

Engineering Report:

Lassen National Forest

Hat Creek Ranger District

Analysis of

National Forest System Road (NFSR)

34N13

for Motorized Mixed Use Designation

Forest: Lassen

District: Hat Creek

Road Number: 34N13

Road Name: Jelly Camp

Introduction: The 34N13 Road segment studied is located on the west side of Lassen National Forest (LNF) in the Jellico quadrangle.

NFSR 34N13 ML3 begins at the intersection with 36N18 DR18 in Section 13 of the Murken Bench quadrangle. It then trends southeast between Proctor Reservoir and Bainbridge Reservoir, ascends the Butte Creek Rim where it terminates into and becomes 34N43. The length of the road is approximately 2.25 miles.

The first segment starts at approximate road mile 1.25 at the intersection with 34N62 in the Jellico quadrangle and intersects with 34N68 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 34N13 / 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

34N62 to 34N68

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 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 34N13 / ML3 currently encourages use as an objective ML3 and operational ML3 arterial road and functions as a forest highway connecting the 36N18 DR22 road to the Hat Creek Ranger District, tree seed plantations, defensible fuel profile zones, and timber commodity units.

This forest highway connects via 36N18 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.

34N13 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 along Lost Creek, and for fire detection / prevention patrol for a very large area that joins the Lassen Volcanic National Park's northern boundary.

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 34N13 / 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.

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 34N13 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 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 34N13 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)

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 roads.

- 34N62
- 34N04
- 34N68

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 34N13 /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 80 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, open Juniper, brush, native grass and lava rock forest land.
- Cross slope is 0-2%.

- Grade is 0-2%.
- 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

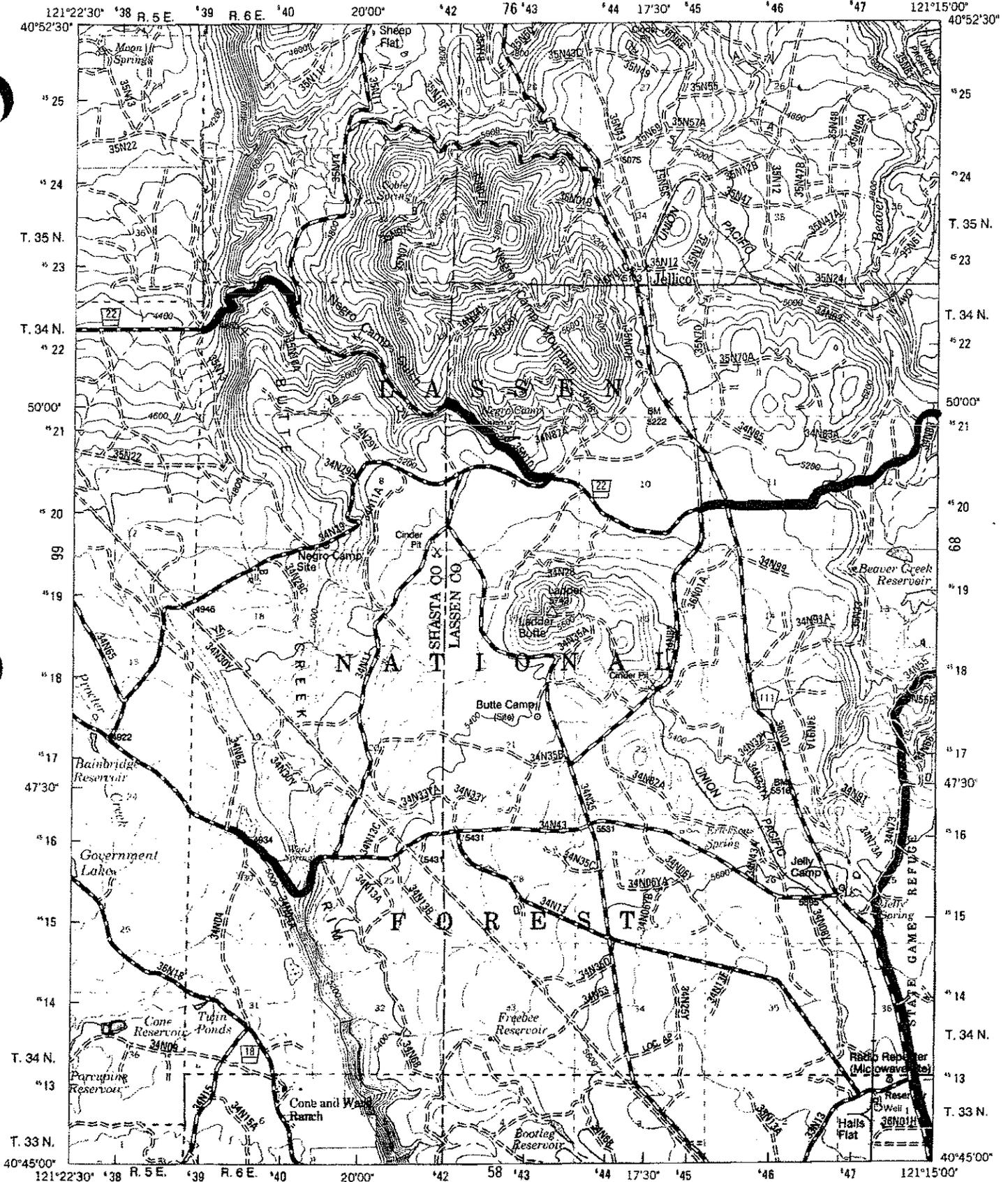
Sept. 10, 2009

Prepared by Tim Dedrick
Lassen NF Civil Engineer

Date

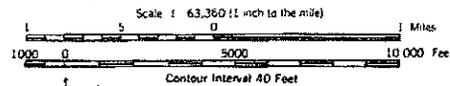
George Kulick
Region 5 Qualified Engineer

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.
Control by USGS and NOS/NOAA
Compiled from aerial photographs taken 1984. Revised from aerial photographs taken 1993. Partial field check by U.S. Forest Service 1995.
North American Datum of 1927 (NAD 27). Projection: California coordinate system, zone 1 (Lambert Conformal Conic).
National Forest System lands. Revised 1997.

This map is not a legal land line or ownership document. Public lands are subject to change and leasing, and may have access restrictions, check with local offices. Obtain permission before entering private lands.



UTM GRID AND 1997 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

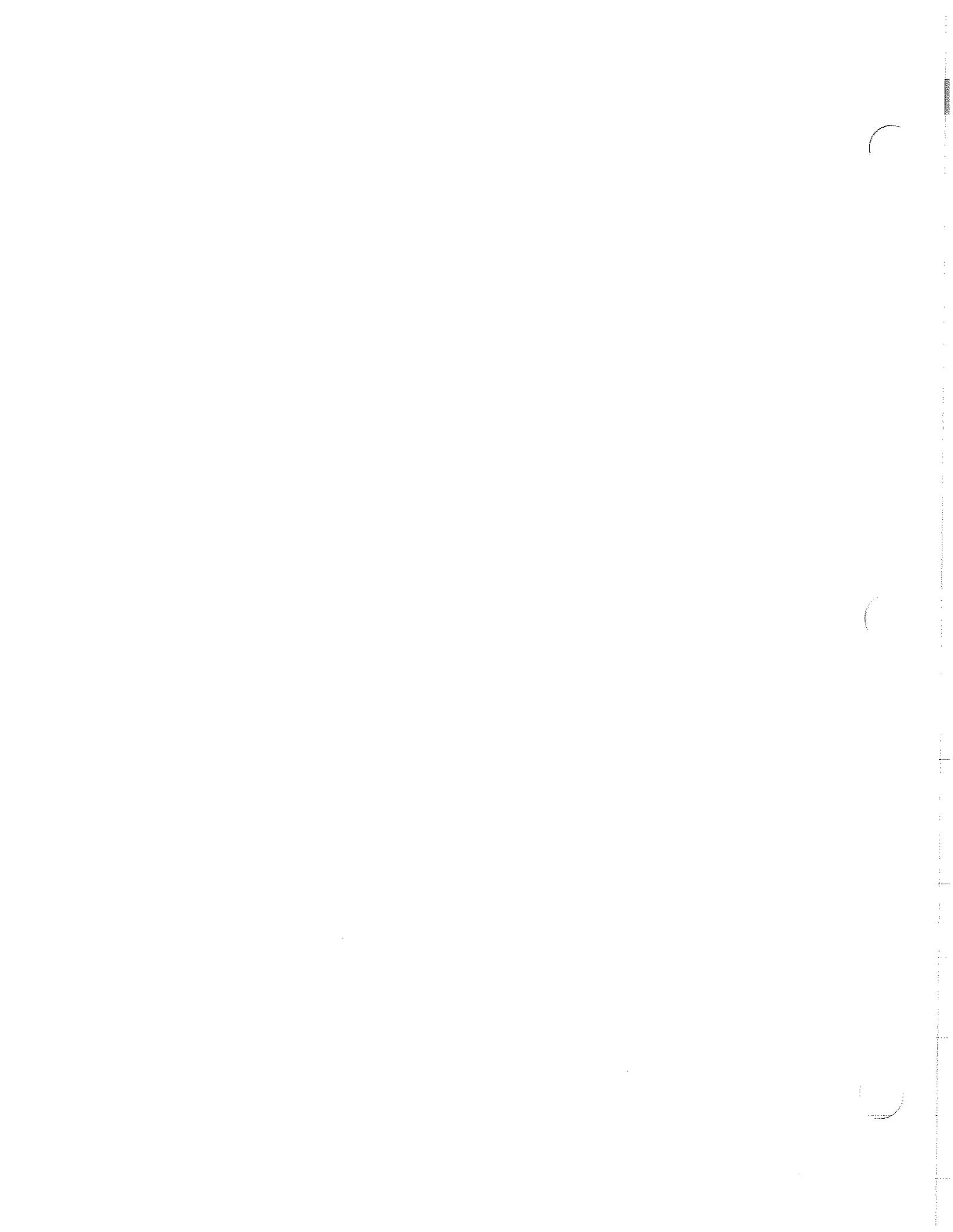
QUADRANGLE LOCATION

1	2	3
4	5	
6	7	8

ADJOINING 7.5' QUADRANGLES

HIGHWAYS AND ROADS

- U.S. Highway 395
- State Highway 139
- County Highway 17
- National Forest Road 30
- Gate
- Primary Highway
- Secondary Highway
- Improved Road, Fr
- Improved Road, Dt
- Composition Unsp
- Unimproved Road
- 4 Wheel Drive Road
- National Recreation
- Trail



Engineering Report:

Lassen National Forest
Hat Creek Ranger District

Analysis of
National Forest System Road (NFSR)
35N10
for Motorized Mixed Use Designation

Forest: Lassen

District: Hat Creek

Road Number: 35N10 – DR22

Road Name: Hat Creek/Little Valley Tie Road

Introduction: The 35N10 Road segments studied are located on the west side of Lassen National Forest (LNF) in the Jellico and Murken Bench quadrangles. NFSR 35N10 ML4 begins at the intersection with County Road 6R2 00/01 and State Highway 89 in Sections 3, 10, 15 (split intersection) of the Burney Mountain East quadrangle and trends east past the University of California Observatory and northeast up the Murken Bench grade, continuing northeast to an intersection with 35N72, thence south and east to an intersection with 36N05 and the start of segment one.

The first segment starts at approximate road mile 6.0 at the intersection with 35N72 in the Murken Bench quadrangle and intersects with 35N22 for a distance of approximately 0.25 miles to road mile post 6.25.

The second segment starts at approximate road mile 7.5 and an intersection with 35N13 in the Jellico quadrangle and continues to an intersection with 35N10A for a distance of approximately 0.5 miles to road mile 8.0.

The third segment starts at road mile 9.0 at an intersection with 34N34 in said quadrangle and continues to an intersection with 34N29 for a distance of 0.75 mile to road mile 9.75.

The fourth segment starts at road mile 11.00 at an intersection with 34N82 in said quadrangle and continues to an intersection with 34N88 for a distance of two miles to road mile 13.00

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 35N10 / 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: 6.00 Ending Mile Post: 6.25

35N72 to 35N22

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: 7.50 Ending Mile Post: 8.00

35N13 to 35N10A

Traffic Service Level: A B C D

Objective Maintenance Level: 1 2 3 4 5

Operational Maintenance Level: 1 2 3 4 5

Segment 3: Beginning Mile Post: 9.00 Ending Mile Post: 9.75

34N34 to 34N29

Traffic Service Level: A B C D

Objective Maintenance Level: 1 2 3 4 5

Operational Maintenance Level: 1 2 3 4 5

Segment 4: Beginning Mile Post: 11.00 Ending Mile Post: 13.00

34N82 to 34N88

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. This particular configuration of segments totals with an estimated mileage of 3.5 miles.

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

Road 35N10 / ML4 currently encourages use as an objective ML4 and operational ML4 arterial road and functions as a forest highway connecting the State Highway 89 to the Hat Creek Ranger District, tree seed plantations, defensible fuel profile zones, and timber commodity units.

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.

35N10 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 along Lost Creek, and for fire detection / prevention patrol for a very large area that joins the Lassen Volcanic National Park's northern boundary.

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 35N10 / 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.

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 35N10 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 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 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 35N10 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 agency motor vehicles were observed during the field visit.

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 roads.

- 36N05
- 35N22

Road segment 2 intersects with the following forest roads.

- 35N13
- 35N10A

Road segment 3 intersects with the following forest roads.

- 34N34
- 34N29

Road segment 4 intersects with the following forest roads.

- 34N82
- 35N33
- 34N88

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 35N10 /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 80 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, open Juniper, brush, native grass and lava rock forest land.
- Cross slope is 0.52%.
- Grade is 0-5%.
- 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/>).

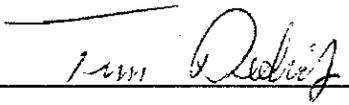
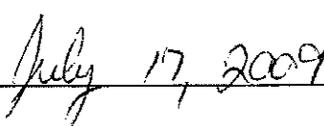
According to the Sign and Poster Guidelines for the Forest Service (2005):

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:

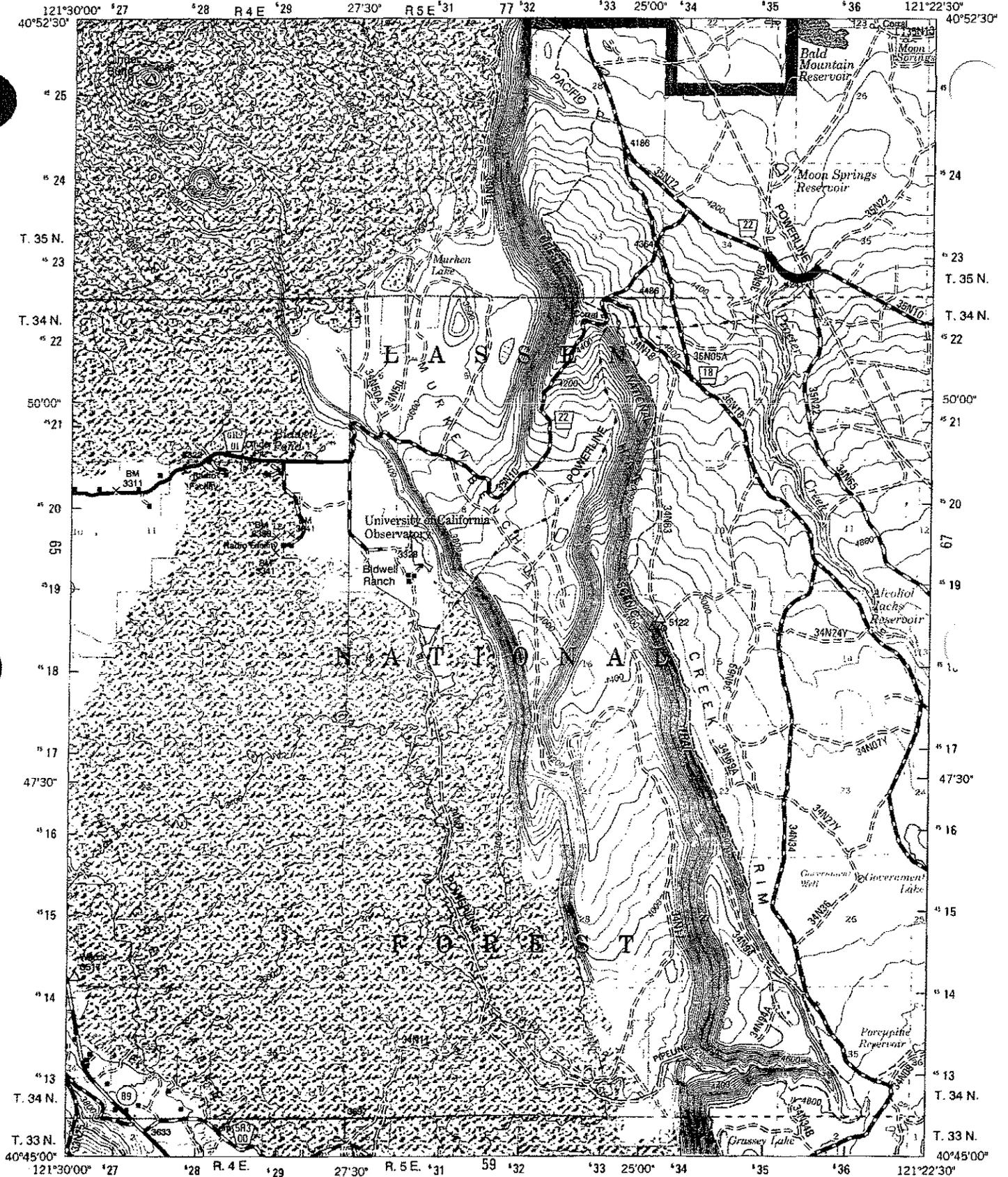
 

Prepared by Tim Dedrick
Lassen NF Civil Engineer

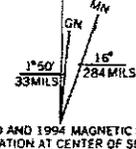
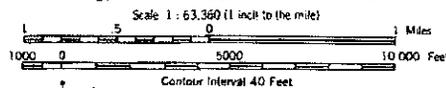
Date

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.
Control by USGS and NGS/NOAA
Compiled from aerial photographs taken 1984. 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.
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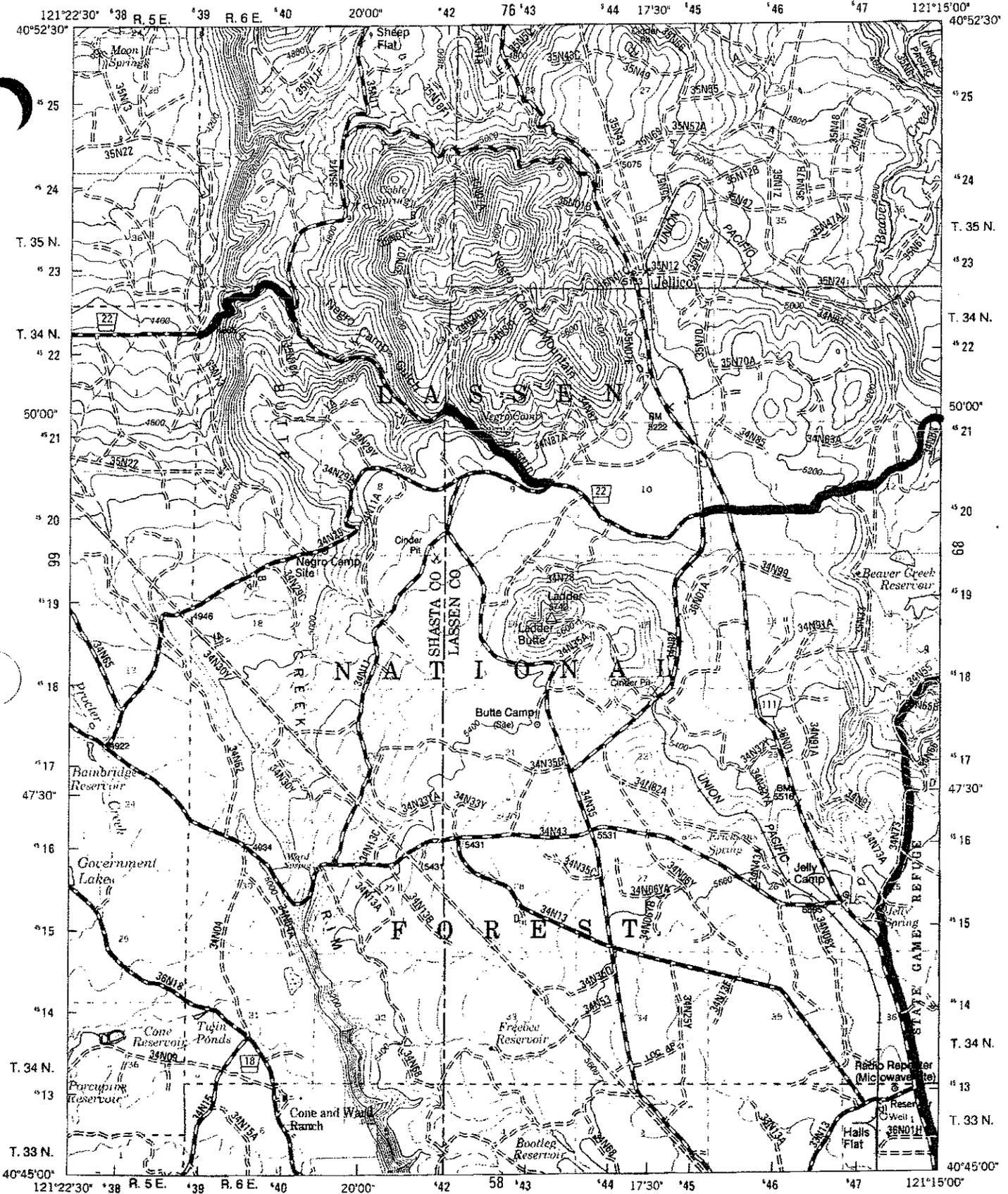
UTM GRID AND 1994 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

QUADRANGLE LOCATION

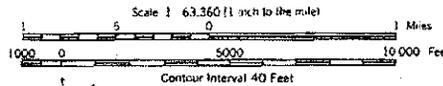
1	2	3
4	5	6
7	8	

ADJOINING 7.5' QUADRANGLES

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



Produced by the U.S. Geological Survey
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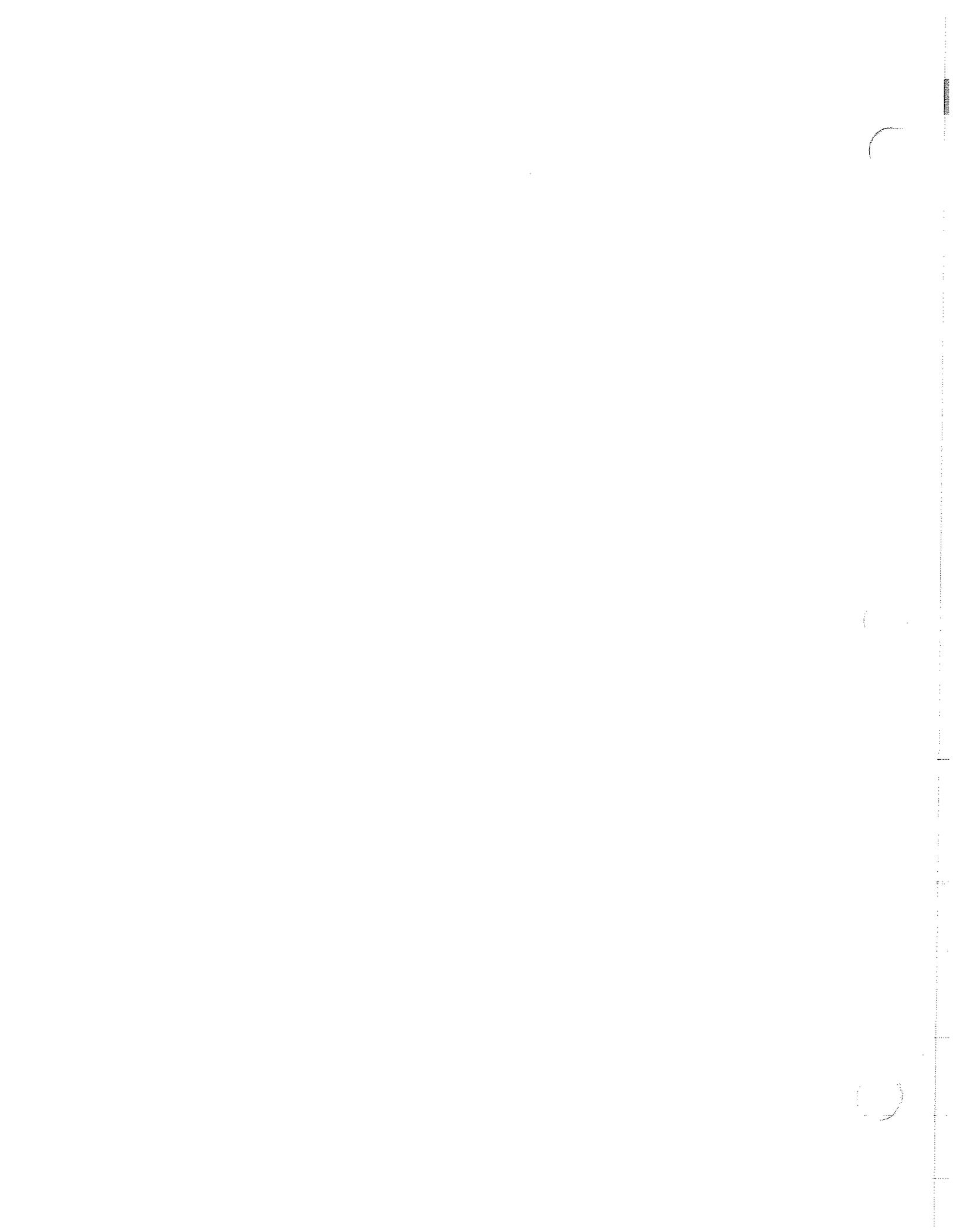
QUADRANGLE LOCATION

1	2	3
4	5	6
7	8	

ADJOINING 7.5 QUADRANGLES

- Hogback Ridge
- Coble Mountain
- Little Valley
- Murken Bench
- Cordens Reservoir
- Old Station
- Sweets Hole
- Person Lake

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



Engineering Report:

Lassen National Forest
Hat Creek Ranger District

Analysis of
National Forest System Road (NFSR)
36N18
for Motorized Mixed Use Designation

Forest: Lassen

District: Eagle lake/Hat Creek

Road Number: 36N18

Road Name: DR 18 Road

Introduction: The 36N18 Road segments studied are located on the east side of Lassen National Forest (LNF) in the Swains Hole quadrangle, on the eastern/western boundary of the Hat Creek/Eagle Lake Ranger Districts respectively.

NFSR 36N18/ML4 begins at the intersection of State Highway 44 in Section 11 of the Swains Hole quadrangle and trends due north and east to the Swains Hole, then trends northwest along the western base of the Butte Creek Rim to Mountain Home, continuing north along the western base of the fault block of Butte Creek Rim, past the Cone and Ward Ranch, continuing past Twin Ponds , Bainbridge, and Alcohol Jack Reservoirs in the Jellico quadrangle. 36N18/ML3 continues northwest into the Murken Bench quadrangle approaching the upper elevations and eastern extents of the Hat Creek Rim, where it parallels the Rim and the Pacific Crest National Scenic Trail until it's terminus in the Hogback Ridge quadrangle at the intersection with County Road 7RO2. The road length is approximately 23 miles.

The two road segments studied are both in the Swain's Hole quadrangle and start at the intersections of UCC706 an Unauthorized Route to 32N52/ML2 for approximately 1.25 miles and the intersections of 33N13YA/ML2 to 33N32/ML2 for approximately 0.25 miles respectively.

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 36N18/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: 0.25 Ending Mile Post: 1.50

UCC076 to 32N52

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: 3.50 Ending Mile Post: 3.75

33N13YA to 33N32

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 DR18 36N18/ML4 currently encourages use as an objective ML4 and operational ML4 collector/arterial road and functions as a forest throughway connecting the Hat Creek Ranger District and nearby State Highway 299 and County Road 7RO2 to the Eagle Lake Ranger District and nearby State Highway 44. This forest highway connects on each end to all weather asphalt surfaced State highways and provides ingress and egress to a myriad of Defensible Fuel Profile Zones – DFPZ's, forest plan units for timber harvesting, grazing allotments and livestock and wildlife watering holes.

36N18 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 range allotment management, for wildlife management at Buffelhead Reservoir, and for fire prevention patrol to a very large area that bisects two Ranger District's and two County boundaries.

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

The proposed use for these two segments of 36N18/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 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 36N18 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 45 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 its road system's adherence to maintenance levels. This road is an objective ML4 and an operational ML4. It provides forest commodity haul, livestock grazing area access 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.
- Although the road rests upon the top of the fault block of the Hat Creek Rim, topologically the unit is dry and flat. 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, livestock grazing, 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 36N18 appears to be consistent with state law and forest policy for operational maintenance level 4 roads.

2. Crash history:

In April 2005 there was a single vehicle crash/collision with a roadside boulder. Vehicle was a passenger car traveling at 35-45 mph as estimated by the California Highway Patrol. Approximate location was on 36N18 about 4.4 miles east of Cassell California. The crash location was the approximate intersection with DR 22, forest highway 35N72/ML4.

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.

3 Forest Service Timber Sale Administration vehicles were observed along the 36N18 road.

An additional 3 log trucks were observed on road 36N18.

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 roads.

- UCC076/Unauthorized Route
- 32N52/ML2

Road segment 2 intersects with the following forest roads.

- 33N13YA/ML2
- 33N32

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 36N18/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 80-100 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 meadows/grazing, fire prevention patrol access, fire suppression access, wildlife management, and commodity haul. Summer and fall seasons will experience peak use, winter and spring can bring snowy and icy conditions.

8. Roadside conditions:

- The segment runs through high elevation, 5,000 ft., open Pine forest, open Juniper, brush, native grass and lava rock forest land.
- Cross slope is 0-5%.
- Grade is 0-3%.
- 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 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 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:

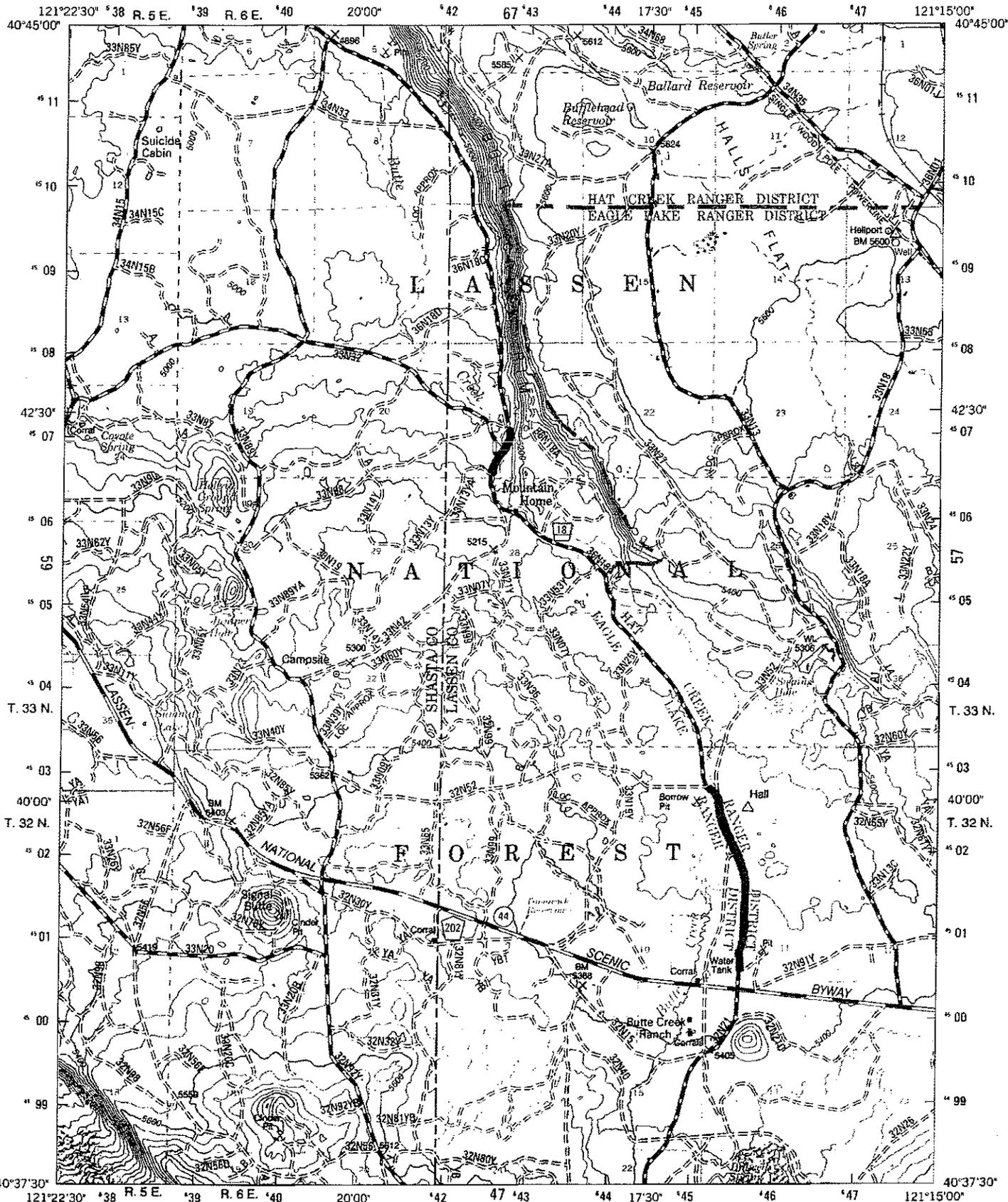
- Provide separate facilities.
- Separate use periods. Roads may be designated for separate use periods such as season, weekday/weekend, or day/night. Notify the public of the locations, effective dates, times, and duration that the roads may or may not be used. Provide appropriate signs as shown in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



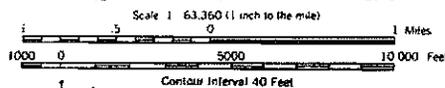
Maps & Photos:





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 - County Highway
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 - Improved Road, P
 - Improved Road, G
 - Improved Road, D
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 - 4WD
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