Vehicle Recreation Division ("OHMV") Grant, with a Project designation as Phase 1 Ground Operations. The various sedimentation problems and proposed BMP treatments along these two trail segments have been identified within the California Geologic Survey ("CGS") 2009 Rubicon Trail Assessment Report with additional DOT 2010 field assessment baseline updates in accordance with the Clean-up and Abatement Order ("CAO"), R5-2009-0030 issued by the State water Quality Control Board Central Valley Region ("SWQCBCVR") and the Grant Guidelines as part of the DOT's 2009 and 2010 OHMV Grants.

1.2 PROJECT GOALS

The main goal of the 2010 Operations and Maintenance Plan for the Phase 1 Rubicon Trail Ground Operations is to mitigate the existing sedimentation issues identified within the CGS Report with supplemental information from the DOT 2010 field assessments. The scope of the Monitoring Plan will assist the DOT in achieving this goal by gathering pertinent existing conditions baseline information to use in the BMP design as well as evaluating the effectiveness of the installed BMP's. The sedimentation problems that will be addressed, using specific BMP's, were defined within the 2009 CGS Report with added DOT 2010 field assessments as part of the OHMV Soil Conservation Plan guidelines. Each BMP treatment type has been further classified within the DOT's BMP Toolbox under the headings of Source Control (SC), Hydrologic Design (HD), and Treatment (T). The Rubicon Trail BMP toolbox is currently being developed in coordination with the Resource Conservation District ("RCD").

1.3 PROJECT OBJECTIVES

The Project objectives represent physical conditions that can be measured to assess the success of the Project in achieving the Project goal. The 2010 Operations and Maintenance Plan ("Project") will conform to the OHMV Soil Conservation Plan guidelines as well as all pertinent USFS guidelines. The purpose of the Project to improve water quality by the following objectives:

1. Removing sediment discharge from the road before it reaches a Type 1 water course (T)
2. Stabilizing eroding cut slopes (SC)
3. Stabilizing roadside drainages (SC)
4. Stabilizing and armoring the road (SC)
5. Directing Off-site drainage across the road (disconnecting the off-site drainage from the road) (HD)

Each of these Objectives can be further delineated into the BMP Types (i.e., for the Objective 1, a BMP Type that will satisfy this Objective is Rock-Lined Energy Dissipator). The DOT will be using the CGS GIS/database with additional DOT field data to track all installed BMP's. Each BMP will be defined by Class, General Name, and Type (e.g. Source Control, Slope Stabilization, and Rock Slope Protection)

1.4 PURPOSE OF MONITORING

The pre-Project monitoring efforts will allow for the evaluation and documentation of existing problem areas with the results of the monitoring being used by the DOT to evaluate and select design solutions as appropriate to the proper BMP Type. The BMPs will be installed to mitigate the associated existing sediment loads from the Rubicon Trail for this particular Project area. The pre-Project Monitoring will also allow for calibration of the hydrologic analysis as well as estimation of the sediment load in the storm water runoff.

The post-Project monitoring efforts will provide the DOT the necessary information to evaluate and document each type of BMP to determine the effectiveness in meeting the specific goal and objectives of the Project. Typically the post-Project monitoring duration is two years which provides the minimum annual variances to complete a BMP assessment. Additional post-Project monitoring efforts are typically chosen to develop a trend analysis for long term planning and scientific research. This Monitoring Plan will utilize the two year BMP effectiveness type of frequencies in order to comply with the OHMV Grant Guidelines and CAO requirements.

Another positive result of post-Project Monitoring is that the data allows the DOT to better determine ongoing annual trail maintenance requirements for the Rubicon Trail and determine maintenance needs for future DOT projects. This type of monitoring is designed for spring and fall BMP inventory assessments which will be on-going throughout the life of the trail improvements. This type of data can be used to build trends with respect to maintenance frequencies, which in turn will assist the DOT with routine maintenance prioritization and potential cost saving measures.

1.5 MONITORING PLAN

The purpose of this Monitoring Plan is to discuss the scope, variables, and methodology to be implemented as part of the Rubicon Trail Phase 1 Operations and Maintenance Plan BMP implementation in accordance with the CAO and OHV Grant requirements. The monitoring effort should establish baseline conditions prior to BMP installation activities (complimenting the 2009 CGS Report), maintenance activities during BMP installation, and two years of BMP evaluation. Results of the monitoring efforts will be presented in the below reports as outlined in the Schedule and Deliverables sections of this plan.

The main objectives of the Plan are:

- Provide photographic documentation of the implemented BMP's as well as record existing and post-Project conditions with respect to proposed improvements
- Evaluate the different BMP Types to control erosion and sediment loss (source control, hydrologic design, treatment)
- Provide visual observations of the site conditions within the Project limits during runoff to assist in hydrologic model calibration (spring runoff)
- Recommend improvements to the BMP design features for use on similar future Projects and to update the BMP Toolbox

Annual Monitoring Report

The Annual Monitoring Report will provide the methods of BMP evaluation to meet the Project objectives, the collected data, photo documentation, and the BMP effectiveness analysis for the first water year after the installation of the BMP's.

Final Monitoring Report

The Final Monitoring Report will provide the second year of collected data and update the BMP effectiveness analysis with a final table which identifies each BMP Type and the effectiveness rating related to controlling erosion and sedimentation on the Phase 1 portion of the Rubicon Trail.

1.6 SCOPE OF MONITORING PLAN

As part of the Rubicon Trail CAO and OHMV Grant the County proposes to conduct visual monitoring of vegetation, surface waters, and BMP's within the Rubicon Trail road alignment to monitor operation and maintenance progress, appropriate implementation of Best Management Practices (BMPs), and to assess the BMP effectiveness with respect to the sedimentation issues on the trail. Field parameters observed will be documented by photographic monitoring using a digital camera and GPS photo tracking device. Data, photos, and their related parameters will be compiled into an Annual Monitoring Report with Final Monitoring Report after two years of monitoring. Photos and other recorded information will be collected before, during, and after BMP implementation. The monitoring will include four distinct seasons:

- Fall – Fall Frontal
- Winter - Rain on snow event (trail accessibly dependent)
- Spring – snowmelt runoff event
- Summer – thunderstorm

Information will be organized into an Annual Monitoring Report (first year of monitoring) and Final Monitoring Report (second year of monitoring) to be delivered to the Water Board and OHV at the completion of monitoring activities, typically at the end of each water year (October) with one to two months for compilation and data analysis.

2.0 Methodology

2.1 VARIABLE SELECTION

Field parameters considered for monitoring include photographic, sedimentation, precipitation and trail counts.

2.1.1 Photo Monitoring

The DOT will conduct visual monitoring of vegetation, Type I and II water courses, existing sedimentation issues within the trail limits to determine appropriate selection of BMPs, and to better quantify the effects that the BMP's had on environmental resources in the area. BMP and revegetation improvements will be documented by the photographic monitoring pre-Project and after the BMP's have been implemented. Data, photos, and their related parameters will be compiled into an Annual and Final Monitoring Report to track BMP effectiveness related to the Project goals and objectives. Photos and other recorded information will be collected before, during, and after BMP implementation pursuant to the OHMV Grant funding guidelines and availability of funds during the following seasons:

- Fall
- Winter
- Spring
- Summer

Field observations associated with the monitoring may include:

Field 1	Field 2	Field 3	Field 4	Field 5	Field 6	Field 7	Field 8	Field 9
Point ID	Photo ID	GPS Coordinates	Description of Location	Purpose of the Photo	Date photo point was established	Date BMP's Installed	Number of Photo Points on Site	BMP Type

See APPENDIX A for examples of a Field Observation Form, database template to be used in the field for purposes of data entry and an example of the Photo Output that will be produced.

2.1.2 Sedimentation Monitoring

As part of this effort, the DOT proposes to include sedimentation capture quantification at the key BMP treatment types for sediment. This will be accomplished through field measurements during the spring/summer BMP assessments and the measurements placed within a database. With this hydrologic/sediment monitoring effort, the DOT intends to extrapolate information from the Phase 1 Operations and Maintenance Plan and apply it to the Phase 2 Operations and Maintenance plan development to assist in the overall BMP design efforts.

2.1.3 Precipitation Monitoring

The DOT will continue to collect data from surrounding available precipitation sites to calibrate the current Rubicon hydrologic model.

2.1.4 Trail Count monitoring

The DOT will be coordinating with the Rubicon Trail Foundation ("FTR") and Friends Of The Rubicon ("FOTR") for the next two years with respect to obtaining seasonal trail counts (i.e.

peak summer season) using trail surveys at main locations (Loon Lake Kiosk and Ellis Creek). The data will be compiled and be incorporated into the Annual and Final Monitoring Reports.

2.2 STATISTICAL DESIGN

Pre-Project photos will be compared to conditions during the 2010 O&M Plan Implementation and post-Project photos to document the pre-existing conditions and allow for a visual comparison of the Project mitigation measures at each monitoring site. Further analysis and query of the parameters may allow recommendations for improvements to the design of BMP's for maintenance upgrades and for future proposed BMP's within the Phase 2 Project area.

2.3 DATA MANAGEMENT AND ACCEPTANCE CRITERIA

During the first season of pre-Project data collection (spring 2010 to fall 2010), the DOT will evaluate photos and data at the identified monitoring locations. From this, a decision will then be made as to whether the sites selected for photo monitoring and data collection provide the appropriate level of detail for monitoring in the subsequent seasons. Depending on the results of this analysis, the availability of funding and necessity, the DOT may either increase or decrease the number of monitoring sites.

2.4 PHOTO FREQUENCY AND DURATION

Photo monitoring of the BMP treatments within the Rubicon Trail Phase 1 O&M area will be collected during the pre-Project effort to better determine existing conditions and help with BMP selection.

The County proposes to monitor during the following seasons:

- Fall – Rain
- Winter – rain on snow event
- Spring – snowmelt runoff event
- Summer – thunderstorm

Photo monitoring of the installed BMP's will continue for two years following the completion of the Phase 1 O&M work to assess the effectiveness of the BMP's in achieving the Project goal and objectives. However, the second year of the monitoring effort scope might be altered based on funding availability and the amount of supporting information gathered from the first year to determine the effectiveness.

2.5 EQUIPMENT AND METHODS

Monitoring sites will be based on areas that receive BMP's, areas of high sediment accumulation, and areas where revegetation/trail rehabilitation may occur. The Pre and Post-Project monitoring will be performed with a digital camera and these photos will be included in the Annual and Final Monitoring Reports. The DOT will also provide a sediment capture estimation at key BMP treatment locations (i.e. directly connected to a Type I water course) based on the annual spring BMP assessment.

2.6 REPORTING

The objective, methods and results of the Rubicon Trail Monitoring Plan will be compiled into an Annual Monitoring Report at the completion of the first year investigation. The post-Project monitoring program will continue throughout the implementation of the 2010 O&M Plan and based on the results of the first year monitoring effort, methods and techniques may be adjusted

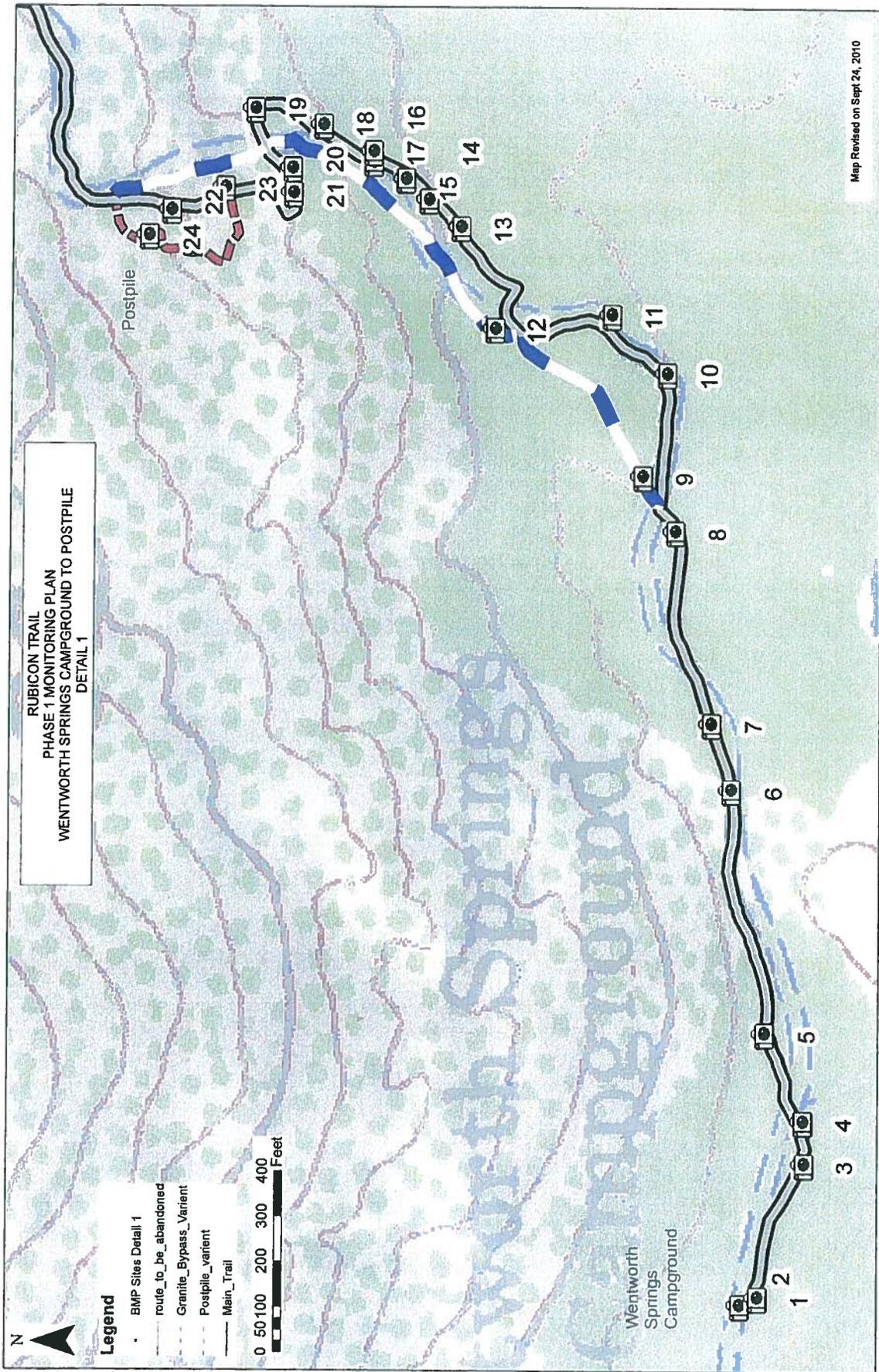
to assure that the findings of the monitoring efforts satisfy the goal and objectives of the Project and ultimately the sedimentation goal within the CAO.

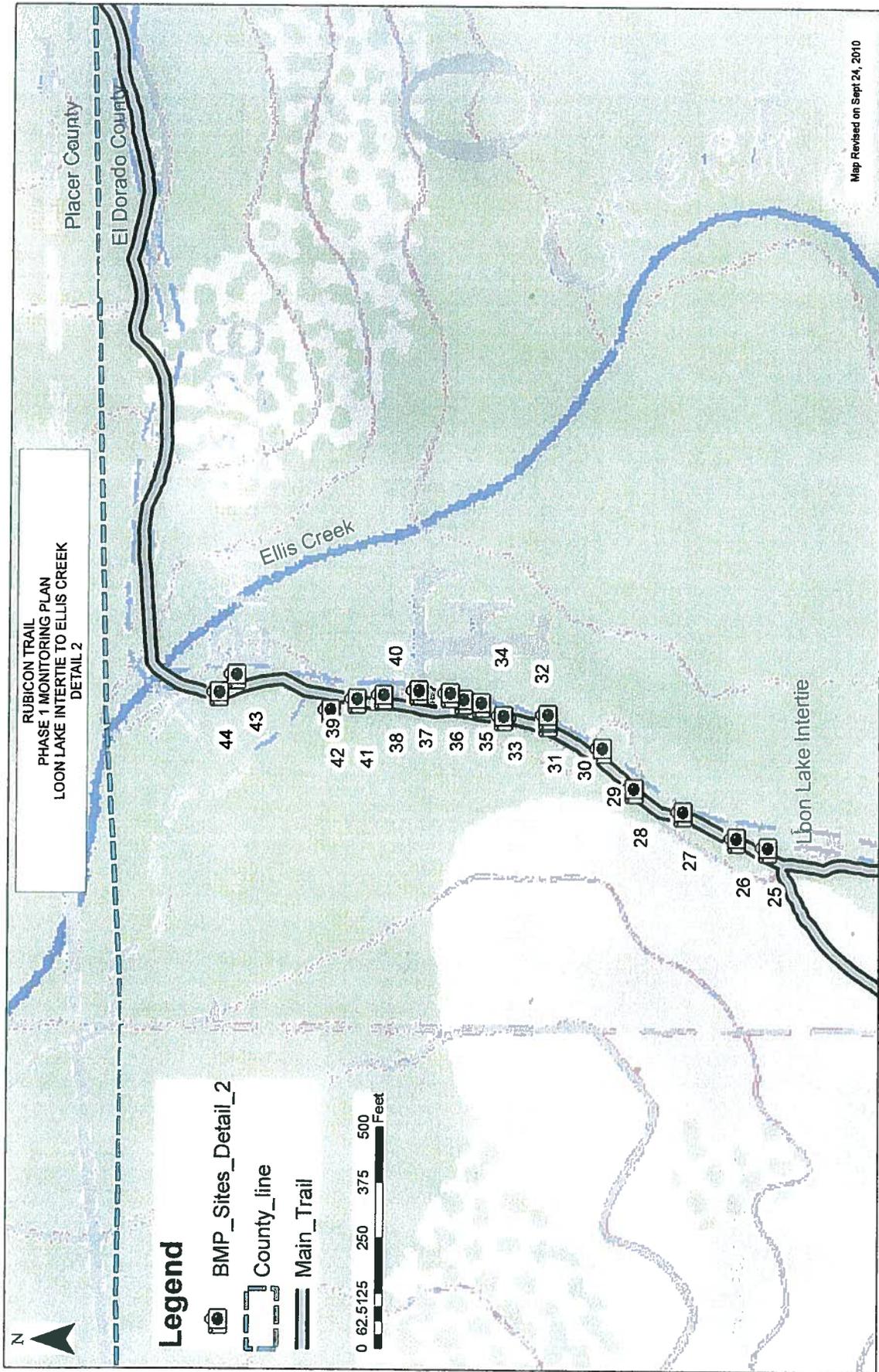
2.7 SCHEDULE / DELIVERABLES

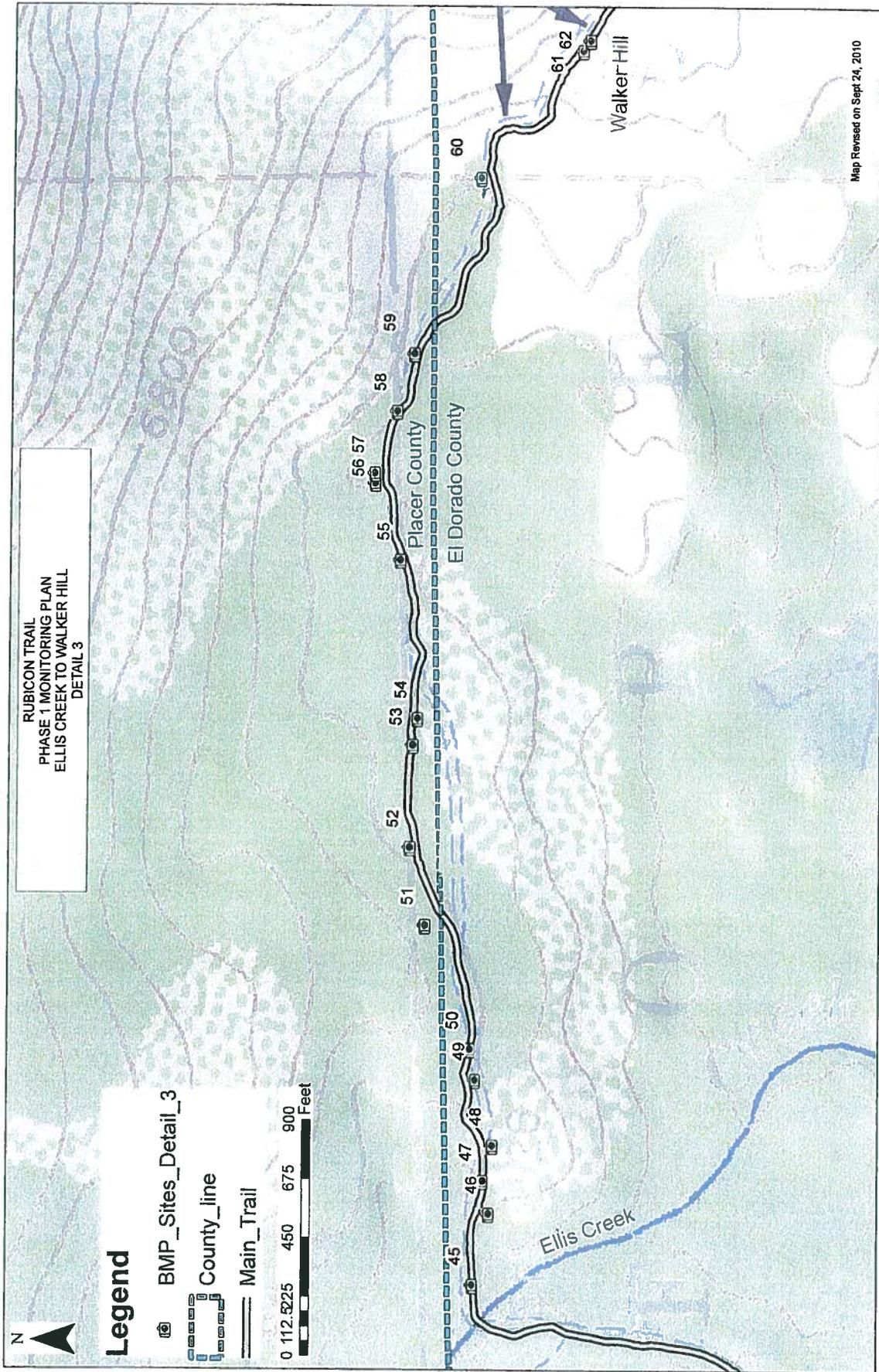
See Table 2 below for the Project monitoring schedule, which assumes the time frame for maintenance activities includes summer 2010. Monitoring will continue over the course of the 2010 Operations and Maintenance Plan implementation for the Phase 1 Rubicon Trail Ground Operations, post-Project monitoring will begin in the winter 2010 and continue through summer/fall 2011. The second year, if required, will begin in the fall of 2011 through the summer/fall of 2012.

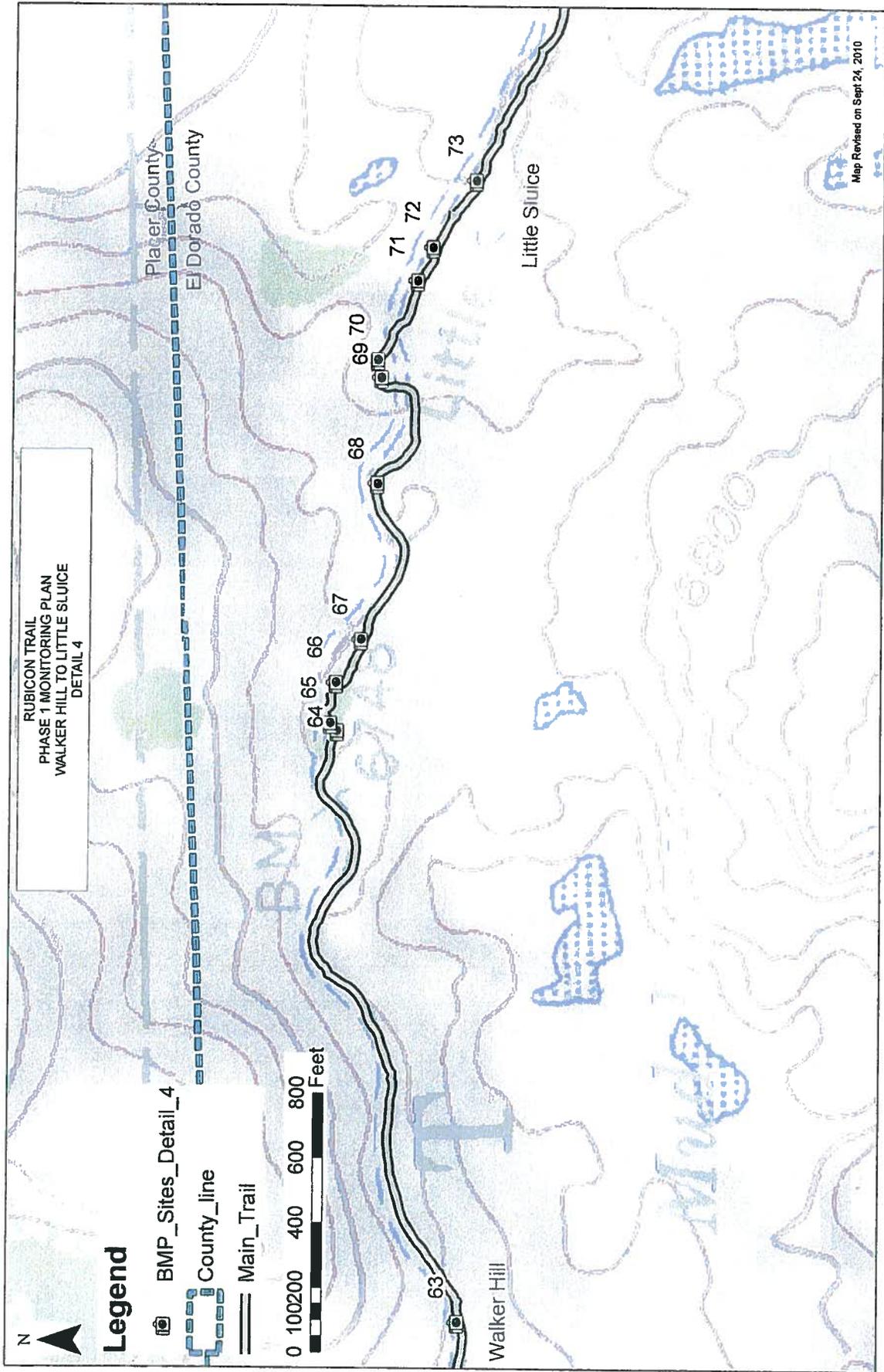
TABLE 2 – SCHEDULE

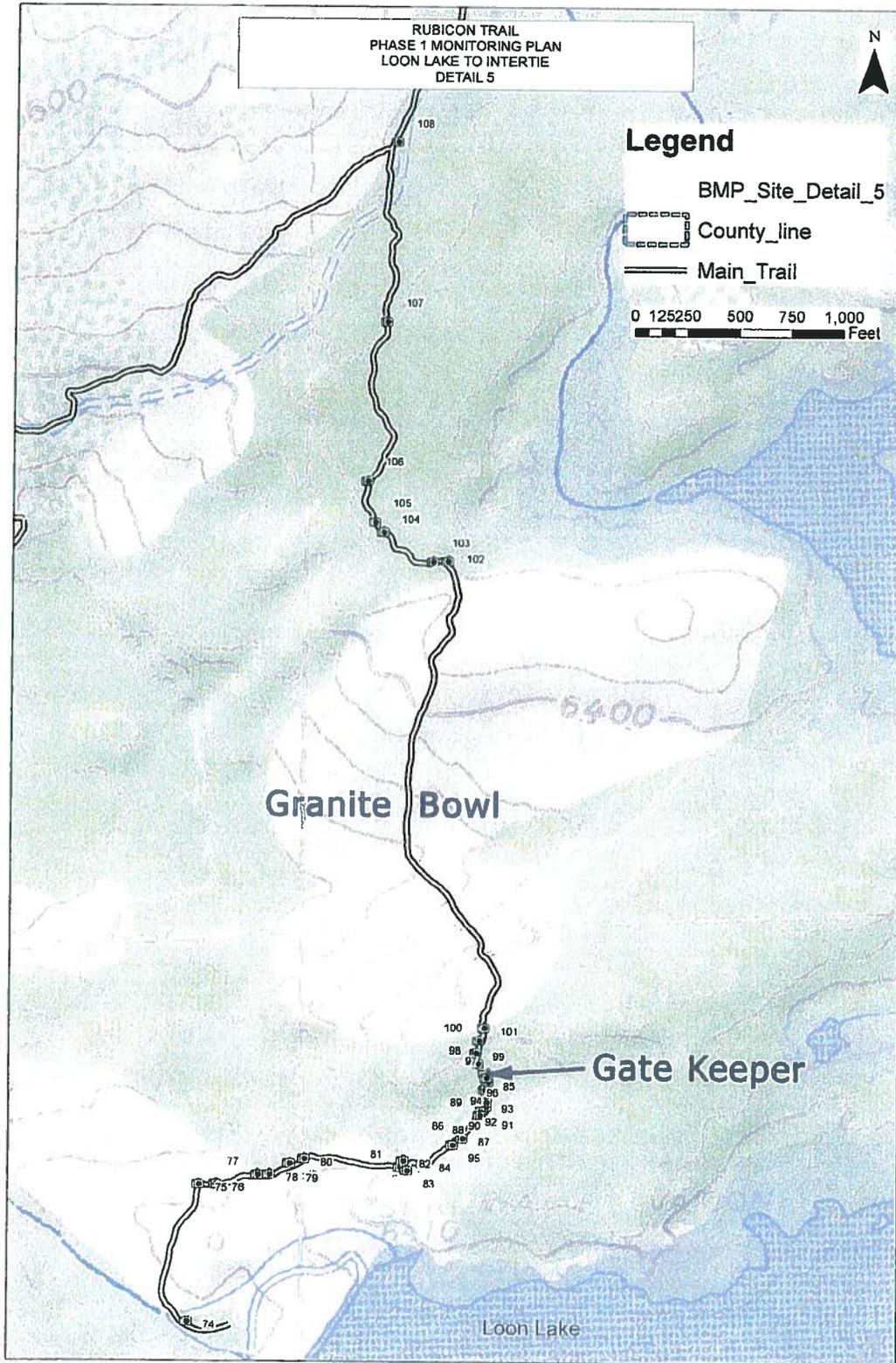
PHASE/TASK	ESTIMATED COMPLETION DATE
Scoping	
Conceptual Development	October 2010
Planning	
Preliminary Monitoring Plan	October 2010
Agency Review	November 2010
Final Monitoring Plan	November 2010
Annual Monitoring Report	November 2011
Final Monitoring Report	December 2012











APPENDIX A
FIELD OBSERVATION FORM EXAMPLE

Project Name: Rubicon Trail 2010 Ground Operations Phase 1

Photo Point #: --

BMP Type: --

BMP Installation Date: --

GPS Coordinates: --

Date Photo Points were Established: --

Number of Photo Points on Site: --

Location Description: --

Purpose of Photo: BMP effectiveness

Additional Comments:

Detailed/Close-up Map Showing Photo Point Location	Larger Scale/Broad-view Map Showing Photo Point Location
--	--

PHOTO OUTPUT FORM
PHOTO POINT #

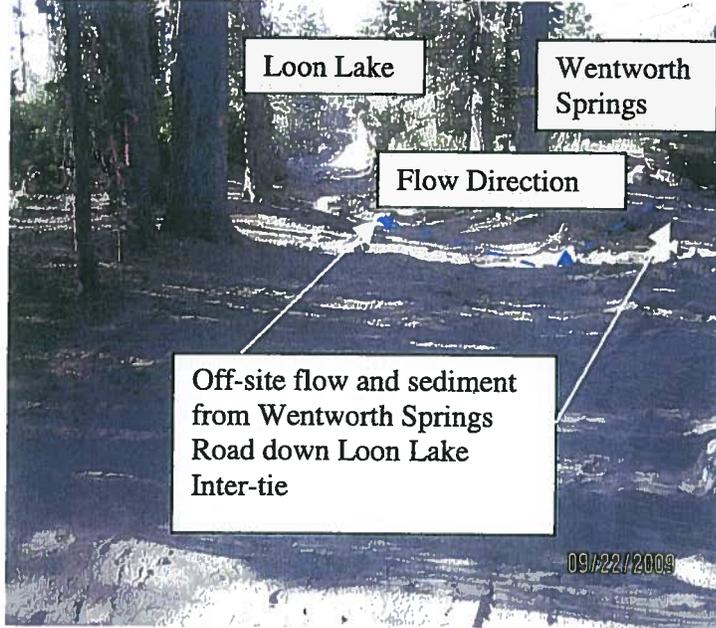
Pre-Project Photo		During Construction Photo	
Pre-Construction	Date	During Construction	Date
Site description etc.		Site Description etc.	

Post-Construction Photo Fall 2006		Post-Construction Photo Spring 2007	
Post-Construction	Date	Post-Construction	Date
Site description etc.		Site Description etc.	

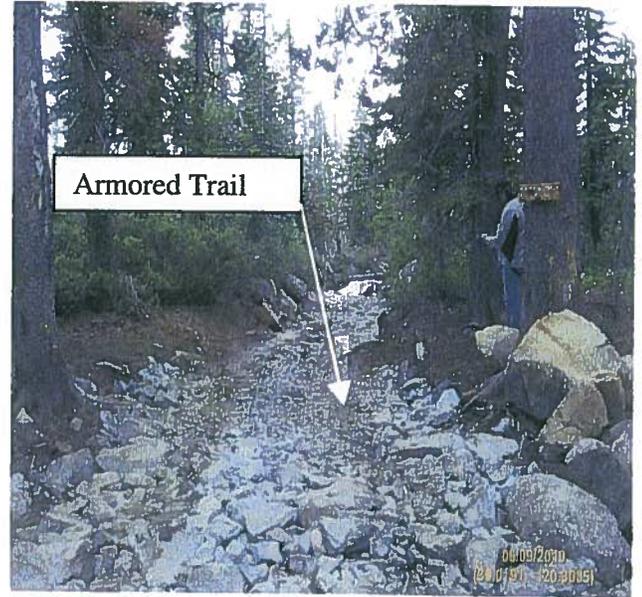
PHOTO OUTPUT EXAMPLE

Photo Point # 25/108 – Station 71+94

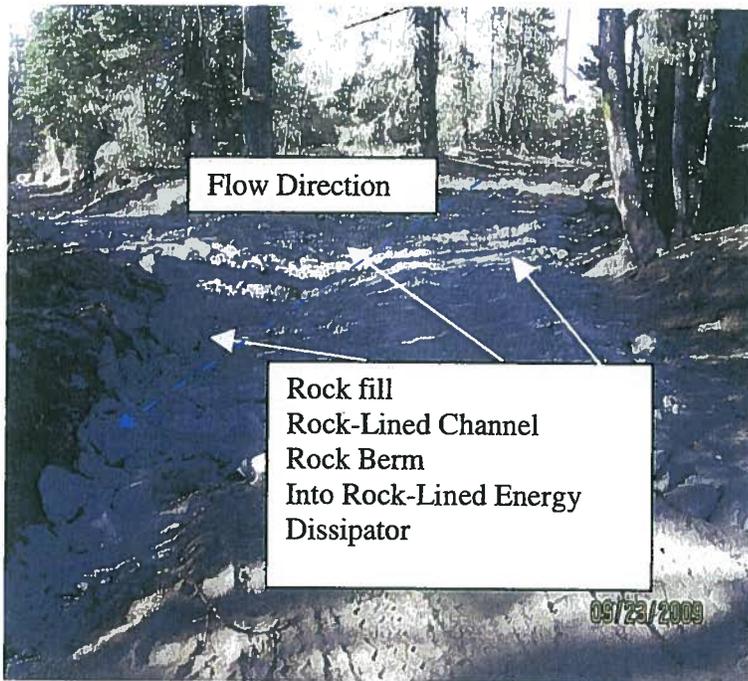
Rubicon Trail Route (1.0) Wentworth Springs Road and Loon Lake Inter-Tie Intersection looking southeast.



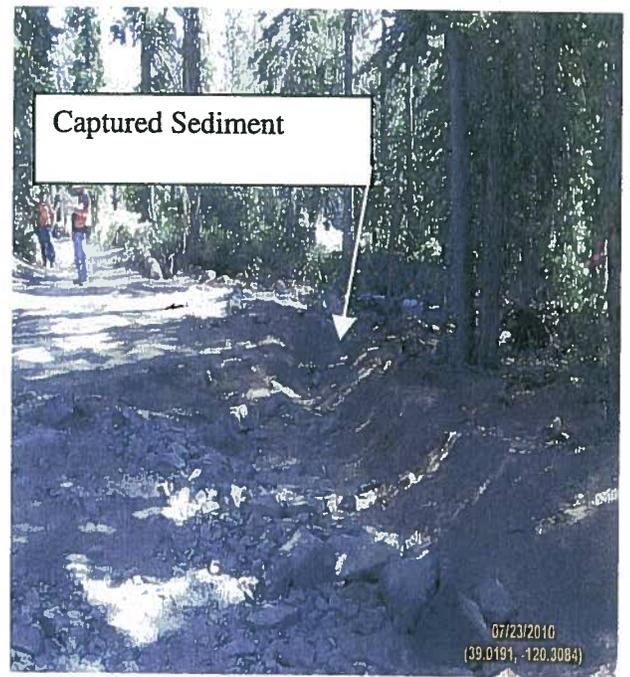
Pre-BMP Implementation
September 2009



Post-BMP Implementation
Spring 2010



Post-BMP Implementation
September 2009



Post-BMP Implementation
Summer 2010

Appendix B: Hydrology

HYDROLOGY - APPENDIX A. WATER QUALITY OBJECTIVES FOR INLAND SURFACE WATERS

Category	Standard
Bacteria	In waters designated for contact recreation, the fecal coliform concentration based on a minimum of not less than five samples for any 30-day period shall not exceed a geometric mean of 200/100 ml, nor shall more than ten percent of the total number of samples taken during any 30-day period exceed 400/100 ml.
Chemical Constituents	Waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses.
Color	Water shall be free of discoloration that causes nuisance or adversely affects beneficial uses.
Dissolved Oxygen	Dissolved oxygen concentrations shall not be reduced below the following minimum levels at any time: <ul style="list-style-type: none"> • Waters designated WARM 5.0 mg/l • Waters designated COLD 7.0 mg/l • Waters designated SPWN 7.0 mg/l.
Floating Material	Water shall not contain floating material in amounts that cause nuisance or adversely affect beneficial uses.
Oil and Grease	Waters shall not contain oils, greases, waxes, or other material in concentrations that cause nuisance, result in visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.
pH	The pH shall not be depressed below 6.5 nor raised above 8.5.
Pesticides	<ul style="list-style-type: none"> • No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses. • Discharges shall not result in pesticide concentrations in bottom sediments or aquatic life that adversely affect beneficial uses. • Total identifiable persistent chlorinated hydrocarbon pesticides shall not be present in the water column at concentrations detectable within the accuracy of analytical methods approved by the EPA or the Executive Officer. • Pesticide concentrations shall not exceed those allowable by applicable antidegradation policies (see State Water Resources Control Board Resolution No. 68-16 and 40 C.F.R. Section 131.12.). • Pesticide concentrations shall not exceed the lowest levels technically and economically achievable. • Waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of pesticides in excess of the Maximum Contaminant Levels set forth in California Code of Regulations, Title 22, Division 4, Chapter 15. • Waters designated for use as domestic or municipal supply shall not contain concentrations of thiobencarb in excess of 1.0 µg/l.
Total Dissolved Solids	Shall not exceed 100 mg/l (90 percentile)
Sediment	The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.
Settleable Material	Waters shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses.

Category	Standard
Suspended Material	Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.
Tastes and Odors	Water shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to domestic or municipal water supplies or to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses.
Temperature	At no time or place shall the temperature of COLD or WARM interstate waters be increased more than 5°F above natural receiving water temperature.
Toxicity	All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.
Turbidity	<p>Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in turbidity attributable to controllable water quality factors shall not exceed the following limits:</p> <ul style="list-style-type: none"> • Where natural turbidity is less than 1 Nephelometric Turbidity Unit (NTU), controllable factors shall not cause downstream turbidity to exceed 2. • Where natural turbidity is between 1 and 5 NTUs, increases shall not exceed 1 NTU. • Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent. • Where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs. • Where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.

California Regional Water Quality Control Board, Central Valley Region, Basin Plan (2007).

HYDROLOGY - APPENDIX B. CUMULATIVE WATERSHED EFFECTS

Definition of CWE	The analysis of cumulative watershed effects (CWE) considers the impacts of all past, present, and foreseeable land disturbances. The land disturbances selected for the analysis of CWE include those that have the potential to result in erosion and an increase in sediment delivery to aquatic features. These land disturbances include, but are not limited to: past timber harvest (both in the National Forest and on private land), roads, fires, man-made impervious areas associated with buildings and other facilities, powerline corridors, and campgrounds. An increase in the amount of sediment delivered to aquatic features can result in a number of negative effects. ¹
Geographic scope of CWE	The 7 th field watersheds, which are generally 3,000 to 10,000 in size, that include the proposed land disturbance or changes in land disturbance. Sub-watersheds less than 3,000 acres in size may be delineated for analysis if land disturbances are concentrated in those areas.
Methods and limitations of assessing CWE	There are a number of methods currently used to assess CWE where the primary direct impact of concern is an increase in sediment delivery to streams and other aquatic features. None of these methods can quantitatively predict the amount of sediment delivered to streams, the distance downstream that the sediment load will travel, or point in time and the duration when an increase in sediment delivery to aquatic features will occur. The reasons for this include the large variability in the magnitude of direct effects from a given land disturbance, inability to predict secondary or indirect effects, lack of data on recovery rates for land disturbances, difficulty of validating predictive models on-the-ground, and the uncertainty of future events such as the size and timing of large storms. As a result, an assessment of CWE is frequently reported as an indicator of the overall <i>risk</i> of cumulative effects occurring in a watershed (Reid 1993; MacDonald 2000).
Magnitude or severity of CWE	The magnitude or severity of CWE following land disturbance depends largely on an event that cannot be prevented and the exact timing of which cannot be accurately predicted. It is whether a “large storm event” occurs within several years after land disturbances when the ground surface is vulnerable to erosion. If a large storm event does not occur within several after the land disturbance, the CWE to aquatic features will be minor, negligible, or absent. As a result of the importance of large storm events in determining actual erosion, sediment delivery to streams, turbidity and suspended sediment levels of streams, the land disturbances themselves in the watersheds play only a partial role in the severity of impacts to aquatic resources.
Method of CWE used in the Eldorado National Forest	The method selected for this CWE analysis is the method of Equivalent Roaded Acres (ERA). This method was developed by Region 5 of the U.S. Forest Service and adapted by the Eldorado National Forest (ENF). The method was specifically developed to assess the <i>risk</i> of CWE in forested watersheds where timber harvest and roads are major land disturbances. The ERA method has been used in the ENF for over 15 years, and nearly all of the 155 watersheds in the ENF have been evaluated with this method. This allows all of the watersheds in the ENF to be compared relative to each other in terms of the risk of CWE.
Description of the method of Equivalent Roaded Acres (ERA)	An index is calculated for an entire watershed that expresses most land uses in terms of the percent of the watershed covered by roads. Based on the percent ERA and a threshold of concern (TOC), a given watershed is assigned a relative risk – <i>low</i> , <i>moderate</i> , <i>high</i> , or <i>very high</i> - of cumulative impacts. A <i>very high risk</i> is merely a warning that cumulative impacts – such as an increase in sediment delivery to streams – might occur. The ERA method has the same limitations as previously described for all commonly used CWE methods where an increase in sediment delivery to streams is the primary concern.

¹ One well-documented cumulative effect is the reduction in the amount and quality of spawning habitat for resident fish as a result of fine-grained sediment deposited in the stream channel.

The ERA method of assessing the risk of CWE

Summary
<p>The risk of cumulative watershed effects (CWE) is assessed using the Equivalent Roaded Acre (ERA) method developed by R5 USFS. The process was further refined and adapted for the Eldorado National Forest (Carlson and Christiansen 1993). In this method, an index is calculated for an entire watershed that expresses most land use in terms of the percent of the watershed covered by roads. Based on the ERA and a threshold of concern (TOC), a given watershed is assigned a relative risk – low, moderate, high, or very high - of CWE. The primary cumulative impact of concern is an increase in sediment delivery to streams and degradation of aquatic habitat.</p>
Important aspects of the ERA method
<ul style="list-style-type: none"> ▪ Roads, which are considered to have the greatest potential to increase runoff and sediment to streams, are given a value of 1.0. The number of acres of roads in a watershed is divided by the size of the entire watershed (in acres). This gives the percent of the watershed covered by roads. ▪ For each land disturbance activity other than roads, the number of acres is multiplied by a number less than 1.0. The result (for each land disturbance activity) is then divided by the number of acres of the entire watershed. This gives the percent of the “equivalent roaded acres” in the watershed for each type of land disturbance. ▪ The values for equivalent roaded acres for all of the land disturbance activities are added together. The final number represents the percent of the watershed that is covered by the ‘equivalent’ of roads. ▪ The threshold of concern (TOC) is usually between 10 and 18 percent. That is, when 10 to 18 percent of a watershed is covered by the equivalent of roads, there is a “high risk” that increased peak flows of streams and sediment delivery to streams will occur. This does not mean these effects will occur precisely when the ERA reaches the TOC, or that an increase in peak flows and sediment delivery to streams will automatically result in a degradation of fish habitat or diminish the experience of recreationists. It is merely a warning that cumulative effects might occur.
Assumptions and limitations of the ERA method
<ul style="list-style-type: none"> ▪ The method is intended for watersheds between 3,000 and 10,000 acres in size, although the method is commonly used for watersheds slightly outside of this range. ▪ ERA values, as well as the TOC, are only indicators of the risk of cumulative impacts occurring. They cannot be used to determine the percent or numerical amount of increase of sediment delivery to streams, stream channel eroded, fish habitat degraded or lost, or any other change in watershed condition. Such quantitative assessments require additional analysis. ▪ The location of land disturbance activities within a watershed is not considered. For example, roads near streams are treated exactly the same as roads that are far from streams. In reality, roads located within or next to riparian areas contribute more sediment to streams than roads in upland areas. ▪ Recovery of the watershed from land disturbing activities occurs with time. For timber harvest activities, hydrologic recovery is assumed to be thirty years (i.e. ERA contribution is zero thirty years after timber harvest.) ▪ The ERA calculations do not take into account site specific Best Management Practices. ▪ ERA values start one year after a land use is implemented.
Risk categories
<ul style="list-style-type: none"> ▪ Low risk of CWE - ERA is less than 50% of TOC ▪ Moderate risk of CWE - ERA is between 50% and 80% of TOC ▪ High risk of CWE - ERA is between 80% and 100% of TOC ▪ Very high risk of CWE - ERA is greater than TOC

HYDROLOGY - APPENDIX C. USFS BEST MANAGEMENT PRACTICES (BMPs)

BMP Number	BMP Practice	BMP Objective
12.21 Road Management BMPs		
2.1	Travel Management Planning and Analysis	Use the travel analysis and road management planning processes to develop measures to avoid, minimize, and mitigate adverse impacts to water, aquatic, and riparian resources during road management activities, contribute toward restoration of water quality where needed, and identify the road system which can be effectively maintained.
2.2	General Guidelines for the Location and Design of Roads	Locate roads to minimize problems and risks to water; aquatic, and riparian resources. Incorporate measures that prevent or reduce impacts, through design for construction, reconstruction, and other route system improvements.
2.3	Road Construction and Reconstruction	Minimize erosion and sediment delivery from roads during road construction or reconstruction, and their related activities.
2.4	Road Maintenance and Operations	To ensure water-quality protection by providing adequate and appropriate maintenance and by controlling road use and operations.
2.7	Road Decommissioning	<p>Stabilize, restore, and vegetate unneeded roads to a more natural state as necessary to protect and enhance NFS lands, resources, and water quality. The end result is that the decommissioned road will not represent a significant impact to water quality by:</p> <ol style="list-style-type: none"> 1. Reducing erosion from road surfaces and slopes and related sedimentation of streams; 2. Reducing risk of mass failures and subsequent impact on water quality; 3. Restoring natural surface and subsurface drainage patterns; 4. Restoring stream channels at road crossings and where roads run adjacent to channels
2.8	Stream Crossings	Minimize water, aquatic, and riparian resource disturbances and related sediment production when constructing, reconstructing, or maintaining temporary and permanent water crossings.
2.10	Parking and Staging Areas	Construct, install, and maintain an appropriate level of drainage and runoff treatment for parking and staging areas to protect

		water, aquatic, and riparian resources.
2.11	Equipment Refueling and Servicing	Prevent fuels, lubricants, cleaners, and other harmful materials from discharging into nearby surface waters or infiltrating through soils to contaminate groundwater resources.
2.13	Erosion Control Plan	<p>Effectively limit and mitigate erosion and sedimentation from any ground-disturbing activities, through planning prior to commencement of project activity, and through project management and administration during project implementation.</p> <ol style="list-style-type: none"> 1. Provide seamless transition between planning-level (NEPA) mitigation descriptions and on-the-ground implementation of erosion-control measures tailored to site conditions. 2. Ensure that all disturbance-related mitigation requirements and provisions for field revisions or modifications are accurately captured in one comprehensive document for each project or activity. 3. Activities include, but are not limited to: timber sale harvest; facility site, road, bridge, trail and appurtenance construction, reconstruction, and maintenance; watershed improvement; road and trail decommissioning; legacy site restoration, administratively permitted activities; and vegetation and fuels management activities. 4. Comply with overarching area plans, such as Northwest Forest Plan and Sierra Nevada Framework Plan Amendment.
12.41 Recreation BMPs		
4.4	Control of Sanitation Facilities	To protect surface and subsurface water from bacteria, nutrients, and chemical pollutants resulting from the collection, transmission, treatment, and disposal of sewage at Forest Service sites.
4.5	Control of Solid Waste Disposal	To protect water from nutrients, bacteria, and chemicals associated with solid waste disposal.
4.7	Best Management Practices for Off-Highway Vehicle Facilities and Use (BMPs 4.7.1 to 4.7.9)	See the individual OHV BMPs on the following pages for specific objectives.
4.9	Protection of Water Quality within Developed and Dispersed Recreation Areas	To protect water quality by regulating the discharge and disposal of potential pollutants.
12.51 Vegetation Manipulation BMPs		

5.1	Soil-disturbing Treatments on the Contour	To decrease sediment production and stream turbidity, while mechanically treating slopes.
5.3	Tractor Operation Limitation in Wetlands and Meadows	To limit turbidity and sediment production resulting from compaction, rutting, runoff concentration, and subsequent erosion by excluding the use of mechanical equipment in wetland and meadows except for the purpose of restoring wetland and meadow function.
5.4	Revegetation of Surface-disturbed Areas	To protect water quality by minimizing soil erosion through the stabilizing influence of vegetation foliage and root network.
5.6	Soil Moisture Limitations for Mechanical Equipment Operations	To prevent compaction, rutting, and gullyng, with resultant sediment production and turbidity.
12.71 Watershed Management BMPs		
7.1	Watershed Restoration	To repair degraded watershed conditions, and improve water quality and soil stability.
7.3	Protection of Wetlands	To avoid adverse water-quality impacts associated with destruction, disturbance, or modification of wetlands.
7.4	Forest and Hazardous Substance Spill Prevention Control and Countermeasure Plan	To prevent contamination of waters from accidental spills.
7.7	Management by Closure to Use (Seasonal, Temporary, and Permanent)	To exclude activities that could result in damages to either resources or improvements, such as roads and trails, resulting in impaired water quality.
7.8	Cumulative Off-site Watershed Effects	To 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.

Table developed from the *Water Quality Management Handbook (USDA, 2011)*

HYDROLOGY - APPENDIX D - RIPARIAN CONSERVATION AREAS (RCAs)

Desired Conditions

The desired future condition of RCAs would be to have riparian areas meet or exceed the goals of the Clean Water Act and Safe Drinking Water Act by providing water that is fishable, swimmable, and suitable for drinking after normal treatment. Riparian areas would support viable populations of native plant, desired non-native plant, invertebrate, and vertebrate riparian and aquatic-dependent species. Species composition and structural diversity of plant and animal communities in riparian areas, wetlands, and meadows would further provide desired habitat conditions and ecological function. The distribution and health of biotic communities in special aquatic habitats sustains their functions and diversity. Spatial and temporal connectivity for riparian and aquatic-dependent species within and between watersheds would provide physically, chemically and biologically unobstructed movement for their survival, migration and reproduction.

Connections of floodplains, channels, and water tables would distribute flood flows and sustain diverse habitats. Soils with favorable infiltration characteristics and diverse vegetative cover would absorb and filter precipitation and sustain favorable conditions of stream flows. In-stream flows are sufficient to sustain desired conditions of riparian, aquatic, wetland, and meadow habitats and keep sediment regimes as close as possible to those with which aquatic and riparian biota evolved. The physical structure and condition of stream banks and shorelines would minimize erosion and sustain desired habitat diversity.

The ecological status of meadow vegetation is late seral and a diversity of age classes of hardwood shrubs is present and regeneration is occurring. Meadows are hydrologically functional and sites of accelerated erosion (e.g. gullies and headcuts) are stabilized and recovering. Meadows with perennial and intermittent streams have the following characteristics: 1) stream energy from high flows is dissipated, reducing erosion and improving water quality, 2) streams filter sediment and capture bedload, aiding in floodplain development, 3) meadow conditions enhance floodwater retention and groundwater recharge, and 4) root masses stabilize stream banks against scouring and undercutting.

The management intent is to meet Standards and Guidelines associated with RCOs through management objectives so that desired future conditions are obtainable. The abbreviated management objectives are:

- To maintain and restore water quality.
- To maintain and restore habitat to support viable populations of native and

desired non-native plant, invertebrate, and vertebrate riparian-dependent species.

- To maintain and restore the species composition and structural diversity of animal communities in riparian areas, wetlands, and meadows to provide desired habitats and ecological functions.
- To maintain and restore the distribution and health of biotic communities in special aquatic habitats (such as springs, seeps, vernal pools, fens, bogs, and marshes) to perpetuate their unique functions and biological diversity.
- To maintain and restore spatial and temporal connectivity for aquatic and riparian species within and between watersheds.

Background

The Sierra Nevada Forest Plan Amendment Record of Decision (SNFPA ROD) of 2004 identified aquatic, riparian, and meadow ecosystems and associated species as one of five problem areas in the region and established goals and strategies for addressing these areas. In response, an Aquatic Management Strategy (AMS) was developed to address this problem area and consists of nine goals that provide a comprehensive framework for establishing desired conditions (see table below). Meeting the goals should improve ecosystem conditions by restoring and maintaining the physical, chemical and biological integrity of the region's waters as mandated by the Clean Water Act, and would support the Forest Service's mission to provide habitat for riparian - and aquatic-dependent species under the National Forest Management Act, Organic Act, Safe Drinking Water Act, Endangered Species Act, and Electric Consumers Protection Act.

Aquatic Management Strategy (AMS) Goals	
Goal	Description
1. Water Quality	Maintain and restore water quality to meet goals of the Clean Water Act and Safe Drinking Water Act, providing water that is fishable, swimmable, and suitable for drinking after normal treatment.
2. Species Viability	Maintain and restore habitat to support viable populations of native and desired non-native plant, invertebrate, and vertebrate riparian-dependent species. Prevent new introductions of invasive species. Where invasive species are adversely affecting the viability of native species, work cooperatively with appropriate State and Federal wildlife agencies to reduce impacts to native populations.
3. Plant and Animal Community Diversity	Maintain and restore the species composition and structural diversity of plant and animal communities in riparian areas, wetlands, and meadows to provide desired habitats and ecological functions.

Aquatic Management Strategy (AMS) Goals	
Goal	Description
4. Special Habitats	Maintain and restore the distribution and health of biotic communities in special aquatic habitats (such as springs, seeps, vernal pools, fens, bogs, and marshes) to perpetuate their unique functions and biological diversity.
5. Watershed Connectivity	Maintain and restore spatial and temporal connectivity for aquatic and riparian species within and between watersheds to provide physically, chemically and biologically unobstructed movement for their survival, migration and reproduction.
6. Floodplains and Water Tables	Maintain and restore the connections of floodplains, channels, and water tables to distribute flood flows and sustain diverse habitats.
7. Watershed Condition	Maintain and restore soils with favorable infiltration characteristics and diverse vegetative cover to absorb and filter precipitation and to sustain favorable conditions of stream flows.
8. Streamflow Patterns and Sediment Regimes	Maintain and restore in-stream flows sufficient to sustain desired conditions of riparian, aquatic, wetland, and meadow habitats and keep sediment regimes as close as possible to those with which aquatic and riparian biota evolved.
9. Stream Banks and Shorelines	Maintain and restore the physical structure and condition of stream banks and shorelines to minimize erosion and sustain desired habitat diversity.

Table developed from pages 32 and 33 of the 2004 SNFPA ROD.

An important key element of the aquatic, riparian, and meadow ecosystem strategy are six RCOs that are linked to individual AMS goals and have one or more associated standards and guidelines. The SNFPA ROD requires the USFS to manage these ecosystems consistent with these RCOs and their associated standards and guidelines. Therefore, activities that occur within RCAs are required to have a site specific analysis conducted to determine the type and extent of activities that can occur within RCAs (see table below). RCA widths are essentially buffers designed to limit or prevent activities with potential adverse effects from occurring in close proximity to aquatic features. They vary based on

the type of aquatic feature and can be adjusted at the project level if a landscape analysis has been completed and a site-specific RCO analysis demonstrates a need for different widths. Management activity, stream condition, soil type, and slope conditions among other variables are often considered when adjusting RCA widths.

Riparian Conservation Areas (RCAs)	
Aquatic feature	RCA width
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 ¹	top of inner gorge
Special Aquatic Features ² 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 the edge of the features 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.

Table developed from page 42 of the 2004 SNFPA ROD.

¹ Inner gorge is defined by stream adjacent slopes greater than 70 percent gradient

² Special Aquatic Features include: lakes, wet meadows, bogs, fens, wetlands, vernal pools, and springs

HYDROLOGY - APPENDIX E. CONSISTENCY WITH RIPARIAN CONSERVATION OBJECTIVES

Consistency of Alternatives with Riparian Conservation Objectives (RCOs)					
RCO #	Alternatives 1	Alternative 2	Modified Alternative 3	Alternative 4	Alternatives 5 & 6
1 - Beneficial Uses	<u>Not likely to meet this objective</u> based on potential water quality and aquatic habitat degradation associated with wet season use.	<u>Not likely to meet this objective</u> based on continued water quality and aquatic habitat degradation during wet season use, at low-water crossings, during runoff periods, and in close proximity to lentic (i.e. wetlands, lakes) features.	<i>Likely to meet this objective</i> based on the saturated soil management strategy for addressing erosion control feature effectiveness.	<u>Not likely to meet this objective</u> based on the potential delivery of petroleum products to nearby wetlands and the potential delivery of petroleum products to the Little Rubicon River and Spider Lake associated with new routes proposed within the RCAs.	<i>Likely to meet this objective.</i> Wet season closure, closure of routes, and a single 50 foot wide easement would provide adequate protection for water quality and aquatic habitat.
2 - Maintain or Restore Geomorphic & Biological Characteristics	<u>Not likely to meet this objective</u> based on potential water quality and aquatic habitat degradation associated with wet season use.	<u>Not likely to meet this objective</u> based on continued impacts to geomorphic and biological characteristics at stream crossings and from uses in close proximity to lentic features.	<i>Likely to meet this objective</i> based on the saturated soil management strategy for addressing erosion control feature effectiveness.	<u>Not likely to meet this objective</u> based on the potential delivery of petroleum products to nearby wetlands and the potential delivery of petroleum products to the Little Rubicon River and Spider Lake associated with new routes proposed within the RCAs.	<i>Likely to meet this objective.</i> Closure of routes, a single 50 foot wide easement, and decreased use in close proximity to lentic features would benefit geomorphic and biological characteristics.
3 - Large Woody Debris	<i>Likely to meet this objective.</i>				
4 - Enhance or Maintain Physical & Biological Characteristics	<u>Not likely to meet this objective</u> based on potential water quality and aquatic habitat degradation associated with wet season use.	<u>Not likely to meet this objective</u> based on continued impacts to physical and biological characteristics at stream crossings and from uses in close proximity to lentic features.	<i>Likely to meet this objective</i> based on the saturated soil management strategy for addressing erosion control feature effectiveness.	<u>Not likely to meet this objective</u> based on the potential delivery of petroleum products to nearby wetlands and the potential delivery of petroleum products to the Little Rubicon River and Spider Lake associated with new routes proposed within the RCAs.	<i>Likely to meet this objective.</i> This alternative would maintain physical and biological characteristics through a wet season closure, closure of routes, and a single 50 foot wide easement.

Consistency of Alternatives with Riparian Conservation Objectives (RCOs)					
RCO #	Alternatives 1	Alternative 2	Modified Alternative 3	Alternative 4	Alternatives 5 & 6
5 - Preserve, Restore, or Enhance Features	<i>Likely to meet this objective</i> based on route closures and trail improvements.	<u>Not likely to meet this objective</u> based on continued sediment and contaminant delivery to nearby lakes and wetlands.	<i>Likely to meet this objective</i> based on the saturated soil management strategy for addressing erosion control feature effectiveness.	<u>Not likely to meet this objective</u> based on the potential delivery of petroleum products to nearby wetlands and the potential delivery of petroleum products to the Little Rubicon River and Spider Lake associated with new routes proposed within the RCAs.	<i>Likely to meet this objective.</i> This alternative would preserve and restore lakes and wetlands through a wet season closure, closure of routes, and a single 50 foot wide easement.
6 - Restoration Actions	<i>Likely to meet this objective</i> based on route closures and trail improvements.	<u>Not likely to meet this objective</u> based on continued trail degradation.	<i>Likely to meet this objective</i> based on the saturated soil management strategy for addressing erosion control feature effectiveness.	<u>Not likely to meet this objective</u> based on the amount of route additions within RCAs.	<i>Likely to meet this objective.</i> Similar to Alternative 1.

HYDROLOGY - APPENDIX F. RIPARIAN CONSERVATION (RCAs & RCOs) STANDARDS and GUIDELINES

Riparian Conservation Areas and Critical Aquatic Refuges	
Standard and Guideline	Analysis with respect to Proposed Action
<p>91. Designate riparian conservation area (RCA) widths as described in the RCA table on the preceding page. The RCA widths displayed in the table may be adjusted at the project level if a landscape analysis has been completed and a site-specific RCO analysis demonstrates a need for different widths.</p>	<p>All Alternatives</p> <p>RCA widths for the project area would be designated as such in accordance with the RCA table in Appendix D. The existing features and activities proposed under the alternatives would occur within RCAs.</p>
<p>92. Evaluate new proposed management activities within CARs and RCAs during environmental analysis to determine consistency with the riparian conservation objectives at the project level and the AMS goals for the landscape. Ensure that appropriate mitigation measures are enacted to (1) minimize the risk of activity-related sediment entering aquatic systems and (2) minimize impacts to habitat for aquatic- or riparian-dependent plant and animal species.</p>	<p>Alternatives 1, 3, 4, 5, 6</p> <p>Under Alternatives 1, 3, 4, 5, and 6; some of the proposed activities are designed to reduce sediment delivery to aquatic systems and reduce impacts to habitat for aquatic- and riparian-dependent plant and animal species.</p> <p>Alternatives 3, 5, and 6</p> <p>In addition to above, these alternatives would include seasonal restrictions designed to further minimize the potential for water quality degradation associated with wet season use.</p> <p>Alternative 2</p> <p>With the exception of completing initiated maintenance activities, no additional management activities are proposed under this alternative and sediment associated with the trail would continue to enter aquatic systems. In addition, impacts to habitat for aquatic- and riparian-dependent plant and animal species would continue.</p>
<p>93. Identify existing uses and activities in CARs and RCAs during landscape analysis. At the time of permit reissuance, evaluate and consider actions needed for consistency with RCOs.</p>	<p>All Alternatives</p> <p>Under all alternatives; dispersed camping, foot traffic, winter recreation, and OHV use would occur on the Rubicon Trail. Indicator Measure 4 in the Hydrology and Riparian Resources section analyzes the consistency of RCOs with regards to the alternatives.</p>

<p>94. As part of project-level analysis, conduct peer reviews for projects that propose ground-disturbing activities in more than 25 percent of the RCA or more than 15 percent of a CAR.</p>	<p>All Alternatives</p> <p>Under all alternatives, proposed activities and existing features would be within RCAs. A high degree of ground disturbance currently exists within RCAs.</p> <p>Alternatives 1, 3, 4, 5, and 6</p> <p>Proposed activities would result in very little additional ground disturbance but would involve trail improvements, toilets, bridges, route closures, and route additions in previously disturbed areas.</p>
<p>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. (AMS goals: 1, 2, 7)</p>	
<p>Standard and Guideline</p>	<p>Analysis with respect to Proposed Action</p>
<p>95. 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.</p>	<p>All Alternatives</p> <p>There are no waters on the 303 (d) list in the project area, however the South Fork American River below Slab Creek Reservoir is listed as impaired due to mercury. Loon Lake and its tributaries are tributary to the South Fork American River via the Loon Lake diversions that route flows from Loon Lake to Gerle Creek Reservoir to Union Valley Reservoir.</p>
<p>96. Ensure that management activities do not adversely affect water temperatures necessary for local aquatic- and riparian-dependent species assemblages.</p>	<p>Alternatives 1, 3, 4, 5, 6</p> <p>Under Alternatives 1, 3, 4, 5, and 6; some of the proposed activities are designed to reduce sediment delivery to nearby water bodies, reduce streambank and shoreline bank failures, and reduce riparian vegetation loss; thereby maintaining water temperatures for local aquatic- and riparian-dependent species assemblages. Excessive quantities of sediment can negatively impact geomorphic shape and function by filling in pools through aggradation, which in turn affects water depth and temperature. Streambank failures often result in sedimentation and channel widening which affects pool depths and water temperature. Streambanks, shoreline banks, and riparian vegetation also provide effective cover for maintaining water temperatures.</p> <p>Alternative 2</p> <p>Under this alternative, excessive sedimentation, streambank and shoreline bank failures, and riparian vegetation loss would continue; thereby adversely affecting water temperatures necessary for local aquatic- and riparian-dependent species assemblages.</p>

<p>97. Limit pesticide applications to cases where project level analysis indicates that pesticide applications are consistent with riparian conservation objectives.</p>	<p>All Alternatives</p> <p>Pesticide applications are not currently proposed.</p>
<p>98. Within 500 feet of known occupied sites for the California red-legged frog, Cascades frog, Yosemite toad, foothill yellow-legged frog, mountain yellow-legged frog, and northern leopard frog, design pesticide applications to avoid adverse effects to individuals and their habitats.</p>	<p>All Alternatives</p> <p>Pesticide applications are not currently proposed.</p>
<p>99. Prohibit storage of fuels and other toxic materials within RCAs and CARs except at designated administrative sites and sites covered by a Special Use Authorization. Prohibit refueling within RCAs and CARs unless there are no other alternatives. Ensure that spill plans are reviewed and up-to-date.</p>	<p>All Alternatives</p> <p>Under all alternatives, the storage and use of fuels and toxic materials would occur within RCAs associated with OHV use. OHV users are required to carry spill prevention kits and follow spill prevention measures for refueling and servicing vehicles.</p> <p>Alternatives 1, 3, 4, 5, 6</p> <p>Under Alternatives 1, 3, 4, 5, and 6; some of the proposed activities would involve vehicular operations within RCAs such as bridge and toilet installation and the installation and maintenance of erosion control features. During these activities, the storage of fuels could occur within RCAs but would be limited to staging areas.</p>
<p>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. (AMS goals: 2, 3, 4, 5, 6, 8, 9)</p>	
<p>Standard and Guideline</p>	<p>Analysis with respect to Proposed Action</p>

<p>100. 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.</p>	<p>Alternatives 1, 3, 4, 5, 6</p> <p>Under Alternatives 1, 3, 4, 5, and 6; the installation and maintenance of trail erosion control features are designed to maintain and restore the hydrologic connectivity of nearby streams, meadows, wetlands, and lakes; and improve flow paths that intersect the trail and are tributary to these features.</p> <p>Alternative 2</p> <p>Under this alternative, flow paths that intersect the trail would continue to be altered and the hydrologic connectivity of nearby streams, meadows, wetlands, and lakes disrupted.</p>
<p>101. Ensure that culverts or other stream crossings do not create barriers to upstream or downstream passage for aquatic-dependent species. Locate water drafting sites to avoid adverse effects to in stream flows and depletion of pool habitat. 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.</p>	<p>Alternatives 1, 3, 4, 5, 6</p> <p>Under Alternatives 1, 3, 4, 5, and 6; the Ellis Creek bridge installation and the Buck Island bridge installation or low-water crossing are designed to improve channel function and aquatic passage by minimizing channel widening and sedimentation of pools.</p> <p>Alternative 2</p> <p>Under this alternative, stream crossings would continue to widen from bank failures and sedimentation, and pools would fill in with sediments; thereby adversely impacting aquatic passage.</p>
<p>102. 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.</p>	<p>Alternatives 1, 3, 4, 5, 6</p> <p>Under Alternatives 1, 3, 4, 5, and 6; some of the proposed activities are designed to improve degraded conditions by slowing runoff velocities, minimizing trail erosion, minimizing streambank failures and riparian vegetation loss, and minimizing sediment and contaminant delivery to nearby water bodies.</p> <p>Alternative 2</p> <p>Under this alternative, water quality degradation and geomorphic alterations of streams would continue. Many of the stream crossings along the Rubicon Trail have been severely altered by past activities and ongoing uses.</p>

<p>103. Prevent disturbance to streambanks and natural lake and pond shorelines caused by resource activities (for example, livestock, off-highway vehicles, and dispersed recreation) from exceeding 20 percent of stream reach or 20 percent of natural lake and pond shorelines. Disturbance includes bank sloughing, chiseling, trampling, and other means of exposing bare soil or cutting plant roots. This standard does not apply to developed recreation sites, sites authorized under Special Use Permits and designated off-highway vehicle routes.</p>	<p>Alternatives 1, 3, 4, 5, 6</p> <p>Under Alternatives 1, 3, 4, 5, and 6; some of the proposed activities are designed to reduce streambank and shoreline bank disturbances by improving stream crossings and minimizing dispersed vehicle uses in close proximity to streams, lakes, and wetlands.</p> <p>Alternative 2</p> <p>Under this alternative, disturbance to streambanks and shoreline banks would continue from OHV use and associated dispersed uses in close proximity to these features.</p>
<p>104. In stream reaches occupied by, or identified as “essential habitat” in the conservation assessment for, the Lahontan and Paiute cutthroat trout and the Little Kern golden trout, limit streambank disturbance from livestock to 10 percent of the occupied or “essential habitat” stream reach. (Conservation assessments are described in the record of decision.) Cooperate with State and Federal agencies to develop streambank disturbance standards for threatened, endangered, and sensitive species. Use the regional streambank assessment protocol. Implement corrective action where disturbance limits have been exceeded.</p>	<p>All Alternatives</p> <p>These salmonid species do not occur within the project area.</p>
<p>105. At either the landscape or project-scale, determine if the age class, structural diversity, composition, and cover of riparian vegetation are within the range of natural variability for the vegetative community. If conditions are outside the range of natural variability, consider implementing mitigation and/or restoration actions that will result in an upward trend. Actions could include restoration of aspen or other riparian vegetation where conifer encroachment is identified as a problem.</p>	<p>Alternatives 1, 3, 4, 5, 6</p> <p>Under Alternatives 1, 3, 4, 5, and 6; some of the proposed activities are designed to reduce streambank and shoreline bank disturbances by improving stream crossings and minimizing dispersed vehicle uses in close proximity to streams, lakes, and wetlands; thereby maintaining or improving riparian vegetation cover.</p> <p>Alternative 2</p> <p>Under this alternative, riparian vegetation loss would continue from OHV use and associated dispersed uses in close proximity to these features.</p>

<p>106. Cooperate with Federal, Tribal, State and local governments to secure in stream flows needed to maintain, recover, and restore riparian resources, channel conditions, and aquatic habitat. Maintain in stream flows to protect aquatic systems to which species are uniquely adapted. Minimize the effects of stream diversions or other flow modifications from hydroelectric projects on threatened, endangered, and sensitive species.</p>	<p>All Alternatives</p> <p>The alternatives do not involve any water rights or flow modification related activities.</p>
<p>107. For exempt hydroelectric facilities on national forest lands, ensure that special use permit language provides adequate in stream flow requirements to maintain, restore, or recover favorable ecological conditions for local riparian- and aquatic-dependent species.</p>	<p>All Alternatives</p> <p>This standard and guideline is not applicable with regards to the alternatives.</p>
<p>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. (AMS goals: 2, 3)</p>	
<p>Standard and Guideline</p>	<p>Analysis with respect to Proposed Action</p>
<p>108. 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.</p>	<p>All Alternatives</p> <p>The proposed activities involve the placement of coarse material and woody debris along the trail to convey flows, reduce runoff velocities, and to capture sediment. Currently no in-channel large woody debris additions are proposed as part of the proposed activities.</p>
<p>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. (AMS goals: 2, 7)</p>	
<p>Standard and Guideline</p>	<p>Analysis with respect to Proposed Action</p>

<p>109. Within CARs, in occupied habitat or “essential habitat” as identified in conservation assessments for threatened, endangered, or sensitive species, evaluate the appropriate role, timing, and extent of prescribed fire. Avoid direct lighting within riparian vegetation; prescribed fires may back into riparian vegetation areas. Develop mitigation measures to avoid impacts to these species whenever ground-disturbing equipment is used.</p>	<p>All Alternatives</p> <p>No prescribed fire is proposed.</p>
<p>110. Use screening devices for water drafting pumps. (Fire suppression activities are exempt during initial attack.) Use pumps with low entry velocity to minimize removal of aquatic species, including juvenile fish, amphibian egg masses and tadpoles, from aquatic habitats.</p>	<p>All Alternatives</p> <p>Water drafting is not proposed with this project.</p>
<p>111. Design prescribed fire treatments to minimize disturbance of ground cover and riparian vegetation in RCAs. In burn plans for project areas that include, or are adjacent to RCAs, identify mitigation measures to minimize the spread of fire into riparian vegetation. In determining which mitigation measures to adopt, weigh the potential harm of mitigation measures, for example fire lines, against the risks and benefits of prescribed fire entering riparian vegetation. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management actions could be damaging to habitat or long-term function of the riparian community.</p>	<p>All Alternatives</p> <p>Prescribed fire treatments are not proposed.</p>
<p>112. Post-wildfire management activities in RCAs and CARs should emphasize enhancing native vegetation cover, stabilizing channels by non-structural means, minimizing adverse effects from the existing road network, and carrying out activities identified in landscape analyses. Post-wildfire operations shall minimize the exposure of bare soil.</p>	<p>All Alternatives</p> <p>Post-wildfire management activities are not expected to occur in conjunction with the alternatives.</p>

<p>113. Allow hazard tree removal within RCAs or CARs. Allow mechanical ground disturbing fuels treatments, salvage harvest, or commercial fuelwood cutting within RCAs or CARs when the activity is consistent with RCOs. Utilize low ground pressure equipment, helicopters, over the snow logging, or other non-ground disturbing actions to operate off of existing roads when needed to achieve RCOs. Ensure that existing roads, landings, and skid trails meet Best Management Practices. Minimize the construction of new skid trails or roads for access into RCAs for fuel treatments, salvage harvest, commercial fuelwood cutting, or hazard tree removal.</p>	<p>All Alternatives</p> <p>At this time, no known hazard tree removal is proposed.</p>
<p>114. As appropriate, assess and document aquatic conditions following the Regional Stream Condition Inventory protocol prior to implementing ground disturbing activities within suitable habitat for California red-legged frog, Cascades frog, Yosemite toad, foothill and mountain yellow-legged frogs, and northern leopard frog.</p>	<p>All Alternatives</p> <p>Although none have been observed, aquatic features along and adjacent to the trail provide suitable habitat for Sierra Nevada yellow-legged frogs.</p>
<p>115. During fire suppression activities, consider impacts to aquatic- and riparian-dependent resources. Where possible, locate incident bases, camps, helibases, staging areas, helispots, and other centers for incident activities outside of RCAs or CARs. During pre-suppression planning, determine guidelines for suppression activities, including avoidance of potential adverse effects to aquatic- and riparian-dependent species as a goal.</p>	<p>All Alternatives</p> <p>Fire suppression activities are not proposed.</p>

<p>116. Identify roads, trails, OHV trails and staging areas, developed recreation sites, dispersed campgrounds, special use permits, grazing permits, 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.</p>	<p>Alternatives 1, 3, 5, 6</p> <p>Under Alternatives 1, 3, 5, and 6; some of the proposed activities are designed to close and rehabilitate unauthorized routes, improve hydrologic connectivity, and improve water quality and habitat for aquatic- and riparian-dependent species.</p> <p>Alternative 2</p> <p>Under this alternative, water quality and habitat for aquatic- and riparian-dependent species would continue to degrade.</p> <p>Alternative 4</p> <p>While this alternative would involve some trail improvements and closure of some unauthorized routes similar to Alternatives 1, 3, 5, and 6; it would also involve the addition of some routes to the National Forest Transportation System within RCAs.</p>
<p>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. (AMS goals 1, 2, 3, 4, 7, 9)</p>	
<p>Standard and Guideline</p>	<p>Analysis with respect to Proposed Action</p>
<p>117. Assess the hydrologic function of meadow habitats and other special aquatic features during range management analysis. Ensure that characteristics of special features are, at a minimum, at Proper Functioning Condition, as defined in the appropriate Technical Reports (or their successor publications): (1) "Process for Assessing PFC" TR 1737-9 (1993), "PFC for Lotic Areas" USDI TR 1737-15 (1998) or (2) "PFC for Lentic Riparian-Wetland Areas" USDI TR 1737-11 (1994).</p>	<p>All Alternatives</p> <p>This project does not involve range management.</p>

<p>118. 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 livestock, pack stock, humans, and wheeled vehicles. Criteria for defining bogs and fens include, but are not limited to, presence of: (1) sphagnum moss (<i>Spagnum spp.</i>), (2) mosses belonging to the genus <i>Meessia</i>, and (3) sundew (<i>Drosera spp.</i>) Complete initial plant inventories of bogs and fens within active grazing allotments prior to re-issuing permits.</p>	<p>All Alternatives</p> <p>Bog and fen ecosystems do not occur within the project area.</p>
<p>119. Locate new facilities for gathering livestock and pack stock outside of meadows and riparian conservation areas. During project-level planning, evaluate and consider relocating existing livestock facilities outside of meadows and riparian areas. Prior to re-issuing grazing permits, assess the compatibility of livestock management facilities located in riparian conservation areas with riparian conservation objectives.</p>	<p>All Alternatives</p> <p>This project does not involve range management.</p>

<p>120. Under season-long grazing:</p> <ul style="list-style-type: none"> • For meadows in early seral status: limit livestock utilization of grass and grass-like plants to 30 percent (or minimum 6-inch stubble height). • For meadows in late seral status: limit livestock utilization of grass and grass-like plants to a maximum of 40 percent (or minimum 4-inch stubble height). <p>Determine ecological status on all key areas monitored for grazing utilization prior to establishing utilization levels. Use Regional ecological scorecards and range plant list in regional range handbooks to determine ecological status. Analyze meadow ecological status every 3 to 5 years. If meadow ecological status is determined to be moving in a downward trend, modify or suspend grazing. Include ecological status data in a spatially explicit Geographical Information System database.</p> <p>Under intensive grazing systems (such as rest-rotation and deferred rotation) where meadows are receiving a period of rest, utilization levels can be higher than the levels described above if the meadow is maintained in late seral status and meadow-associated species are not being impacted. Degraded meadows (such as those in early seral status with greater than 10 percent of the meadow area in bare soil and active erosion) require total rest from grazing until they have recovered and have moved to mid- or late seral status.</p>	<p>All Alternatives</p> <p>This project does not involve range management.</p>
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<p>121. Limit browsing to no more than 20 percent of the annual leader growth of mature riparian shrubs and no more than 20 percent of individual seedlings. Remove livestock from any area of an allotment when browsing indicates a change in livestock preference from grazing herbaceous vegetation to browsing woody riparian vegetation.</p>	<p>All Alternatives</p> <p>This project does not involve range management.</p>
<p>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. (AMS goals: all)</p>	
<p>Standard and Guideline</p>	<p>Analysis with respect to Proposed Action</p>
<p>122. 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, which may be contributing to the observed degradation.</p>	<p>Alternatives 1, 3, 5, 6</p> <p>Under Alternatives 1, 3, 5, and 6; some of the proposed activities are designed to close and rehabilitate unauthorized routes, improve hydrologic connectivity, and improve water quality and habitat for aquatic- and riparian-dependent species. These activities would slow runoff velocities, reduce trail erosion, and reduce sediment and contaminant delivery potential to nearby water bodies.</p> <p>Alternative 2</p> <p>Under this alternative, water quality and habitat for aquatic- and riparian-dependent species would continue to degrade.</p> <p>Alternative 4</p> <p>While this alternative would involve some trail improvements and closure of some unauthorized routes similar to Alternatives 1, 3, 5, and 6; it would also involve the addition of some routes to the National Forest Transportation System within RCAs.</p>

Table developed from Standards and Guidelines on pages 62-66 of the 2004 SNFPA ROD.

Appendix C. Comment Letters

Appendix C

Public and Agency Comments

The Notice of Availability of the Draft Environmental Impact Statement (DEIS) was published in the Federal Register on December 16, 2011 and copies of the DEIS were mailed to over 84 individuals, organizations, tribes, and government agencies. The comment period ended on January 30, 2012. Approximately 15 people submitted comments during the comment period. The commenters are listed below in numerical order. Following the commenters' names are 5 letters received on the DEIS from federal, state, and local agencies, federally recognized tribes, and elected officials.

1. Rusty Folena
2. Wendy Wyels, Central Valley Regional Water Quality Control Board
3. Jesse Barton, Gallery and Barton, Rubicon Trails Foundation (RTF)
4. Jim Bramham, California Association of four Wheel Drive Clubs, Inc.
5. Amy Granat, California Off-Road Vehicle Access (CORVA)
6. Patricia Port, USDI
7. Rich Platt
8. Monte Hendricks
9. Karen Schambach, Public Employees for Environmental Responsibility (PEER); Center for Sierra Nevada conservation; Center for Biological Diversity; Maidu Group, Sierra Club; and The Wilderness Society
10. Dan Canfield, California State Parks – Off-Highway Motor Vehicle Recreation Division
11. Edward Knapp, El Dorado County Office of the County Counsel
12. Annie Walker
13. Ken Hower
14. Kathleen Martyn Goforth, United States Environmental Protection Agency, Region 9
15. Marcus Libkind, Snowlands Network and Winter Wildlands Alliance
16. Darrel Cruz, Washoe Tribe of Nevada and California

Kathryn D. Hardy, Forest Supervisor
Eldorado National Forest
100 Forni Road
Placerville, CA 95667

Subject: Central Valley Water Board Comments on the December 2011 Rubicon Trail Easement and Resource Improvement Draft Environmental Impact Statement (DEIS)

Central Valley Water Board staff has reviewed the DEIS to evaluate compliance with Cleanup and Abatement Order (CAO) R5-2009-0030, which was issued to El Dorado County and the US Forest Service. Alternatives 1, 3, 4, and 5 could result in compliance with the CAO if sediment, sanitation, and spills are adequately addressed and the operating agreement between El Dorado County Department of Transportation and the Eldorado National Forest is followed. It is noted that the winter closure concept may still be necessary if the actions described in the County's Saturated Soils Water Quality Protection Plan do not protect water quality.

We have the following additional comments on the DEIS:

1. The reference to the Rubicon Trail Cleanup and Abatement Order (CAO) number on Pages 11 and 49 are incorrect. The correct CAO Number is R5-2009-0030.
2. The reference to El Dorado County's Saturated Soil Water Quality Protection Plan is dated 14 December 2010. Major updates to this plan were included in an amendment to the Water Board on 28 January 2011, and references to the Saturated Soil Water Quality Protection Plan should state "as amended on 28 January 2011".
3. Under the Hydrology and Riparian Resources Section on Pages 56, 63, and 77, the Aquatic Resources Section on Page 98, and the Reference Section on Page 311, the DEIS references a Water Board study that is not a published document, and as a result of 26 April 2009 Water Board meeting, this study was removed from the public record. We request that you eliminate this reference from the Final EIS.
4. The County's Saturated Soil Water Quality Protection Plan provides results of sediment yield due to Off Highway Vehicle use of the Rubicon Trail, and this document may be a better reference to cite in the Final EIS.

Please feel free to contact Marty Hartzell at mhartzell@waterboards.ca.gov if you have any questions.

Wendy Wyels
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United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Pacific Southwest Region

333 Bush Street, Suite 515

San Francisco, CA 94104

IN REPLY REFER TO:
(ER 11/1150)

Filed Electronically

30 January 2012

Ms. Laura Hierholzer

El Dorado National Forest

7887 Highway 50

Pollock Pines, CA 95726

Subject: Review of the USFS Draft Environmental Impact Statement (DEIS), Rubicon Trail Easement and Resource Improvement Project, Construction and Operation, Right-of-Way Grant, Eldorado National Forest, Pacific Ranger District, El Dorado County, CA

Dear Ms. Hierholzer:

The Department of the Interior has received and reviewed the subject document and has the no comments to offer.

Thank you for the opportunity to review this project.

Sincerely,

A handwritten signature in black ink that reads "Patricia Sanderson Port". The signature is written in a cursive, flowing style.

Patricia Sanderson Port
Regional Environmental Officer

cc:

Director, OEPC

Lisa Treichel, OEPC staff contact



DEPARTMENT OF PARKS AND RECREATION
Off-Highway Motor Vehicle Recreation Division
1725 23rd Street, Suite 200
Sacramento, California 95816

Ruth Coleman, Director

January 30, 2012

Ms. Kathryn D. Hardy
USFS Eldorado National Forest
100 Forni Road
Placerville, CA 95667

Subject: Comment letter regarding Rubicon Draft Environmental Impact Statement.

Dear Ms. Hardy,

The California Department of Parks and Recreation, Off-Highway Motor Vehicle Recreation (OHMVR) Division appreciates the opportunity to comment on the Rubicon Draft Environmental Impact Statement (DEIS). The OHMVR Division has a legislative mandate to ensure the citizens of California have sustainable opportunities for off-highway vehicle (OHV) recreation. The OHMVR Division has a long standing cooperative relationship with the Eldorado National Forest in support of effectively managed OHV recreation.

The Rubicon Trail is recognized as one of the premiere OHV trails in North America. It is an extremely valuable recreational resource for the people of El Dorado County and the State of California. The OHMVR Division, through the Grants and Cooperative Agreements Program, has provided substantial financial assistance in support of the Rubicon trail. The Rubicon DEIS is being partially funded through a cooperative agreement between the Division and the El Dorado National Forest.

Following are the OHMVR Division comments on the Rubicon DEIS;

1. In regards to the proposed easement width, the OHMVR Division supports a variable easement width that supports resource conservation and sustaining OHV Recreation relative to the Rubicon Trail. A variable easement width allows for the reality of the local terrain as opposed to a rigid line on a map.
2. The OHMVR Division supports the construction of additional restroom facilities along the Rubicon Trail to ensure sanitary trail conditions and quality of recreational experience. The continued use of personal sanitation methods should be promoted until such time that additional restroom facilities are constructed.
3. The OHMVR Division supports the addition of identified routes to the Eldorado NF Travel Management System to sustain reasonable and managed motorized access to camping facilities. These additional routes should be classified as open

to off-highway licensed vehicles and highway licensed vehicles. Also the additional routes should have a “yearlong” season of use to accommodate the season of use on the Rubicon trail.

4. The OHMVR Division is concerned that a rigid seasonal closure would unnecessarily detract from the recreational resource of the Rubicon trail while adding very little to the management or resource protection of the trail.
5. On Table S-3, Alternative 5 identifies “Number of Vault Toilets to be constructed” as 9. Also on Table 2-1, Alternative 5 identifies “Number of Vault Toilets to be constructed” as 9. The balance of the document identifies that Alternative 5 would involve no construction of vault toilets?
6. On page 20, first paragraph, the OHMVR Division is incorrectly identified as the “OHV Division”. This same error occurs on page 248, third paragraph.
7. On page 163, first paragraph, the DEIS states; “The area surrounding the Rubicon Trail is currently utilized fully OHVs with no authorized trails, creation of new trails and OHV use occurring in open areas off any trails.”. This statement is confusing since the Forest land surrounding the Rubicon trail is closed to cross-county travel.

We appreciate the opportunity to provide these comments and look forward to working cooperatively with the Eldorado National Forest to ensure this outstanding and irreplaceable recreational resource is sustained.

Sincerely,



Dan Canfield, Planning Manager
OHMVR Division

cc: Phil Jenkins, OHMVR Division Chief

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January 30, 2012

Kathryn D. Hardy
Forest Supervisor
Rubicon Trail Easement DEIS
Eldorado National Forest
100 Forni Road
Placerville, CA 95667

Re: Comments of El Dorado County on "Eldorado National Forest Rubicon Trail Easement and Resource Improvement Project DEIS"

Dear Ms. Hardy:

Thank you for the opportunity to comment on the Eldorado National Forest (hereafter "ENF") Draft EIS for the Rubicon Trail Easement and Resource Improvement Project (hereafter "DEIS"). El Dorado County has the following comments.

1. Width of Proposed Ellis Creek Bridge

El Dorado County has been planning on building a new bridge over Ellis Creek near where the historic Rubicon Trail currently crosses the creek at grade. On April 30, 2009, the Central Valley Regional Water Quality Control Board issued a Cleanup and Abatement Order (No. R5-2009-0030) requiring El Dorado County and the Eldorado National Forest to cease the discharge of sediment and other wastes due to motorized use of Rubicon Trail, and one of the actions specifically required by the CAO is the construction of a bridge at Ellis Creek. A bridge crossing at Ellis Creek would reduce the amount of particles that enter the creek from vehicles crossing the creek as well as from vehicles on the trail approaches, and reduce the turbidity of the creek from tires disturbing the natural stream bed, and it therefore environmentally beneficial.

The plan is to build a 16 feet wide bridge about 60 to 75 feet downstream from the current grade crossing. Apparently a comment was received by the ENF during the DEIS scoping period that a bridge only 12 feet wide would be better. The EIS on page iii has "Table S-1: List of Significant Issues," in which Item number 4 states "Overly large bridge at Ellis Creek will

cause adverse impacts to riparian areas and species and is inconsistent with the historic nature of the trail.” Alternate 5 includes the easement for the Trail in a modified form, and, as stated on page 25, “The bridge at Ellis Creek would be constructed to a width of 12 feet.” On page 16, among the significant issues list is number 4, which states “Overly large bridge proposed at Ellis Creek will cause adverse impacts to riparian areas and species and is inconsistent with the historic nature of the trail.” We are not aware of any support for the assumption that a 16 foot wide bridge would cause any more impacts to riparian areas and species than a 12 foot wide bridge would, because the abutments and approaches would be the same, and it makes no sense that a slightly narrower bridge would be more or less consistent with the historic nature of the trail than a slightly wider bridge would be. El Dorado County hereby comments that the proposed bridge must be 16 feet wide under applicable bridge design standards, the lengthy and expensive planning process which been completed over the past several years would be wasted if the plan were to change at this late date, the delay caused by a redesign at this point would likely be fatal to the funding source and thus end any hope of replacing the grade crossing with a bridge, and that reducing the bridge width by 4 feet would not provide any environmental benefits.

The reason the bridge was planned for a width of 16 feet is that this is the minimum width allowed by applicable bridge design standards. The El Dorado County General Plan Transportation and Circulation Element dated July 2004 and amended on January 2009, includes Policy TC-1, which requires that road design standards for County-maintained roads shall be based on the American Association of State Highway and Transportation Officials (AASHTO) standards, and supplemented by California Department of Transportation (Caltrans) design standards and by County Department of Transportation standards. The federal and state transportation funding programs which have provided funding for the bridge project also require that the bridge design must meet the AASHTO standards. During the County’s preliminary design process and its CEQA process for the bridge proposal, the County consulted with ENF staff. The County design took into consideration the USFS bridge design guidelines entitled “Standards for Bridge Design, Construction, Inspection and Maintenance Northern Region August 14, 2008,” which adopts the standards for bridge design, construction, and inspection that have been established by AASHTO. The Forest Service has adopted these standards, which apply to all bridges located on NFS lands, regardless of bridge ownership or road jurisdiction, to ensure public safety and resource protection. Forest Service policy (FSM 7736) directs the agency to follow the requirements of the Federal Highway Safety Act of 1968, et seq., and direction provided via the National Bridge Inspection Standards (NBIS, 23 CFR Part 650) on National Forest System (NFS) roads open to public use. Under the USFS rules, the bridge design must be completed in accordance with the latest edition of AASHTO Specifications for Highway Bridge Design. Under the AASHTO guidelines, at a minimum the bridge design must include appropriate approach roadways and site drainage, topographical site surveys, hydraulic and scour analysis, and geotechnical evaluation. Additional design criteria and guidance for bridge widths, approach roadways, and railing shall be in accordance with AASHTO Guidelines for Geometric Design of Very Low-Volume Local Roads. The bridge design must accommodate a 100-year flood, with appropriate freeboard for debris, and to allow for passage of aquatic

wildlife. At a minimum, abutments shall be located outside the bank-full stream channel and installed so as to minimize resource damage.

The 2001 AASHTO “Guidelines for Geometric Design of Very Low-Volume Local Roads” were consulted during the design of the Ellis Creek bridge project. In Chapter four, entitled Design Guidelines, the section that discusses bridge width and design states the following on page 21: “One-lane bridges may be provided on single-lane roads and two lane roads with ADT less than 100 veh/day where the designer finds that a one-lane bridge can operate effectively. The minimum width of a one-lane bridge should be 15 ft unless the designer concludes that a narrower bridge can function effectively.” Dropping below these safety design standards requires a formal “design exception” be approved because the minimum 15 foot width is considered necessary for public safety.

The proposed bridge over Ellis Creek was designed with 16 foot spacing between the two structural support trusses, leaving an approximate 15 foot clear passage inside the structural steel-truss and its protective inside railing, as required by the AASHTO standards. Since the drive-through two-truss design is a fracture critical structure, severe damage to one truss can potentially lead to a structure collapse, so that proper clear space and inside railings to shield the truss members are important safety features. Thus under USFS regulations, and the terms of the grants for the bridge, and under proper bridge engineering practices for public safety, the AASHTO guidelines must be followed, and they require a minimum of 15 foot spacing between the trusses, and that is how the Ellis Creek bridge was designed.

The plans for the bridge minimize the project construction footprint. The bridge abutments will be located in the uplands outside the ordinary high watermark (OHWM) of Ellis Creek in order to obtain the bridge height and span length necessary to pass 100-year flows. The foundation type for the bridge abutments will be spread footings landing on competent native rock for minimal foundation size. The new bridge will be 70 feet long, and will be located downstream of the existing grade crossing because that location avoids two ephemeral channels, the section of Ellis Creek is better suited to passing floods, and the southern approach to the bridge will make use of areas that have already been disturbed. Subsequent to the preliminary design approval, the plan was modified slightly to reduce the rock slope protection originally proposed for the protection of bridge abutments to further minimize potential impacts to the aquatic environment. The bridge plans now show rock slope protection outside the OHWM and no water diversion is required for construction. There is no riparian vegetation within the OHWM or seasonal wetland area at the project site. The rock slope protection does not extend into the channel or seep as identified on the approved Preliminary Wetland Delineation Map. With these proposed project modifications, all potential discharges within or below the OHWM have been eliminated.

The proposal to reduce the bridge width to 12 feet in DEIS Alternative 5 would require a “design exception” for lowering public safety design standards. A design exception would take a long time and cost a great deal of money, and there is no reason for undertaking these steps. Reducing the planned width to 12 feet would result in no measurable difference in impacts to the

riparian areas, and does not appear to be any more or less consistent or representative of the historic nature of the trail. Any historical impacts are taken care of through the Programmatic Agreement with SHPO. There is no reason to believe that a reduced width bridge would reduce the number of vehicles using the Rubicon Trail because the expected traffic would be accommodated by a bridge of either width, and the wider bridge would not increase the expected vehicular traffic because usage is determined by many other factors and the width of one bridge on the route would make no difference.

The plans for a 16 foot wide bridge have been prepared at great expense over the past few years, and it would not be possible to alter the plans at this late date to reduce the width without setting the timing of the project back significantly, which would threaten the continued availability of the current funding. The proposed bridge construction project is funded with a combination of County local transportation funds and Federal Highway Administration (FHWA) Funds administered through the California State Department of Transportation (Caltrans) Division of Local Assistance. El Dorado County also received a grant from the California Department of Parks and Recreation Division of Off-Highway Motor Vehicle Recreation for planning a new crossing for the Rubicon Trail over Ellis Creek that would reduce pollution of sediment and petroleum products in Ellis Creek. The lengthy delay that would inevitably be caused by a redesign this late in the process would most likely be the death knell for the funding, which would eliminate all of the environmental benefits that would result from a bridge taking vehicles out of the creek bed.

The design for a bridge 16 feet wide has already been approved in a number of public processes. About 1 year ago, on February 8, 2011, El Dorado County approved a Mitigated Negative Declaration (MND) under the California Environmental Quality Act (CEQA) entitled "Rubicon Trail at Ellis Creek Bridge Low Water Crossing Conversion Project." The project was a 16 foot wide bridge. During the public review period, only one comment was received on the MND, and was from the El Dorado County Historical Society requesting that the site be examined by a qualified archaeologist and that research be conducted at the County's Historical Museum. This was accomplished and also was discussed in the MND. No one raised any issues about reducing the width, and the MND was certified for a bridge 16 feet wide.

Reducing the bridge width from 16 feet to 12 feet would not provide any benefits whatsoever, and would be contrary to applicable bridge design standards, and would more than likely result in the loss of funding and the ultimate loss of the bridge.

2. Width of Easement

The description of the easement requested by the County is described on page 18, first paragraph, as follows: "The easement would generally be 25 feet from centerline with several variant widths identified." It is important to note that the requested easement is generally 25 feet on each side of the defined centerline, for a total width of 50 feet, except at Little Sluice and at Postpile.

On page 21, Alternative 3 refers to a “short bypass on the North side of Little Sluice.” The North side has what is commonly referred to as the long bypass (Route 1.8) which has the typical 50 foot width. The South side of Little Sluice has what has been called the short bypass. Alternative 3 proposes to reduce the easement on the south side of Little Sluice to 75 feet. El Dorado County's application for an easement at this location depicted a main Trail centerline through Little Sluice with a dimension of 25 feet on each side of the centerline, plus an additional easement width of 175' from the southerly edge of the main trail easement to cover the short south bypass section and the dispersed use access area. The total easement on the south side of the main route through Little Sluice, measured from the centerline of the main route through Little Sluice, would include the 25 foot easement on the south side of the centerline, plus the additional 175 feet, for a total of 200 feet south of the centerline of the main Little Sluice route. The easement on the north side of the main route is 25 feet from the centerline. El Dorado County believes that an easement of 200 feet south of the centerline of the main Little Sluice route is necessary to accommodate the activities which have and will take place there, and a narrower easement in that area would be insufficient.

3. Seasonal Closure

On page 35, the seventh bulleted assumption is that El Dorado County DOT would implement and enforce a seasonal closure. El Dorado County has stated many times that it does not believe that State law would allow it to seasonally close a non-county-maintained road, and no one has provided any analysis that would contradict this legal position. Furthermore, a seasonal closure is not necessary because the El Dorado County engineers have designed the erosion control features so that wet season usage will not create unacceptable sedimentation. Also that assumption and the following one appear to say that the Rubicon Trail is in the San Joaquin River basin, which it is not.

4. Misuse of Term “Wetland”

In several places, the DEIS uses the term “wetland” to describe a variety of different areas. This term appears to be used indiscriminately in the DEIS to describe a diverse set of different areas, and does not appear to have been used in any of its legally-defined ways. In several instances, the verbal discussion of “wetlands” in the DEIS does not accord with the wetlands depicted on the accompanying maps. See, *e.g.*, page 42 where it refers to something called the “Gerle Creek Wetland.” It is not clear how the term “wetland” is defined, or exactly what it is referring to, or whether it is used in different places in the DEIS to describe different areas. The paragraph on page 42 says the Trail “bisects an edge of Gerle Wetlands,” but the soil indicator map shows something labeled Gerle Creek Wetland a considerable distance south of the Trail. Different symbols on the maps for wet areas or wetlands are confusing, and do not appear to be used consistently. On page 43, reference is made to something called the Little Sluice Wetland, and the statement is made that the Trail crosses a “wetland area” yet the map depicts a wet area north of the Trail. It is not clear what the difference is between the terms wet soil, wetland, wetland complex, *etc.* The term wetland is fraught with meaning and legal implications in different contexts, and El Dorado County requests that the DEIS be more

scrupulous in the use of terms like wetland and wet soil, and that it be more careful in its depiction of the location of wet areas in relation to the actual location of the Rubicon Trail.

5. Sedimentation

On page 56, reference is made that the Coe and Hartzell report of 2009 estimated approximately 100 cubic yards of sediment per year were caused by use of the Rubicon Trail. The protocols used in the Coe report for sediment production were never validated, and its validity has not been established, and therefore estimates in that report such as 100 cubic yard per year are not reliable and should not be used.

In regard to the pebble counts in Ellis Creek, the Rubicon Trail Foundation arranged for a pebble count study that is more reliable and which contradicts many of the assumptions in the DEIS concerning the effort of vehicles crossing Ellis Creek. El Dorado County requests that the DEIS use that pebble count study. The estimate of a 50-fold difference in erosion rates between logging roads and the Rubicon Trail is scientifically unsupported, factually incorrect, and should not be used.

6. Miscellanea

In various places, the DEIS refers to the “construction” of erosion control features on the Rubicon Trail. See, *e.g.*, page 19, last paragraph, which is entitled “Construction of Erosion Control Features.” The County suggests that the word “construction” be changed everywhere it is used in the DEIS to “installation” of erosion control features, in order to avoid confusion with the issue of which road maintenance activities fall into the category of “maintenance” and which fall into “construction” for purposes of NEPA categorical exclusions and other purposes.

On page 21, the description of Alternative 2, the no action alternative, correctly states that with no formal written easement from the USFS, El Dorado County will continue to assert its RS 2477 rights, but it incorrectly states that if no easement is granted then no additional erosion control features would be constructed from Wentworth Springs Campground to the county line with Placer County. If no formal written easement is granted, the County would continue to assert its RS 2477 rights (which the USFS has stated are the equivalent of an easement), which include the right to maintain the road, and therefore without a formal written easement El Dorado County will continue to install erosion control measures along the Rubicon Trail just as it has been doing over the past few years.

On page 25, in the description of Alternative 5, it is stated that “No toilets would be constructed.” On page v, in the Summary of Environmental Consequences, the column for alternate 5 shows 9 toilets to be constructed. This dichotomy should be resolved. We interpret Alternative 5 to include no new toilets. The construction of new toilets, when coupled with the education campaign concerning sanitation, would be environmentally beneficial.

On page 38, first paragraph, the statement is made that approximately 17 miles of the Rubicon Trail are situated in El Dorado County. Starting at Wentworth Springs Campground

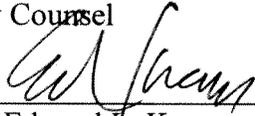
and proceeding easterly, a more accurate figure would be that there is about 8 miles of trail, plus about 2 miles of variant, in the county.

Attached hereto is a map produced by El Dorado County entitled "Rubicon Trail Comparison" which superimposes the route of the county's easement application in red, over the U.S.G.S. quadrangle map from 1897, which depicts the Rubicon Trail as it existed in 1897. The overlay shows that the routes are essentially identical. This supports the statement in the DEIS at page 272 that the modern route of the Rubicon Trail overlays in most part the historic wagon road. This also establishes that the easement applied for is essentially the same as the RS 2477 right of way claimed by the county. In regard to the RS 2477 right-of-way, the DEIS at page 10 accurately notes that the location of the trail changed a little each season, which supports the claim of right of way over variant routes. The DEIS at page 272 also recognizes the many different types of travel that have been used over the years, and correctly notes that "all of these modes of transportation have either necessitated or desired slightly different routes." The use of each of these different routes established a legal right of way over that route under RS 2477. The easement, if granted, will allow the county to channel use into one main route with a few carefully selected and maintained variant routes, which will lessen the impact of vehicular use in the Eldorado National Forest.

Sincerely,

LOUIS B. GREEN
County Counsel

By: _____


Edward E. Knapp
Chief Ass't. County Counsel



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX

75 Hawthorne Street
San Francisco, CA 94105-3901

2012 JAN 31 PM 12:57

JAN 30 2012

Kathryn D. Hardy
Forest Supervisor
El Dorado Forest
100 Forni Road
Placerville, California 95667

Subject: Draft Environmental Impact Statement for the Rubicon Trail Easement, El Dorado County, California (CEQ# 20110417)

Dear Ms. Hardy:

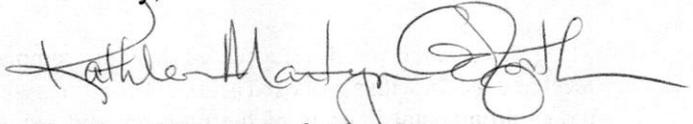
The Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (EIS) for the above project. Our review and comments are pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act.

The Draft EIS evaluates the impacts of issuing a right-of-way easement to El Dorado County for improvements along the Rubicon Trail within Eldorado National Forest, Pacific Ranger District. The project includes constructing a bridge at Ellis Creek and hardening the crossing at Buck Island to reduce sediment delivery, constructing vault toilets to address sanitation issues along the trail, and implementing various erosion control measures. EPA supports the project's goals of reducing erosion and runoff from the historic Rubicon Trail into nearby creeks and wetlands. Overall, the Draft EIS contains valuable information useful to both the public and decision maker(s) and we have rated the Draft EIS as Lack of Objections (LO) (see enclosed "*Summary of Rating Definitions*").

While we have no objections to the project, EPA recommends that the Forest Service elaborate on the Best Management Practices (BMPs) that will be used on a site-specific basis along the 6.7 miles of the Rubicon Trail. Appendix C contains descriptions of BMPs that will be used to reduce sediment and contaminant delivery to hydrologic features in the project area but does not identify which measures will be used to address specific erosion and sediment problems identified in the Draft EIS. One example is the Winter Camp Wetland, which is noted as a problem area because of severely incised and exposed banks, high disturbance, and sanitation issues. The Draft EIS states that the installation and maintenance of erosion control features will reduce sediment and contaminant delivery to these wetland features. We recommend that the Final EIS identify the specific features that will be employed at Winter Camp Wetland, as well as the other areas listed on page 42, and discuss their effectiveness for reducing erosion and sediment delivery to streams.

We appreciate the opportunity to review this Draft EIS. When the Final EIS is released for public review, please send one hard copy and one CD to the address above (mail code: CED-2). Should you have any questions regarding our comments, please contact me at (415) 972-3521, or contact Stephanie Skophammer, the lead reviewer for the project. Stephanie can be reached at (415) 972-3098 or skophammer.stephanie@epa.gov.

Sincerely,



Kathleen Martyn Goforth, Manager
Environmental Review Office

Enclosures: Summary of EPA Rating Definitions

SUMMARY OF EPA RATING DEFINITIONS*

This rating system was developed as a means to summarize the U.S. Environmental Protection Agency's (EPA) level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the Environmental Impact Statement (EIS).

ENVIRONMENTAL IMPACT OF THE ACTION

"LO" (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

ADEQUACY OF THE IMPACT STATEMENT

"Category 1" (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

"Category 2" (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analysed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

"Category 3" (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analysed in the draft EIS, which should be analysed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640, Policy and Procedures for the Review of Federal Actions Impacting the Environment.

Washoe Tribe of Nevada and California

Tribal Historic Preservation Office



February 17, 2012

Jordan Serin, Heritage Resource Specialist
Eldorado National Forest

Subject: Rubicon Trail Easement and Resource Improvement Project

Dear Mr. Serin,

Thank you for consulting with the Washoe Tribe of Nevada and California on the proposed project undertaking. The project is within the ancestral territory of the Washoe Tribe and there are numerous heritage resources valuable to the Washoe Tribe.

Although we are concerned with project effects to Washoe heritage resources we are equally concerned with environmental concerns as well. We are pleased to see remediation efforts under way to preserve water quality.

Please see the following list of questions and comments from the Washoe Tribe.

- Will there be monitoring plan that monitors off road traffic to ensure with USFS directives?
- At risk archeological sites: I am not sure if the proposed mitigation measures would be adequate enough to keep people out and causing further destruction. I propose protecting by installing large boulders to keep vehicles out and on the main road.
- I would like to visit the at risk sites to get a better understanding of the adverse impacts and make a mitigation plan.
- The flagging should only be put up during construction work and take down when no construction activities to keep looters from finding the locations.
- If there is to be any site excavations, we prefer no data recovery, but leave in place or relocate to a safe place. Unless eminent threat of loss. Any artifact removal diminishes our presence and our history. Things must be left in place to preserve the integrity.
- Will there be ARPA signage at the trailheads? The public must be informed of cultural sensitivity.

- Will there be a site monitor in the at risk sites when ground disturbance activities take place?
- The closure and addition of roads: Is there any archeological resources within the proposed new road additions?
- Will the closed roads be rehabilitated?

The tribe wishes to keep involved with this project and be consulted with on protection of archeological resources.

Thank you and call me if you have any questions at (775) 888-0936

Respectfully,



Darrel Cruz, CRO/THPO

Cc; Washoe Cultural Resources Advisory Council

Appendix D. Response to Comments

Appendix D. Response to Comments

Response to Comments ---

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Alternative 1

PEER - Alternative 1– The Forest must explain in a supplemental draft EIS what wet season closures, if any, are proposed, and analyze the impacts of wet weather use in any areas where wet season closures are not proposed. As the Forest is well aware, motorized travel on trails in the wet season causes significantly more damage to soils, water resources, and species habitats than in the dry seasons.

Response: The FEIS has been modified to display the seasonal closures by alternative as shown in Table 2-1, Chapter 2 of the FEIS. The analyses in Chapter 3 have been modified to reflect the seasonal closures included in each alternative. The need for a supplemental DEIS is addressed under the Response to Comments section titled “Supplemental DEIS”.

PEER - Alternative 1 includes a vault toilet on Walker Hill, west of Soup Bowl. A supplemental draft EIS must analyze the direct and indirect effects on the environment of placing a toilet in this location. A supplemental draft EIS should state whether the county or Eldorado NF will enter into a contract with the Rubicon Trail Foundation for cleaning of this and any other toilets, and the details of that contract. A Forest Service sanitation specialist, Dan Totheroh, provided a report detailing the difficulties of cleaning and maintaining vault toilets on the difficult terrain; the supplemental draft EIS must disclose how the proposal will address those issues. (Rubicon Trail Human Waste Removal, Exhibit F).

Response: Chapter 2 of the FEIS has been modified to describe the maintenance of the toilets proposed to be installed in various alternatives. The difficulty in maintaining these toilets is recognized; however, as described in the environmental effects analyses in Chapter 3, there are benefits to the installation of these toilets. Mr. Totheroh’s report suggested installation of a toilet at Loon Lake trailhead, installation of additional vault toilets, and use of personal portable toilets (RubiCANS). A toilet has been installed at Loon Lake trailhead and at Ellis Creek, and education efforts have resulted in increased use of personal portable toilets and WAG bags. Mr. Totheroh suggested using a helicopter to transfer waste from the vault toilets, which would be difficult maintenance. Rubicon Trail Foundation has acquired and equipped a vehicle to pump vault toilets along the Rubicon Trail, for transfer to a holding tank at Ellis Creek.

PEER - A supplemental draft EIS must explain why straw bales and signs are the only barricades proposed for defining the parking areas at Little Sluice, as opposed to rock and log barriers in the other parking areas. It must analyze the effectiveness of straw bales and signs, in light of their historical ineffectiveness and relatively short life spans, as described in the Aquatics BE. “Presently at the popular Little Sluice overlook, vehicles can drive off the road within 75 feet of Spider Lake, although fallen

carsonite signs and decaying hay bales limit parking outside the RCA of Spider Lake” (Aquatics BE, P. 17).

Response: Alternative 6 has been added which includes the placement of permanent rock barriers and markers in the area of Little Sluice. The environmental effects are described in Chapter 3.

Alternative 2

Snowlands Network - Even if the County were to prove their R.S. 2477 rights, that action would not preclude the Forest Service from limiting use of lands they administer in order to protect the environment from degradation. Therefore the No Action alternative should include words to the affect that the Forest Service will continue to have the authority to limit and restrict use of the Trail as necessary to ensure that the trail and surrounding lands are not subject to environmental damage.

Response: The description of Alternative 2 in Chapter 2 identifies that there will continue to be a lack of clarity regarding responsibility for management of the trail if El Dorado County continues to assert R.S. 2477 rights. The description of Alternative 2 does not limit the Forest Service's ability to administer the lands adjacent to the Rubicon Trail.

PEER - Alternative 2: We assume this alternative is only included to describe baseline conditions. It obviously does not meet the Purpose and Need.

Response: Correct; Alternative 2 does not meet the Purpose and Need, and is used as a baseline for analysis of effects.

Alternative 3

CORVA - Between the 5 alternatives, other than Alternative 2 (the no action alternative) the differences are subtle but important to continued use and good condition of the trail. CORVA endorses the selection of a modified Alternative 3 as the preferred alternative, or Alternative#4.

Response: Correct; there are subtle, but important differences between the various alternatives which respond to the issues brought forward by the public.

CORVA - The planned construction of 6 toilets in Alternative 3 is a very welcome addition to the easement plan. Again, acknowledging current traffic and use of the Rubicon Trail enabled planners to more accurately assess the needs of the trail, and plan for the correct amount of toilet facilities.

Response: The addition of toilets will provide for better management of sanitation needs along the Rubicon Trail.

CA4WDC - The proposed bridge at Buck Island is unneeded and unwarranted. We are pleased that the preferred alternative does not include this bridge.

Response: The EIS examines several options for crossing the Little Rubicon River in response to comments received from the public and in order to provide the decision-maker and the public with a range of alternatives to consider.

CA4WDC - Our Association has been proactive about the concerns of human waste along the route. We have supported efforts to modify longstanding user activities and to promote and educate users about alternative practices of human waste management. To this end, we are glad to see the number of toilets in Alternative 3 and feel the locations will serve the public well.

Response: The addition of toilets will provide for better management of sanitation needs along the Rubicon Trail.

Barton - It is unclear why NSRELD-63D-A is being proposed to be added to the NFS (see Map 2 of Alternative 3). This is the "short bypass" of Little Sluice and the County has slated it for closure for safety reasons and because it requires frequent maintenance in order to remain open (there is steep drop off at the bottom that requires concrete work every few years).

Response: Alternative 3 has been modified to remove this route as suggested by the commenter.

Barton - We are pleased to see that Alternative 3 does not include a bridge at Buck Island Lake. Such a bridge would be totally unnecessary.

We are pleased to see that Alternative 3 includes five more toilets than Alternative 1 and one more than Alternative 4. Each toilet appears to be in a good location.

Response: The addition of toilets will provide for better management of sanitation needs along the Rubicon Trail. The elevated rock ford, rather than a bridge was included in Modified Alternative 3 for the Little Rubicon River crossing at Buck Island Reservoir to provide differences between the various alternatives in response to the issues brought forward by the public.

PEER - Alternative 3- A bridge at the Buck Island outlet is clearly needed to protect hydrological and aquatic resources; the hardened crossing will not accomplish this, as shown in the hydrological report. It is ridiculous to assert that a bridge here (under an existing large concrete dam) would degrade the view, when the same alternative includes a 16-ft bridge at Ellis Creek. The bypass north of Little Sluice would continue impacts to wetlands: “The Long Bypass next to Little Sluice is composed primarily of granite bedrock slabs with drainage pathways between slabs. Oil spots left on the rocks by vehicles could drain oil pollutants into the Little Sluice wetland and Winter Camp wetland” (Aquatics BE, P. 14)

Placement of additional vault toilets should be analyzed for direct and indirect impacts that result from the placement, which will encourage concentrated use in those locations. Clarify who will maintain the additional toilets.

Response: The elevated rock ford, rather than a bridge was included in Alternative 3 for the Little Rubicon River crossing at Buck Island Reservoir to provide differences between the various alternatives in response to the issues brought forward by the public. The effects of a crossing rather than a bridge are included in Chapter 3. Alternatives 5 and 6 do not include issuance of an easement for any bypasses on the north side of Little Sluice. The effects of not authorizing any bypasses at the Little Sluice are described in Chapter 3. Chapter 2 of the FEIS has been modified to describe the maintenance of the toilets proposed to be installed in various alternatives. The difficulty in maintaining these toilets is recognized; however, as described in the environmental effects analyses in Chapter 3, there are benefits to the installation of these toilets. Toilet locations were selected based on areas of existing concentrated use as stated in the Modified Alternative 3 description in Chapter 2. The potential for encouraging or increasing concentrated use at these locations is addressed in the Recreation section in Chapter 3.

Alternative 4

Folena - I would like to support of the above Alternative # 4, with some additions from Alternative #3 and others Alternatives

From Alt #3- The easement would include addition of the short bypass on the north side of Little Sluice and reduce the easement width on the south side of Little Sluice to 75 feet.

From Alt #1- **Ellis Bridge:** Construct a new 16 feet wide, 70 feet long prefabricated steel truss bridge approximately 60 feet downstream of the existing Ellis Creek ford. Bridge abutments would be located in the uplands outside the ordinary high watermark of Ellis Creek. The foundation type for the bridge abutments would be spread footings. Rock slope protection would be placed around the bridge abutments and upstream of the proposed bridge along the outside curve of Ellis Creek to prevent scour. The rock slope protection would extend from the bridge abutments to the toe of the Ellis Creek bank below the high watermark. Large boulders would be placed at both bridge approaches to guide vehicles to the bridge and protect the bridge from being damaged.

From Alt #1- **FOTR Bridge:** Remove the existing timber structure and replace with a three sided bottomless arch. Remove existing rock ford crossing downstream of the existing crossing structure and install erosion control features including rock slope protection, rock lined channel, rock fill, and delineate trail with rock boulders and logs. Reconfigure channel and stabilize banks with rip-rap, matting, wattles, and riparian vegetation.

From Alt #1- **Addition of vehicle access for dispersed recreation:** Specific unauthorized routes listed in the Comparison of the Alternatives below will be added to the National Forest Transportation System (NFTS) and be designated for 4WD trail vehicle use in order to provide vehicle access for dispersed activities such as camping. Rock/log barriers and signs would be used to define limits vehicles may travel off of the designated routes. Unauthorized routes added to the NFTS will be designated as 4WD trails open to high clearance vehicles and will follow the seasonal restrictions established in the 2008 Travel Management Record of Decision. These routes will be shown on the updated Motor Vehicle Use Map following the final decision. The following list identifies the locations where unauthorized routes will be added to the NFTS: the Soup Bowl, Buck Island Dam Site, North Shore Buck Island Spur, Eagle View, East Buck Island A and B Spurs and Buck Island Overlook (displayed on maps below).

Response: Alternative 4 does not include the short bypass at Little Sluice based on comments from El Dorado County and many user groups, due to the steepness.

Alternative 4 does include a 16' bridge at Ellis Creek, replacement of the FOTR bridge, and additional vehicle access for dispersed recreation.

CA4WDC - The CA4WDC finds that Alternative 4 most closely reflects the stated goal of the County and the recreating public who wish to enjoy this route. The County has stated it will accept responsibility and has demonstrated its willingness to work cooperatively with all parties to insure the integrity of the route. The USFS does not adequately explain its rejection of the County's request for the scope of the Easement by making Alternative 3 the preferred action.

Response: Alternative 1 reflects the easement request received from El Dorado County. Alternative 4 includes additional elements to better meet public use and needs along and adjacent to the Rubicon Trail. The easement and route for the Rubicon Trail are the same in Alternatives 1 and 4. Chapter 3 of the FEIS describes the environmental effects of implementing each of the alternatives. The Record of Decision will explain the rationale for the selection of the selected alternative.

CA4WDC - We remain convinced that Alternative 4 would create a better managed, more user friendly, and environmentally sound way forward. The analysis the USFS did of Alternative 4 continues to claim new impacts even though all proposed routes and dispersed camp areas have decade's long history. The funneling of use to less area is not prudent. The USFS has not adequately defended its rejection of the desires of the County and trail users set forth in Alternative 4. Alternative 3 comes closer to addressing these desires than the Proposed Project. Please reconsider Alternative 4 or at a minimum include the concerns we have raised. I am available for additional information or context as you develop the Final Environmental Impact Statement.

Response: The environmental effects analysis in Chapter 3 has been modified to reflect where impacts are continuing to occur or where there will be new impacts. There are subtle, but important differences between Alternatives 3 and 4 which respond to the issues brought forward by the public. The environmental effects of concentrating use in these two alternatives have been analyzed and are displayed in Chapter 3.

Barton - Table 2-3 summarizes the environmental impacts of each alternative, and suggests that Alternative 4 will not be consistent with RCOs 1-6. Page 85 of the DEIS outlines why the USFS does not believe Alternative 4 meets RCOs 1,2,4 or 6. However, the "routes" that USFS proposes to "add" under Alternative 4 are not new routes. These routes have been used, and are currently used, so the suggestion that use of these routes will lead to "increased" use, "new disturbances," or additional degradation is unfounded. The use of these routes is part of the baseline of the project, and instead of looking at the impacts of the baseline, the USFS should be looking at the impacts that will result from removing these routes from use. Removal

of these routes could lead to increased use of the remaining routes, which has not been adequately discussed in the DEIS.

Response: The environmental effects analysis in Chapter 3 has been modified to reflect where impacts are continuing to occur or where there will be new impacts. The SNFPA requires the USFS to analyze the impact of new activities, such as the addition of new routes (i.e. those that do not exist or those that exist but are not currently recognized as part of the NFTS) within RCAs for consistency with RCOs. Based on field reconnaissance and available GIS data, it was determined that portions of the 3 routes in Alternative 4 that are not in Modified Alternative 3 would be within RCAs as defined in the SNFPA. While additional sediment and contaminant delivery associated with use of these routes may be minor, it would still be additive in terms of cumulative watershed effects if only for a short duration and at a localized scale.

Barton - As discussed above, on balance, Alternative 3 is better than the Proposed Project, but Alternative 4 embraces more of the County's and the off-highway community's concerns, and the USFS has provided no compelling reason for rejecting it. Alternative 4 will not result in any new impacts as suggested by the USFS. Therefore, we encourage the USFS to incorporate our suggestions into the final EIS and select Alternative 4 as the project. If during the course of drafting the final environmental impact statement you need additional information from us, please let us know.

Response: The Record of Decision will explain the rationale for the selection of the selected alternative.

PEER - Alternative 4 fails to meet the SNFPA RCOs

This alternative has all the impacts of Alternative 1, with additional impacts from the designation of new user-created routes within the RCAs:

Alt. 4 fails to meet RCO #1: "Use of the 14N34B spur may continue to degrade road conditions leading to sediment delivery to Ellis Creek. Use of NSRELD-63-V near Spider Lake could lead to sediment and contaminant delivery to Spider Lake and associated wetlands. Proposed route NSRELD-63-U is within the RCA of the Little Rubicon River and could result in new disturbances that increase sediment and contaminant delivery potential thereby adversely impacting water quality and fisheries habitat" (Hydrology Report, P. 30)

Alt. 4 fails to meet RCO #2: "Under Alternative 4, there would be allowed use of 14N34B in close proximity to Ellis Creek, NSRELD-63-V would be in close proximity to Spider Lake, and NSRELD-63-U would be in close proximity to the Little Rubicon River. Use of 14N34B could degrade road conditions leading to sediment delivery to Ellis Creek and the filling in of pools which would alter aquatic habitat and geomorphic conditions. NSRELD-63-V would be within the RCA of Spider Lake and its

associated wetland and pond habitat that could lead to increased use along the shoreline resulting in a reduction of riparian vegetation, and compaction and bank failures. These impacts would degrade shoreline habitat, alter shoreline geomorphic processes, and disturb young fish and larval amphibians that use these shallow water areas. NSRELD-63-U is within the RCA of the Little Rubicon River and could result in new disturbances that increase sediment and contaminant delivery potential thereby degrading biological and geomorphic conditions and impacting the aquatic species that reside there” (Hydrology Report, P. 30).

Alt. 4 fails to meet RCO #4: “The effects to physical and biological characteristics associated with aquatic- and riparian-dependent species under this alternative would be similar to those under Alternative 1 with some exceptions. Under Alternative 4, there would be allowed use of 14N34B in close proximity to Ellis Creek, NSRELD-63-V would be in close proximity to Spider Lake, and NSRELD-63-U would be in close proximity to the Little Rubicon River. As described in RCO #1 and RCO under this alternative, these routes would likely be within the RCAs of Ellis Creek, the Winter Camp Wetland, Spider Lake, and the Little Rubicon River and have the potential to adversely impact water quality, geomorphic processes, and aquatic and riparian habitat” (Hydrology Report, P. 31).

Alt. 4 fails to meet RCO #5: “The new route providing access to Spider Lake would not likely preserve, restore, or enhance meadows, lakes, and wetlands. Therefore, the new route providing access to Spider Lake would therefore not provide the ecological conditions and processes needed to recover or enhance the viability of species that rely on the Spider Lake” (Hydrology Report, P. 31).

Alt. 4 fails to meet RCO #6: “The effects under this alternative would be similar to those under Alternative 1 with a few exceptions. Under Alternative 4, there would be allowed use of 14N34B in close proximity to Ellis Creek, NSRELD-63-V would be in close proximity to Spider Lake, and NSRELD-63-U would be in close proximity to the Little Rubicon River. While many of the activities proposed under Alternative 4 would improve water quality, aquatic habitat, geomorphic processes, and hydrologic connectivity; the allowed use of 14N34B, use of NSRELD-63-V and NSRELD-63-U would not. As described in RCO #1 and RCO #2 under this alternative, these additional activities would not maintain, restore, or enhance water quality and habitat for riparian and aquatic species” (Hydrology Report, P. 31).

Response: Correct, as identified in Chapter 3 of the FEIS, Alternative 4 fails to meet RCO # 1, 2, 4, 5 and 6.

Alternative 5

Snowlands Network - Contamination of the environment due to the discharge of petroleum products from 4x4 vehicles on the Rubicon Trail is the result of the degradation of the Trail and intentional use of vehicles in areas where it is likely that damage will occur to the oil pan or transmission, or due to over-turning of the vehicle. We refer to "Mud on the Rubicon 4x4 Trail" where poor judgment on the part of drivers results in environmental pollution. This pollution can be stopped while maintaining the historical use of the trail by adoption of a "single route easement" that is suitable for street legal vehicles. In fact, the DEIS states: "The single route easement would reduce water quality degradation associated with petroleum products being delivered to the Little Sluice and Winter Camp wetlands from the long bypass. Sediment and contaminant delivery potential to hydrologic features near Little Sluice and the Little Rubicon River would be reduced. "

Yet the Forest Service's Proposed Alternative fails to implement a single route easement.

Response: The environmental effects of implementing the various alternatives, including a single route easement, is presented in Chapter 3 of the FEIS. The rationale for the selection of the selected alternative will be provided in the ROD.

PEER - In principle, we support the Buck Island Bridge and replacement of the FOTR bridge to minimize impacts from motorized vehicle use on forest resources.

However, there is no explanation for, or analysis of, the need for a 16-foot bridge at Ellis Creek. This large a bridge needlessly disturbs more riparian vegetation at the site than would a smaller bridge and is visually incompatible with a trail experience. A 12-ft bridge, such as proposed at Buck Island, would be more than ample for trail use, would minimize disturbance in a riparian area and is visually more appropriate. The Forest should look at a smaller alternative in a supplemental draft EIS.

Response: Chapter 3 provides a comparison of effects between Alternatives 1 and 5 regarding the differences in constructing a 16' wide bridge and a 12' wide bridge. Modified Alternative 3 includes construction of a 16 foot wide bridge at Ellis Creek. Public comments expressed concerns about riparian disturbance from construction of a 16 foot wide bridge. El Dorado County has received funding for the bridge through Federal Highways Administration administered through CalTrans Highway Bridge Project. The federal and state transportation funding programs require the bridge design must meet the American Association of State Highway and Transportation Officials (AASHTO) standards for Geometric Design of Very Low-Volume Local Roads. The 2001 AASHTO "Guidelines for Geometric Design of Very Low-Volume Local Roads" were consulted during the design of the Ellis Creek bridge project. In Chapter four, entitled Design Guidelines, the section that discusses bridge width and design states

the following on page 21: "One-lane bridges may be provided on single-lane roads and two lane roads with ADT less than 100 vehicles/day where the designer finds that a one-lane bridge can operate effectively. The minimum width of a one-lane bridge should be 15 feet unless the designer concludes that a narrower bridge can function effectively." Dropping below these safety design standards requires a formal "design exception" be approved because the minimum 15 foot width is considered necessary for public safety. The proposed bridge over Ellis Creek was designed with 16 foot spacing between the two structural support trusses, leaving an approximate 15 foot clear passage inside the structural steel-truss and its protective inside railing, as required by the AASHTO standards for safety. A 16 foot wide bridge would impact 0.05 acres of riparian habitat versus a 12 foot bridge would impact 0.03 acres of riparian habitat. I selected Modified Alternative 3 because the impacts to riparian habitat from building a 16 foot wide bridge versus a 12 foot wide bridge would be 0.02 acres.

PEER - The DEIS is inconsistent in its description of Alt. 5. In some places it states toilet facilities would be installed under this alternative; in others it states no toilet facilities would be built. This inconsistency frustrates the public's ability to comment on the alternative. The DEIS identifies as Significant Issue #1: "Use during the wet season causes damage to resources." Only Alternative 5 specifically addresses this issue.

Response: The comparison table in Chapter 2 has been corrected with respect to the number of toilets proposed in each alternative. The FEIS has been modified to display the seasonal closures by alternative as shown in Table 2-1, Chapter 2 of the FEIS. The analyses in Chapter 3 have been modified to reflect the seasonal closures included in each alternative.

PEER - As currently designed, all alternatives violate NFMA because they fail to comply with the SNFPA Standards and Guidelines for Riparian Conservation Areas and noxious weeds. None of the Alternatives sufficiently addresses the many and complex issues on the Rubicon Trail. Alternative 5 could potentially be amended in a supplemental draft EIS to include feasible ways to deal with human waste and noxious weeds and potentially meet the required standards.

Response: Mitigation measures for the spread of invasive plant species have been added to all of the action alternatives. Consistency with RCO standards and guidelines by alternative is displayed in Appendix B.

The SNFPA does not state that activities cannot occur within RCAs, but that such activities must be analyzed for consistency with RCOs, and appropriate mitigation and protective measures identified. Components of the alternatives were formulated based on scoping comments and are an attempt to address consistency with RCOs by improving RCA conditions. There are components within the alternatives that are designed to at the least maintain conditions and in some cases restore or enhance

these conditions. This information was used to complete the analysis regarding which individual RCOs would be met by each alternative.

PEER - Alternative 5 best meets the SNFPA RCOs:

RCO #1: “The seasonal closure would reduce rutting, displacement, vegetation loss, soil compaction, and trail widening associated with wet season use; thereby reducing wet weather soil impacts which in turn could affect water quality. Direct water quality effects from turbidity and petroleum products associated with driving through standing water on the trail, driving through flowing trail segments, and low-water crossings would be reduced. Closure of unauthorized routes and trail variants could lead to natural recovery over time as groundcover increases and vegetation becomes reestablished; which would eventually reduce soil loss and sediment delivery to nearby hydrologic features.

“The single route easement would reduce water quality degradation associated with petroleum products being delivered to the Little Sluice and Winter Camp wetlands from the long bypass. Sediment and contaminant delivery potential to hydrologic features near Little Sluice and the Little Rubicon River would be reduced” (Hydrology Report, P. 32).

Riparian Conservation Objective #4: “The seasonal closure would reduce rutting, displacement, vegetation loss, channeling of flows, compaction, and trail widening associated with wet season use. The seasonal closure would also reduce the disruption of flow patterns which affect hydrologic connectivity. In addition unauthorized routes and some trail variants would be closed allowing for vegetation reestablishment and improved groundcover. As mentioned in RCO #1 and RCO #2 under this alternative, activities within RCAs would be reduced and in some cases RCA conditions improved thereby maintaining the physical and biological characteristics associated with aquatic- and riparian-dependent species through improved water quality, hydrologic connectivity, geomorphic processes, and aquatic and riparian habitat” (Hydrology Report, P. 33).

Riparian Conservation Objective #5: “As described in RCO #1 and RCO #2 under this alternative, these activities would improve water quality, aquatic habitat, geomorphic processes, and Hydrologic connectivity. Activities proposed under Alternative 5 would preserve, restore, and in some cases enhance meadows, lakes, and wetlands; thereby providing the ecological conditions and processes needed to recover or enhance the viability of species that rely on these areas” (Hydrology Report, P. 33).

Riparian Conservation Objective #6: “As described in RCO #1 and RCO #2 under this alternative, these activities would improve water quality, aquatic habitat, geomorphic processes, and Hydrologic connectivity. This alternative would maintain, restore, and in some cases enhance water quality and habitat for riparian and aquatic species” (Hydrology Report, P. 34).

Response: Alternative 5 is consistent with RCO # 1, 4, 5 and 6.

Alternatives

Snowlands Network -

Of the five alternatives, four are "action" alternatives. Of those, alternatives 1, 3 and 4 are almost the same. The only differences are how the Buck Island crossing is dealt with, the number of toilets and the exact mileage of unauthorized routes closed or added.

All substantial differences are lumped into Alternative 5. This alternative includes (1) a wet season closure and (2) a single route without variants. Alternative 5 does not include a requirement that the single route be navigable by street legal vehicles.

Limit use of the Trail to street legal vehicles only was an alternative proposed by the public during scoping to reduce the trail to one route and eliminate the need for variants to bypass the areas that are difficult to maneuver. Alternative 5 addresses this concern by issuing an easement for one route without variants; therefore it was eliminated from detailed study.

The public recommended limiting the Trail to street legal vehicles AND making the Trail a single route that is navigable by street legal vehicles. However, the single route with no variants shown on the map for Alternative 5 shows it going through the Little Sluice Box, which is not navigable by street legal vehicles. Furthermore, the description of Alternative 5 does not include any language that indicates that any changes would be made to the Little Sluice Box that would make it passable by street legal vehicles.

Therefore the range of alternatives is not adequate and not all issues were analyzed in sufficient detail to determine whether they are in the environment's best interest.

Response: Modifications have been made to the EIS to address comments and information raised during the public comment period, including addition of Alternative 6 which proposes restoration of Little Sluice so that it is passable by all motorized vehicles.

Assumptions

Hendricks - Three of the assumptions on which the analysis is based are flawed. The assumptions are stated on page 35 of the DEIS. The second assumption listed is "The public would follow the rules": There are no facts stated to back up this assumption and is contrary to the correct statement on page 250 in the Recreation section, under Visitor Management - "A major reason underlying participation is to get away from the controls and constraints of the everyday world." And, this is graphically illustrated by what is going on out on the Rubicon Trail. Unacceptable behavior is rampant and celebrated out on the Trail.

Platt - The Basic Assumptions (DEIS pg. 35) applied to all sections of the DEIS are flawed and address for the most part, the hypothetical rather than the reality of the past, present and future situation on the Rubicon. The assumptions are predicated on the belief that the public will follow the rules. The bulk of the problems associated with the Rubicon are a result of non-compliance with rules and regulations by users. Observations on the trail testify to this fact. Evidence of barriers being moved or driven over is apparent. Carsonite signage restricting use to the trail in many instances is ignored, vandalized or destroyed, resulting in new user created trails and play areas, trail widening and damage to the National Forest.

Response: We have removed those assumptions from the document. Signs and route barriers proposed under several alternatives will help reduce unauthorized use. In addition, while unauthorized use is expected to continue, enforcement and education are expected to further reduce that use over time.

Hendricks - Assumption three listed is: "The county has stated parking within the easement would be allowed anywhere within the 25 feet from the centerline either side as long as it doesn't damage resources. The assumption is that the public would follow the rules and damage will not continue." My comments above also apply to this flawed assumption.

To eliminate trail widening and resource damage outside of the narrow travel way this must be required in the easement: Define on the ground the authorized travel way and turnouts with barrier rocks and logs, supported by signs and trail markers. Clearly mark and maintain the outer boundaries of the Easement with identifiable signage.

Platt - It is false to assume that drainage structures will keep vehicles on the trail thereby preventing damage to banks. Trail widening is a direct result of user attitude and behavior, period.

The assumptions that this analysis should be based upon are the 3E's: Engineer, Educate and Enforce. Identify the problem, engineer a solution, educate and inform the users and most importantly, protect the investment through strict law

enforcement. Responsible trail users deserve to have their trail and recreation experience protected.

Response: This assumption has been removed from the final document. Mitigation measures have been incorporated in the action alternatives that restrict access of the Rubicon Trail in sensitive areas. Alternative 6 has been added which includes defining the trail on the ground with barrier rocks and logs, supported by signs and trail markers. The environmental effects of implementing these alternatives are shown in Chapter 3.

Hendricks - The seventh assumption listed is: "El Dorado County would implement and enforce a seasonal closure as needed In order to meet the terms of the CAO issued by the state of California Regional Water Quality Control Board, Central Valley Region and to fulfill water quality standards in the Water Quality Control Plan (Basin Plan) for the Sacramento River Basin established by the California Regional Water Quality Control Board, Central Valley Region. (Cleanup and Abatement Order No. RS-2009-0030, page 8 -#2)"

This assumption is flawed because seasonal closure for protection of all resources is too important of an issue to leave out of the requirements of this proposed easement. Leaving this requirement out with the expectation that El Dorado County will handle it is an abdication of the Forest's duty to protect watersheds and resources in the public's behalf. El Dorado County has commonly resorted to the claim that they cannot legally adopt any requirements of users of the Rubicon Trail, including seasonal closure. This is a weak legal opinion that has never been tested in the courts.

Platt - The assumption that Seasonal Closures would be the responsibility of El Dorado County Department of Transportation, if they see the need to implement, is irresponsible to say the least. The Rubicon Trail lies on National Forest Lands and it is the responsibility of the Forest Service to implement a seasonal closure as supported by the analysis in this DEIS, Forest Service policy and regulations, Best Management Practices and the Forest's Land and Resource Management Plan.

Response: The assumption regarding El Dorado County's responsibility to implement and enforce a seasonal closure has been removed from the final document. The alternative descriptions have been modified to describe the seasonal closures included in each alternative and the effects analysis in Chapter 3 describes the effects.

Aquatics

Barton - On page 71 of the DEIS, the USFS suggests that the proposed 200-foot easement between Little Sluice and Spider Lake could lead to increased use of the lake shore and the degradation of the shoreline. However, use of the shoreline has decreased since 2004 and has stabilized at a lower level under current conditions despite regular use of the proposed 200-foot easement area. The widening of the easement at this location then would simply recognize existing conditions and would not lead to increased use. This result is confirmed in the DEIS at the top of page 289. Furthermore, the DEIS states that the 200-foot easement would be within the RCA of Spider Lake. However, the 175-foot easement chosen by the County would be outside the RCA of Spider Lake.

Response: While this easement may not necessarily increase visitation, acceptance of it would be inconsistent with the SNFPA. The SNFPA requires the USFS to analyze the impact of new activities, such as the addition of new routes or easements (i.e. those that do not exist or those that exist but are not currently recognized as part of the NFTS) within RCAs for consistency with RCOs. Based on field reconnaissance and available GIS data, it was determined by the RCO team (consisting of Botany, Aquatics, and Hydrology) that this area would likely be within RCAs as defined in the SNFPA and that activities within this area could potentially have adverse impacts on RCA conditions. El Dorado County's easement request in the vicinity of Spider Lake was for a total width of 200 feet (175 feet in addition to the 25 foot standard width).

Barton - On page 95 of the DEIS, the USFS asserts that the low trout biomass on the Little Rubicon River can be attributed to two causes, recreational fishing or impacts from off-highway vehicles. The USFS fails to consider several other possibilities, such as competition from the golden shiners, spills from Buck Island Lake (see page 100 of DEIS), the lack of fish planting present in other streams, and improper comparisons.

Response: Correct, there are other reasons that may be affecting trout populations in the Little Rubicon River besides the two that were given. Spills from Buck Island Lake, along with reduced macroinvertebrate assemblages, which could be caused by the spills, result with less food for trout. The habitat downstream is comprised of bedrock chutes which tend to be poor habitat structure for trout species, plus there is very little spawning gravel (DTA and Stillwater 2005). Many additive impacts have caused cumulative effects for trout, resulting with their difficulty to survive in this reach. Competition from golden shiners may not be a significant factor, though, as trout will eat golden shiners (D.Hanson, 2012, pers.comm.), although they do compete for other available food, such as small surface invertebrates. The analysis in Chapter 3 has been modified to include these factors.

PEER - Like the Hydrology Report, the Aquatic BE appears to assume a wet season closure, with only an unquantified amount of winter use by private landowners. A

supplemental draft EIS is needed to clarify which alternatives include wet season use and the amount of that use, and evaluate the impacts to resources based on accurate assumptions regarding wet season use.

Sierra Nevada Yellow-legged frog-The Sierra Nevada yellow legged frog is a candidate species for protection under the ESA and the California ESA, and we expect that the species will be provided full protection under the California ESA within the next few months as recommended by the California Department of Fish and Game (See Exhibit G, Status Review, November 28, 2011; February 2, 2012 California Fish and Game Commission agenda, Item 6(a)(<http://www.fgc.ca.gov/meetings/2012/020212agd.pdf>)). The Aquatic Biological Evaluation and Management Indicator Species of the Rubicon Trail Easement (Aquatic BE) for the DEIS admits the presence of suitable habitat within the analysis area for Sierra Nevada yellow-legged frog. "Potential Sierra Nevada yellow-legged frog habitat within ½ mile of the Rubicon Trail includes Gerle Creek wetland, Winter Camp ponds and wetland, Little Sluice wetland, Spider Lake and associated wetlands, and Big Sluice spring and wetland. There are 64.6 acres of water bodies and ½ mile of Ellis Creek, all within ¼ mile of the Rubicon Trail; these aquatic features would be the most likely suitable habitat for Sierra Nevada yellow-legged frog affected by the Rubicon Trail" (Aquatics BE, P. 11).

These same ponds and wetlands are also those most impacted by the trail: "The ponds and wetlands which had aquatic species habitat most affected by the Rubicon Trail were Gerle Creek wetland, Winter Camp ponds and wetland, Little Sluice wetland, Spider Lake and associated wetlands, and Big Sluice spring and wetland" (Aquatics BE, P. 10).

The Aquatics biologist, Jann Williams, concluded, "It is my determination that Alternative 4 of the Rubicon Trail Easement may affect individuals, but is not likely to result in a trend toward listing or loss of viability for the Sierra Nevada yellow-legged frog in the Forest Plan area" (Aquatic BE, P. 20). This statement makes little sense given that the species is clearly on a "trend towards listing" and any additional impacts to individuals and habitat will adversely contribute to that trend. California ESA protection.

Moreover, the plain terms of this determination show that the Eldorado cannot select Alternative 4, because it creates a high risk to the species: "For species that have declined substantially, such as yellow-legged frog, any management actions that could affect local population dynamics are considered high risk for the species as a whole." (DEIS, p. 96).

Moreover, it does not appear that any site specific surveys were conducted in these areas to determine the presence of SNMYLF or other imperiled aquatic species. Where incomplete or insufficient information is available for a through environmental

analysis, NEPA requires the agency to do the necessary work to obtain it where possible. 40 C.F.R. §1502.22; see National Parks & Conservation Ass'n

v. Babbitt, 241 F.3d 722, 733 (9 th Cir. 2001) (“lack of knowledge does not excuse the preparation of an EIS; rather it requires [the agency] to do the necessary work to obtain it.”) Because additional survey data is needed to thoroughly assess the impacts to the SNYLF and other aquatic species, Eldorado should do the work to obtain that information and provide that data and additional analysis in a supplemental draft EIS.

Response: The assumption regarding El Dorado County’s responsibility to implement and enforce a seasonal closure has been removed from the final document. The alternative descriptions have been modified to describe the seasonal closures included in each alternative and the effects analysis in Chapter 3 describes the effects. Waterbodies/ponds/streams within ¼ mile of the Rubicon Trail were surveyed from Wentworth Springs to Buck Island Reservoir on September 27-29, 2010, Walker Hill to Little Sluice on July 18, 2011, Airport Flat to Wentworth Springs Campground on August 11, 2011, and Miller Creek to Ellis Creek on September 20, 2011. There is no established protocol for Sierra Nevada yellow-legged frogs, therefore the standard Visual Encounter Survey was used for surveying aquatic features within ¼ mile of the trail. These features included Ellis Creek, Gerle Creek wetland, Winter Camp ponds and wetland, Little Sluice wetland, Spider Lake and associated wetlands, Big Sluice spring and wetland, and the Little Rubicon River. Ellis Creek, Gerle Creek, and Little Rubicon River have trout which makes these streams unsuitable for Sierra Nevada yellow-legged frogs (Knapp and Matthews 2000), although SNYLF have been observed 1.7 miles from Ellis Creek crossing but on another stream where trout reside.

The Aquatic Biologist determined Alternative 4 may affect individuals, but is not likely to result in a trend toward listing or loss of viability for the Sierra Nevada yellow-legged frog based on the following:

Alternative 4 would add 0.72 miles of trail and close 1.24 miles of trail within the RCA; this closure of 1.24 miles of trail within the RCA would likely benefit aquatic species. Three routes to be added are within the RCAs; one at Spider Lake, one at Ellis Creek, and one at Little Rubicon River. All of these routes would cause an increase in adverse impacts to aquatic species from public use at these lakes and streams. Dispersed camping near Spider Lake would likely cause fecal contamination to the wetlands associated with Spider Lake and shoreline disturbance to aquatic species and their habitat. Perennial wetlands that are suitable habitat for Sierra Nevada yellow-legged frogs could be impacted by petroleum products from vehicle use during wet trail conditions during spring runoff, if they are there. In Alternative 4, there are no wet crossings that have suitable habitat downstream for Sierra Nevada yellow-legged frogs.

Botany

PEER - Sensitive Plants—Only features within 100 feet of occurrences were carried forward in the analysis to capture potential indirect effects. The 100-foot distance was based on the judgment that indirect effects from compaction, changes to drainage patterns, and potential spread of invasive plant species were mostly likely to occur within that distance. (Sensitive Plant BE, P. 22) (Exhibit D) However, the DEIS and Sensitive Plant BE disclose impacts to sensitive plants beyond the 100-foot distance. For example, an occurrence of Stebbins Phacelia (PHST6_4) occurs where fire rings are present and is approximately 150 feet from the edge of the Rubicon Trail prism. As a result, it is clear that a wider area must be analyzed regarding indirect effects to sensitive plants. The presence of the unauthorized routes that damage sensitive plants and other resources is further evidence that vehicles, in the absence of physical barriers, do not stay on the trail.

Response: Old campfire rings are present near Stebbins' phacelia occurrence PHST6_4, which is approximately 150 feet from the edge of the Rubicon Trail easement (refer to Table 7 in the Sensitive Plant BE). These old campfire rings are evidence, at a minimum, of past dispersed use; however, no evidence of vehicle use was documented. The potential for indirect effects were disclosed for several occurrences. Without a history of surveys or documentation of effects within the analysis area, no justification existed for a greater survey area. Mitigation measures have been incorporated into all of the action alternatives, including installing rock or log barriers to restrict vehicle access off of the Rubicon Trail in the vicinity of sensitive plant occurrences.

Bridges

Hendricks - The analysis in the various sections of Chapter 3 on affected environments adamantly support the need for the three bridges discussed: Ellis Creek, replacement of the FOTR bridge, and a bridge over the little Rubicon at the Buck Island dam outlet. I agree that these three bridges are needed and support this going forward. There is, though, a great unexplained discrepancy in the width of the proposed Ellis bridge. The historic bridge across the Rubicon River is 10 feet wide. The proposed new bridge at Buck Island is 12 feet wide. There is no reasonable argument to support the 16 feet width proposed for the Ellis Creek bridge or to incur the extra cost for a wider bridge. A width of 16 feet is unnecessary and out of line with the character of a narrow mountain road and a historic trail. The bridge at Ellis Creek needs to be 12 feet wide. Concern is mentioned in the DEIS that a bridge over the little Rubicon would degrade the view. This bridge would be placed directly below a large concrete dam and spillway. The surrounding riparian area is damaged by dispersed camping. A bridge along with eliminating camping within the RCA and restoration of the area will greatly improve the view.

Response: Alternative 6 was developed and includes a 12' wide bridge at Ellis Creek, replacement of the FOTR bridge and construction of a 12' wide bridge at Little Rubicon River. Alternative 6 also includes eliminating camping within the RCA at Little Rubicon River. The environmental effects of implementing this alternative are described in Chapter 3.

Platt - The construction of new bridges at Ellis Creek and Buck Island outlet, and the replacement of the FOTR Bridge with a box culvert, are essential to provide for vehicle access and to maintain water quality. The bridge at Ellis Creek has a design width of 16 feet. This width is not consistent with the 12 foot design standards for the FOTR bridge replacement, or the proposed bridge at Buck Island outlet, or the existing historic 10 foot wide bridge crossing the Rubicon River near Rubicon Springs. A 12 foot wide structure would adequately protect the creek and provide safe access for both users and County maintenance equipment. I have long recognized the need for a bridge at Ellis Creek, and I have provided written support to the County to help acquire funding for its construction. This support was based on the premise that the bridge was for summer season access only and stream course protection, not to facilitate or encourage access during saturated soil conditions.

I find it interesting that in Alternative 3, visual quality concerns at Buck Island outlet are driving the need for a low water crossing in lieu of a bridge. A bridge would provide the protection necessary to meet RCOs and a low water crossing would not, as stated in the DEIS pg. 83:

The improved low-water crossing could impact biological characteristics downstream if contaminants are delivered during vehicular crossings. This low water crossing could

also impact geomorphic characteristics by dispersing flow at the crossing (e.g. channel widening, shallow pools) and reduce aquatic passage at the crossing during low flow conditions.

The location of the new bridge would essentially be in the shadow of a massive concrete dam, which has already impacted visual quality. The logic that a bridge would adversely affect the Visual Quality Objectives for this area is inconsistent with user support for the placement of toilets in some of the most scenic locations along the trail, and the construction of a 16 foot wide bridge at Ellis Creek.

Response: Alternative 6 was developed and includes a 12' wide bridge at Ellis Creek, replacement of the FOTR bridge and construction of a 12' wide bridge at Little Rubicon River. The environmental effects of implementing this alternative are described in Chapter 3.

CAO

PEER - Compliance with the Cleanup and Abatement Order -The Central Valley Regional Water Quality Control Board's Cleanup and Abatement Order of April 30, 2009(CAO) (Exhibit C) requires, among other things, "The Responsible Parties will take all reasonable steps to cease the discharge of sediment and other wastes due to motorized use of the Rubicon Trail to waters of the State, including Gerle Creek, Ellis Creek, Loon Lake and its tributaries, and to the Rubicon River and its tributaries" (CAO, p. 8, emphasis added). The DEIS alternatives offer various levels of reducing sediment and other waste products, but the Hydrological Report and Aquatic BE indicate Alternative 5 best meets the requirement to "cease" discharges.

Response: Correct, the alternatives presented in the environmental analysis offer various levels of reducing sediment and other waste products and address the CAO.

PEER - The CAO includes several references to enforcement, including the use of wag bags, spill kits, and the enforcement of trail regulations with regard to water quality (CAO, p.10). The DEIS needs to discuss compliance with these requirements as well.

Response: Mitigation measures have been added to all of the action alternatives, addressing education, monitoring and enforcement.

Cultural Resources

Washoe – At risk archeological sites: I am not sure if the proposed mitigation measures would be adequate enough to keep people out and causing further destruction. I propose protecting by installing large boulders to keep vehicles out and on the main road.

Response: Boulders or other natural barriers will be used to protect archaeological sites from unauthorized OHV traffic, and these protection measures will be incorporated into the final cultural resource report more explicitly.

Washoe: I would like to visit the at risk sites to get a better understanding of the adverse impacts and make a mitigation plan.

Response: We will schedule a visit to the at-risk sites for this upcoming field season so you are familiar with the sites and so that we can be more specific about protection measures at each site. It is understood that protection measures and authorizations for certain types of project activities may change based on our monitoring during the site visits. During the site visits we will identify locations where site monitors should be present during project implementation.

Washoe: The flagging should only be put up during construction work and taken down when no construction activities to keep looters from finding the locations.

Response: Flagging will be hung and removed appropriately according to the project implementation schedule.

Washoe: If there is to be any site excavation, we prefer no data recovery, but leave in place or relocate to a safe place. Unless eminent threat of loss. Any artifact removal diminishes our presence and our history. Things must be left in place to preserve the integrity.

Response: During our site visits we can identify which, if any, sites would be candidates for treatment under the CARIDAP program or other evaluation procedures depending on the effectiveness of protection measures. We will consult with you if any excavation is planned and follow your request to leave artifacts in place or relocate to a safe place.

Washoe: Will there be ARPA signage at the trailheads? The public must be informed of cultural sensitivity.

Response: Kiosks with visitor information at the trailhead locations at Wentworth Springs Campground and at Loon Lake would be good places for ARPA signage. This recommendation will be included in the final cultural resource report and communicated to the project leader.

Washoe: Will there be a site monitor in the at risk sites when ground disturbance activities take place?

Response: FS Site 05-03-55-710 is in the vicinity of the proposed Road NSRELD-63 in Alternative 4. Boulders will be used as barriers to prevent OHV traffic through the site if Alternative 4 is chosen.

Washoe: The closure and addition of roads: Is there any archeological resources within the proposed new road additions? Will the closed roads be rehabilitated?

Response: The extent of rehabilitation efforts on routes that are proposed for closure will vary. The specific rehabilitation activities will be designed to avoid adverse effects to archaeological sites. There are no known archaeological sites with a prehistoric component along roads proposed for closure and rehabilitation.

DEIS errors

Howser - The document refers to the Rubicon Trail in several places. The Rubicon is a county road, and therefore should be address as such.

Such as here: Minimal impacts to habitat, potential impacts to species from noise and use of trail

Change to: Minimal impacts to habitat, potential impacts to species from noise and use of road.

Abstract for Alt 5 has an error. Alternative 5 proposes the same activities as Alternative 1 except the easement would be a single route without variants, a seasonal closure from November 1 to July 1 would be included, the bridge at Ellis Creek would be constructed to a width of 12 feet, no vault toilets would be constructed, and no additional routes would be added. When in fact the summary chart says 9 (the highest number) would be constructed

Response: The table in Chapter 2 has been corrected to list the correct number of toilets proposed in each alternative. The easement application submitted by El Dorado County referred to the route as the Rubicon Trail and intends to manage the route for high-clearance trail vehicles.

Folena - I also would like to add that this DEIS Document is very hard for the lay person to understand, which I believe is done on purpose to confuse the public that is supposed to comment on it. This process for a dirt road is absurd; there is good scientific evidence that is ignored that proves that what is being said is false.

This DEIS Document itself is full of miss information on locations it is hard to tell where an area is that is being referenced buy the document.

Response: This document was written in the least technical terms possible in order for the public to understand. Mr. Folena's concern about locations and the confusion they present is warranted due to the scale of the project and the high proportion of important resource features. However, given the number of observations and impacts observed the current product represents a simplified version of resource conditions to allow the reader to follow along. To include all available information at this time would be extremely confusing for the lay person. Observations and occurrences were noted frequently along the Rubicon Trail during spring snowmelt, summer, and fall conditions to capture changing resource conditions and the impacts associated with varying seasonal conditions.

Central Valley Water Board - The reference to the Rubicon Trail Cleanup and Abatement Order (CAO) number on Pages 11 and 49 are incorrect. The correct CAO Number is R5-2009-0030.

Response: The correction has been made.

Central Valley Water Board - The reference to El Dorado County's Saturated Soil Water Quality Protection Plan is dated 14 December 2010. Major updates to this plan were included in an amendment to the Water Board on 28 January 2011, and references to the Saturated Soil Water Quality Protection Plan should state "as amended on 28 January 2011".

Response: The correction has been made.

Central Valley Water Board - Under the Hydrology and Riparian Resources Section on Pages 56, 63, and 77, the Aquatic Resources Section on Page 98, and the Reference Section on Page 311, the DEIS references a Water Board study that is not a published document, and as a result of 26 April 2009 Water Board meeting, this study was removed from the public record. We request that you eliminate this reference from the Final EIS.

Response: The first three paragraphs on page 56 have been removed. The reference to Coe and Hartzell in the first bullet on page 63 has been removed. The reference to Cedarholm on page 77 has been removed. These references on pages 310-311 and the reference to Luce and Black on page 317 have been removed.

CORVA - There are two different terminologies that are referred to regarding the hardening of the Buck Island crossing of the Little Rubicon River. In different areas of the document it is referred to as 'hardening' and in another as 'ford', and in another as a 'hardened ford'. It would be very helpful to the public if the terminology used be consistent. We endorse the use of the hardened ford for the Buck Island crossing, rather than a bridge, which we deem unnecessary.

Response: The terminology has been corrected and is consistent throughout the document.

CORVA - The smaller area for the Little Sluice easement proposed for Alternative #3 is labeled as a 'dispersed use access area' on the map for Alternative #3, but not on any of the maps for the other alternatives. This is an unexplained inconsistency.

Response: The increased width of easement in the vicinity of Little Sluice in Alternatives 1, 3, 4 and 6 is to allow for motor vehicle use and parking. The symbol for motor vehicle use areas has been removed at Little Sluice in Alternatives 1, 3, 4, and 6 and only the easement width is displayed.

CA4WDC - The Mud Lake east of the Little Sluice remains the same as when mapped by the USGS more than 50 years ago. The trail in that area is on a shelf of solid rock that has not changed significantly in 30 years. The lake is dry most summers and would seem to fall well short of a wetlands definition. We are requesting a better description of its location, clarification of its proximity to the trail, and hydrological connections and quantities leading from the trail. We are also requesting a discussion of the definition of wetland within the USFS guidelines and regulations that would apply to this area, and how the USFS scientifically determined that all stated wetlands have met this definition.

Response: A definition for wetlands, as the term is used in this EIS, has been added to the Glossary. Mud Lake was not identified as a wetland, but rather is shown as depicted on existing topographic base maps.

California State Parks - On Table S-3, Alternative 5 identifies “Number of Vault Toilets to be constructed’ as 9. Also on Table 2-1, Alternative 5 identifies “Number of Vault Toilets to be constructed’ as 9. The balance of the document identifies that Alternative 5 would involve no construction of vault toilets?

Response: These tables have been corrected.

California State Parks - On page 20, first paragraph, the OHMVR Division is incorrectly identified as the “OHV Division”. This same error occurs on page 248, third paragraph.

Response: This correction has been made.

Barton - On page 56 of the DEIS, the USFS makes reference to sediment delivery estimations and a "pebble count" performed by the Central Valley Regional Water Quality Control Board. This examination was based upon a visual and arbitrary estimation. This office supplied the USFS with an actual pebble count performed by a fishery biologist in our October 3, 2011, NOI comment letter. This pebble count was performed using transects and multiple randomly selected sample sites. The conclusions of the fishery biologist directly contradict the estimations made by the Regional Board's geologist. In other words, it turned out that there was more siltation of Ellis Creek *above* the Trail crossing than below it. It also turned out that there was higher quality spawning habitat *below* the Trail crossing. Not only are federal agencies supposed to use the "best information available" when preparing a NEPA analysis, those same agencies are required to acknowledge and discuss any flaws with that information. The USFS reference to the Regional Board's study without discussing the flaws and unreliability of that study is an abuse of discretion.

Response: These references have been removed from the document.

Barton - Table 2-1 of the DEIS suggests that Alternative 5 will have nine vault toilets installed, but in later description, the number of toilets installed will be zero. The final EIS should declare which is the correct number.

Response: This table has been corrected.

Barton - On page 15 of the DEIS, the USFS makes reference to the Rubicon Trail being listed as a Candidate National Recreation Trail. RTF requested documentation regarding the candidacy of the Rubicon Trail as a National Recreation Trail and there was either no response from your office on the matter, or the response was that the Rubicon Trail is not listed as a candidate NRT, depending upon to whom we spoke. Please remove this statement from the EIS or provide full documentation of the listing.

Response: The Eldorado National Forest Land and Resource Management Plan lists the Rubicon Trail as a candidate National Recreation Trail (page 4-142) and provides further direction to prepare an establishment report recommending designation of the Rubicon Trail as a National Recreation Trail (page 4-144). The establishment report was not initiated and this route has not been designated. The use of the term "candidate" does not carry any level of designation but rather was used to identify that the trail should be further evaluated.

Barton - On page 43 of the DEIS, the USFS refers to a "Devil's Peak" incision. This area has been well known as Walker Hill for several decades. Renaming it confuses the reader.

Response: The text has been modified to reduce the confusion.

El Dorado County - On page 56, reference is made that the Coe and Hartzell report of 2009 estimated approximately 100 cubic yards of sediment per year were caused by use of the Rubicon Trail. The protocols used in the Coe report for sediment production were never validated, and its validity has not been established, and therefore estimates in that report such as 100 cubic yard per year are not reliable and should not be used.

In regard to the pebble counts in Ellis Creek, the Rubicon Trail Foundation arranged for a pebble count study that is more reliable and which contradicts many of the assumptions in the DEIS concerning the effort of vehicles crossing Ellis Creek. El Dorado County requests that the DEIS use that pebble count study. The estimate of a 50-fold difference in erosion rates between logging roads and the Rubicon Trail is scientifically unsupported, factually incorrect, and should not be used.

Response: This reference has been removed from the document.

El Dorado County - In various places, the DEIS refers to the "construction" of erosion control features on the Rubicon Trail. See, e.g., page 19, last paragraph, which is entitled "Construction of Erosion Control Features." The County suggests that the

word "construction" be changed everywhere it is used in the DEIS to "installation" of erosion control features, in order to avoid confusion with the issue of which road maintenance activities fall into the category of "maintenance" and which fall into "construction" for purposes of NEPA categorical exclusions and other purposes.

Response: This modification has been made to the text of the document.

El Dorado County - On page 21, the description of Alternative 2, the no action alternative, correctly states that with no formal written easement from the USFS, El Dorado County will continue to assert its RS 2477 rights, but it incorrectly states that if no easement is granted then no additional erosion control features would be constructed from Wentworth Springs Campground to the county line with Placer County. If no formal written easement is granted, the County would continue to assert its RS 2477 rights (which the USFS has stated are the equivalent of an easement), which include the right to maintain the road, and therefore without a formal written easement El Dorado County will continue to install erosion control measures along the Rubicon Trail just as it has been doing over the past few years.

Response: The Forest Service recognizes that under its claim of R.S. 2477 rights, El Dorado County could conduct maintenance within the travel way of the Rubicon Trail.

El Dorado County - On page 25, in the description of Alternative 5, it is stated that "No toilets would be constructed." On page v, in the Summary of Environmental Consequences, the column for Alternative 5 shows 9 toilets to be constructed. This dichotomy should be resolved. We interpret Alternative 5 to include no new toilets. The construction of new toilets, when coupled with the education campaign concerning sanitation, would be environmentally beneficial.

Response: This table has been corrected.

El Dorado County - On page 38, first paragraph, the statement is made that approximately 17 miles of the Rubicon Trail are situated in El Dorado County. Starting at Wentworth Springs Campground and proceeding easterly, a more accurate figure would be that there is about 8 miles of trail, plus about 2 miles of variant, in the county.

Response: The text referenced has been corrected.

PEER - The information regarding vault toilets in Alternative 5 is inconsistent; in some places the DEIS states there would be nine toilets under this alternative; other places indicate no toilets. A supplemental draft EIS must clarify this inconsistency and provide the needed analysis.

Response: The table has been corrected.

Dispersed Use

Hendricks - There are three areas that are heavily impacted by dispersed camping along the Rubicon Trail-the so called Winter Camp, the area adjacent to the little Sluice wetland, and the area along the little Rubicon River at the outlet of the Buck Island dam. All of the sites are in riparian areas or adjacent to wetlands. All of them show extreme damage, denuding of vegetation, soil compaction, death of trees, and other human caused impacts. Please see Attachment 20 for photos of conditions west of little Sluice Box and Attachment 21 for conditions along little Rubicon River. All of these sites are inappropriate for camping. All of these sites need the camping use eliminated and moved to other areas that have a chance of withstanding the use. These sites all need to be restored to a proper, functioning condition. These changes must be required in the easement.

Response: Alternative 6 addresses minimizing impacts to resources from dispersed camping in several areas by eliminating camping near Soup Bowl, Winter Camp, and the Little Rubicon River.

Easement

CORVA - Include a wider access area near Little Sluice in Alternative #3, which the public is already accustomed to using for parking and associated uses. In the Rubicon Recognition Project completed by El Dorado County, a wider area was included for public access in acknowledgment of the current patterns of usage. Members of the public have chosen to populate the area around Little Sluice as part of their enjoyment of the trail. Arbitrarily limiting that area to 75' rather than 175' (as requested by the county) serves little purpose, and would prove difficult to enforce. There is an implication on page 70 of the DEIS that additional footage around Little Sluice would lead to increased visitation to Spider Lake. The stated affects of the 175' easement as opposed to the 75' easement are all conjecture and hypothesis, specifically, there are no studies cited to support these conclusions. The supposition that a smaller easement might limit public intrusion on Spider lake is flawed logic, and not likely to be true.

Response: El Dorado County's easement request in the vicinity of Spider Lake was for a total width of 200 feet (175 feet in addition to the 25 foot standard width). While this easement may not necessarily increase visitation, acceptance of it would be inconsistent with the SNFPA. The SNFPA requires the USFS to analyze the impact of new activities, such as the addition of new routes or easements (i.e. those that do not exist or those that exist but are not currently recognized as part of the NFTS) within RCAs for consistency with RCOs. Based on field reconnaissance and available GIS data, it was determined by the RCO team (consisting of Botany, Aquatics, and Hydrology) that this area would likely be within RCAs as defined in the SNFPA and the vehicle use would be inconsistent with RCOs #1 and 2. The reduced width of the easement at Little Sluice in Modified Alternative 3 was in response to public comments and resource concerns identified by the ID team. The purpose of the different alternatives is to display the effects of implementing different management actions. In this case, the effects of implementing a narrower easement, and reducing the area where motor vehicle travel would be allowed are described in the Aquatics, Hydrology, Botany, Wildlife and Recreation sections. The ID Team evaluated the effects of reducing the easement and considered the likely effect on public use at Spider Lake. The estimation that use at Spider Lake would decrease if motor vehicle access closer to the lake is prohibited is based on observations by professional staff and public use patterns.

CA4WDC - At Little Sluice the County requested 175' of easement in an area of primarily solid rock. The reduction to 75 feet is not well justified in the DEIS. This area is used by clubs and groups for hiking, sightseeing, picnicking as well as camping. The proximity to Spider Lake and midway point from the western trail entrances to Rubicon Springs makes this a natural spot to congregate. On page 71, the USFS seems to try to justify the reduction of the 200' easement between Spider

Lake and the Little Sluice stating it would lead to increased impacts and use of the shore line. This was addressed in 2004 and the current use levels are stable yet dramatically lower than the pre-2004 levels. Also, on page 289, the DEIS asserts that a 200' easement would encroach on the Spider Lake RCA. While this may be true, the 175' requested by the County is clearly outside the RCA of Spider Lake.

Response: El Dorado County's easement request in the vicinity of Spider Lake was for a total width of 200 feet (175 feet in addition to the 25 foot standard width). While this easement may not necessarily increase visitation, acceptance of it would be inconsistent with the SNFPA. The SNFPA requires the USFS to analyze the impact of new activities, such as the addition of new routes or easements (i.e. those that do not exist or those that exist but are not currently recognized as part of the NFTS) within RCAs for consistency with RCOs. Based on field reconnaissance and available GIS data, it was determined by the RCO team (consisting of Botany, Aquatics, and Hydrology) that this area would likely be within RCAs as defined in the SNFPA and the vehicle use would be inconsistent with RCOs #1, 2, and 5.

California State Parks - In regards to the proposed easement width, the OHMVR Division supports a variable easement width that supports resource conservation and sustaining OHV Recreation relative to the Rubicon Trail. A variable easement width allows for the reality of the local terrain as opposed to a rigid line on a map.

Response: The different alternatives considered in this environmental analysis include various options for varying the width of the easement, ranging from the variable width proposed by El Dorado County (Alternative 1) to a single width along the entire route (Alternative 5). The effects analyses presented in Chapter 3 of the EIS describe the effects associated with implementing various easement widths.

Barton - The reason behind reducing the dispersed use access area at Little Sluice to 75 feet is not adequately explained. El Dorado County requested 175 feet in their easement application and it seems that if the County is willing to maintain access, the USFS should not unnecessarily or unjustifiably restrict such access. The area under discussion is made of solid rock and supports few biological resources. We recommend that the dispersed use access area at Little Sluice be restored to 175 feet as requested by the County.

Response: El Dorado County's easement request in the vicinity of Spider Lake was for a total width of 200 feet (175 feet in addition to the 25 foot standard width). Some of the public comments received during the initial scoping period identified the desire for a narrower easement width at the Little Sluice. The project must be consistent with the Forest Land and Resource Management Plan (as amended) which requires meeting standards and guidelines. To meet the standards and guidelines from the SNFPA, the USFS must analyze the impact of new activities, such as the addition of new routes or easements (i.e. those that do not exist or those that exist but are not currently

recognized as part of the NFTS) within RCAs for consistency with RCOs. Based on field reconnaissance and available GIS data, it was determined by the RCO team (consisting of Botany, Aquatics, and Hydrology) that this area would likely be within RCAs as defined in the SNFPA and the vehicle use would be inconsistent with RCOs #1, 2, and 5.

El Dorado County - The description of the easement requested by the County is described on page 18, first paragraph, as follows: "The easement would generally be 25 feet from centerline with several variant widths identified." It is important to note that the requested easement is generally 25 feet on each side of the defined centerline, for a total width of 50 feet, except at Little Sluice and at Postpile.

On page 21, Alternative 3 refers to a "short bypass on the North side of Little Sluice." The North side has what is commonly referred to as the long bypass (Route 1.8) which has the typical 50 foot width. The South side of Little Sluice has what has been called the short bypass. Alternative 3 proposes to reduce the easement on the south side of Little Sluice to 75 feet. El Dorado County's application for an easement at this location depicted a main Trail centerline through Little Sluice with a dimension of 25 feet on each side of the centerline, plus an additional easement width of 175' from the southerly edge of the main trail easement to cover the short south bypass section and the dispersed use access area. The total easement on the south side of the main route through Little Sluice, measured from the centerline of the main route through Little Sluice, would include the 25 foot easement on the south side of the centerline, plus the additional 175 feet, for a total of 200 feet south of the centerline of the main Little Sluice route. The easement on the north side of the main route is 25 feet from the centerline. El Dorado County believes that an easement of 200 feet south of the centerline of the main Little Sluice route is necessary to accommodate the activities which have and will take place there, and a narrower easement in that area would be insufficient.

Response: Different alternatives were developed in order to respond to the issues brought forward by the public. Some of the public comments received during the initial scoping period identified the desire for a narrower easement width at the Little Sluice. The project must be consistent with the Forest Land and Resource Management Plan (as amended) which requires meeting standards and guidelines. To meet the standards and guidelines from the SNFPA, the USFS must analyze the impact of new activities, such as the addition of new routes or easements (i.e. those that do not exist or those that exist but are not currently recognized as part of the NFTS) within RCAs for consistency with RCOs. Based on field reconnaissance and available GIS data, it was determined by the RCO team (consisting of Botany, Aquatics, and Hydrology) that this area would likely be within RCAs as defined in the SNFPA and the vehicle use would be inconsistent with RCOs #1, 2, and 5.

Hendricks - The major issue with this easement was not addressed in the DEIS and has yet to be resolved in federal court, that is the issue of access. An easement for a public road is meant to give access to the public at large. The whole concept of RS2477 rights is meant to give access to the public both to and through federally managed public lands. The Rubicon Trail was historically a road that provided that access. Yes, it became rougher as it fell into disuse, but it was still negotiable with street legal vehicles although four wheel drive was required for some sections. That has changed. The Trail is no longer a public road as claimed by El Dorado County. It is now taken over by non street legal extreme vehicles. This use has damaged the Trail and is misplacing and denying access to the traditional users, the public. I own a slightly modified 4x4 vehicle that I travel with throughout the west. I regularly travel rough 4x4 roads. I would never travel the Rubicon Trail. I am denied access because the Rubicon Trail is no longer a road but an OHV park. El Dorado County is requesting an easement for a public road and has claimed RS2477 rights to assure public access. Allowing non-street legal vehicles and the associated damage to the road surface denies access to the traditional user and the public at large. I would love to be able to drive this public road to access my public lands in this area. I cannot. A road is a travel way to get a vehicle from point A to point B. An OHV park is a place to go to "play" with your vehicle. The Forest Service has been asked for an easement for a public road not a special use permit for an OHV park. The Forest Service must revisit the comments made during scoping and insist on requirements in the easement -such as licensed street legal vehicles only and the route restored to a standard that stock 4x4 vehicles can travel-that assure the Rubicon Trail is a public road.

Response: The easement which El Dorado County has applied for and which the Forest Service is considering issuing is under the authority of the National Forest Roads and Trails Act (NFRTA). This easement does not restrict vehicle types to only highway licensed vehicles, nor does it restrict the purpose or type of use of the easement. The easement need not be solely for the purpose of allowing travelers to get from point A to point B. The NFRTA recognizes recreation as one of the uses of National Forest System lands. Recreational use of roads and trails has long been an accepted use of these travel ways, including driving for pleasure and off-highway vehicle travel. Limiting the type of vehicles using the trail to highway licensed vehicles only was suggested during the initial public scoping for this analysis and was considered as one of the alternatives. Alternatives 1, 3 and 4 provide for a bypass at the Little Sluice to allow capable vehicles to operate around Little Sluice and still traverse the Trail. Alternative 6 has been added to display the analysis of restoring the Little Sluice to a drivable condition for typical 4WD vehicles (in contrast with extreme 4WD vehicles).

Hendricks - I have always been a proponent of one route for the Rubicon Trail. As the Trail has changed into an OHV park, the use of extreme vehicles has damaged the route to the extent that sections became impassable for street legal vehicles. Two

examples are the Little Sluice Box and the old true Sluice Box. The historic users were forced to find bypasses around these damaged sections. Another issue is the proliferation of off route "playground" areas pioneered by extreme vehicle users looking for a "challenge". The Soup Bowl area is an excellent example and the ongoing damage here is appalling. Because an individual can build one of these extreme vehicles does not mean its use is appropriate or should be allowed on our public lands or our public roads. As an example, I could build an Indy style race car capable of extreme high speed and cornering ability. Common sense and law prevents me from driving it down Sly Park Road (another El Dorado County road).

A single route would assure these two issues are prevented, bypasses searching out areas for destruction and destruction of once usable road sections necessitating the traditional user to look for bypasses. Rich Platt and I presented this viewpoint before the El Dorado County Board of Supervisors on 26 January 2010 when the issue of the route of the Rubicon Trail was decided (please see Attachment 13).

Response: Alternative 5 analyzed for the benefits and impacts of limiting the Rubicon Trail to a single route and not designating any additional bypasses or other routes. One of the purposes of this environmental analysis described in Chapter 1 of the EIS and a purpose for issuing an easement to El Dorado County is to identify the specific route or routes where motor vehicle use will be allowed and to provide for better enforcement to prevent users from travelling off of the designated routes. The proliferation of bypasses or off-trail "playgrounds" will be better avoided through clarifying the authorized routes and the responsibilities of the different managing agencies.

Platt - The location of the R/W and the corresponding closing of unauthorized routes and variants should be consistent with the 11/26/2010 BOS decision, as I have stated previously. (See attachment 2) To be consistent with this decision, the Easement should be confined to a 50 foot R/W in the vicinity of East Wentworth and Post Pile areas to accommodate the main trail and its single variant. The DEIS provides no explanation for the need for a wider easement in this very sensitive, steep and highly erodible area.

It is also inappropriate and inconsistent to consider allowing vehicle access off the established trail at the Soup Bowl. Soup Bowl has become an extreme vehicle play area showing signs of unacceptable resource damage. Specialist analysis throughout the DEIS describe impacts from vehicle use in these areas as having negative effects on soil, hydrology, terrestrial and botanical resources. Restoration projects should be implemented as mitigation measures in these areas of concern, in lieu of the establishment of a play area resembling an OHV park.

The Easement in the Little Sluice area should be confined to 75 feet, incorporating the historic route and the southern variant (ELD-63-E). This action would also require

that boulders deliberately and illegally pulled into the trail be resized, providing access to this trail icon for all vehicles travelling on the Rubicon.

Response: Alternative 6 has been added to the FEIS in order to better display the environmental consequences of implementing the suggestions made, including limiting the easement width in the vicinity of East Wentworth and the Post Pile, eliminating the access area at Soup Bowl, and reducing the easement width near Little Sluice. The environmental effects are described in Chapter 3. Alternative 3 was also modified to eliminate the motor vehicle use area in the vicinity of Soup Bowl.

Snowlands Network - Alternative 2, the No Action alternative, states: “The LRMP would continue to guide management of the project area. No easement would be issued to El Dorado County; the Rubicon Trail would stay in the current alignment across Ellis Creek and no bridge built; the FOTR bridge would not be replaced with a culvert and vehicles would continue to cross the bridge and downstream ford; Buck Island bridge would not be built; additional erosion control features would not be constructed from Wentworth Springs Campground to the county line; no additional toilet would be installed, unauthorized routes would not be closed and rehabilitated; and no additional routes would be added to the NFTS to accomplish the purpose and need. El Dorado County will continue to assert their RS 2477 claims. “

The Forest Service implies that through El Dorado County's assertion of R.S. 2477 claims the County would be able to ensure continued access to the existing Rubicon Trail. If that were the case, why is the County requesting an easement? The assertion of R.S. 2477 claims is not equivalent to the County having R.S. 2477 rights.

The exact opposite is true. Without an easement the Forest Service retains all rights to manage the lands on which the Rubicon Trail passes. They would retain the right to designate a wet season closure and a single route that is navigable by street legal vehicles.

On March 12, 2009, Edward Knapp, Counsel for El Dorado County, stated that El Dorado County claims that the Rubicon Trail is a public road, not a county road or county highway. The County further claims that it does not have the obligation and little or no authority to manage, maintain, or regulate use of the Rubicon Trail.

The Rubicon Trail is USDA Forest Service land. Unless El Dorado County has applied for pursuant to RS 2477 and subsequently been granted by the Forest Service jurisdiction to manage the right-of-way known as the Rubicon Trail, the Forest Service retains sole jurisdiction over the right-of-way and has the sole responsibility and authority to manage, maintain, and regulate its use. RS 2477, passed in 1866, gave states the right to build roads on federal lands. Though repealed in 1976, the law still applies to "highways" that were in use before the repeal. On June 29, 2007, District Court Judge Bruce Jenkins ruled that a federal agency does not have the power to grant R.S. 2477 rights-of-way. Rather, counties must prove their claims.

El Dorado County has not applied for jurisdiction over the right-of-way known as the Rubicon Trail pursuant to R.S. 2477. Therefore, jurisdiction over the right-of-way is held by the Forest Service and they alone have the sole responsibility and authority to manage, maintain, and regulate its use. El Dorado County has absolutely no responsibility or authority over the Rubicon Trail. This is in keeping with the statements by Edward Knapp, Counsel for El Dorado County on March 12, 2009.

The County has no basis for requesting an easement because they have not have rights under R.S. 2477. Therefore the subject DEIS is premature. The Forest Service retains all rights to manage the Rubicon Trail.

Response: El Dorado County has applied for an easement and the Forest Service has the authority to issue an easement under the National Forest Roads and Trails Act (NFRTA) of 1964. El Dorado County is not required to demonstrate rights under R.S. 2477 in order to apply for an easement. Therefore this analysis is not considered to be premature.

Under Alternative 2, the status quo would continue. El Dorado County would continue to assert its R.S. 2477 claims and there would continue to be a lack of clarity regarding responsibility for management of the trail. The commenter has claimed that Alternative 2 does not accurately reflect the No-Action Alternative, in that the Forest Service has more authority and responsibility than described in the Alternative. However, some of the points raised include actions the Forest Service could take in the future, but which are not part of current management, such as the implementation of a seasonal closure on the Rubicon Trail. The intent of the No Action alternative is to display the effects of no action, in order to compare with various action alternatives. One of the alternatives considered but not analyzed in detail is that the Forest Service manage the Rubicon Trail and not issue an easement to El Dorado County. This alternative was not analyzed in detail since it left unresolved issues such as authority to conduct maintenance on the Rubicon Trail. There is not a clearly defined process for issuing R.S. 2477 rights, nor is there a requirement that an entity apply for R.S. 2477 rights. Rather, El Dorado County could file suit to quiet title against the United States, or request an easement as the County has done. Alternative 2, as described, is considered to properly reflect the No-Action alternative.

PEER - The easement must be limited to the route as adopted by the Board of Supervisors on January 26, 2010. (Exhibit A)

Response: The easement described in Alternative 1 reflects El Dorado County's understanding of the route adopted by the Board of Supervisors during their meeting on January 26, 2010. However, Alternative 6 has been added to the FEIS in order to better display the environmental consequences of implementing the suggestion made to limit the Rubicon Trail and easement to the route adopted by the Board of Supervisors as understood by the commenter.

PEER - The specialists' reports disclose the "Long Bypass" would allow petroleum products to continue to contaminate the Winter Camp and Little Sluice wetlands: "the use of the Long Bypass would also allow contaminants such as petroleum products to be delivered to the two nearby wetlands" (Hydrology Report, p. 20); and "Alternative 1 includes the Long Bypass next to Little Sluice. This variant is composed of primarily granite bedrock slabs with drainage pathways between slabs. Oil spots left on the rocks by vehicles could drain oil pollutants into the Little Sluice wetland and Winter Camp wetland, causing petroleum effluents to settle on the surface of the water, potentially affecting aquatic species swimming there" (Aquatics BE, P. 14). The Long Bypass fails to meet the RCO objectives and must be closed.

Response: While the Aquatics BE recognizes petroleum effluents potentially affecting aquatic species, the RCO analysis concluded that the RCOs were being met. Petroleum products could be delivered to these water bodies if a runoff event were to occur following deposition of such products. However, given the timing of such events there is potential for deposited products to decompose prior to a runoff event. These effects are described in the Hydrology and Aquatics sections of Chapter 3 of the FEIS and in the RCO Analysis.

Ellis Bridge

El Dorado County - El Dorado County has been planning on building a new bridge over Ellis Creek near where the historic Rubicon Trail currently crosses the creek at grade. On April 30, 2009, the Central Valley Regional Water Quality Control Board issued a Cleanup and Abatement Order (No. RS-2009-0030) requiring El Dorado County and the Eldorado National Forest to cease the discharge of sediment and other wastes due to motorized use of Rubicon Trail, and one of the actions specifically required by the CAO is the construction of a bridge at Ellis Creek. A bridge crossing at Ellis Creek would reduce the amount of particles that enter the creek from vehicles crossing the creek as well as from vehicles on the trail approaches, and reduce the turbidity of the creek from tires disturbing the natural stream bed, and it therefore environmentally beneficial. The plan is to build a 16 feet wide bridge about 60 to 75 feet downstream from the current grade crossing. Apparently a comment was received by the ENF during the DEIS scoping period that a bridge only 12 feet wide would be better. The EIS on page iii has "Table S-1: List of Significant Issues," in which Item number 4 states "Overly large bridge at Ellis Creek will cause adverse impacts to riparian areas and species and is inconsistent with the historic nature of the trail" Alternate 5 includes the easement for the Trail in a modified form, and, as stated on page "The bridge at Ellis Creek would be constructed to a width of 12 feet." On page 16, among the significant issues list is number 4, which states "Overly large bridge proposed at Ellis Creek will cause adverse impacts to riparian areas and species and is inconsistent with the historic nature of the trail." We are not aware of any support for the assumption that a 16 foot wide bridge would cause any more impacts to riparian areas and species than a 12 foot wide bridge would, because the abutments and approaches would be the same, and it makes no sense that a slightly narrower bridge would be more or less consistent with the historic nature of the trail than a slightly wider bridge would be. El Dorado County hereby comments that the proposed bridge must be 16 feet wide under applicable bridge design standards, the lengthy and expensive planning process which been completed over the past several years would be wasted if the plan were to change at this late date, the delay caused by a redesign at this point would likely be fatal to the funding source and thus end any hope of replacing the grade crossing with a bridge, and that reducing the bridge width by 4 feet would not provide any environmental benefits.

Response: The alternatives display bridge widths at Ellis Creek of 12 and 16 feet, based on issues raised by the public during initial scoping. The effects of implementing these different alternatives are presented in Chapter 3.

Forest Plan

Snowlands Network - The LRMP states "Manage the areas principally for their recreation use substantially in their natural condition. Preserve the integrity of the special interest features for which the areas were established."

The DEIS fails to define what is the baseline "natural condition" and implement an easement that favors the natural condition.

Given that the easement is for the Rubicon Trail it follows that one should look at the condition of the trail in its early days. For example, slide 68 in "Mud on the Rubicon 4x4 Trail" is an early 1900s photograph of vehicles traversing the Little Sluice Box section of the Trail. Slides 69, 70 and 71 show that section today and the extreme changes that have taken place.

In order to provide recreation in the area's natural condition as stated in the LRMP the Rubicon Trail must be returned to its earlier state where street legal vehicles can traverse it. The current condition of the Trail precludes the vast majority of forest visitors from enjoying this area while benefiting only a very small minority who own non-street legal vehicles.

Response: The text cited is from the Management Emphasis which describes the emphasis for all Special Areas, not just the Rubicon Trail. More specific management direction is provided under specific management practices. Under Management Practice 27 – Restricted Off-Road Vehicle Management, the standard and guideline is to use restricted access as a means of protection. Designation of specific routes to allow for dispersed recreation adjacent to the Rubicon Trail, closure of other routes and a prohibition of travel off of designated routes meets this standard and guideline. Management Practice 27 also recognizes that the Rubicon Trail should be managed expressly for 4WD vehicles. The standard and guideline does not distinguish between highway licensed 4WD vehicles and non-highway registered vehicles. However, the intent is to provide for a 4WD recreation opportunity, not a travel way for highway licensed passenger vehicles. Alternatives 1, 3 and 4 provide for a bypass at the Little Sluice to allow capable vehicles to operate around Little Sluice and still traverse the Trail. Alternative 6 has been added to display the analysis of restoring the Little Sluice to a drivable condition for typical 4WD vehicles (in contrast with extreme 4WD vehicles).

Hydrology

Howser - In addition to sediment; petroleum and other contaminants are likely being delivered both from runoff and from vehicles crossing. Dispersed camping sites that are encroaching on Ellis Creek have resulted in compacted, denuded surfaces and dispersed restroom use has resulted in fecal matter being available for delivery to Ellis Creek.

Likely? Either it is or it isn't. If there is no evidence, it should be removed.

Resulted? What were the results of the test? Human fecal? Animal? Fish? Either produce the results of a test or remove speculation.

Response: There is evidence of sediment and toxic material being delivered to water bodies. Photographic evidence of oil sheen on the surface of Ellis Creek during vehicle crossings is available. In addition, photographic evidence of increases in turbidity during vehicle crossings and associated with snowmelt are available. Photographic evidence of fecal matter and toilet paper in close proximity to Ellis Creek exists as well as documentation of counts of fecal material in dispersed use areas along the Rubicon Trail performed by rangers.

Barton - Also on page 43, the USFS refers to impacts at Winter Camp. USFS provides no documentation for the assertion that there was, in fact, a perennial water table in this area. It is our understanding, based upon decades of use and firsthand experience, that water has always seasonally flowed in this area. Labeling this area as "perennial" is inappropriate. Furthermore, references to the Winter Camp wetland are confusing and contradictory. For example, there is a marked feature on the USGS maps that refers to a "Mud Lake" that seems to be the "Winter Camp" wetland. This lake is perennial but it is some distance away from Winter Camp. Water flow into the lake is interrupted by several fallen trees, which block sediment that may have been observed by USFS staff. The "creek bed" that the trail follows just upstream and prior to this Mud Lake has seen little change in erosion over several decades. Thus, a better description of just where this wetland is, and why it is a wetland, would be appreciated.

Response: The reference to a perennial water table refers to the groundwater, not surface water flow, and is based on observations of soil exposures made by the Soil Scientist. The Winter Camp wetlands is shown on the Alternative Maps, is described in the Hydrology section of Chapter 3, and is not the same as Mud Lake. A definition of wetlands, as used in this document is provided in the Glossary.

Snowlands Network - Snowlands Network and WWA are very pleased that the Central Valley Regional Water Quality Control Board issued a cleanup and abatement order (CAO) for the Rubicon Trail because it brought to light the issues at hand and started the review process of which this DEIS is a consequence. But while the Board focused

on sedimentation in streams and lakes, an equally large problem is basic erosion that has gone unchecked.

The Water Quality Control Board determined that in at least one location sedimentation is 50 times greater than should be expected and that this is due to the use of 4x4 vehicles. Through photographs Snow lands and WW A will show that erosion "in general" is rampant and that a primary goal of the Forest Service should be to end such erosion in addition to sedimentation. This can only be accomplished by a moratorium on motorized use of the Trail in the wet season. As will be discussed further, this is the only alternative that is consistent with the "Eldorado National Forest Public Wheeled Motorized Travel Management EIS" (hereafter, Travel Management EIS).

At the same time changes must be made to prevent the future discharge of oil and petroleum products into the environment -all the environment, not just into streams.

Response: The need to reduce sediment discharge and discharge of other wastes into the waters of the State from the Rubicon Trail, and the need to address wet season use are elements within the Purpose and Need for this project, as identified in Chapter 1. The alternatives include different approaches to address these needs, including implementation of erosion control measures as part of the SSWQPP, implementation of seasonal operating periods, construction of bridges or other means of crossing streams, installation of toilets to address sanitation, etc. Erosion control measures being installed and maintained by the county are designed to minimize mechanical erosion associated with trail use, convey and direct runoff off of the trail, and to capture sediment generated along the trail. The effects of implementing the various measures in each alternative are described in Chapter 3.

PEER - The project Hydrology Report is clear in its assessment that impacts to RCA hydrological and riparian resources will continue if wet weather use is allowed:

“During wet season use; trail widening, vegetation loss, soil compaction, and soil displacement could occur on some segments of the trail, trail variants, and unauthorized routes and the impacts would vary based on the soil type and depth, vegetation condition, and effective groundcover. These impacts would occur in areas where vehicles avoid obstacles such as snowdrifts to continue, and where exposed soils lack effective groundcover in the form of rocks, vegetation, adequate snow cover, and downed woody debris. Impacts to soil conditions could lead to the formation of ruts, rills, gullies, and compacted surfaces. Ruts, rills, and gullies channel runoff increasing hillslope erosion rates and delivering sediment concentrated flow to nearby hydrologic features while compacted surfaces have decreased infiltration rates and thereby accelerate hillslope runoff and erosion rates. “ (Hydrology Report, P. 15).

The Hydrology Report also discloses, “Vehicle use during periods of wet trail conditions would result in an increase in sediment and contaminant delivery to hydrologic

features associated with the creation of ruts, compaction, and from direct vehicular contact with flowing water bodies or flowing trail surfaces“ (Hydrology Report, P. 13, emphasis added).

The Hydrology Report states, “During project implementation, erosion and sedimentation control techniques (BMP features) described in the Saturated Soil Water Quality Protection Plan (El Dorado County, 2010b) would be installed and maintained to protect water quality and aquatic habitat. In addition, applicable DRAFT Best Management Practices (BMPs) in Appendix C of this document and described in Water Quality Management for Forest System Lands in California, Best Management Practices (USDA, September 2000) would be adhered to during project implementation.” (P. 13)

We agree with the first assumption; vehicles on wet soils cause sedimentation and hydrological damage. But as to the second assumption, El Dorado County has not yet provided a report on the effectiveness of its BMP implementation and the Regional Water Board has changed the report date for the County’s first annual review to October 1, 2012, so there is no evidence the County’s BMPs will be effective. In fact, our own review of the trail following a storm in October 2010 showed that, while some of the maintenance structures were functioning, others were not. Some of the sediment basins had filled up in a single storm event and werespilling.¹

The assumption that the project would adhere to “applicable” Draft Forest Service BMPs is vague and not reassuring. Without specificity, the public cannot know which BMPs are proposed to be applied, and so cannot comment as to their potential effectiveness. Since the DEIS has rejected monitoring, the public can’t know if BMPs are successful at protecting, enhancing and restoring water quality and riparian habitat. The DEIS also rejects any enforcement component, therefore the public can’t assume proposed management elements will be implemented.

Response: The assumptions have been removed from Chapter 3, including specific assumptions in each section. The Hydrology section in Chapter 3 has been edited to describe the environmental effects of the modifications to the seasonal operating periods in the various alternatives. In addition, the Forest Service BMPs that were shown as Draft in the DEIS have now been finalized and discussed further in the Hydrology section of Chapter 3. These USFS BMPs are primarily practices designed to meet state water quality objectives while the County’s erosion control features are physical structures designed to meet state water quality objectives. With similar goals and objectives, the erosion control features being installed and maintained by the County would therefore be consistent with many of the USFS BMPs. Erosion control feature effectiveness was observed in June 2011 by USFS personnel, El Dorado County DOT personnel, and members of the Water Board. It is expected that similar monitoring events involving primarily those three agencies would continue annually following spring snowmelt. The California Regional Water Quality Control Board,

Central Valley Region informed the Eldorado National Forest Supervisor and El Dorado County DOT Deputy Director that the Water Board had found that the SSWQPP submitted by El Dorado County adequately addressed water quality impacts caused by vehicle use during saturated soil conditions and by over-the-snow travel on the Rubicon Trail and the specific bypass routes identified by the County (letter dated January 5, 2012). Further, in the comments submitted by the Water Board, in response to the DEIS, the Water Board clarified that a seasonal closure is not needed at this time to comply with the CAO, but that a seasonal closure may be needed if the actions described in the County's SSWQPP do not protect water quality.

Field observations and the SSWQPP provide evidence that the erosion control features being installed and maintained by the County are effective at capturing sediment and contaminants and at minimizing erosional processes. However, it is important to recognize the need for continued maintenance and reconstruction of such erosion control features to ensure they remain effective. In addition, it is expected that annual monitoring involving the USFS, El Dorado County DOT, and the Water Board will continue.

PEER - Under Alternative 3, past, present, and foreseeable future activities would be similar to Alternative 1. It is expected that during high flows, contaminants such as petroleum products and solvents could be washed from the undercarriage of vehicles crossing the Little Rubicon River and delivered downstream; thereby impacting water quality and aquatic habitat. (Hydrology Report, P. 29)

Response: Alternative 1 includes a bridge across the Little Rubicon River and so vehicles will not be driving through the river. Modified Alternative 3 includes an elevated rock ford across the Little Rubicon River, such that vehicles will not be driving through the river except during periods of higher flow. This is believed to be true based on the logic of the undercarriage of OHVs being submerged below the water surface. However, this would only occur at those times when the undercarriage is submerged or splashed during crossing. In late summer and fall, the water level at the Buck Island Lake Outlet is likely lower than in early season. The elevated rock ford would be designed to convey flows while minimizing vehicular contact with running water.

Information

Walker - Weeds in Gerle Quarry are: Klamath weed, cheat grass, sweet clover, bullthistle, Jerusalem oak, and mullein. Bull thistle and mullein are common on the Forest, and though they are aggressive and invasive nuisances, are eventually limited by the regrowth of native shrubs and trees. Jerusalem oak is already common to roadside gravels on the Forest and known from near Loon Lake. Klamath weed is a invasive weed which can infiltrate wetlands, though it is fairly inoffensive compared to some others. Sweet clover, (*Melilotus* spp.) both yellow and white is the real invader on the District. During the early 90s I noticed an abundance of sweet clover on main roads in the district, and understood they were introduced in road gravels. It colonized the road shoulders of Ice House Road for a few years and still persists there. It can now be found on many if not most, of the secondary roads on the Eldorado. In the fall of 2010, I saw sweet clover on 13N22 near Hay Meadow in Van Vleck area. This occurrence is growing in a small amount of imported gravel which serves to stabilize the road as it edges close to the riparian zone bordering Hay Meadow. The plant community of the Rubicon trail is generally much the same as Van Vleck, with red fir, lodgepole, and riparian/meadow zones. So it could easily establish on the Rubicon Trail in the disturbed areas. Sweet clover is a vicious pest. It not only grows to a height of more than six feet, but will grow in a dense thicket, dominating the habitat, and drying out in the fall, just at the height of fire season. It would be a shame to introduce it to the Rubicon Trail.

Response: This information has been added to the project file and is reflected in the analysis.

Central Valley Water Board - Central Valley Water Board staff has reviewed the DEIS to evaluate compliance with Cleanup and Abatement Order (CAO) R5-2009-0030, which was issued to El Dorado County and the US Forest Service. Alternatives 1, 3, 4, and 5 could result in compliance with the CAO if sediment, sanitation, and spills are adequately addressed and the operating agreement between El Dorado County Department of Transportation and the Eldorado National Forest is followed. It is noted that the winter closure concept may still be necessary if the actions described in the County's Saturated Soils Water Quality Protection Plan do not protect water quality.

Response: Based on information received during the comment period, the seasonal operating periods for each alternative have been modified and the effects of implementing these different seasonal operating periods are displayed in Chapter 3.

Central Valley Water Board - The County's Saturated Soil Water Quality Protection Plan provides results of sediment yield due to Off Highway Vehicle use of the Rubicon Trail, and this document may be a better reference to cite in the Final EIS.

Response: This recommended change has been made.

California State Parks - The Rubicon Trail is recognized as one of the premiere OHV trails in North America. It is an extremely valuable recreational resource for the people of El Dorado County and the State of California. The OHMVR Division, through the Grants and Cooperative Agreements Program, has provided substantial financial assistance in support of the Rubicon Trail. The Rubicon DEIS is being partially funded through a cooperative agreement between the Division and the El Dorado National Forest.

Response: Correct, State OHV trust funds have been used to help fund management of the Rubicon Trail and adjacent lands by both El Dorado County and the Eldorado National Forest.

El Dorado County - Attached hereto is a map produced by El Dorado County entitled "Rubicon Trail Comparison" which superimposes the route of the county's easement application in red, over the U.S.G.S. quadrangle map from 1897, which depicts the Rubicon Trail as it existed in 1897. The overlay shows that the routes are essentially identical. This supports the statement in the DEIS at page 272 that the modern route of the Rubicon Trail overlays in most part the historic wagon road. This also establishes that the easement applied for is essentially the same as the RS 2477 right of way claimed by the county. In regard to the RS 2477 right-of-way, the DEIS at page 10 accurately notes that the location of the trail changed a little each season, which supports the claim of right of way over variant routes. The DEIS at page 272 also recognizes the many different types of travel that have been used over the years, and correctly notes that "all of these modes of transportation have either necessitated or desired slightly different routes." The use of each of these different routes established a legal right of way over that route under RS 2477. The easement, if granted, will allow the county to channel use into one main route with a few carefully selected and maintained variant routes, which will lessen the impact of vehicular use in the Eldorado National Forest.

Response: This map has been added to the project record.

Mitigation

EPA - While we have no objections to the project, EPA recommends that the Forest Service elaborate on the Best Management Practices (BMPs) that will be used on a site-specific basis along the 6.7 miles of the Rubicon Trail. ... We recommend that the Final EIS identify the specific features that will be employed at Winter Camp Wetland, as well as the other areas listed on page 42, and discuss their effectiveness for reducing erosion and sediment delivery to streams.

Response: The project record contains the location of specific erosion control features called for in El Dorado County's SSWQPP and the SSWQPP Implementation Plan. The County erosion control features (referred to in the SSWQPP as BMPs) are designed to meet State water quality objectives and have been accepted by the Water Board, and would therefore meet the goals and objectives of applicable USFS BMPs. These erosion control features are designed to minimize erosion, capture sediment, and effectively convey flows across the trail; thereby minimizing offsite erosion and sedimentation associated with the trail and associated routes.

PEER - In addition, the DEIS fails to address the need for the Forest to require use of weed-free rock, gravel or other materials in all construction and maintenance activities undertaken pursuant to the proposed easement. The available sources of clean materials should be listed and use required. Eldorado National Forest cannot allow the use of weed-infested rock and gravel to be transported across and to National Forest lands for use as fill material or otherwise. A supplemental Draft EIS must include alternatives to avoid and minimize such risks to protect forest resources.

Response: Mitigation measures have been added to all action alternatives specific to invasive plant species and rock, gravel or other imported fill material.

Monitoring

PEER - The proposed easement must include a monitoring and enforcement plan as well. The DEIS dismisses this as an alternative outside the scope of the project; that is a ludicrous statement. Monitoring is not an alternative, it is the way the Eldorado National Forest and the public can determine whether the purpose and needs are being met and whether additional protections are needed to protect forest resources. For example, if maintenance structures fail, water quality will suffer. If illegal use continues, soil damage and hydrological impacts will continue and impacts to wildlife and plants may be greater than anticipated in the DEIS. Monitoring is also necessary to ensure the amount of human waste entering the waters is actually reduced (and ultimately eliminated) as required by the California Regional Water Quality Control Board's Cease and Desist Order (discussed further below). The Eldorado NF cannot grant an easement and then abandon its responsibilities to protect public resources.

Response: Monitoring of water quality protection measures, as described in El Dorado County's SSWQPP, has been included in all action alternatives. The California Regional Water Quality Control Board, Central Valley Region has approved the County's SSWQPP which includes monitoring of erosion control feature effectiveness. Other monitoring for invasive plants and cultural resources has also been added to the action alternatives. In addition, all action alternatives include an operating agreement with El Dorado County that includes a monitoring and enforcement plan.

New Routes

CORVA - Alternative 4 includes the addition of 3 very small spur trails that have been described in the DEIS as having potential for sediment delivery into the watersheds of Spider Lake, Ellis Creek and the Little Rubicon River. Terminology is used to describe the potential for “new disturbances” and “increased use”. Since the use of these routes, NSRELD-63-U, NSRELD-63-V and 14N34B, very small spur trails, are already in use, there could be no occurrences of either of the aforementioned conditions. If sedimentation issues are not evident at the present time while access to these areas is open, the likelihood of continued use would not change the status quo. Page 107 definitively states that the addition of these routes “would cause an increase in adverse impacts”. Accurately reporting these conditions would also enable Alternative 4 to be in compliance with Riparian Conservation Objectives, increasing the attractiveness of this alternative.

Response: The text has been revised to more accurately reflect that there have been impacts from these routes and that with designation of these routes, impacts may continue at a level comparable to current impacts. However, the inclusion of the three routes within RCAs would not likely meet the RCO #4 because these routes contribute sediment and petroleum products to water bodies. Designating routes within the RCA may continue to encourage users to recreate adjacent to the Little Rubicon River, which could lead to introduction of fecal waste that would impact aquatic species. While additional sediment and contaminant delivery associated with use of these routes may be minor, it would still be additive in terms of cumulative watershed effects if only for a short duration and at a localized scale.

CA4WDC - The exclusion of NSRELD-63_FBB, NSRELD-63-FBD, NSRELD-63-FBE (also referred to as 16, 17, and 18) is problematic. These routes create a loop that serves well established campsites and traverse an area well above lake level. They are solid and, to our knowledge, have shown no sign of deterioration or erosion in more than 30 years. History would foretell that user desire to have this access will remain high and the risk of environmental impacts is extremely low. Please reconsider their exclusion.

Response: During one of the field visits conducted by the ID Team in Fall 2011, the team determined that these routes are in close proximity to the high water mark of Buck Island Reservoir, and were not considered to be “well above lake level”. These routes were determined to be within the RCA for Buck Island Reservoir. The trail surfaces appear stable; however there is a likelihood that petroleum products would continue to be transported to Buck Island Reservoir if use continued on these routes so they were not recommended for designation. In addition, camping along the shoreline of Buck Island Reservoir increases the likelihood of the introduction of fecal waste, along with petroleum products that would impact the aquatic species that live in the reservoir and at the shoreline. These locations are therefore considered to be

inconsistent with SNFPA standard and guideline #116. While negative impacts associated with use of these routes may be believed by some to be minor, these impacts would still be additive in terms of cumulative watershed effects if only for a short duration and at a localized scale and is therefore not consistent with RCO #4. Other routes have been proposed for designation to provide access for dispersed camping while still maintaining a suitable buffer from aquatic habitat to reduce impacts.

CA4WDC - Camping and day use of the area below the Buck Island dam has been historically very high. It is highly desirable to have as much dispersed camping in the area as possible. Please include the route that is just east of the proposed Buck Island Bridge that runs north west to some long established campsites.

Response: This route, identified as NSRELD-63-U in the DEIS, is included in Alternative 4 and the environmental effects are described in Chapter 3. A portion of this route is located within the riparian conservation area (RCA) along the Little Rubicon River. This route was not included in the selected alternative based on the impacts from the use and location of this route, including potential delivery of petroleum products.

California State Parks - The OHMVR Division supports the addition of identified routes to the Eldorado NF Travel Management System to sustain reasonable and managed motorized access to camping facilities. These additional routes should be classified as open to off-highway licensed vehicles and highway licensed vehicles. Also the additional routes should have a “yearlong” season of use to accommodate the season of use on the Rubicon Trail.

Response: The routes to be added to the National Forest Transportation System (NFTS) are proposed to have a seasonal restriction consistent with the other native surface roads and trails within the Eldorado National Forest. This seasonal closure is to assure that use on these trails is consistent with the standard and guideline in the ENF LRMP that calls for implementing seasonal restrictions on use of native surface roads and trails during the wet season, and to minimize damage to forest resources consistent with 36 CFR 212.55(b). In addition, the seasonal closure meets the requirement in the CAO that calls for implementing measures to protect water quality during periods of saturated soil conditions.

Barton - It is unclear why routes NSRELD-63-FBB, NSRELD-63-FBD, NSRELD-63-FBE are not being added to the NFS. (See Map 3 of Alternative 3.) (These routes had previously been labeled 16, 17; and 18 in the Notice of Intent.) These spurs are all on high ground well above the lake level, form a loop that encompasses several viable existing campsites, and are naturally armored with 3" to 10" cobble that is common to the area. They have been in existence for at least 25 years that we personally know of and have not deteriorated in that time. Since the potential for use is high and the

potential for environmental impacts is low, we see no reason they should not be added to the NFS.

Response: During one of the field visits conducted by the ID Team in Fall 2011, the team determined that these routes are in close proximity to the high water mark of Buck Island Reservoir, and were not considered to be “well above lake level”. These routes were determined to be within the RCA for Buck Island Reservoir. The trail surfaces appear stable; however there is a likelihood that petroleum products would continue to be transported to Buck Island Reservoir if use continued on these routes so they were not recommended for designation. In addition, camping along the shoreline of Buck Island Reservoir increases the likelihood of the introduction of fecal waste, along with petroleum products that would impact the aquatic species that live in the reservoir and at the shoreline. These locations are therefore considered to be inconsistent with SNFPA standard and guideline #116. While negative impacts associated with use of these routes may be believed by some to be minor, these impacts would still be additive in terms of cumulative watershed effects if only for a short duration and at a localized scale and is therefore not consistent with RCO #4. Other routes have been proposed for designation to provide access for dispersed camping while still maintaining a suitable buffer from aquatic habitat to reduce impacts.

Barton - The new route we identified as "Spur IX" in our October 3, 2011, NOI comment letter has not been added to the NFS. It appears that it may have been added to Map 3 of Alternative 4, but its location is slightly different from what we suggested. This spur should be added to the NFS. It is approximately 360 feet long and runs in a northwesterly direction just east of the proposed bridge at Buck Island. It is all on granite, has an area in which to turn around, and has established dispersed campsites in the area. For ease in reference, we have attached the map that we included as an exhibit to our October 3, 2011, NOI comment letter. The map, attached to this letter as Exhibit A, shows the new routes we discuss in our third and fourth points above.

Response: The location of this route is correct on the maps. This route, identified as NSRELD-63-U in the DEIS, is included in Alternative 4 and the environmental effects are described in Chapter 3. A portion of this route is located within the riparian conservation area (RCA) along the Little Rubicon River. Additionally, dispersed camping along Little Rubicon River increases the likelihood of the introduction of fecal waste and petroleum products that would impact the aquatic species that live there.

PEER - There is no “need” to add routes to the Forest Service route system. The Eldorado has not even begun an analysis of a minimum road system; no roads should be added until that process has been completed. Nor does the DEIS make a case for the need for additional routes. The specialists’ reports all indicate these additional

routes would be harmful to wildlife, soils, water quality and plants. Site-specific Riparian Conservation Objectives analyses must also be completed for the proposed easement and each route proposed for addition to the Eldorado's road system.

Response: The explanation for the need for limited additions to the NFTS is provided in the Purpose and Need section of Chapter 1 and in the description of Alternative 1 in Chapter 2. These routes are proposed to be added to the NFTS as 4WD trails, consistent with the nature of the access, the type of use these routes receive and the management objective for these routes. Additional clarification has been added to the text of the FEIS to explain the purpose of each route. A travel analysis has been completed for this project and is included in the project record. This travel analysis considered the transportation system in the project area and travel needs. This travel analysis considered the transportation system in the project area and travel needs. This travel analysis will be used to inform the Forest Supervisor regarding whether to add these trails to the NFTS and the class of vehicles for which the trails would be designated for. The RCO Analysis for this project did consider each of the routes to be added to the NFTS for each alternative. Not all routes were determined to be within RCAs or to have potential adverse impacts to RCAs. This determination is based on field observations, measurements, and GIS analysis.

PEER - We oppose the designation of new routes; analysis for the additional routes is lacking and designation of additional routes is premature prior to the Forest completing Travel Analysis. A supplemental draft EIS must explain how the promised seasonal closures of these additions to the FS road system would be enforced, if the Rubicon Trail itself has no wet season closure, or different closure dates. Since monitoring and enforcement are not considered within the scope of the project, the Forest must address in a supplemental draft EIS the inevitable violation of seasonal closures of these new routes, if they are designated.

Response: A travel analysis has been completed for this project, and is included in the project record. This travel analysis considered the transportation system in the project area and travel needs. This travel analysis will be used to inform the Forest Supervisor regarding whether to add these trails to the NFTS and the class of vehicles for which the trails would be designated for. The routes to be added to the NFTS will follow the seasonal restrictions established in the 2008 Travel Management Record of Decision, as described in the Alternative 1 description in Chapter 2. This seasonal restriction calls for closing the native surface trails from January 1 through March 31 of each year, and allows for the seasonal closure to be extended, based on site conditions. Differing seasonal operating periods and seasonal closure dates for the Rubicon Trail are included in different alternatives. Many of the routes proposed to be added to the NFTS would not likely receive use during periods when snow covers the Rubicon Trail, since they provide access for dispersed camping and other day use access. Education and enforcement efforts will be the primary means of maintaining

the effectiveness and level of compliance with the seasonal closure. Education and enforcement elements have been added to each of the action alternatives, as described in Chapter 2.

Noxious Weeds

Walker - I am making these comments after reading the Biological Evaluation (Plants) for the Rubicon Trail DEIS. In this document, Susan Durham gives the project a moderate risk for noxious weeds. On page 35, she states that the following Noxious Weed Management Standards and Guidelines (USDA FS, 2004b) would not be met because: The document lacks any criteria to prevent introducing weeds; no control measures are listed for existing weeds; and there are no stipulations about cleaning equipment; and no mitigation measures for existing noxious weeds. I don't see any either. Is there a reason no attention is given to noxious weeds?

Also mentioned as being present in the quarry is cheatgrass. Cheatgrass is an exotic annual grass that has infiltrated rangelands and waste places everywhere. It can produce more than 10,000 plants per square yard and is highly flammable. Despite many studies, there is simply no good way to get rid of it. In the absence of a viable method of eradication, let us not introduce it to the Rubicon Trail.

The BE states that the current list of ENF WEEDS is currently under revision. If that is the case, then draw from the more current one when available. Regarding this list, it is my opinion that sweet clover and cheat grass ought to be elevated in status to the A list.

Response: Design Criteria to prevent the introduction of invasive plant species have been added to the FEIS.

PEER - Noxious Weeds-The proposed project violates Executive Order 13112, the Forest Service Manual and Sierra Nevada Forest Plan Amendment Standards and Guidelines (and thus the National Forest Management Act) because it is likely to introduce and cause the spread of weeds to the project area.

According to the DEIS and Sensitive Plant BE, "the greatest risk for the introduction of invasive plant species is imported material such as rock and gravel for trail maintenance" (DEIS, P. 233)(Sensitive Plant BE, P. 24) The DEIS and Sensitive Plant BE disclose the source of El Dorado County's fill material for maintenance on the RT is weed-infested. "Four invasive plant species of concern to the ENF (Priority 1 to 3) were identified at the Gerle Creek Adit quarry where El Dorado County Department of Transportation acquires material for roadwork on the Rubicon Trail. The species are *Bromus tectorum* (cheatgrass), *Hypericum perforatum* (Klamathweed), *Melilotus officinalis* (yellow sweetclover), and *Cirsium vulgare* (bull thistle). Other invasive plant species included *Chenopodium botrys* (Jerusalem-oak goosefoot) and *Verbascum thapsus* (woollymullein). " (DEIS, p. 231 and Sensitive Plant BE, P. 1)

Alternatives 1, 2, 3 and 4 violate direction in the Forest Service Handbook. The Forest Service Handbook (FSM 2081.03 (USDA FS 1995) directs that "when any ground disturbing action or activity is proposed, determine the risk of introducing or

spreading noxious weeds associated with the proposed action. 1. For project shaving moderate to high risk of introducing or spreading noxious weeds, the project decision document must identify noxious weed control measures that must be undertaken during project implementation.”

Alternatives 1, 2, 3 and 4 violate Sierra Nevada Forest Plan Amendment Standards and Guidelines. The Sierra Nevada Forest Plan Amendment includes Standards and Guidelines regarding noxious weeds management.

Response: Design Criteria to prevent the introduction and spread of invasive plant species have been added to the FEIS. Standards and Guidelines listed above are met for the action alternatives.

Design Criteria to prevent the introduction of invasive plant species include equipment cleaning; use of weed-free rock, gravel, or other fill when available; use of certified weed-free mulch or straw; post-construction monitoring for invasive plant species at

Oil and Petroleum

Snowlands Network - The entrance of oil and other petroleum products into the environment is a problem resulting from the extreme ruggedness of the Rubicon Trail. Petroleum products enter the environment through exhaust⁶ and as a result of two additional causes.

4x4 vehicles regularly damage their oil pans and transmissions thereby releasing petroleum products into the environment. The first photo below shows the terrain that causes these accidents and the second and third photos are examples of oil residue left behind.

The oil and other petroleum products eventually find their way into streams and lakes.

Oil and other petroleum products are also discharged into the environment when 4x4 vehicles overturn. This is a common occurrence and in many cases viewed as "fun" within the 4x4 community. The following three photos are examples of overturns that result in petroleum product discharge into the environment. Notice the crowd of on-lookers enjoying the thrill of the overturn in the first photo.

To put an end to oil and other petroleum products entering the environment as a result of extreme 4x4 vehicle use (1) the Rubicon Trail must be restored to its original condition where street legal 4x4 vehicles are capable of traversing the trail, and (2) only street legal vehicles should be allowed on the Rubicon Trail. The restriction to street legal vehicles is the only alternative that is consistent with El Dorado County's designation of the Rubicon Trail as a county road. Only street legal vehicles are permitted on county roads.

Response: Alternative 6 was developed, which calls for restoring the trail segment of the Little Sluice to allow typical 4WDs (in contrast with extreme 4WDs) to negotiate this segment of the trail. The points raised in this comment have been considered by the ID Team and effects analyses incorporated these ideas.

Over the Snow Travel

CORVA - Page 134 of the document refers to snowmobile use in and around the trail during the winter season, and is again mentioned together with wheeled-over-the-snow travel in regards to the potential impact on the American Marten population on page 197. The only study that has been cited regarding either type of over-the-snow travel is the observation stated in Forest Service testimony that weather conditions self-limit travel on the Rubicon Trail. To insure continued use by both snowmobile and wheeled-over-the-snow vehicles, it is suggested that clear studies be cited that prove the affect on habitat, if not, then mention of any supposed impact be removed.

Response: The analysis in the FEIS for the American Marten states:

Trails for Competitors. Roads that are driven during the winter months may allow coyotes to enter into marten winter habitat, affecting marten through competition or direct mortality from predation. This has been identified as a significant threat within lynx habitat. Since both lynx and marten have unique morphologies that allow them to occupy deep snow habitats where they have a competitive advantage over carnivores such as coyotes and bobcats, human modifications of this habitat, such as winter road use, over-the-snow travel, and snowmobile trails, can eliminate this advantage, providing increased access for predators and competitors. This has been identified as a potentially significant risk factor in the Sierra Nevada, worthy of further investigation (draft Conservation Assessment, Rubicon Trail Terrestrial Wildlife Biological Evaluation, Appendix A).

The draft Conservation Assessment referenced in the FEIS is located in the Rubicon Trail Terrestrial Wildlife Biological Evaluation, Appendix A.

Barton - We are concerned about the lack of analysis of over-the-snow travel in this DEIS. We are aware of a suit recently filed by the Snowlands Network (Snowlands Network v. United States Forest Service) against the USFS for the alleged lack of NEPA analysis for the USFS Over-Snow-Vehicle program. While the project being examined in this DEIS is an easement application for the County of El Dorado, we wanted to express our concern about the lack of discussion.

Response: We recognize the point you have raised. This project is not included in any current litigation. Over-the-snow travel and the associated effects are analyzed in this EIS.

Purpose and Need

Hower - Page 12: There is a need to reduce sediment delivery to Ellis Creek.

Where is the evidence? Produce a study that says sediment is increased downstream and is causing harm.

Response: The project file for the Rubicon Trail Easement contains photographic evidence of sediment delivery to Ellis Creek during runoff and increases in turbidity associated with runoff delivery and vehicle crossings.

Snowlands Network - The Forest Service in the subject DEIS does not clearly analyze issues and the need for the easement.

As aforementioned, there is no clear authority for the El Dorado County having any management authority over the Rubicon Trail. Therefore, why is this easement being pursued?

"The Forest Service receives grant funding from the California State Parks Off-Highway Motor Vehicle Recreation Division grant program to help manage, operate, maintain, and develop OHV use on NFS lands." Why then does the Forest Service not take responsibility and use the State funds to manage and maintain the Rubicon Trail and their land?

The relevance of El Dorado County funding is not clearly stated or analyzed. [s funding from El Dorado County an issue? If so, then why is it an issue? Has the County legally committed to provide funding if the easement is granted?

What is the Rubicon Trail? Is it a county road? Is it a Forest Service road? What is meant by "public road?"

Response: The Purpose and Need in Chapter 1 has been modified to identify the lack of clarity as to the management responsibilities for the Rubicon Trail between the Forest Service and El Dorado County. El Dorado County has requested an easement, in part because there is no clearly defined process for issuing R.S. 2477 rights, nor is there a requirement that an entity apply for R.S. 2477 rights. El Dorado County could file suit to quiet title against the United States, or request an easement as the County has done. The Forest Service is responding to this request.

The Eldorado National Forest receives funds from the State OHV trust fund for management of activities adjacent to the Rubicon Trail, but not for maintenance and operation of the Rubicon Trail itself.

In the event that the Forest Service issues El Dorado County an easement for the Rubicon Trail, El Dorado County is responsible for meeting the terms of the easement,

which includes maintenance of the route. The easement does not require El Dorado County to provide funding.

As described in Chapter 1, the Rubicon Trail is an historic route that is now used by OHV enthusiasts and is open to other users. El Dorado County has submitted a description and survey of the Rubicon Trail in the easement request. A more complete description of the history and management of the Rubicon Trail is provided in Chapter 1. The definition of a public road is included in the Glossary.

Recreation

PEER - CSNC's scoping letter of September 25, 2011, asked that the EIS include a discussion and analysis of the Rubicon Trail's carrying capacity. The DEIS Appendix A, Scoping Comment Summary, states that the "the recreation analysis will address the use of the Rubicon Trail including numbers of users and types of users" (DEIS, P. 342). However, the recreation analysis does not include numbers of users, merely a reference to a summary of visitor counts in the project record. That summary should be part of the information in the EIS. Moreover, the DEIS has no discussion or analysis of the number of visitors and vehicles that can be accommodated on the trail and its environs without damage to resources. This should include a discussion of the Land Management Plan's requirements in Semi-primitive Motorized High Country Areas, which include "Provide for low concentrations of use. Provide developed recreation opportunities that blend with the environment."

Response: The Recreation section in Chapter 3 has been modified to include information regarding recent use of the trail. The Recreation section in Chapter 3 analyzed the effects of implementing the different alternatives based on the Recreation Opportunity Spectrum (ROS) consistent with the LRMP direction to manage Semi-primitive Motorized High Country for low concentrations of use. More specifically, the analysis in Chapter 3 considered social encounters as well as remoteness, visitor management and visitor impacts.

RCO

PEER - Riparian Conservation Objectives (RCO) Analysis –The RCO analysis does not support DEIS conclusions regarding the effects of the alternatives on hydrological, riparian and aquatic resources. Only Alternative 5 unqualifiedly meets the objectives.

Alternative 1 fails to satisfy the objectives for SNFPA Riparian Conservation Areas. Alternative 1– The RCO analysis admits Alternative 1 is not consistent with the RCO #1, to protect beneficial uses of water: Nor is Alternative 1 consistent with RCO #2: Nor does Alternative 1 meet RCO #5:

Alternative 3 does not satisfy the RCOs either. Nor does Alt. 3 meet RCO # 2:
“Alternative 3 fails RCO#4:

The EIS should explain that the term BMP, as used in the Forest Service Water Quality Management Plan, differs from the County’s use of the term, which refers to structures, not practices.

PEER - Summary of RCO findings: Alternatives 1, 2, 3 and 4 violate NFMA because they fail to comply with the SNFPA RCO Standards and Guidelines. Based on the statements and findings in the Hydrological Report, Table S-3, Page iv in the DEIS, “Summary of Environmental Effects,” is incorrect in concluding that Alternatives 1 and 3 are “likely to meet all” of the RCOs. Quite the opposite, the Hydrological Report is quite clear that those alternatives fall short of meeting the objectives. A supplemental draft EIS must correct that error. Also, an RCO analysis must determine whether an alternative meets an objective or not; “likely” or “unlikely” is not sufficiently definitive. A supplemental draft EIS must also analyze the degree of claimed “improvements” promised by some of the alternatives. Merely “improving” hydrological and habitat conditions that are presently far out of compliance with the RCOs may still not result in meeting the objectives.

Response: The term BMP with regards to the County’s erosion control features has been removed from the document. These features are now referred to as erosion control features. The term BMP with regards to the USFS refers to practices that are designed to meet State water quality objectives. The County’s erosion control features are physical structures that are also designed to meet State water quality objectives as well as the objectives of the USFS BMPs. The USFS BMPs are provided in the document to show what objectives are being met by installation and maintenance of the County’s erosion control features and as additional guidance for the County if needed.

The descriptions of the alternatives have been modified to clarify which alternatives include a seasonal operating period. Year round use was analyzed primarily for Alternatives 1, 2, and 4 that do not include a seasonal operating period. Modified

Alternative 3 includes a saturated soil management strategy that is designed to minimize the impacts of use on the trail when it is conveying runoff.

The determination was made by the RCO team that some impacts were of short-duration and negligible in scale. Such impacts would not result in an overall determination of that the activity is not consistent with RCOs. The RCO analysis is based on the best information available and includes on-the-ground review by professional hydrologists and soil scientists. Nevertheless, the analysis must necessarily work with limited quantitative data and rely on professional judgment to some extent. The RCOs are objectives, and the SNFPA does not prohibit activities within RCAs; it requires analysis of consistency and the identification of appropriate mitigation measures to minimize the risk of activity-related sediment entering aquatic systems and impacts to habitat for aquatic or riparian-dependent species, but that such activities must be analyzed and that justification for a determination must be given.

The RCO team determined that Alternatives 3, 5, and 6 would be consistent with all RCOs. Any RCO inconsistencies under these alternatives would be short-lived and have negligible impacts to resource conditions. Technically many activities on public lands may have short term impacts but these may be acceptable over a longer time frame. Many of these activities can and will violate RCOs on a short-term basis, but overall may have very little impact. The RCO team made these determinations based on duration of impacts under each alternative and it was determined that impacts under Alternatives 3, 5, and 6 would be acceptable based on the life of the potential impact.

The ford could result in RCO inconsistencies from petroleum products entering the Little Rubicon River, but only during high water conditions. The impact would be of short-duration and localized, therefore being minor in scale. The ford would be designed allow for flow conveyance while minimizing vehicular contact with running water. High flow conditions are primarily in response to spring snowmelt and are expected to be of short duration and during periods of the relatively low trail use.

The determination was made by the RCO team that some impacts were of short-duration and negligible in scale. Such impacts would not result in an overall determination of “not meeting”. Continued impacts and large scale impacts result in “not likely to meet”. The terms “not likely” and “likely” are used because the RCO analysis procedure is subjective in many ways that include the season of use, the type of vehicle present, professional judgment, and limited quantitative data. The SNFPA does not state that no activities can occur within RCAs, but that such activities must be analyzed and that justification for a determination must be given.

Sanitation

California State Parks - The OHMVR Division supports the construction of additional restroom facilities along the Rubicon Trail to ensure sanitary trail conditions and quality of recreational experience. The continued use of personal sanitation methods should be promoted until such time that additional restroom facilities are constructed.

Response: As stated in Chapter 1, El Dorado County and the Forest Service will continue to educate users about the need for use of WAG Bags and appropriate personal sanitation methods.

Hendricks - In the early days of the ROC, it was decided that individual use of WAG bags or similar human waste disposal systems was preferable over placement of toilets along the road. Reasons for this were that toilet placement would by default create a campground area around it and individuals carrying out their own waste would eliminate the cost of installing toilets, pumping out toilets, and related maintenance. To this end the County spent thousands of dollars of grant money purchasing and giving away free WAG bags to Trail users. Two things they did not do-monitor to evaluate usage or require that WAG bags be carried and used. Because there was no real incentive or requirement to use these products, they were treated as a novelty, and human waste issues continue on the Trail. In October of 2010, I overheard a conversation in a restaurant in Bridgeport (see Attachment 19) that reported once individuals got over the initial reluctance to handle their waste in a new way, they actually preferred this over toilets. The County was on the verge of victory in this approach, but dropped the ball in failing to make WAG bags a requirement -along with enforcement -and turned a possible big victory into a defeat.

I am resigned that the County is incapable of doing any better on this issue. They seem happy and eager to pay for installation of toilets and incur the continuing costs of maintenance and pumping. And, the Forest must be prepared to tackle and deal with the impacts that will occur around toilet placements along the Trail since they, in their analysis of Alternative 5, improperly negated the simple and beneficial aspects of individual responsibly for handling human waste with WAG bags. The Forest must also know that if the County fails in its upkeep and maintenance of toilets along the road, it will fall to the Forest to take over. Words and promises are always great at the beginning of a plan; things always change as time goes on and it is usually me, the taxpayer that ends up paying the bill. Since it appears that motorized users cannot use WAG bags, unlike climbers/hikers on Shasta and in other non-motorized areas, placement of toilets is the only solution.

Response: The description of the alternatives in Chapter 2 has been modified to clarify that the toilets will be maintained. In addition, mitigation measures have been added to the action alternatives that includes education of users about the need for use of WAG Bags and appropriate personal sanitation methods.

Platt - As stated previously, it is unfortunate that Rubicon users, unlike many back country enthusiasts, will not support personal responsibility for their own human waste by using a WAG Bag system. The only option left is the strategic placement of toilets along the trail. I accept this fact and recommend the placement of four vault toilets, one in the vicinity of Walker Hill Upper, one the south side of Little Sluice, and three at Buck Island.

Response: Alternatives 3, 4 and 6 include installation of toilets at the identified locations. The description of the action alternatives have been modified to include education of users about the need for use of WAG Bags and appropriate personal sanitation methods.

PEER - We agree that something must be done to address the issue of human waste, but adding vault toilets alone is unlikely to adequately address this issue as such facilities are likely to encourage use in the areas they are located. There is no analysis of the effects of the placement of toilet facilities on the environment. Each alternative that includes toilets must address such placement, and who will be responsible for cleaning and maintenance. Toilets should only be installed with the acknowledgement that these facilities will encourage concentrated use in the areas where these are located; and a supplemental draft EIS must analyze toilet placement, including direct and indirect impacts on sensitive resources.

Response: The description of the alternatives in Chapter 2 has been modified to clarify that the toilets will be maintained. In addition, mitigation measures have been added to the action alternatives that includes education of users about the need for use of WAG Bags and appropriate personal sanitation methods. The effects of installation and maintenance of toilets is presented in Chapter 3.

Soils

Hower - Page 43: On the terrace, nearly all vegetation except for residual trees is absent due to traffic and the soils are highly compacted.

Please change this sentence to more accurately reflect the area is dominated by Sandy soil. (your own admission: Page 43: Up to 1 meter of recent sandy deposits were noted adjacent to the Winter Camp wetland.

This area has no characteristics of a Wetland as defined by the EPA. By your own admission on Page 38 and 43, that Sandy soils are poor growing soil due to lack of nutrients and that this area is dominated by Sand! You can't have it both ways....it's a wetland cause we said so, and people have compacted the area, but also say it's sandy and has poor growing conditions.

Response: The text has been modified to reduce the confusion.

Hower - Page 44: *Big Sluice wetland*

Once again, this is another area that does not meet the EPA definition of a wetland. Just because an area has water, does not make it a wetland.

Most of the winter, I have a puddle in the dirt section of my driveway.....it's hardly a wetland.

Response: A definition of the term "wetlands", as it is used in this document has been added to the Glossary.

CA4WDC - On page 43 there is a reference to a portion of the trail as "Devil's Peak". This area has been referred to in public meetings, other documents, and by the public as Walker Hill. Renaming this for the purpose of this document will only create confusion.

Response: The text has been modified to reduce the confusion.

Seasonal Closure

California State Parks - The OHMVR Division is concerned that a rigid seasonal closure would unnecessarily detract from the recreational resource of the Rubicon Trail while adding very little to the management or resource protection of the trail.

Response: A purpose of examining a range of alternatives is so that the decision-maker and the public can see the impacts associated with the proposed action and alternatives in comparative form. A seasonal closure of the Rubicon Trail and the routes added to the NFTS was included in several alternatives because it meets the purpose and need and will provide a higher degree of protection to water quality and resources impacts associated with wet season use of the trail. The different alternatives considered in the EIS propose different seasonal operating periods and seasonal operating period dates and the effects of implementing these different seasonal operating periods are displayed in Chapter 3. The CAO issued by the California Regional Water Quality Control Board, Central Valley Region called for a saturated soil water quality protection plan (SSWQPP) to meet this objective and noted that the plan should consider a seasonal closure as well as other means to protect water quality. The California Regional Water Quality Control Board, Central Valley Region informed the Eldorado National Forest Supervisor and El Dorado County DOT Deputy Director that the Water Board had found that the SSWQPP submitted by El Dorado County adequately addressed water quality impacts caused by vehicle use during saturated soil conditions and by over-the-snow travel on the Rubicon Trail and the specific bypass routes identified by the County (letter dated January 5, 2012). The SSWQPP did not address the additional routes the Forest Service has proposed to add to the NFTS. Further, in the comments submitted by the Water Board, in response to the DEIS, the Water Board clarified that a seasonal closure is not needed at this time to comply with the CAO, but that a seasonal closure may be needed if the actions described in the County's SSWQPP do not protect water quality.

El Dorado County - On page 35, the seventh bulleted assumption is that El Dorado County DOT would implement and enforce a seasonal closure. El Dorado County has stated many times that it does not believe that State law would allow it to seasonally close a non-county-maintained road, and no one has provided any analysis that would contradict this legal position. Furthermore, a seasonal closure is not necessary because the El Dorado County engineers have designed the erosion control features so that wet season usage will not create unacceptable sedimentation. Also that assumption and the following one appear to say that the Rubicon Trail is in the San Joaquin River basin, which it is not.

Response: The assumption that El Dorado County will implement and enforce a seasonal closure of the Rubicon Trail has been deleted and the description of seasonal restrictions has been modified in the various Alternatives described in Chapter 2.

Alternative 1 reflects El Dorado County's position that the County does not have the authority to close the Rubicon Trail, and so this alternative includes implementing the erosion control measures and other elements called for in the SSWQPP, but does not call for a seasonal closure. The California Regional Water Quality Control Board, Central Valley Region informed the Eldorado National Forest Supervisor and El Dorado County DOT Deputy Director that the Water Board had found that the Saturated Soil Plan submitted by El Dorado County adequately addressed water quality impacts caused by vehicle use during saturated soil conditions and by over-the-snow travel (letter dated January 5, 2012). However, in the comments submitted by the Water Board, in response to the DEIS, the Water Board clarified that a seasonal closure is not needed at this time to comply with the CAO, but that a seasonal closure may be needed if the actions described in the County's SSWQPP do not protect water quality. Accordingly, Alternative 3 includes a seasonal closure that will be implemented if monitoring demonstrates that the County's SSWQPP is not effective at protecting water quality.

Hendricks - The effects from wheeled vehicle use during the winter wet season has been well documented in the Eldorado National Forest Travel Management Final Environmental Impact Statement, Appendix D (please see Attachment 22). This analysis properly led to the seasonal closure of all native surface roads on the Eldorado Forest. I have documented the ongoing use of the Rubicon Trail without a needed seasonal closure and the effects of wet season use on the Rubicon Trail in several personal reports including one from Jan. 2009 (please Attachment 23).

Throughout the analysis in the DEIS are many statements about the negative effects of wet season use and also the benefits of a seasonal closure, such as: "Vehicle use during periods of wet trail conditions would result in an increase in sediment and contaminant delivery to hydrologic features associated with the creation of ruts, compaction, and from direct vehicular contact with flowing water bodies or flowing."

The County has been doing much good work with the installation of drainage structures and what they refer to as "bmps". Some will argue that these structures are fixing the problem and wet season use should be allowed. Please take a look at my report from Jan. 2011 (Attachment 24). All these photos are sections of the Rubicon Trail where all of El Dorado County's structures are in place. Water still runs down the Trail and flowing or ponding water still melts out the snow to the surface. There is little change.

The Forest's analysis has concluded that seasonal closure is necessary to protect the structures that the County has and plans to install on the Rubicon Trail. The Forest's analysis of wet season closures in Eldorado National Forest Travel Management Final Environmental Impact Statement, page D-1 (please see Attachment 22) states: " The primary objectives of the wet season closure are to protect the drainage structures from damage, to protect the road or trail tread from rutting and other damage, and to

minimize impacts to water quality at stream crossings or where drainage off of roads or trails becomes concentrated, carrying sediment and other deleterious materials into stream courses."

Without requiring a seasonal closure in the proposed easement, the USFS will be allowing these kinds of impacts to water quality and resources -to continue. This proposed easement must require a seasonal closure of the entire Trail from November 1 to July 1.

Response: Alternatives 5 and 6 have seasonal operating periods of the Rubicon Trail from July 1 to November 1 of each year, as suggested by the commenter. Each of the action alternatives also includes a seasonal closure of the trails to be added to the NFTS consistent with the direction in the 2008 Travel Management ROD. Modified Alternative 3 includes a saturated soil management strategy, whereby if the SSWQPP erosion control measures or other measures are not found to be effective, and if other measures cannot be implemented, the Rubicon Trail will be closed March 1 through May 15. The effects of implementing these different seasonal closures are displayed in Chapter 3. The California Regional Water Quality Control Board, Central Valley Region informed the Eldorado National Forest Supervisor and El Dorado County DOT Deputy Director that the Water Board had found that the SSWQPP submitted by El Dorado County adequately addressed water quality impacts caused by vehicle use during saturated soil conditions and by over-the-snow travel (letter dated January 5, 2012). However, in the comments submitted by the Water Board, in response to the DEIS, the Water Board clarified that a seasonal closure is not needed at this time to comply with the CAO, but that a seasonal closure may be needed if the actions described in the County's SSWQPP do not protect water quality.

Platt - During times when saturated soil conditions exist, it is imperative that a wet season closure be required for the Rubicon Trail system authorized by the Easement. This would include the historic route, variants and any additional new routes added to the system. This action would provide for consistency with the 2008 Travel Management Record of Decision, the Eldorado National Forest Land and Resource Management Plan, BMP's, RCO's and analysis by Specialists documented in this DEIS.

Appendix D of the Public Wheeled Motorized Travel Management EIS states:

- The Eldorado NF LRMP includes a standard and guideline under Forestwide Management Practice 27 that calls for instituting a closure for motorized use of roads and trails normally open for Off-Highway vehicle use during wet weather periods to reduce damage to native surface routes. This standard and guideline also calls for allowing roads and trails to be open when soil conditions permit. A wet season closure is a tool for protecting native surfaced roads and trails when they are susceptible to rutting and soil damage. Rutting causes direct damage

to travelway treads, concentrates runoff that can lead to gully erosion, and leads to trail widening. Wet season use can also damage drainage structures such as rolling dips, waterbars, and other waterbreaks. These structures are easily damaged when soils are too wet. The primary objectives of the wet season closure are to protect the drainage structures from damage, to protect the road or trail tread from rutting and other damage, and to minimize impacts to water quality at stream crossings or where drainage off of roads or trails becomes concentrated, carrying sediment and other deleterious materials into stream courses.

The impacts from wet season use are clearly identified in the Rubicon Easement DEIS as stated on page 63: "Vehicle use during periods of wet trail conditions would result in an increase in sediment and contaminant delivery to hydrologic features associated with the creation of ruts, compaction, and from direct vehicular contact with flowing water bodies or flowing trail surfaces."

The DEIS discusses further the cumulative effects of not implementing a seasonal closure on page 81 by stating: "Soil compaction, soil displacement, vegetation cover loss, and the development of water flow patterns would continue to occur during wet season vehicular use. The result would be accelerated erosion and sediment delivery to nearby hydrologic features during spring snowmelt. Stream channel morphology would continue to be altered at low-water crossings associated with sediment delivery and stream bank failures from mechanical erosion and riparian vegetation loss. Petroleum products and solvents would continue to be delivered to nearby hydrologic features during wet season use, low-water crossings, and dispersed vehicular use on unauthorized routes."

In the DEIS, the assumption is made that very little winter use occurs, and that use which does occur is primarily private land owner access to Spider Lake private property (see DEIS pg. 247). True, compared to summer use, winter use represents a small portion. What is not addressed is the disproportionate impact resulting from use during the winter and shoulder seasons. The majority of winter use is by extreme vehicle users that want the additional challenge of mud and snow, not private land owner access as stated in the DEIS. During the winter months, snow conditions restrict most vehicles to portions of the trail west of Walker Hill. It is very rare that wheeled vehicles can drive during winter months, over snow, to the private land parcels at Spider Lake. The snow is variable from 4-6 feet in many locations, eroded by water running down the trail to the dirt. Monte Hendricks and I presented a Power Point presentation to Forest Supervisor Ramiro Villalvazo to inform him of winter trail conditions. (See attachment 3) These conditions even inhibit over the snow vehicles such as snow cats or snowmobiles.

Unfortunately, the area between Wentworth Springs and Walker Hill has become a wet season play area. Little to no regard is given to "Tread Lightly Principles" or Forest

Regulations restricting vehicles to designated routes and the prohibition of off road travel. It is not uncommon for vehicles to travel off the trail in these areas causing resource damage as documented in Water Board Inspection Reports. (See attachment 4)

Response: Each of the action alternatives includes a seasonal closure of the trails to be added to the NFTS consistent with the direction in the 2008 Travel Management ROD, as suggested by the commenter. The various alternatives also include different seasonal restrictions and/or seasonal closure dates for the Rubicon Trail, including Alternatives 5 and 6 which have seasonal operating period of the Rubicon Trail from July 1 to November 1 of each year. Alternatives 1 and 4 include implementation of the erosion control measures and other measures and do not include a seasonal closure of the Rubicon Trail. Modified Alternative 3 includes a saturated soil management strategy, whereby if the SSWQPP erosion control measures or other measures are not found to be effective, and if other measures cannot be implemented, the Rubicon Trail will be closed March 1 through May 15. The effects of implementing these different seasonal closures are displayed in Chapter 3. The California Regional Water Quality Control Board, Central Valley Region informed the Eldorado National Forest Supervisor and El Dorado County DOT Deputy Director that the Water Board had found that the SSWQPP submitted by El Dorado County adequately addressed water quality impacts caused by vehicle use during saturated soil conditions and by over-the-snow travel (letter dated January 5, 2012). However, in the comments submitted by the Water Board, in response to the DEIS, the Water Board clarified that a seasonal closure is not needed at this time to comply with the CAO, but that a seasonal closure may be needed if the actions described in the County's SSWQPP do not protect water quality.

The assumption that El Dorado County will implement and enforce a seasonal closure, if needed has been removed from the document.

Snowlands Network - The use of 4x4 vehicles on the Rubicon Trail during the wet seasons (fall, winter and spring) causes excessive damage to the environment through erosion and sedimentation. Environmental degradation due to oil and other petroleum products being released into the environment should be stopped by restoring the Trail to its original condition where street legal 4x4 vehicles are capable of traversing it. In order to minimize degradation and erosion associated with this historic route only street legal vehicles should be allowed on it.

In the discussion of environmental consequences regarding the Proposed Action, Alternative I, the DEIS states: "During wet season use; trail widening, vegetation loss, soil compaction, and soil displacement could occur on some segments of the trail and trail variants and the impacts would vary based on the soil type and depth, vegetation condition, and effective groundcover. These impacts would occur in areas where vehicles avoid obstacles such as snow drifts to continue, and where exposed soils lack

effective groundcover in the form of rocks, vegetation, adequate snow cover, and downed woody debris.”

The damage to the environment caused by this type of winter use will continue regardless of the construction of a few bridges or the adding of toilets. Therefore, winter vehicle use of the Rubicon Trail must be prohibited in order to prevent continued erosion and sedimentation. In the shoulder seasons, fall and spring, the impacts of 4x4 vehicle use on the Rubicon Trail is just as destructive as winter and contributes to excessive erosion and sedimentation. The following two photos are typical of what occurs during these times. Yet the Proposed Alternative (Alternative 1), the Preferred Alternative (Alternative 3) and Alternative 4 fail to deal with erosion that is exacerbated by travel during the wet season.

Most glaring are the numbers for erosion that prove that the Forest Service claim that the impacts from wet season use of the Trail will be "minimal, short-term and localized" is false. Nearby to the Rubicon Trail erosion has been estimated to be 13 lbs./acre/year. On the Rubicon Trail it is 8000 lbs./acre/year⁴

The Forest Service's own hydrology report' supports the need for a wet season closure. The analysis contained in the report does not support the lack of a wet season closure as in alternatives 1, 2 and 4.

Based on the best available data the easement for the Rubicon Trail must include a wet season closure that covers the period in which erosion due to saturated soils is most likely to take place.

Response: As pointed out by the commenter, the Purpose and Need for Action in Chapter 1 recognizes that there is a need to reduce runoff from the Rubicon Trail and to reduce discharge of sediment and other wastes into the waters of the State. One of the significant issues identified through public scoping and presented in Chapter 1 is the use of the Rubicon Trail during the wet season, causing damage to resources. Based on this need and issue, the various alternatives include different seasonal restrictions and/or seasonal closure dates for the Rubicon Trail, including Alternatives 5 and 6 which have seasonal operating period of the Rubicon Trail from July 1 to November 1 of each year. Each of the action alternatives includes a seasonal closure of the trails to be added to the NFTS consistent with the direction in the 2008 Travel Management ROD, as suggested by the commenter. Alternatives 1 and 4 include implementation of the erosion control measures and other measures and do not include a seasonal closure of the Rubicon Trail. Modified Alternative 3 includes a saturated soil management strategy, whereby if the SSWQPP erosion control measures or other measures are not found to be effective, and if other measures cannot be implemented, the Rubicon Trail will be closed March 1 through May 15. The effects of implementing these different seasonal closures are displayed in Chapter 3. The California Regional Water Quality Control Board, Central Valley Region informed the

Eldorado National Forest Supervisor and El Dorado County DOT Deputy Director that the Water Board had found that the SSWQPP submitted by El Dorado County adequately addressed water quality impacts caused by vehicle use during saturated soil conditions and by over-the-snow travel (letter dated January 5, 2012). However, in the comments submitted by the Water Board, in response to the DEIS, the Water Board clarified that a seasonal closure is not needed at this time to comply with the CAO, but that a seasonal closure may be needed if the actions described in the County's SSWQPP do not protect water quality.

The DEIS had included an assumption that El Dorado County would implement and enforce a seasonal closure if the SSWQPP measures were not effective, in order to be in compliance with the CAO. This assumption was used in completing the environmental effects analyses in Chapter 3. This assumption has been removed from the document. The descriptions of the seasonal restrictions or seasonal operating period for each alternative have been modified to better reflect the range of management options and authorities. The effects analysis in Chapter 3 describes the anticipated effects from implementing the various alternatives.

Snowlands Network - The Record of Decision, April 2008, for the Eldorado National Forest Public Wheeled Motorized Travel Management EIS adopted a general winter motorized closure (Alternative B (Modified) because "it best provides for the protection of the resources while still addressing the other elements of purpose and need for the project." Thus, wheeled travel is prohibited on Eldorado routes from January 1 to March 31. Having adopted this general restriction, Eldorado National Forest cannot override such restriction without amending its motorized travel management plan.

Eldorado National Forest Supervisor Ramiro Villalvazo wrote in that Decision:

Implementation of the January 1 to March 31 seasonal closure in Modified B will provide protection to native surface roads and trails by minimizing rutting caused by vehicle travel on saturated roads as explained in Appendix D of the FEIS. I realize that the seasonal closure will restrict the number of months available to recreate in portions of the forest. I selected this closure period because it protects the roads and trails from damage during the periods they are most susceptible to impacts, yet minimizes impacts on public access to the forest.

In this Rubicon easement matter, the Forest Service violates its own rules in alternatives I, 3 and 4 for the Rubicon Trail in that they do not comply with Eldorado's recently adopted travel management policies. No creditable rationale has been set forth for why management of the Rubicon Trail should differ from that of other native soil roads on the Eldorado, and Eldorado has not amended its travel management policy to allow such an exception.

Given the clear benefit to a wet season closure and that Eldorado National Forest has adopted a general wet season closure applicable to all native soil routes on the forest,

the failure to include a wet season closure for the Rubicon easement is a violation of Eldorado's own policies, unreasonable, and arbitrary and capricious.

Response: Each of the action alternatives includes a seasonal closure of the trails to be added to the NFTS consistent with the direction in the 2008 Travel Management ROD, as suggested by the commenter. The same seasonal restriction is not included for the Rubicon Trail itself in all alternatives since the project includes implementation of the SSWQPP along the Rubicon Trail, the purpose of which is to address erosion and sedimentation from wet season use. These same measures are not proposed for each of the routes to be added to the NFTS, although they will receive appropriate mitigation measures and regular maintenance to ensure they meet standards for NFS trails. Additionally, the easement request from El Dorado County did not include a seasonal closure, so this requirement was not included in Alternative 1. The California Regional Water Quality Control Board, Central Valley Region informed the Eldorado National Forest Supervisor and El Dorado County DOT Deputy Director that the Water Board had found that the SSWQPP submitted by El Dorado County adequately addressed water quality impacts caused by vehicle use during saturated soil conditions and by over-the-snow travel (letter dated January 5, 2012). However, in the comments submitted by the Water Board, in response to the DEIS, the Water Board clarified that a seasonal closure is not needed at this time to comply with the CAO, but that a seasonal closure may be needed if the actions described in the County's SSWQPP do not protect water quality. Based on this information, Alternative 3 was modified to include a saturated soil management strategy whereby if the SSWQPP erosion control measures or other measures are not found to be effective, and if other measures cannot be implemented, the Rubicon Trail will be closed March 1 through May 15.

PEER - Due to potential impacts on forest resources, especially aquatic and riparian resources, a supplemental draft EIS must analyze and any easement must include wet weather closures. The hydrological and aquatic assessments clearly demonstrate significant damage to hydrological resources will continue unless motorized vehicle use on wet soils is curtailed. The DEIS, as written, gives the public the impression that only owners of private land will have winter access. For example, the Hydrology Report discloses, "Under Alternative 1, some wet season use of the trail would occur associated with access to privately owned lands"(Hydrology and Riparian Resources Report, p. 15). However, nowhere in the DEIS is even this limited vehicle use quantified. Other sections of the DEIS and background documents refer to the potential for seasonal closures "as needed." For example, the Aquatic BE notes, "Water quality of aquatic species habitat will be maintained, based on the ability of the County to implement a seasonal closure as needed to meet water quality objectives" (Aquatics BE, p. 14). (Exhibit E).

The DEIS fails, however, to inform the public of the extent or nature of the needed closures. The DEIS also implies the County will implement at least one seasonal

closure: “El Dorado County DOT would implement and enforce a seasonal closure as needed to meet the terms of the CAO issued by the Central Valley Regional Water Quality Control Board...” (DEIS, p. 35). Again, the DEIS implies there will be wet weather closures, but only Alternative 5 expressly addresses such a closure.

Response: The DEIS had included an assumption that El Dorado County would implement and enforce a seasonal closure if the SSWQPP measures were not effective, in order to be in compliance with the CAO (DEIS, p 35). Under this assumption, it was determined that public use would be restricted and only access for private landowners would be allowed. This assumption was used in completing the environmental effects analyses in Chapter 3. This assumption has been removed from the document. The descriptions of the seasonal restrictions or seasonal operating period for each alternative have been modified to better reflect the range of management options and authorities. The effects analysis in Chapter 3 describes the anticipated effects from implementing the various alternatives. Alternatives 5 and 6 include a seasonal operating period of the Rubicon Trail from July 1 to November 1 of each year, and the environmental effects of implementing those alternatives are described in Chapter 3. At this time, the California Regional Water Quality Control Board, Central Valley Region has found that the SSWQPP submitted by El Dorado County adequately addresses water quality impacts caused by vehicle use during saturated soil conditions and by over-the-snow travel (letter dated January 5, 2012). In the comments submitted by the Water Board, in response to the DEIS, the Water Board clarified that a seasonal closure is not needed at this time to comply with the CAO, but that a seasonal closure may be needed if the actions described in the County's SSWQPP do not protect water quality. Based on this information and other comments received during the comment period, Alternative 3 was modified to include a saturated soil management strategy whereby if the SSWQPP erosion control measures or other measures are not found to be effective, and if other measures cannot be implemented, the Rubicon Trail will be closed March 1 through May 15.

PEER - Because the DEIS is not clear about if or under what circumstances wet weather use would be allowed, those analyses based on the assumption of limited wet weather use are not valid for those alternatives that have no such limits.

Response: The descriptions of the seasonal operating periods or seasonal restrictions in the various alternatives have been modified to provide greater clarity and specificity, as suggested by the commenter. Modified Alternative 3 includes a saturated soil management strategy, whereby if the SSWQPP erosion control measures or other measures are not found to be effective, and if other measures cannot be implemented, the Rubicon Trail will be closed March 1 through May 15. The monitoring for effectiveness of the SSWQPP measures, which would trigger the need for a closure of the Rubicon Trail, is based on the monitoring described by El Dorado County in the SSWQPP, which has been accepted by the California Regional Water Quality Control Board, Central Valley Region.

Supplemental DEIS

PEER - The proposed action addresses El Dorado County's request for an easement across National Forest lands to maintain the current, but not necessarily historic, alignment of the Rubicon Trail. We support an easement for maintenance purposes to reduce impacts to the environmental resources, as such, any easement must include conditions sufficient to ensure the protection of public lands and natural and cultural resources, as well as address the impacts that trail users are having on other users of the public lands. None of the Alternatives presented in the DEIS sufficiently address or mitigate resource issues, particularly hydrological impacts and impacts to imperiled species and habitats. We urge the Forest Supervisor to consider an alternative that includes 12-foot-wide bridges at both Ellis Creek and the Buck Island outlet, wet season closures to protect soils and aquatic and riparian resources, and limits the easement to the route adopted by the El Dorado County Board of Supervisors on January 26, 2010 as a maximum. (Exhibit A) Because these alternatives and other issues were not adequately explored in the DEIS we urge the Forest to prepare and circulate a supplemental draft EIS.

Response: Forest Service Handbook 1909.15, 25.1 – Use of Comments on a Draft Environmental Impact Statement in a Final Environmental Impact Statement states:

“Review, analyze, evaluate, and respond to substantive comments on the draft EIS.

(a) An agency preparing a final environmental impact statement shall assess and consider comments both individually and collectively, and shall respond by one or more of the means listed below, stating its response in the final statement. Possible responses are to:

(1) Modify alternatives including the proposed action.

(2) Develop and evaluate alternatives not previously given serious consideration by the agency.

(3) Supplement, improve, or modify its analyses.

(4) Make factual corrections.

(5) Explain why the comments do not warrant further agency response, citing the sources, authorities, or reasons which support the agency's position and, if appropriate, indicate those circumstances which would trigger agency reappraisal or further response.

(b) All substantive comments received on the draft statement (or summaries thereof where the response has been exceptionally voluminous), should be attached to the final statement whether or not the comment is thought to merit individual discussion by the agency in the text of the statement.

(c) If changes in response to comments are minor and are confined to the responses described in paragraphs (a) (4) and (5) of this section, agencies may write them on errata sheets and attach them to the statement instead of rewriting the draft statement. In such cases only the comments, the responses, and the changes and not the final statement need be circulated (§1502.19). The entire document with a new cover sheet shall be filed as the final statement (§1506.9). (40 CFR 1503.4)”

Comments on the DEIS that we received were reviewed, analyzed, evaluated, and responded to in the following ways: Alternative 3 was modified; a new alternative (Alternative 6) was developed and evaluated; the analysis was supplemented, improved, and modified; factual corrections were made; and we address and explained why comments did not warrant further agency response.

PEER - Whatever El Dorado County may claim, the Forest Service, as landowner, has the right to impose any reasonable conditions and restrictions on any easement that is necessary to protect these lands and resources. See *Adams v. U.S.*, 3 F.3d 1254, 1258 n.1 (9th Cir. 1993) (easement for use of road over forest service lands is no bar to reasonable forest service regulations); *U.S. v. Vogler*, 859 F.2d 638, 642 (9th Cir.1988) (federal land owner may regulate the manner of use of an easement or right of way to conserve natural and cultural resources including wildlife). A supplemental draft EIS is needed to clarify which alternatives include wet weather vehicle use, quantify the amount of use expected under each alternative, and to analyze the impacts such use will have on hydrological, riparian and aquatic resources.

Response: The description of the alternatives has been modified to explain which alternatives have seasonal operating periods. The Recreation Section in Chapter 3 has been modified to describe the past use and anticipated changes in use under each alternative and the effects associated with implementing each of the alternatives are described in Chapter 3 for hydrologic, riparian and aquatic resources.

PEER - There is no enforcement section in the DEIS, despite the attention this issue has received for the past ten years. A supplemental Draft EIS must address this issue, including a description of enforcement methods attempted in the past, success or failure indicators, and how the Forest Service and the County intend to enforce in the future.

Response: The descriptions of the action alternatives have been modified to include monitoring and enforcement. The effects of implementing each of the alternatives are described in Chapter 3. Some of these analyses include consideration of the level of enforcement, such as in the Recreation section under Visitor Management.

Wetlands

Hower - Remove the word WETLAND where referring to Winter Camp. The definition of WETLAND: <http://water.epa.gov/type/wetlands/what.cfm> - On the EPA website, it clearly states: **Inland wetlands include marshes and wet meadows dominated by herbaceous plants, swamps dominated by shrubs, and wooded swamps dominated by trees.**

This is not the case at winter camp at all. The pond off from Little Sluice would be considered part of a wetland, but this area is off the trail.

In your own document on page 38 you state: Sandy soils have a poor plant nutrient. The road while wet during the run off, is very high in sand content, which is why nothing is growing there.

Response: The description in the Soils section of Chapter 3 has been modified to clarify the difference between wet soils and wetlands. Additionally, a definition of wetlands, as used in this document, has been added to the Glossary.

Hower - Page 43: This area consists of a downcut wetland in which the perennial water table has drained and converted to a seasonal wetland.

Please remove this sentence. The winter camp area is not a wetland, as defined by the EPA (Please see Comment 5).

Response: The text has been modified to address the confusion between wet soils and wetlands.

CA4WDC - There are many references to Wetland in the DEIS. There is no discussion of how the USFS distinguished a biological difference between ponding without an outlet or seasonal flow through areas with the surrounding higher soils.

Response: The description in the Soils section of Chapter 3 has been modified to clarify the difference between wet soils and wetlands. Additionally, a definition of wetlands, as used in this document, has been added to the Glossary.

CA4WDC - The wetland identified in the Little Sluice area is a snow pond in a solid rock formation. It is above the grade of the trail and has no impact on or from the trail or its use.

Response: This area meets the definition of a wetland as presented in the Glossary, and contains water dependent vegetation, perennial water, and saturated soils. It receives snowmelt and runoff from surrounding areas. These surrounding areas are often driven over by OHVs and therefore deposited compounds could reach this wetland during runoff periods.

Barton - We are concerned about the use of the word “wetland” through the DEIS. It appears to be used to generally describe any area that has water in or near it for any part of the year. According to the USFS publication, one of the identifying characteristics of wetlands, from both ecological and statutory points of view, is the presence of hydric, or wet, soils. Hydric soils are defined by the USDA Natural Resources Conservation Service as “soils that formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part.”

We see no evidence that the USFS undertook the necessary investigation to determine whether seasonally saturated areas met this definition. To the contrary, we have looked at many of these areas and find them indistinguishable from areas of dry high ground. We are concerned that by loosely stating that these areas are “wetlands”, the document has unnecessarily and inappropriately created a new set of environmental concerns. We suggest that all references to the word “wetlands” be removed from the document in the absence of the empirical evidence that defines them as such.

Response: A definition of wetlands, as used in this document has been added to the Glossary. The Soil Scientist mapped hydric soils in the area based on observations of soil exposures. Perennial or intermittent water was observed in these features and riparian/wetland vegetation was observed at all of these features.

Barton - Also on page 43, the Little Sluice wetland is actually a pond just adjacent to and upgradient from the Rubicon Trail. Being above the Trail, it should be considered to not be impacted by it at all. The description of soils mapping density indicates that this is too small to have been captured on any map or soils survey as it is in a depression between rock outcroppings.

Response: The Soils section in Chapter 3 has been modified to eliminate this confusion.

El Dorado County - In several places, the DEIS uses the term "wetland" to describe a variety of different areas. This term appears to be used indiscriminately in the DEIS to describe a diverse set of different areas, and does not appear to have been used in any of its legally-defined ways. In several instances, the verbal discussion of "wetlands" in the DEIS does not accord with the wetlands depicted on the accompanying maps. See, *e.g.*, page 42 where it refers to something called the "Gerle Creek Wetland." It is not clear how the term "wetland" is defined, or exactly what it is referring to, or whether it is used in different places in the DEIS to describe different areas. The paragraph on page 42 says the Trail "bisects an edge of Gerle Wetlands," but the soil indicator map shows something labeled Gerle Creek Wetland a considerable distance south of the Trail. Different symbols on the maps for wet areas or wetlands are confusing, and do not appear to be used consistently. On page 43, reference is made to something called the Little Sluice Wetland, and the statement is made that the Trail crosses a "wetland

area" yet the map depicts a wet area north of the Trail. It is not clear what the difference is between the terms wet soil, wetland, wetland complex, *etc.* The term wetland is fraught with meaning and legal implications in different contexts, and EI Dorado County requests that the DEIS be more scrupulous in the use of terms like wetland and wet soil, and that it be more careful in its depiction of the location of wet areas in relation to the actual location of the Rubicon Trail.

Response: The description in the Soils section of Chapter 3 has been modified to clarify the difference between wet soils and wetlands. Additionally, a definition of wetlands, as used in this document, has been added to the Glossary.

Wildlife

California State Parks - On page 163, first paragraph, the DEIS states; “The area surrounding the Rubicon Trail is currently utilized fully OHVs with no authorized trails, creation of new trails and OHV use occurring in open areas off any trails”. This statement is confusing since the Forest land surrounding the Rubicon Trail is closed to cross-country travel.

Response: This sentence has been rewritten to eliminate the confusion.

Appendix E. California Regional Water Quality Control Board, Central Valley Region: Cleanup and Abatement Order (CAO) No. R5-2009-0030



**California Regional Water Quality Control Board
Central Valley Region
Katherine Hart, Chair**



Matthew Rodriguez
Secretary for
Environmental Protection

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Edmund G. Brown Jr.
Governor

5 January 2012

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RUBICON TRAIL SATURATED SOIL WATER QUALITY PROTECTION PLAN, COUNTY OF EL DORADO DEPARTMENT OF TRANSPORTATION AND ELDORADO NATIONAL FOREST, EL DORADO COUNTY

Central Valley Water Board staff reviewed the following documents submitted by the County of El Dorado Department of Transportation (County) in support of the requirement to prepare and implement a Rubicon Trail Saturated Soil Water Quality Protection Plan:

<u>Report Name</u>	<u>Date Received</u>
Rubicon Trail 2010 Operations and Maintenance Plan (O&M Plan)	1 October 2010
Saturated Soil Water Quality Protection Plan (Saturated Soil Plan)	31 December 2010
Amendment #1 to the Saturated Soil Plan (Amendment #1)	28 January 2011
Responses to Water Board Comments letter (Response Letter)	29 April 2011

Water Board staff provided an initial review of the Saturated Soil Plan and Amendment #1 in March 2011 and requested the County and the Forest Service to provide additional explanation on a few issues. In April 2011, the County submitted their Response Letter to address the requested items. The Response Letter provides a comprehensive description of the County's strategy to maintain the trail and provide added water quality protection including: constructing road armoring and road drainage structures along the length of the trail within El Dorado County; a discussion of why the County does not have the legal right to close the trail during saturated soil conditions; and addressing the County maintained segment of roadway from Airport Flat Campground to Wentworth Springs Campground. All submittals identify the County's commitment to continued trail monitoring and BMP installation and maintenance to improve water quality protection.

With the annual monitoring and BMP maintenance proposed in the Saturated Soil Plan and the O&M Plan, the complete Saturated Soil Plan appears adequate to address water quality impacts caused by vehicle use during saturated soil conditions and by over-the-snow travel. In our 13 December 2011 letter, the Executive Officer agreed to change the report date for the annual review of the Saturated Soil Plan to 1 October of each year starting on 1 October 2012.

Therefore, by **1 October 2012**, please provide a thorough review of work done to implement the Saturated Soil Plan and describe how successful BMP implementation was in terms of

protecting water quality, the types of enforcement activities completed to ensure the success, and any proposed changes to the Saturated Soil Plan or to on-the-ground BMPs prior to the next winter. Also, please include a review of the temporary erosion control plan implemented in 2010 and 2011 as described in the Response Letter.

Please contact Marty Hartzell at (916) 464-4630 or me at (916) 464-4631 with questions.



STEVE E. ROSENBAUM
Chief, Storm Water Compliance and Enforcement Unit

cc: Ed Knapp, El Dorado County Counsel, Placerville
Steve Kooyman, County of El Dorado Department of Transportation, Placerville
Vickie Sanders, El Dorado County, Placerville
Katy Parr, Eldorado National Forest, Pollock Pines
Debbie Gaynor, Eldorado National Forest, Pollock Pines
Daphne Greene, California State Parks, Sacramento
Scott Johnston, Rubicon Trail Foundation, Placerville
Jesse Barton, Gallery & Barton, Sacramento
Karen Schambach, Public Employees for Environmental Responsibility, Georgetown
Rich Platt, Pollock Pines
Monte Hendricks, Pollock Pines



California Regional Water Quality Control Board Central Valley Region

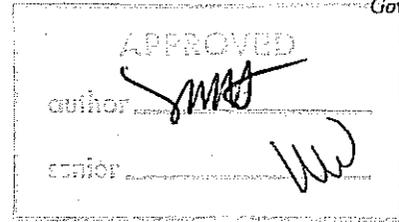
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Arnold
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30 April 2009

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NOTICE

ADOPTED CLEANUP AND ABATEMENT ORDER FOR EL DORADO COUNTY AND THE UNITED STATES DEPARTMENT OF AGRICULTURE, FOREST SERVICE, ELDORADO NATIONAL FOREST RUBICON TRAIL EL DORADO COUNTY

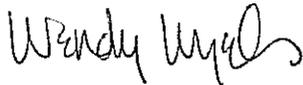
Cleanup and Abatement Order (CAO) No. R5-2009-0030 for the above-named responsible parties was adopted by the Central Valley Regional Water Quality Control Board (Central Valley Regional Board) on 23 April 2009.

Please note that several submittals required by the CAO are due in the next few months. The first submittal is the first Quarterly Update for the *Rubicon Trail Saturated Water Quality Protection Plan* and the *Long Term Management Plan for the Rubicon Trail* that is due on 30 June 2009 and described in Item 7 of the CAO. The second required submittal is the *2009 Maintenance Training Plan* that is due by 15 July 2009 and described in Item 4 of the CAO. A number of additional submittals are required throughout the year; please refer to the attached CAO for due dates.

In order to conserve resources, this letter transmits paper copies of the documents to the Responsible Parties only. Interested persons may download the documents from the Regional Water Board's Internet website at:

[http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/]. Copies of these documents can also be obtained by contacting or visiting the Central Valley Water Board's office weekdays between 8:00 AM and 5:00 PM.

If you have any questions regarding the CAO, please contact Marty Hartzell at (916) 464-4630 or at mhartzell@waterboards.ca.gov.



WENDY WYELS, Supervisor
Compliance and Enforcement Section

Enclosure: CAO Order (Responsible Parties Only)

cc w/o enc: Steve Davey, Chief of Staff for Assembly Member Gaines, Sacramento
Reed Sato, Office of Enforcement, SWRCB, Sacramento
Patrick Pulupa, Office of the Chief Counsel, SWRCB, Sacramento
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Randy Burleson, Rubicon Trail Foundation, Fair Oaks
John Arenz, Rubicon Trail Foundation, Pollock Pines
Del Albright, Friends of the Rubicon, Mokelumne Hill
Pearse Umlauf, National Off-Road Association, Georgetown

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

CLEANUP AND ABATEMENT ORDER NO. R5-2009-0030
FOR

EL DORADO COUNTY
AND THE
UNITED STATES DEPARTMENT OF AGRICULTURE, FOREST SERVICE,
ELDORADO NATIONAL FOREST
RUBICON TRAIL
EL DORADO COUNTY

This Order is issued to El Dorado County and the U.S Department of Agriculture, Eldorado National Forest (hereafter "Dischargers" or "Responsible Parties") based on provisions of California Water Code (CWC) sections 13304 and 13267 which authorize issuance of Cleanup and Abatement Orders and the requirement to submit technical reports.

The Central Valley Regional Water Quality Control Board (Central Valley Water Board) finds, with respect to the Responsible Parties' acts, or failure to act, the following:

1. The Rubicon Trail is an internationally known, historic off-highway vehicle (OHV) route that crosses the Sierra Nevada Mountains, connecting the town of Georgetown in El Dorado County to Homewood on the west side of Lake Tahoe. The Rubicon Trail ranges in condition from a well-defined dirt road to granite domes, ledges, and rock debris that create moderate to difficult passage for street legal vehicles and OHVs.
2. There are currently two access points to the Rubicon Trail. The historic access originates at the Airport Flat Campground and extends easterly through the Wentworth Springs Campground to Ellis Creek. A second access, known as the Ellis Creek Intertie, starts at the Loon Lake Dam and extends in a northerly direction to its intersection with the trail near Ellis Creek. From that point, the trail runs easterly to the Little Sluice Box-Spider Lake area and the Buck Island Reservoir area, then northerly through the Rubicon Springs area to the El Dorado/Placer County line. This Order only addresses the portion of the Rubicon Trail within El Dorado County.
3. The majority of the Rubicon Trail crosses land owned by the United States, with a few shorter segments of the trail crossing land owned by private parties. El Dorado County, through its Department of Transportation (DOT), currently conducts maintenance operations and is planning improvements to the Rubicon Trail, while the United States is the primary owner of the land on either side of the trail and holds title to most of the land underlying the Rubicon Trail right-of-way. Many trail users park their vehicles and camp on land managed by the U.S. Forest Service. The trail also passes through some private land, over which El Dorado County has jurisdiction.

4. Pursuant to federal Revised Statute 2477, El Dorado County (County) asserted a right-of-way over federal land through an 1887 declaration; this right-of-way is known as the Rubicon Trail. In its adoption of Resolution 142-89 on 30 May 1989, the El Dorado County Board of Supervisors reaffirmed the 3 August 1887 declaration, and declared that the Rubicon Trail is a non-maintained public road in El Dorado County. The portion of the trail from Airport Flat Campground to Wentworth Springs Campground has been accepted into the County's maintained road system. For the Ellis Creek Intertie portion of the trail, the County has been granted deeded easements by the U.S. Forest Service and a private property owner.

BACKGROUND

5. The Rubicon Trail is open to OHV use throughout the year. The highest OHV trail use is during weekends and holidays between Memorial Day and Labor Day; however, OHV users also drive the trail when it is covered by snow and at times when saturated soil conditions exist during spring snowmelt and fall rains. Although OHV users groups hold workdays to maintain the trail, large segments of the trail are severely eroded, allowing runoff from rainfall and snowmelt events to discharge sediment to waters of the state. The trail has become incised due to the heavy use, and water from rainfall and snowmelt events is intercepted by the incised trail then transported along with sediment to stream crossings. Water also collects in large puddles and mud bog depressions in many locations along the trail. OHVs are driven through these mud bogs, thereby accelerating trail erosion and sedimentation of water bodies. Many of these puddles and bogs become hydrologically connected to the stream network when trail runoff exceeds the capacity of the depression.
6. Multiple OHV user groups, including the Rubicon Trail Foundation (RTF) and the Friends of the Rubicon (FOTR), have volunteered countless hours to repair, maintain, and clean up the trail. El Dorado County and the Eldorado National Forest have provided assistance for the OHV groups by organizing volunteer efforts and providing materials for trail maintenance. According to the County, it has received over \$700,000 in grant funding from the Off Highway Motor Vehicle Recreation Division of the State Department of Parks and Recreation (OHMVR Division), in addition to grants from other agencies such as the Integrated Waste Management Board and the Highway Bridge Program. According to the OHMVR Division, it has provided over \$1.2 million in grants between 1984 and 2006 for the El Dorado County portion of the trail.

These funds have been used for activities such as purchasing personal sanitation units and spill kits to distribute to the trail users, production of educational material, purchase of a law enforcement vehicle and paying for patrol time by law enforcement officers, consultant services for preparation of a master plan, land surveys, and the design, planning, and construction (anticipated in 2010) of two bridges. The County has also used its own funds and staff to perform trail maintenance work.

7. According to the Eldorado National Forest, it has taken actions over the last two decades to control the discharge of sediment and other pollutants from the National Forest lands adjacent to the Rubicon Trail, including (a) restoring impacted areas along the Ellis Creek intertie and near Ellis Creek, (b) working cooperatively with El Dorado County to obtain the permit needed for the installation of the toilet at the Loon Lake trailhead, (c) providing summer time law enforcement patrols along the Rubicon Trail and adjacent National Forest lands, (d) assisting OHV groups by providing material for trail maintenance, as well as coordinating and training volunteers, (e) providing a cabin to be used as an information station at the Loon Lake trailhead, (f) and issuing a Travel Management decision which prohibits motor vehicles from traveling off of roads or trails within the Eldorado National Forest and establishes a minimum seasonal closure period for native surface roads and trails from January 1 through March 31 of each year. The Travel Management decision does not apply to the Rubicon Trail because it has been declared an El Dorado County unmaintained road.

EL DORADO COUNTY PLANNING PROCESS

8. The Rubicon Oversight Committee (ROC) was established by the County in June 2002. It currently operates as an advisory body to the El Dorado County Department of Transportation and provides an opportunity for OHV user groups to coordinate their volunteer activities with the County. The ROC has met on a monthly basis since its formation and its members have worked on a variety of Rubicon Trail issues such as signage, winter use, sanitation, and the master planning process.
9. In June 2003, the El Dorado County contracted with Environmental Stewardship and Planning, Incorporated to conduct multiple workshops and prepare multiple interim documents that would become the basis for a Draft Environmental Impact Report (EIR) for the Rubicon Trail.
10. On 9 October 2007, El Dorado County distributed the Draft EIR with alternatives for the Rubicon Trail Master Plan for public review and comment. In the Draft EIR, El Dorado County identified the following tasks under Alternative A:
 - a) Water runoff best management practices (BMPs) would be implemented on the trail;
 - b) Annual monitoring reports of soil and water sampling along the trail would be provided to the Central Valley Water Board and Department of Toxic Substances Control, and should any observed values exceed concentration limits established in coordination with oversight agencies, El Dorado County would work with appropriate agencies to determine remediation and monitoring activities to mitigate identified contamination; and
 - c) The trail would be closed to recreational vehicles from November 1 to April 30 if El Dorado County and Rubicon Oversight Committee representatives determined that there is a potential for soil erosion to occur during saturated soil conditions.

The "No Project" and the "Alternative B" project alternatives of the Draft EIR do not ensure the implementation of these mitigations. Alternative B included several elective plan actions that the County could consider for implementation if adopted and identified fewer management responsibilities than Alternative A. Alternative B contained the following elective elements as resources allowed: water quality monitoring; an ordinance proclaiming that trail modification without the written approval, and authorization from, the County DOT would be in violation of the County Code; and trail and drainage improvement projects.

11. In September 2008, the El Dorado County staff informed the Water Board that work on the EIR/Master Plan process has stopped because of budget constraints and that there are no plans to reinstate the process. A final EIR/Master Plan for the Rubicon Trail has not been completed to date. The County now contends that it lacks the legal authority and/or legal obligation to implement some of the measures described in the Draft EIR on some sections of the Trail.
12. In the spring of 2008, El Dorado County began negotiations with the OHMVR Division and the California Geological Survey to complete a comprehensive survey of the Rubicon Trail, as related to erosion and sedimentation processes. The County will use this survey, expected to be released in April 2009, as the basis for a comprehensive maintenance plan for the Rubicon Trail. In addition, the survey will be a location-based repository for the information about Trail conditions as they evolve over time.

ENVIRONMENTAL IMPACTS

13. In July 2004, the El Dorado County Board of Supervisors issued a state of local emergency due to the significant amount of human fecal waste littered around the Spider Lake area. The amount of fecal waste was determined to pose a health and safety threat to users of the trail and to streams and lakes that are tributary to the Rubicon River and the Middle Fork American River. At the same time, the Eldorado National Forest Supervisor issued a Forest Order closing the National Forest System lands around Spider Lake. As a result, the Spider Lake area was closed to camping and all human access.
14. Through the cooperation of the Responsible Parties and trail user organizations, a vault toilet was installed at the Loon Lake Trailhead in October 2008. Currently, restroom facilities exist at each trailhead, but there are no public sanitation facilities along the Rubicon Trail or at the Ellis Creek, Spider Lake, or Buck Island Reservoir primitive camping areas. Privately-owned sanitation facilities may be available to Trail users in the Rubicon Springs area. Otherwise, once in the backcountry, trail users must rely on individual human waste disposal methods. Trail volunteers and County staff have provided human waste "WAG Bags" free of charge to trail users since 2003; however, the Responsible Parties have not initiated a program to require the use or tracking of the Wag Bags to determine if individual human waste disposal methods are working. A

human waste study conducted in 2001 estimates that 8,000 gallons/year of human waste are deposited on public land along the Rubicon Trail. During trail evaluations in July and August 2008, Water Board staff observed multiple areas along the trail with visible human excrement and toilet paper.

15. Section 3.6 of the County's Draft EIR provides details of preliminary water quality monitoring along the Rubicon Trail. Following a sampling effort in the summer of 2005, low levels of oil and grease were identified in water and soil samples collected along the Rubicon Trail, and low levels of copper and cadmium were identified in soil samples. This contamination is likely due to motor oil, grease, and other petroleum-based fluids spilling and leaking from OHVs that have overturned or have damaged mechanical components while traversing rocky segments of the trail. One water sample from Spider Lake also tested positive for fecal coliform following a high-use weekend in June.
16. Central Valley Water Board staff completed a rapid assessment sediment study along the Rubicon Trail during July and August 2008. Staff identified a few segments of the Rubicon Trail that are hydrologically connected to watercourses tributary to Loon Lake and the Rubicon River, and provided a relative estimate of the sediment volume along these trail segments by measuring the dust layer. With this information, staff made an order of magnitude estimation that between 60 and 80 cubic yards of sediment is being delivered from one mile of hydrologically connected trail to waters of the state annually. This estimate is an order of magnitude greater than sediment production rates from light traffic native surfaced roads and is within the same order of magnitude to other OHV trail production rates available in the literature. The draft sediment study is currently undergoing peer review.
17. Board staff also completed a pebble count survey at the Ellis Creek crossing of the Rubicon Trail and identified that the influx of sediment into this perennial fish-bearing stream is causing a fining of bed material downstream of the crossing. This increased sediment load can fill spawning gravels and reduce aquatic habitat, and has the potential to carry contaminants from vehicle operations on the trail into waters of the state.
18. The Erosion Study concludes that there is erosion of sediment from portions of the Rubicon Trail and that some of that eroded sediment enters surface waters. The pebble count indicates that, at one location, there were more fine bottom sediments downstream of the Trail than upstream of the Trail, possibly indicating an impact of Trail sediments on the streambed. The methodologies used in the study have been questioned by several commenters; however, the Study's conclusions that erosion of sediment from the Trail to streams is well corroborated by other evidence in the record, including photographic evidence. The quantification of that erosion at the specific locations and conditions in the Study are not critical to the Board's findings on this issue.
19. An accurate count, accepted by all of the user groups, of the number of the annual or seasonal users on the Rubicon Trail has not been completed to date. User counts and estimates vary widely. An accurate count of trail users is necessary for the Responsible

Parties to adequately manage the Rubicon Trail, especially with regard to the issue of human waste.

LEGAL CONSIDERATIONS

20. Due to the 1887 RS 2477 declaration (mentioned in Finding 4, *supra*), the Forest Service claims that it has limited ability to regulate El Dorado County's activities on this road, and therefore El Dorado County is responsible for operations and maintenance of the Trail. El Dorado County makes similar claims relative to its responsibility of the Trail, stating that because it does not hold a property interest in the trail, all of the activities it has thus far undertaken on the Trail have been completely voluntary. However, from the perspective of the Central Valley Water Board, it is clear that these two parties share primary responsibility for maintenance and management of the Trail.
21. A legal easement for the Rubicon Trail has not been recorded except for the portion from the Loon Lake Dam to near Ellis Creek (known as the Ellis Creek Intertie). Other than the Ellis Creek Intertie, the exact location and width of the Rubicon Trail has not been fully defined.

REGULATORY CONSIDERATIONS

22. The El Dorado County portion of the Rubicon Trail is at an elevation of 5,400 feet to 7,000 feet and traverses the eastern portion of the Sierra Nevada mountain range. This trail intersects the headwaters of Gerle Creek, Ellis Creek, and parts of the Rubicon River. Surface drainage is toward the south and west and is within the Middle Fork American River watershed, and via the Loon Lake diversions, also within the South Fork American River watershed.
23. The Water Quality Control Plan, Fourth Edition, for the Sacramento River Basin and the San Joaquin River Basin (hereafter Basin Plan), designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for all waters of the Basin.
24. The designated beneficial uses of the Middle Fork American River (source to Folsom Lake), as specified in the Basin Plan, are municipal and domestic supply, irrigation, stock watering, power, contact and non-contact water recreation, warm and cold freshwater habitat, coldwater spawning, and wildlife habitat. The designated beneficial uses of the South Fork American River (source to Placerville), as specified in the Basin Plan, are municipal and domestic supply, power, contact and non-contact water recreation, warm and cold freshwater habitat, coldwater spawning, and wildlife habitat. Gerle Creek, Ellis Creek, Loon Lake, and the Rubicon River, as tributaries to the Middle Fork and South Fork American River, share these beneficial uses.

25. The California Department of Fish and Game has identified at least seven fish species and one frog species as among the terrestrial and aquatic species that have known habitat in the Rubicon Trail area and are at risk from water quality impacts.

26. CWC section 13304(c)(1) provides that:

Any person who has discharged or discharges waste into waters of this state in violation of any waste discharge requirements or other order or prohibition issued by a Regional Water Board or the state board, or who has caused or permitted, causes or permits, or threatens to cause or permit any waste to be discharged or deposited where it is, or probably will be, discharged into the waters of the state and creates, or threatens to create, a condition of pollution or nuisance, shall upon order of the Regional Water Board clean up the waste or abate the effects of the waste, or, in the case of threatened pollution or nuisance, take other necessary remedial action, including but not limited to, overseeing cleanup and abatement efforts. ... Upon failure of any person to comply with the cleanup or abatement order, the Attorney General, at the request of the board, shall petition the superior court for that county for the issuance of an injunction requiring the person to comply with the order. In the suit, the court shall have jurisdiction to grant a prohibitory or mandatory injunction, either preliminary or permanent, as the facts may warrant.

27. The Rubicon Trail is not adequately drained and maintained. Runoff from the trail has discharged, and has the potential to discharge, sediment and other waste into waters of the state. There are human sanitation problems, soil contamination from metals, and water contamination from petroleum-based fluids. Thus, the Responsible Parties have caused or permitted waste to be discharged or deposited where it will be, or has the potential to be, discharged to waters of the state. The Responsible Parties have created or threaten to create a condition of pollution or nuisance.

28. CWC section 13267(b) provides that:

In conducting an investigation specified in subdivision (a), the Regional Water Board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste outside of its region that could affect the quality of waters of the state within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the Regional Water Board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports.

29. The technical reports required by this Order are necessary to assure compliance with this Order, and to protect human health and the environment. Existing data and information about the site indicates that waste has been discharged and will continue to be discharged along the Rubicon Trail, which is currently managed by the Responsible Parties.

30. The issuance of this Order is an enforcement action taken by a regulatory agency and is exempt from the provisions of the California Environmental Quality Act (CEQA) (Pub. Resources Code § 21000 et seq.), pursuant to California Code of Regulations, title 14, section 15321(a)(2). The implementation of this Order is also an action to assure the restoration of natural resources and/or the environment and is exempt from the provisions of the CEQA, in accordance with California Code of Regulations, title 14, sections 15307 and 15308.

IT IS HEREBY ORDERED THAT, pursuant to CWC sections 13304 and 13267, El Dorado County and the Eldorado National Forest (hereafter "Dischargers" or "Responsible Parties") shall jointly cleanup and abate the impacts resulting from OHV use of the Rubicon Trail in accordance with the scope and schedule set forth below.

1. The Responsible Parties shall take all reasonable steps to cease the discharge of sediment and other wastes due to motorized use of the Rubicon Trail to waters of the state, including discharges to Gerle Creek, Ellis Creek, Loon Lake and its tributaries, and to the Rubicon River and its tributaries. This includes, but is not necessarily limited to, implementing all of the following actions. These actions shall apply to lands which are within the watersheds of the surface water bodies described above.
2. By **1 October 2010**, the Responsible Parties shall prepare a *Rubicon Trail Saturated Soil Water Quality Protection Plan*, which shall evaluate, and where appropriate, propose means of addressing, water quality impacts caused by vehicle use (excluding snowmobiles) during saturated soil conditions and by over-the-snow travel. This plan must clearly show how its implementation will protect water quality by minimizing or preventing the mobilization of sediment to surface waters. The plan should consider, as one way of addressing water quality impacts, a seasonal closure involving hard dates (similar to those used in most portions of the Eldorado National Forest) or dates that are dependant upon weather conditions (such as the Eldorado National Forest's Rock Creek closure method). In addition, the plan must propose an education component, an implementation component, and an enforcement component. Upon approval by the Executive Officer, the plan shall be immediately implemented.

Maintenance-related activities for 2009

3. El Dorado County shall continue to implement the following items, which it has previously committed to complete during 2009:
 - a) Installing water breaks, cross drains and rock filled rolling dips on a 2,000 foot section of the Rubicon Trail just west of the Ellis Creek Crossing;
 - b) Dispensing wag bags and cardboard commodes at the Loon lake Trailhead in cooperation with Rubicon Trail Foundation volunteers;

- c) Installing educational signage at Loon Lake Trailhead and Wentworth Springs campground to encourage "pack it in, pack it out" and the use of wag bags on the trail; and
 - d) Continuing with preliminary engineering and environmental review for the construction of bridges at Gerle Creek and Ellis Creek. The County shall take all reasonable steps to ensure that permitting activities take place by the fall of 2009, that the construction contract shall be out to bid in the spring of 2010, and that construction will begin in the summer of 2010.
4. By **15 July 2009**, the Responsible Parties shall submit a *2009 Maintenance Training Plan* describing procedures for training County, Federal, and volunteer groups to ensure that Rubicon Trail maintenance projects planned for the 2009 season will be installed to County or Forest Service road maintenance specifications (or equivalent).
 5. By **15 July 2010**, the Responsible Parties shall submit a *2010 Maintenance Training Plan* describing procedures for training County, Federal, and volunteer groups to ensure that Rubicon Trail maintenance projects planned for the 2010 season will be installed to County or Forest Service road maintenance specifications (or equivalent).

Long Term Management Plan

6. By **30 April 2011**, the Responsible Parties shall submit a *Long Term Management Plan for the Rubicon Trail* which shall address the following minimum information, and shall implement paragraphs (e), (f) and (i) by **30 April 2011**:
 - a) A clear definition of each party's responsibilities for the Rubicon Trail, including maintenance activities, education, enforcement, seasonal closure, and all other actions necessary to protect water quality.
 - b) The results of a Trail Use Count that shall be conducted during 2009 and/or 2010. The results shall describe the expected annual use of the Rubicon Trail, both in terms of vehicles and people.
 - c) An estimate of the number of people and vehicles who can use the Rubicon Trail, in its current condition, without adversely impacting water quality due to sediment, human waste, or petroleum discharges. Using this estimate and the Trail Use Count, determine whether there is a need to restrict use of the trail to protect water quality. Alternatively, determine whether certain specific improvements will result in the ability for the current number (or an increased number) of people and vehicles to use the trail without impacting water quality. If so, describe those improvements and provide a proposed timeline for their implementation.
 - d) Documentation of the actual location of the Rubicon Trail within El Dorado County, including the centerline and an agreed-upon width from each side of that line. The

documentation shall be in a form that shall be easily understood by both the public and law enforcement officials.

- e) A strategy to address human waste management on the Rubicon Trail. At a minimum, the Responsible Parties must effectively communicate to users the importance of using portable human waste collection devices and WAG bags. The Responsible Parties must also consider the use of portable human waste collection devices and "WAG" bags. This section must contain a feasibility study for installation of permanent toilet facilities along the trail, including information as to how human waste will be removed from the toilets and disposed of. The plan must also contain procedures for annually removing human waste that has been deposited on the ground, where feasible. If the annual human waste inspection does not show significant improvements, then the Responsible Parties must evaluate reducing the number of people using the trail.
- f) Procedures to enforce the use of spill kits for containment of liquid and solid wastes generated from vehicle use on the Rubicon Trail, as well as procedures for annually removing or mitigating petroleum contaminated soils and rocks, where feasible, on the trail.
- g) A discussion of the type of law enforcement officers and the frequency of their patrols that are needed to enforce trail regulations in regard to water quality. Evaluate options for providing this level of law enforcement, including funding from the Responsible Parties, an agreement with the OHMVR Division, partnering with OHV user groups, applying for grant funds, and the feasibility of collecting fees from the trail users.
- h) A discussion of the annual cost to implement the Long Term Management Plan and the Saturated Soil Water Quality Protection Plan. An evaluation of funding options shall be discussed, including a cooperative agreement with the OHMVR Division, availability of grant funds, and the feasibility of collecting fees from the trail users.
- i) A Construction and Maintenance Procedures Plan that shall contain (a) operating procedures for constructing, maintaining, and/or decommissioning drainage structures, stream crossings, and trail segments, and (b) procedures for training County, Federal, and volunteer groups to ensure that this work is completed to County or Forest Service road maintenance specifications (or equivalent).

Periodic Reports

7. Beginning **30 June 2009 and continuing through 30 December 2010**, the Responsible Parties shall submit quarterly updates describing the progress that has been completed to prepare the *Rubicon Trail Saturated Soil Water Quality Protection Plan* and the *Long Term Management Plan for the Rubicon Trail*.

8. By **15 December of each year (beginning in 2009)**, the Responsible Parties shall submit an *Annual Rubicon Trail Summary* describing trail and maintenance activities, educational activities, and enforcement activities completed during the previous season. The report shall also include (a) the results of an on-the-ground inspection taken after Labor Day to estimate the amount and general locations of human waste present on the trail, and (b) the results of an on-the-ground inspection taken after Labor Day to estimate the amount and general locations of petroleum products present along the trail. These results shall be compared to the results obtained during previous years. The report shall document the amount of human waste that has been picked up off the ground and removed from the trail area each fall, as well as the amount of petroleum contaminated soil which has been removed and/or remediated each fall. Finally, the report shall clearly describe the law enforcement presence on the trail during the year.
9. By **15 May of each year (beginning in 2010)**, the Responsible Parties shall submit an *Annual Trail Maintenance and Activities Plan* that lists the projects to be completed during the upcoming field season, including those projects proposed to be completed by volunteer groups. The report shall also evaluate the previous year's success in preventing and or removing the deposition of human waste and petroleum products, report on the status of projects described in the prior year's plan, and if needed to protect water quality, shall propose additional management practices for the upcoming season.
10. By **15 July of each year (beginning in 2011)**, the Responsible Parties shall submit an *Annual Review of the Saturated Soil Water Quality Protection Plan*. The report shall describe the steps taken to implement the Plan during the previous winter, how successful the implementation was in terms of protecting water quality, the types of enforcement activities to ensure the success, and any proposed changes for the next winter.

Three years after full implementation of the *Long Term Management Plan*, Water Board staff will evaluate (a) whether the Responsible Parties have taken all reasonable steps to protect water quality and (b) whether activities on the Rubicon Trail still impact, or threaten to impact, water quality. Using this information, staff will evaluate whether this Order should be rescinded.

If the Responsible Parties are unable to perform any activity or submit any document in compliance with the schedule set forth herein, or in compliance with any work schedule submitted pursuant to this Order, the Responsible Parties may request, in writing, an extension of the time specified. The extension request shall include justification for the delay. Any extension request shall be submitted as soon as the situation is recognized and no later than the compliance date. An extension may be granted by revision of this Order or by a letter from the Executive Officer. Extension requests not approved in writing by the Executive Officer with reference to this Order are denied.

In accordance with California Business and Professions Code sections 6735, 7835, and 7835.1, engineering and geologic evaluations and judgments shall be performed by or under

the direction of registered professionals competent and proficient in the fields pertinent to the required activities. All technical reports specified herein that contain workplans for, that describe the conduct of investigations and studies, or that contain technical conclusions and recommendations concerning engineering and geology shall be prepared by or under the direction of appropriately qualified professional(s), even if not explicitly stated. Each technical report submitted by the Responsible Parties shall contain the professional's signature and/or stamp of the seal.

Any person signing a document submitted under this Order shall make the following certification: *"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my knowledge and on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."*

If, in the opinion of the Executive Officer, the Responsible Parties fail to comply with the provisions of this Order, the Executive Officer may refer this matter to the Attorney General for judicial enforcement or may issue a complaint for administrative civil liability.

Administrative Civil Liability of up to \$10,000 per violation per day may be imposed pursuant to the CWC sections 13268, 13350, and/or 13385. The Central Valley Water Board reserves its right to take any enforcement actions authorized by law.

Any person aggrieved by this action of the Central Valley Regional Water Board may petition the State Regional Water Board to review the action in accordance with CWC section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Regional Water Board must receive the petition by 5:00 p.m., 30 days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Regional Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at:

http://www.waterboards.ca.gov/public_notices/petitions/water_quality or will be provided upon request.

I, Pamela C. Creedon, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the Central Valley Regional Water Quality Control Board, on 23 April 2009.



PAMELA C. CREEDON, Executive Officer

Appendix F. Rubicon Trail Operating Agreement between El Dorado County and ENF

COUNTY OF EL DORADO

DEPARTMENT OF TRANSPORTATION



MAINTENANCE DIVISION

2441 Headington Road
Placerville CA 95667
Phone: (530) 642-4909
Fax: (530) 642-9238

JAMES W. WARE, P.E.
Director of Transportation

Internet Web Site:
<http://www.edgov.us/dot>

MAIN OFFICE

2850 Fairlane Court
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Phone: (530) 621-5900
Fax: (530) 626-0387



December 30, 2011

Pamela C. Creedon
California Regional Water Quality Control Board
Central Valley Region
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670

Attached is the current draft operating agreement under consideration by the County of El Dorado and the Eldorado National Forest in response to Clean Up and Abatement Order No. R5-2009-0030, Page 9 & 10, Item 6, a through i. Currently this is a draft copy, once a final recommended agreement is reached the agreement will have to go to the El Dorado County Board of Supervisors in January for approval. The Eldorado National Forest Supervisor Kathy Hardy will go through a similar approval process at the Forest Service for approval. Once all parties have approved, I will submit the final version.

El Dorado County appreciates the cooperation and continued support of your staff as we work through the many issues on the Rubicon Trail. This is a very important requirement of the Clean Up and Abatement Order and we do not take it lightly, therefore both agencies are following the proper procedures for approval.

Sincerely,

A handwritten signature in blue ink that reads "Tom Celio".

Tom Celio
Deputy Director
Maintenance & Operations
El Dorado County DOT
2441 Headington Road
Placerville, CA 95667

cc: John Knight, Board of Supervisors, District I
Ray Nutting, Board of Supervisors, District II
Jack Sweeney, Board of Supervisors, District III
Ron Briggs, Board of Supervisors, District IV
Norma Santiago, Board of Supervisors, District V
Terri Daly, El Dorado County Chief Administrative Office
Ed Knapp, El Dorado County County Counsel
Jim Ware, El Dorado County Department of Transportation
Steve Kooyman, El Dorado County Department of Transportation
Kathy Hardy, USDA El Dorado National Forest

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Rubicon Trail BMP Toolbox (Previously Submitted)



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Operating Agreement

CLEANUP AND ABATEMENT ORDER (CAO) No. R5-2009-0030
RUBICON TRAIL

6.
 - a) *A clear definition of each party's responsibilities for the Rubicon Trail, including maintenance activities, education, enforcement, seasonal closure, and all other actions necessary to protect water quality.*

See Draft Memorandum of Understanding, page 12.

b) The results of a Trail Use Count that shall be conducted during 2009 and/or 2010. The results shall describe the expected annual use of the Rubicon Trail, both in terms of vehicles and people.

Rubicon Trail Foundation conducted a trail count in 2009 and 2010.

The 2009 season count resulted in a total of 8,500 users with two people per vehicle average for a total of 4,250 vehicles. In the 2010 season there were 5,000 users with two people per vehicle average for a total of 2,295 vehicles.

It is evident from the count that use is dependent on the weather. In 2010 the snow melt was late and the trail was not desirable to most users until the snow melted. The snow also started early in September which shortened the season.

- c) *An estimate of the number of people and vehicles who can use the Rubicon Trail, in its current condition, without adversely impacting water quality due to sediment, human waste or petroleum discharges. Using the estimate and the Trail Use Count determine whether there is a need to restrict use of the trail to protect water quality. Alternatively, determine whether certain specific improvements will result in the ability for the current number (or an increased number) of people and vehicles to use the trail without impacting water quality. If so, describe those improvements and provide a proposed timeline for their implementation.*

The County of El Dorado estimates the Rubicon Trail can sustain the existing use level in its current condition, recognizing that the trail's condition today is vastly improved over the condition at the time of the order. Installation of the BMP's should be completed in 2012. The bridge schedule is as follows; Gerle in 2012, Ellis in 2013, and the season drainage at the FOTR crossing in 2013.

The trail can sustain the current and increasing use because of the BMP features that have been and will be installed and the bridge projects. The Forest Service and County will conduct annual monitoring. The County of El Dorado will provide routine maintenance to the BMP's and evaluate their effectiveness and make changes accordingly.

Annually volunteer groups provide a year end cleanup of the trail, removing litter and white flowers, cleanup of oil spills and any other routine maintenance needed. The amount of garbage and white flowers has been considerably reduced, but will continue to be monitored annually.

- d) *Documentation of the actual location of the Rubicon Trail within El Dorado County, including the centerline and an agreed-upon width from each side of that line. The documentation shall be in a form that shall be easily understood by both the public and law enforcement officials.*

The County of El Dorado completed a trail survey documenting the trail location. This survey was used when applying to the Forest Service for an easement.

Environmental analysis is being completed to authorize issuance of the easement. A combination of Rubicon Trail signs along the route, centerline reflectors/markers on the ground, and mile markers attached to trees along the trail have been installed and are being maintained. The trail location can be easily understood as the BMP's are completed on the trail.

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- e) *A strategy to address human waste management of the Rubicon Trail. At a minimum, the Responsible Parties must effectively communicate to users the importance of using portable human waste collection devices and WAG bags. The Responsible Parties must also consider the use of portable human waste collection devices and “WAG” bags. This section must contain a feasibility study for installation of permanent toilet facilities along the trail, including information as to how human waste will be removed from the toilets and disposed of. The plan must also contain procedures for annually removing human waste that has been deposited on the ground, where feasible. If the annual human waste inspection does not show significant improvements, then the Responsible Parties must evaluate reducing the number of people using the trail.*

Two restrooms have been installed, one at Loon Lake and the other at Ellis Creek. The availability of these restrooms has greatly improved sanitation issues and there are more restrooms recommended as funding becomes available. Visitors are using WAG bags and portable toilets in greater numbers.

The County and the Forest Service will continue with the educational efforts regarding sanitation, spills and sedimentation with the bandana campaign. This promotion has been very successful and the Yellow Bandana Campaign will continue with kiosk signs, brochures, and handouts.

Results of the 2011 fall clean up by Friends of the Rubicon show that users are responding to the education efforts by cleaning up after themselves and others, and human waste and trash along the trail is decreasing. During the wet season, the County and Forest Service will continue educational efforts regarding trail conditions tread lightly and winter condition etiquette.

The Forest Service has identified additional locations for restroom facilities along the Trail. If approved in the EIS process they will be installed when funding becomes available.

- f) *Procedures to enforce the use of spill kits for containment of liquid and solid wastes generated from vehicle use on the Rubicon trail, as well as procedures for annually removing or mitigating petroleum contaminated soils and rocks, where feasible, on the trail.*

Spill kits will remain available at the Loon Lake kiosk and the County of El Dorado will continue the educational efforts of the Blue Bandana campaign. Hazardous waste material sheds are located at each of the three Rubicon trailheads, and are serviced by El Dorado County Environmental Management. Spill cleanup procedures are provided on the County DOT website and in the BMP Toolbox.

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- g) A discussion of the type of law enforcement officers and the frequency of their patrols that are needed to enforce trail regulations in regard to water quality. Evaluate operations for providing this level of law enforcement, including funding from the responsible parties, an agreement with the OHMVR Division, partnering with OHV user groups, applying for grant funds, and the feasibility of collecting fees from the trail users.*

Currently Law Enforcement is provided every weekend during the Rubicon season by State Parks OHV Division. The season is usually Memorial Day to Labor Day. El Dorado County Sheriff's Department currently patrol Saturday and Sunday. The Forest Service had education and monitoring patrols Thursday through Monday last field season, and occasional law enforcement patrols.

El Dorado County and the Eldorado National Forest have received funding through the OHV Division of State Parks annually for law enforcement activities. The County and Forest Service will continue to seek grant funding for this activity. If the funding becomes unavailable, the county will look for alternative ways to fund law enforcement activities, such as in-lieu funding, or SMUD relicensing revenue. The Forest Service plans to have Forest Protection Officers and Recreation Technicians to patrol, monitor use and resources, and educate visitors.

- h) A discussion of the annual cost to implement the Long Term Management Plan and the Saturated Soil Water Quality Protection Plan. An evaluation of funding options shall be discussed, including a cooperative agreement with the OHMVR Division, availability of grant funds, and the feasibility of collecting fees from the trail users.*

The County of El Dorado has been fortunate to receive grant funding from State Parks, Off- Highway Motor Vehicle Division which provided funding for the maintenance activities, restroom, spill kits and the educational program. The County of El Dorado will continue to seek grant funding. Should the county be unsuccessful in obtaining grant funding, maintenance and operation activities will be funded through the use of in-lieu funding and revenue the county will receive once the SMUD relicensing is completed. Forest Service funding is dependent on Congressional appropriations and external grants.

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- i) *A Construction and maintenance Procedures Plan that shall contain (a) operating procedures for constructing, maintaining, and/or decommissioning drainage structures, stream crossings, and trail segments, and (b) procedures for training County, Federal, and volunteer groups to ensure that this work is completed to County or Forest Service road maintenance specification (or equivalent).*

The County of El Dorado prepared the Rubicon Trail BMP Toolbox which contains information on construction of BMP's for soil providing procedures for constructing, maintaining and/or decommissioning drainage structures, stream crossings, and trail segments. This toolbox also addresses sanitation and spills solutions. This toolbox provides the training for volunteer groups to ensure projects are to road maintenance specifications. The county has a liaison to work with the volunteer groups at each road maintenance volunteer project.

The County has also submitted the Saturated Soil Water Quality Protection Plan that details BMP features and their location along the Trail.

El Dorado County sponsored a Tread Lightly class on May 14, 2011. There will be additional Tread Lightly classes in the future as El Dorado County develops hiking trails in the county the issues are consistently the same, sanitation, garbage and trespass. The Forest Service conducted a G-Y-R trail and road condition training in June.

FS-1500-15 Memorandum of Understanding Sample



USDA Forest Service

OMB 0596-0217
FS-1500-15

FS Agreement No.

08-MU-11091313-
009

**MEMORANDUM OF UNDERSTANDING
Between The
COUNTY OF EL DORADO, DEPARTMENT OF TRANSPORTATION
And The
U.S. FOREST SERVICE,
ELDORADO NATIONAL FOREST**

This MEMORANDUM OF UNDERSTANDING (MOU) is hereby made and entered into by and between the El Dorado County Department of Transportation, hereinafter referred to as the County, and the U.S. Forest Service, Eldorado National Forest, hereinafter referred to as the Forest Service.

Title: Rubicon Trail Operating Agreement

I. PURPOSE: The purpose of this MOU is to document the cooperation between the parties for the operation and maintenance of the Rubicon Trail, in accordance with the following provisions.

II. STATEMENT OF MUTUAL BENEFIT AND INTERESTS:

The County and the Forest Service all have a desire to define each party's responsibilities for the Rubicon Trail, including maintenance activities, education, law enforcement, seasonal closure, and all other actions necessary to protect the resources.

In consideration of the above premises, the parties agree as follows:

III. THE EL DORADO COUNTY DEPARTMENT OF TRANSPORTATION SHALL:

- A. The County is responsible for road maintenance. The Department of Transportation has prepared the Saturated Soil Water Quality Protection Plan (SSWQPP) that is a living document. The SSWQPP documents the Best Management Practice (BMP's) that has been installed to protect water quality. This document also has a monitoring component which will be updated annually as the County maintains documents and analyzes the BMP's.
- B. The County will continue the effort to educate the public on spill cleanup. Spill kits will be available at the kiosk and maintenance of the Hazardous Materials Shed will continue. Spill

cleanup will take place annually as the county provides annual maintenance and at the yearend volunteer clean up.

- C. The County and the Forest Service will continue to provide education regarding sanitation issues on the trail. WAG Bags will be available at the kiosk as funding is provided. The two agencies will work together to provide restroom facilities as funding becomes available.
- D. The County has completed a survey and documentation of the trail. This survey was used to apply for the easement from the Forest Service. The county will prepare a map which will be located at the trail heads. The County will continue to work with the volunteers to provide trail markers where needed.
- E. The County will continue to work with the Forest Service and volunteer groups on the Rubicon Trail, recognizing the value of the volunteer their efforts and support are critical.
- F. The County will continue with a law enforcement presence on the Rubicon. The County will work with the Forest Service and State Parks to provide coverage through the Rubicon high-use season and during the winter as staffing allows.
- G. The County and the Forest Service will continue to work together to resolve issues as they develop on the trail, continue the educational bandana campaign and continue to work together for the preservation of the Rubicon Trail.

IV. THE FOREST SERVICE SHALL:

- A. The Forest Service and the County of El Dorado will continue to provide education regarding sanitation issues on the trail. WAG Bags will be available at the kiosk as funding is provided. The two agencies will work together to provide restroom facilities as funding becomes available.
- B. The Forest Service has accepted an application for an easement for the Rubicon Trail from the County and is completing NEPA analysis to issue the authorization.
- C. The Forest Service will continue to work with the County and volunteer groups on the Rubicon Trail, recognizing the value of the volunteer their efforts and support are critical.
- D. The Forest Service will continue with a law enforcement and education presence on the Rubicon. The Forest Service will work with the County Sheriff and State Parks to provide coverage through the Rubicon high-use season and during the winter as staffing allows.
- E. The Forest Service and the County will continue to work together to resolve issues as they develop on the trail, continue the educational bandana campaign and continue to work together for the preservation of the Rubicon Trail.
- F. Forest Service is responsible for dispersed camping and will manage it following the forest plan.

V. IT IS MUTUALLY UNDERSTOOD AND AGREED BY AND BETWEEN THE PARTIES THAT:

- A. PRINCIPAL CONTACTS. Individuals listed below are authorized to act in their respective areas for matters related to this instrument.

Principal Cooperator Contacts:

El Dorado County Contact	El Dorado DOT Contact
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Name: Jack Sweeney, Supervisor Address: City, State, Zip: Placerville, CA 95667 Telephone: 530- FAX: 530- Email: bosthree@edcgov.us	Name: Tom Celio Address: 2441 Headington Road City, State, Zip: Placerville, CA 95667 Telephone: 530-642-4905 FAX: 530-642-9238 Email: tom.celio@edcgov.us
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Principal Forest Service Contacts:

Forest Service Program Contact	Forest Service Administrative Contact
Name: Kathryn Hardy Address: 100 Forni Road City, State, Zip: Placerville, CA 95667 Telephone: 530-621-5206 FAX: 530-621-5282 Email: kdhardy@fs.fed.us	Name: Address: City, State, Zip: Telephone: FAX: Email:

- B. **NON-LIABILITY.** The Forest Service does not assume liability for any third party claims for damages arising out of this MOU.
- C. **NOTICES.** Any communications affecting the operations covered by this agreement given by the Forest Service or the Cooperator is sufficient only if in writing and delivered in person, mailed, or transmitted electronically by e-mail or fax, as follows:
- To the Forest Service Program Manager, at the address specified in the MOU.
- To Cooperator, at the Cooperator's address shown in the MOU or such other address designated within the MOU.
- Notices are effective when delivered in accordance with this provision, or on the effective date of the notice, whichever is later.
- D. **PARTICIPATION IN SIMILAR ACTIVITIES.** This MOU in no way restricts the Forest Service or the Cooperator(s) from participating in similar activities with other public or private agencies, organizations, and individuals.
- E. **ENDORSEMENT.** Any Cooperator contributions made under this MOU do not by direct reference or implication convey Forest Service endorsement of the Cooperator's products or activities.
- F. **NONBINDING AGREEMENT.** This MOU creates no right, benefit, or trust responsibility, substantive or procedural, enforceable at law or equity. The parties shall manage their respective resources and activities in a separate, coordinated and mutually beneficial manner to meet the purposes(s) of this MOU. Nothing in this MOU authorizes any of the parties to obligate or transfer funds. Specific projects or activities that involve the transfer of funds, services, or property among the parties

require execution of separate agreements and are contingent upon the availability of appropriated funds. These activities must be independently authorized by statute. This MOU does not provide that authority. Negotiation, execution, and administration of these agreements must comply with all applicable law. Each party operates under its own laws, regulations, and policies, subject to the availability of appropriated funds. Nothing in this MOU is intended to alter, limit, or expand the agencies' statutory and regulatory authority.

- G. MEMBERS OF U.S. CONGRESS. Pursuant to 41 U.S.C. 22, no United States member of, or United States delegate to, Congress shall be admitted to any share or part of this MOU, or benefits that may arise there from, either directly or indirectly.
- H. FREEDOM OF INFORMATION ACT (FOIA). Public access to MOU or agreement records must not be limited, except when such records must be kept confidential and would have been excepted from disclosure pursuant to Freedom of Information regulations (5 U.S.C. 552).
- I. TERMINATION. Any of the parties, in writing, may terminate this MOU in whole, or in part, at any time before the date of expiration.
- J. DEBARMENT AND SUSPENSION. The Cooperator shall immediately inform the Forest Service if they or any of their principals are presently excluded, debarred, or suspended from entering into covered transactions with the federal government according to the terms of 2 CFR Part 180. Additionally, should the Cooperator or any of their principals receive a transmittal letter or other official Federal notice of debarment or suspension, then they shall notify the Forest Service without undue delay. This applies whether the exclusion, debarment, or suspension is voluntary or involuntary.
- K. MODIFICATIONS. Modifications within the scope of this MOU must be made by mutual consent of the parties, by the issuance of a written modification signed and dated by all properly authorized, signatory officials, prior to any changes being performed. Requests for modification should be made, in writing, at least 30 days prior to implementation of the requested change.
- L. COMMENCEMENT/EXPIRATION DATE. This MOU is executed as of the date of the last signature and is effective through December 31, 2016 at which time it will expire, unless extended by an executed modification, signed and dated by all properly authorized, signatory officials.
- M. AUTHORIZED REPRESENTATIVES. By signature below, each party certifies that the individuals listed in this document as representatives of the individual parties are authorized to act in their respective areas for matters related to this MOU. In witness whereof, the parties hereto have executed this MOU as of the last date written below.

JAMES D. SWEENEY, Supervisor El Dorado County Board of supervisors	Date
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TOM CELIO, Deputy Director
El Dorado County Department of Transportation

Date

KATHRYN D. HARDY, Forest Supervisor
U.S. Forest Service, Eldorado National Forest

Date

The authority and format of this instrument has been reviewed and approved for signature.

U.S. Forest Service Grants & Agreements
Specialist

Date

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69.1 - Exhibit 01--Continued



USDA Forest Service

OMB 0596-0217
FS-1500-15

Burden Statement

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0596-New. The time required to complete this information collection is estimated to average XX minutes/hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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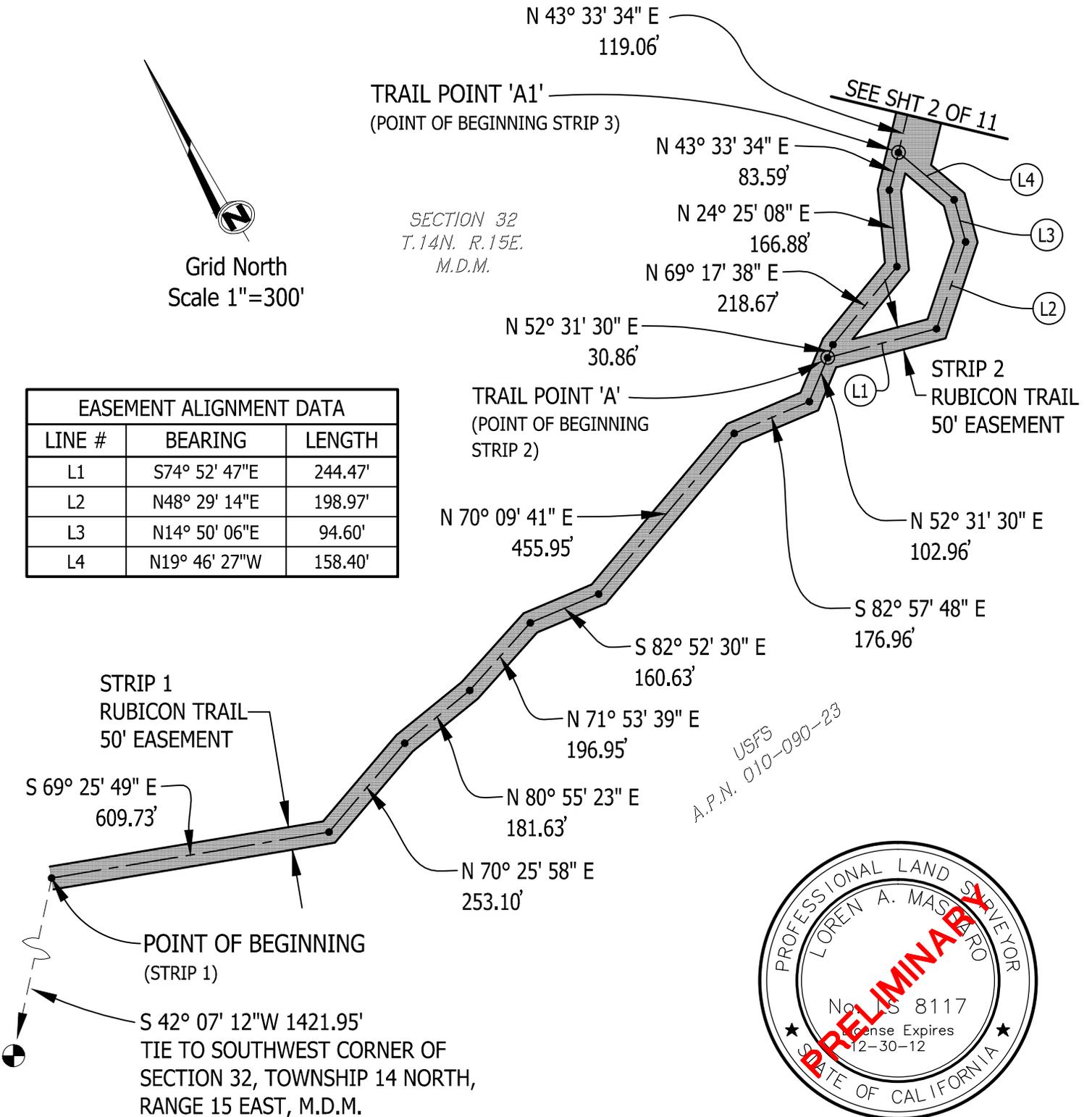
Situate in Sections 28, 32, 33, and 34 Township 14 North, Range 15 East, M.D.M. ,
 El Dorado County and Placer County, State of California and Section 2 Township 13
 North, Range 15 East, M.D.M. and Section 6 Township 13 North, Range 16 East, M.D.M.
 El Dorado County, State of California



Grid North
 Scale 1"=300'

SECTION 32
 T. 14N. R. 15E.
 M.D.M.

EASEMENT ALIGNMENT DATA		
LINE #	BEARING	LENGTH
L1	S74° 52' 47"E	244.47'
L2	N48° 29' 14"E	198.97'
L3	N14° 50' 06"E	94.60'
L4	N19° 46' 27"W	158.40'

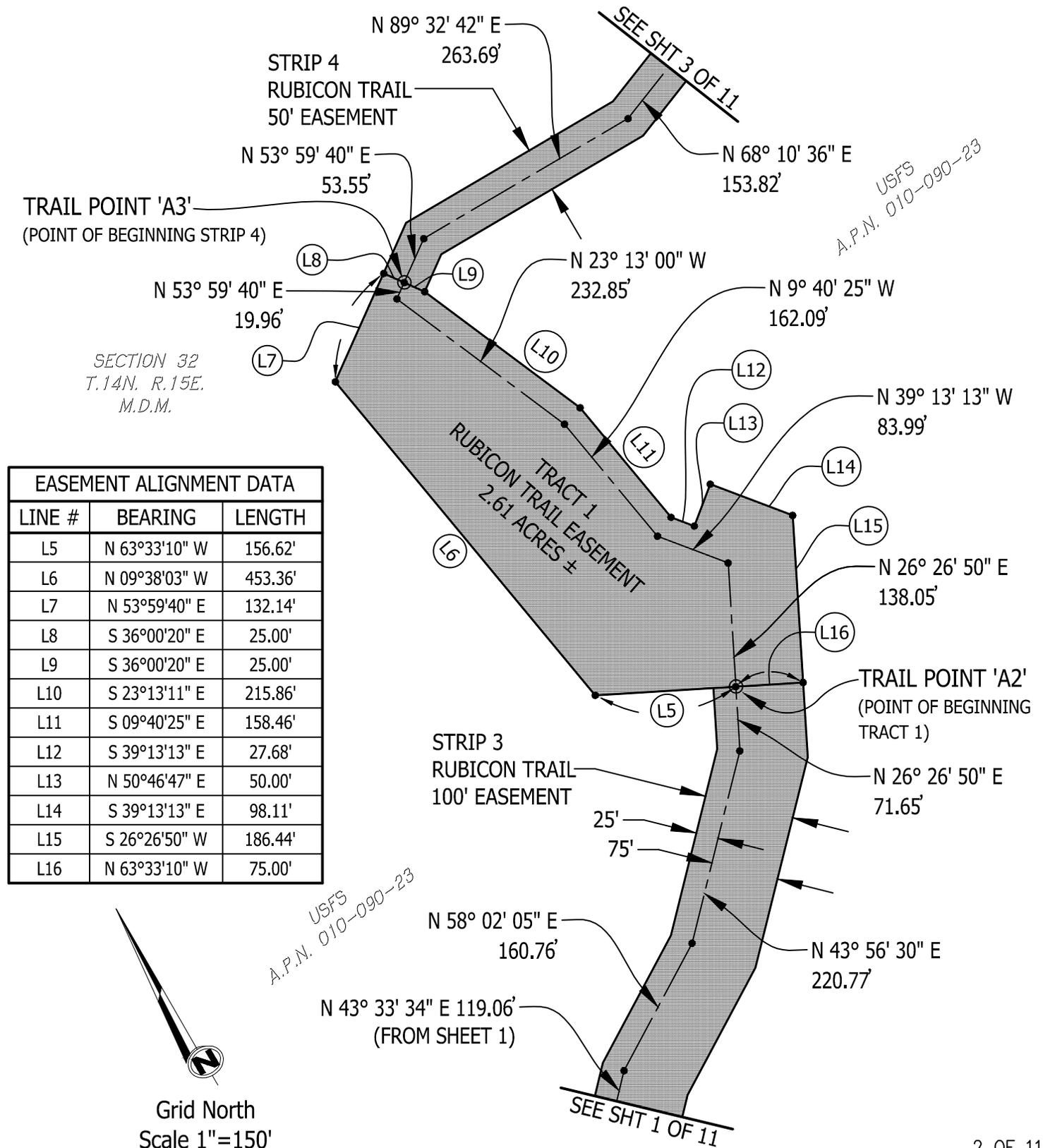


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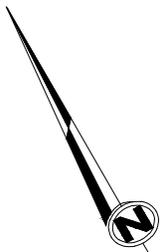
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 El Dorado County, State of California



SECTION 32
 T.14N. R.15E.
 M.D.M.

EASEMENT ALIGNMENT DATA		
LINE #	BEARING	LENGTH
L5	N 63°33'10" W	156.62'
L6	N 09°38'03" W	453.36'
L7	N 53°59'40" E	132.14'
L8	S 36°00'20" E	25.00'
L9	S 36°00'20" E	25.00'
L10	S 23°13'11" E	215.86'
L11	S 09°40'25" E	158.46'
L12	S 39°13'13" E	27.68'
L13	N 50°46'47" E	50.00'
L14	S 39°13'13" E	98.11'
L15	S 26°26'50" W	186.44'
L16	N 63°33'10" W	75.00'



Grid North
 Scale 1"=150'

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 El Dorado County, State of California

EASEMENT ALIGNMENT DATA		
LINE #	BEARING	LENGTH
L17	N 6° 37' 15" W	126.20'
L18	N 75° 57' 16" E	179.40'
L19	N 65° 53' 22" E	209.75'
L20	S 60° 31' 04" E	90.44'
L21	N 38° 28' 48" E	53.99'
L22	N 38° 28' 48" E	86.00'
L23	N 12° 02' 55" E	274.43'
L24	N 46° 41' 45" E	157.81'
L25	S 82° 08' 30" E	96.42'
L26	N 41° 34' 13" E	247.33'
L27	N 35° 06' 11" E	120.01'
L28	N 63° 18' 49" E	239.26'
L29	N 36° 57' 48" E	211.94'
L30	N 65° 29' 42" E	148.11'
L31	N 60° 35' 35" E	46.23'
L32	N 26° 47' 27" E	50.69'
L33	N 23° 12' 07" E	204.41'
L34	N 29° 29' 14" E	80.49'
L48	S 74° 30' 54" E	88.99'
L49	N 70° 35' 32" E	86.03'
L50	S 84° 18' 53" E	142.24'
L51	N 60° 30' 11" E	243.27'
L52	N 48° 19' 03" E	188.13'
L53	N 11° 18' 59" E	181.99'
L54	N 28° 20' 44" W	151.21'
L55	N 15° 44' 26" E	244.71'

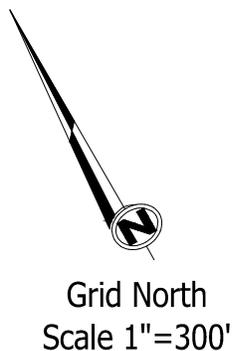
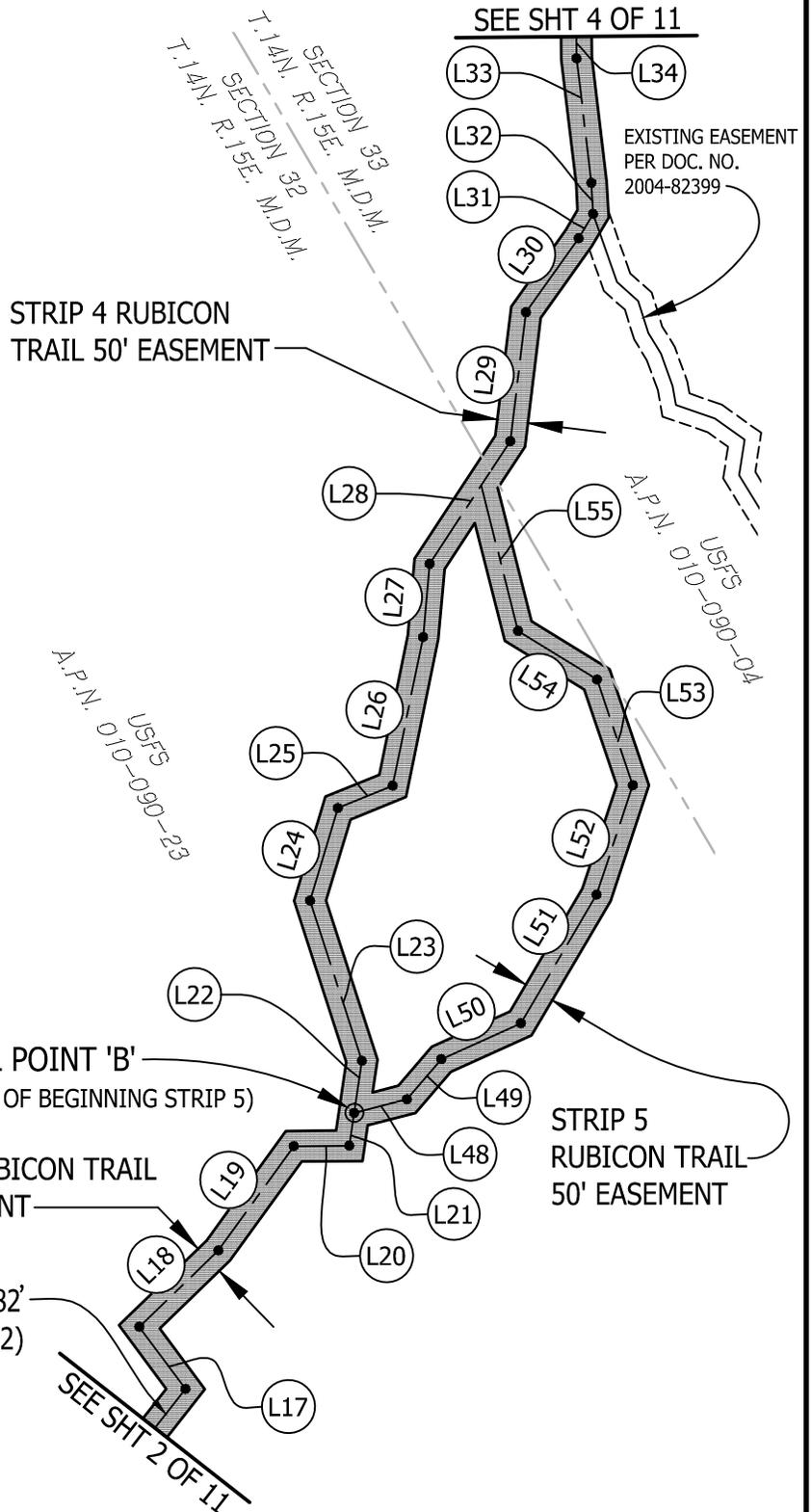


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 El Dorado County, State of California

EASEMENT ALIGNMENT DATA		
LINE #	BEARING	LENGTH
L35	N 44° 00' 09" E	100.99'
L36	N 40° 05' 11" E	50.06'
L37	N 32° 40' 56" E	48.44'
L38	N 26° 14' 06" E	68.70'
L39	N 18° 52' 21" E	60.34'
L40	N 08° 30' 06" E	103.82'
L41	N 04° 39' 09" E	99.03'
L42	N 10° 27' 39" E	99.38'
L43	N 00° 08' 34" W	44.79'
L44	N 13° 30' 32" E	51.85'
L45	N 09° 55' 47" E	103.87'
L46	N 26° 39' 04" E	71.33'
L56	N 03° 49' 01" E	122.55'
L57	N 42° 31' 09" E	62.70'
L58	N 19° 00' 24" E	102.93'
L59	N 31° 32' 18" E	27.33'
L60	N 17° 08' 26" W	139.03'
L61	N 16° 26' 25" E	95.40'
L62	N 34° 08' 37" E	52.56'
L63	N 49° 30' 50" E	26.95'
L64	N 86° 33' 51" E	326.25'
L65	S 71° 10' 48" E	183.11'
L66	S 78° 38' 03" E	174.36'
L67	N 26° 13' 09" E	96.59'
L68	S 77° 15' 21" E	178.49'
L69	N 57° 49' 19" E	71.31'
L70	S 85° 25' 28" E	136.53'

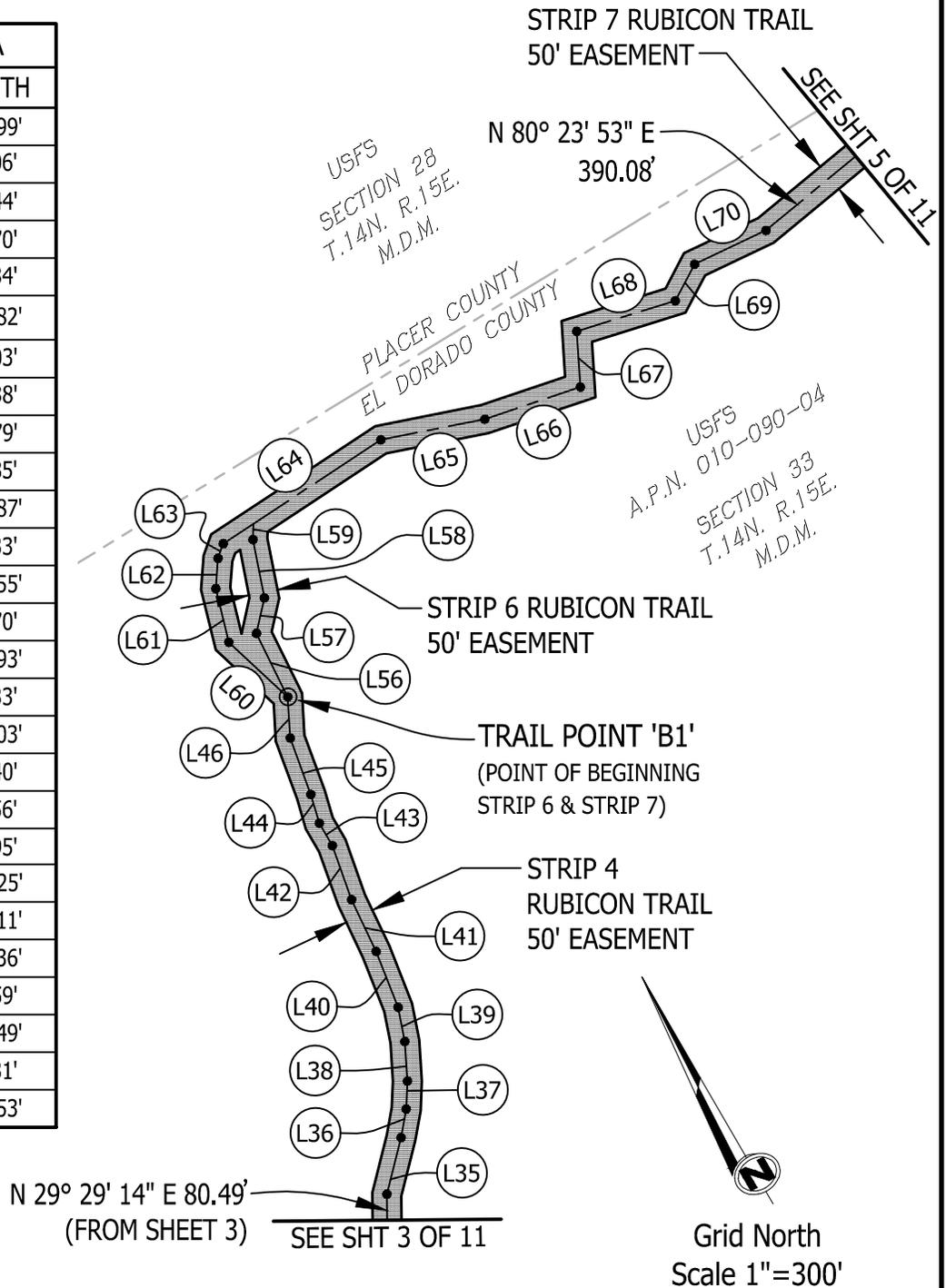


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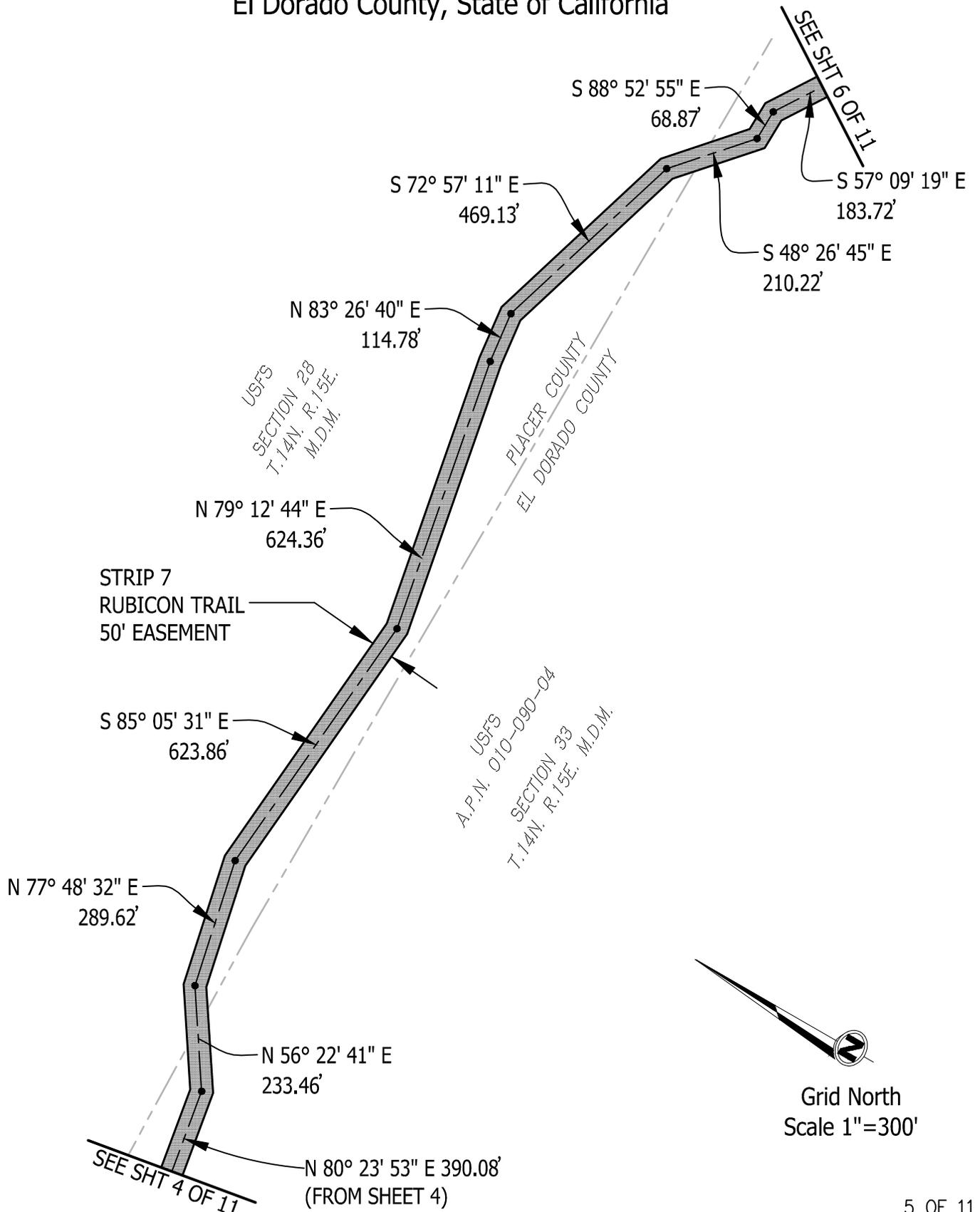


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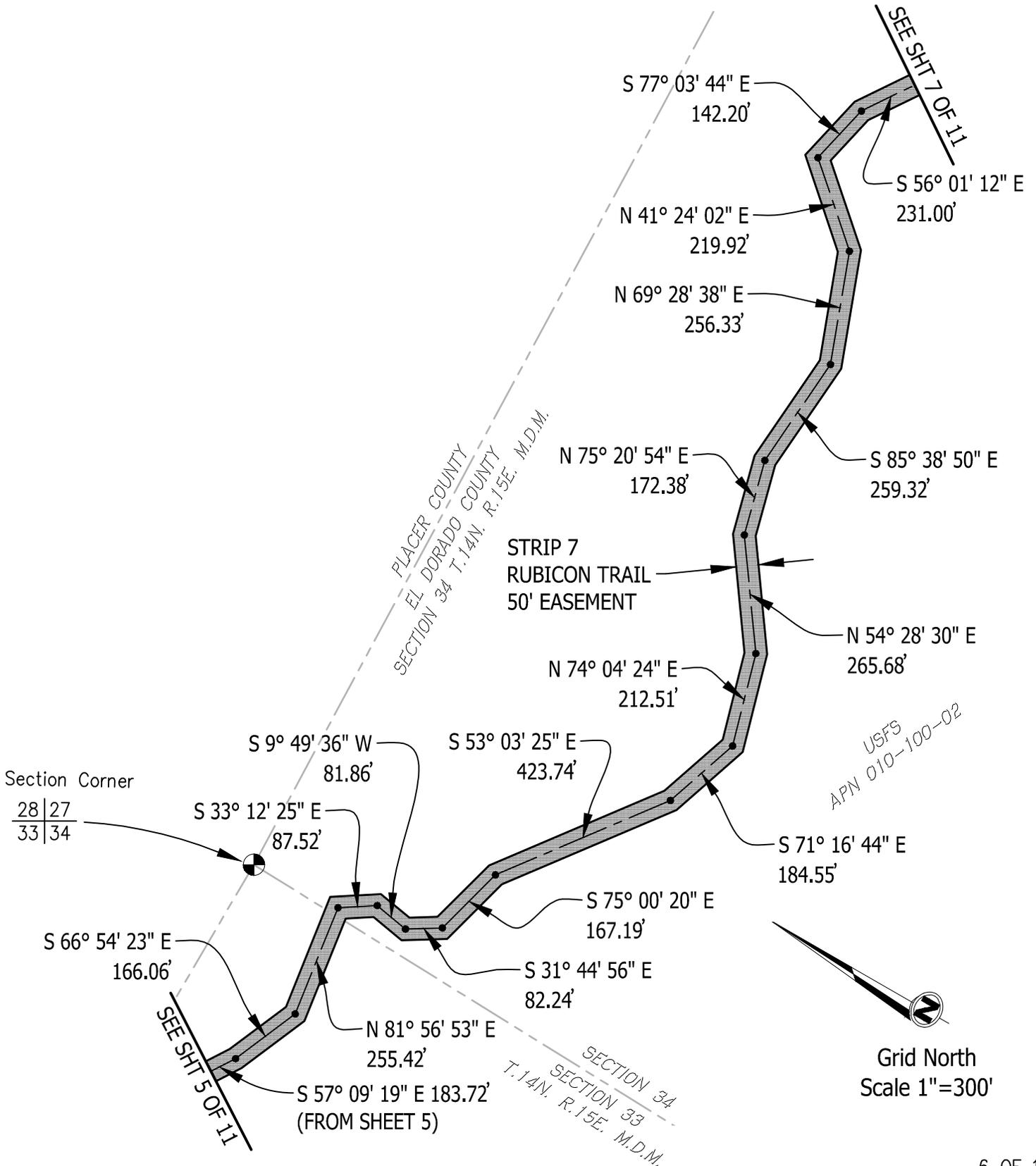


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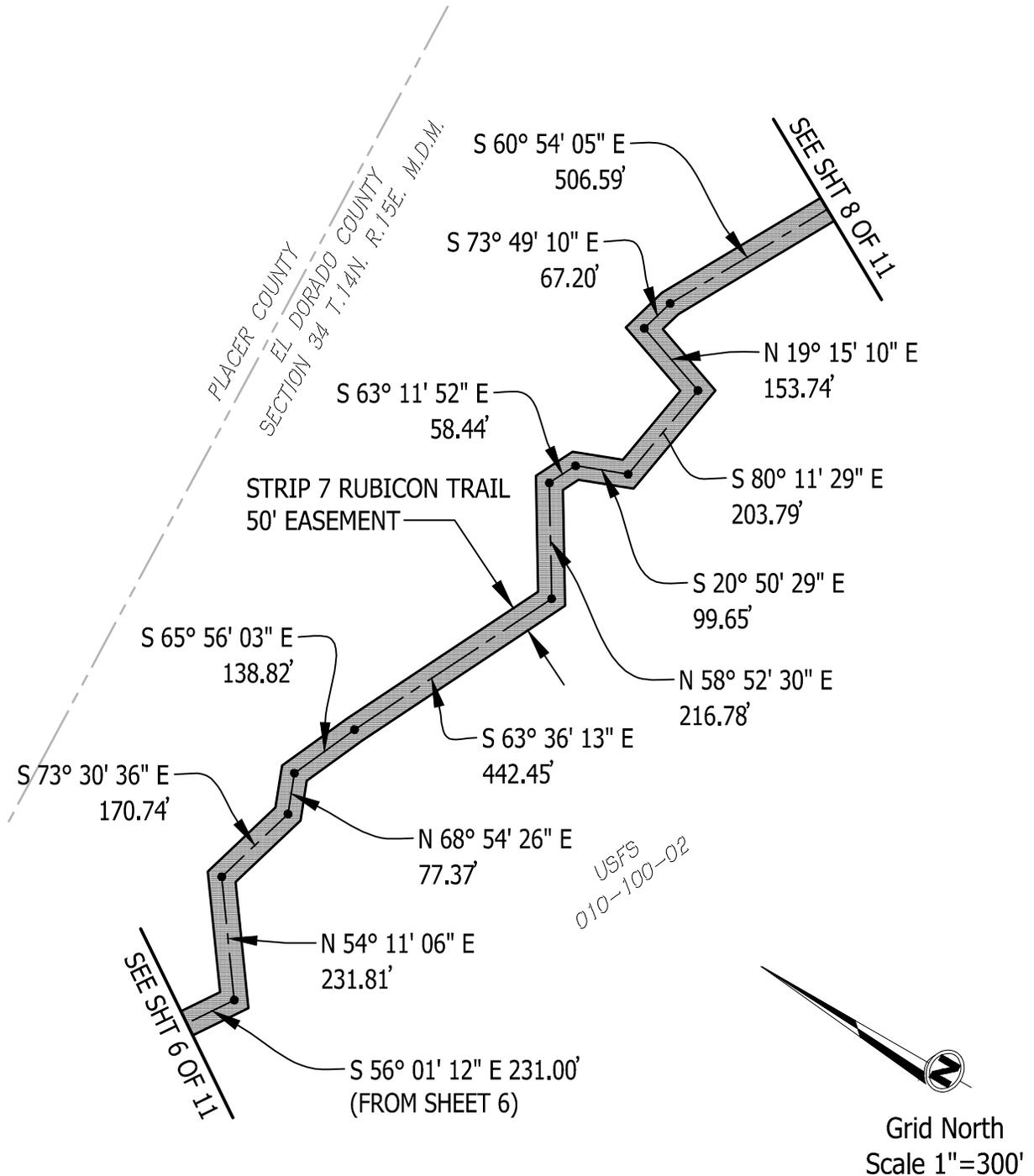


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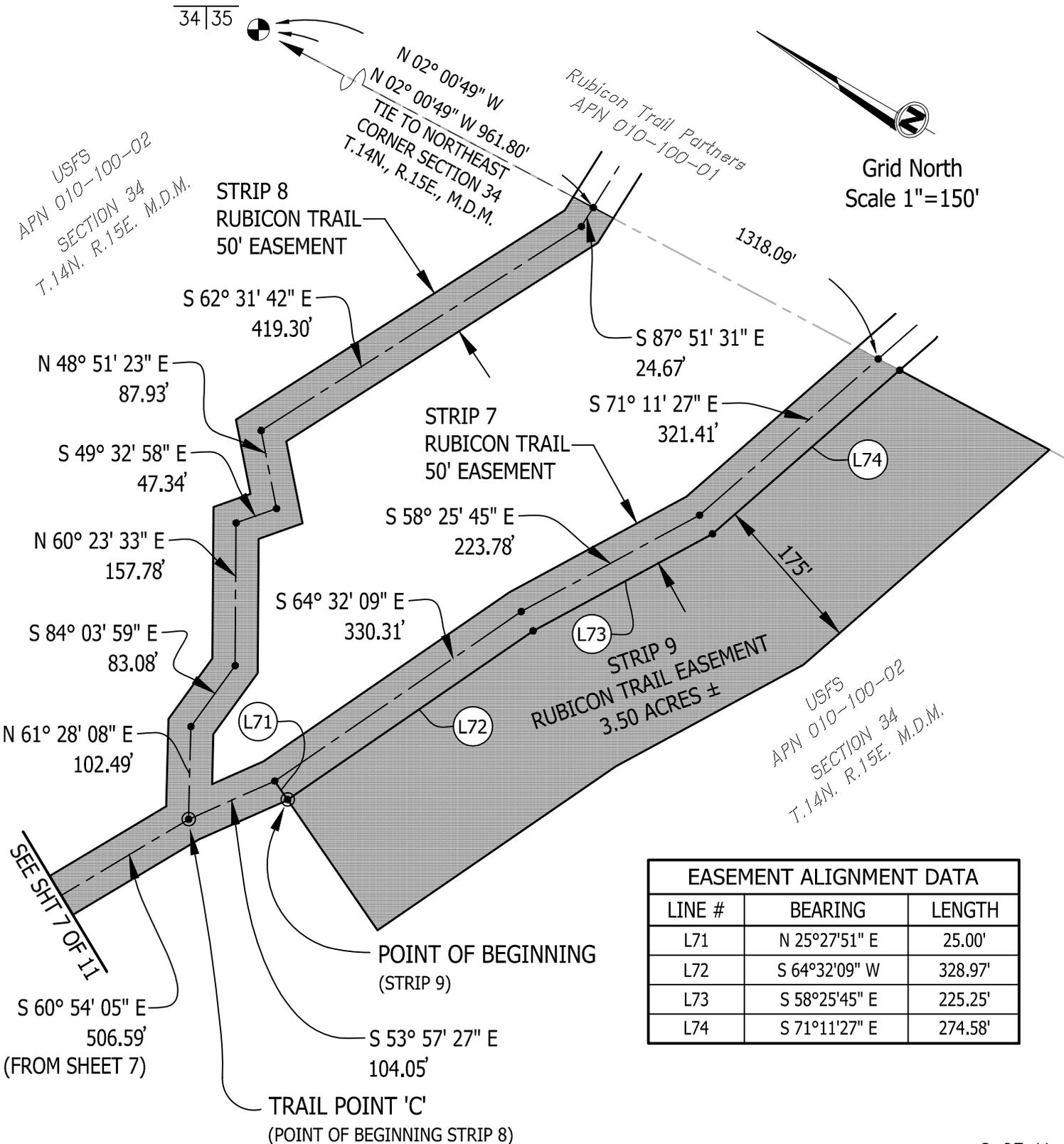


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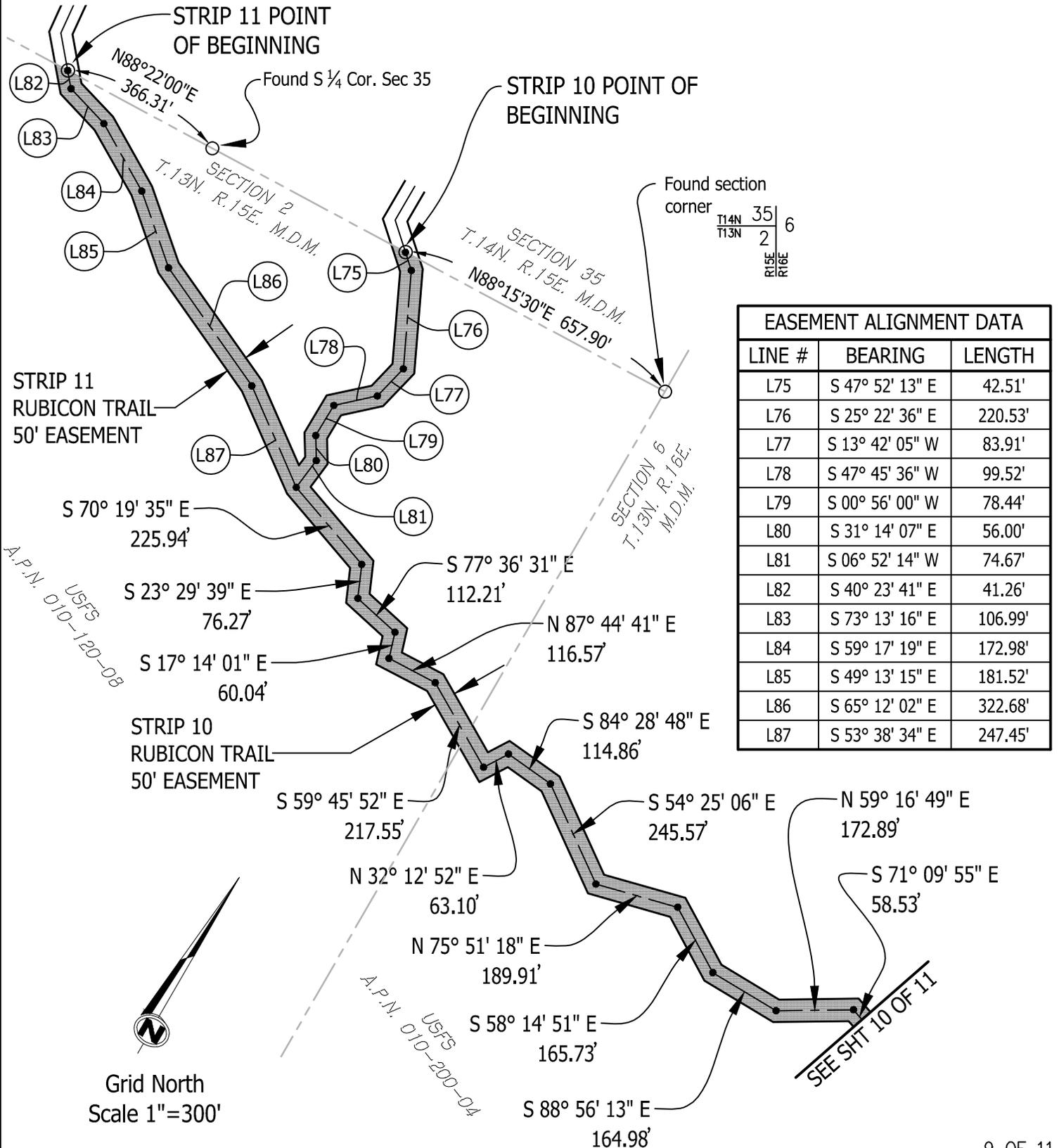


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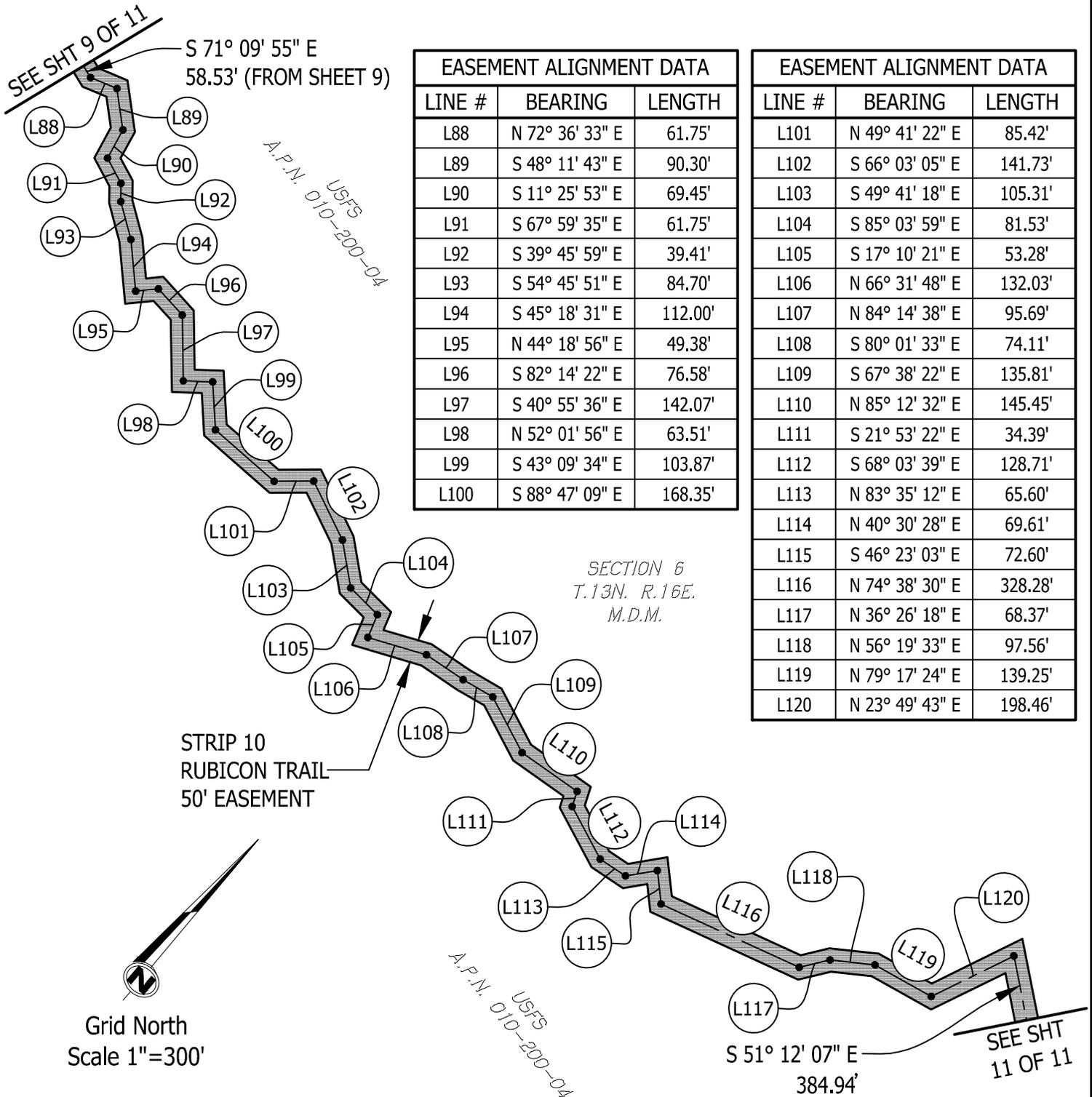


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