Engineering Report:

Lassen National Forest
Hat Creek Ranger District

Analysis of
National Forest System Road (NFSR)

# 34N34

for Motorized Mixed Use Designation
Introduction: This report documents the engineering analysis for a segment of 34N34 - West Government totaling 1.6 miles in length. This total route is a minor collector road connecting NFSR road 36N18 (distinctive route 18) on the north to California State Highway 44 on the south. 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: 3.6  Ending Mile Post: 5.2
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:** None

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 tie road between NFSR road 36N18 and State highway 44. The road is a single-lane road with turnouts. NFSR 34N34 has traditionally served administration of the LNF, including fuels and vegetation management, commodity extraction, fire suppression, and recreation. The road provides access to the Pacific Crest National Scenic Trail (NFSR 34N94) and parallels the Hat Creek Rim. 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 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 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. 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 34N34 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)

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.

40 mph based on observation and engineering judgment.

5. Road surface type: coordinate

Segment has cinder surfacing and single lane traveled ways with turnouts. Segment is approximately 14 feet wide.
6. Intersections with other roads and trails:

The sight distances at the managed intersections are rated good.

7. Other roadway factors:

- Grass growing on parts of travel way indicate low traffic volumes.
- Dust "plumes" are obviously visible from oncoming traffic. If multiple cars are caravanning this could limit visibility.

8. Roadside conditions:

- The segment has a design prism is typical through fill construction with 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 Transportation on and along the highway to identify and communicate the potential hazards related to motorized mixed use.
- 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, this change would not be consistent with the road management objectives.
- Approximate Implementation Cost: $9,000 per mile
- 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 is on flat slopes and would provide for a parallel trail system.
- Approximate implementation cost: $8,000 per mile
  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.
Figure 2: Intersection with NFSR 34N36 (left) and the study segment.

Figure 3: Straightaway along the study segment.
Figure 4: Intersection with NFSR 34N94 and the study segment.

Figure 5: Straightaway.
Figure 6: Entering a curve along the study segment. Note "washboarded" surface.

Figure 7: Cattleguard along the study segment.
Figure 8: South end of the study segment (left); intersection with NFSR 34N09 (right).

Figure 9: Looking down the study segment from the intersection with NFSR 34N09.
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Engineering Report:

Lassen National Forest

Eagle Lake Ranger District

Analysis of

National Forest System Road (NFSR)

# 35N04

for Motorized Mixed Use Designation
Introduction: The 35N04 Road segment studied is located on the east side of Lassen National Forest (LNF) in the Harvey Mountain quadrangle, on the western boundary of Harvey Valley.

NFSR 35N04 begins at the intersection of 33N02/ML3 in Section 21 of the Harvey Mountain Quadrangle and runs northwest to an intersection with 33N15/ML3 and then turns due north up the western flank of Harvey Mountain to a four way intersection with 33N08/ML3, 33N85/ML2, 34N37/ML2, and 33N29Y/ML2. This road segment is approximately 2 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 35N04, from the intersection of 33N02 to 33N15 and the four way intersection and connection to 33N08. 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: 0.00  Ending Mile Post: 2.10

33N02 to 33N08

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 for the Harvey Mountain Fire Lookout, commodity extraction/forest management for Harvey Mountain and Aspen Flats.

Road 35N04 provides access from 33N02/ML3-4 for a short distance of approximately two miles from the Harvey Valley western margin, up the southwest and western flank of Harvey Mountain. Speeds are approximately 25-30 mph on native crushed rock and volcanic cinder aggregate.

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 this segment of 35N04/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
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 35N04 is an observed 1+ lane operational maintenance level 3 standard to approximate road mile 2.2 where it intersects with four NFSR roads. 35N04 continues as a maintenance level 2 from this intersection to it’s terminus with 34N12 at approximate road mile 3.

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. 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 it’s road system’s adherence to maintenance levels. This road is an objective ML3 as it provides fire lookout tower access which necessitates a high level ingress/egress emergency access road.

- Topologically, the unit is semi-mountainous, fairly dry, and sandwiched between the Pacific Southwest Research Station’s research forest, Black’s Mountain Experimental Forest and the State of California Game Refuge to the west, and the forest rangeland of the Harvey Valley area to the east. The operational level of this road is classified as a 3. The road has a management objective of maintenance level 3 to provide 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 emergency fire detection and suppression response, wildlife management in conjunction with the State Game Refuge, commodity extraction, forest
management, rangeland allotments, and dispersed recreation.

- 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 35N04 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.
No vehicles observed.

4. Speed - Anticipated average speed (85th percentile):
The speed greatly varies, depending on the roadway conditions. The 85th percentile would be estimated at: 25 mph.

5. Road surface type:
The road has 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 road is approximately 16' wide. The surface appeared well-maintained.

6. Intersections with other roads and trails:
The segment intersects with the following forest roads.
- 33N15/ML3
- 34N37/ML2
- 35N85B/ML2
- 33N02Y/ML2
- 33N90Y/ML2
- 33N83/ML2
- 34N01/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 intersection of 35N04/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 16', approximately.
- Raised roadbed provides approximate 6 foot vertical drops off of road shoulder.
- The road provides administrative access for fire lookout access. Summer and fall seasons will experience peak use, winter and spring can bring snowy and icy conditions.

8. Roadside conditions:

- The segment runs through open pine forest.
- Cross slope is 5-25%.
- Grade is 2-4%.
- Pine trees are ≥18” and numerous rocks.
- Emergency run-out is limited as the raised roadbed creates vertical drop-offs from the road shoulders.

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

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:
Alternative 5
(Motorized Emphasis)
Travel Management
Lassen National Forest

Unauthorized Routes to be Added to the National Forest Transportation System

Areas Open to Motorized Vehicle Use

Harvey Mtn
Alternative 5
(Motorized Emphasis)
Travel Management
Lassen National Forest

Straylor Lake

Unauthorized Routes to be Added to the National Forest Transportation System