

Engineering Report:

Lassen National Forest

Eagle Lake Ranger District

Analysis of

National Forest System Road (NFSR)

35N08

for Motorized Mixed Use Designation

Forest: Lassen

District: Eagle Lake

Road Number: 35N08

Road Name: Blacks Mountain Road

Introduction: The 35N08 Road segments studied are located on the east side of Lassen National Forest (LNF) in the Poison Lake quadrangle.

NFSR 35N08 begins at the intersection of State Highway 44 in Section 9 of the Poison Lake quadrangle and runs northeast along the west boundary of Poison Lake, thence north parallel to and crossing the Burlington Northern Railroad tracks and into the State Game Refuge, thence runs north and northwest past the east boundary of Dry Lake, enters the southern extents of the Blacks Mountain Experimental Forest and continues along the western boundary of said experimental forest, thence turns northeast and exits the northern boundary of said experimental forest, road continues northeasterly into the Blacks Mountain quadrangle and the proximity of Bear Valley Reservoir, then continues east and north past the west side of Corders Reservoir and changes direction to the northwest and it's terminus in Section 35 with the intersection of NFSR 35N05ML3-4. This road is approximately 13.5 miles in length.

The 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 2 segments of 35N08, from the intersection of 33N28Y/ML2 to 35N08N/ML2 and the intersection of the Pittville Road – Lassen County Road 111 to 33N61Y/ML2. The LNF Travel Analysis (June 2008) identified these road sections as connectors 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: 0.50 Ending Mile Post: 1.50

33N28Y to 35N08N

Traffic Service Level: A B C D

Objective Maintenance Level: 1 2 3 4 5

Operational Maintenance Level: 1 2 3 4 5

Segment 2: Beginning Mile Post: 2.25 Ending Mile Post: 2.75

Lassen County Road 111 to 33N61Y

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 inconsistency with State and local law:

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 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 encourages use as an objective and operational ML3 local collector road and functions as ingress/egress access to the west shore of Poison Lake, commodity extraction, wildlife management, and forest management activities.

Road 35N08 provides access from State Highway 44 which is a two lane all weather asphalt surfaced highway, through the Poison Lake and Blacks Mountain quadrangles. This collector road serves as the only maintenance level 3 through-road that connects these two quadrangles and provides primary access to Poison Lake, Dry Lake, Blacks Mountain Experimental Forest, Blacks Mountain, Bear Valley Reservoir, Busters Reservoir, Corders Reservoir, and NFSR 35N05 a forest perimeter ML4 forest highway. Speeds are approximately 25-45 mph with a travel way consisting primarily of red volcanic cinder aggregate and some areas of native crushed rock.

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 accord with the Highway Safety Act.

The proposed use for these segments of 35N08/ML3 identified in this analysis is to authorize motorized mixed vehicle class use. The proposal is to utilize the ML3 road segments to connect adjacent non-system Unauthorized Routes and ML2 roads into loops 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 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.

NFSR road 35N08 is an observed 1.5 lane objective and operational maintenance level 3-4 standard throughout its extents.

The road is maintained to a standard allowing efficient passenger car through traffic at speeds up to 45 mph for reasonable and prudent drivers on straightaways. The road grade is fairly flat with segments that may approach 3%. Sight distance is limited along the extents of the road alignment with numerous horizontal and vertical curves. Vegetation encroaches upon travel way in many locations. 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.

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 operational ML3-4.
- Topologically, the unit is a series of ephemeral small-lake drainage basins with semi-arid meadows in the lower elevations and open pine forests and manzanita brushfields vegetating the low-mid elevations and mountain flanks. The operational level of this road is classified as a 3-4. The road has a management objective of maintenance level 3 to provide for all-weather (during fire season May to October) forest management activities. The objective of the road is to provide access for emergency fire suppression response, wildlife management, private property access, and commodity extraction.
- Road is a high-level forest collector/arterial ML3-4 haul through-road to Blacks Mtn Experimental Forest.
- 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 35N08 appears to be consistent with state law and forest policy for operational maintenance level 3 roads.
- Many roads in this vicinity, including the study segment, were dry and contributed significant dust when driven over.

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 1-hour observation July 30, 2008.

1 agency pickup truck was observed on this road.

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

The speed greatly varies, depending on the roadway conditions. The 85th percentile would be estimated at: 45 mph.

5. Road surface type:

The road has a predominance of red volcanic cinder aggregate surfacing with minor areas with native crushed rock. Portions of the traveled way are raised and the shoulders are soft and non-compacted. The road is approximately 15'-18' wide. The grade is consistently flat with pitches up to 3%. The dry travel way, loose surface material, and higher vehicle driving speeds have produced a consistent wash-boarding of the acceleration/deceleration zones (horizontal

curves) along the road. Vehicle control is limited due to loose travel way surface material (volcanic cinder aggregate) and horizontal curves.

6. Intersections with other roads and trails:

Segment 1 intersects with the following forest roads.

- 33N28Y/ML2
- 35N08M/ML2
- 35N08N/ML2

Segment 2 intersects with the following forest roads.

- Lassen County Road 111, (Pittville Rd.)
- 33N61Y/ML2

The maintenance level 2 roads have historically provided forest management access, fire suppression access, commodity access, and hunting and firewood gathering access.

The proposed MMU intersections of 35N08/ML3 may result in higher traffic merging speeds.

7. Other roadway factors:

- Substantial horizontal and vertical curves are present and limit sight distance.
- Roadway alignment was adequate for the assigned maintenance level.
- The road was maintained with a traveled way width of 15'-18', approximately.
- Cross slope of approximately 6% in stretches of alignment.
- Grade of road is up to approximately 3%.
- The road provides administrative access for forest management activities, wildlife management, fire suppression access, commodity haul. Summer and fall seasons will experience peak use, winter and spring can bring snowy and icy conditions.

8. Roadside conditions:

- The segment runs along lake shores, through arid meadows, open pine forest and manzanita brush.
- Cross slope is maximum 6%.
- Grade is up to 3%.
- Pine trees are $\geq 18''$, encroaching roadside manzanita, volcanic rocks.
- Emergency run-out is limited as the roadbed is raised with vertical drop-offs of up to 6 feet from the road shoulders and associated culverts.

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 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 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 segment 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.
- Remove cinder material and replace with compacted crushed rock aggregate.
- Notify the Commissioner of the California Highway Patrol and review their opinion.

- Approximate Implementation Cost: \$ 50,000
- 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.

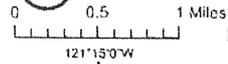
Maps & Photos:



May 2008 DRAFT



Alternative 5 (Motorized Emphasis) Travel Management Lassen National Forest



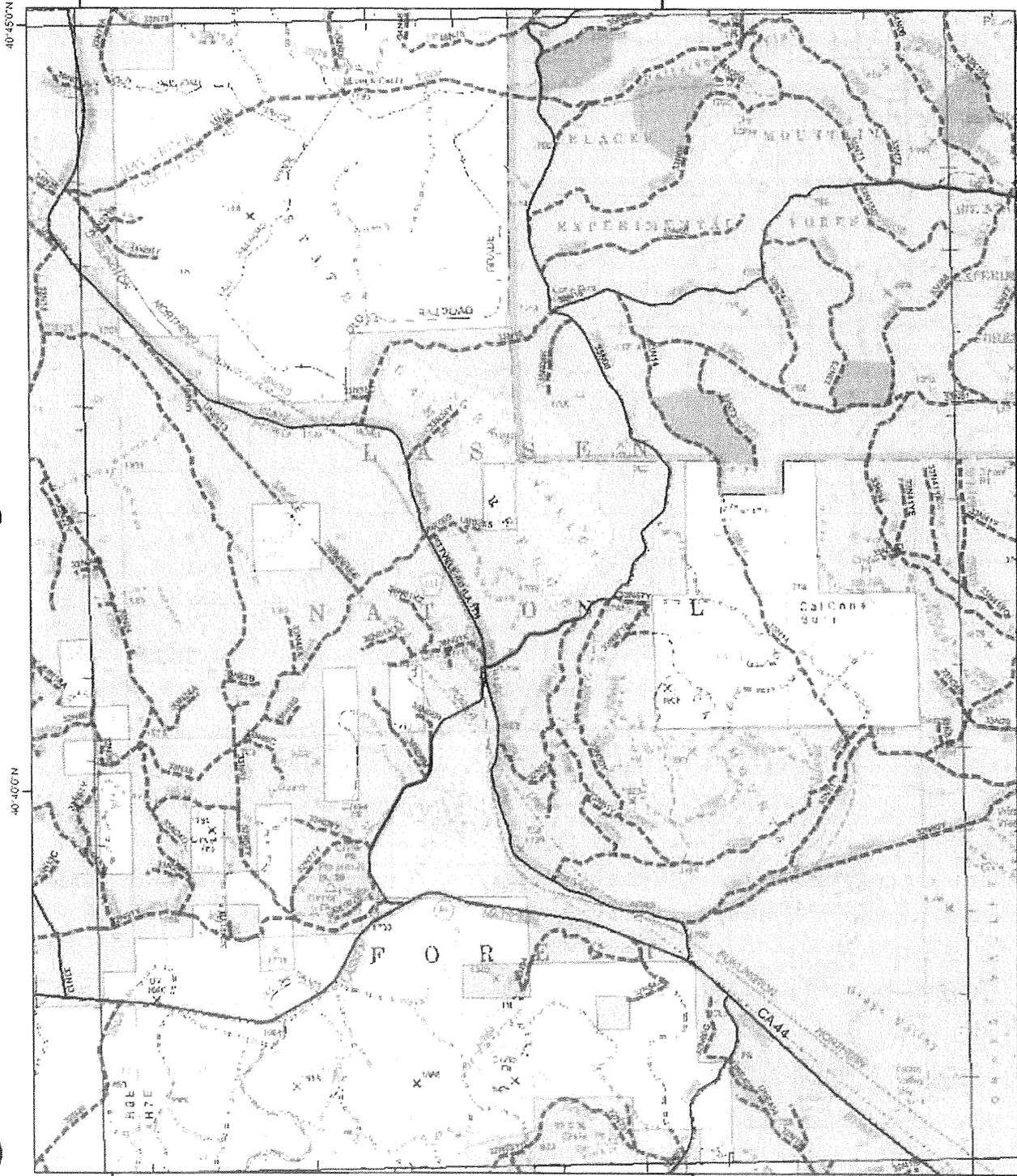
Poison Lake

- NFS Surface Roads or Non-NFS Jurisdiction Roads Open to Highway Legal Vehicles Only (includes NFS Maintenance Level 3-5 Roads, State and County Roads, etc.)
- Road Open to All Highway Legal and Non-Highway Legal Vehicles
- County Jurisdiction Native Surface Road
- 4WD Trail Open to High Clearance Vehicles
- Non-Motorized Trail
- Unauthorized Routes to be Added to the National Forest Transportation System

Restricted Season of Use to Summer/Fall (Winter Rec. Trail)

- Motor Vehicles Prohibited
- Lassen National Forest
- Private Land

Areas Open to Motorized Vehicle Use



121°15'0\"/>

121°10'0\"/>

40°40'0\"/>

40°40'0\"/>

Prepared by
Tim Dedrick

Tim Dedrick

Forest Transportation Planner/Civil Engineer
Lassen National Forest

Date 9/29/08

Reviewed by
George Kulick

Region 5 Qualified Engineer
Region 5 Office of Engineering

Date

Engineering Report:

Lassen National Forest

Hat Creek Ranger District

Analysis of

National Forest System Road (NFSR)

35N10

for Motorized Mixed Use Designation

Forest: Lassen

District: Hat Creek

Road Number: 35N10

Road Name: Hat Creek – Little Valley Tie

Introduction: This report documents the engineering analysis for 4 segments of 35N10 (Distinctive Route 22) Hat Creek – Little Valley Tie, totaling 3.83 miles in length. The total route encompasses from Little Valley on the east to Shasta County Road 6R201 in the Hat Creek Valley on the west. This is the western portion of distinctive route 22. The eastern portion is currently in the data base under NFSR 35N05. Lassen National Forest (LNF) currently manages this road as open only to highway-legal vehicles.

The study 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 identified these road sections as potential connections for recreational off-highway vehicle (OHV) loop opportunities on the adjacent road network, which is currently managed as open to non-highway-legal vehicle use.

Study Segment road data from the forest transportation atlas:

Segment 1: NFSR 35N38 to NFSR 35N40

Segment 2: NFSR 34N82 to NFSR 34N88

Segment 3: NFSR 35N13 to NFSR 35N14

Segment 4: NFSR 36N05 to NFSR 35N22

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:

There are utility and railroad corridor crossings along the roadway.

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 provides access from Little Valley to the Hat Creek Valley. The road is a single-lane road with turnouts. The favorable alignment along with greater than ordinary width (14 – 18 feet) provides for speeds up to 40 MPH.

NFSR 35N10 has traditionally served administration of the LNF, including fuels and vegetation management, commodity extraction, fire suppression, and recreation.

The road is considered a highway by the Forest Service and is managed in accordance with the Highway Safety Act. The road is managed for passenger car vehicles and is appropriately posted with horizontal route identification markers. Most of the year it is currently managed as open only to highway-legal vehicles.

The road is also managed as a Forest Distinctive Route (DR 22), which means that this serves as a primary route on the FS unit. The road segment is also part of the Lassen Backcountry Byway, a designated roadway for passenger car vehicles with a brochure highlighting attractions for visitors to see.

The study segments are 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 improving sight distance by removing brush, maintaining proper signing, and providing better communication, will reduce crash probability.

Road hazard 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.

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

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. Culverts are common drainage features on maintenance level 2 roads and standard on maintenance level 4 roads. Often roads on this national forest could be classified one maintenance level higher.**
- **Allowing non-highway-legal vehicles to use the road segments 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 current use on NFSR 35N10 appears to be consistent with State law and Forest Service policy for operational maintenance level 3 roads.
- The roadbed is raised and appears to provide for sufficient drainage and passenger car travel.
- Commercial, recreational, and administrative traffic is expected along this segment.

2. Crash history:

No record of accidents

3. Observed 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)

No traffic was observed during the field investigations on the segments.

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

The road segments were driven at various speeds to simulate conditions encountered by a reasonable and prudent driver in a passenger car.

Segment 1:

40 mph based on observation and engineering judgment.

Segment 2:

40 mph based on observation and engineering judgment.

Segment 3:

30 mph based on observation and engineering judgment.

Segment 4:

35 - 40 mph based on observation and engineering judgment.

5. Road surface type: coordinate

All segments have a combination of cinder and aggregate surfacing and single lane traveled ways with turnouts. Segment 1 and segment 2 is approximately 14 – 16 feet wide. Segment 3 is approximately 14 – 20 feet wide. Segment 4 is approximately 16 feet wide.

6. Intersections with other roads and trails:

The sight distances at the managed intersections are rated good. Many of the intersection with NFSR level 2 routes allows for higher merging speeds since the road lacks the proper entrance treatment.

7. Other roadway factors:

- **None**

8. Roadside conditions:

- **On all segments the design prism is typical of side hill construction with inboard ditch plus x-drain relief**

9. Risk without mitigation if designating the roadway “open to all motor vehicles”:

Segment one

Crash probability: High Med Low

Crash severity: High Med Low

Segment two

Crash probability: High Med Low

Crash severity: High Med Low

Segment three

Crash probability: High Med Low

Crash severity: High Med Low

Segment four

Crash probability: High Med Low

Crash severity: High Med Low

Crash probability was assessed based on:

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

Crash severity was assessed based on:

- **Roadway geometry (embankments, slopes, horizontal and vertical alignments), 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 and trees, especially along curves and at intersections, to improve sight distance.
warning: improved sight distance may result in higher speeds
- Removal of roadside hazards such as boulders, trees, and debris.
- 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”. Continue to manage the road in accordance with maintenance level 3 standards.

- Maintain all roadway signing to MUTCD standards.
- Approximate Implementation Cost: \$ 0
- Expected risk:
All segments
Crash probability: High Med Low
Crash severity: High Med Low

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

- 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

- **Coordinate with the State and revise existing agreements with Caltrans as applicable.**
- **Notify the Commissioner of the California Highway Patrol and review their opinion.**
- **Approximate Implementation Cost: \$ 7500**
This does not account for the additional long-term annual maintenance cost increase associated with maintaining these critical safety corridors.
- **Expected risk:**
Segment one,two and four
Crash probability: High Med Low

Crash severity: High Med Low

Segment three
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 segments in accordance with maintenance level 2 standards. This would require removing culverts and ditches, reconstructing the template and narrowing the roadway.

- **Based on the quality of the road, the amount of thru traffic, the distinctive route status, and the change from the rest of the collector route, this change would not be consistent with the road management objectives.**
- **This option is not currently feasible, based on the high standard of existing road**
- **Approximate Implementation Cost: \$ 15,000 per mile**
- **Expected risk on all segments**

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.

Segment one

- **The terrain in this area is flat and would provide for a parallel trail**

- **Approximate implementation cost: \$8000 per mile**

Segment two

- **The terrain in this area is on moderate to flat slopes and would provide for a parallel trail system.**
- **Approximate implementation cost: \$8000 per mile**

Segment three

- **The terrain in this area is on moderate to steep slopes and would not easily provide for a parallel trail system.**
- **Approximate implementation cost: \$16,000 per mile**

Segment four

- **The terrain in this area is on moderate slopes and would provide for a parallel trail system.**
- **Approximate implementation cost: \$8000 per mile**

These costs do not include the planning, agreements, and long term maintenance costs associated with a new NFS trail.

For all segments

Crash probability: High Med Low

Crash severity: High Med Low

Final Comments:

Signing on national forest system roads will 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:

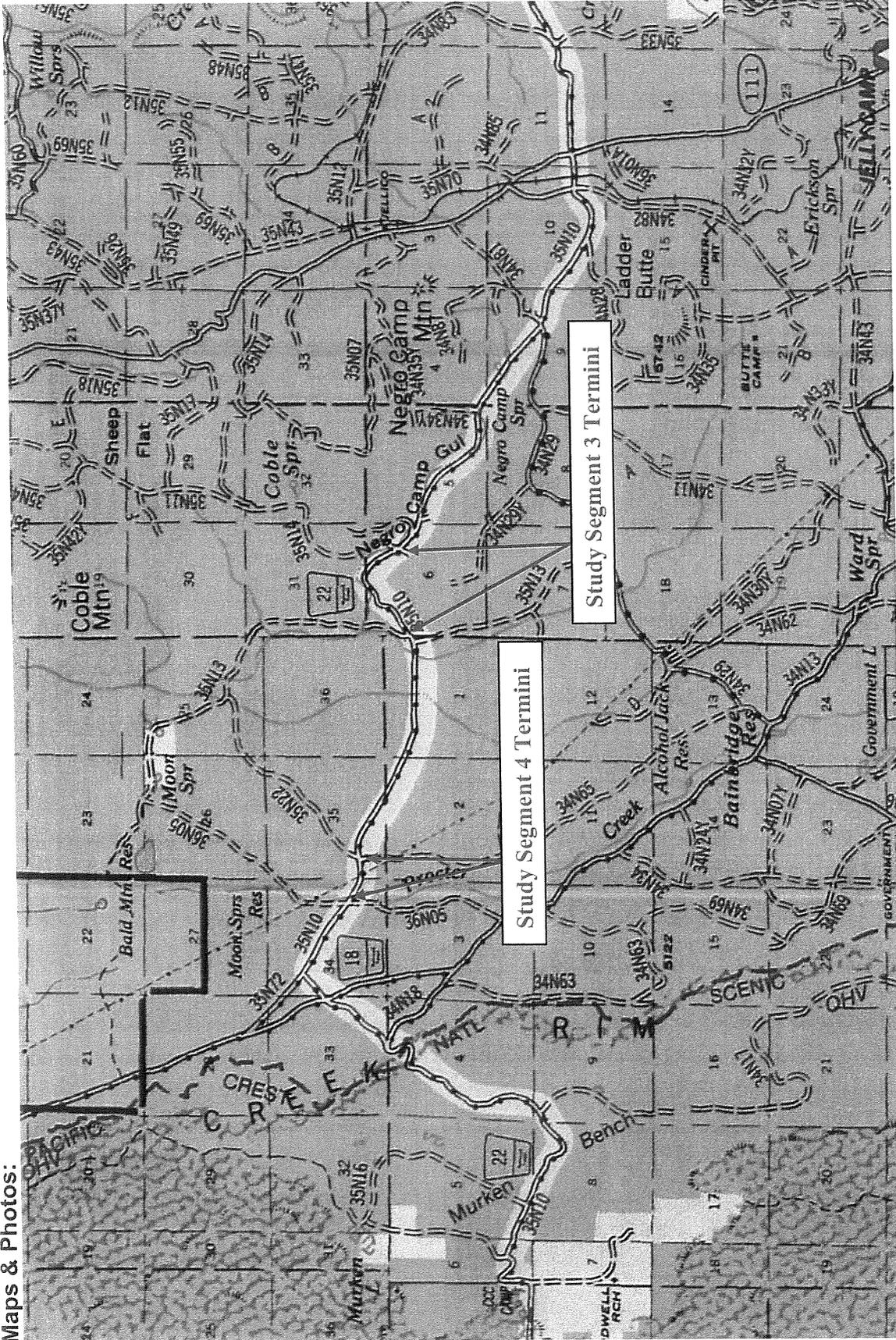


Figure 1: West half of NFSR 35N10.



Figure 3: Looking at study segment 4, with the intersection of NFSR 36N05 (left).



Figure 4: Cattleguard, section 4.



Figure 5: Looking back at segment 4, with the intersection of NFSR 35N22 on left. Note utility line crossing.



Figure 6: Looking at segment 3, with the intersection of NFSR 35N13 on the right.



Figure 7: Segment 3 straightaway.



Figure 8: Segment 3 roadside conditions.



Figure 9: Looking back at segment 3 (ahead right), with the intersection of NFSR 35N14.



Figure 10: Looking at segment 2; intersection with NFSR 34N82 on right.



Figure 11: Segment 2 straightaway.



Figure 12: Curve along segment 2.



Figure 13: Looking back at segment 2, NFSR 34N88 on left.



Figure 14: Looking at segment 1 from the intersection with NFSR 35N38.



Figure 15: Looking at segment 1; intersection with NFSR 35N38 on left.

Chris Bielecki

Prepared by:
Chris Bielecki, Supervisory Civil Engineer

