

Exhibit 2

Lassen National Forest

2009 Engineering Reports of Motorized

Mixed Use on National Forest System Roads

Please note, these reports were sent to Sylvia Milligan incomplete. We did not alter them in any way.

Table 3 in Exhibit 1 is based on a more complete version of the reports. There are still many boxes throughout the reports where the text is incomplete. The Lassen NF said this was due to the box format, but did not send us the missing text.

Elizabeth Norton

From: Elizabeth Norton [bobliz@frontiernet.net]
Sent: Wednesday, January 06, 2010 1:58 PM
To: 'Chris J Obrien'; 'David Pilz'
Cc: 'Sylvia Milligan'
Subject: Map Request and Engineering Analysis questions

Hi Chris and Dave, could I please get a copy of the Alt. 5 map (showing all new routes, mixed use, ML 2 changes, and a 2nd Alt. 5 map showing these routes with the proposed seasonal restrictions?

Also, I'd like the Alt. 1 map showing all unauthorized routes. If possible, could I pick these 3 maps up tomorrow when I'm in Chester?

The Engineering Analyses have several text boxes with incomplete sentences as if a page is missing. Could you pls. send me the missing page for the following roads?

28N70, see page 7 bottom for missing text
31N17, page 7 bottom
32N02, page 8 bottom
32N12, page 10 bottom
32N13, page 10 bottom
32N22, pages 8 and 9 bottom
35N10, page 9 bottom
35N10 (Negro Camp Spring), page 8 bottom
36N18 (Six Mile Hill), page 8 bottom
36N18, DR 18 Road has no photos with the report. Pls. send.

For several roads such as 35N04, 35N08 and 36N18, the study segments are not displayed on the road map so I'm not clear which segment(s) was analyzed. The map scale is very small to read the intersecting road #s. Other road maps are very clear. Is there a reason why some maps have arrows displaying the study segments and many others don't?

Thank you for your assistance. Sylvia said she also requested a complete copy of the engineering analyses, so she's appreciate the missing pages as well. Liz

Engineering Report:

Lassen National Forest

Almanor Ranger District

Analysis of

National Forest System Road (NFSR)

28N70

for Motorized Mixed Use Designation

Forest: Lassen

District: Almanor

Road Number: 28N70

Road Name: Turner Mountain Lookout

Introduction: Turner Mountain is located on the west slope of the Lassen National Forest (LNF), approximately 3 miles south of Mineral, CA. NFSR 28N70 begins at NFSR 29N48 (Turner Mountain Loop) and ends at the summit of Turner Mountain. The entire road is currently managed by LNF as open only to highway-legal vehicles. This was based on a previous management decision to classify and manage all roads providing access to lookouts as operational and objective maintenance level 3 roads.

Each of the two road segments were recommended in the LNF Travel Analysis (2008) for an engineering analysis of motorized mixed use. The purpose of this engineering analysis is to investigate the potentials, and associated risks, for transporting both highway-legal vehicles (motor vehicles, including the operators, that are licensed or certified for general operation on public roads within the State) and non-highway-legal vehicles (motor vehicles, including the operators, that are not licensed or certified for general operation on public roads within the State) from the beginning termini to the end termini. The LNF Travel Analysis (June 2008) identified this road section as a potential destination and connection for recreational off-highway vehicle (OHV) loop opportunities on the adjacent road network, of which is a portion is currently managed as open to non-highway-legal vehicle use.

Study Segment road data from the forest transportation atlas:

Beginning Mile Post: 0.7 Ending Mile Post: 4.2

Traffic Service Level: A B C D

Objective Maintenance Level: 1 2 3 4 5

Operational Maintenance Level: 1 2 3 4 5

Maintenance by: **Forest Service (FS)**

Non-Forest Service ROW or jurisdiction? Yes No

Any road use agreements, maintenance agreements, or other encumbrances?

Yes No

Description of agreements or encumbrances:

No agreements are documented in the atlas; however, there is a cell phone tower at the summit and it is expected a Special Use Permit was issued by Almanor Ranger District for this commercial communication site. In addition, State employees were observed maintaining radio communications equipment at the summit.

Subject to Highway Safety Act? Yes No

Non-highway-legal vehicles currently permitted? Yes No

Is motorized mixed use consistent with State and local laws? Yes No

The proposed segment would be consistent with California Vehicle Code (CVC), Combined Use Highways Designation (CVC Division 16.5, Chapter 2, Article 1, Section 38026) if limited to **less than 3** consecutive miles on maintenance level 3+ roadways. Based on the CVC and Forest Service Region 5 guidelines, the designation of motorized mixed use requires California Highway Patrol notification prior to designation. Based on the response from the CHP

commissioner, the Forest may reconsider the decision to designate MMU and/or may adjust mitigation measures needed for implementation.

Based on the Forest Service purpose and need of allowing all motor vehicles on this segment, designation for motorized mixed use would involve the preemption of state law if the road is to remain a highway.

Description of road management objectives (RMOs), existing use, and proposed use:

The road currently serves as a local road and provides access to an administrative site (2 inactive lookouts, interagency radio communication site) and the Pear Lake trailhead. Traffic associated with maintaining these communication sites is expected throughout the year on this road.

The road has traditionally served commodity extraction, fire suppression (including providing access to a lookout tower), and recreation.

The road is appropriately posted with horizontal route identification markers. However, the road is currently maintained at a maintenance level 2 standard. In addition, an advisory sign stating "All Wheel Drive Road" exists approximately 0.5 miles from the summit; this statement contradicts with the assignment maintenance level of the road.

Most of the year it is currently managed as open only to highway legal traffic; however, when snow-covered the road serves as a groomed trail for both skiers and snowmobiles. The road is considered a highway by the forest service and is managed in accordance with the Highway Safety Act.

The study segment is proposed for designation of motorized mixed use to allow both highway-legal and non-highway-legal vehicles to utilize the roadway. Operators of any motor vehicle would be required to be in possession of a valid state driver's license.

General Considerations:

All motor vehicle operators need to be cognizant of the applicable state laws, and how they pertain to each age group, vehicle type, and national forest system road classification (see next bullet).

Through authorities delegated by the Secretary, the Forest Service may restrict or control use to meet road management objectives (36 CFR 212.5). The LNF currently manages this road as a highway, in accordance with the Highway

Safety Act. The road is therefore subject to the provisions of the California Vehicle Code (CVC) for highways.

State OHV Regulations: any motor vehicle must have a street-legal license plate to operate on highways. To operate on public lands, off of highways, motor vehicles must have either a street-legal license plate or a red sticker or a green sticker. For more information, see the CA State Parks Off-Highway Motor Vehicle Recreation site, available @ <http://ohv.parks.ca.gov/>

California has:

- requirements for ATV safety
- conditions for operating ATVs
- OHV equipment requirements
- OHV operation requirements

Summary of Findings:

Implementing the universal mitigation measures, especially improved signing and better communication, will reduce crash probability.

Road mitigation should be prioritized regardless of mixed use, along with implementing a comprehensive communication, management, and enforcement plan. Associated implementation costs will depend on the designated allowed use for the road.

The road transitions from an apparent operational maintenance level 3 road (lower 2.5 miles) with a lack of maintenance into a road better suited to an operational maintenance level 2 classification (upper 0.6 miles). The "all wheel drive road" signing, although not in appropriate warning sign format or color, correctly identifies that the upcoming section is recommended for high clearance vehicles with four wheel / all wheel drive.

To quote the Lassen National Forest Winter Recreation Guide, "the old jeep road to Turner Mountain can be difficult as the road is narrow."

The road is maintained to a standard allowing efficient passenger car through traffic at speeds up to 30 mph for reasonable and prudent drivers on straightaways. Speeds along the upper section are estimated at approximately 5 mph.

Designating the road segment for motorized mixed use, with mitigation, results in a risk assessment of low crash probability and moderate crash severity.

Implementing mitigation measures will reduce crash probability.

Factors Considered:

1. Operator considerations:

- The Lassen National Forest currently manages this road as a highway, in accordance with the Highway Safety Act. The road is subject to the provisions of the California Vehicle Code (CVC) for highways.
- The current use on NFSR 28N70 appears to be consistent with state law and forest policy for operational maintenance level 3 roads.
- The last section of roadway would be challenging for passenger vehicles accessing the summit and trailhead. The road condition currently requires slower speeds to navigate obstacles, erosion, and steep sections.
- Administrative traffic was observed on the road (state employees maintaining radio communication site).

2. Crash history:

At the time of this analysis, there are no records of vehicle crashes on this road.

3. Traffic volume and type:

Non-highway-legal vehicles:

< 12 inch tread width < 50 inch tread width >50 inch tread width

Highway-legal vehicles:

< 12 inch tread width < 50 inch tread width >50 inch tread width

Passenger cars Commercial vehicles Recreation vehicles (RV's)

Vehicle distribution from a 2-hour observation, beginning Tuesday 6/10/08 @ 1430 and ending @ 1630

1 vehicle: 4 x 4 Suburban, administrative

4. Speed - Anticipated average speed (85th percentile):

The speed greatly varies, depending on the roadway conditions. Along the first 2.5 miles, the 85th percentile would be estimated at 25-30 mph based on observation and engineering judgment. Straightaways allow for higher speeds. The upper 0.6 miles would accommodate an 85th percentile speed of approximately 5 mph.

5. Road surface type:

MP 0 to 4.2: native material

* the upper switchbacks have sections of spot-surfacing, approx 2" minus river rock - type aggregate

6. Intersections with other roads and trails:

The study segment begins at the intersection with an adjacent operational maintenance level 2 road, NFSR 28N28. Although NFSR 28N28 is assigned a lower maintenance level, the entrance is not maintained in accordance. NFSR 28N28 appears to be maintained at a higher standard based on the initial 200' visible from this intersection and lacks the appropriate entrance treatments needed to provide for the appropriate traffic management strategies (discourage or prohibit passenger cars – *or* – accept or discourage high-clearance vehicles). The current intersection may result in higher traffic merging speeds.

NFSR 28N70 also intersects with an unauthorized road, ULA191B. This intersection is located at approximately the point where the roadway condition of NFSR 28N70 changes into a high clearance vehicle route. The unauthorized route is being considered for addition to the forest transportation system and connects with another operational maintenance level 3 road, NFSR 29N48.

7. Other roadway factors:

- Roadway alignment was adequate for the assigned maintenance level in the lower sections; however, the alignment of the final 0.6 miles was appropriate for a maintenance level 2 road.
- The road was maintained with a traveled way width of 12' - 14'. The roadway narrows as the route nears the summit.
- Drainage along the lower portion of the road features include an inside

- The upper portion of the road is eroding, various gullies occur in the traveled way.
- The portion of NFSR 28N70 in the study is a single-lane road with occasional turnouts.
- Summer and fall seasons will experience peak use, winter and spring can bring snowy and icy conditions along with snowmobile traffic.

8. Roadside conditions:

- The initial road identification sign was found damaged and laying in the brush near the proper location.
- Roadside brush (manzanita) was beginning to encroach upon the traveled way in multiple sections; this should be removed to provide for improved sight distance.
- Windthrow, in multiple sections, fell across the roadway. This was removed through various methods and requires removal from the ditches and traveled way.

9. Risk without mitigation:

Lower portion, MP 0.7 to 3.6:

Crash probability: High Med Low

Crash severity: High Med Low

Upper portion, MP 3.6 to 4.2:

Crash probability: High Med Low

Crash severity: High Med Low

Crash probability was assessed based on factors including:

- **Operator considerations, traffic volume, rates of speed, alignment, sight distance, traveled way surface and width, drainage, roadside conditions.**

Crash severity was assessed based on factors including:

- **Roadway geometry (embankments, slopes, horizontal and vertical alignments), speed, traffic types and difference in vehicle sizes, difference in speeds of OHVs and full-size passenger vehicles, potential path and objects encountered if a vehicle left the traveled way.**

Alternatives and Mitigation Measures:

Alternatives and mitigation measures are presented to assist with safe road management. They are to be considered, should the agency have the appropriate time, workload, and funding based on competing priorities.

For all situations, the following mitigation measures apply:

- Clear communication and education to the visitors on allowed uses, safe motor vehicle use, and natural resources (informational signing and kiosks, maps, website, etc.).
- Improved route identification signing. Repair and replace devices as needed.
- Clear brush, especially along curves, to improve sight distance.
- Combine the appropriate enforcement measures with the allowed uses for the road.
- Coordinate with other agencies to improve enforcement consistency.
- Utilize a monitoring program to better determine the appropriate management strategy for the types of use, new technologies, changes in visitor demands, and resource protection measures.
- Remove the existing brown-on-white sign stating "All Wheel Drive Road" and replace with a combination of appropriately colored warning and forest road destination signing.

In addition, these mitigation measures would apply to the following alternatives. Although the following alternatives are not comprehensive for the situation, they represent the most likely and/or practical options based on engineering judgment.

Alternative 1: Designate the road segments as "open to highway-legal vehicles only". Manage the road in accordance with maintenance level 3 standards.

- Maintain all roadway signing to MUTCD standards.
- Consider designing new trails, a new trailhead, and/or a new camping area to provide better opportunities for non-highway-legal motor vehicle traffic to access the area and the adjacent maintenance level 2 roads.
- Approximate Implementation Cost: \$ 0
- Expected risk:

Crash probability: High Med Low

Crash severity: High Med Low

Alternative 2: Designate the road segments as “open to all motor vehicles”, including highway-legal and non-highway-legal vehicles. Change the upper portion of the roadway to operational maintenance level 2 to accurately reflect current conditions.

- Recognize that this situation would involve different allowed uses and would complicate communication and enforcement.
- Improve education and enforcement communication to explain the complexities of various allowed uses on the road.
- Install appropriate signs of a type approved by the Department of Transportation on and along the highway to identify and communicate the potential hazards related to motorized mixed use.
- Notify the Commissioner of the California Highway Patrol and review their opinion.
- Approximate Implementation Cost: \$ 4500
- Expected risk:

Crash probability: High Med Low

Crash severity: High Med Low

Alternative 3: Designate the road as “open to all motor vehicles”, including highway-legal and non-highway-legal vehicles. Downgrade the road segment in accordance with maintenance level 2 standards. This would require removing

culverts and ditches, reconstructing the template and narrowing the roadway.

- Most of the road is already maintained in accordance with a maintenance level 2 standard.
- Install appropriate route identification signing (vertical fiberglass type)
- Approximate Implementation Cost: \$ 40,000
- Expected risk

Crash probability: High Med Low

Crash severity: High Med Low

Alternative 4: Construct trail segments to allow non-highway-legal vehicles to bypass the road and access adjacent maintenance level 2 roads.

- The terrain in this area does not provide for a parallel trail system.

Final Comments:

Signing on national forest system roads should conform to the standards presented in the FS sign and poster guidelines (available @ http://fsweb.wo.fs.fed.us/eng/roads_trails/signs_05/index.htm).

In addition, roads managed under the highway safety act, including the study segments here, must comply with the standards in the MUTCD (available @ <http://mutcd.fhwa.dot.gov/>).

According to the Sign and Poster Guidelines for the Forest Service (2005):

The following priorities are to be used to minimize the potential conflicts of mixed use:

- Provide separate facilities.
- Separate use periods. Roads may be designated for separate use periods such as season, weekday/weekend, or day/night. Notify the public of the locations, effective dates, times, and duration that the roads may or may not be used. Provide appropriate signs as shown in Chapter 3A.
- Manage concurrent use.

Upon designation and prior to allowing any mixed use, the Forest Supervisor is responsible for appropriately signing and mapping the route such that the dual traffic use is clear to all users.



Figure 2: Road destination sign at the intersection of NFSR 28N70 & NFSR 29N48.

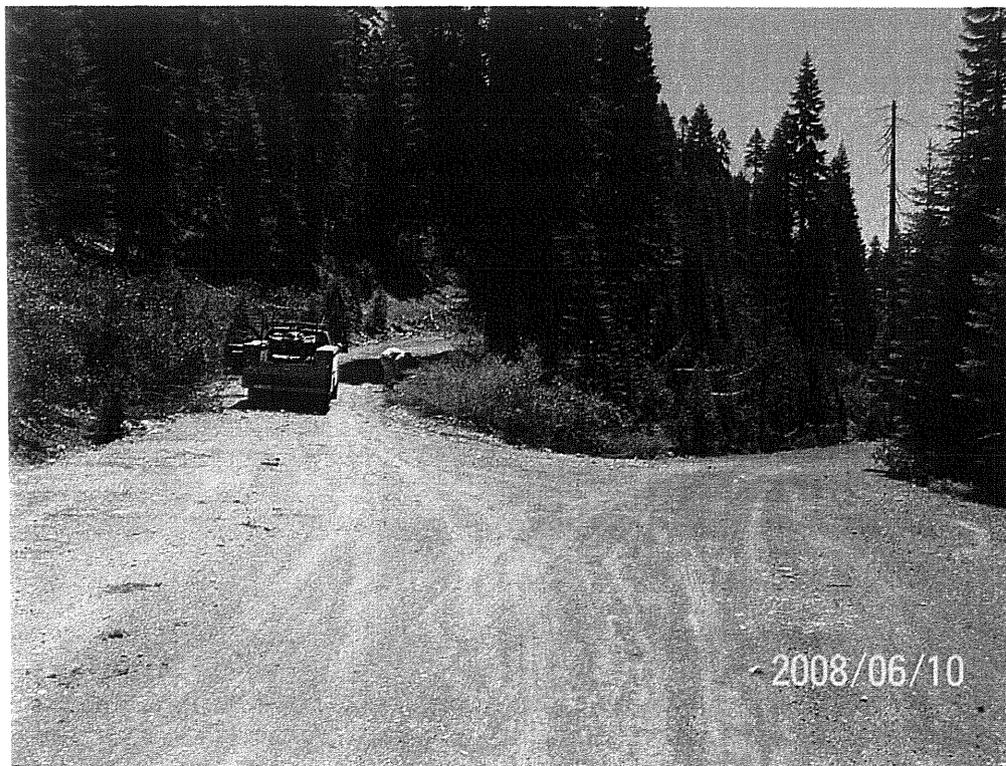


Figure 3: Intersection of NFSR 28N70 (left) and NFSR 29N48 (right).



Figure 4: Broken horizontal route identification marker at the intersection with NFSR 29N48.



Figure 5: Intersection of NFSR 28N70 (left) and NFSR 28N28 (right).



Figure 6: Typical traveled way of NFSR 28N70 along the lower 3.5 miles of the route.



Figure 7: Brush & debris encroachment, NFSR 28N70.



Figure 8: Straightaway along NFSR 28N70.



Figure 9: Guide sign combined with warning message, NFSR 28N70, mp 3.6.



Figure 10: Snow banks along the upper 0.5 miles of NFSR 28N70.



Figure 11: Traveled way along NFSR 28N70, mp 4.1.

Chris Bielecki

Prepared by:
Chris Bielecki, Supervisory Civil Engineer

Engineering Report:

Lassen National Forest
Eagle Lake Ranger District

Analysis of
National Forest System Road (NFSR)
29N03
for Motorized Mixed Use Designation

Forest: Lassen

District: Eagle Lake

Road Number: 29N03

Road Name: Willard Creek Road

Introduction: The 29N03 Road segment studied is located on the west side of Lassen National Forest (LNF) in the Fredonyer Pass quadrangle.

NFSR 29N03 ML3 begins at the intersection with State Highway 44 in Section 13 of the Roon Mountain quadrangle, enters the Fredonyer Pass quadrangle and trends south and to the west, passes the Roxie Peconom Campground, passes through private property, re-enters Lassen National Forest and parallels Willard Creek, starts climbing out of the canyon east of Coyote Peak and enters the Plumas National Forest where it terminates with an intersection at 28N08 in a non-standard-size Section 7 of said quadrangle. The road length is approximately 7.5 miles in length.

The segment studied starts at approximate road mile 1.25 in Section 24 of Fredonyer Pass Buttes quadrangle at the intersection with 29N20Y and intersects with 29N03B for a distance of approximately 1.00 miles to approx. road mile 2.25.

This entire road is currently managed by LNF as open only to highway-legal vehicles. The road segments analyzed were recommended in the LNF Travel Analysis (2008) for an engineering analysis of motorized mixed use. The purpose of this engineering analysis is to investigate the potentials, and associated risks, for operating/transporting both highway-legal vehicles (motor vehicles, including the operators, that are licensed or certified for general

operation on public roads within the State) and non-highway-legal vehicles (motor vehicles, including the operators, that are not licensed or certified for general operation on public roads within the State) on 29N03 / ML3. The LNF Travel Analysis (June 2008) identified this road section as a connector for recreational off-highway vehicle (OHV) loop opportunities on the adjacent maintenance level two road network, of which a portion is currently managed as open to non-highway-legal vehicle use.

Study Segment road data from the forest transportation atlas:

Segment 1: Beginning Mile Post: 1.25 Ending Mile Post: 2.25

29N20Y to 29N03B

Traffic Service Level: A B C D

Objective Maintenance Level: 1 2 3 4 5

Operational Maintenance Level: 1 2 3 4 5

Maintenance by: Forest Service (FS)

Non-Forest Service ROW or jurisdiction? Yes No

Any road use agreements, maintenance agreements, or other encumbrances?

Yes No

Description of agreements or encumbrances:

No agreements are documented.

Subject to Highway Safety Act? Yes No

Non-highway-legal vehicles currently permitted? Yes No

Would motorized mixed use be consistent with State and local laws? Yes
 No

Description of State California Vehicle Code and Forest Service Directives:

According to California Vehicle Code section 38026, *Designating Highways: Combined Use*, off-highway operators on a Combined Use highway must be in possession of a valid driver's license.

Based on the Forest Service Directives and Travel Management purpose and need, to allow all motor vehicles on this segment with a designation of motorized mixed use for a segment or segments with a cumulative distance of 3 miles or less could be consistent with state and federal laws and directives with appropriate mitigation for safety concerns.

Description of road management objectives (RMOs), existing use, and proposed use:

Road 29N03 / ML3 currently encourages use as an objective ML3 and operational ML3 collector road and functions as a forest highway connecting the State Highway 36 to the Eagle Lake Ranger District, defensible fuel profile zones, and recreation destinations.

This forest highway connects to all weather asphalt surfaced State highway and provides ingress and egress to a myriad of defensible fuel profile zones – DFPZ's, forest plan units for timber harvesting, and wildlife management areas.

29N03 is utilized by forest personnel for ingress and egress to Defensible Fuel Profile Zones – DFPZ's and their associated vegetation management and fire suppression functions, for wildlife management, and for recreation access to several forest destinations.

Most of the year it is currently managed as open only to highway legal traffic. The road is considered a highway by the forest service and is managed in accordance with the Highway Safety Act.

The proposed use for this segment of 29N03 / ML3 identified in this analysis is to authorize motorized mixed vehicle class use. The proposal is to utilize the ML3 road segment to connect adjacent ML2 roads into a loop for off highway motorized vehicle use.

General Considerations:

All motor vehicle operators need to be cognizant of the applicable state laws, and how they pertain to each age group, vehicle type, and national forest system road classification (see next bullet).

Through authorities delegated by the Secretary, the Forest Service may restrict or control use to meet road management objectives (36 CFR 212.5). The LNF currently manages this road as a highway, in accordance with the Highway Safety Act. The road is therefore subject to the provisions of the California Vehicle Code (CVC) for highways.

State OHV Regulations: any motor vehicle must have a street-legal license plate to operate on highways. To operate on public lands, off of highways, motor vehicles must have either a street-legal license plate or a red sticker or a green sticker. For more information, see the CA State Parks Off-Highway Motor Vehicle Recreation site, available @ <http://ohv.parks.ca.gov/>

California has:

- requirements for ATV safety
- conditions for operating ATVs
- OHV equipment requirements
- OHV operation requirements

Summary of Findings:

Implementing mitigation measures, especially improved road / safety signing and comprehensive public education / outreach, will reduce crash probability although road alignment and associated higher closing speeds will continue to affect crash severity.

Road mitigation should include implementing a comprehensive communication, management, and enforcement plan. Associated implementation costs will depend on the designated allowed use for the road.

NFSR road 29N03 is an observed 1+ lane operational maintenance level 3 standard throughout its extent.

The road is maintained to a standard allowing efficient passenger car through traffic at speeds up to 40 mph for reasonable and prudent drivers on straightaways. Based on speeds and their associated risk for crash severity, designating the road segments as open only to highway-legal vehicles will provide the lowest crash probability and severity. Crash severity is determined by the dynamics of a vehicles speed or combined speeds, mass, and configurations.

Factors Considered:

1. Operator considerations:

- Based on engineering judgment and experience/observation on other national forest management units, the LNF has an above average standard of road. The Lassen is not "typical" in its road system's adherence to maintenance levels. This road is an objective ML3 and an operational ML3. It provides forest commodity haul and fire suppression access which necessitates a high level ingress/egress access road for the DOT Class 8 (26,001 – 33,000 GVWR) trucks that use it.
- The objective level of this road is classified as a 3, and the operational level is a ML3. This provides for all-weather (during fire season May to October) fire staffing access and fire vehicle emergency access. The objective of the road is to provide access for commodity haul, wildlife management, emergency fire detection and suppression response.
- Allowing non-highway-legal vehicles to use the road segment can involve both non-highway-legal equipment and non-licensed operators, including children.
- In California, children under the age of 18 must take a prescribed safety course, be under direct supervision of an adult possessing appropriate safety certificate, or possess the appropriate safety certificate in order to operate an ATV. In addition, children under the age of 14 cannot operate an ATV without direct supervision by parent, guardian, or authorized adult.
- The Lassen National Forest currently manages this road as a highway, in accordance with the Highway Safety Act. The road is subject to the provisions of the California Vehicle Code (CVC) for highways.
- The current use on NFSR 29N03 appears to be consistent with state law and forest policy for operational maintenance level 3 roads.

2. Crash history:

There are no reported motor vehicle crashes on this road.

3. Traffic volume and type:

Non-highway-legal vehicles:

< 12 inch tread width < 50 inch tread width >50 inch tread width

Highway-legal vehicles:

< 12 inch tread width < 50 inch tread width >50 inch tread width

Passenger cars Commercial vehicles Recreation vehicles (RV's)

3 civilian motor vehicles were observed along the 29N03 road during the field observation.

4. Speed - Anticipated average speed (85th percentile):

The speed greatly varies, depending on the roadway conditions. The 85th percentile would be estimated at: 35 mph.

5. Road surface type:

The road has a combination of native crushed rock aggregate and volcanic cinder surfacing. The majority of the traveled way is constructed upon a raised roadbed and the road has drainage ditches, singular culverts, and ditch-relief culverts. The road is approximately 16'-20' wide. The road traveled way is very dry and contains many fine aggregate components and produces prodigious quantities of dust when driven over. Road shoulders are soft and unconsolidated.

6. Intersections with other roads and trails:

Road segment 1 intersects with the following forest road.

- 29N20Y
- 29N03C
- 29N13
- 29N03B

The maintenance level 2 roads have historically provided forest management access, fire suppression access, commodity haul, forest grazing access, and hunting and firewood gathering access. The proposed MMU intersections of 29N03 /ML3 may result in higher traffic merging speeds.

7. Other roadway factors:

- Roadway alignment was adequate for the assigned maintenance level. Alignment provides for vehicle closing speeds of approximately 90 mph.
- The road was maintained with a traveled way width of 16'-20".
- Raised roadbed creates soft unconsolidated shoulders. Emergency vehicle run-out among numerous lava rocks, Juniper trees, Pine trees, and brush may lead to loss of control for vehicle operators and/or collisions with immobile objects.
- The road provides administrative access for commodity haul, fire prevention patrol access, fire suppression access, wildlife management. Summer and fall seasons will experience peak use, winter and spring can bring snowy and icy conditions.

8. Roadside conditions:

- The segment runs through high elevation, 5,000 ft., open Pine forest, meadow, open Juniper, brush, native grass and lava rock forest land.
- Cross slope is 0-3%.
- Grade is 0-3%.
- Pine and other conifer trees are ≤ 18 " and numerous.
- Emergency run-out is limited.

9. Risk without mitigation:

Crash probability: High Med Low

Crash severity: High Med Low

Crash probability was assessed based on:

- Traffic volume, dust, rates of speed, alignment, sight distance, traveled way surface and width.

Crash severity was assessed based on:

- Roadway geometry (including embankments), difference in vehicle sizes, difference in speeds of OHVs and full-size passenger vehicles.

Alternatives and Mitigation Measures:

Alternatives and mitigation measures are presented to assist with safe road management. They are to be considered, should the agency have the appropriate time, workload, and funding based on competing priorities.

For all situations, the following mitigation measures apply:

- Clear communication and education to the visitors on allowed uses, safe motor vehicle use, and natural resources (informational signing and kiosks, maps, website, etc.).
- Improved route identification and safety signing. Repair and replace

devices as needed.

- Clear brush, especially along curves, to improve sight distance.
- Combine the appropriate enforcement measures with the allowed uses for the road.
- Coordinate with other agencies to improve enforcement consistency.
- Utilize a monitoring program to better determine the appropriate management strategy for the types of use, new technologies, changes in visitor demands, and resource protection measures.

In addition, these mitigation measures would apply to the following alternatives. Although the following alternatives are not comprehensive for the situation, they represent the most likely and/or practical options based on engineering judgment.

Alternative 1: Designate the road segments as “open to highway-legal vehicles only”. Manage the road in accordance with maintenance level 3 standards.

- Maintain all roadway signing to MUTCD standards.
- Consider designing new road-parallel trails, a new trailhead, and/or a new camping area to provide better opportunities for non-highway-legal motor vehicle traffic to access the area and the adjacent maintenance level 2 roads.
- Approximate Implementation Cost: \$ 0
- Expected risk:

Crash probability: High Med Low

Crash severity: High Med Low

Alternative 2: Designate the road segments as “open to all motor vehicles”, including highway-legal and non-highway-legal vehicles.

- Recognize that this situation would involve different allowed uses and would complicate communication and enforcement.
- Improve education and enforcement communication to explain the complexities of various allowed uses on the road.
- Install appropriate signs of a type approved by the Department of Transportation on and along the highway to identify and communicate the potential hazards related to motorized mixed use.

- Notify the Commissioner of the California Highway Patrol and review their opinion.
- Approximate Implementation Cost: \$ 3500 per segment
- Expected risk:

Crash probability: High Med Low

Crash severity: High Med Low

Final Comments:

Signing on national forest system roads should conform to the standards presented in the FS sign and poster guidelines (available @ http://fsweb.wo.fs.fed.us/eng/roads_trails/signs_05/index.htm).

In addition, roads managed under the highway safety act, including the study segments here, must comply with the standards in the MUTCD (available @ <http://mutcd.fhwa.dot.gov/>).

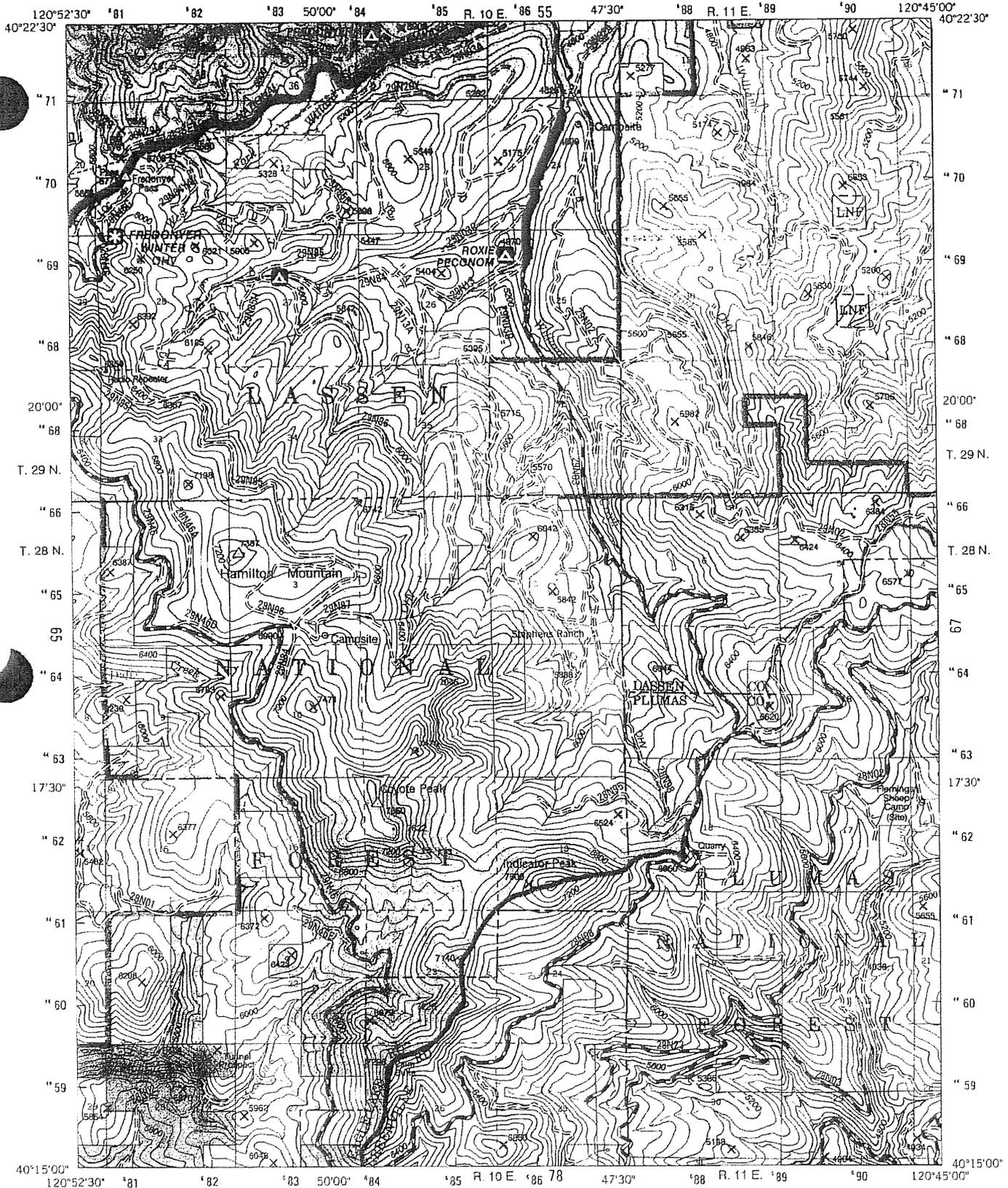
According to the Sign and Poster Guidelines for the Forest Service (2005):

The following priorities are to be used to minimize the potential conflicts of mixed use:

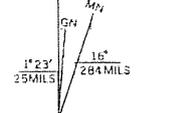
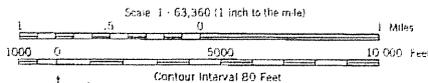
- Provide separate facilities.
- Separate use periods. Roads may be designated for separate use periods such as season, weekday/weekend, or day/night. Notify the public of the locations, effective dates, times, and duration that the roads may or may not be used. Provide appropriate signs as shown in Chapter 3A.
- Manage concurrent use.

Upon designation and prior to allowing any mixed use, the Forest Supervisor is responsible for appropriately signing and mapping the route such that the dual traffic use is clear to all users.

Maps & Photos:



Produced by the U.S. Geological Survey
Revised by the U.S. Forest Service
Areas outside the National Forest System lands may not have been revised.
Control by USGS and NOS/NDAA
Compiled from aerial photographs taken 1973. Revised from aerial photographs taken 1993. Partial field check by U.S. Forest Service 1995
North American Datum of 1927 (NAD 27). Projection, California coordinate system, zone 1 (Lambert Conformal Conic)
National Forest System lands. Revised 1997.
This map is not a legal land line or ownership document. Public lands are subject to change and leasing, and may have access restrictions; check with local offices. Obtain permission before entering private lands.



UTM GRID AND 1997 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

QUADRANGLE LOCATION

1	2	3	1 Peleg Mountain
4	5	2 Pop Mountain	3 Susarville
6	7	8	4 Westwood East
			5 Diamond Mountain
			6 Greenville
			7 Moonlight Peak
			8 Kettle Rock

ADJOINING 7.5' QUADRANGLES

HIGHWAYS AND ROADS

- U.S. Highway
- State Highway
- County Highway
- National Forest Highway
- Gate
- Primary Highway
- Secondary Highway
- Improved Road, Paved
- Improved Road, Gravel
- Improved Road, Dirt
- Composition Unspecified
- Unimproved Road
- OHV 4 Wheel Drive Road
- National Recreation Trail
- Trail

Tim Dedrick

Sept. 17, 2009

Prepared by Tim Dedrick
Lassen NF Civil Engineer

Date

George Kulick
Region 5 Qualified Engineer

Date

Engineering Report:

Lassen National Forest

Almanor Ranger District

Analysis of

National Forest System Road (NFSR)

29N18

for Motorized Mixed Use Designation

Forest: Lassen

District: Almanor

Road Number: 29N18

Road Name: Blue Lake

Introduction: The Blue Lake Road is located on the west side of Lassen National Forest (LNF), approximately 3 miles south of Mineral, CA. NFSR 29N18 begins at Plumas County (PL) Road 311 and ends at PL 769 near Wilson Lake. The road loops around Feather River Meadows area, providing access to private land, cinder pits, local FS roads, dispersed campsites, and waterways such as Rice Creek. The entire road is currently managed by LNF as open only to highway-legal vehicles.

Each of the road segments were recommended in the LNF Travel Analysis (2008) for an engineering analysis of motorized mixed use. The purpose of this engineering analysis is to investigate the potentials, and associated risks, for transporting both highway-legal vehicles (motor vehicles, including the operators, that are licensed or certified for general operation on public roads within the State) and non-highway-legal vehicles (motor vehicles, including the operators, that are not licensed or certified for general operation on public roads within the State) from the beginning termini to the end termini. The LNF Travel Analysis (June 2008) identified these road sections as connections for recreational off-highway vehicle (OHV) loop opportunities on the adjacent road network, of which a portion is currently managed as open to non-highway-legal vehicle use.

Study Segment road data from the forest transportation atlas:

Segment 1: Beginning Mile Post: 0.0 Ending Mile Post: 0.8

PL311 to NFSR 29N16

Segment 2: Beginning Mile Post: 1.5 Ending Mile Post: 2.0

NFSR 29N79 to NFSR 29N95

Segment 3: Beginning Mile Post: 3.9 Ending Mile Post: 5.5

NFSR 29N75 to NFSR 29N16

The following information is applicable to both segments:

Traffic Service Level: A B C D

Objective Maintenance Level: 1 2 3 4 5

Operational Maintenance Level: 1 2 3 4 5

Maintenance by: **Forest Service (FS)**

Non-Forest Service ROW or jurisdiction? Yes No

Any road use agreements, maintenance agreements, or other encumbrances?

Yes No

Description of agreements or encumbrances:

No agreements are documented.

Subject to Highway Safety Act? Yes No

Non-highway-legal vehicles currently permitted? Yes No

Would motorized mixed use be consistent with State and local laws? Yes
 No

The proposed segment would be consistent with California Vehicle Code (CVC), Combined Use Highways Designation (CVC Division 16.5, Chapter 2, Article 1, Section 38026) if limited to less than 3 consecutive miles on maintenance level 3+ roadways. Based on the CVC and Forest Service Region 5 guidelines, the designation of motorized mixed use requires California Highway Patrol notification prior to designation. Based on the response from the CHP commissioner, the Forest may reconsider the decision to designate MMU and/or may adjust mitigation measures needed for implementation.

Description of road management objectives (RMOs), existing use, and proposed use:

The road currently serves as a collector road and serves as a loop road around Feather River Meadows. Situated near the southern boundary of Lassen National Park, this route connects to a network of lower standard system roads that access NFS lands near National Park Service and private lands.

The road has traditionally served commodity extraction, fire suppression, residential access, mining (accesses various cinder pits), and recreation.

The road is appropriately posted with horizontal route identification markers.

Most of the year it is currently managed as open only to highway legal traffic; however, when snow-covered the road serves as a winter recreation route open to ATVs, 4WDs, skiers and snowmobiles. The road is considered a highway by the forest service and is managed in accordance with the Highway Safety Act.

The study segment is proposed for designation of motorized mixed use to allow both highway-legal and non-highway-legal vehicles to utilize the roadway. Operators of any motor vehicle would be required to be in possession of a valid state driver's license.

General Considerations:

All motor vehicle operators need to be cognizant of the applicable state laws, and how they pertain to each age group, vehicle type, and national forest system road classification (see next bullet).

Through authorities delegated by the Secretary, the Forest Service may restrict or control use to meet road management objectives (36 CFR 212.5). The LNF

currently manages this road as a highway, in accordance with the Highway Safety Act. The road is therefore subject to the provisions of the California Vehicle Code (CVC) for highways.

State OHV Regulations: any motor vehicle must have a street-legal license plate to operate on highways. To operate on public lands, off of highways, motor vehicles must have either a street-legal license plate or a red sticker or a green sticker. For more information, see the CA State Parks Off-Highway Motor Vehicle Recreation site, available @ <http://ohv.parks.ca.gov/>

California has:

- requirements for ATV safety
- conditions for operating ATVs
- OHV equipment requirements
- OHV operation requirements

Summary of Findings:

Implementing the universal mitigation measures, especially improved signing and better communication, will reduce crash probability.

Road mitigation should be prioritized regardless of mixed use, along with implementing a comprehensive communication, management, and enforcement plan. Associated implementation costs will depend on the designated allowed use for the road.

The road transitions from an observed, 2-lane, operational maintenance level 4 standard (first 2 segments) to a narrower operational maintenance level 3 standard (segment 3).

In the last 5 years, the road has been maintained for resource protection and repaired for storm damage. The surfacing is generally reconditioned on an annual basis. The road is maintained to a standard allowing efficient passenger car through traffic at speeds up to 40 mph for reasonable and prudent drivers on straightaways.

Designating the road segments for motorized mixed use, with mitigation, results in a risk assessment of moderate crash probability and high crash severity. Designating only particular segments can result in lower risks – see the following report for more information.

Factors Considered:

1. Operator considerations:

- The Lassen National Forest currently manages this road as a highway, in accordance with the Highway Safety Act. The road is subject to the provisions of the California Vehicle Code (CVC) for highways.
- The current use on NFSR 29N18 appears to be consistent with state law and forest policy for operational maintenance level 3 roads.
- Frequent commercial and residential traffic was observed on PL311 at the intersection with study segment 1.
- Many roads in this vicinity, including the study segments, were dry and contributed significant dust when driven over.
- The study segments are near multiple recreational residence tracts.
- NFSR 29N95 is signed as a "Fire Lane".
- There are multiple material pits (cinder or aggregate) in the vicinity.
- The Pacific Crest Trail is located near the beginning of segment 1, along with a parking area and trailhead.
- Various guide and road destination signs are placed along the study segments.
- Segment 2 involves some curvy sections, sometimes with reverse ("S") curves.

2. Crash history:

At the time of this analysis, there are no records of vehicle crashes on this road.

3. Traffic volume and type:

Non-highway-legal vehicles:

< 12 inch tread width < 50 inch tread width >50 inch tread width

Highway-legal vehicles:

< 12 inch tread width < 50 inch tread width >50 inch tread width

Passenger cars Commercial vehicles Recreation vehicles (RV's)

Vehicle distribution from a 2-hour observation, beginning Saturday 6/28/08 @ 1430 and ending @ 1630.

- 1 flatbed pickup, commercial (~40mph, seg 1)
- 1 SUV (~25mph, seg 3)
- 1 pickup (~20mph, seg 3)

4. Speed - Anticipated average speed (85th percentile):

The speed greatly varies, depending on the roadway conditions. The 85th percentile would be estimated at:

- 40 mph – segment 1
- 35 mph – segment 2
- 30 mph – segment 3

5. Road surface type:

All three segments are aggregate surfaced. A component appears to be volcanic ash—which contributes to significant dust upon vehicular traffic. Segment 1 was approximately 22' wide, segment 2 was approximately 20', and segment 3 was approximately 16'. The surface appeared well-maintained and recently conditioned. Portions of segment 3 were damaged in the floods during winter 2005-2006 are scheduled for repair and resurfacing during summer 2008.

6. Intersections with other roads and trails:

The study segment begins at a busy (observed) 5-way intersection. There are various intersections throughout the segments, some with routes accessing private property, county roads, and material pits.

Some connecting maintenance level 2 roads lack the appropriate entrance treatments needed to provide for the appropriate traffic management strategies (discourage or prohibit passenger cars – *or* – accept or discourage high-clearance vehicles). The current intersection may result in higher traffic merging

speeds.

7. Other roadway factors:

- Roadway alignment was adequate for the assigned maintenance level.
- The road was maintained with a traveled way width of 22' – 16'. The roadway narrows as the route continued from segment 1 to segment 3.
- Summer and fall seasons will experience peak use, winter and spring can bring snowy and icy conditions along with snowmobile traffic.

8. Roadside conditions:

- Seg 1: gentle terrain roadside, near private land, trees \leq 18", boulders \leq 2', open vegetation.
- Seg 2: moderate tree coverage, some trees within the clearing limits and encroaching the shoulders and roadway.
- Seg 3: Parallel drainage, steep embankments.

9. Risk without mitigation:

Segment 1:

Crash probability: High Med Low

Crash severity: High Med Low

Segment 2:

Crash probability: High Med Low

Crash severity: High Med Low

Segment 3:

Crash probability: High Med Low

Crash severity: High Med Low

Crash probability was assessed based on factors including:

- **Operator considerations, traffic volume, rates of speed, alignment, sight distance, traveled way surface and width, drainage, roadside conditions.**

Crash severity was assessed based on factors including:

- **Roadway geometry (embankments, slopes, horizontal and vertical alignments), speed, traffic types and difference in vehicle sizes, difference in speeds of OHVs and full-size passenger vehicles, potential path and objects encountered if a vehicle left the traveled way.**

Alternatives and Mitigation Measures:

Alternatives and mitigation measures are presented to assist with safe road management. They are to be considered, should the agency have the appropriate time, workload, and funding based on competing priorities.

For all situations, the following mitigation measures apply:

- Clear communication and education to the visitors on allowed uses, safe motor vehicle use, and natural resources (informational signing and kiosks, maps, website, etc.).
- Improved route identification signing. Repair and replace devices as needed.
- Clear brush, especially along curves, to improve sight distance.
- Combine the appropriate enforcement measures with the allowed uses for the road.
- Coordinate with other agencies to improve enforcement consistency.
- Utilize a monitoring program to better determine the appropriate management strategy for the types of use, new technologies, changes in visitor demands, and resource protection measures.
- Remove the existing brown-on-white sign stating "All Wheel Drive Road" and replace with a combination of appropriately colored warning and forest road destination signing.

In addition, these mitigation measures would apply to the following alternatives. Although the following alternatives are not comprehensive for the situation, they represent the most likely and/or practical options based on engineering judgment.

Alternative 1: Designate the road segments as “open to highway-legal vehicles only”. Manage the road in accordance with maintenance level 3 standards.

- Maintain all roadway signing to MUTCD standards.
- Consider designing new trails, a new trailhead, and/or a new camping area to provide better opportunities for non-highway-legal motor vehicle traffic to access the area and the adjacent maintenance level 2 roads.
- Approximate Implementation Cost: \$ 0
- Expected risk:

Crash probability: High Med Low

Crash severity: High Med Low

Alternative 2: Designate the road segments as “open to all motor vehicles”, including highway-legal and non-highway-legal vehicles.

- Recognize that this situation would involve different allowed uses and would complicate communication and enforcement.
- Improve education and enforcement communication to explain the complexities of various allowed uses on the road.
- Install appropriate signs of a type approved by the Department of Transportation on and along the highway to identify and communicate the potential hazards related to motorized mixed use.
- Notify the Commissioner of the California Highway Patrol and review their opinion.
- Approximate Implementation Cost: \$ 5500
- Expected risk:

Segments 1 & 2

Crash probability: High Med Low

Crash severity: High Med Low

Segment 3

Crash probability: High Med Low

Crash severity: High Med Low

Alternative 3: Designate the road as “open to all motor vehicles”, including highway-legal and non-highway-legal vehicles. Downgrade the road segment in accordance with maintenance level 2 standards. This would require removing culverts and ditches, reconstructing the template and narrowing the roadway.

- Install appropriate route identification signing (vertical fiberglass type)
- Approximate Implementation Cost: \$ 75,000
- Expected risk

Crash probability: High Med Low

Crash severity: High Med Low

Alternative 4: Construct trail segments to allow non-highway-legal vehicles to bypass the road and access adjacent maintenance level 2 roads.

- Due to the high volume of maintenance level 2 roads in the vicinity, the amount of new construction would be limited and would provide extensive contiguous OHV opportunities with minimal effort.
- Private land in the area would necessitate public involvement and coordination.
- Approximate Implementation Cost: \$20,000

Crash probability: High Med Low

Crash severity: High Med Low

Final Comments:

Signing on national forest system roads should conform to the standards presented in the FS sign and poster guidelines (available @ http://fsweb.wo.fs.fed.us/eng/roads_trails/signs_05/index.htm).

In addition, roads managed under the highway safety act, including the study segments here, must comply with the standards in the MUTCD (available @ <http://mutcd.fhwa.dot.gov/>).

According to the Sign and Poster Guidelines for the Forest Service (2005):

The following priorities are to be used to minimize the potential conflicts of mixed use:

- Provide separate facilities.
- Separate use periods. Roads may be designated for separate use periods such as season, weekday/weekend, or day/night. Notify the public of the locations, effective dates, times, and duration that the roads may or may not be used. Provide appropriate signs as shown in Chapter 3A.
- Manage concurrent use.

Upon designation and prior to allowing any mixed use, the Forest Supervisor is responsible for appropriately signing and mapping the route such that the dual traffic use is clear to all users.

Maps & Photos:

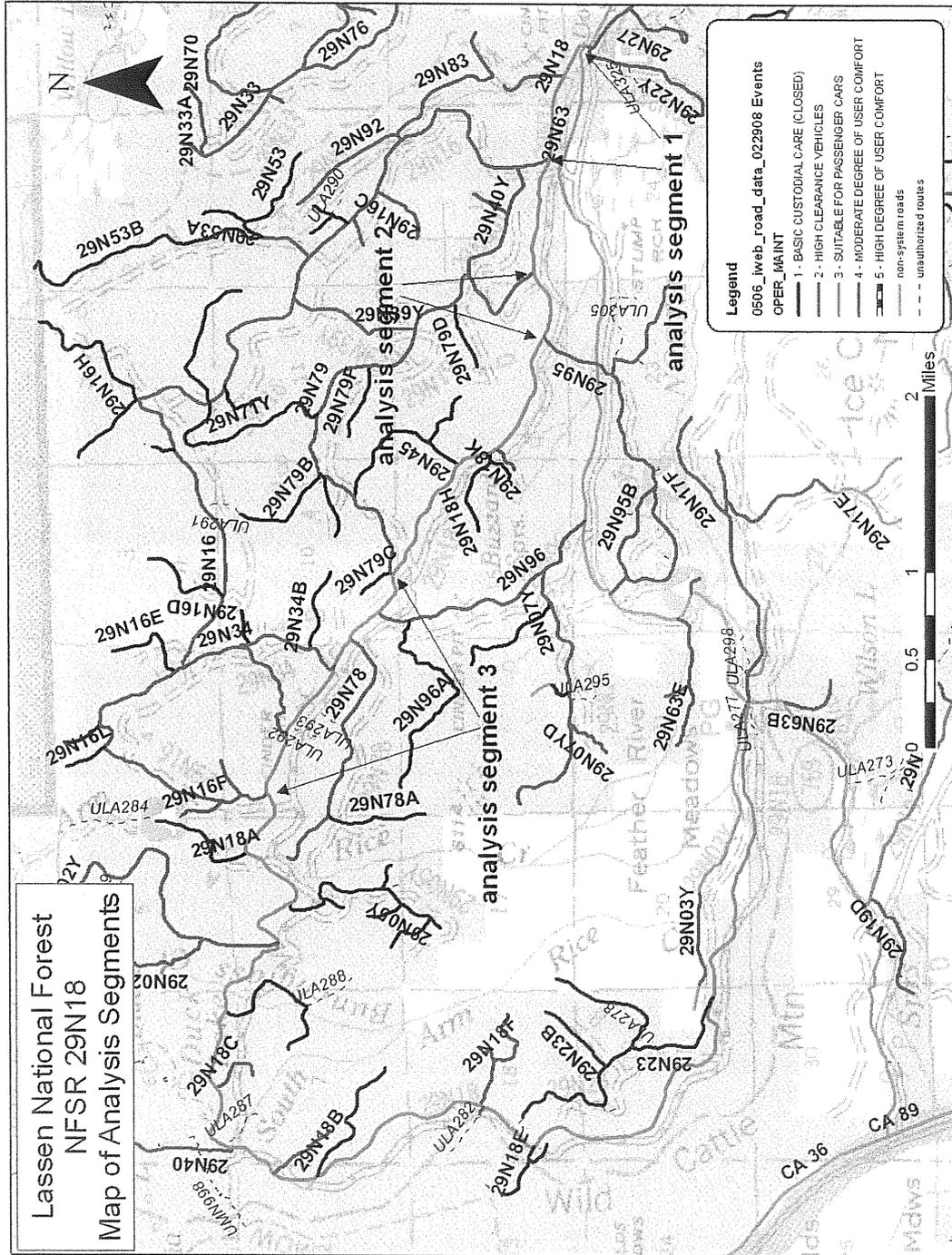


Figure 1: Map of road segments analyzed.



Figure 2: Looking at study segment 1, from the intersection with Plumas County Road 311.



Figure 3: Curve in segment 1.



Figure 4: Segment 1 straightaway.



Figure 5: Horizontal route identification signing.



Figure 6: NFSR 29N16 from NFSR 29N18. Note the lack of entrance treatment to discourage passenger cars.



Figure 7: Looking at segment 2 (left), with the intersection of NFSR 29N79 to the right.



Figure 8: Forest road destination signing, segment 2.



Figure 9: End of straightaway, segment 2.



Figure 10: Looking back at segment 2 (left), with NFSR 29N95 to the right.



Figure 11: NFSR 29N95, with "Fire Lane" signing.