

Engineering Report:

Lassen National Forest

Eagle Lake Ranger District

Analysis of

National Forest System Road (NFSR)

32N10

for Motorized Mixed Use Designation

Forest: Lassen

District: Eagle Lake

Road Number: 32N10

Road Name: Robbers Spring DR 10

Introduction: The 32N10 Road segment studied is located on the west side of Lassen National Forest (LNF) in the Pine Creek Valley quadrangle.

NFSR 32N10 DR10 ML4 begins at the intersection with State Highway 44 in Section 33 of said quadrangle and trends south and west to the beginning of the Bogard Buttes, then turns due south to Silver Lake in the Bogard Buttes quadrangle, thence into the Red Cinder quadrangle and runs by Betty Lake and Shotoverin Lake before running south again and by Echo Lake and along Bailey Creek and into the Chester quadrangle where the road continues south along the east flank of Manzanita Mountain, thence to an intersection at its terminus with County Road A13. The road length is approximately 30 miles.

The segment studied starts at road mile 0.00 in Section 33 of Pine Creek Valley quadrangle at the intersection with State Highway 44 and intersects with an unauthorized route for a distance of approximately 0.50 miles to road mile post 0.50.

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

operation on public roads within the State) and non-highway-legal vehicles (motor vehicles, including the operators, that are not licensed or certified for general operation on public roads within the State) on 32N10 / ML4. The LNF Travel Analysis (June 2008) identified this road section as a connector for recreational off-highway vehicle (OHV) loop opportunities on the adjacent maintenance level two road network, of which a portion is currently managed as open to non-highway-legal vehicle use.

Study Segment road data from the forest transportation atlas:

Segment 1: Beginning Mile Post: 0.00 Ending Mile Post: 0.50

State Hwy 44 to unauthorized route

Traffic Service Level: A B C D

Objective Maintenance Level: 1 2 3 4 5

Operational Maintenance Level: 1 2 3 4 5

Maintenance by: Forest Service (FS)

Non-Forest Service ROW or jurisdiction? Yes No

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

Yes No

Description of agreements or encumbrances:

No agreements are documented.

Subject to Highway Safety Act? Yes No

Non-highway-legal vehicles currently permitted? Yes No

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

Description of State California Vehicle Code and Forest Service Directives:

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

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

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

Road 32N10 / ML4 currently encourages use as an objective ML4 and operational ML4 collector road and functions as a forest highway connecting the State Highway 44 to the Hat Creek Ranger District, tree seed plantations, defensible fuel profile zones, and multiple recreation destinations.

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

32N10 is utilized by forest personnel for ingress and egress to Defensible Fuel Profile Zones – DFPZ's and their associated vegetation management and fire suppression functions, for wildlife management, and for recreation access to several forest destinations.

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

The proposed use for these two segments of 32N10 / ML4 identified in this analysis is to authorize motorized mixed vehicle class use. The proposal is to utilize the ML4 road segment to connect adjacent ML2 roads into a loop for off highway motorized vehicle use.

General Considerations:

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

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

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

California has:

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

Summary of Findings:

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

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

NFSR road 32N10 is an observed 1+ lane operational maintenance level 4 standard throughout its extent.

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

Factors Considered:

1. Operator considerations:

- Based on engineering judgment and experience/observation on other national forest management units, the LNF has an above average standard of road. The Lassen is not "typical" in its road system's adherence to maintenance levels. This road is an objective ML4 and an operational ML4. It provides forest commodity haul and fire suppression access which necessitates a high level ingress/egress access road for the DOT Class 8 (26,001 – 33,000 GVWR) trucks that use it.
- The objective level of this road is classified as a 4, and the operational level is a ML4. This provides for all-weather (during fire season May to October) fire staffing access and fire vehicle emergency access. The objective of the road is to provide access for commodity haul, wildlife management, emergency fire detection and suppression response.
- Allowing non-highway-legal vehicles to use the road segment can involve both non-highway-legal equipment and non-licensed operators, including children.
- In California, children under the age of 18 must take a prescribed safety course, be under direct supervision of an adult possessing appropriate safety certificate, or possess the appropriate safety certificate in order to operate an ATV. In addition, children under the age of 14 cannot operate an ATV without direct supervision by parent, guardian, or authorized adult.
- The Lassen National Forest currently manages this road as a highway, in accordance with the Highway Safety Act. The road is subject to the provisions of the California Vehicle Code (CVC) for highways.
- The current use on NFSR 32N10 appears to be consistent with state law and forest policy for operational maintenance level 3 roads.

2. Crash history:

There are two reported motor vehicle crashes on this road as of July 16, 2003.

Accident No. 1 - Two vehicles trailing each other, one backtracked and they ran into each other head-on.

Accident No. 2 - an ATV left the roadway.

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)

5 civilian motor vehicles were observed along the 32N10 road during the field observation.

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

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

5. Road surface type:

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

6. Intersections with other roads and trails:

Road segment 1 intersects with the following forest road.

- 31N19
- Unauthorized Route

The maintenance level 2 roads have historically provided forest management access, fire suppression access, commodity haul, forest grazing access, and hunting and firewood gathering access. The proposed MMU intersections of 32N10 /ML4 may result in higher traffic merging speeds.

7. Other roadway factors:

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

8. Roadside conditions:

- The segment runs through high elevation, 5,000 ft., open Pine forest, meadow, open Juniper, brush, native grass and lava rock forest land.
- Cross slope is 0-1%.
- Grade is 0-1%.
- Pine and Juniper trees are $\leq 18''$ and numerous lava ejecta rocks.
- Emergency run-out is limited.

9. Risk without mitigation:

Crash probability: High Med Low

Crash severity: High Med Low

Crash probability was assessed based on:

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

Crash severity was assessed based on:

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

Alternatives and Mitigation Measures:

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

For all situations, the following mitigation measures apply:

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

devices as needed.

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

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

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

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

Crash probability: High Med Low

Crash severity: High Med Low

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

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

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

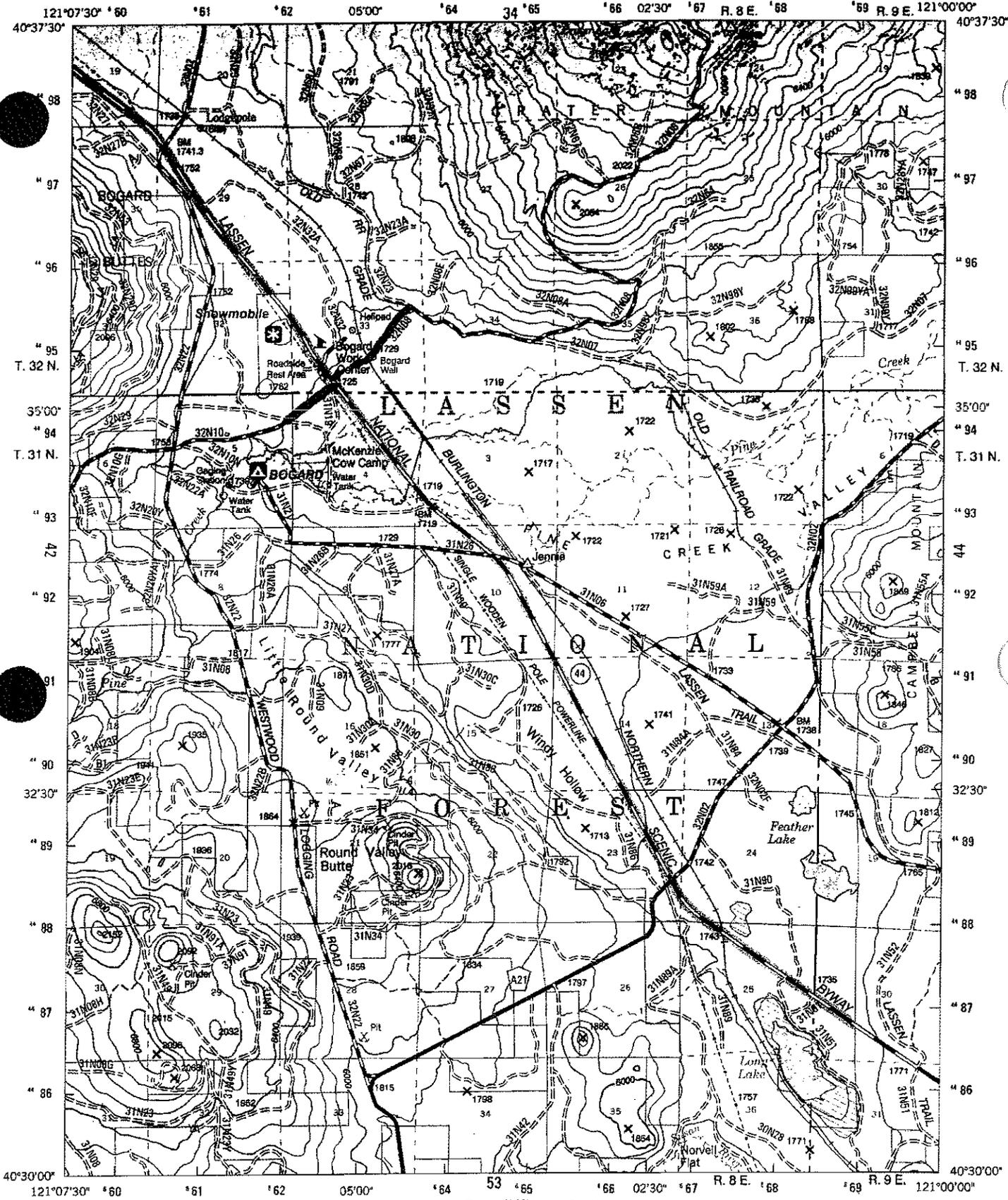


Tim Dedrick *July 29, 2009*
Prepared by Tim Dedrick
Lassen NF Civil Engineer

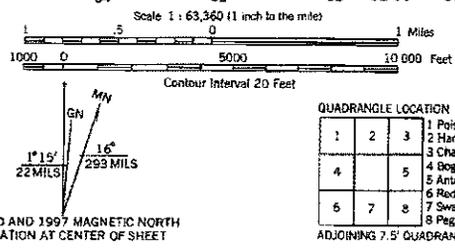
Date

George Kulick
Region 5 Qualified Engineer

Date



Produced by the U.S. Geological Survey
Revised by the U.S. Forest Service
Areas outside the National Forest System lands may not have been revised.
Map by USGS and NOS/NOAA
Compiled from aerial photographs taken 1980. Revised from aerial photographs taken 1991 and 1993. Partial field check by U.S. Forest Service 1995.
North American Datum of 1927 (NAD 27). Projection: California coordinate system, zone 1 (Lambert Conformal Conic).
National Forest System lands. Revised 1997.
This map is not a legal land use or ownership document. Public lands are subject to change and leasing, and may have access restrictions; check with local offices. Obtain permission before entering private lands.

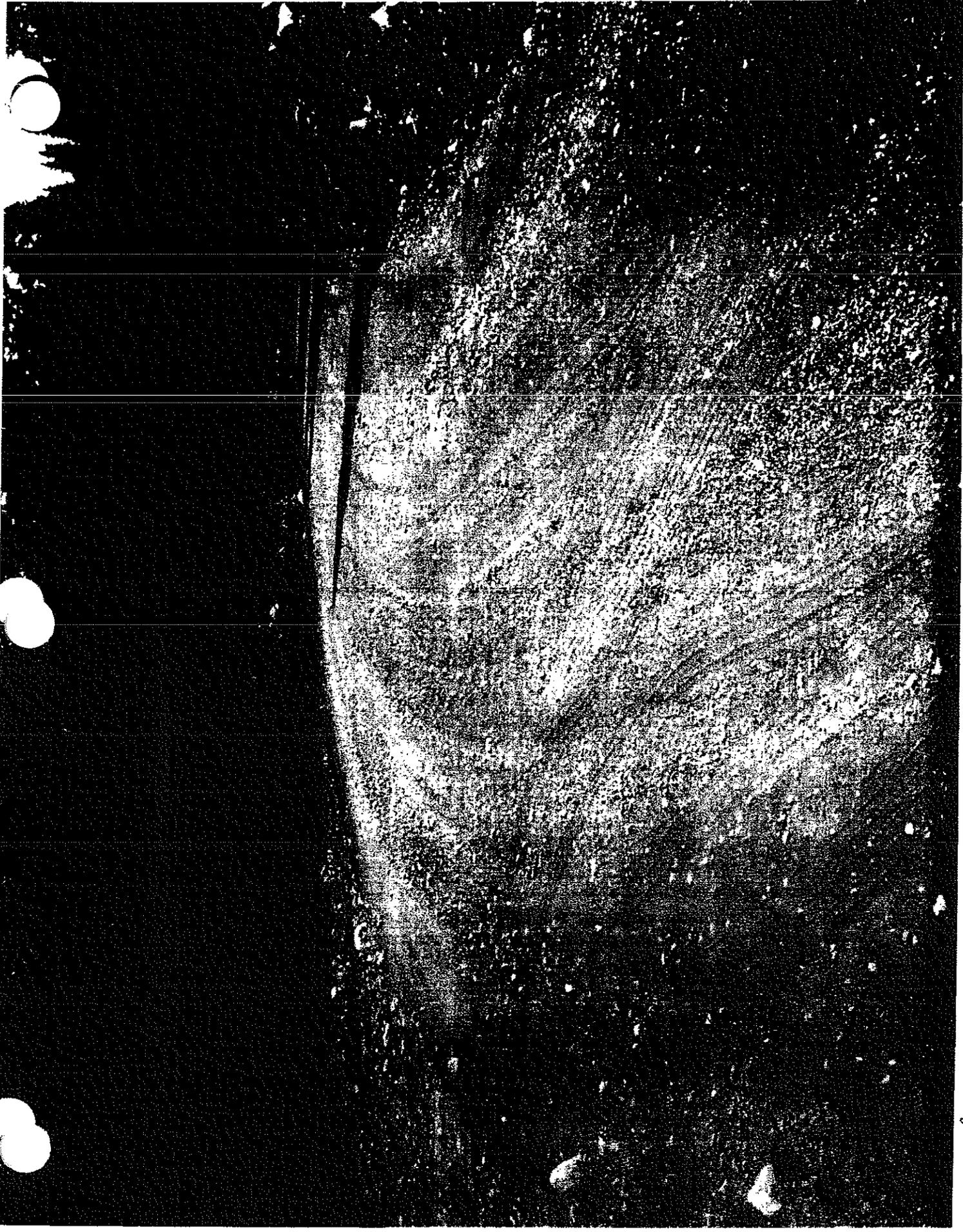


QUADRANGLE LOCATION

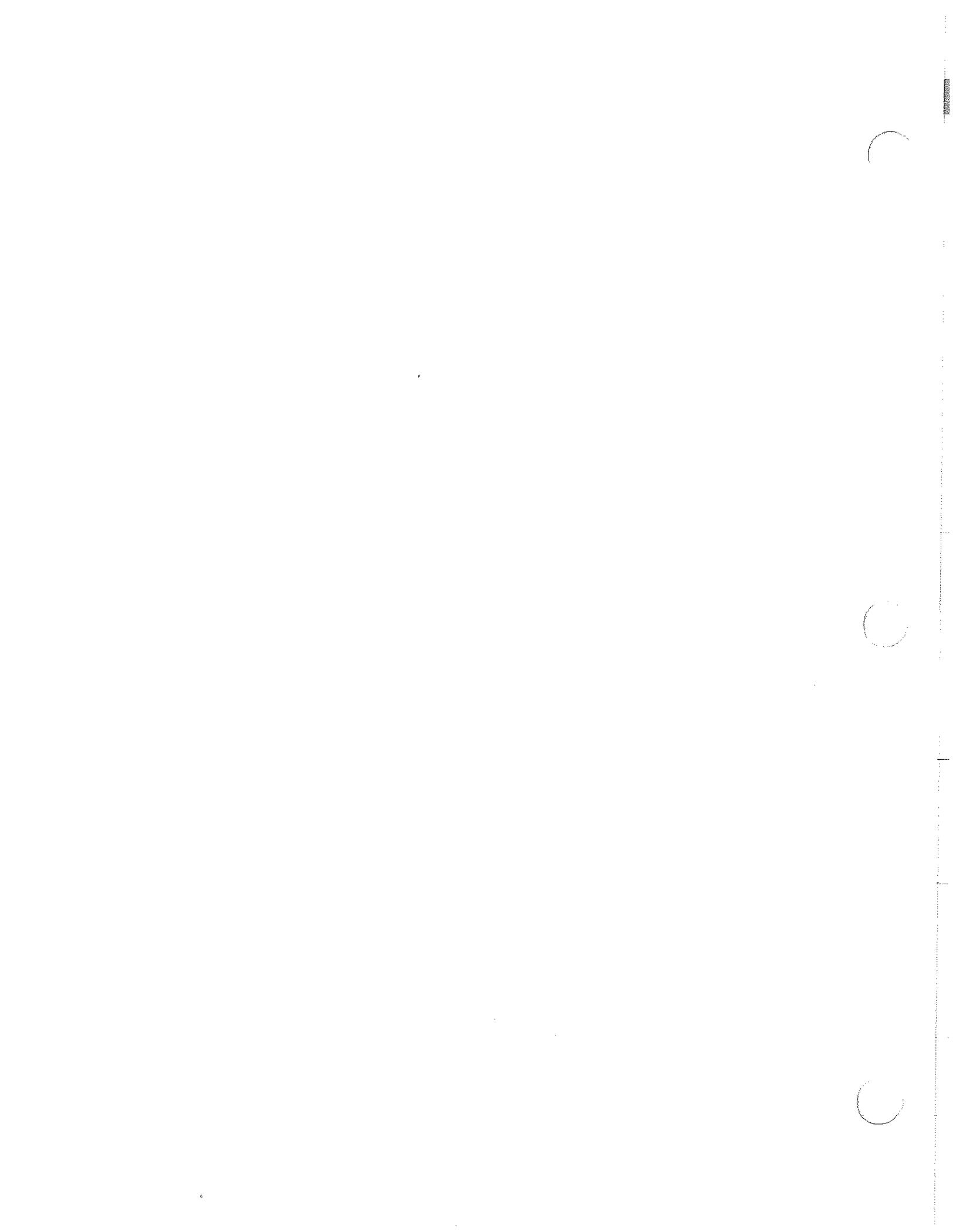
1	2	3
4	5	6
7	8	

ADJOINING 7.5' QUADRANGLES

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



Sandra - ATV Accident - 10 Road June 30, 2003



Engineering Report:

Lassen National Forest

Eagle Lake Ranger District

Analysis of

National Forest System Road (NFSR)

32N21

for Motorized Mixed Use Designation

Forest: Lassen

District: Eagle Lake

Road Number: 32N21

Road Name: Butte Lake Road

Introduction: The 32N21 Road segment studied is located on the west side of Lassen National Forest (LNF) in the Pine Creek Valley quadrangle.

NFSR 32N21 ML3 begins at the intersection with State Highway 44 in Section 11 of the Swains Hole quadrangle and trends south to and through the boundary of the Lassen Volcanic National Park and to the Butte Lake Campground. The road length is approximately 5 miles.

The segment studied starts at approximate road mile 3.00 in Section 27 of Prospect Peak quadrangle at the intersection with 32N92Y and intersects with 32N61 for a distance of approximately 0.50 miles to road mile post 3.50.

This entire road is currently managed by LNF as open only to highway-legal vehicles. The road segments analyzed were recommended in the LNF Travel Analysis (2008) for an engineering analysis of motorized mixed use. The purpose of this engineering analysis is to investigate the potentials, and associated risks, for operating/transporting both highway-legal vehicles (motor vehicles, including the operators, that are licensed or certified for general operation on public roads within the State) and non-highway-legal vehicles (motor vehicles, including the operators, that are not licensed or certified for general operation on public roads within the State) on 32N21 / ML3. The LNF Travel Analysis (June 2008) identified this road section as a connector for recreational off-highway vehicle (OHV) loop opportunities on the adjacent

maintenance level two road network, of which a portion is currently managed as open to non-highway-legal vehicle use.

Study Segment road data from the forest transportation atlas:

Segment 1: Beginning Mile Post: 3.00 Ending Mile Post: 3.50

32N92Y to 32N61

Traffic Service Level: A B C D

Objective Maintenance Level: 1 2 3 4 5

Operational Maintenance Level: 1 2 3 4 5

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

Non-Forest Service ROW or jurisdiction? Yes No

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

Yes No

Description of agreements or encumbrances:

No agreements are documented.

Subject to Highway Safety Act? Yes No

Non-highway-legal vehicles currently permitted? Yes No

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

Description of State California Vehicle Code and Forest Service Directives:

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

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

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

Road 32N21 / ML3 currently encourages use as an objective ML3 and operational ML3 collector road and functions as a forest highway connecting the State Highway 44 to the Hat Creek Ranger District, tree seed plantations, defensible fuel profile zones, and multiple recreation destinations.

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

32N21 is utilized by forest personnel for ingress and egress to Defensible Fuel Profile Zones – DFPZ's and their associated vegetation management and fire suppression functions, for wildlife management, and for recreation access to several forest destinations.

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

The proposed use for these two segments of 32N21 / ML3 identified in this analysis is to authorize motorized mixed vehicle class use. The proposal is to utilize the ML3 road segment to connect adjacent ML2 roads into a loop for off highway motorized vehicle use.

General Considerations:

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

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

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

California has:

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

Summary of Findings:

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

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

NFSR road 32N21 is an observed 1+ lane operational maintenance level 3 standard throughout its extent.

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

Factors Considered:

1. Operator considerations:

- Based on engineering judgment and experience/observation on other national forest management units, the LNF has an above average standard of road. The Lassen is not "typical" in its road system's adherence to maintenance levels. This road is an objective ML3 and an operational ML3. It provides forest commodity haul and fire suppression access which necessitates a high level ingress/egress access road for the DOT Class 8 (26,001 – 33,000 GVWR) trucks that use it.
- The objective level of this road is classified as a 3, and the operational level is a ML3. This provides for all-weather (during fire season May to October) fire staffing access and fire vehicle emergency access. The objective of the road is to provide access for commodity haul, wildlife management, emergency fire detection and suppression response.
- Allowing non-highway-legal vehicles to use the road segment can involve both non-highway-legal equipment and non-licensed operators, including children.
- In California, children under the age of 18 must take a prescribed safety course, be under direct supervision of an adult possessing appropriate safety certificate, or possess the appropriate safety certificate in order to operate an ATV. In addition, children under the age of 14 cannot operate an ATV without direct supervision by parent, guardian, or authorized adult.
- The Lassen National Forest currently manages this road as a highway, in accordance with the Highway Safety Act. The road is subject to the provisions of the California Vehicle Code (CVC) for highways.
- The current use on NFSR 32N21 appears to be consistent with state law and forest policy for operational maintenance level 3 roads.

2. Crash history:

There are no reported motor vehicle crashes on this road.

3. Traffic volume and type:

Non-highway-legal vehicles:

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

Highway-legal vehicles:

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

Passenger cars Commercial vehicles Recreation vehicles (RV's)

7 civilian motor vehicles were observed along the 32N21 road during the field observation.

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

The speed greatly varies, depending on the roadway conditions. The 85th percentile would be estimated at: 40 mph.

5. Road surface type:

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

6. Intersections with other roads and trails:

Road segment 1 intersects with the following forest road.

- 32N92Y
- 32N61

The maintenance level 2 roads have historically provided forest management access, fire suppression access, commodity haul, forest grazing access, and hunting and firewood gathering access. The proposed MMU intersections of 32N21 /ML3 may result in higher traffic merging speeds.

7. Other roadway factors:

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

8. Roadside conditions:

- The segment runs through high elevation, 5,000 ft., open Pine forest, meadow, open Juniper, brush, native grass and lava rock forest land.
- Cross slope is 0-1%.
- Grade is 0-1%.
- Pine and Juniper trees are ≤ 18 " and numerous lava ejecta rocks.
- Emergency run-out is limited.

9. Risk without mitigation:

Crash probability: High Med Low

Crash severity: High Med Low

Crash probability was assessed based on:

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

Crash severity was assessed based on:

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

Alternatives and Mitigation Measures:

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

For all situations, the following mitigation measures apply:

- Clear communication and education to the visitors on allowed uses, safe motor vehicle use, and natural resources (informational signing and kiosks, maps, website, etc.).
- Improved route identification and safety signing. Repair and replace devices as needed.
- Clear brush, especially along curves, to improve sight distance.
- Combine the appropriate enforcement measures with the allowed uses for the road.
- Coordinate with other agencies to improve enforcement consistency.
- Utilize a monitoring program to better determine the appropriate management strategy for the types of use, new technologies, changes in visitor demands, and resource protection measures.

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

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

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

Crash probability: High Med Low

Crash severity: High Med Low

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

- Recognize that this situation would involve different allowed uses and would complicate communication and enforcement.
- Improve education and enforcement communication to explain the complexities of various allowed uses on the road.
- Install appropriate signs of a type approved by the Department of Transportation on and along the highway to identify and communicate the potential hazards related to motorized mixed use.
- Notify the Commissioner of the California Highway Patrol and review their opinion.
- Approximate Implementation Cost: \$ 3500
- Expected risk:

Crash probability: High Med Low

Crash severity: High Med Low

Final Comments:

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

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

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

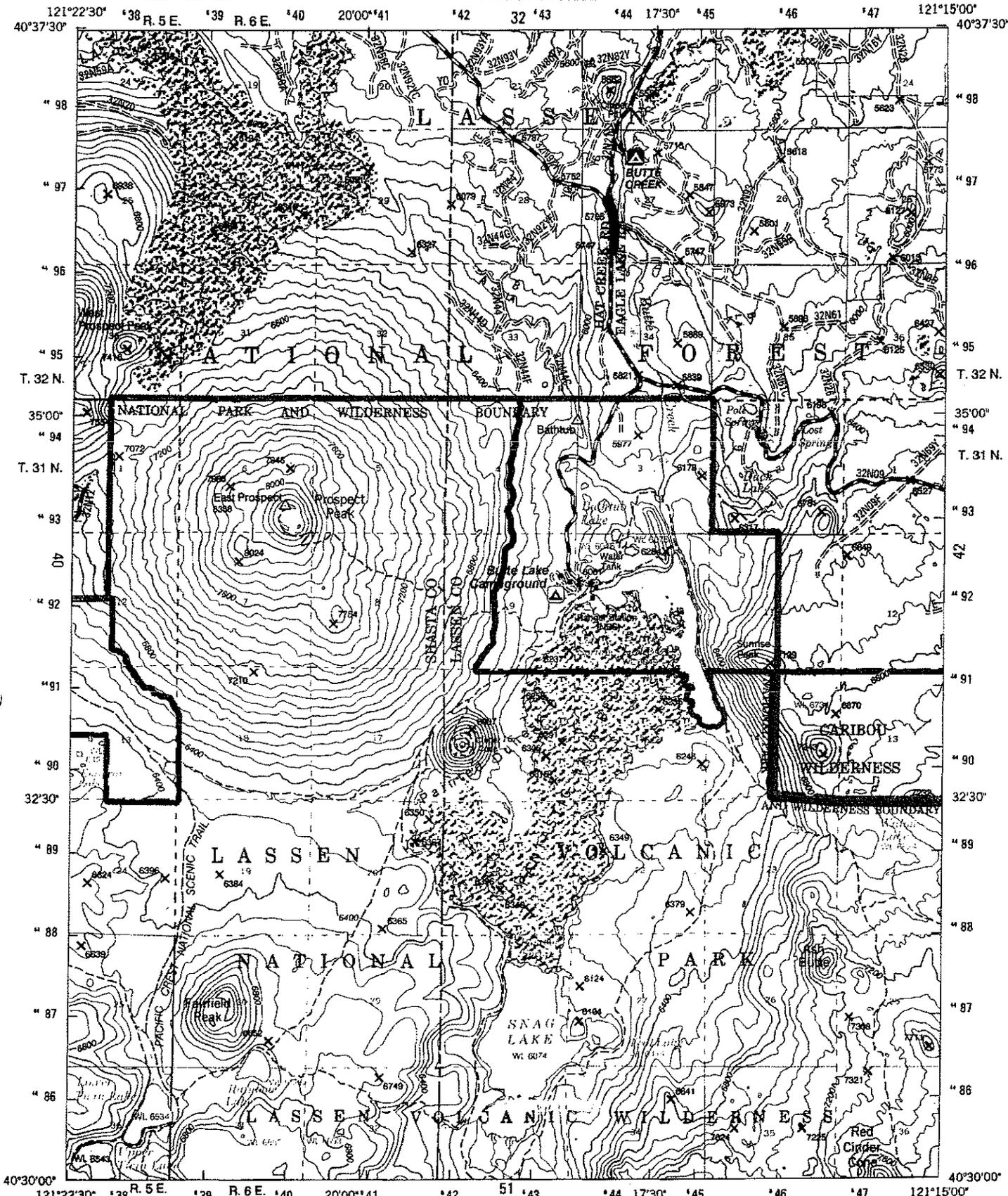
The following priorities are to be used to minimize the potential conflicts of mixed use:

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

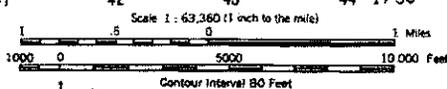
Upon designation and prior to allowing any mixed use, the Forest Supervisor is responsible for appropriately signing and mapping the route such that the dual traffic use is clear to all users.

Maps & Photos:





Produced by the U.S. Geological Survey
Revised by the U.S. Forest Service
Areas outside the National Forest System lands may not have been revised.
Control by USGS and NDS/NOAA
Compiled from aerial photographs taken 1980. Revised from aerial photographs taken 1993. Partial field check by U.S. Forest Service 1995.
North American Datum of 1927 (NAD 27). Projection: California coordinate system, zone 1 (Lambert Conformal Conic).
National Forest System lands. Revised 1997.
This map is not a legal land or ownership document. Public lands are subject to change and leasing, and may have access restrictions; check with local offices. Obtain permission before entering private lands.



UTM GRID AND 1997 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

QUADRANGLE LOCATION

1	2	3
4	5	6
7	8	

ADJOINING 7.5' QUADRANGLES

- HIGHWAYS AND ROADS
- U.S. Primary Highway
 - Secondary Highway
 - Improved Road, Paved
 - Improved Road, Gravel
 - Improved Road, Dirt
 - Unimproved Road
 - OHV
 - 4 Wheel Drive Road
 - National Forest
 - National Recreation Trail
 - Trail

Tim Dedrick *July 29, 2009*

Prepared by Tim Dedrick
Lassen NF Civil Engineer

Date

George Kulick
Region 5 Qualified Engineer

Date

Engineering Report:

Lassen National Forest

Eagle Lake Ranger District

Analysis of

National Forest System Road (NFSR)

32N22

for Motorized Mixed Use Designation

Forest: Lassen

District: Eagle Lake

Road Number: 32N22

Road Name: Westwood Logging Road

Introduction: The 32N22 Road segment studied is located on the west side of Lassen National Forest (LNF) in the Pine Creek Valley quadrangle.

NFSR 32N22 ML3 begins at the intersection with State Highway 44 in Section 29 of said quadrangle and trends south and east to the intersection with County Road A21. The road length is approximately 8 miles.

The segment studied starts at road mile 0.00 in Section 33 of Pine Creek Valley quadrangle at the intersection with State Highway 44 and intersects with an unauthorized route for a distance of approximately 0.25 miles to road mile post 1.50.

This entire road is currently managed by LNF as open only to highway-legal vehicles. The road segments analyzed were recommended in the LNF Travel Analysis (2008) for an engineering analysis of motorized mixed use. The purpose of this engineering analysis is to investigate the potentials, and associated risks, for operating/transporting both highway-legal vehicles (motor vehicles, including the operators, that are licensed or certified for general operation on public roads within the State) and non-highway-legal vehicles (motor vehicles, including the operators, that are not licensed or certified for general operation on public roads within the State) on 32N22 / ML3. The LNF Travel Analysis (June 2008) identified this road section as a connector for recreational off-highway vehicle (OHV) loop opportunities on the adjacent

maintenance level two road network, of which a portion is currently managed as open to non-highway-legal vehicle use.

Study Segment road data from the forest transportation atlas:

Segment 1: Beginning Mile Post: 1.25 Ending Mile Post: 1.50

32N53 to unauthorized route

Traffic Service Level: A B C D

Objective Maintenance Level: 1 2 3 4 5

Operational Maintenance Level: 1 2 3 4 5

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

Non-Forest Service ROW or jurisdiction? Yes No

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

Yes No

Description of agreements or encumbrances:

No agreements are documented.

Subject to Highway Safety Act? Yes No

Non-highway-legal vehicles currently permitted? Yes No

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

Description of State California Vehicle Code and Forest Service Directives:

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

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

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

Road 32N22 / ML3 currently encourages use as an objective ML3 and operational ML3 collector road and functions as a forest highway connecting the State Highway 44 to the Hat Creek Ranger District, tree seed plantations, defensible fuel profile zones, and multiple recreation destinations.

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

32N22 is utilized by forest personnel for ingress and egress to Defensible Fuel Profile Zones – DFPZ's and their associated vegetation management and fire suppression functions, for wildlife management, and for recreation access to several forest destinations.

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

The proposed use for these two segments of 32N22 / ML3 identified in this analysis is to authorize motorized mixed vehicle class use. The proposal is to utilize the ML3 road segment to connect adjacent ML2 roads into a loop for off highway motorized vehicle use.

General Considerations:

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

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

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

California has:

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

Summary of Findings:

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

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

NFSR road 32N22 is an observed 1+ lane operational maintenance level 3 standard throughout its extent.

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

Factors Considered:

1. Operator considerations:

- Based on engineering judgment and experience/observation on other national forest management units, the LNF has an above average standard of road. The Lassen is not "typical" in its road system's adherence to maintenance levels. This road is an objective ML3 and an operational ML3. It provides forest commodity haul and fire suppression access which necessitates a high level ingress/egress access road for the DOT Class 8 (26,001 – 33,000 GVWR) trucks that use it.
- The objective level of this road is classified as a 3, and the operational level is a ML3. This provides for all-weather (during fire season May to October) fire staffing access and fire vehicle emergency access. The objective of the road is to provide access for commodity haul, wildlife management, emergency fire detection and suppression response.
- Allowing non-highway-legal vehicles to use the road segment can involve both non-highway-legal equipment and non-licensed operators, including children.
- In California, children under the age of 18 must take a prescribed safety course, be under direct supervision of an adult possessing appropriate safety certificate, or possess the appropriate safety certificate in order to operate an ATV. In addition, children under the age of 14 cannot operate an ATV without direct supervision by parent, guardian, or authorized adult.
- The Lassen National Forest currently manages this road as a highway, in accordance with the Highway Safety Act. The road is subject to the provisions of the California Vehicle Code (CVC) for highways.
- The current use on NFSR 32N22 appears to be consistent with state law and forest policy for operational maintenance level 3 roads.

2. Crash history:

There are no reported motor vehicle crashes on this road.

3. Traffic volume and type:

Non-highway-legal vehicles:

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

Highway-legal vehicles:

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

Passenger cars Commercial vehicles Recreation vehicles (RV's)

3 civilian motor vehicles were observed along the 32N22 road during the field observation.

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

The speed greatly varies, depending on the roadway conditions. The 85th percentile would be estimated at: 40 mph.

5. Road surface type:

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

6. Intersections with other roads and trails:

Road segment 1 intersects with the following forest road.

- 32N53
- Unauthorized Route

The maintenance level 2 roads have historically provided forest management access, fire suppression access, commodity haul, forest grazing access, and hunting and firewood gathering access. The proposed MMU intersections of 32N22 /ML3 may result in higher traffic merging speeds.

7. Other roadway factors:

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

8. Roadside conditions:

- The segment runs through high elevation, 5,000 ft., open Pine forest, meadow, open Juniper, brush, native grass and lava rock forest land.
- Cross slope is 0-1%.
- Grade is 0-1%.
- Pine and Juniper trees are $\leq 18"$ and numerous lava ejecta rocks.
- Emergency run-out is limited.

9. Risk without mitigation:

Crash probability: High Med Low

Crash severity: High Med Low

Crash probability was assessed based on:

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

Crash severity was assessed based on:

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

Alternatives and Mitigation Measures:

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

For all situations, the following mitigation measures apply:

- Clear communication and education to the visitors on allowed uses, safe motor vehicle use, and natural resources (informational signing and kiosks, maps, website, etc.).
- Improved route identification and safety signing. Repair and replace devices as needed.
- Clear brush, especially along curves, to improve sight distance.
- Combine the appropriate enforcement measures with the allowed uses for the road.
- Coordinate with other agencies to improve enforcement consistency.
- Utilize a monitoring program to better determine the appropriate management strategy for the types of use, new technologies, changes in visitor demands, and resource protection measures.

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

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

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

Crash probability: High Med Low

Crash severity: High Med Low

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

- Recognize that this situation would involve different allowed uses and would complicate communication and enforcement.
- Improve education and enforcement communication to explain the complexities of various allowed uses on the road.
- Install appropriate signs of a type approved by the Department of Transportation on and along the highway to identify and communicate the potential hazards related to motorized mixed use.
- Notify the Commissioner of the California Highway Patrol and review their opinion.
- Approximate Implementation Cost: \$ 3500
- 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):

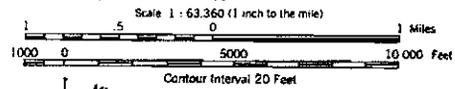
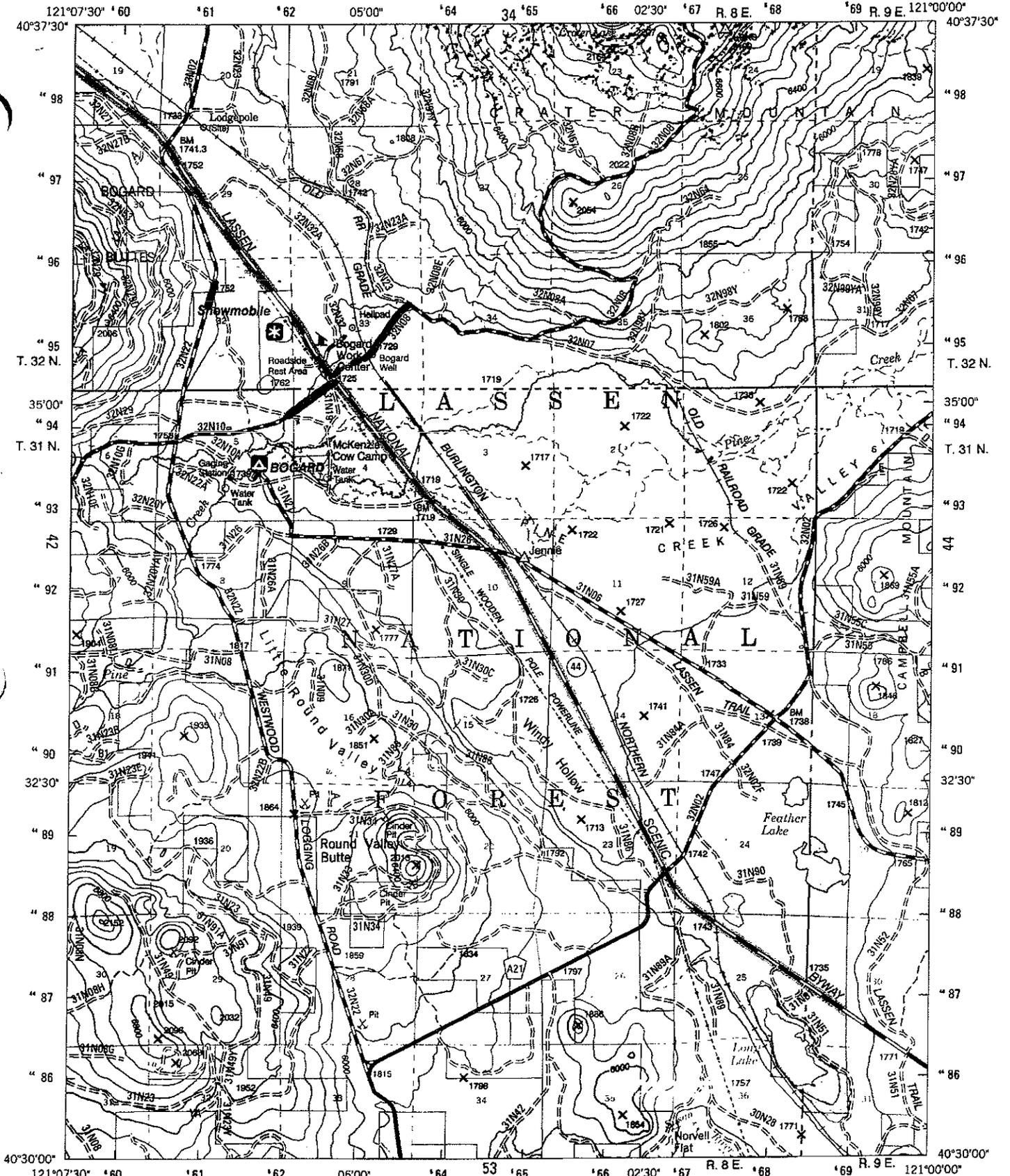
The following priorities are to be used to minimize the potential conflicts of mixed use:

- 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:





HIGHWAYS AND ROADS

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

QUADRANGLE LOCATION

1	2	3
4	5	6
7	8	

ADJOINING 7.5' QUADRANGLES

Produced by the U.S. Geological Survey
 Revised by the U.S. Forest Service
 Areas outside the National Forest System lands may not have been revised.
 Control by USGS and NOS/NOAA
 Compiled from aerial photographs taken 1980. Revised from aerial photographs taken 1991 and 1993. Partial field check by U.S. Forest Service 1995.
 North American Datum of 1927 (NAD 27). Projection: California coordinate system, zone 1 (Lambert Conformal Conic).
 National Forest System lands. Revised 1997.
 This map is not a legal land line or ownership document. Public lands are subject to change and leasing, and may have access restrictions; check with local offices. Obtain permission before entering private lands.

Tim Dedrick

August 26, 2009

Prepared by Tim Dedrick
Lassen NF Civil Engineer

Date

George Kulick
Region 5 Qualified Engineer

Date

Engineering Report:

Lassen National Forest

Eagle Lake Ranger District

Analysis of

National Forest System Road (NFSR)

32N60

for Motorized Mixed Use Designation

Forest: Lassen

District: Eagle Lake

Road Number: 32N60

Road Name: Grays Flat Road

Introduction: The 32N60 Road segment studied is located on the west side of Lassen National Forest (LNF) in the Pine Creek Valley quadrangle.

NFSR 32N60 ML3 begins at the intersection with State Highway 44 in Section 14 of the Poison Lake quadrangle and trends south and to the west, enters the Bogard Buttes quadrangle, then trends south again to an intersection with 32N09 and the beginning of the Bogard Buttes. The road length is approximately 7.5 miles in length.

The first segment studied starts at approximate road mile 1.50 in Section 22 of Bogard Buttes quadrangle at the intersection with 32N73Y and intersects with 32N73YE for a distance of approximately 1.00 miles to approx. road mile 2.50.

The second segment studied starts at approximate road mile 4.00 in Section 33 of said quadrangle at the intersection of 32N11 and intersects with 32N69Y and 32N37 for a distance of approximately 0.50 miles to approx. road mile 4.50.

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

(motor vehicles, including the operators, that are not licensed or certified for general operation on public roads within the State) on 32N60 / ML3. The LNF Travel Analysis (June 2008) identified this road section as a connector for recreational off-highway vehicle (OHV) loop opportunities on the adjacent maintenance level two road network, of which a portion is currently managed as open to non-highway-legal vehicle use.

Study Segment road data from the forest transportation atlas:

Segment 1: Beginning Mile Post: 1.50 Ending Mile Post: 2.50

32N73Y to 32N73YE

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: 4.00 Ending Mile Post: 4.50

32N11 to 32N69Y/32N37

Traffic Service Level: A B C D

Objective Maintenance Level: 1 2 3 4 5

Operational Maintenance Level: 1 2 3 4 5

Maintenance by: Forest Service (FS)

Non-Forest Service ROW or jurisdiction? Yes No

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

Yes No

Description of agreements or encumbrances:

No agreements are documented.

Subject to Highway Safety Act? Yes No

Non-highway-legal vehicles currently permitted? Yes No

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

Description of State California Vehicle Code and Forest Service Directives:

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

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

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

Road 32N60 / ML3 currently encourages use as an objective ML3 and operational ML3 collector road and functions as a forest highway connecting the State Highway 44 to the Hat Creek Ranger District, tree seed plantations, defensible fuel profile zones, and multiple recreation destinations.

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

32N60 is utilized by forest personnel for ingress and egress to Defensible Fuel Profile Zones – DFPZ's and their associated vegetation management and fire suppression functions, for wildlife management, and for recreation access to several forest destinations.

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

The proposed use for these two segments of 32N60 / ML3 identified in this analysis is to authorize motorized mixed vehicle class use. The proposal is to utilize the ML3 road segment to connect adjacent ML2 roads into a loop for off highway motorized vehicle use.

General Considerations:

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

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

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

California has:

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

Summary of Findings:

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

Road mitigation should include implementing a comprehensive communication, management, and enforcement plan. Associated implementation costs will

depend on the designated allowed use for the road.

NFSR road 32N60 is an observed 1+ lane operational maintenance level 3 standard throughout its extent.

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

Factors Considered:

1. Operator considerations:

- Based on engineering judgment and experience/observation on other national forest management units, the LNF has an above average standard of road. The Lassen is not "typical" in its road system's adherence to maintenance levels. This road is an objective ML3 and an operational ML3. It provides forest commodity haul and fire suppression access which necessitates a high level ingress/egress access road for the DOT Class 8 (26,001 – 33,000 GVWR) trucks that use it.
- The objective level of this road is classified as a 3, and the operational level is a ML3. This provides for all-weather (during fire season May to October) fire staffing access and fire vehicle emergency access. The objective of the road is to provide access for commodity haul, wildlife management, emergency fire detection and suppression response.
- Allowing non-highway-legal vehicles to use the road segment can involve both non-highway-legal equipment and non-licensed operators, including children.
- In California, children under the age of 18 must take a prescribed safety course, be under direct supervision of an adult possessing appropriate safety certificate, or possess the appropriate safety certificate in order to operate an ATV. In addition, children under the age of 14 cannot operate an ATV without direct supervision by parent, guardian, or authorized adult.
- The Lassen National Forest currently manages this road as a highway, in accordance with the Highway Safety Act. The road is subject to the provisions of the California Vehicle Code (CVC) for highways.
- The current use on NFSR 32N60 appears to be consistent with state law and forest policy for operational maintenance level 3 roads.

2. Crash history:

There are no reported motor vehicle crashes on this road.

3. Traffic volume and type:

Non-highway-legal vehicles:

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

Highway-legal vehicles:

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

Passenger cars Commercial vehicles Recreation vehicles (RV's)

2 civilian motor vehicles were observed along the 32N60 road during the field observation.

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

The speed greatly varies, depending on the roadway conditions. The 85th percentile would be estimated at: 40 mph.

5. Road surface type:

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

6. Intersections with other roads and trails:

Road segment 1 intersects with the following forest road.

- 32N73Y
- 32N60F
- 32N53
- 32N73YE

Road segment 2 intersects with the following forest road.

- 32N11
- 32N60C
- 32N69Y
- 32N37

The maintenance level 2 roads have historically provided forest management access, fire suppression access, commodity haul, forest grazing access, and hunting and firewood gathering access. The proposed MMU intersections of 32N60 /ML3 may result in higher traffic merging speeds.

7. Other roadway factors:

- Roadway alignment was adequate for the assigned maintenance level. Alignment provides for vehicle closing speeds of approximately 90 mph.
- The road was maintained with a traveled way width of 16'-20".
- Raised roadbed creates soft unconsolidated shoulders. Emergency

vehicle run-out among numerous lava rocks, Juniper trees, Pine trees, and brush may lead to loss of control for vehicle operators and/or collisions with immobile objects.

- The road provides administrative access for commodity haul, fire prevention patrol access, fire suppression access, wildlife management. Summer and fall seasons will experience peak use, winter and spring can bring snowy and icy conditions.

8. Roadside conditions:

- The segment runs through high elevation, 5,000 ft., open Pine forest, meadow, open Juniper, brush, native grass and lava rock forest land.
- Cross slope is 0-1%.
- Grade is 0-1%.
- Pine and Juniper trees are $\leq 18''$ and numerous lava ejecta rocks.
- Emergency run-out is limited.

9. Risk without mitigation:

Crash probability: High Med Low

Crash severity: High Med Low

Crash probability was assessed based on:

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

Crash severity was assessed based on:

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

Alternatives and Mitigation Measures:

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

For all situations, the following mitigation measures apply:

- Clear communication and education to the visitors on allowed uses, safe motor vehicle use, and natural resources (informational signing and kiosks, maps, website, etc.).
- Improved route identification and safety signing. Repair and replace devices as needed.
- Clear brush, especially along curves, to improve sight distance.
- Combine the appropriate enforcement measures with the allowed uses for the road.
- Coordinate with other agencies to improve enforcement consistency.
- Utilize a monitoring program to better determine the appropriate management strategy for the types of use, new technologies, changes in visitor demands, and resource protection measures.

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

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

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

Crash probability: High Med Low

Crash severity: High Med Low

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

- Recognize that this situation would involve different allowed uses and would complicate communication and enforcement.
- Improve education and enforcement communication to explain the complexities of various allowed uses on the road.
- Install appropriate signs of a type approved by the Department of Transportation on and along the highway to identify and communicate the potential hazards related to motorized mixed use.
- Notify the Commissioner of the California Highway Patrol and review their opinion.
- Approximate Implementation Cost: \$ 3500 per segment
- Expected risk:

Crash probability: High Med Low

Crash severity: High Med Low

Final Comments:

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

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

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

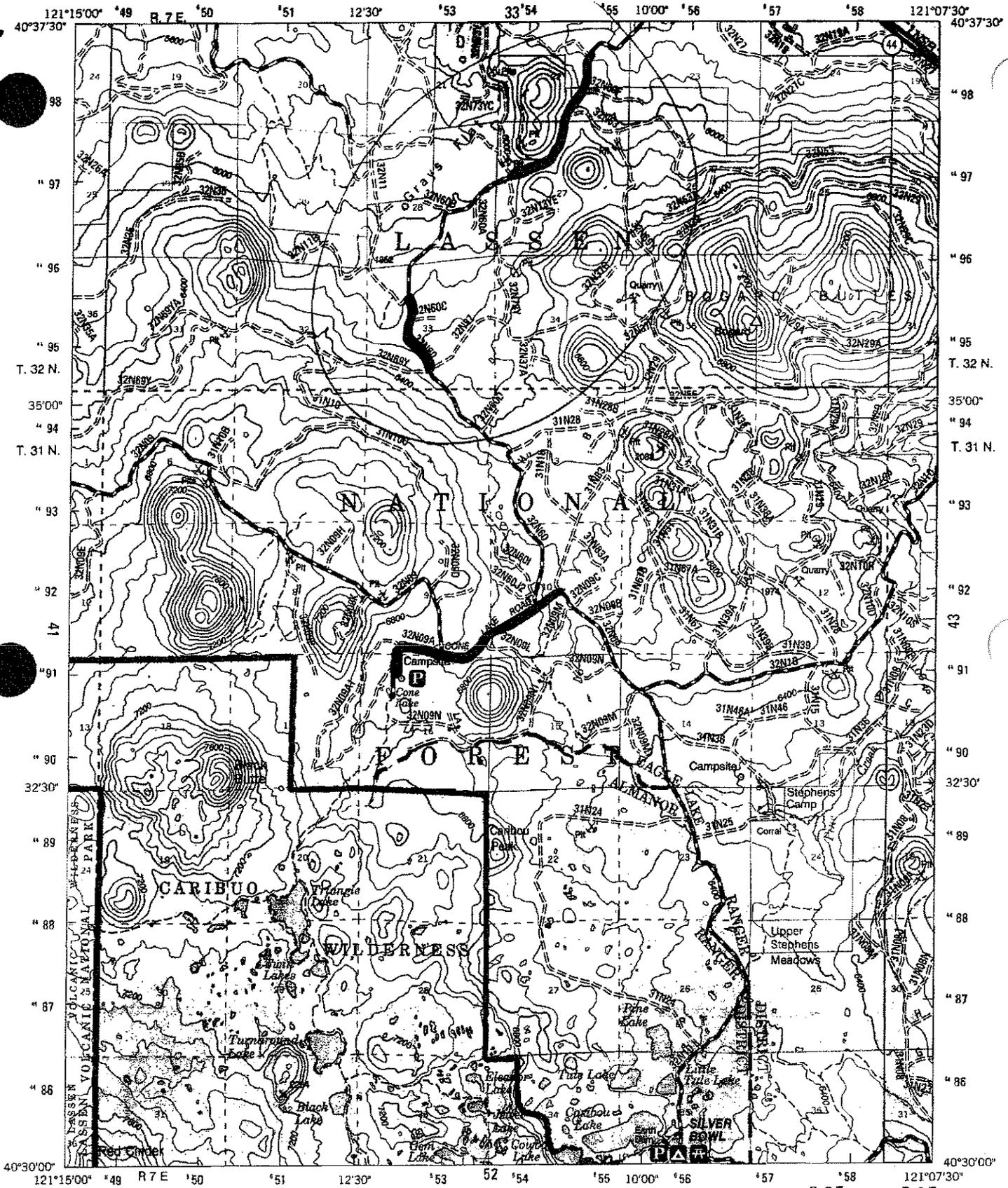
The following priorities are to be used to minimize the potential conflicts of mixed use:

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

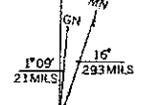
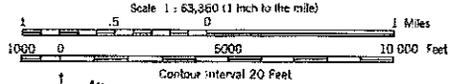
Upon designation and prior to allowing any mixed use, the Forest

Supervisor is responsible for appropriately signing and mapping the route such that the dual traffic use is clear to all users.

Maps & Photos:



Produced by the U.S. Geological Survey
 Revised by the U.S. Forest Service
 Areas outside the National Forest System lands may not have been revised.
 Control by USGS and NGS/NOAA
 Compiled from aerial photographs taken 1980. Revised from aerial photographs taken 1991 and 1993. Partial field check by U.S. Forest Service 1995.
 North American Datum of 1927 (NAD 27). Projection: California coordinate system, zone 1 (Lambert Conformal Conic).
 National Forest System lands. Revised 1997.
 This map is not a legal land line or ownership document. Public lands are subject to change and leasing, and may have access restrictions; check with local offices. Obtain permission before entering private lands.



UTM GRID AND 1997 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

QUADRANGLE LOCATION

1	2	3
4	5	6
7	8	

ADJOINING 7.5' QUADRANGLES

- HIGHWAYS AND ROADS
- 395 U.S. Primary Highway
 - 139 State Secondary Highway
 - 11 County Improved Road, Paved
 - 30 National Forest Improved Road, Gravel
 - OHV Improved Road, Dirt
 - Gate Composition Unspecified
 - Trail Unimproved Road
 - 4 Wheel Drive Road
 - National Recreation Trail

Tim Dedrick

Sept. 17, 2009

Prepared by Tim Dedrick
Lassen NF Civil Engineer

Date

George Kulick
Region 5 Qualified Engineer

Date

