

Engineering Report:

Lassen National Forest

Eagle Lake Ranger District

Analysis of

National Forest System Road (NFSR)

32N02

for Motorized Mixed Use Designation

Forest: Lassen

District: Eagle Lake

Road Number: 32N02

Road Name: Summit Camp

Introduction: This report documents the engineering analysis for a segment of 32N02 (Distinctive Route 21) – Summit Camp, totaling 0.22 miles in length. This total route, which also serves as Distinctive Route 21, is an arterial road connecting California State Highway 44 on the west to Lassen County Road A1 (Eagle Lake Road) on the east. The route is currently on the PFSR priority list for upgrade. There is substantial traffic using the route; it is commonly used as an alternative route to Eagle Lake by traffic originating from points northwest of Lassen National Forest traveling south on highway 44. Lassen National Forest (LNF) currently manages this road as open only to highway-legal vehicles.

The study segment was 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 this road section as a potential connection 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 : Beginning Mile Post: 4.7 Ending Mile Post: 4.9

NFSR 32N05 to NFSR 32N73

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:

The study segment is on private land. The Forest Service has a full public easement with jurisdiction.

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 total route currently serves as an arterial road, Forest distinctive route, and provides through access from California State Highway Route 44 to Lassen County Road A1. The road is a very wide single-lane (bordering on double lane in portions on the west) road with turnouts.

NFSR 32N02 has traditionally served administration of the LNF, including fuels and vegetation management, range management, commodity extraction, fire suppression, and recreation. It also provides access to private land inholdings. 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. During the winter the route is groomed for OSV and skier use; ATV and 4WD are not allowed.

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 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 45 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:

- The current use on NFSR 32N02 appears to be consistent with State law and Forest Service policy for operational maintenance level 4 roads.
- The roadbed is raised and appears to provide for sufficient drainage and passenger car travel.
- Commercial, recreational, private, 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)

None was observed during field investigation to the site.

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

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

45 mph based on observation and engineering judgment.

5. Road surface type: coordinate

Segment has aggregate surfacing and single lane traveled ways with turnouts. Segment is approximately 22 feet wide.

6. Intersections with other roads and trails:

The sight distances at the managed intersections are rated good.

7. Other roadway factors:

- **None**

8. Roadside conditions:

- **On segment one 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":

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 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:

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: \$ 3500**
This does not account for the additional long-term annual maintenance cost increase associated with maintaining these critical safety corridors.

- **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 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 arterial route, this change would not be consistent with the road management objectives.
- **Approximate Implementation Cost: \$10,000**
- **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.
Segment one

- The terrain in this area is on gentle to moderate slopes and would provide for a parallel trail system.
- The segment is partially on private land and would need an easement
- **Approximate implementation cost: \$7500**
This does not include the planning, agreements, and long term maintenance costs associated with a new NFS trail.
- **Expected risk:**

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:

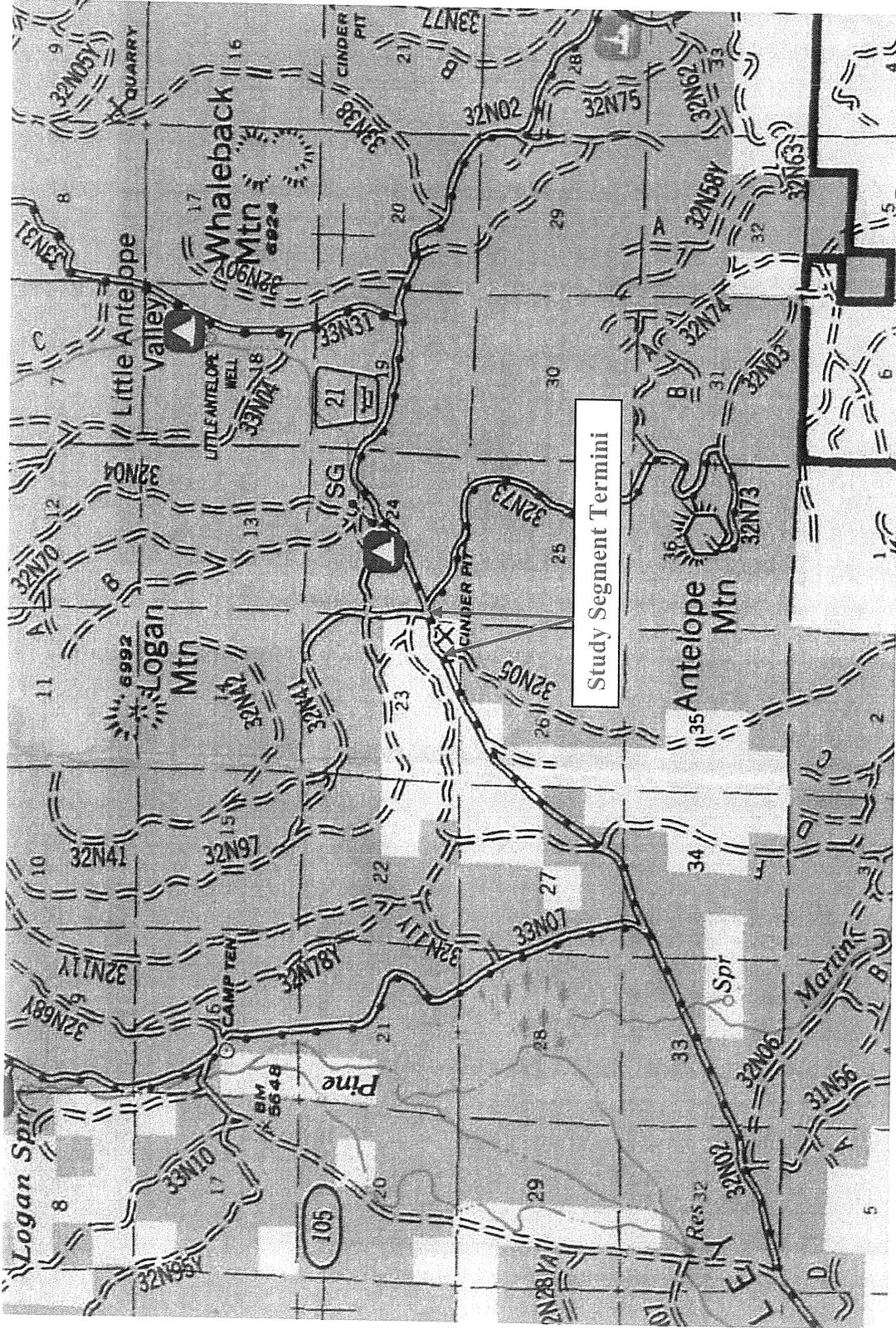


Figure 1: Map of road segments analyzed.



Figure 2: Intersection with NFSR 32N05 (right) and the study segment.



Figure 3: Curve within the study segment.



Figure 4: Straightaway within the study segment.



Figure 5: Passenger car vehicle sticker.



Figure 6: Intersection with NFSR 32N73 (left) and the study segment (ahead).

Chris Bielecki

Prepared by:
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Engineering Report:

Lassen National Forest

Eagle Lake Ranger District

Analysis of

National Forest System Road (NFSR)

32N02

for Motorized Mixed Use Designation

Forest: Lassen

District: Eagle Lake

Road Number: 32N02

Road Name: Distinguished Route 21

Introduction: The Distinguished Route 21 Road segments studied are located on the east side of Lassen National Forest (LNF) in the Champs Flat quadrangle, approximately 1 mile southwest of Whaleback Mountain. NFSR 32N02 begins at Lassen County (LA) Road A1 and ends at State Highway 44 near Feather Lake. The road starts approximately 3 miles northwest of the western and southern extents of Eagle Lake, on Paved County Road A1, and travels upslope and northwesterly from the eastern toe of the slope of Antelope Mountain, around the northern toe of slope of said Antelope Mountain, traverses the western toe of slope of Antelope Mountain, then Campbell Mountain, intersects with Lassen County Road 105 which it shares a route identification number with, and enters into the lower altitudes of Pine Creek Valley where it intersects with Lassen County Road 112 and terminates into California State Highway 44. 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 two segments of 32N02, from the intersection of 33N38 to 33N31 for segment 1, and from 32N08YA to 32N04 for segment 2. The LNF Travel Analysis (June 2008) identified these road sections as connectors 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: 1.02 Ending Mile Post: 1.67

33N38 to 33N31

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: 2.16 Ending Mile Post: 2.56

32N08YA to 32N04

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 serves as a ML3 collector road and functions as a through-road for commodity extraction, range allotment access, and fire lookout and fire suppression access from Lassen County Road A1 to the State of California Highway 44.

The road provides access from the lower elevations adjacent to Eagle Lake and County Road A1 which provides an all-weather surface and access to State Highway 395 to the south and State Highway 139 to the northeast. Road 32N02 provides an important function as an ML3 forest collector providing said access from 3 all-weather highways, through a variety of forest landscapes providing range, timber, fire suppression, and dispersed recreation, upon a well maintained gravel and cinder aggregate surfaced road, through a 15 mile traverse, to State Highway 44 to the southwest.

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 the two segments of 32N02/ML3 identified in this analysis is to authorize motorized mixed vehicle class use. The proposal is to utilize the two segments of ML3 road 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 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 is an observed 1-lane operational maintenance level 3 standard throughout the selected segments.

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 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. Topologically, the unit is dry and flat with pronounced volcanic relief features, once roads are improved for management activities, the improvements are long lasting. Culverts are common drainage features on maintenance level 2 roads and standard on maintenance level 3 roads. Often roads on this national forest could be classified one maintenance level higher.
- 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 32N02 appears to be consistent with state law and forest policy for operational maintenance level 3 roads.
- Frequent residential, recreational, and commercial traffic was observed on Lassen County Road A1 at the intersection with 32N02.
- 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 Pickup truck.

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.

5. Road surface type:

The segments have a combination of crushed rock aggregate and red volcanic cinder aggregate surfacing. Portions of the traveled way are raised and the shoulders are soft and non-compacted. The segments are approximately 16' wide. The surfaces appeared well-maintained.

6. Intersections with other roads and trails:

Study segment 1 begins at an intersection with 33N38/ML2. 32N69 is a maintenance level 2 road that intersects with 32N02 and trends south, up the northern flank of Antelope Mountain. The segment ends with an intersection with 33N31/ML3

33N31 is a maintenance level 3 road and is another analysis segment of forest ML3 road that is receiving analysis for motorized mixed use. The road lacks the appropriate entrance treatment of discourage high-clearance vehicles.

Study segment 2 begins at an intersection with 32N08YA which is an unauthorized route and ends with an intersection with 32N04, a maintenance level 2 road.

The proposed MMU intersection of 32N02 and 33N38 may result in higher traffic

merging speeds. The proposed intersections of 32N08YA and 32N02 as well as 32N04 meet on horizontal curves and result in lessened sight distances.

7. Other roadway factors:

- Substantial vertical curves are present.
- Roadway alignment was adequate for the assigned maintenance level.
- The road was maintained with a traveled way width of 16', approximately.
- The road provides administrative access for range allotment and fire lookout access. It is a winter snowmobile sports trail. 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 segment runs through open pine forest.
- Cross slope is 0-5%.
- Grade is 0-5%.
- Pine trees are $\leq 18''$ and numerous volcanic rocks. Emergency run-out is possible.

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

- 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

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.