. Department of the Interior
eau of Land Management

Medford District Office
3040 Biddle Road
Medford, Oregon 97504

May 2002

Cascade-Siskiyou National Monument

Draft Resource Management Plan/ Environmental Impact Statement

Volume 2 - Maps and Appendices

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

BLM/OR/WA/PL-01/017+1792

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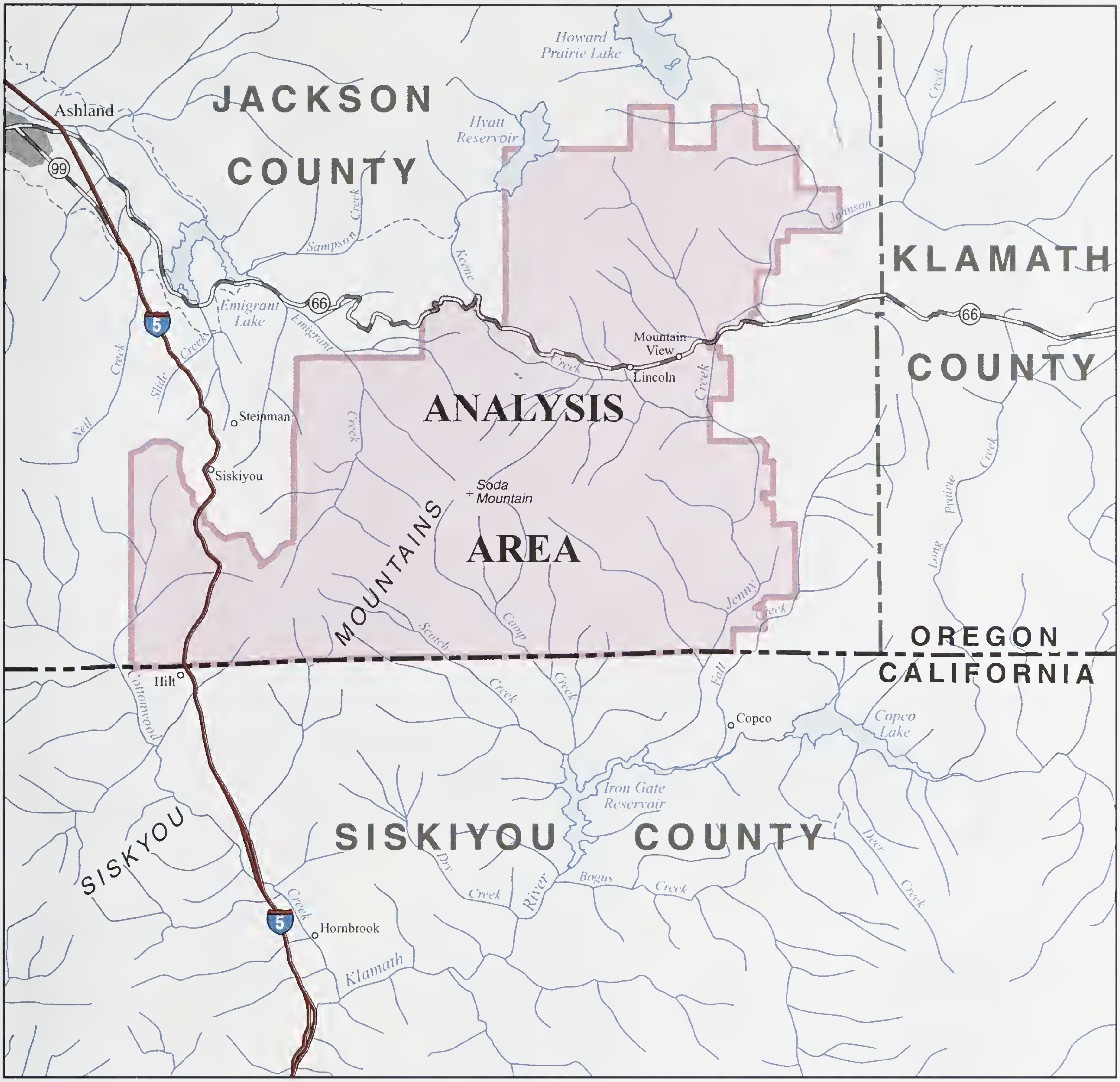
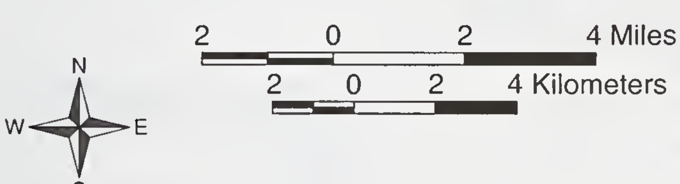
Cascade-Siskiyou National Monument
Analysis Area Location





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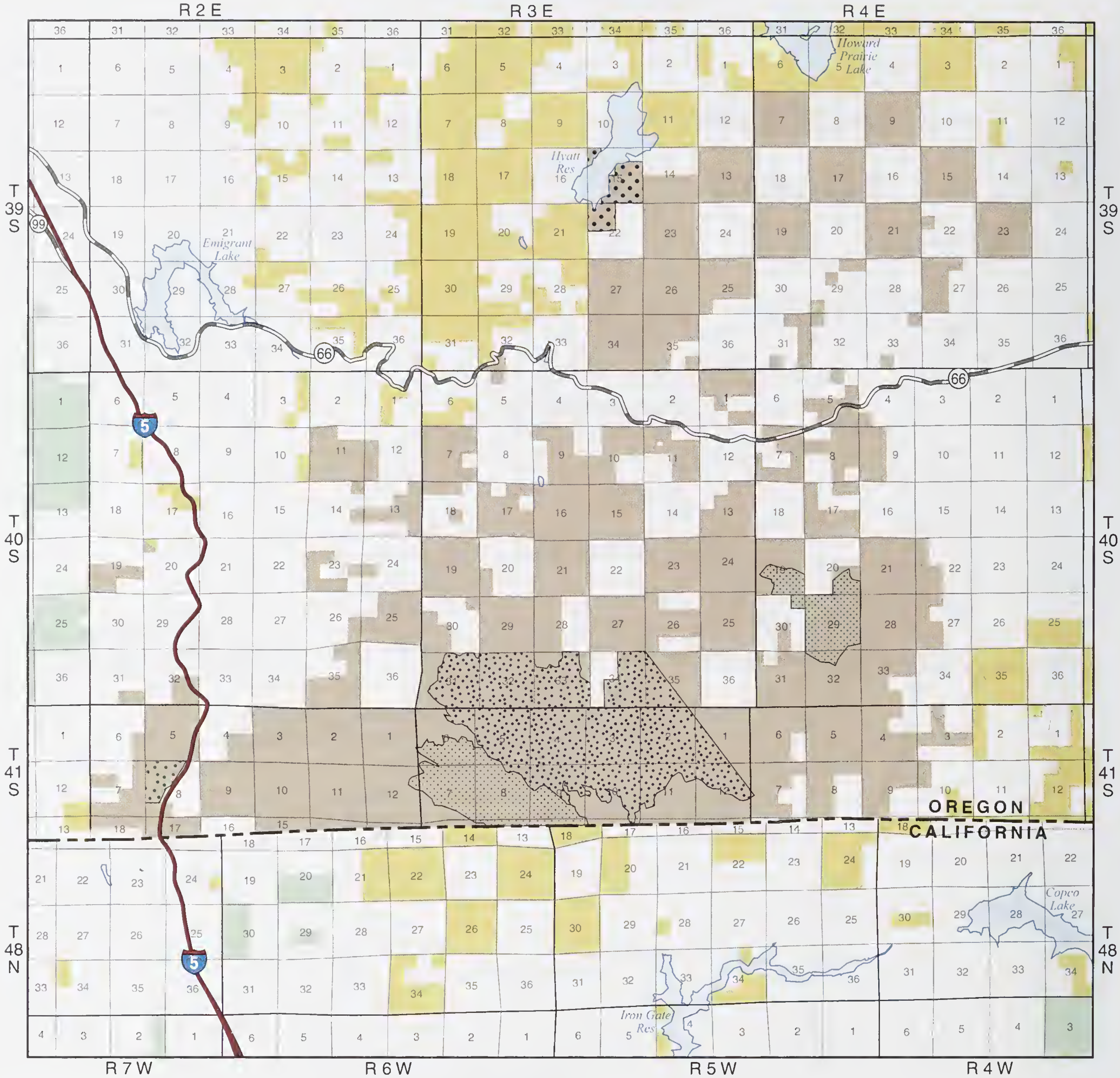
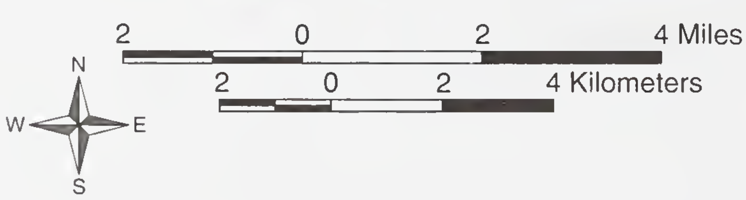
MAP 1

lzowada: usr3/workarea/lzowada/cseeanew/map1.aml

D11-05-2000:JR

Cascade-Siskiyou National Monument
Existing Environment





LEGEND

- Cascade-Siskiyou National Monument
- Other BLM Administered Land
- U.S. Forest Service
- Bureau of Reclamation
- Non-Federal Land
- Hyatt Lake Recreation Area
- Mariposa Botanical Area
- Oregon Gulch RNA
- Scotch Creek RNA
- Wilderness Study Area

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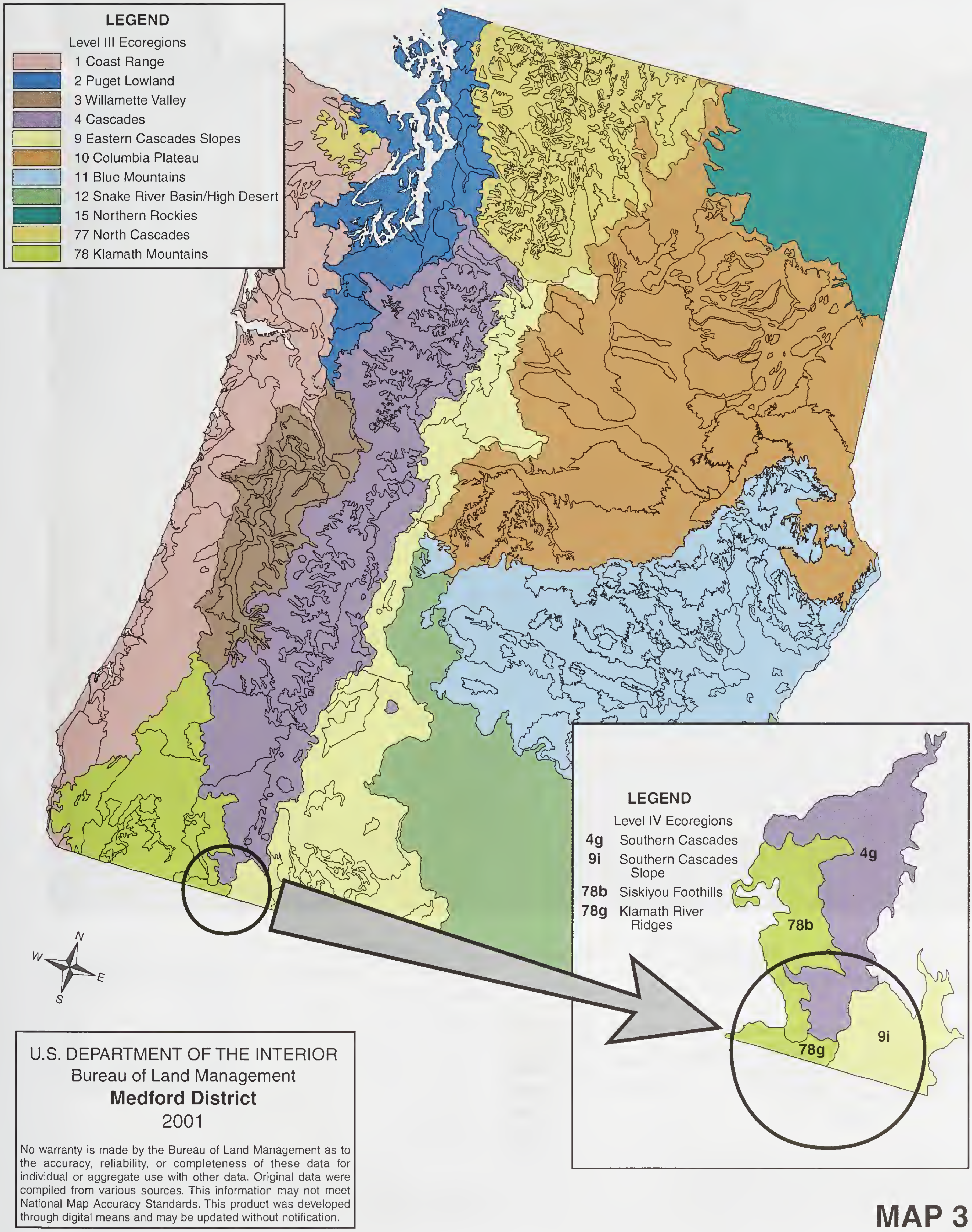
MAP 2

lzowada: ormd197/usr3/lz/natmonfinal/map2.aml

D11-05-2000:JR

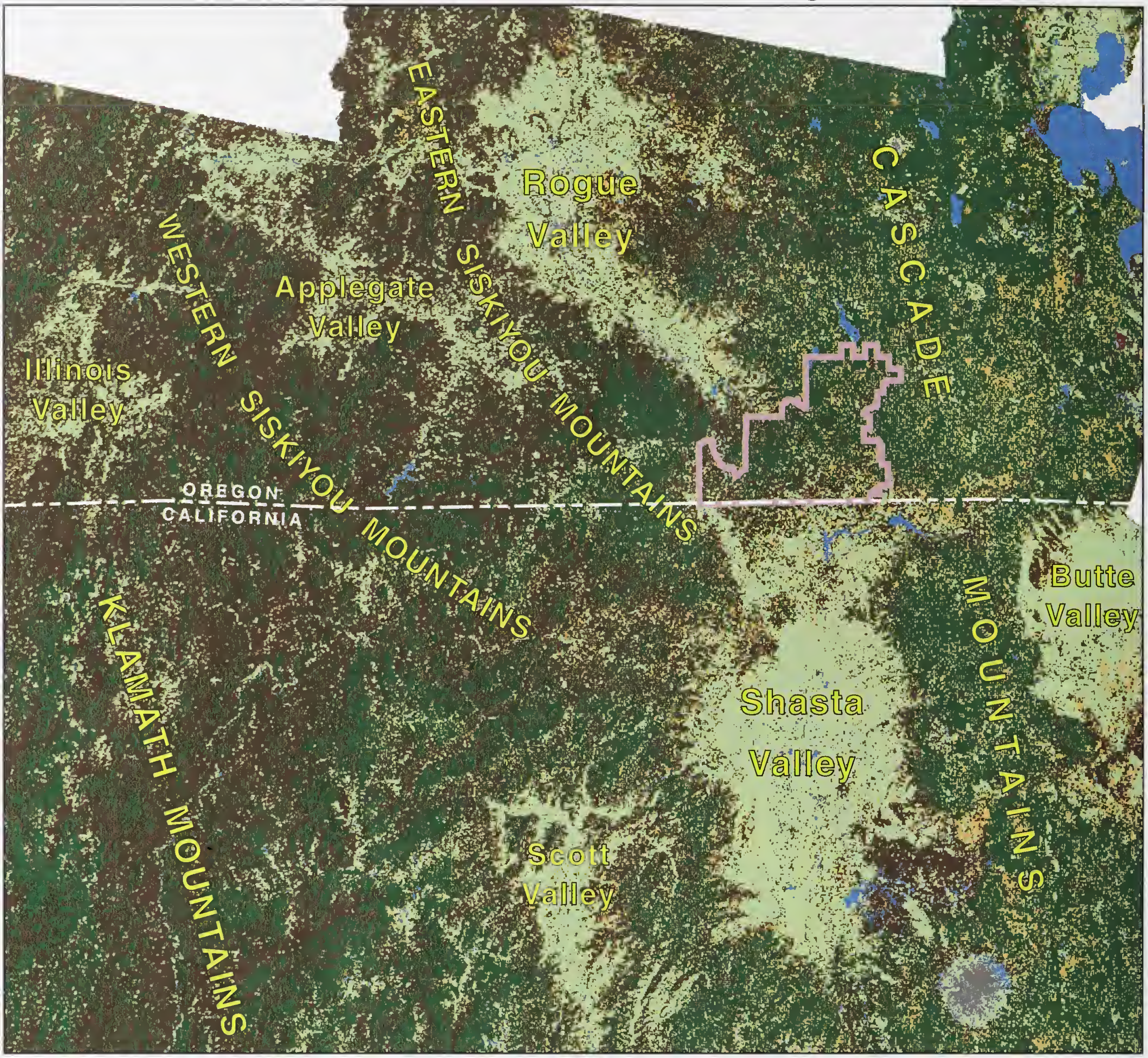
Cascade-Siskiyou National Monument
Ecoregions of Oregon and Washington



phosten: arcwork/newcseea/ecoregions.apr

D11-05-2000:JR

Cascade-Siskiyou National Monument
Satellite Imagery of Coarse Plant Communities of Northern California and Southern Oregon



N
W E
S

8 0 8 16 Miles
8 0 8 16 Kilometers

LEGEND

Vegetation classes

- Grassland
- Shrubland
- Woodland
- Conifer
- Wet Meadow
- Rock/Gravel
- Water

Cascade-Siskiyou National Monument Boundary

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MAP 4

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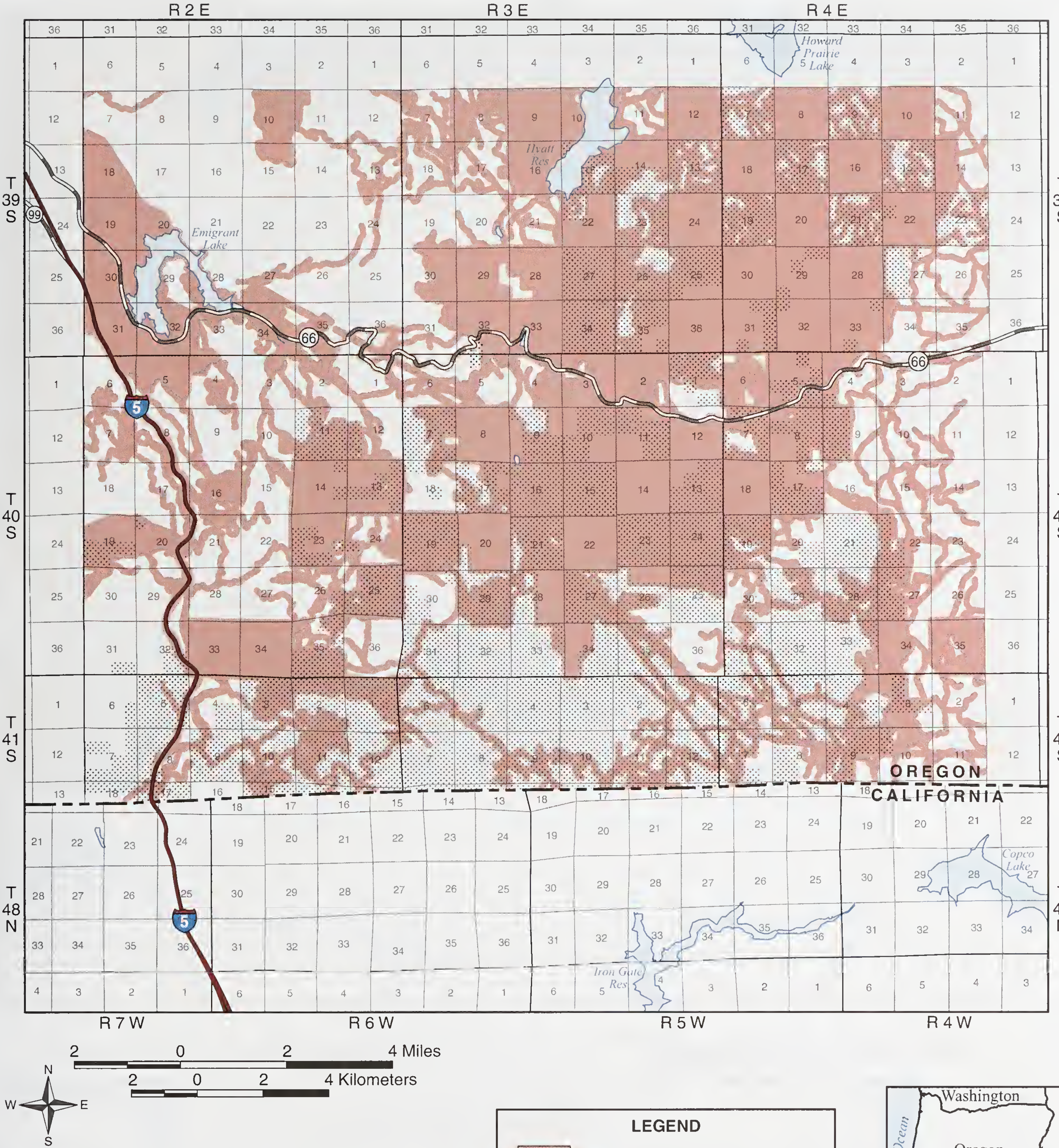
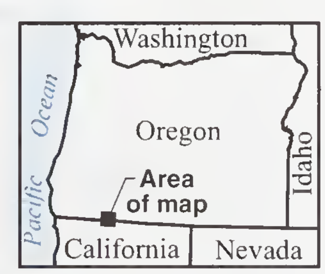
Cascade-Siskiyou National Monument
Acute Surface Disturbance



LEGEND

- Cumulative Surface Disturbance
- Cascade-Siskiyou National Monument



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phosten: arcwork/cseat/disturbed.apr

MAP 5

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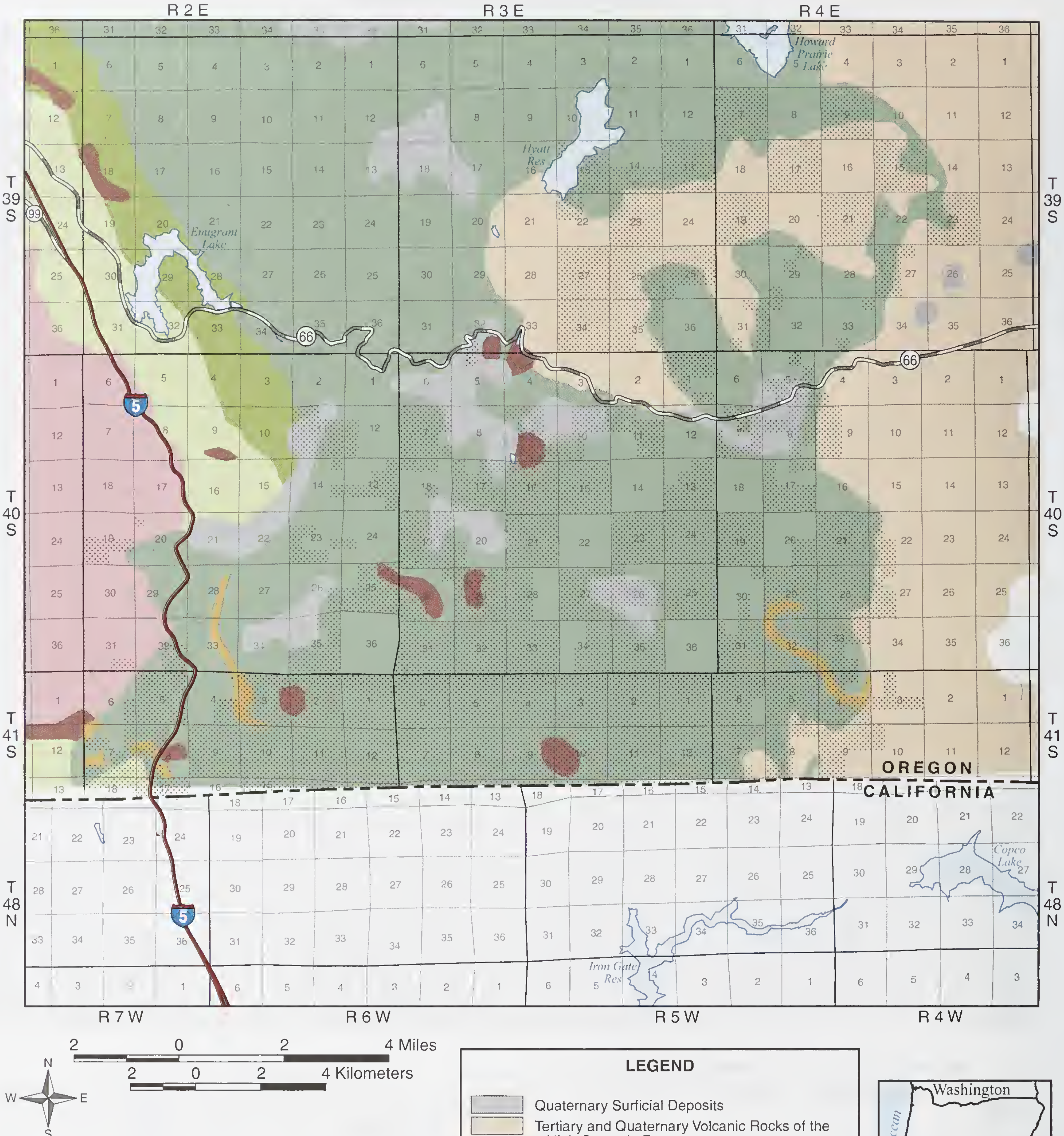
Cascade-Siskiyou National Monument
General Geology



LEGEND

- Quaternary Surficial Deposits
- Tertiary and Quaternary Volcanic Rocks of the High Cascade Range
- Tertiary Volcanic Rocks of the Western Cascade Range
- Intrusive Rocks
- Ash Flow Tuff
- Eocene Sedimentary Rocks
- Late Cretaceous Hornbrook Formation Sedimentary Marine
- Jurassic Granitic Plutonic Rocks (Ashland Pluton)
- Cascade-Siskiyou National Monument

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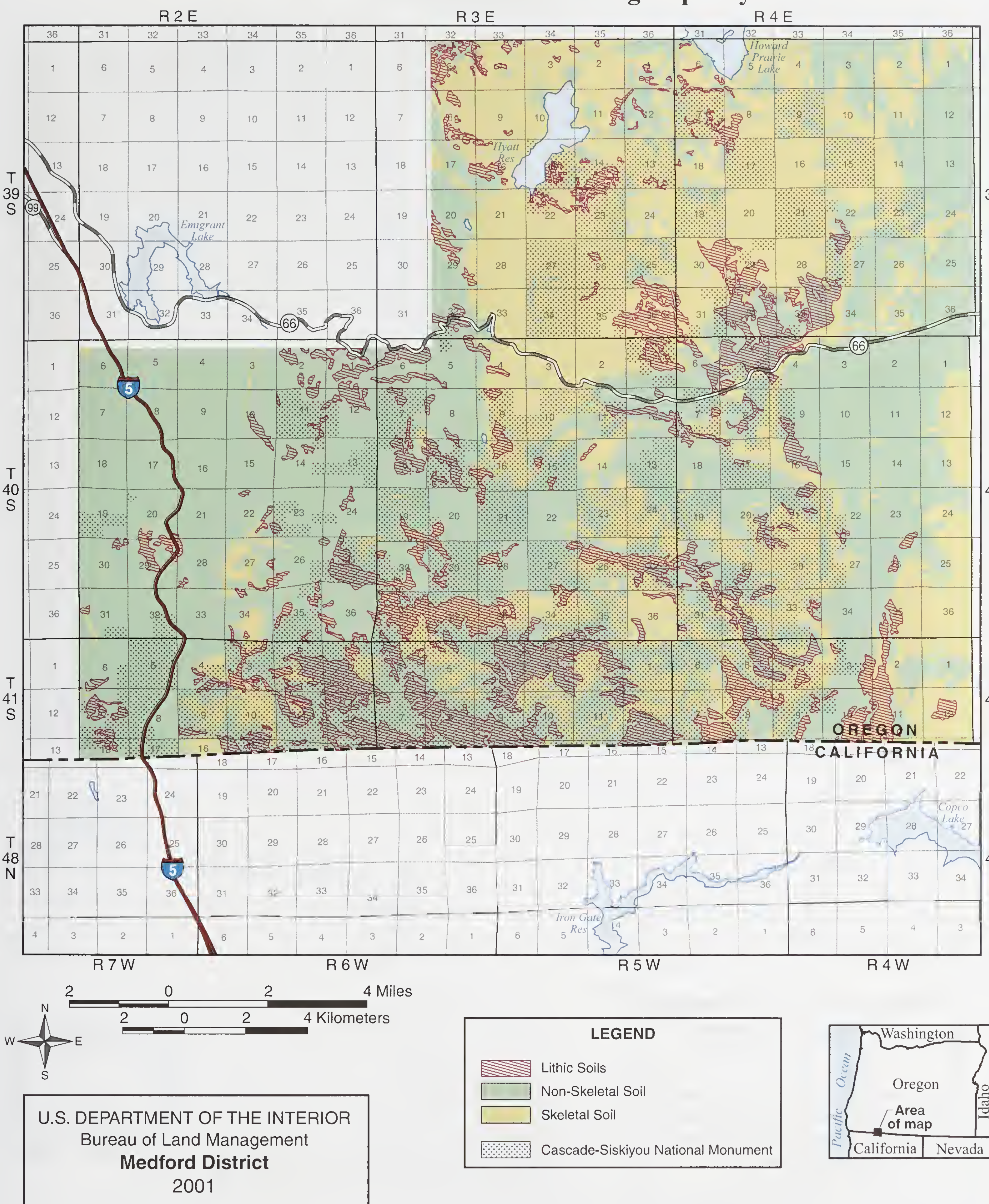
MAP 6

lzowada: usr3/workarea/lzowada/cseeanew/map6.aml

D11-05-2000:JR

Cascade-Siskiyou National Monument Soils with Limited Water Holding Capacity



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MAP 7

photen: arcwork/cseat/soils.apr

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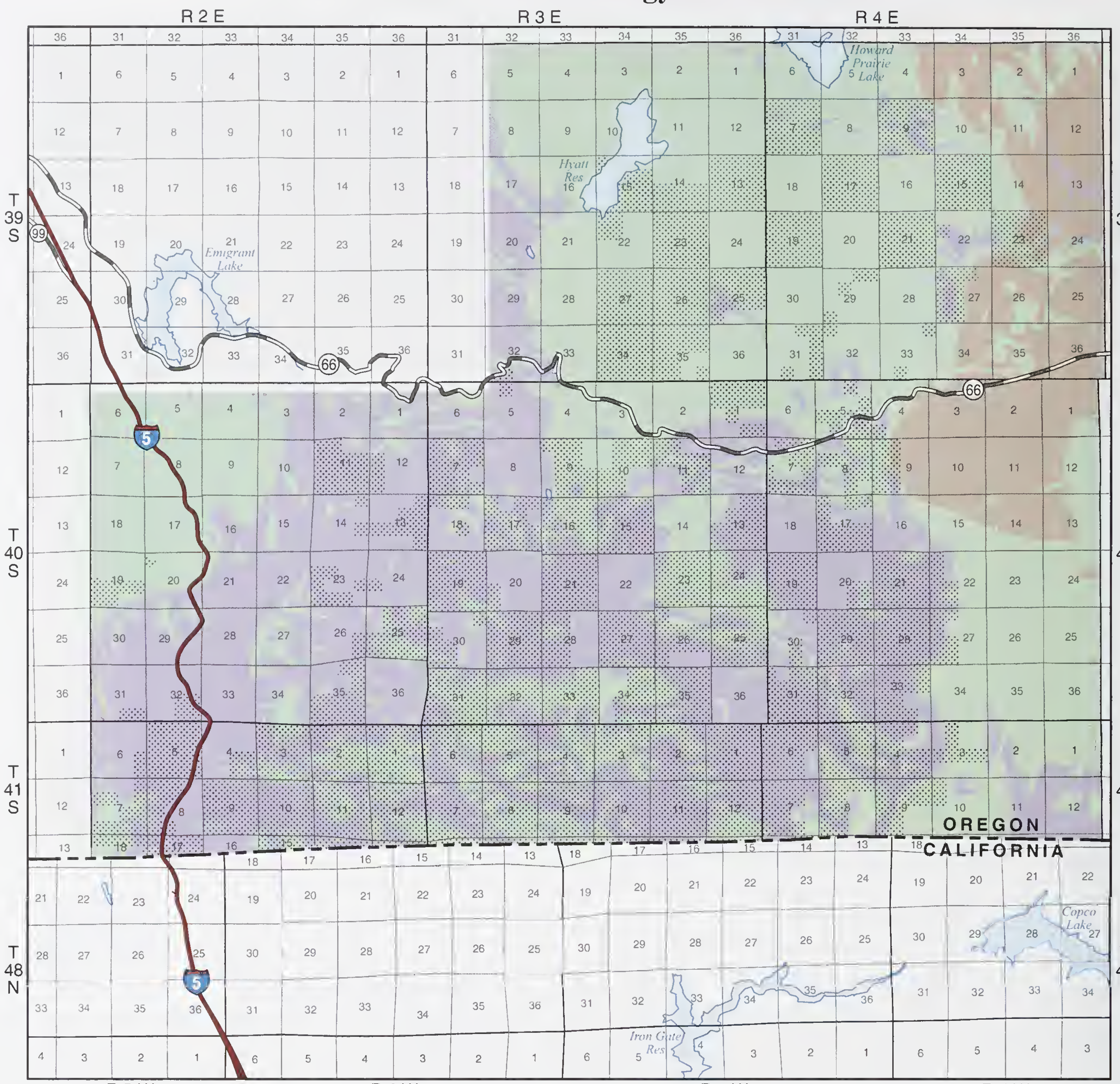
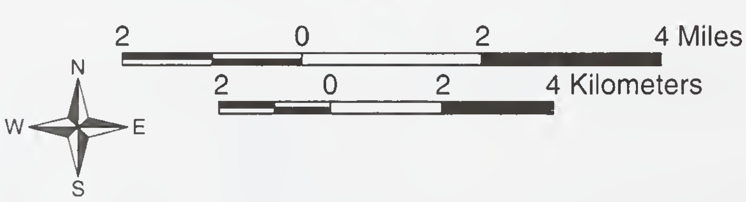
Cascade-Siskiyou National Monument
Soil Mineralogy





LEGEND

Mineralogy

- Halloysitic
- Mixed
- Montmorillonitic
- Cascade-Siskiyou National Monument

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MAP 8

phosten: arcwork/cseat/soils.apr

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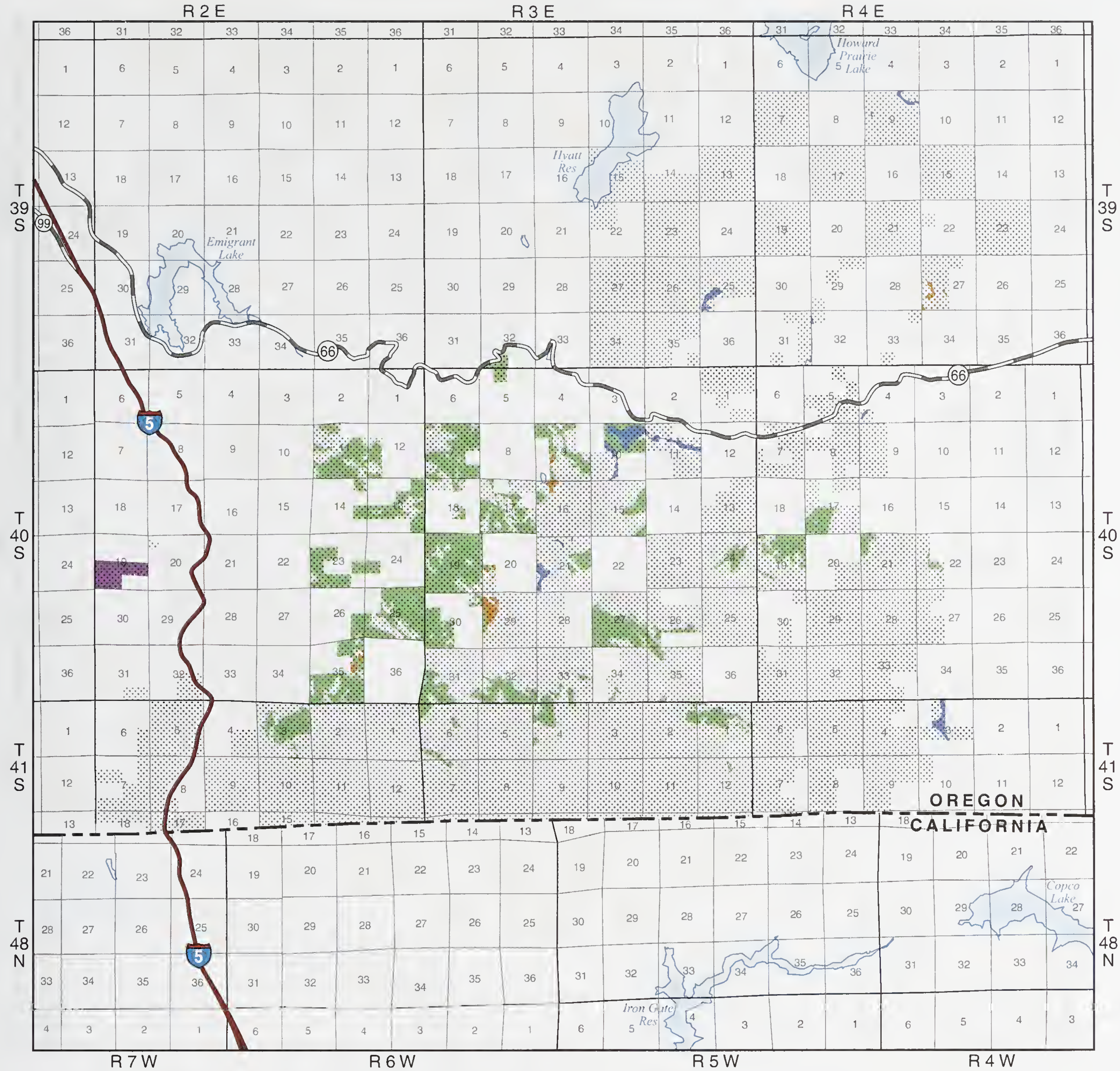
Cascade-Siskiyou National Monument
Fragile Soils



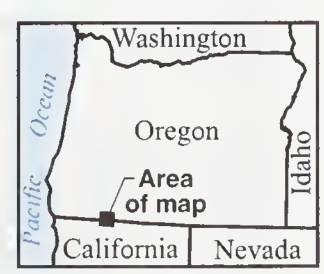
2 0 2 4 Miles

2 0 2 4 Kilometers

N W E S

LEGEND

- Fragile Groundwater
- Fragile Mass Movement
- Fragile Slope Gradient
- Fragile Surface Erosion
- Cascade-Siskiyou National Monument



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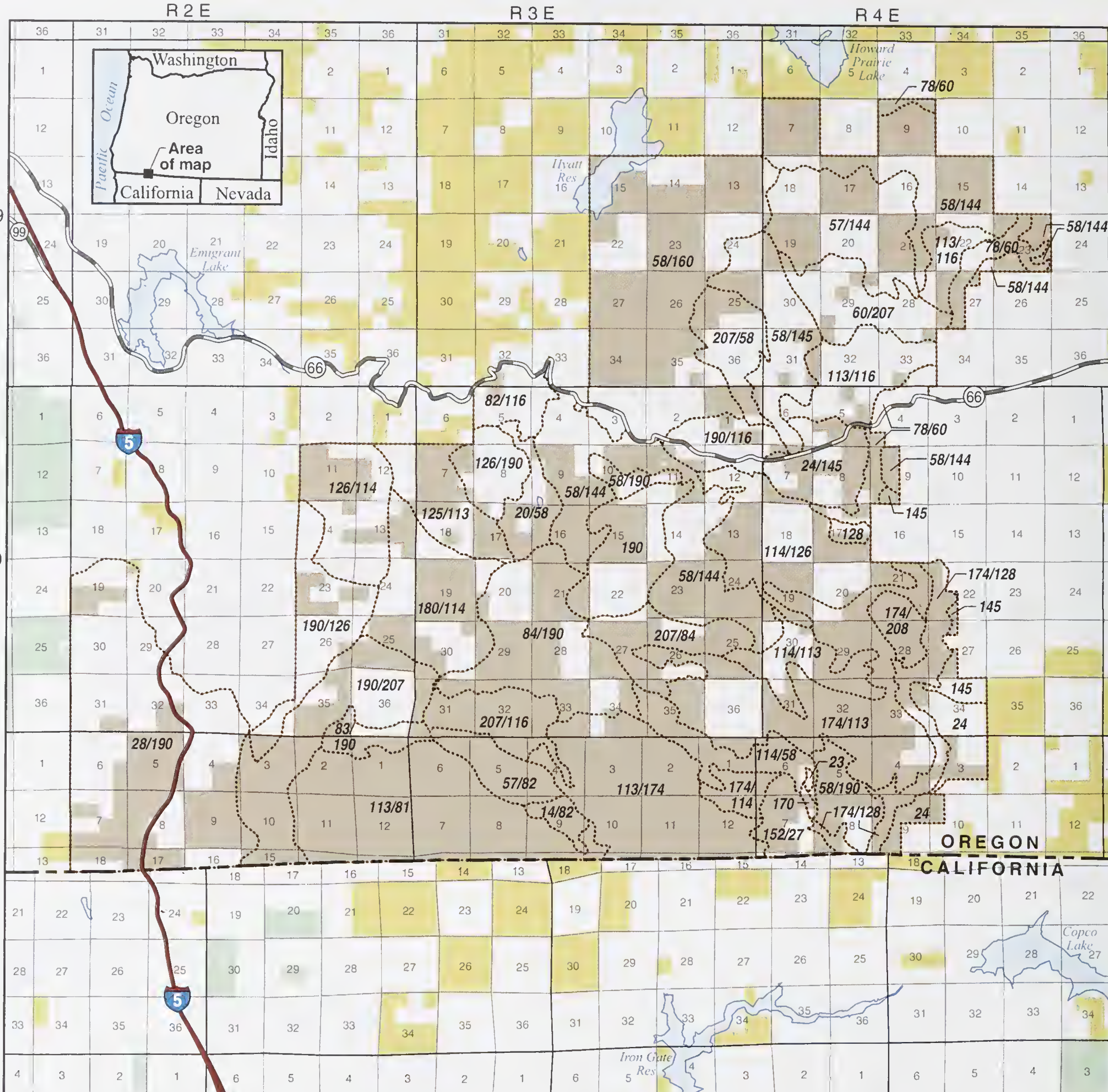
MAP 9

lzowada: ormd197/usr3/lz/natmonfinal/map9.aml

D11-05-2000:JR

Cascade-Siskiyou National Monument
General Soils



2 0 2 4 Miles

2 0 2 4 Kilometers

N S E W

General Soil Unit

14 Bogus very gravelly loam
18 Bybee loam
20 Bybee-Tatouche complex
24 Campfour-Paragon complex
27 Carney clay
28 Carney cobbly clay
58 Farva very cobbly loam
60 Farva-Rock outcrop complex
78 Greystoke stony loam
81 Heppsie clay
82 Heppsie-McMullin complex
84 Hobit loam
96 Kanutcham clay
113 McMullin-Rock outcrop complex
114 McNull loam
116 McNull-McmMullin complex
125 Medco-McMullin complex
126 McNull-Medco complex
128 Medford clay loam, gravelly substratum
144 Pinehurst loam
145 Pinehurst-Greystoke complex
152 Randcore-Shoat complex
160 Rustlerpeak gravelly loam
167 Sibannac silt loam
170 Skookum very cobbly loam
174 Skookum-Rock outcrop-McMullin complex
180 Steinmetz sandy loam
190 Tatouche gravelly loam
207 Woodseye-Rock outcrop complex
208 Xerorthents-Dumps complex

LEGEND

Soil Unit Boundary

180/114 Soil Conservation Service Number (primary/secondary)

Cascade-Siskiyou National Monument

Other BLM Administered Land

U.S. Forest Service

Bureau of Reclamation

Non-Federal Land

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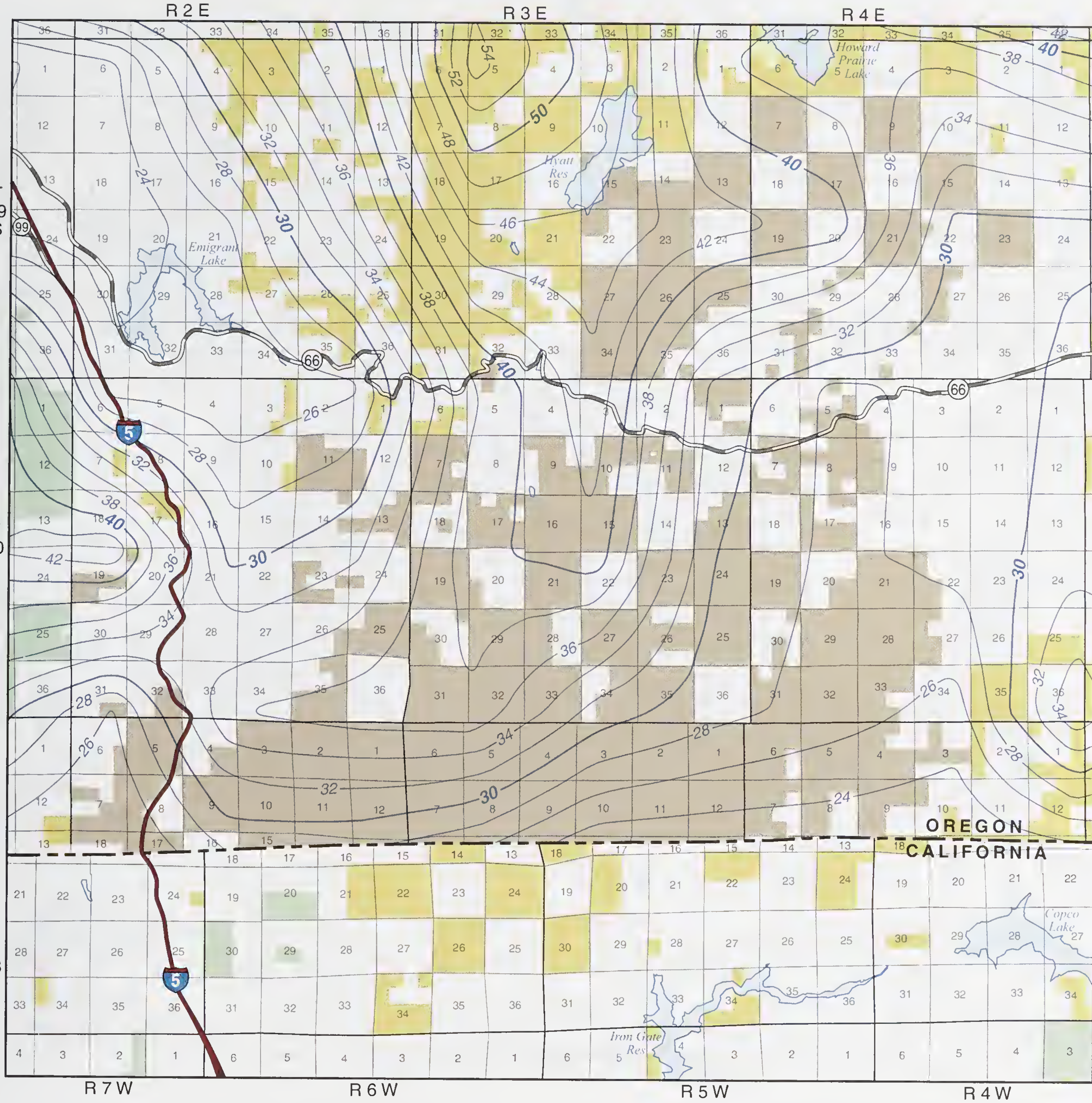
MAP 10

D11-05-2000:JR

Cascade-Siskiyou National Monument Average Annual Precipitation



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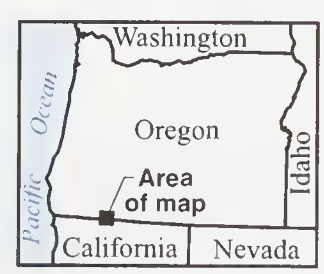
LEGEND

- —30— Average Annual Precipitation - Isohyetal Interval 2 inches
- Cascade-Siskiyou National Monument
- Other BLM Administered Land
- U.S. Forest Service
- Bureau of Reclamation
- Non-Federal Land

Precipitation Data: Oregon Climate Services, 1995

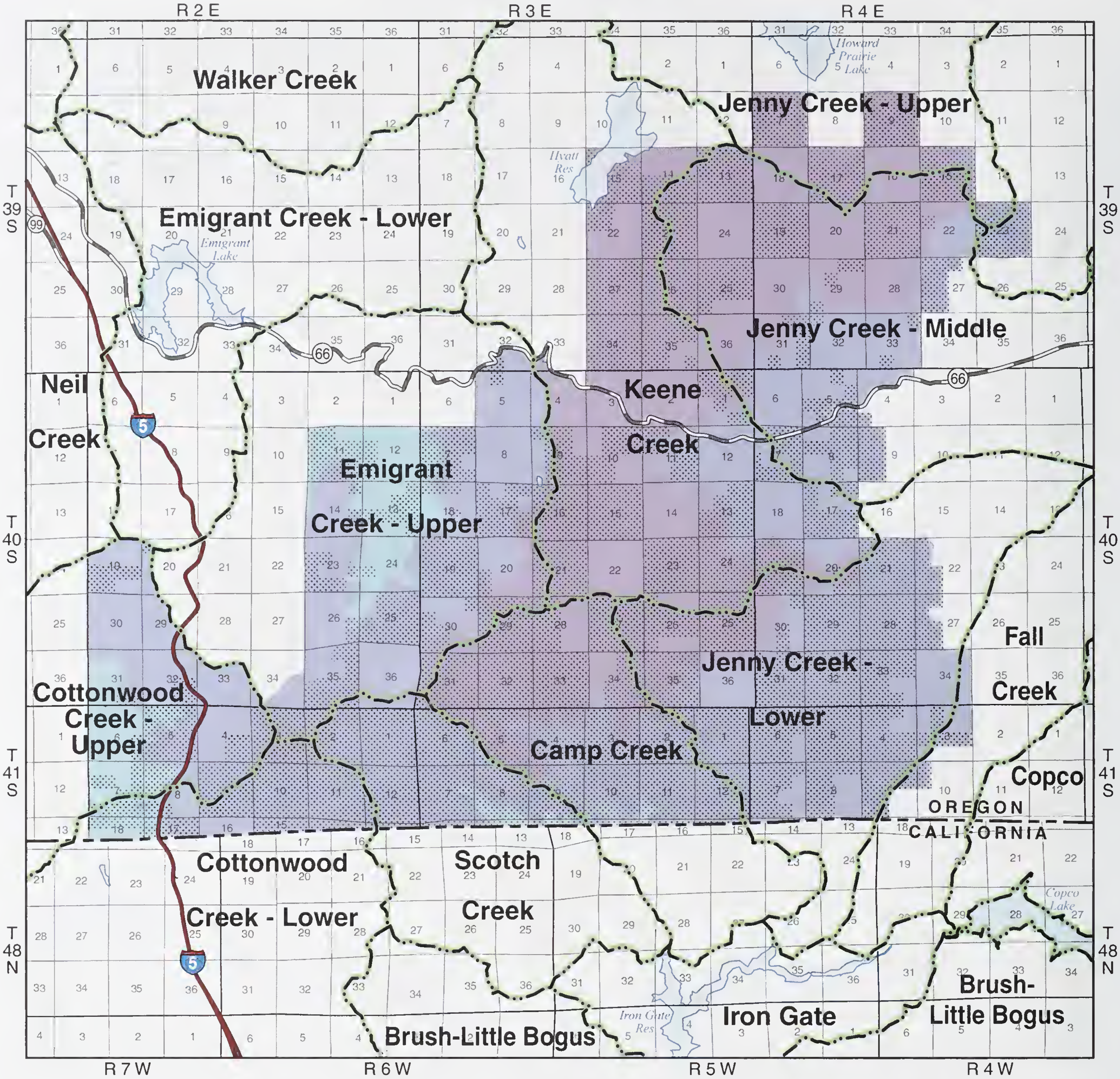


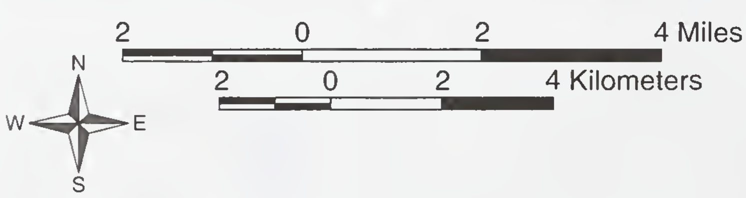
llindell: ormd197/usr3/lz/natmonfinal/map11.aml

MAP 11

D11-05-2000:JR

Cascade-Siskiyou National Monument
Precipitation Zones





LEGEND

- Rainfall Dominated Zone
- Rain-on-Snow Dominated Zone
- Snow Dominated Zone
- Cascade-Siskiyou National Monument
- Subwatershed Boundary

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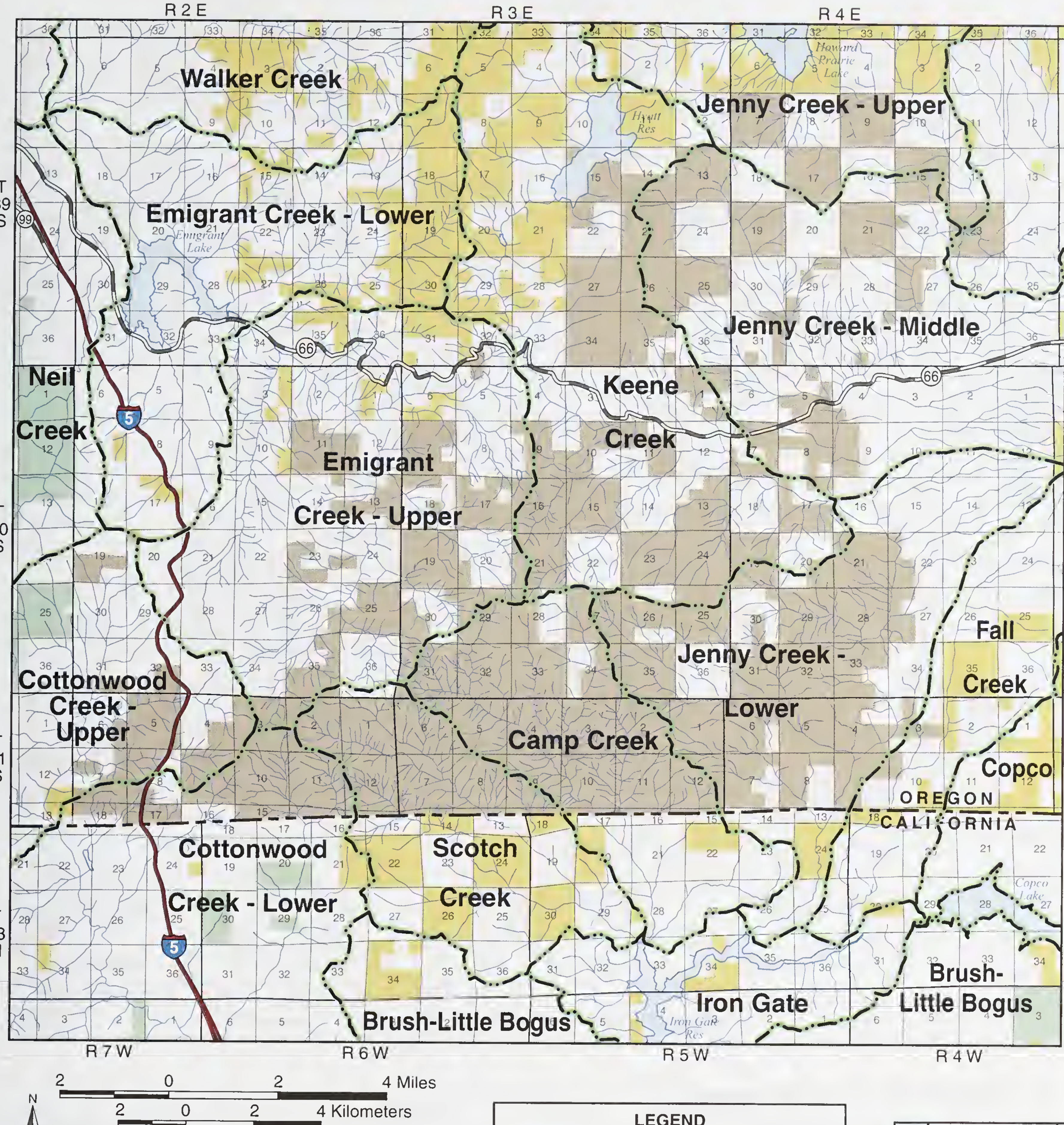
MAP 12

llindell: ormd197/usr3/lz/natmonfinal/map12.aml

D11-05-2000:JR

Cascade-Siskiyou National Monument Hydrologic Units (Subwatersheds)



LEGEND

- Subwatershed Boundary
- Cascade-Siskiyou National Monument
- Other BLM Administered Land
- U.S. Forest Service
- Bureau of Reclamation
- Non-Federal Land

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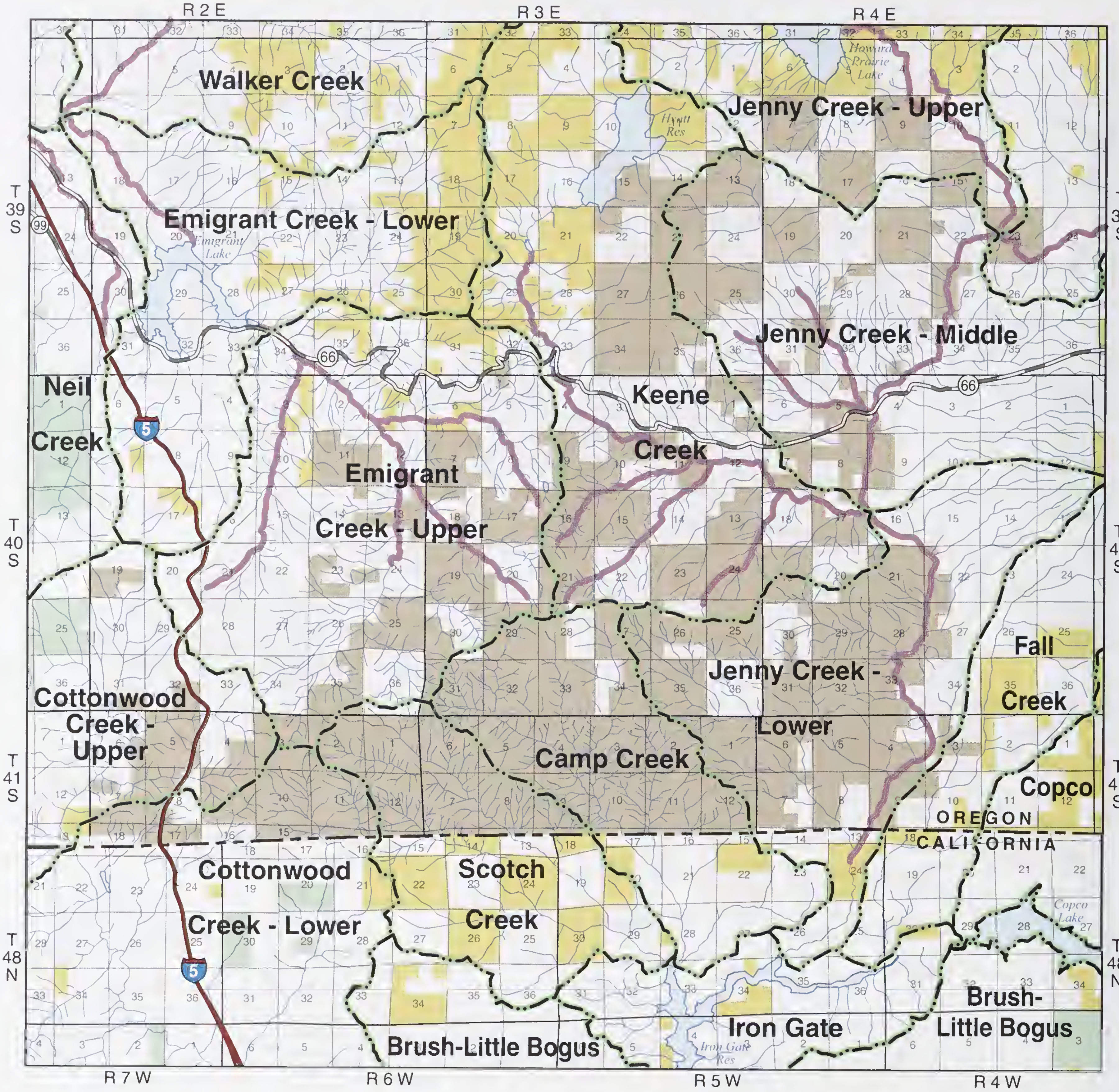
llindell: ormd197/usr3/lz/natmonfinal/map13.aml

MAP 13

D11-05-2000:JR

Cascade-Siskiyou National Monument
Water Quality Limited Streams



2 0 2 4 Miles

2 0 2 4 Kilometers

N W E S

LEGEND

- Water Quality Limited Stream Summer Temperature (Oregon DEQ, 1998)
- Subwatershed Boundary
- Cascade-Siskiyou National Monument
- Other BLM Administered Land
- U.S. Forest Service
- Bureau of Reclamation
- Non-Federal Land

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MAP 14

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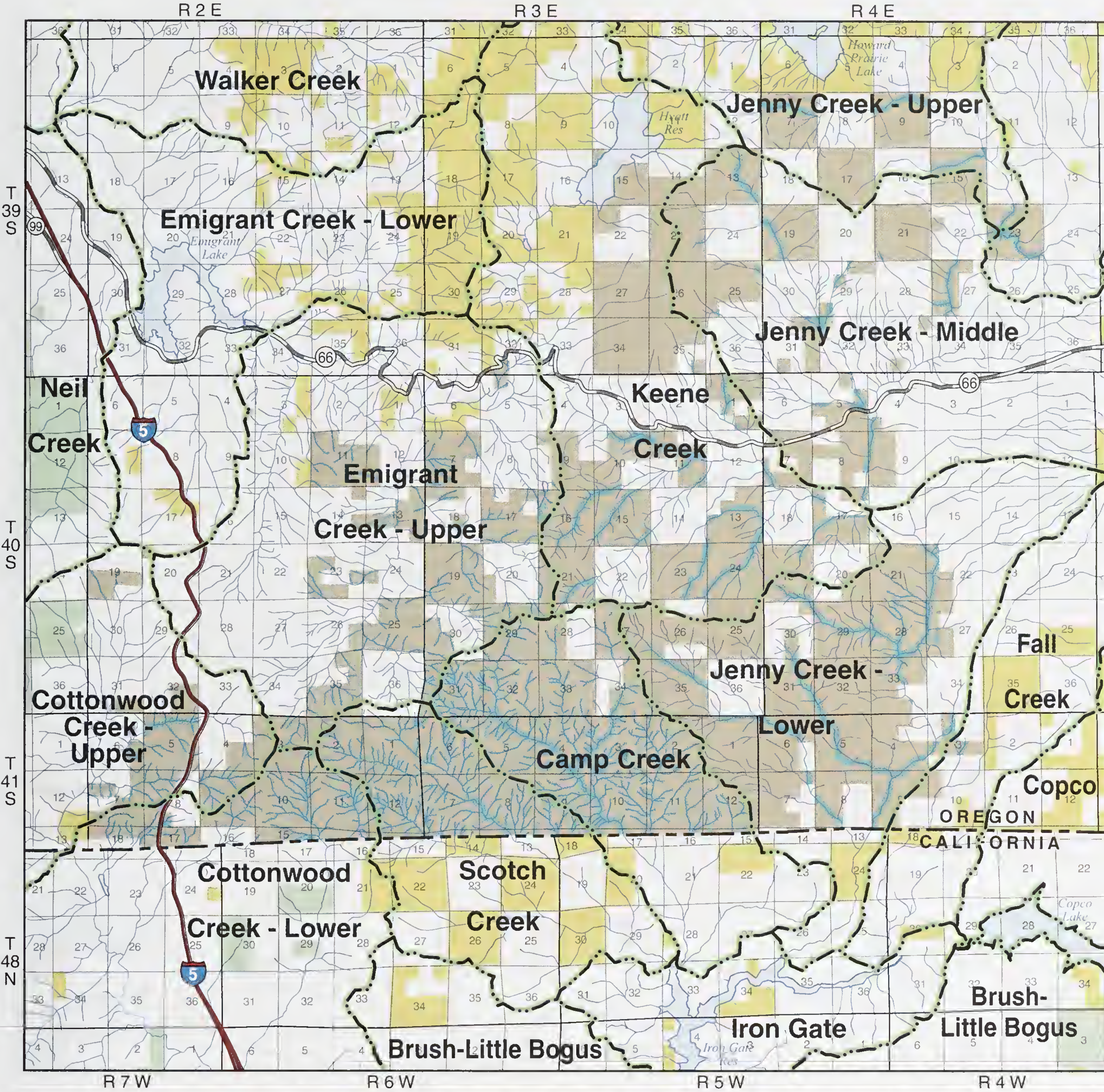
D11-05-2000:JR

Cascade-Siskiyou National Monument
Stream Systems and Riparian Reserves Established as of December 2000



2 0 2 4 Miles

2 0 2 4 Kilometers

N E S W

LEGEND

- Riparian Reserve - *Surveys to determine extent of riparian reserves have only been completed in the Klamath-Irongate area.*
- Subwatershed Boundary
- Cascade-Siskiyou National Monument
- Other BLM Administered Land
- U.S. Forest Service
- Bureau of Reclamation
- Non-Federal Land

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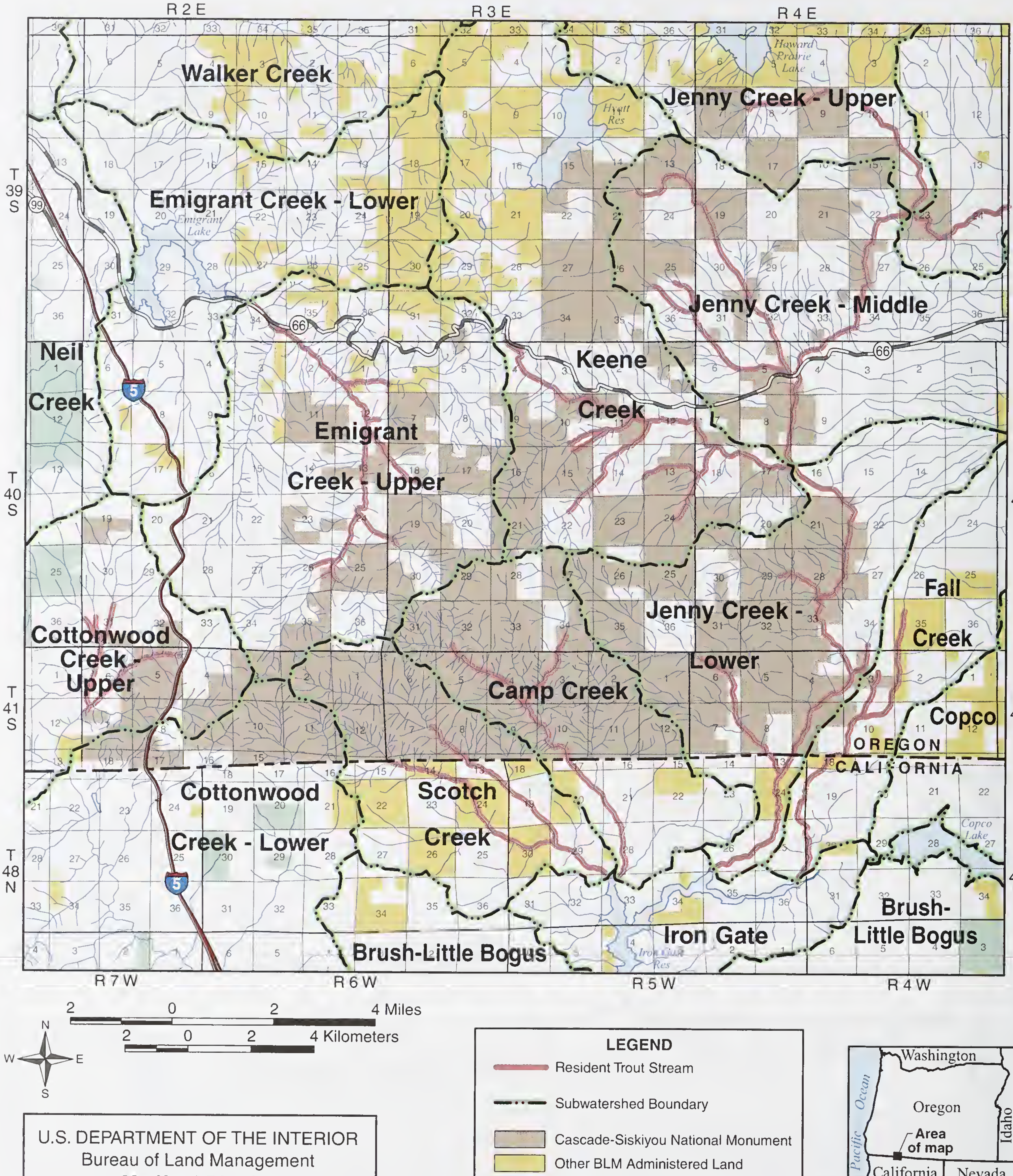
MAP 15

lzowada: usr3/lzowada/cseea/new/map13.aml

D11-05-2000:JR

Cascade-Siskiyou National Monument
Fish Bearing Streams



LEGEND

- Resident Trout Stream
- Subwatershed Boundary
- Cascade-Siskiyou National Monument
- Other BLM Administered Land
- U.S. Forest Service
- Bureau of Reclamation
- Non-Federal Land

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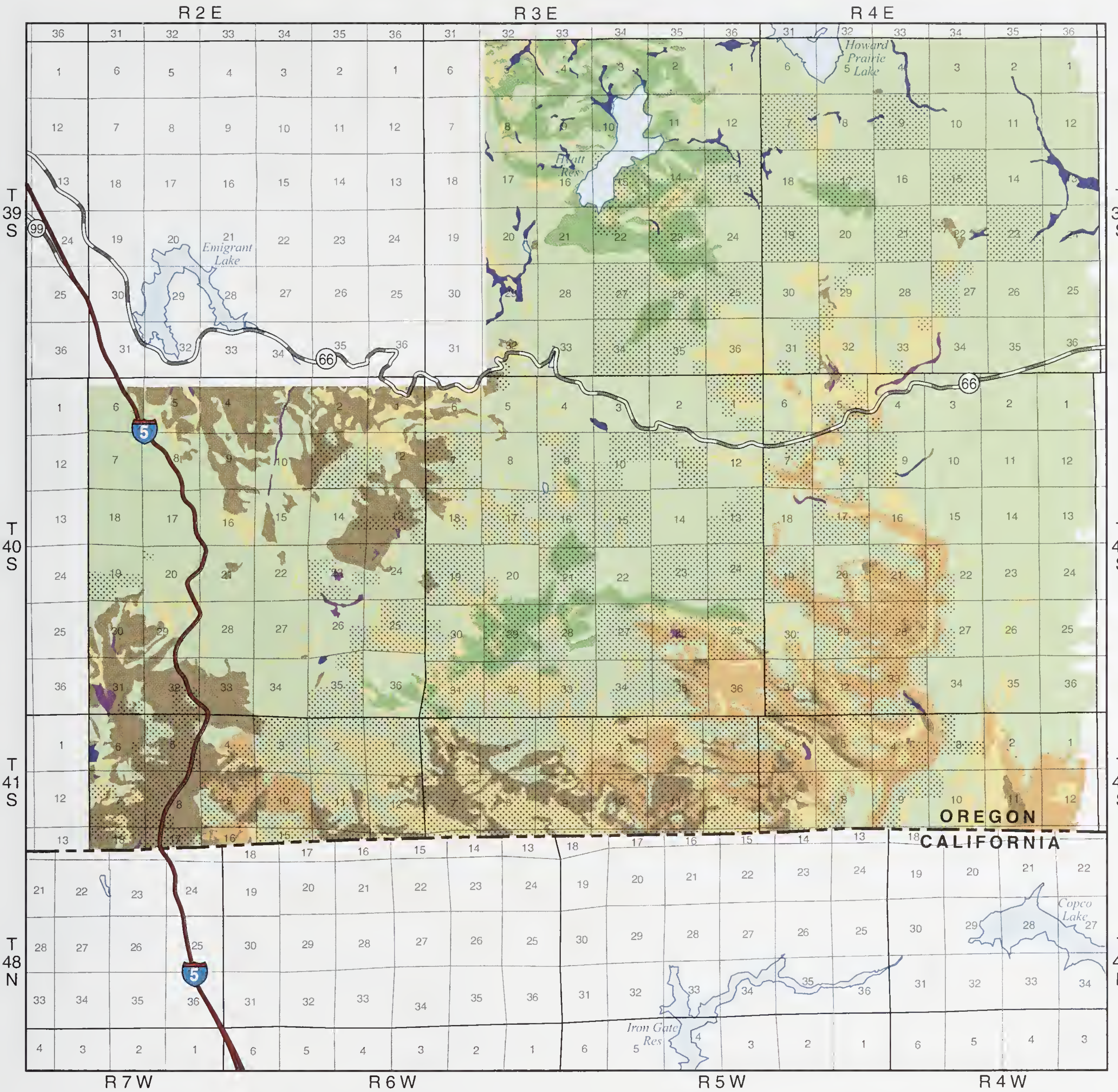
MAP 16

lzowada: usr3/lzowada/cseea/new/map13.aml

D11-05-2000:JR

Cascade-Siskiyou National Monument
Distribution of Plant Communities

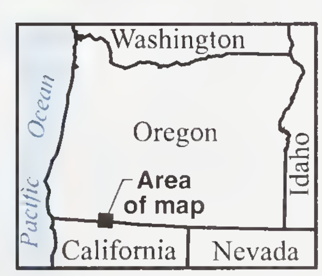


2 0 2 4 Miles
2 0 2 4 Kilometers

N W E S

LEGEND

Plant Communities
- Grassland/Meadow
- Shrub/Woodland
- Hardwoodland
- Mixed Conifer
- White Fir
- Semi-Wetland
- Wetland
- Cascade-Siskiyou National Monument



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MAP 17

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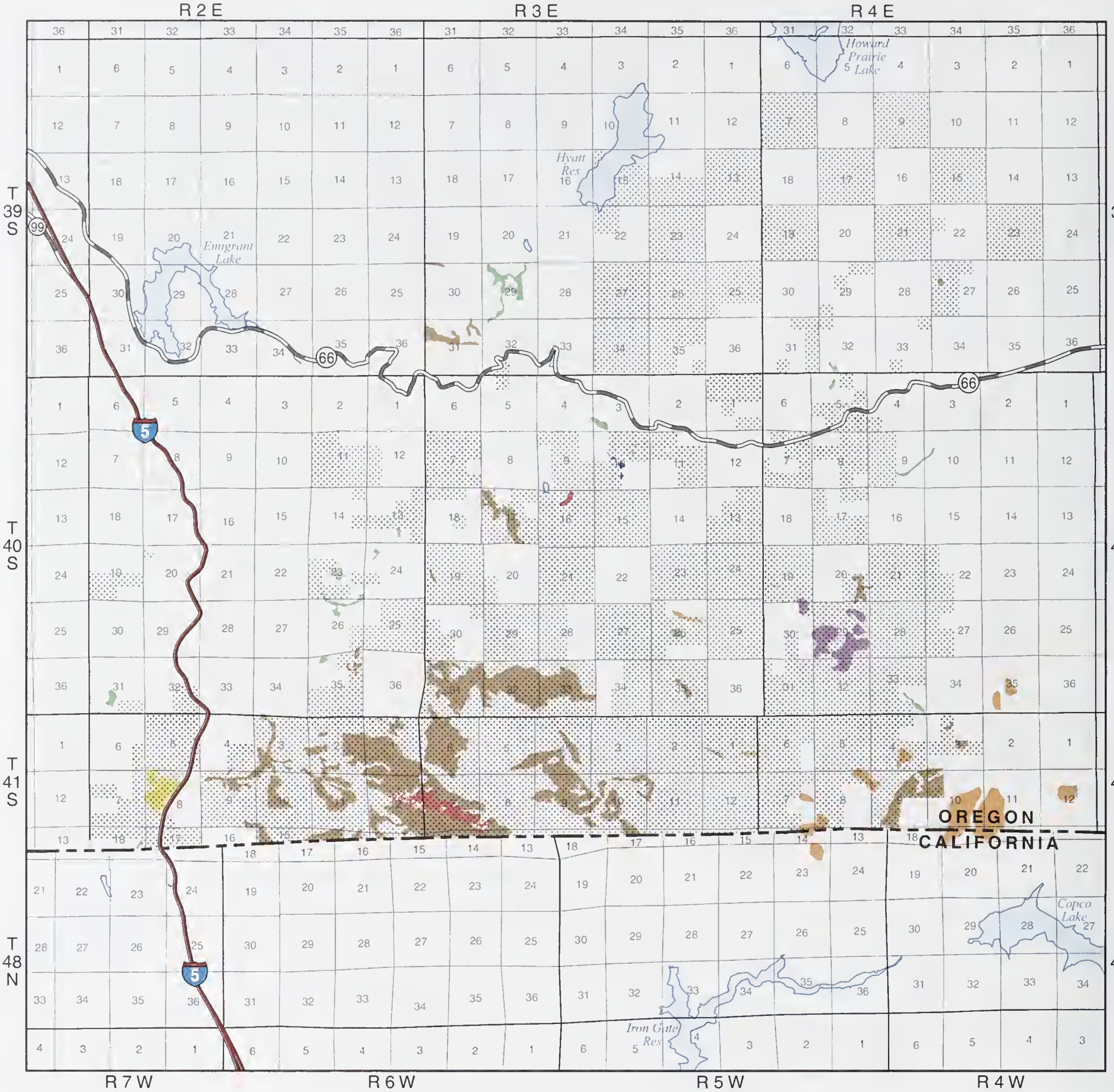
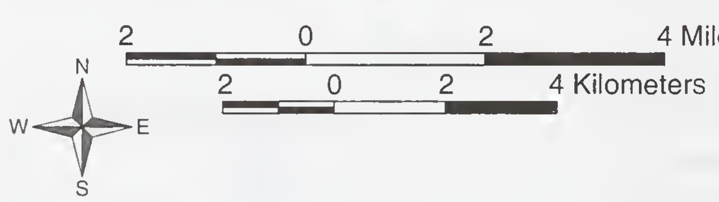
Cascade-Siskiyou National Monument
Special Plant Communities





LEGEND

Special Plant Communities

- Pond (Parsnip Lakes)
- Wet and Semi-Wet Meadows
- Biscuit Scablands
- Rosaceous Chaparral
- Woodland-Mariposa Lily
- Old-Growth Sugar Pine
- Oak-Juniper Mix
- Cascade-Siskiyou National Monument

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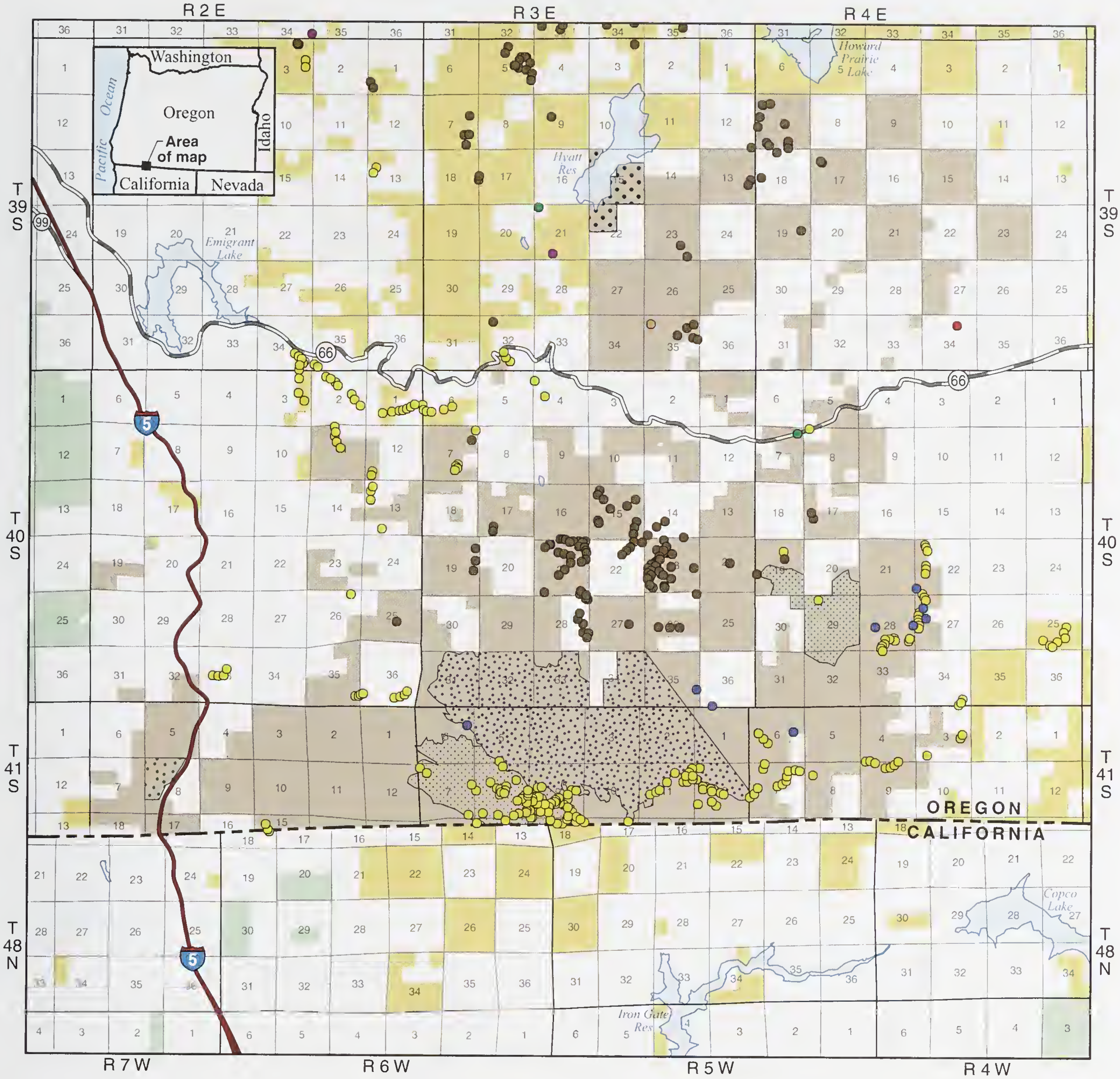
MAP 18

phosten: arcwork/cseat/vegetation.apr

D11-05-2000:JR

Cascade-Siskiyou National Monument
Noxious Weed Identification



2 0 2 4 Miles

2 0 2 4 Kilometers

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LEGEND

- Cascade-Siskiyou National Monument
- Other BLM Administered Land
- U.S. Forest Service
- Bureau of Reclamation
- Non-Federal Land
- Hyatt Lake Recreation Area
- Mariposa Botanical Area
- Oregon Gulch RNA
- Scotch Creek RNA
- Wilderness Study Area

Noxious Weeds

- Canada Thistle
- Dalmatian Toadflax
- Diffuse Knapweed
- Dyers Woad
- Meadow Knapweed
- Spotted Knapweed
- Yellow Starthistle

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MAP 19

phosten: ormd197/usr3/lz/natmonfinal/map19.aml

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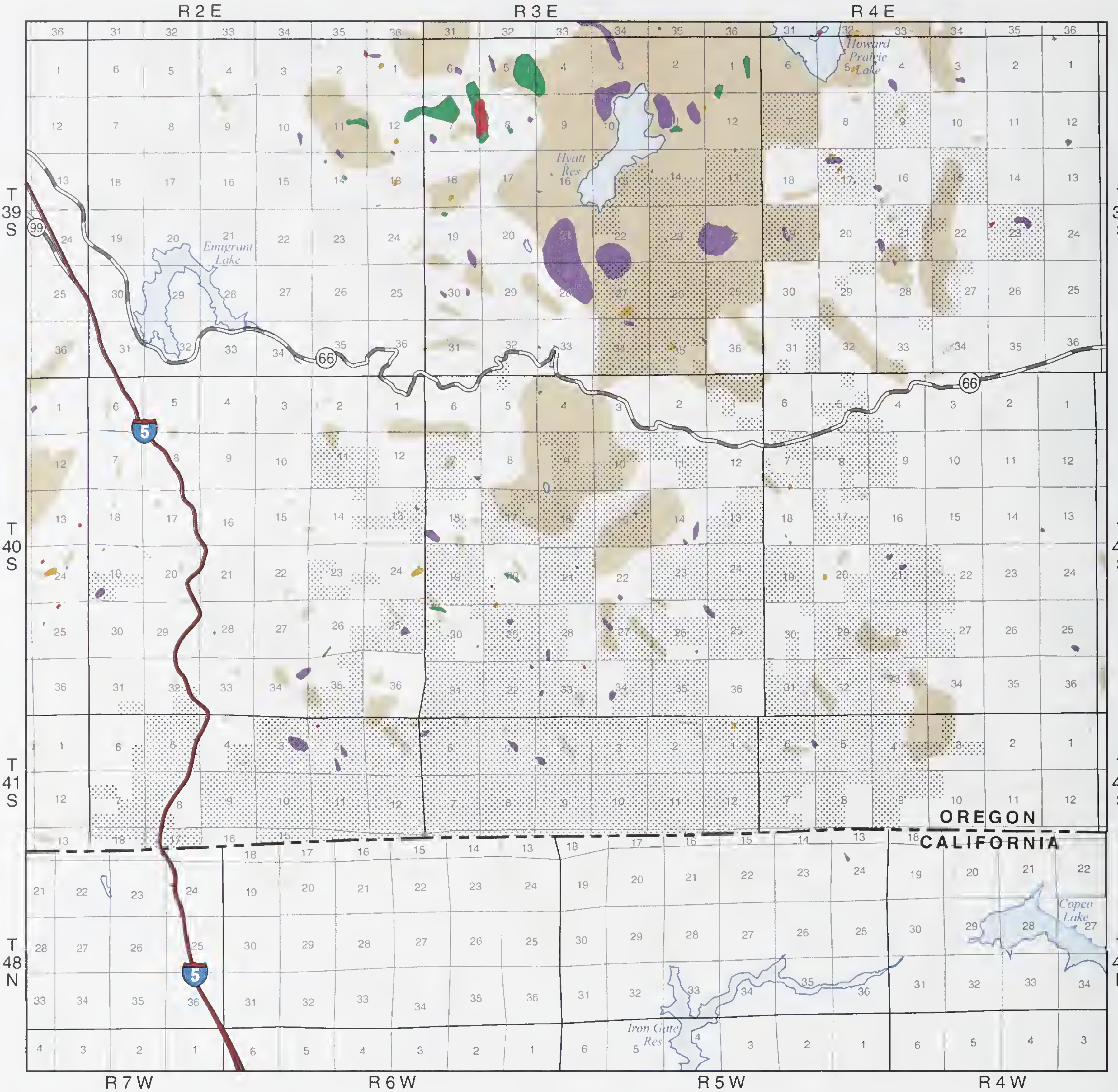
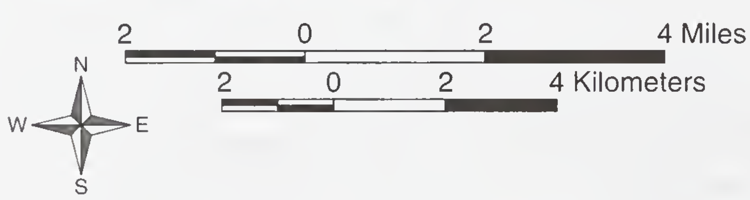
Cascade-Siskiyou National Monument
Insect Incident 1995-1999





LEGEND

- Mortality 1995
- Mortality 1996
- Mortality 1997
- Mortality 1998
- Mortality 1999
- Cascade-Siskiyou National Monument

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MAP 20

lzowada: ormd197/usr3/lz/natmonfinal/map17.aml

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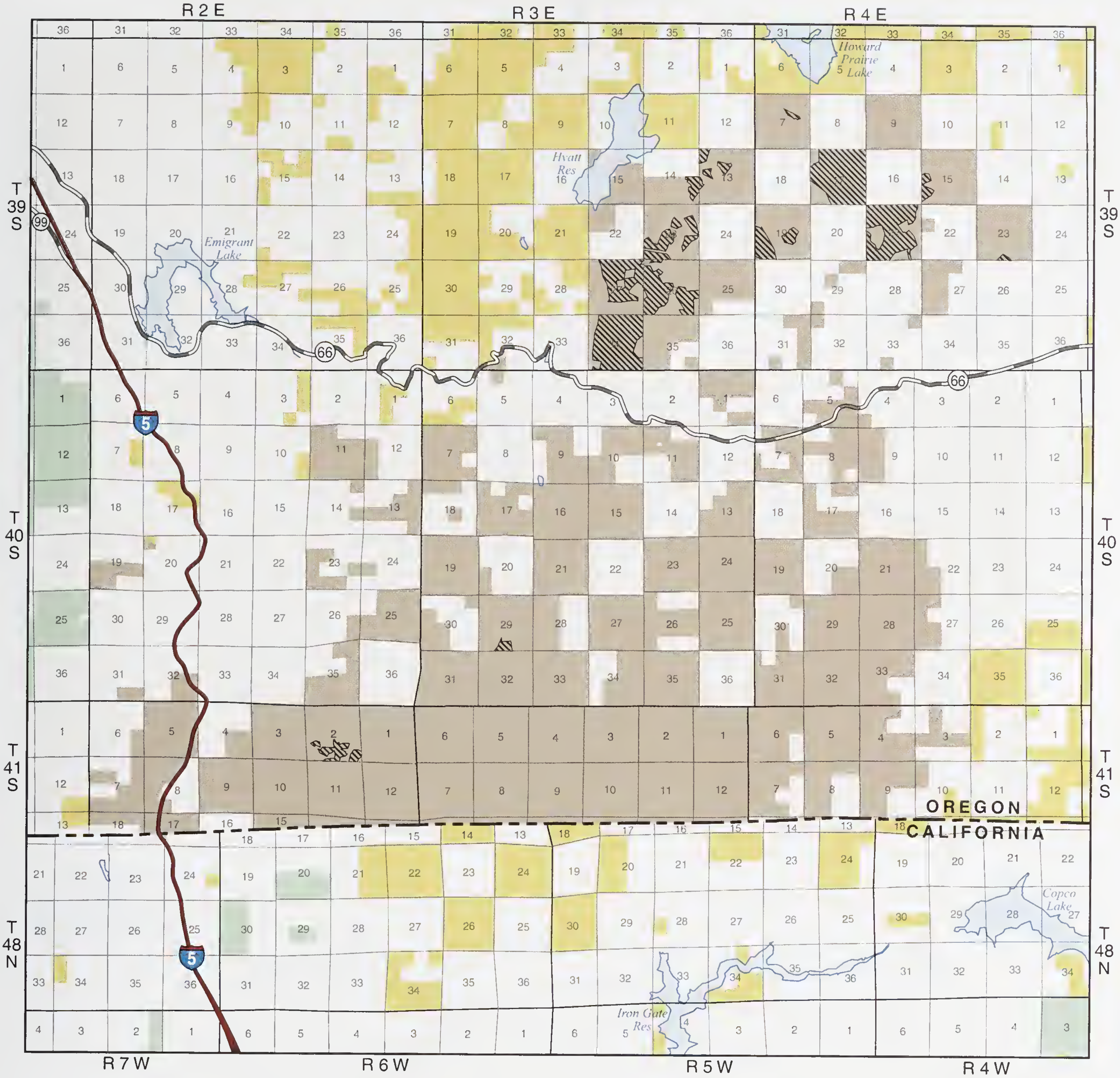
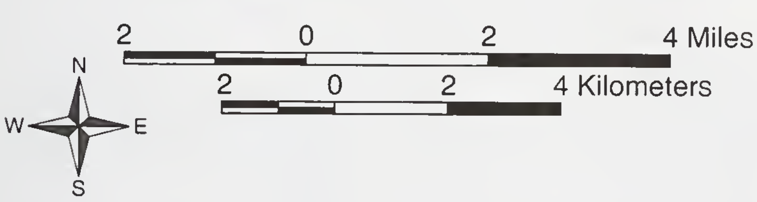
Cascade-Siskiyou National Monument
Laminated Root Rot Presence





LEGEND

- Presence of Root Rot
- Cascade-Siskiyou National Monument
- Other BLM Administered Land
- U.S. Forest Service
- Bureau of Reclamation
- Non-Federal Land

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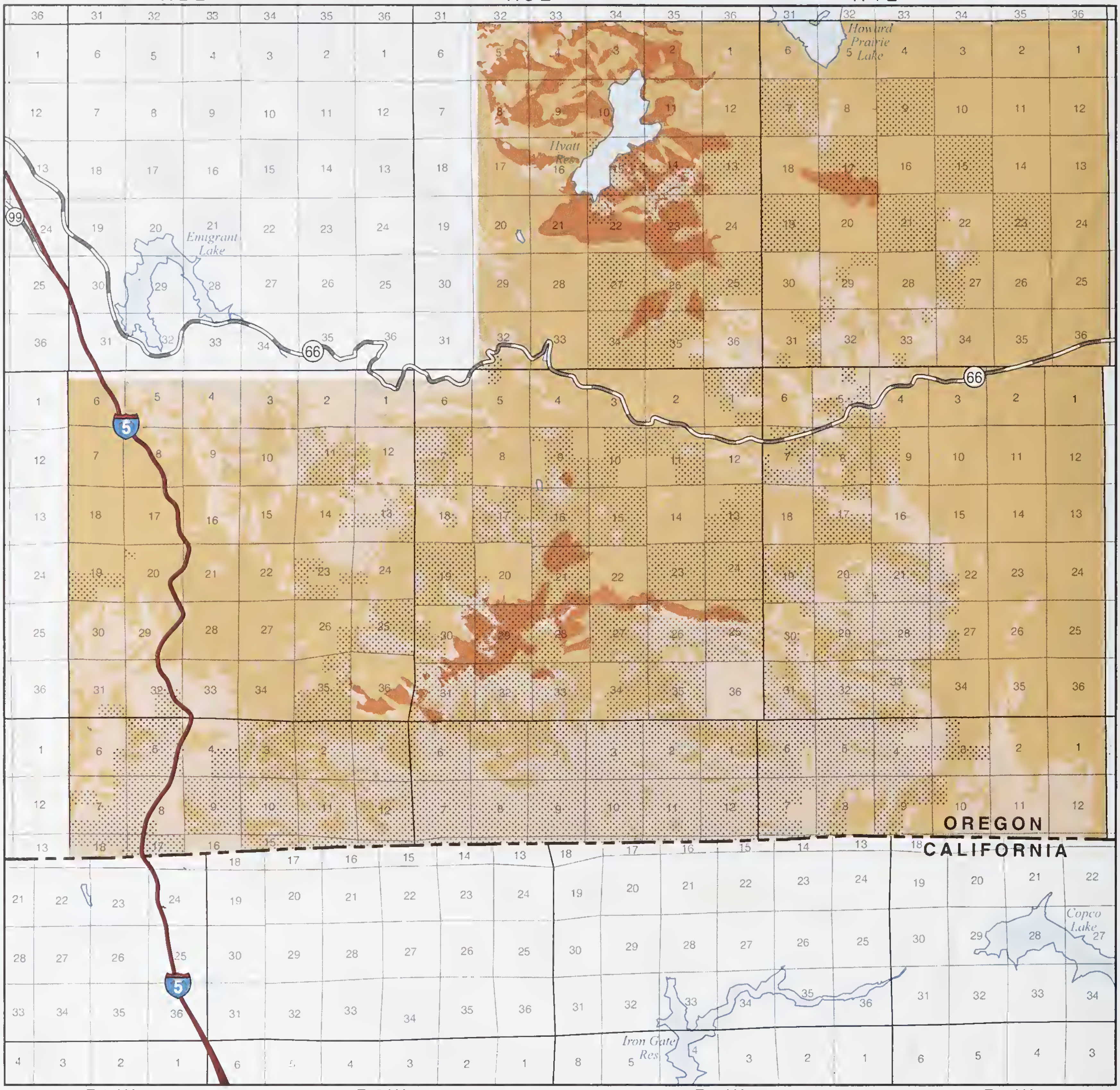
lzowada: usr3/workarea/lzowada/cseeanew/map44.aml

MAP 21

D11-05-2000:JR

Cascade-Siskiyou National Monument
Fire Regime



2 0 2 4 Miles

2 0 2 4 Kilometers

N
W E
S

LEGEND

Fire Regime (Based on NRCS Potential Vegetation)

Low Severity

Moderate Severity

High Severity

Cascade-Siskiyou National Monument

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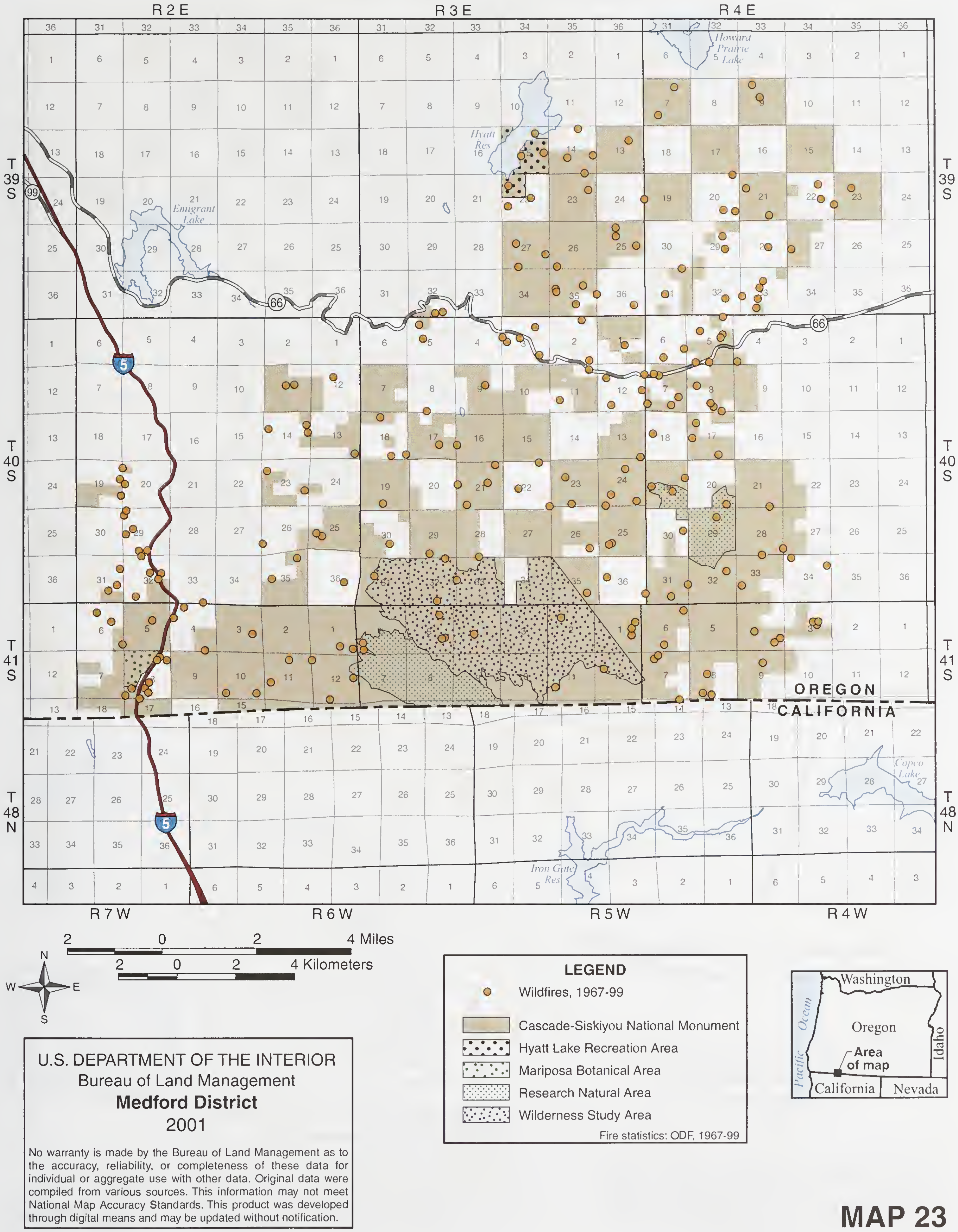
MAP 22

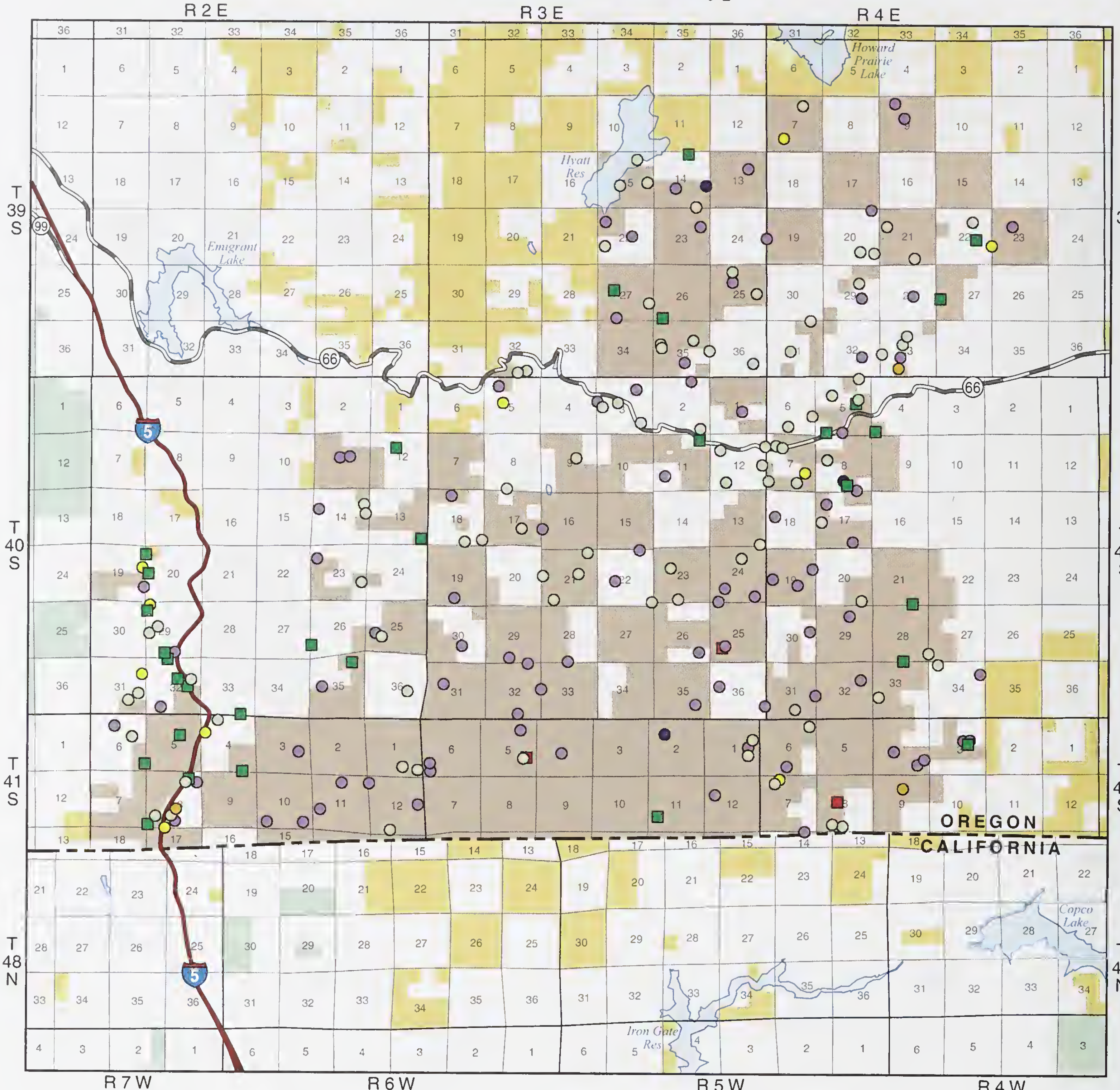
phosten: arcwork/cseat/fire_reg.apr

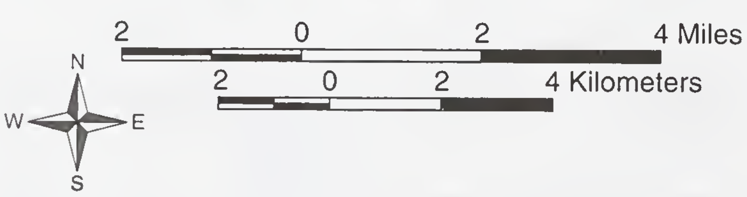
D11-05-2000:JR

Cascade-Siskiyou National Monument
Past Wildland Fires



Cascade-Siskiyou National Monument
Initial Wildfire Attack Type





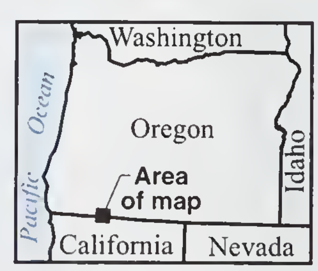
LEGEND

Wildfires by Initial Attack Type, 1967-99

- Bulldozer
- Engine (Less than 300 Gallon)
- Engine (Greater than 300 Gallon)
- Hand Tools
- Helicopter with Water Bucket
- Retardent Tanker
- Other

- Cascade-Siskiyou National Monument
- Other BLM Administered Lands
- U.S. Forest Service
- Bureau of Reclamation
- Non-Federal Land

Fire statistics: ODF, 1967-99



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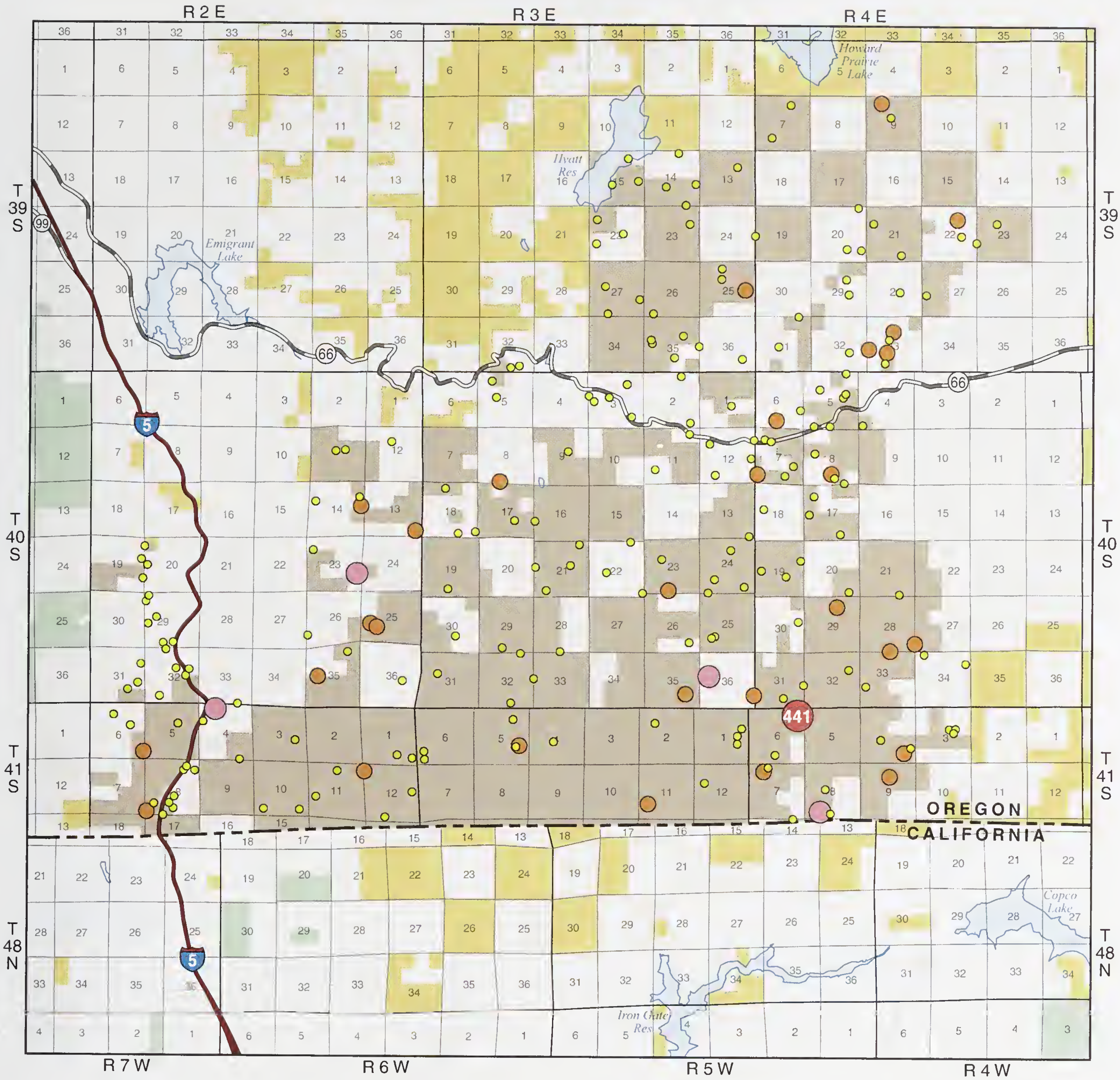
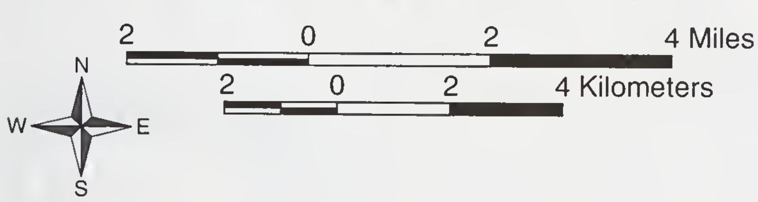
MAP 24

lzowada: ormd197/usr3/lz/natmonfinal/map24.aml

D11-05-2000:JR

Cascade-Siskiyou National Monument Wildfire Size





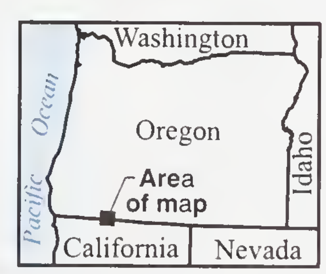
LEGEND

Wildfire Size in Burned Acreage, 1967-99

- 0 to 0.25
- 0.26 to 10
- 10.01 to 100
- 441 Greater than 100 (actual value listed)

- Cascade-Siskiyou National Monument
- Other BLM Administered Land
- U.S. Forest Service
- Bureau of Reclamation
- Non-Federal Land

Fire statistics: ODF, 1967-99



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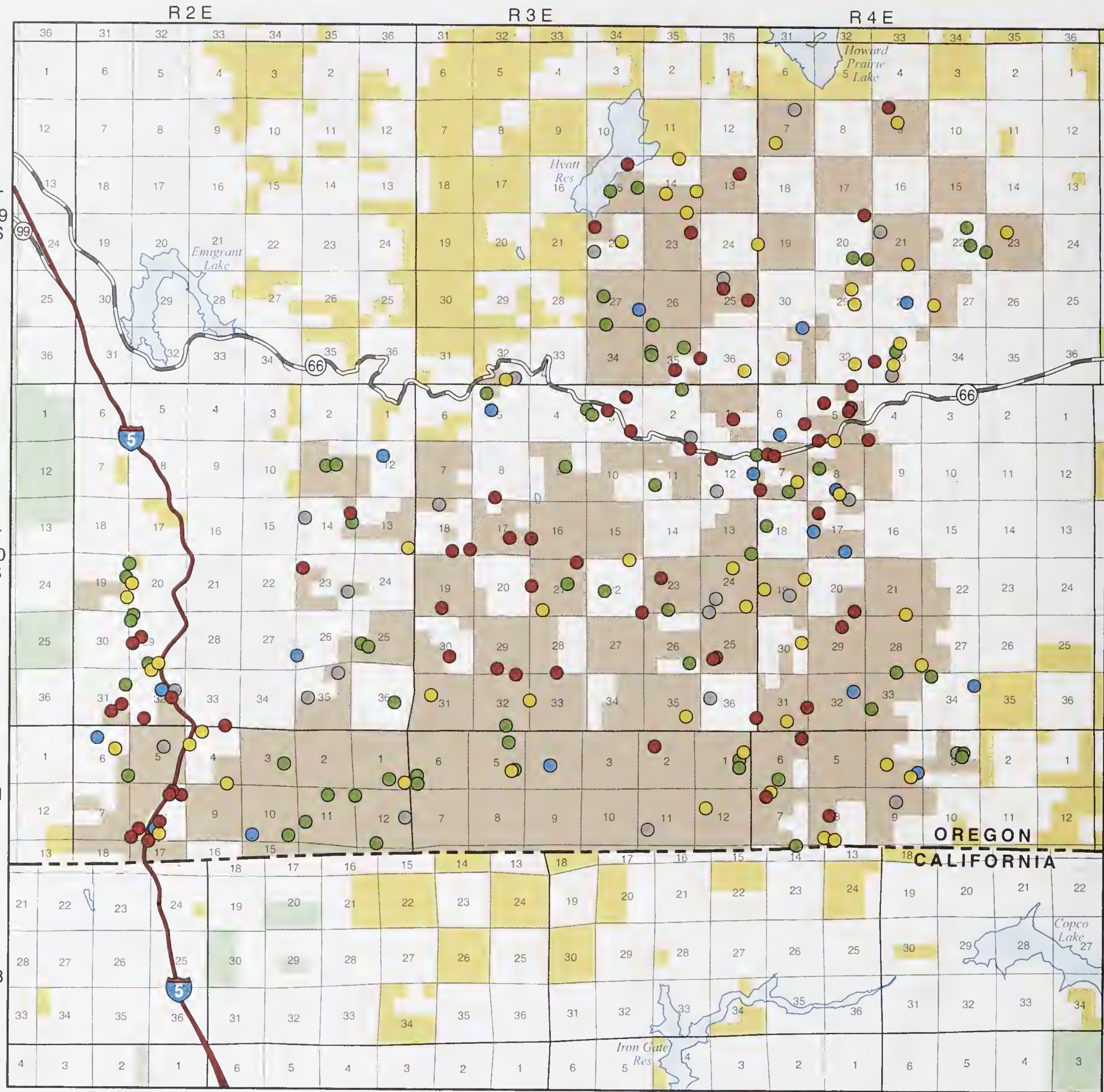
MAP 25

D11-05-2000:JR

lzowada: ormd197/usr3/lz/natmonfinal/map25.aml

Cascade-Siskiyou National Monument
Danger Classification of Wildfire



2 0 2 4 Miles

2 0 2 4 Kilometers

LEGEND

Danger Classification of Wildfire 1967-99

- Extreme
- High
- Moderate
- Low
- Not During Fire Season

- Cascade-Siskiyou National Monument
- Other BLM Administered Land
- U.S. Forest Service
- Bureau of Reclamation
- Non-Federal Land

Fire statistics: ODF, 1967-99

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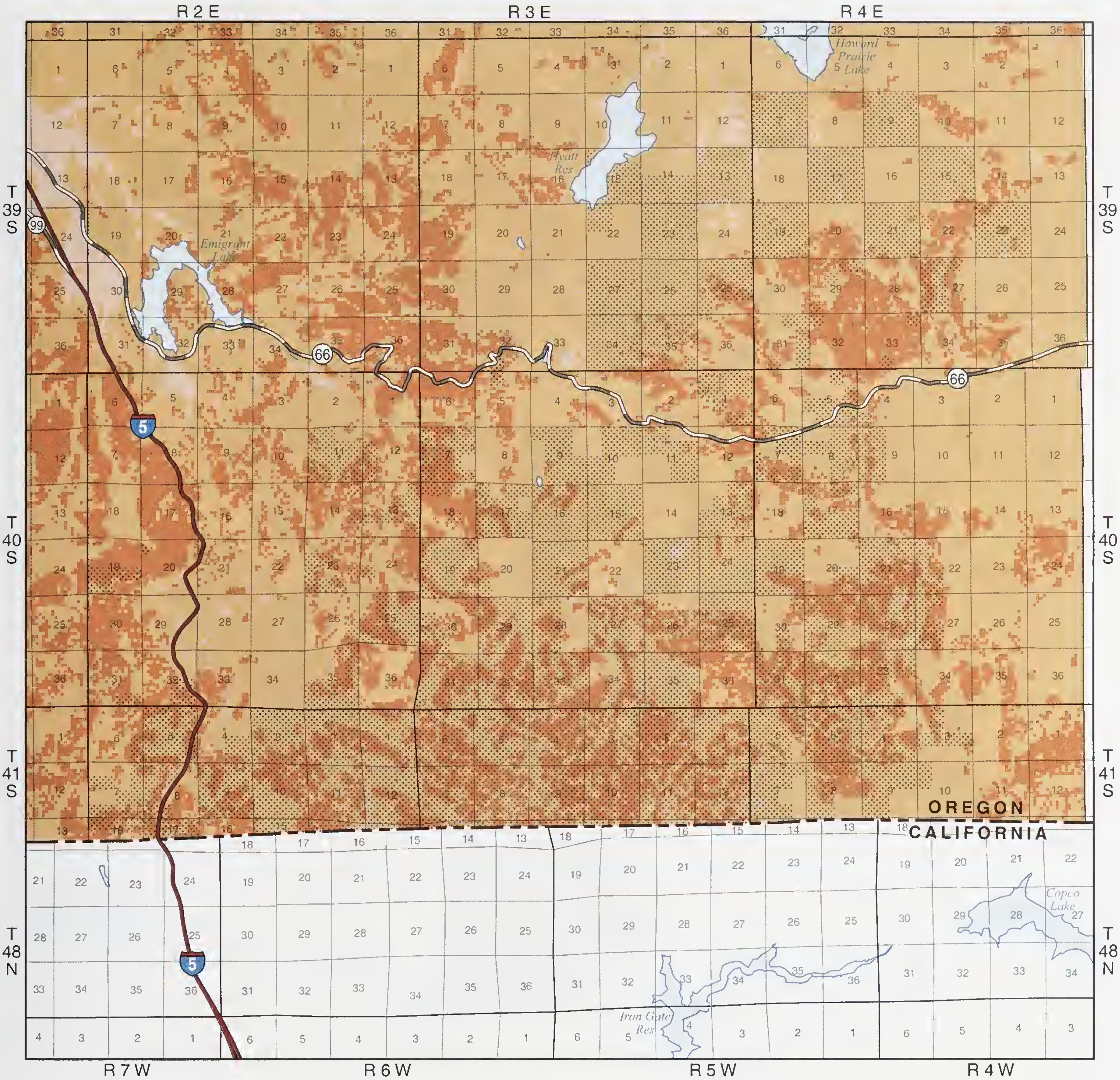
MAP 26

lzowada: ormd197/usr3/lz/natmonfinal/map26.aml

D11-05-2000:JR

Cascade-Siskiyou National Monument
Fire Hazard Ratings



2 0 2 4 Miles

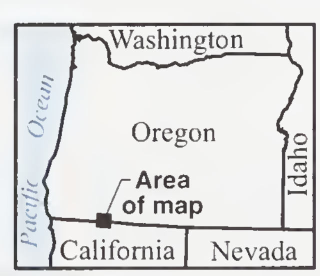
2 0 2 4 Kilometers

N W E S

LEGEND

Fire Hazard Rating

- Low Hazard
- Moderate Hazard
- High Hazard
- Cascade-Siskiyou National Monument



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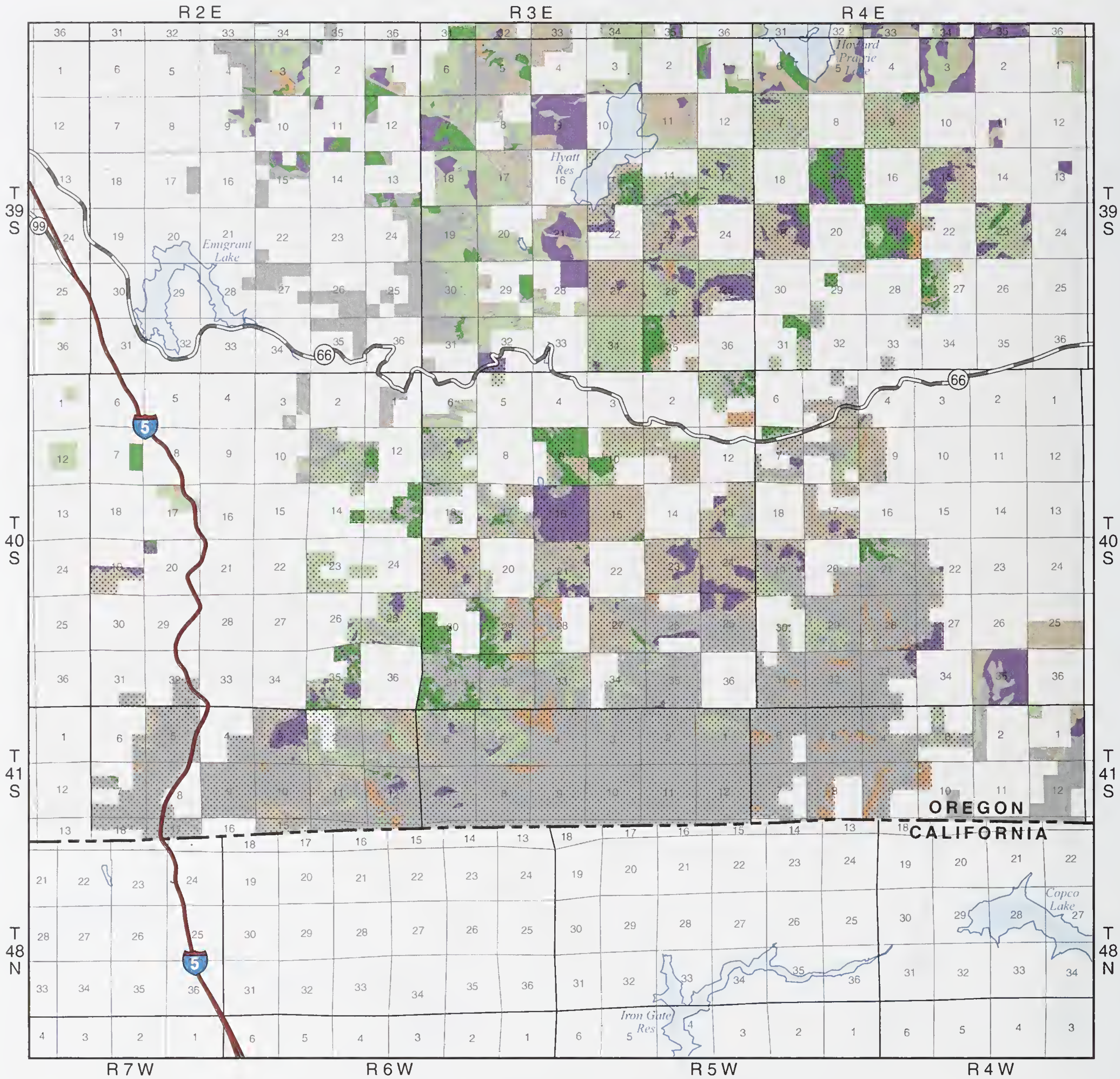
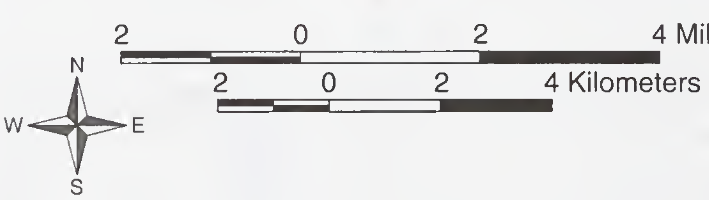
MAP 27

lzowada: usr3/workarea/lzowada/cseeanew/map19.aml

D11-05-2000:JR

Cascade-Siskiyou National Monument
Northern Spotted Owl Habitat (Modified McKelvie Rating)





LEGEND

- Habitat 1: Nesting
- Habitat 2: Roosting/Foraging
- Habitat 3: Young Stands
- Habitat 4: No Potential
- Habitat 5: Dispersal with Potential
- Habitat 6: Dispersal with No Potential
- Cascade-Siskiyou National Monument

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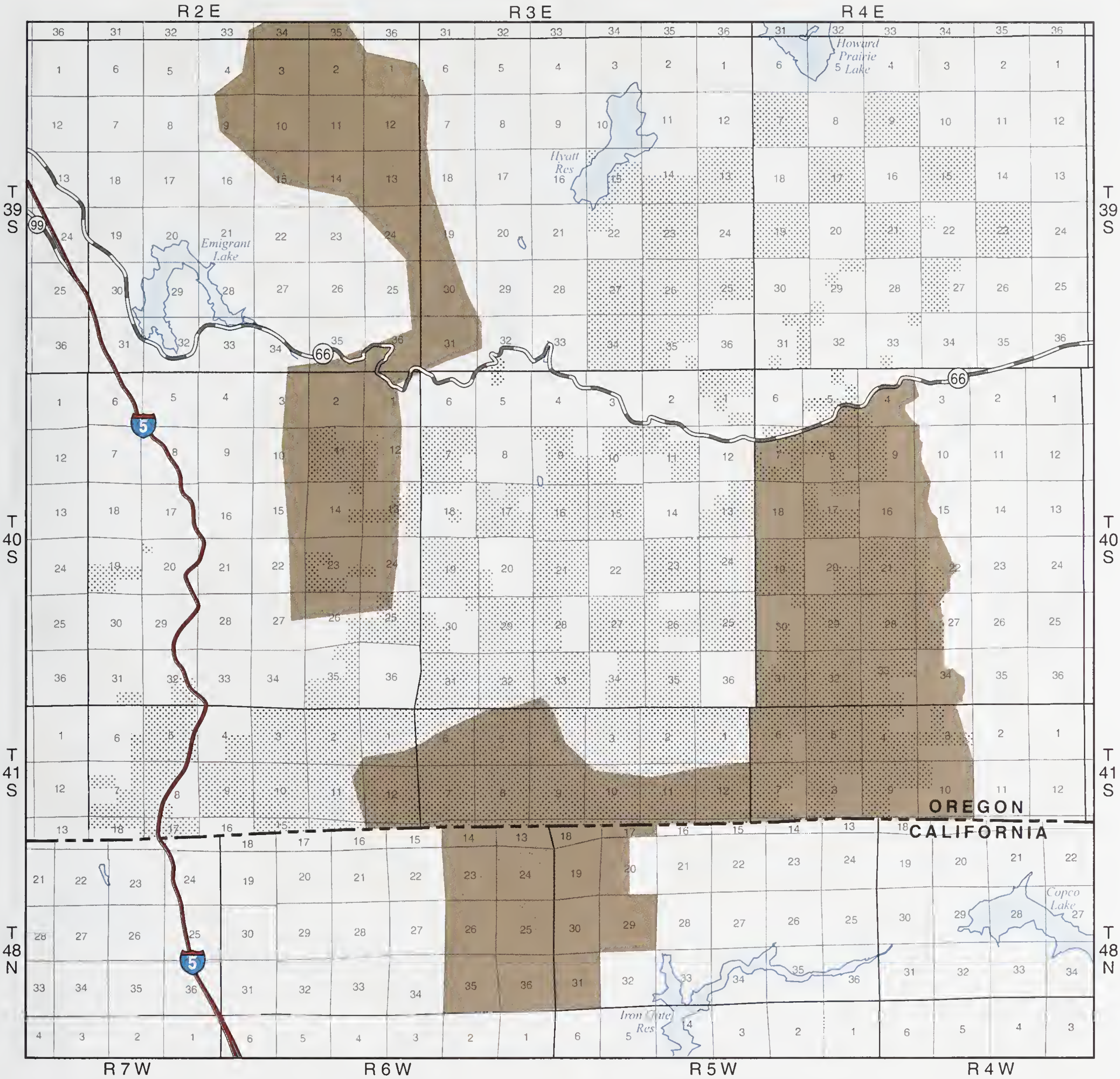
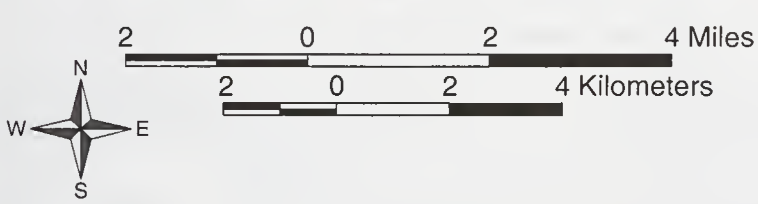
MAP 28

lzowada: usr3/workarea/lzowada/cseeanew/map20.aml

D11-05-2000:JR

Cascade-Siskiyou National Monument
Big Game Management Area





LEGEND

- Big Game Management Area
- Cascade-Siskiyou National Monument

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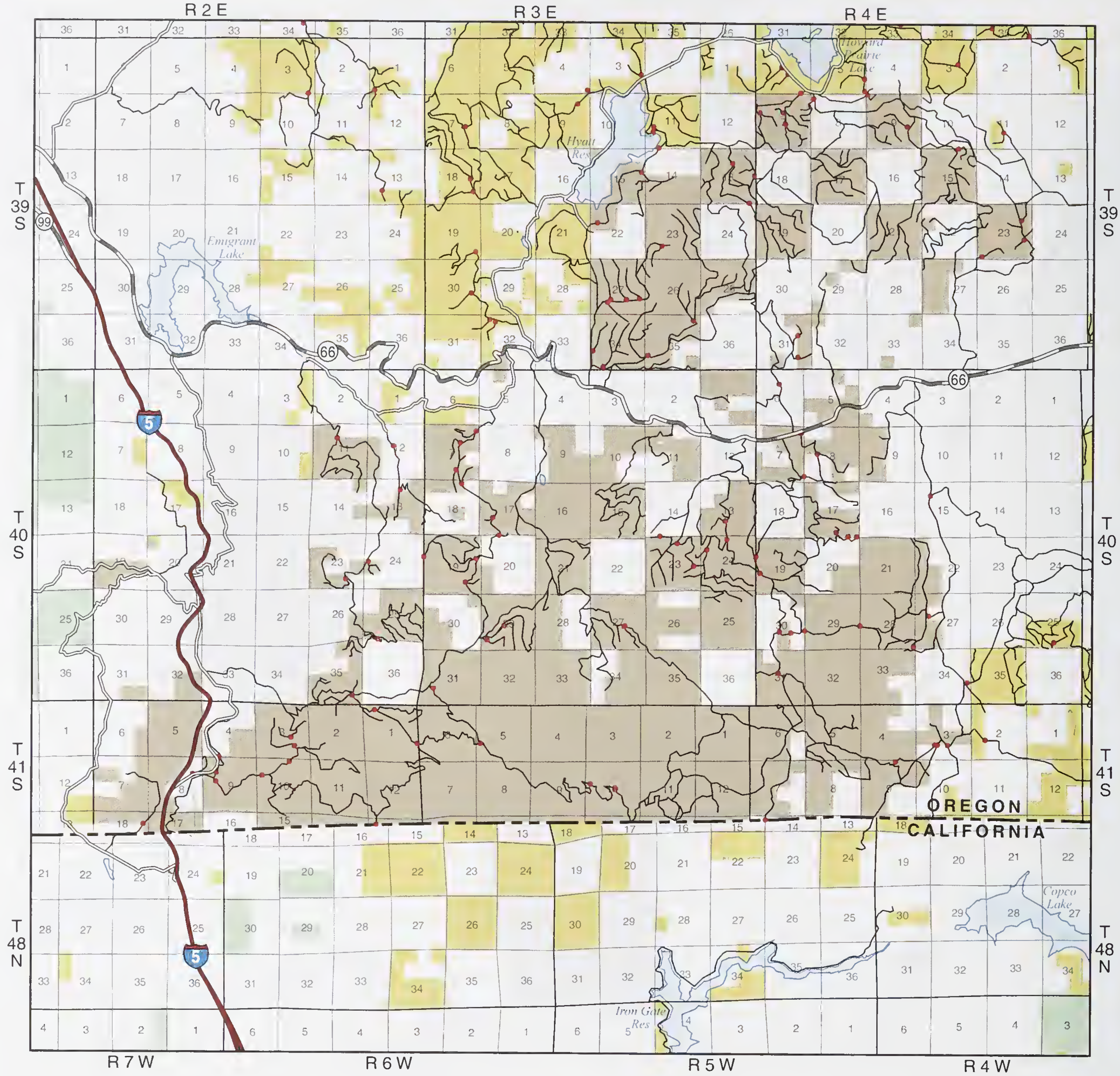
lzowada: usr3/workarea/lzowada/cseeanew/map21.aml

MAP 29

D11-05-2000:JR

Cascade-Siskiyou National Monument
Road Systems - Alternative A



2 0 2 4 Miles

2 0 2 4 Kilometers

N
W E
S

LEGEND

- Interstate Highway
- State Highway
- State or County Road
- Inventoried Road - See Plate 1 for TMOs
- Road Block
- Cascade-Siskiyou National Monument
- Other BLM Administered Land
- U.S. Forest Service
- Bureau of Reclamation
- Non-Federal Land

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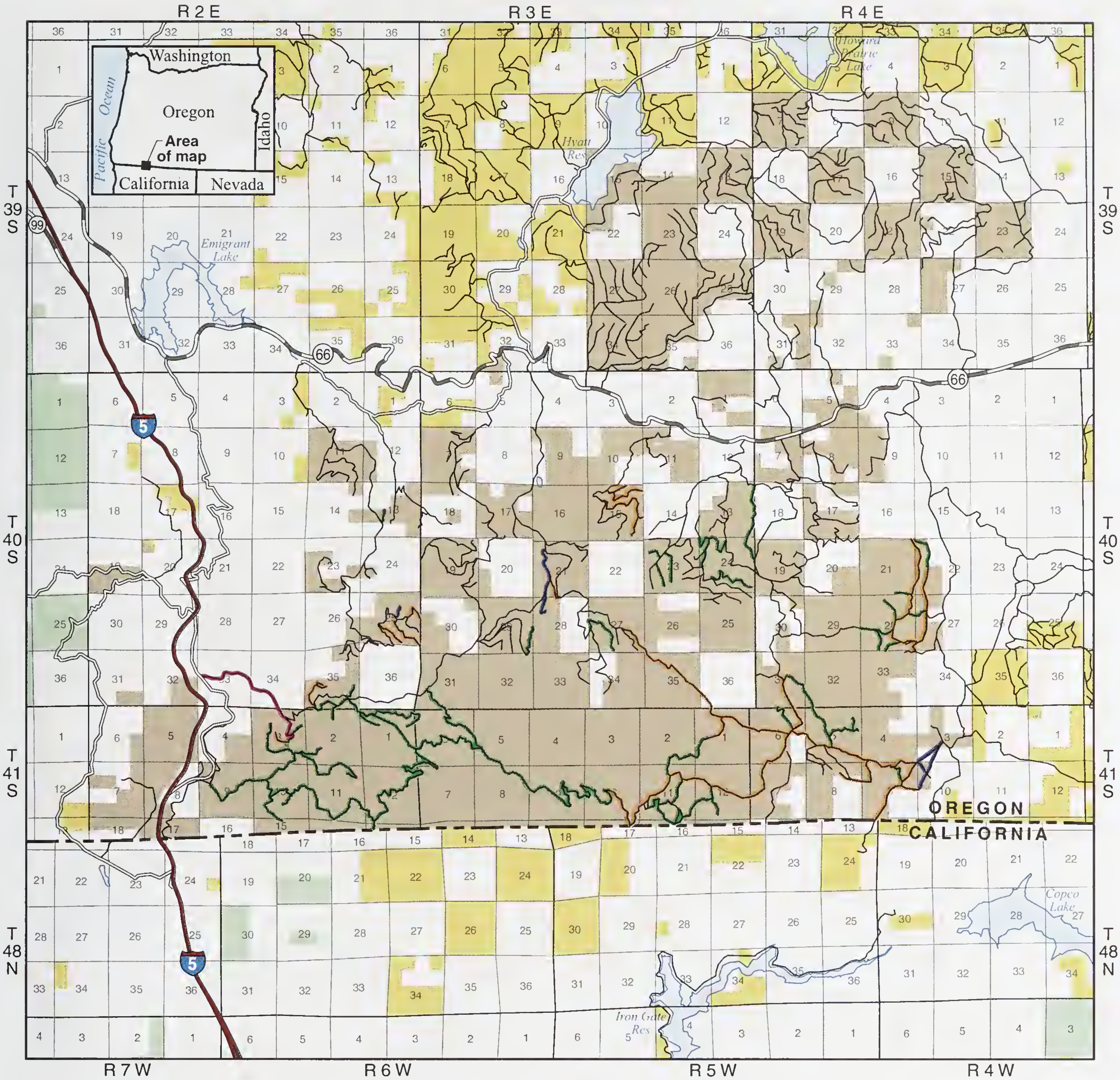
MAP 30

lzowada: ormd197/usr3/lz/natmonfinal/map30.aml

D11-05-2000:JR

Cascade-Siskiyou National Monument
Road Systems - Alternative B



2 0 2 4 Miles

2 0 2 4 Kilometers

N W E S

LEGEND

- Interstate Highway
- State Highway
- State or County Road
- Inventoried Road
- Natural Decommission
- Improve Drainage and Block to the General Public
- Improve Road and Leave Open
- Close Road (gate) to Vehicle Use by the General Public
- Cascade-Siskiyou National Monument
- Other BLM Administered Land
- U.S. Forest Service
- Bureau of Reclamation
- Non-Federal Land

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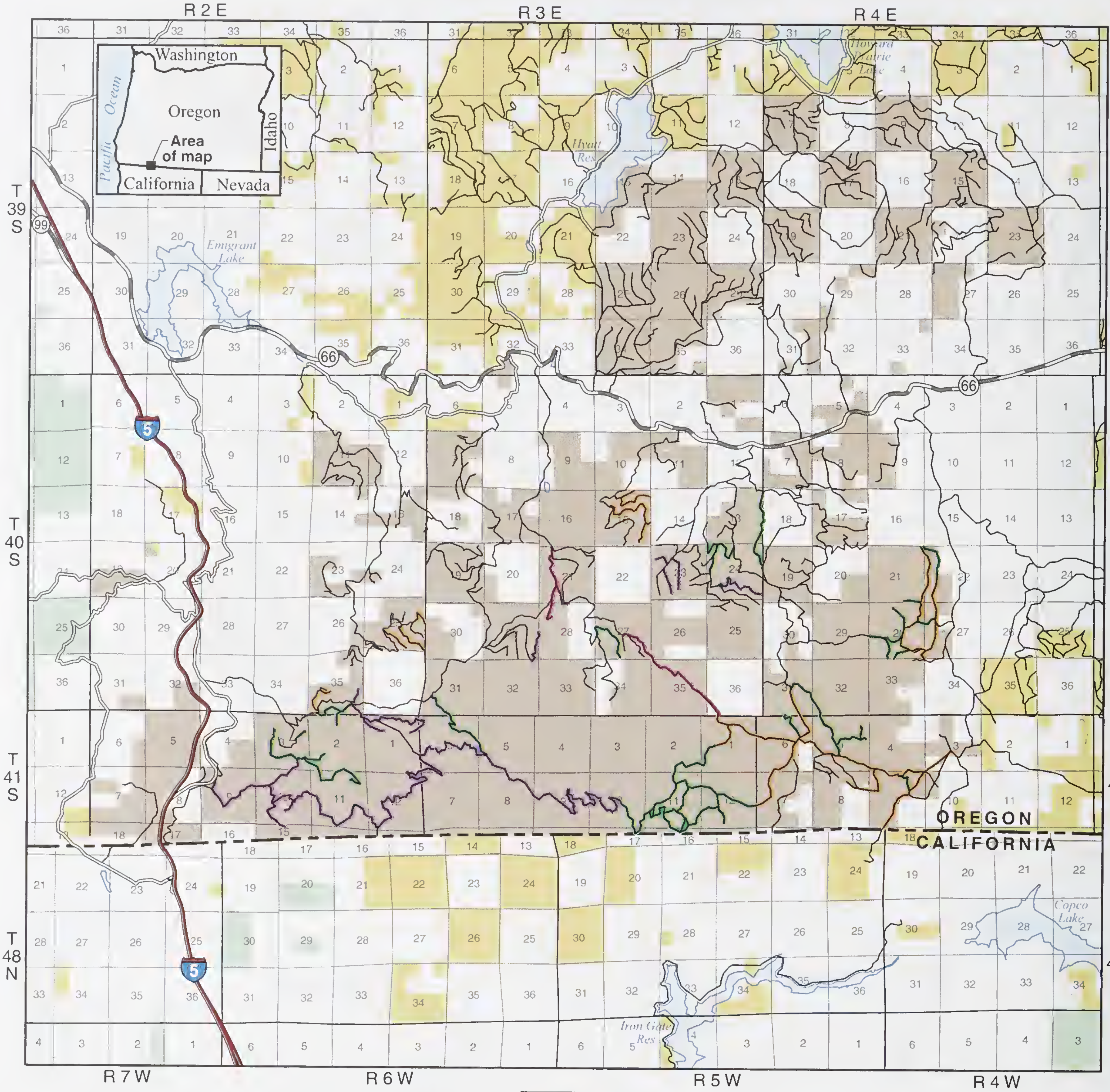
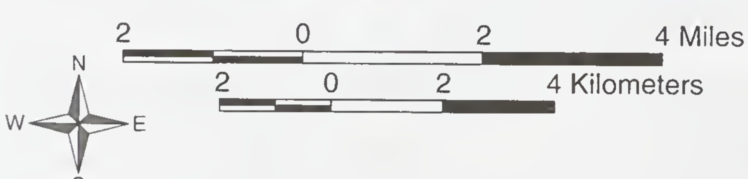
MAP 31

lzowada: ormd197/usr3/lz/natmonfinal/map31.aml

D11-05-2000:JR

Cascade-Siskiyou National Monument
Road Systems - Alternative C





LEGEND

- Interstate Highway
- State Highway
- State or County Road
- Inventoried Road
- Mechanical Decommission
- Natural Decommission
- Improve Drainage and Block to the General Public
- Close Road (gate) to Vehicle Use by the General Public
- Cascade-Siskiyou National Monument
- Other BLM Administered Land
- U.S. Forest Service
- Bureau of Reclamation
- Non-Federal Land

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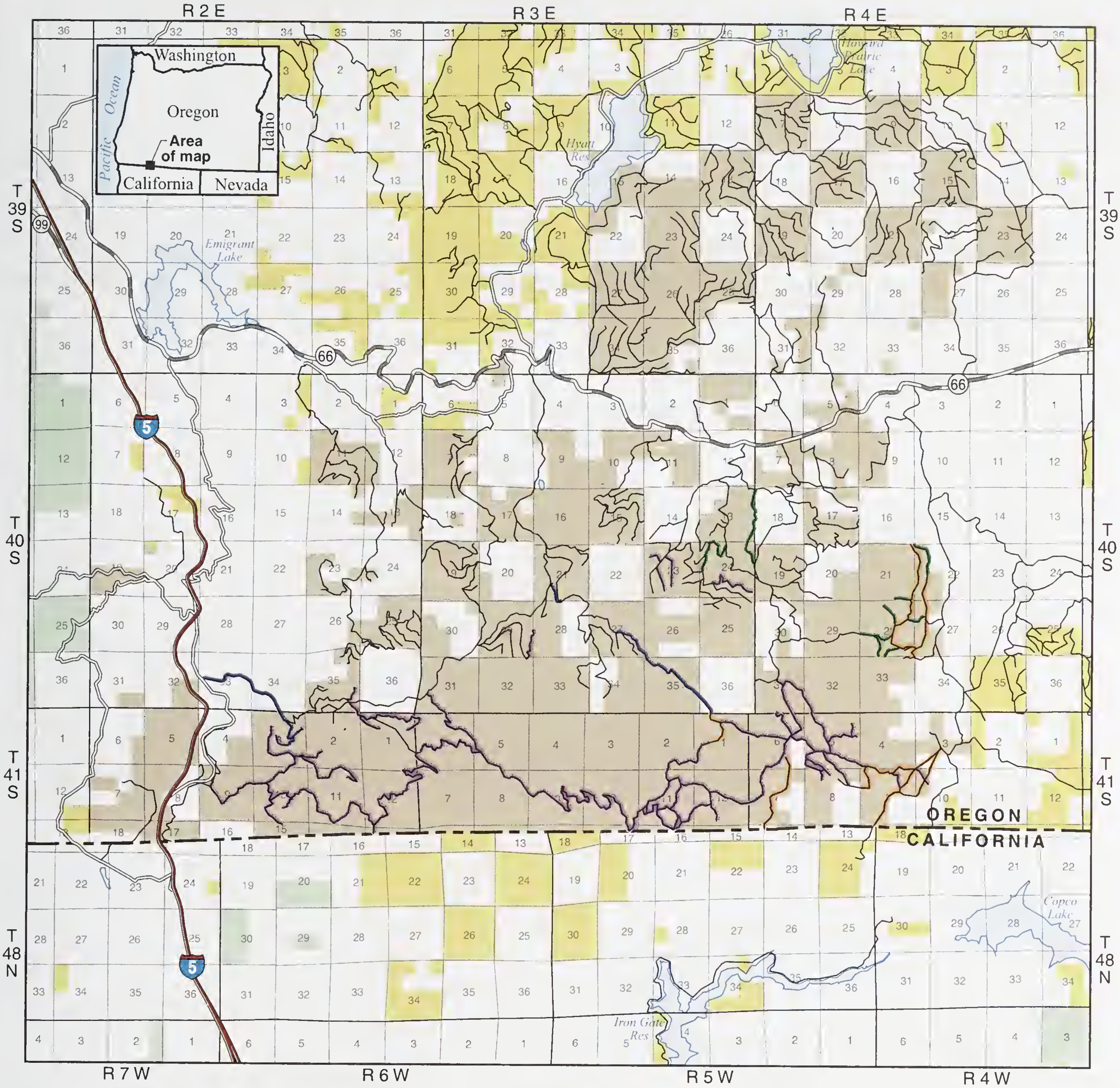
MAP 32

lzowada: ormd197/usr3/lz/natmonfinal/map32.aml

D11-05-2000:JR

Cascade-Siskiyou National Monument
Road Systems - Alternative D



2 0 2 4 Miles

2 0 2 4 Kilometers

N
W E
S

LEGEND

- Interstate Highway
- State Highway
- State or County Road
- Inventoried Road
- Mechanical Decommission
- Natural Decommission
- Improve Drainage and Block to the General Public
- Improve Road and Leave Open
- Cascade-Siskiyou National Monument
- Other BLM Administered Land
- U.S. Forest Service
- Bureau of Reclamation
- Non-Federal Land

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MAP 33

lzowada: ormd197/usr3/lz/natmonfinal/map33.aml

D11-05-2000:JR

Correction

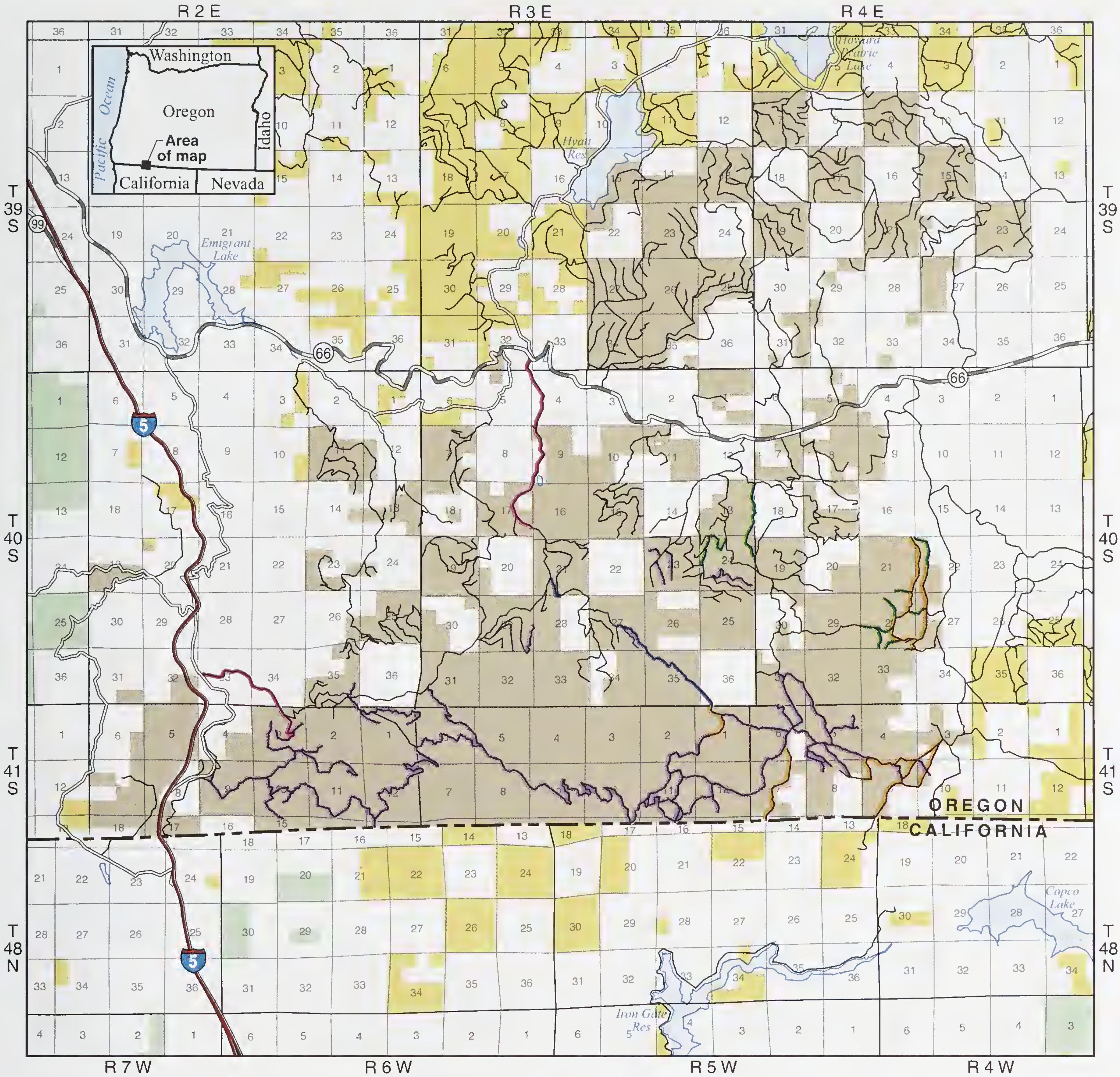
Dear Reader,

Due to an inadvertent error at the contract printer, Map 33 was printed incorrectly in Volume II of the Cascade-Siskiyou National Monument Draft Plan. Please insert this corrected version into Volume II (page 35).

We apologize for any inconvenience.

Howard J. Hunter, Acting
Richard Drehobl, National Monument Manager
Medford District BLM

Cascade-Siskiyou National Monument
Road Systems - Alternative D



2 0 2 4 Miles

2 0 2 4 Kilometers

N
W E
S

LEGEND

- Interstate Highway
- State Highway
- State or County Road
- Inventoried Road
- Mechanical Decommission
- Natural Decommission
- Improve Drainage and Block to the General Public
- Improve Road and Leave Open
- Close Road (gate) to Vehicle Use by the General Public
- Cascade-Siskiyou National Monument
- Other BLM Administered Land
- U.S. Forest Service
- Bureau of Reclamation
- Non-Federal Land

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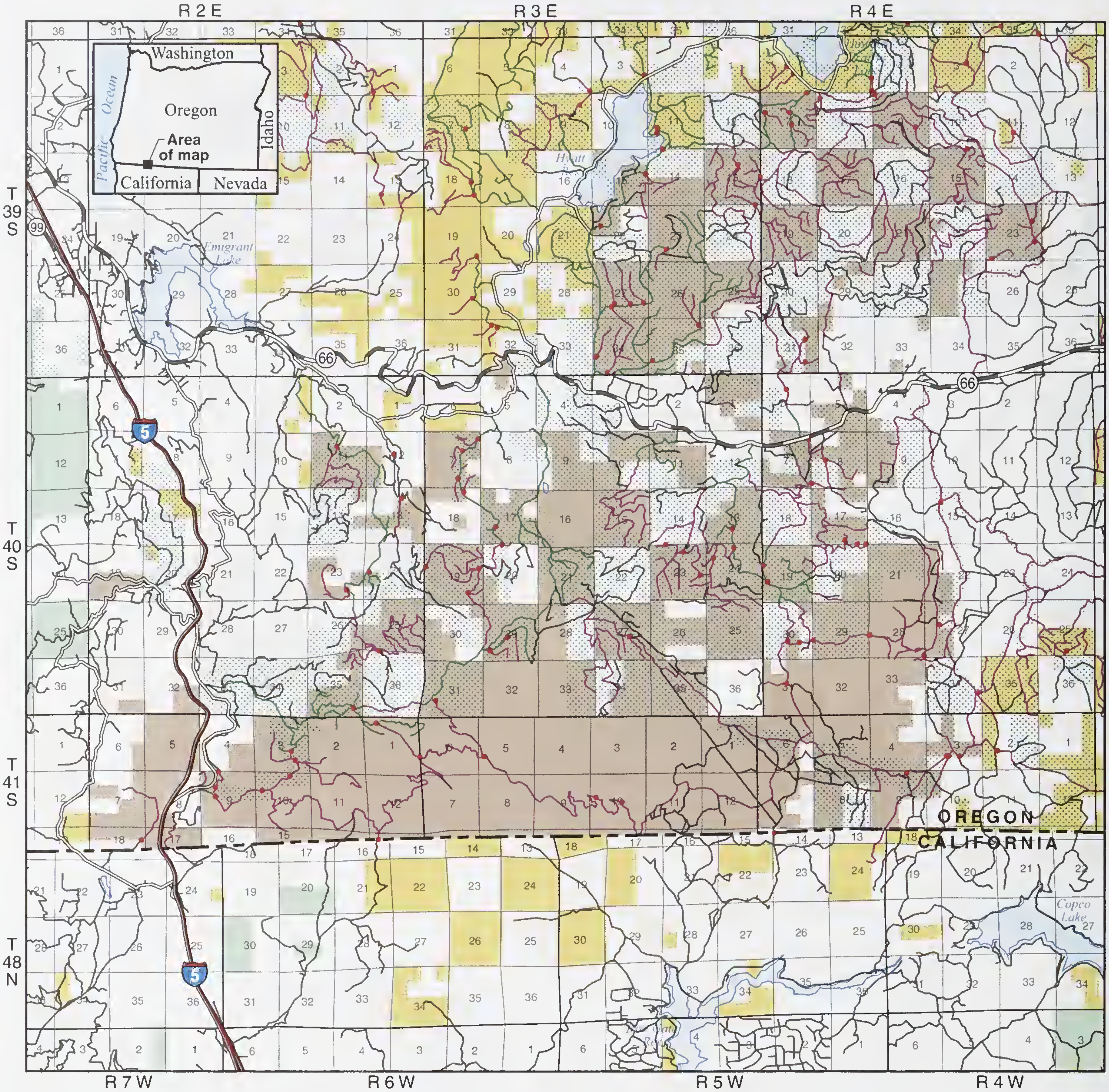
MAP 33

lzowada: ormd197/usr3/lz/natmonfinal/map33.aml

D11-05-2000:JR

Cascade-Siskiyou National Monument
Access Rights



2 0 2 4 Miles
2 0 2 4 Kilometers

N W E S

LEGEND

- Interstate Highway (public access)
- State Highway (public access)
- State or County Road (public access)
- BLM and Public Access Road
- BLM Access Road (no public access)
- Private or Non-Inventoried Road
- Reciprocal Right-of-Way Agreement
- Road Block
- Cascade-Siskiyou National Monument
- Other BLM Administered Land
- U.S. Forest Service
- Bureau of Reclamation
- Non-Federal Land

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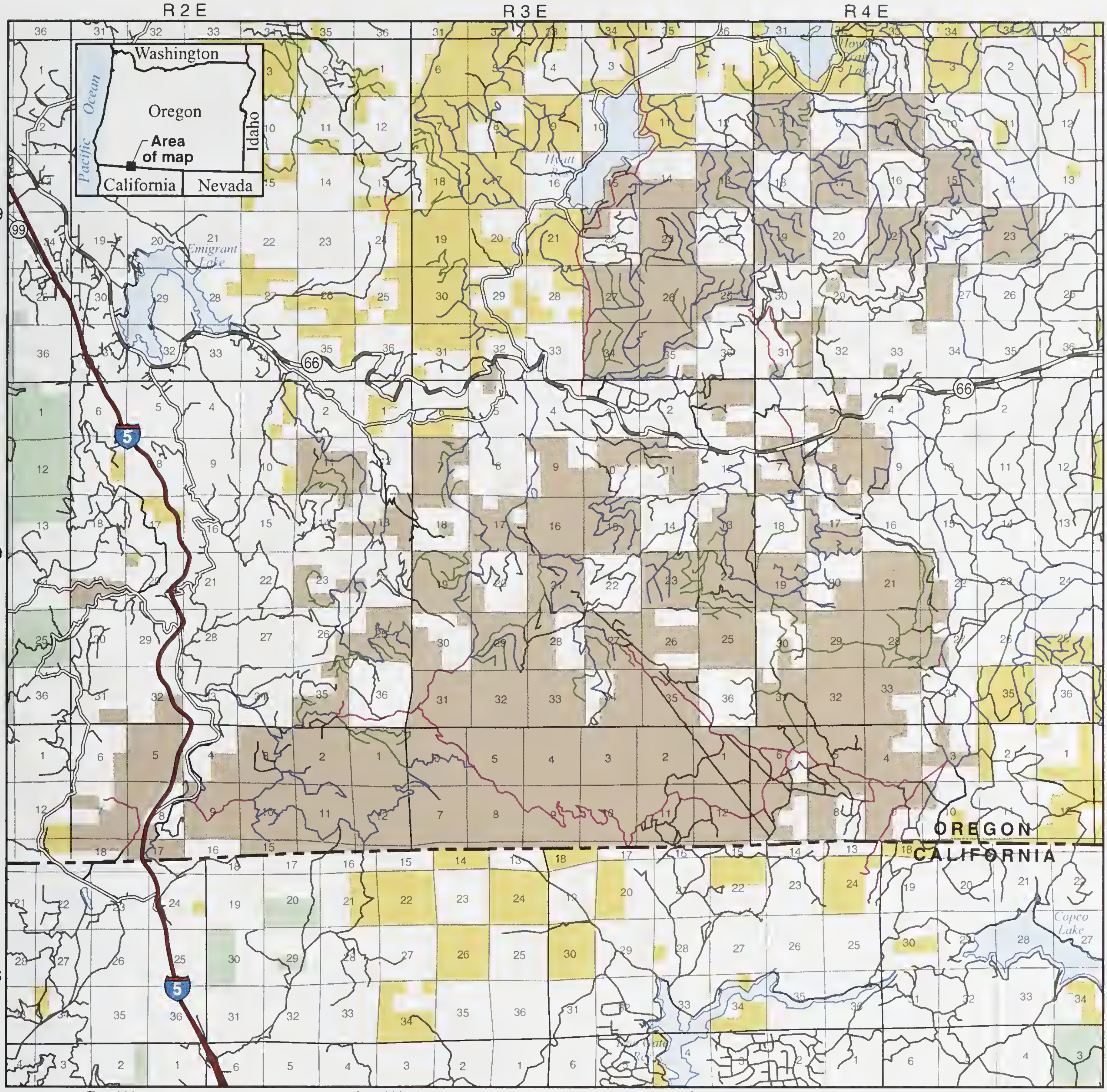
lzowada: ormd197/usr3/lz/natmonfinal/map34.aml

MAP 34

D11-05-2000:JR

Cascade-Siskiyou National Monument
Road Surface Conditions



2 0 2 4 Miles

2 0 2 4 Kilometers

N
W E
S

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LEGEND

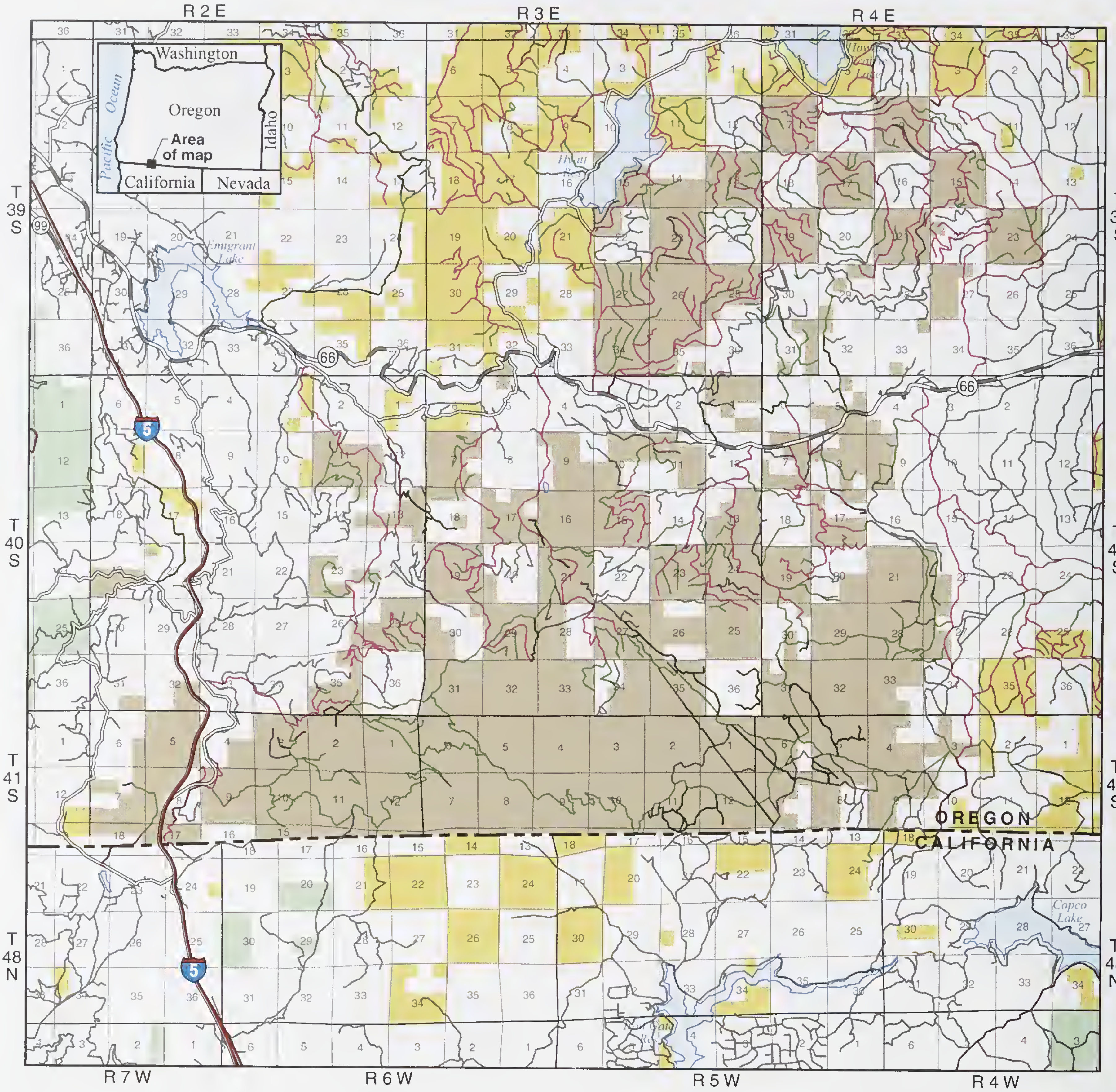
- Interstate Highway (public access)
- State Highway (public access)
- State or County Road (public access)
- Road with Good Surface Condition
- Road with Fair Surface Condition
- Road with Poor Surface Condition
- Private or Non-Inventoried Road
- Cascade-Siskiyou National Monument
- Other BLM Administered Land
- U.S. Forest Service
- Bureau of Reclamation
- Non-Federal Land

MAP 35

lzowada: ormd197/usr3/lz/natmonfinal/map35.aml

D11-05-2000:JR

Cascade-Siskiyou National Monument
Road Surface Type



2 0 2 4 Miles

2 0 2 4 Kilometers

N W E S

LEGEND

- Interstate Highway (public access)
- State Highway (public access)
- State or County Road (public access)
- Road with Rocked or BST Surface Type
- Road with Natural Surface Type
- Private or Non-Inventoried Road
- Cascade-Siskiyou National Monument
- Other BLM Administered Land
- U.S. Forest Service
- Bureau of Reclamation
- Non-Federal Land

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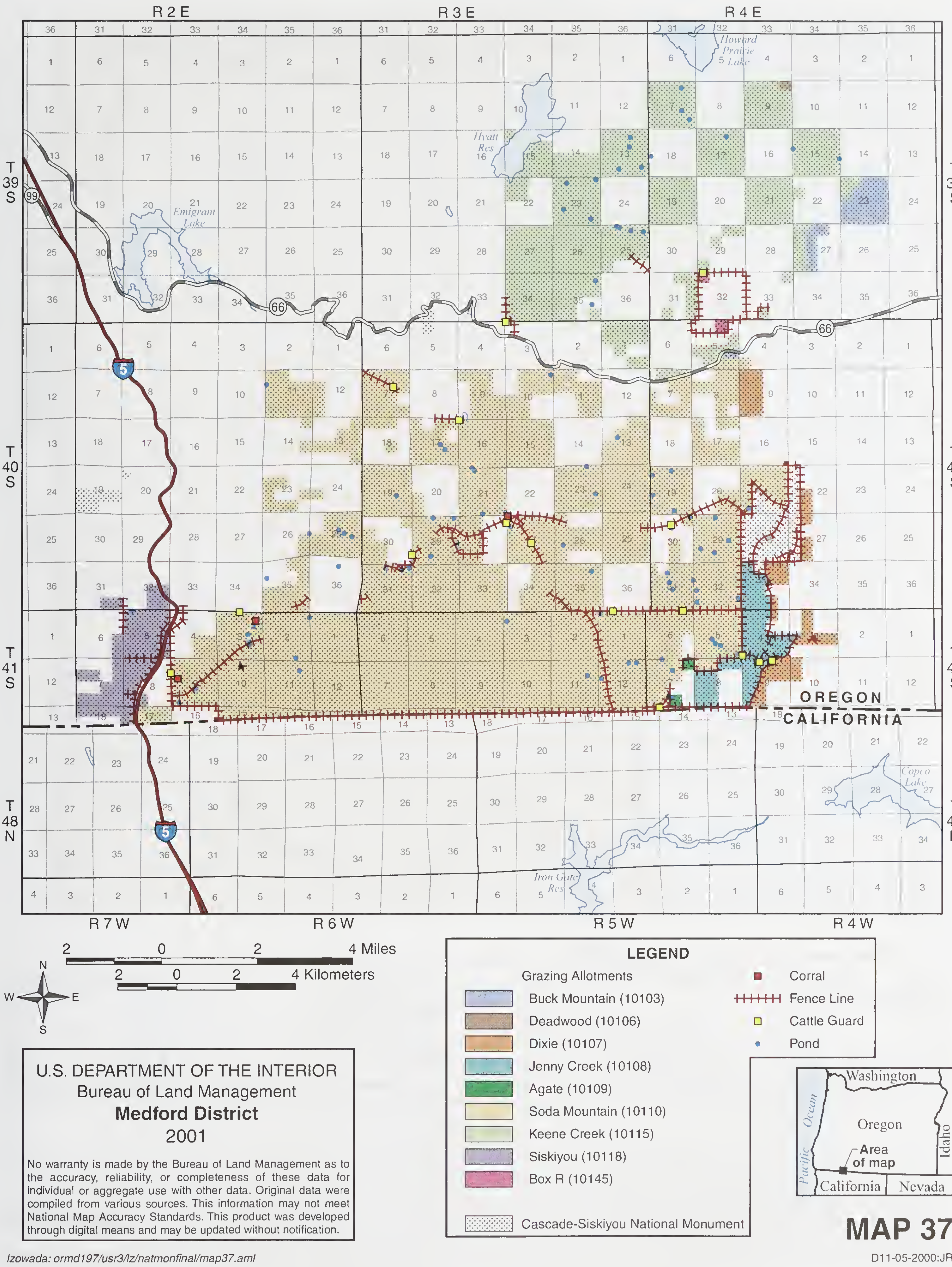
MAP 36

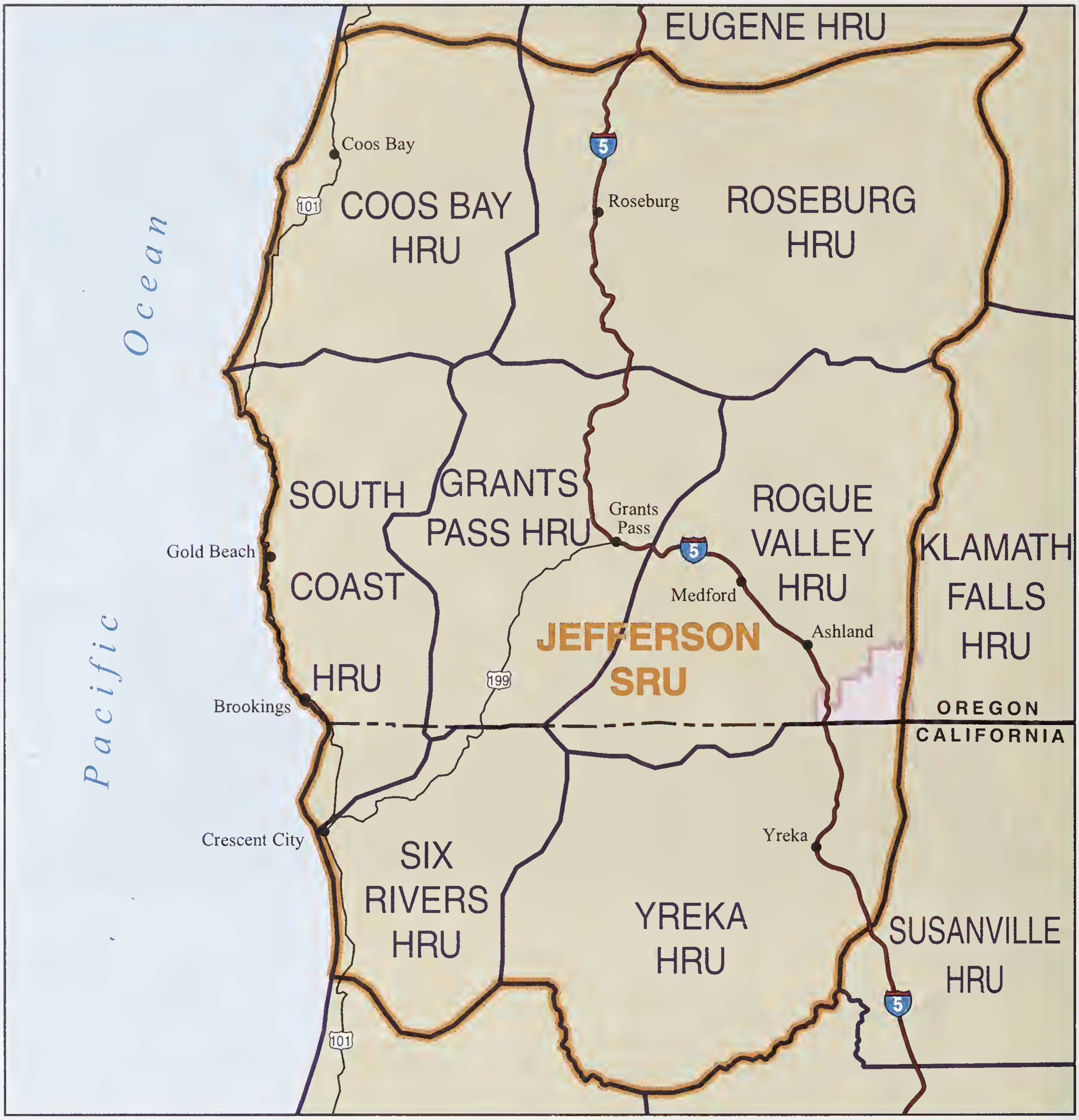
D11-05-2000:JR

lzowada: ormd197/usr3/lz/natmonfinal/map36.aml

Cascade-Siskiyou National Monument
Grazing Allotments and Rangeland Improvements



Cascade-Siskiyou National Monument
Social and Human Resources Units



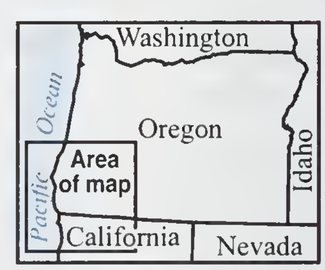
20 0 20 40 Miles

20 0 20 40 Kilometers

N
W E
S

LEGEND

- Jefferson Social Resource Unit (SRU) Boundary
- Human Resource Unit (HRU) Boundary
- Cascade-Siskiyou National Monument



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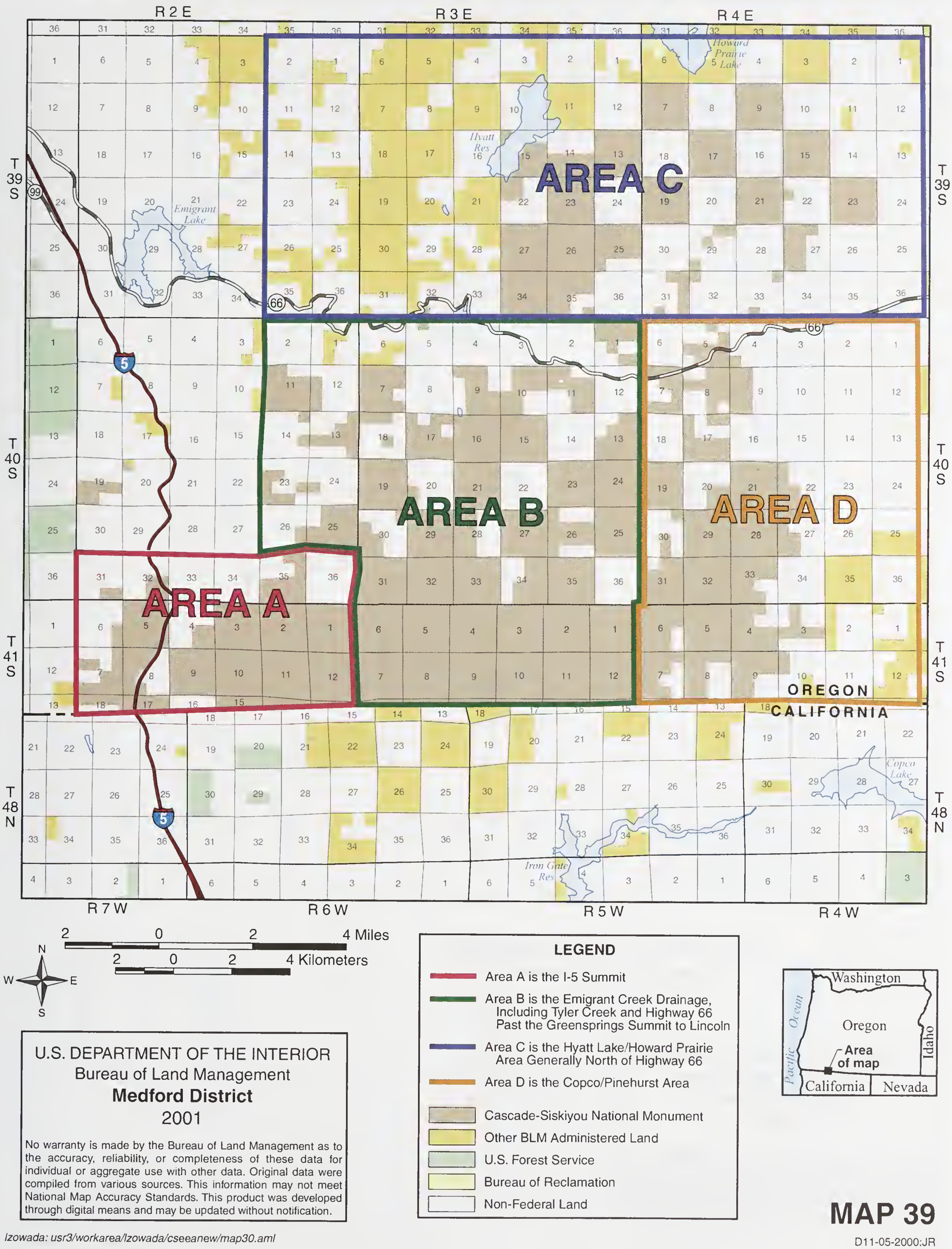
MAP 38

lzowada: usr3/workarea/lzowada/cseeanew/map29.aml

D11-05-2000:JR

Cascade-Siskiyou National Monument Socioeconomic Areas



Cascade-Siskiyou National Monument
Parks and Monuments in the Vicinity of Cascade-Siskiyou National Monument

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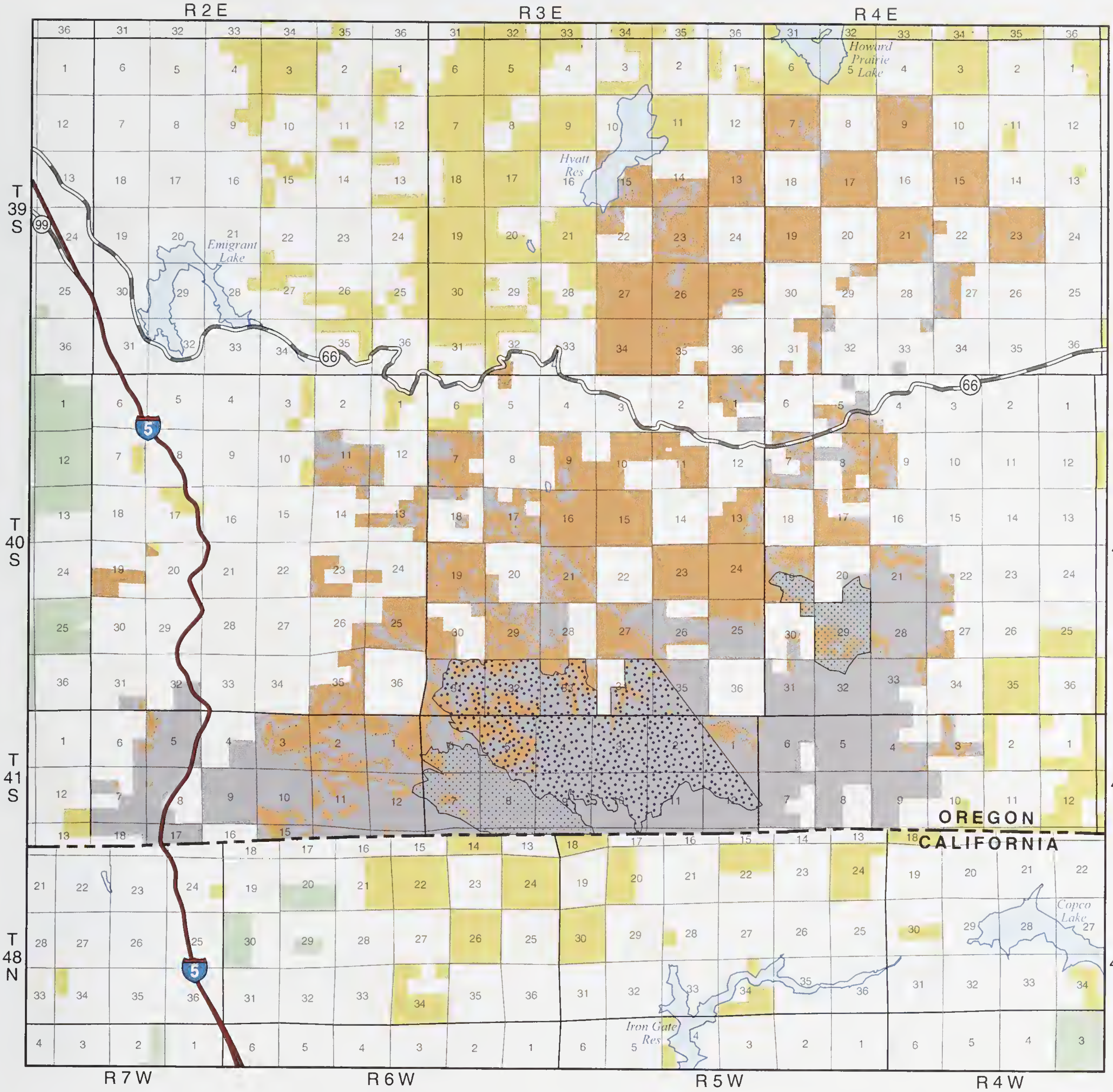
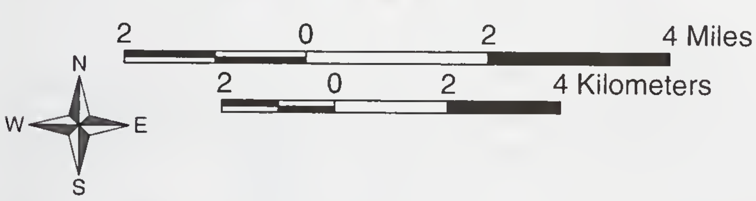
MAP 40

D11-05-2000:JR

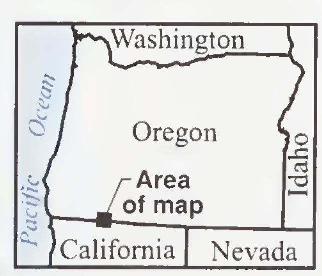
Cascade-Siskiyou National Monument Vegetation Emphasis Areas





LEGEND

Cascade-Siskiyou National Monument
- Old Growth Emphasis Area
- Diversity Emphasis Area
- Other BLM Administered Land
- U.S. Forest Service
- Bureau of Reclamation
- Non-Federal Land
- Oregon Gulch RNA
- Scotch Creek RNA
- Wilderness Study Area



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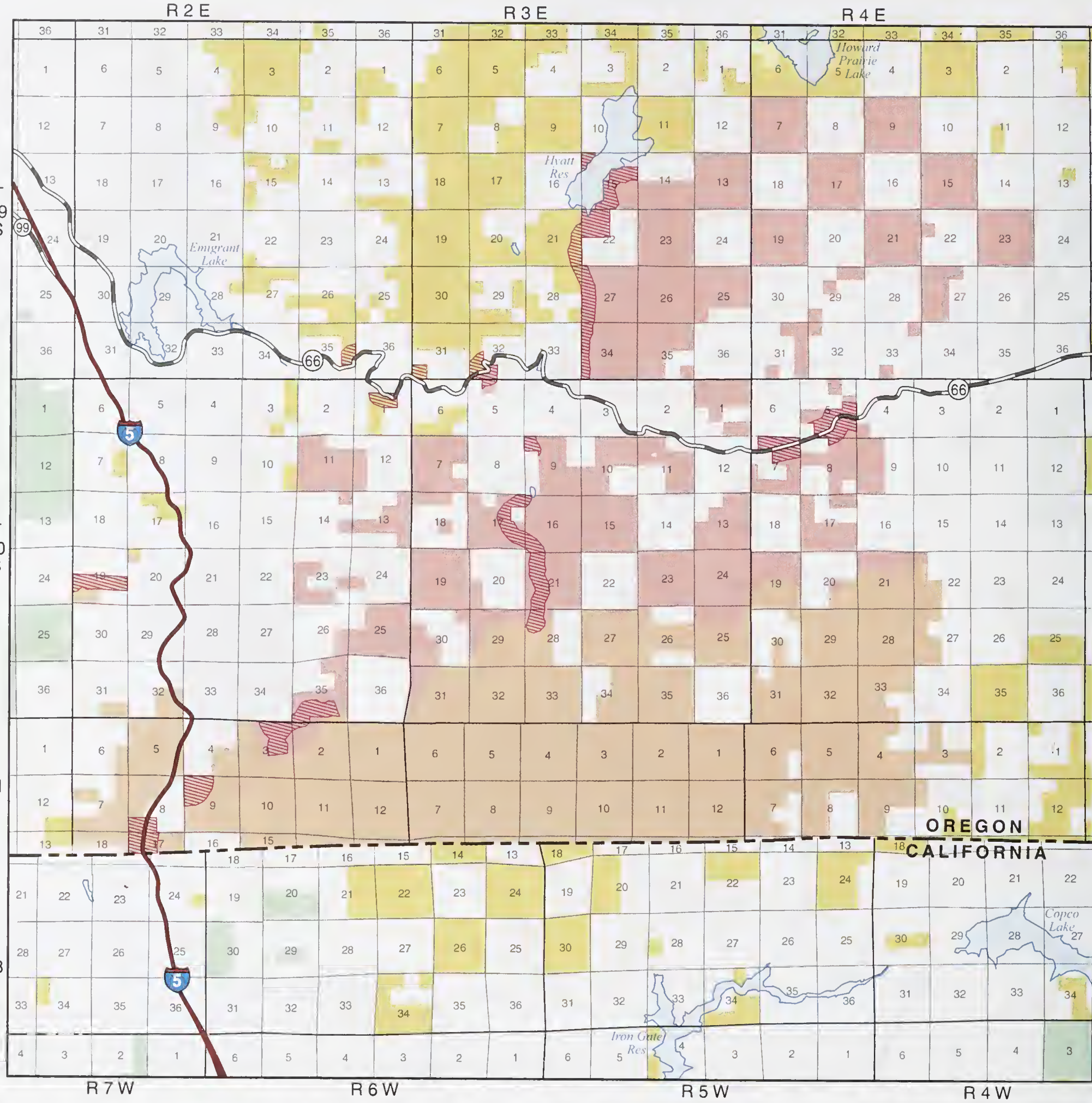
MAP 41

D11-05-2000:JR

lzowada: ormd197/usr3/lz/natmonfinal/map41.aml

Cascade-Siskiyou National Monument
Management Zones



2 0 2 4 Miles

2 0 2 4 Kilometers

N
W E
S

LEGEND

- Primary Recreation Use Zone
- Cascade-Siskiyou National Monument
  - North Zone
  - South Zone
- Other BLM Administered Land
- U.S. Forest Service
- Bureau of Reclamation
- Non-Federal Land

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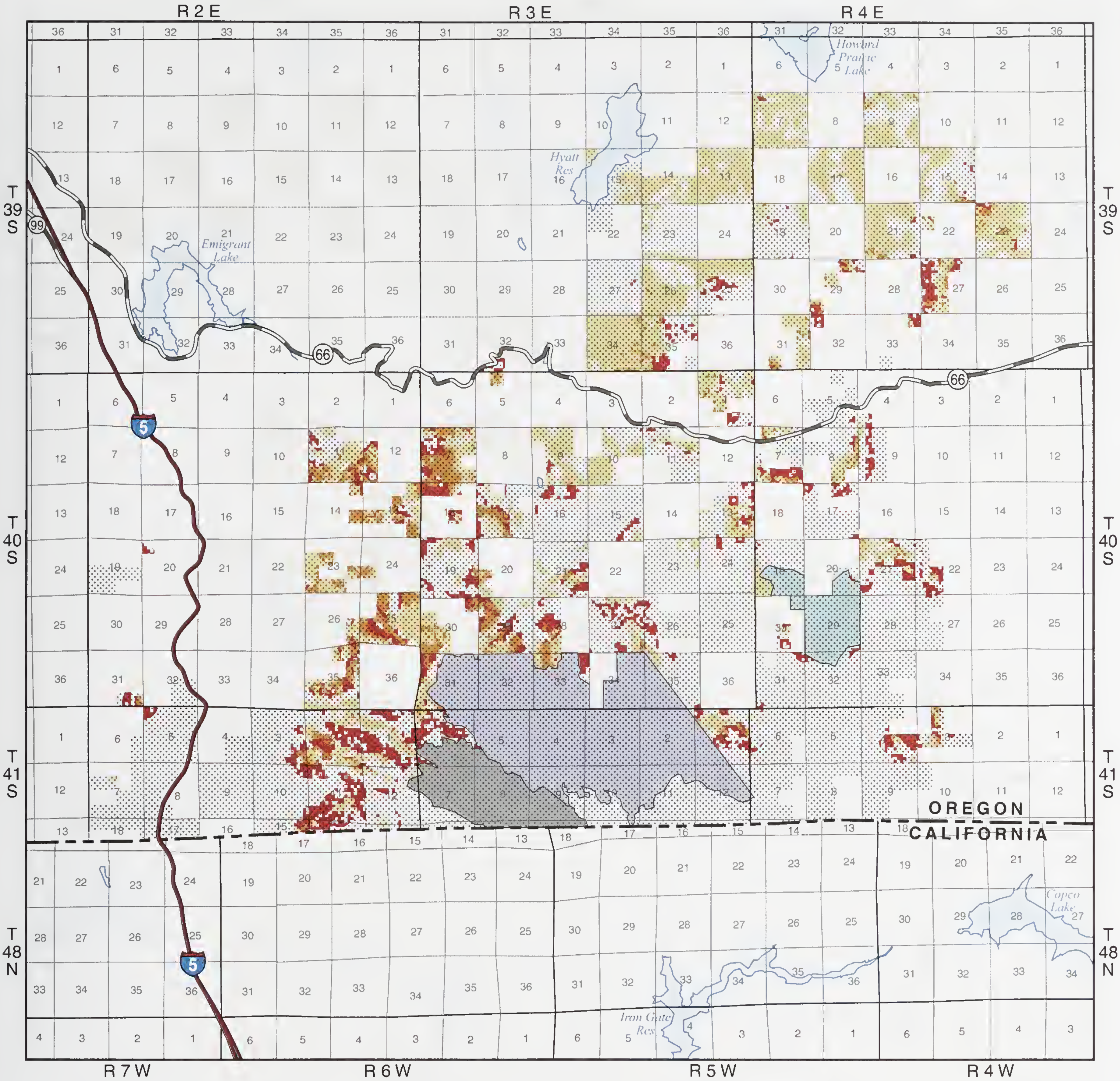
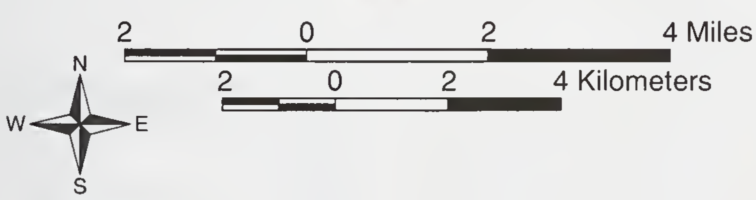
MAP 42

lzowada: usr3/workarea/lz/natmonument/reczones.aml

D11-05-2000:JR

Cascade-Siskiyou National Monument
High Fire Hazard within 1/4 mile of McKelvie Habitat 1 and 2





LEGEND

McKelvie Habitat 1 and 2 (11,500 acres)
- High Fire Hazard (2,168 acres)
- Other (9,332 acres)

High Fire Hazard within 1/4 Mile of McKelvie Habitat 1 and 2 (3,955 acres)

Cascade-Siskiyou National Monument

Oregon Gulch RNA

Scotch Creek RNA

Wilderness Study Area

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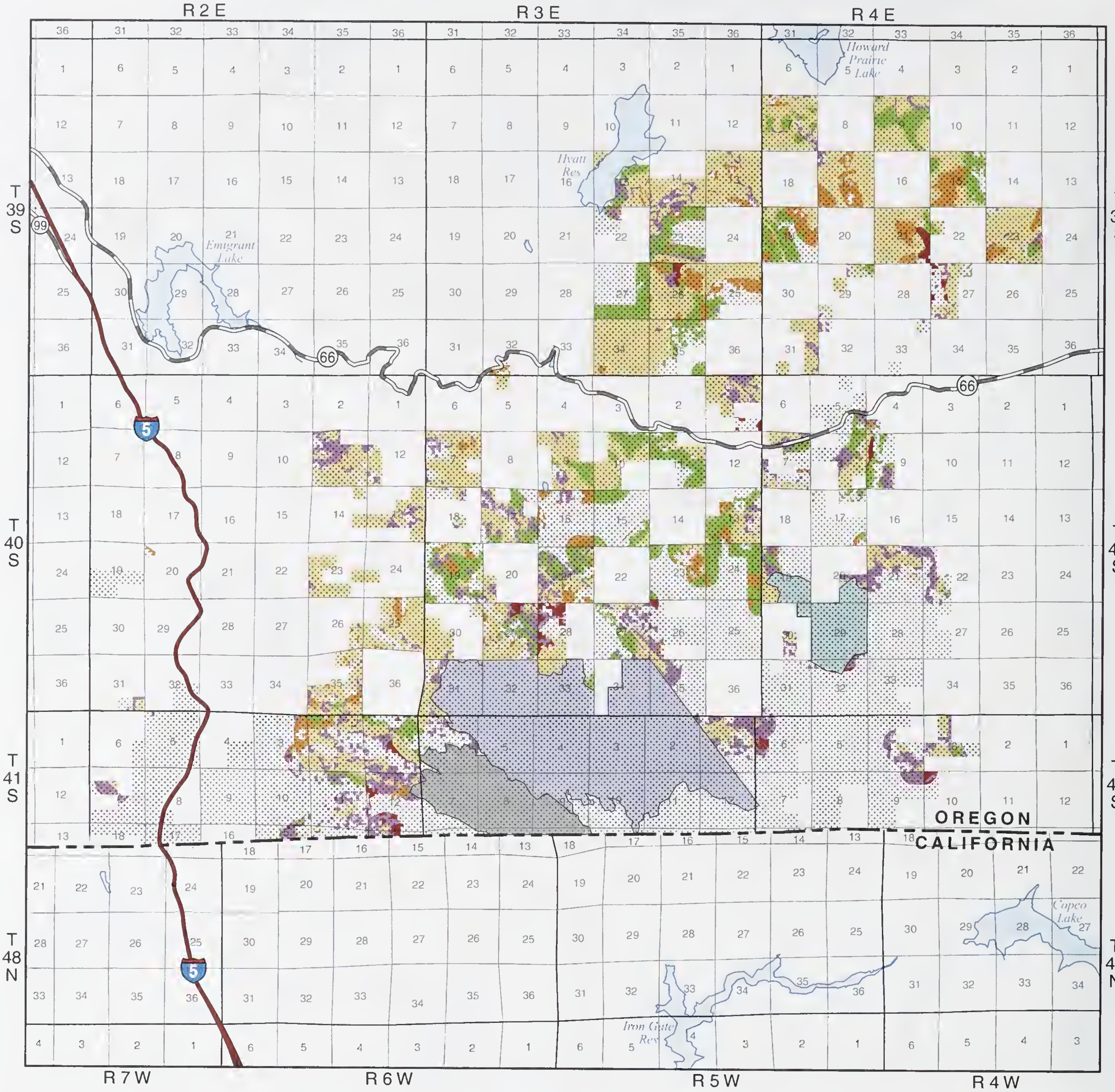
Bureau of Land Management
Medford District
2001

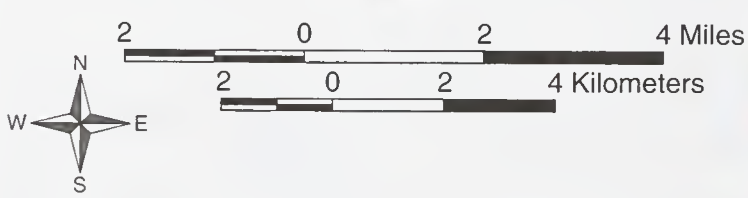
MAP 43

lzowada: usr3/workarea/rhertz/monument/newhighhaz.aml

D11-05-2000:JR

Cascade-Siskiyou National Monument
Moderate Fire Hazard within 1/4 mile of McKelvie Habitat 1 and 2





LEGEND

- McKelvie Habitat 1 and 2 (11,500 acres)
- McKelvie Habitat 3 in Moderate Hazard within 1/4 Mile of McKelvie Habitat 1 and 2 (1,999 acres)
- McKelvie Habitat 4 in Moderate Hazard within 1/4 Mile of McKelvie Habitat 1 and 2 (4,216 acres)
- McKelvie Habitat 5 in Moderate Hazard within 1/4 Mile of McKelvie Habitat 1 and 2 (4,423 acres)
- McKelvie Habitat 6 in Moderate Hazard within 1/4 Mile of McKelvie Habitat 1 and 2
- Cascade-Siskiyou National Monument
- Oregon Gulch RNA
- Scotch Creek RNA
- Wilderness Study Area

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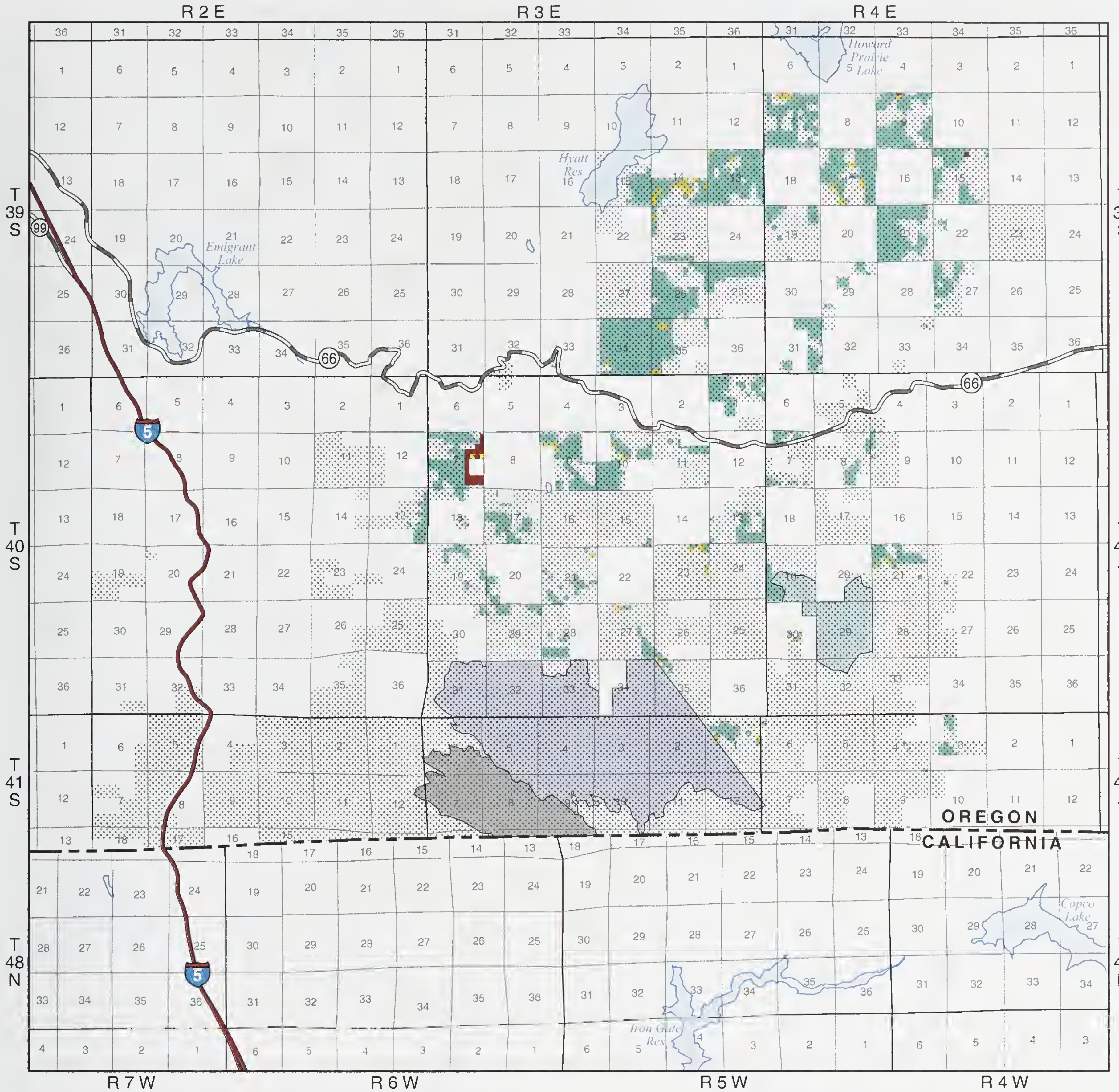
Medford District
2001

MAP 44

rhertz: usr3/workarea/rhertz/monument/modhaz.aml

D11-05-2000:JR

Cascade-Siskiyou National Monument
Predicted Fire Behavior in McKelvie Habitat 1 and 2



2 0 2 4 Miles

2 0 2 4 Kilometers

N
W E
S

LEGEND

- McKelvie 1 and 2, Flames Less than 4 feet
- McKelvie 1 and 2, Flames 4 to 8 feet
- McKelvie 1 and 2, Flames Greater than 8 feet
- Cascade-Siskiyou National Monument
- Oregon Gulch RNA
- Scotch Creek RNA
- Wilderness Study Area

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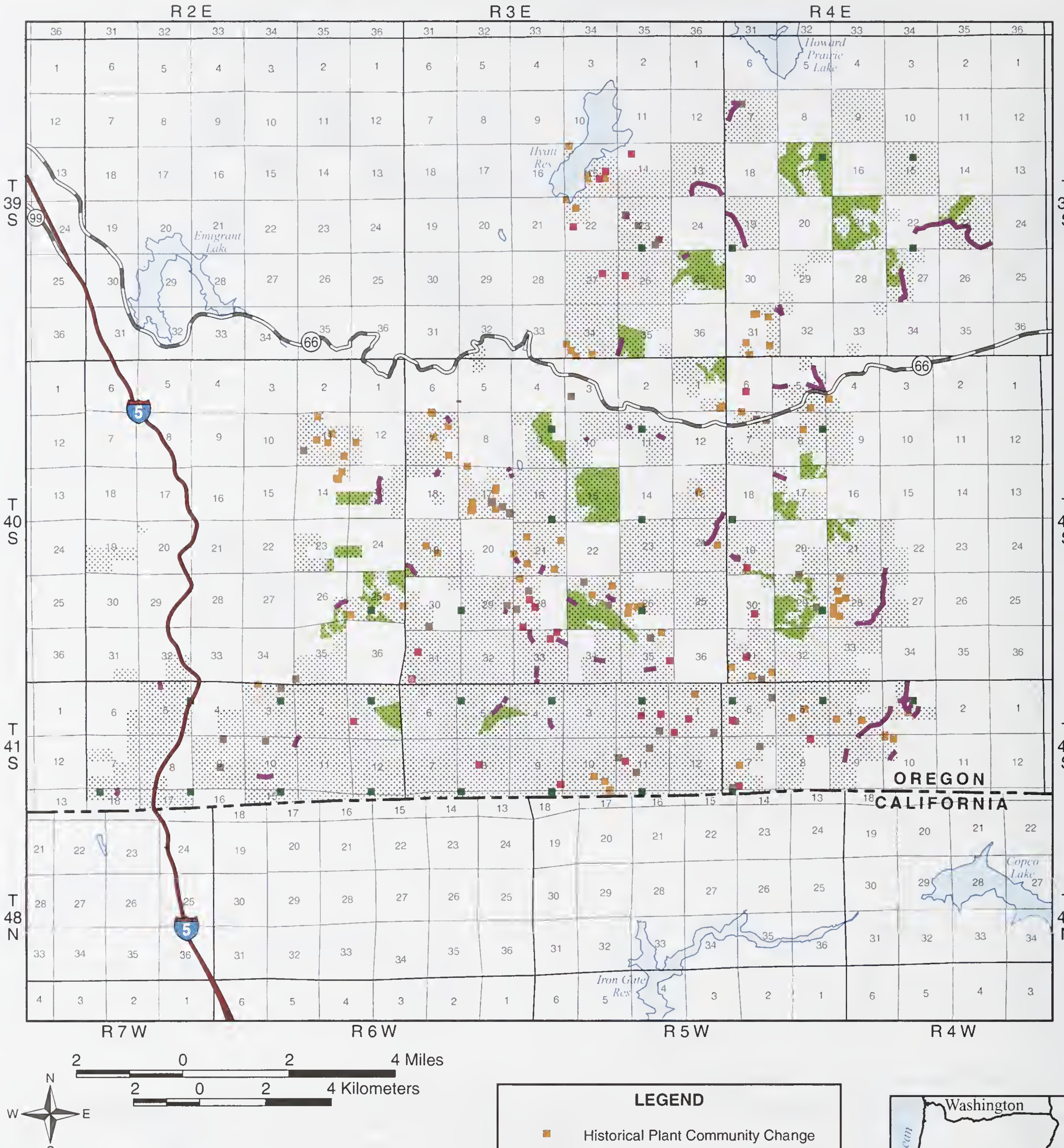
MAP 45

rhertz: lsr/map11new.aml

D11-05-2000:JR

Cascade-Siskiyou National Monument Monitoring Sites



LEGEND

- Historical Plant Community Change
- Rangeland Monitoring
- Historic Wildlife Transects
- Forest Health Plots
- Forest Health
- Riparian / Fish Habitat Monitoring
- Cascade-Siskiyou National Monument

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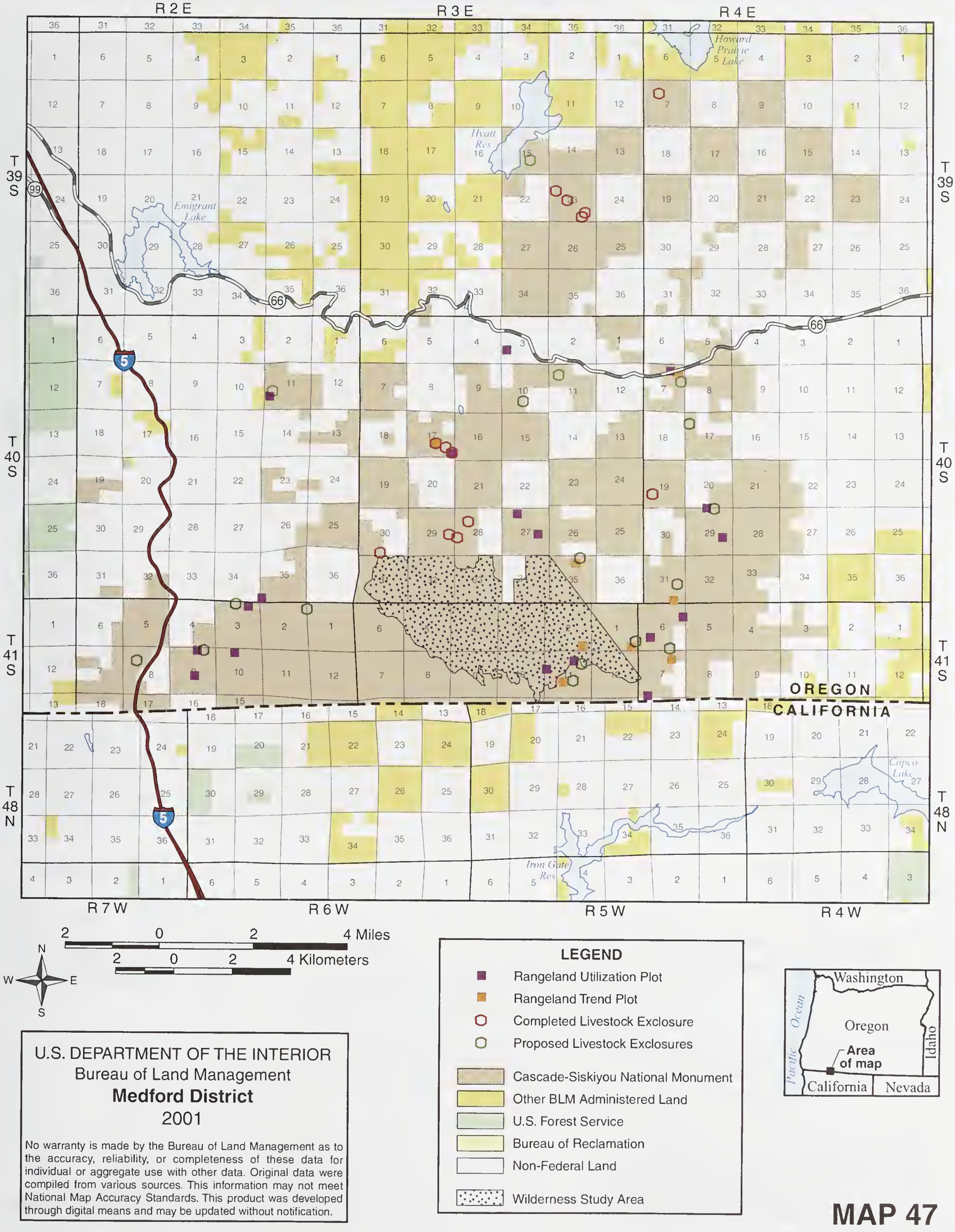
Medford District
2001

MAP 46

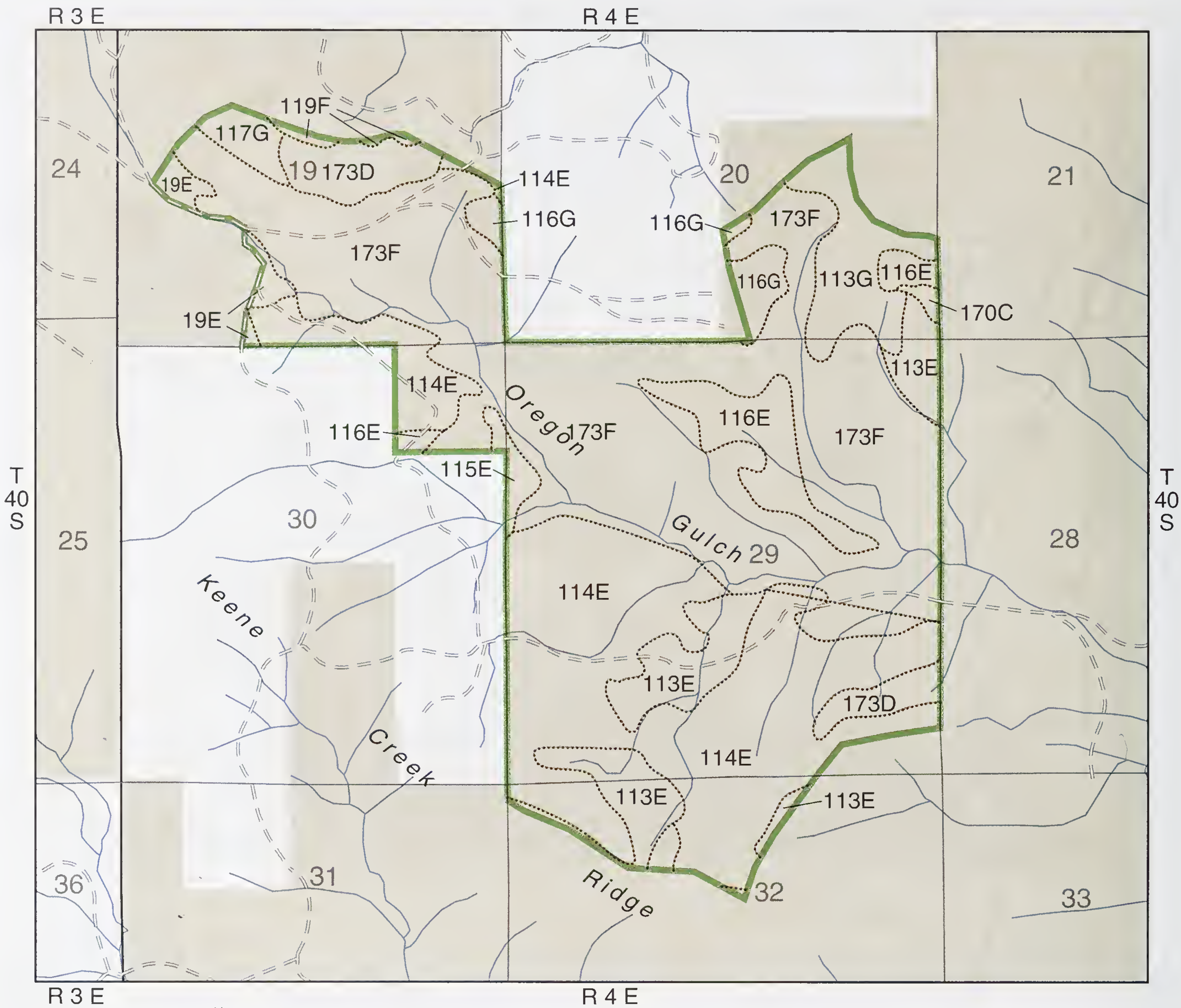
rhertz: usr3/workarea/rhertz/monument/map46.aml

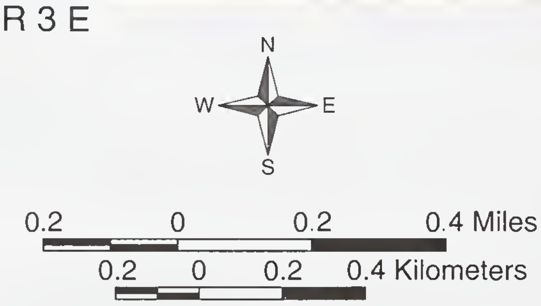
D11-05-2000:JR

Cascade-Siskiyou National Monument
Rangeland Plots and Livestock Exclosures



Cascade-Siskiyou National Monument
Soils of Oregon Gulch Research Natural Area





LEGEND

Soil Type Boundary--see Appendix DD for Soil Description

Oregon Gulch RNA Boundary

Unimproved Road

Public Lands

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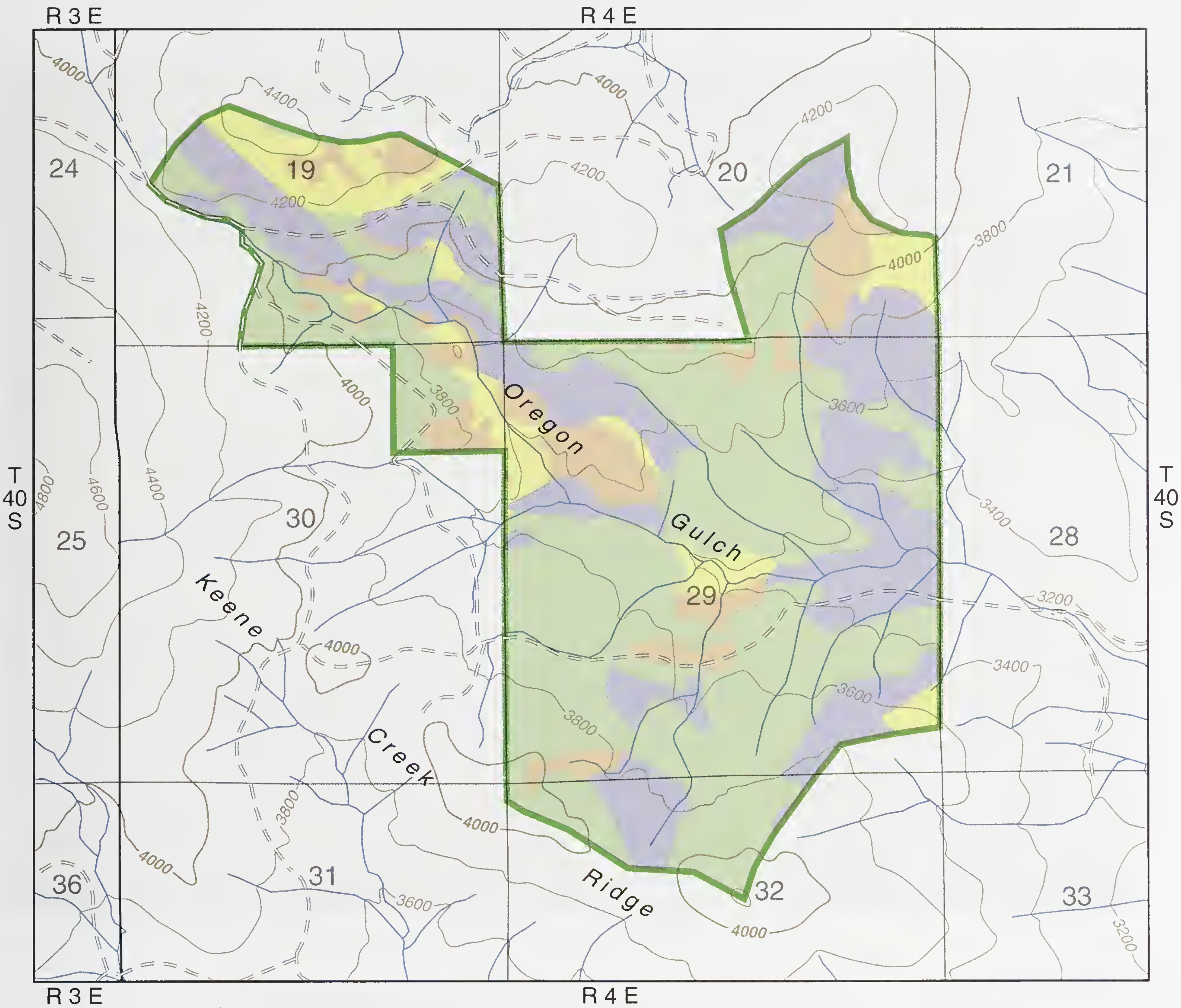
MAP 48

phosten: arcwork/soils_orgrna.apr

D11-05-2000:JR

Cascade-Siskiyou National Monument
Distribution of Plant Communities of Oregon Gulch Research Natural Area



LEGEND

Plant Communities

- Western Juniper/White Oak
- White Oak/Wedgeleaf Ceanothus
- White Oak/Ponderosa Pine
- Mixed Conifer/California Black Oak

- Oregon Gulch RNA Boundary
- Unimproved Road
- Elevation Contour, Interval 200 Feet

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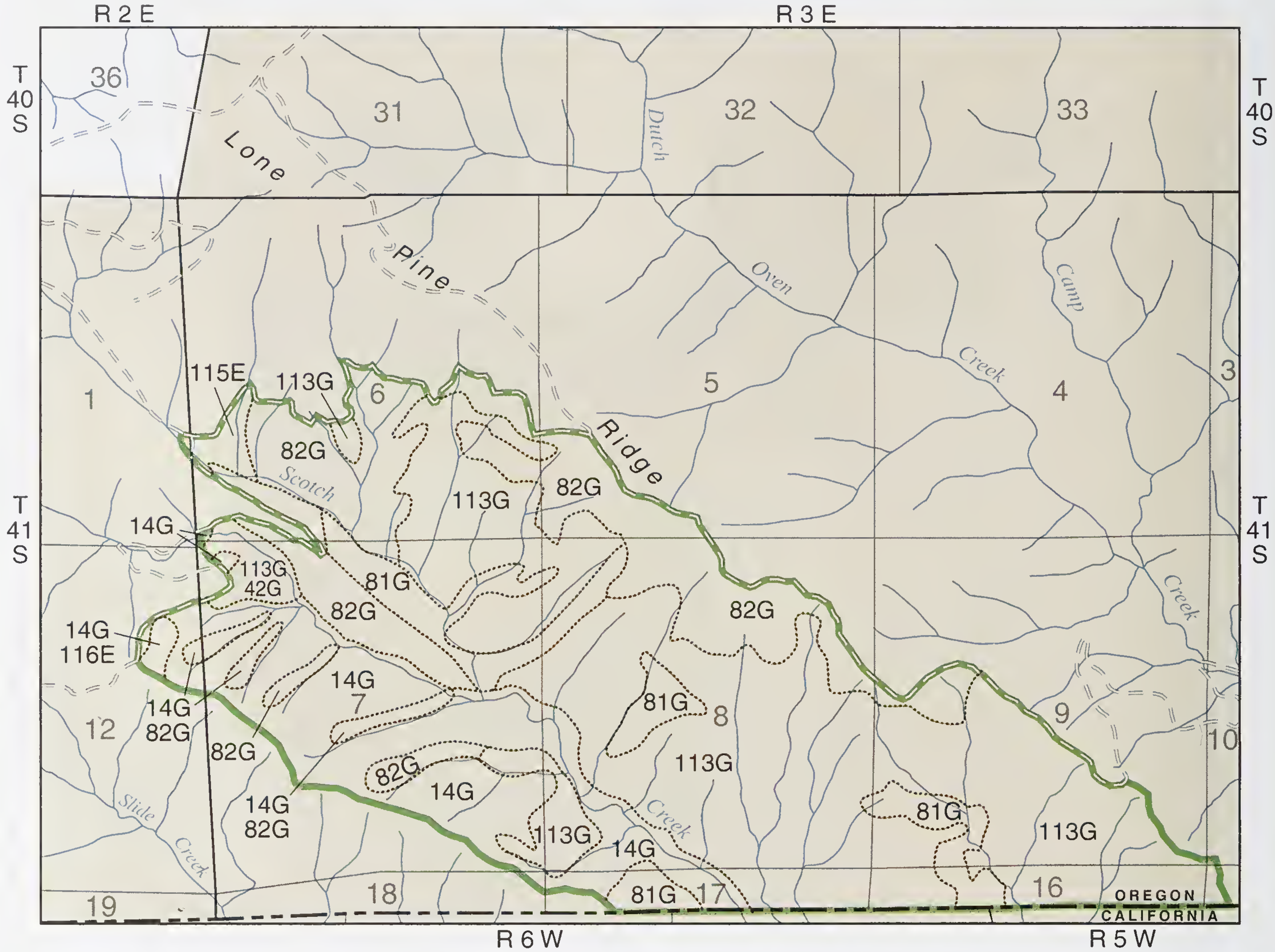
MAP 49

phosten: arcwork/eis_maripveg.apr

D11-05-2000:JR

Cascade-Siskiyou National Monument
Soils of Scotch Creek RNA



0.5 0 0.5 1Mile

0.5 0 0.5 1 Kilometer

LEGEND

- Soil Type Boundary--see Appendix EE for Soil Description
- Scotch Creek RNA Boundary
- Unimproved Road
- Public Lands

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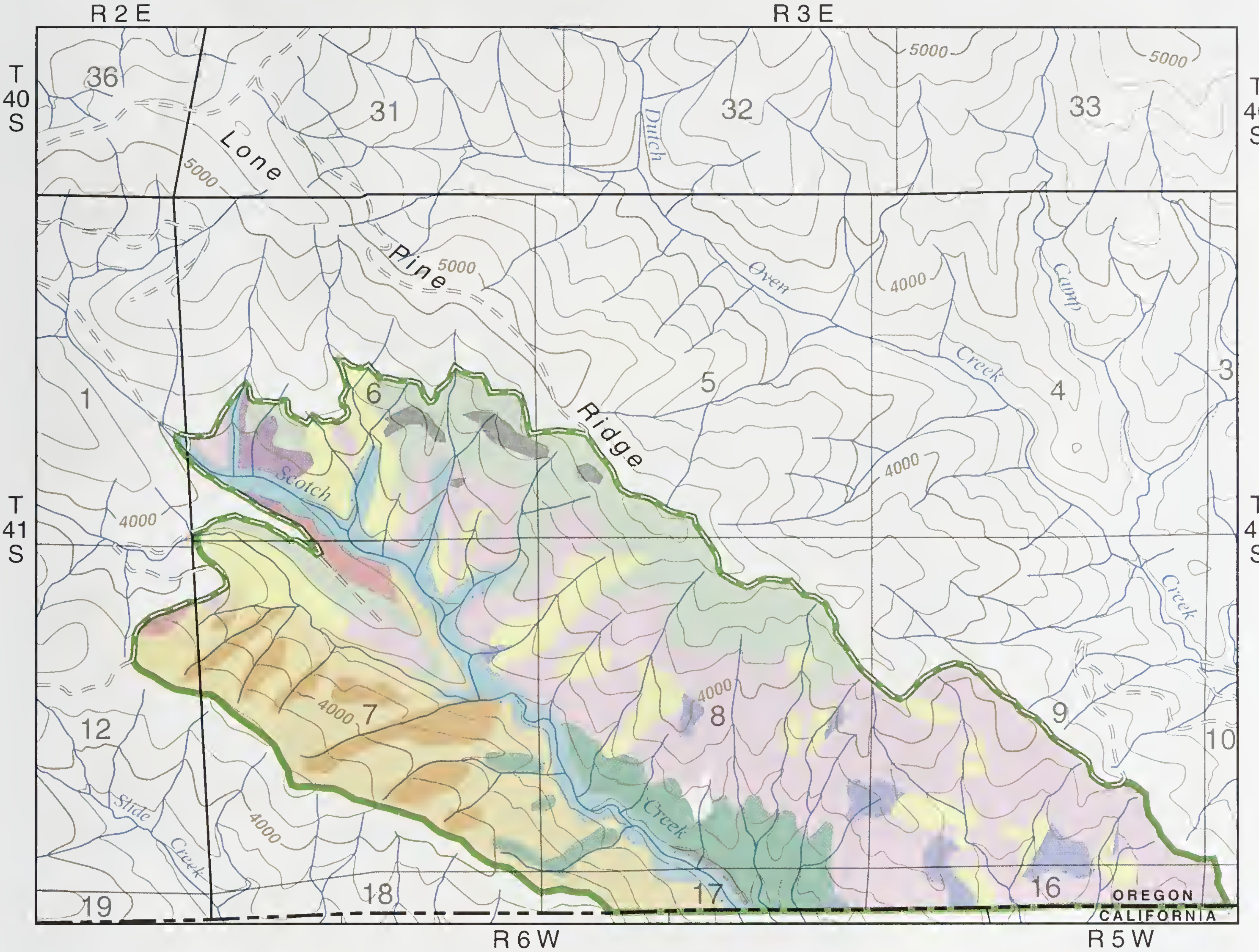
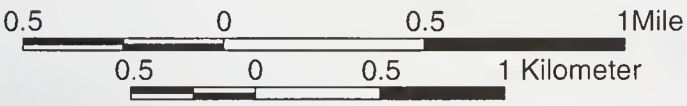
phosten: arcwork/soils_orgscotch.apr

MAP 50

D11-05-2000:JR

Cascade-Siskiyou National Monument
Distribution of Plant Communities of Scotch Creek RNA





LEGEND

Scotch Creek RNA Plant Communities

- Lower Slope Grassland/Rock Outcrop Complex
- Middle Slope Grassland/White Oak Woodland Complex
- White Oak/Klamath Plum-Wedgeleaf Ceanothus Chaparral
- White Oak/Hollyleaved Barberry (tall) Woodland
- Riparian Bigleaf Maple-White Oak Woodland
- White Oak/Birchleaf Mountain Mahogany-Klamath Plum Chaparral Complex (Lone Pine Ridge)
- White Fir/Hollyleaved Barberry (dwarf) Association
- Douglas-Fir/Serviceberry-Hollyleaved Barberry (tall)
- White Oak/Birchleaf Mountain Mahogany-Common Snowberry Chaparral Complex (Slide Ridge)
- Douglas-Fir-White Oak Potential in Slide Ridge Complex
- Unknown
- Rock Outcrop

- Scotch Creek RNA Boundary
- Unimproved Road
- Elevation Contour, Interval 200 Feet

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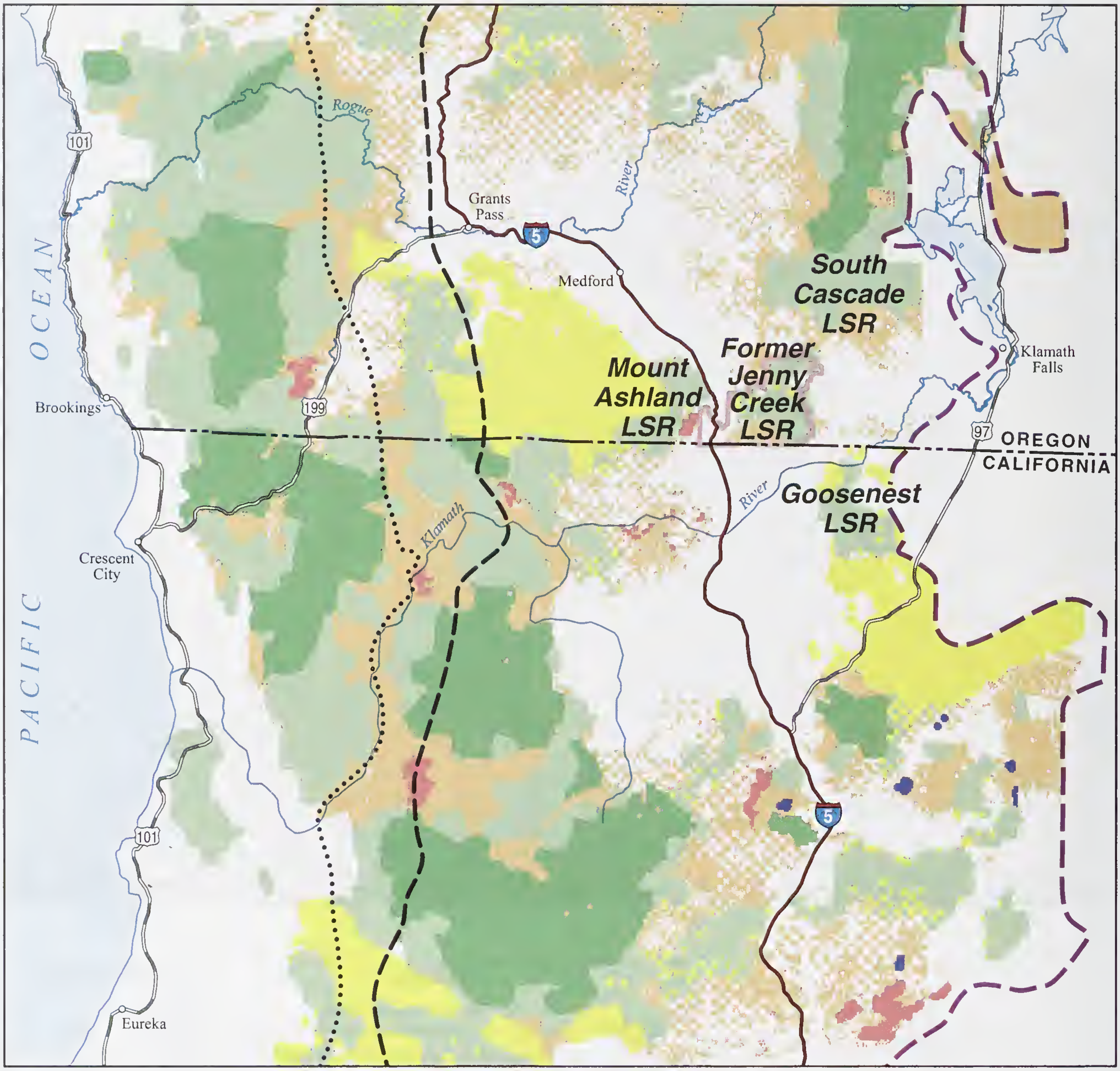
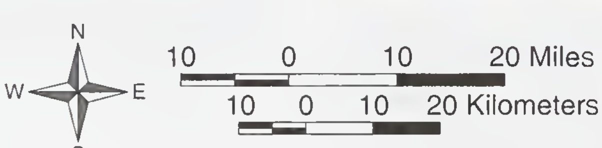
MAP 51

photen: arcwork/eis_maripveg.apr

D11-05-2000:JR

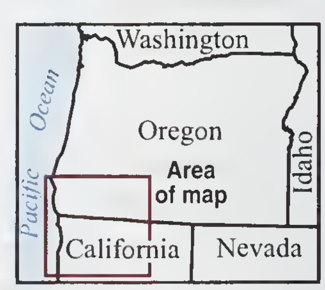
Cascade-Siskiyou National Monument
Physical Relationship Between Former Jenny Creek LSR and Neighboring LSRs





LEGEND

- Congressionally Reserved Area
- Late Successional Reserve
- Managed Late Successional Area
- Administratively Withdrawn Area
- Adaptive Management Area
- Matrix
- Eastern Limit of the Northern Spotted Owl Range
- Eastern Limit of the Marbled Murrelet (Zone 1)
- Eastern Limit of the Marbled Murrelet (Zone 2)
- Cascade-Siskiyou National Monument Boundary



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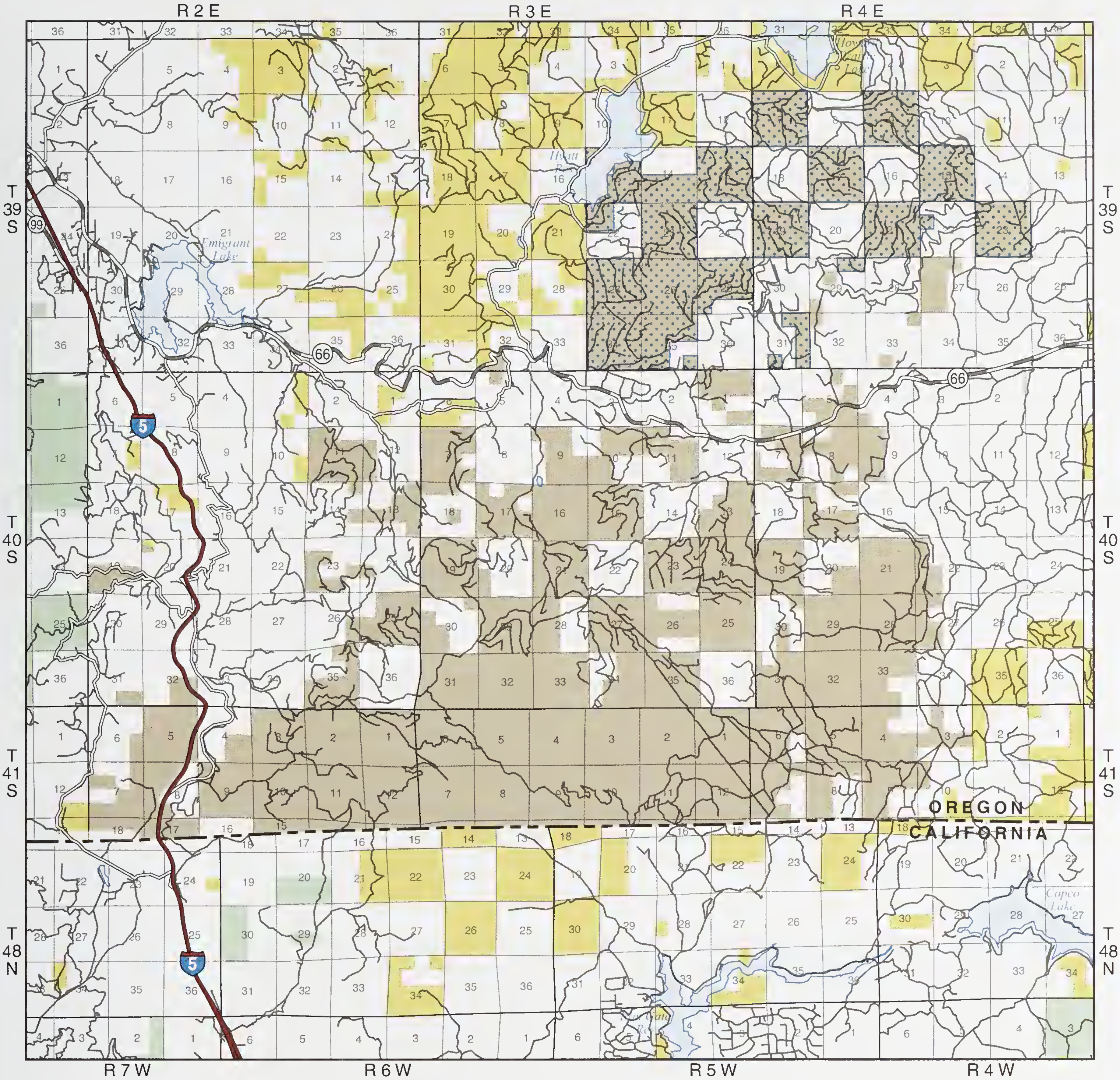
MAP 52

D11-05-2000:JR

Cascade-Siskiyou National Monument
Area Where Roads Are Currently Open to Snowmobile Use



2 0 2 4 Miles

2 0 2 4 Kilometers

N W E S

LEGEND

- Area Where Public Roads Are Currently Open to Snowmobile Use (No snowmobiles off of roads)
- Cascade-Siskiyou National Monument (Closed to snowmobiles)
- Other BLM Administered Land
- U.S. Forest Service
- Bureau of Reclamation
- Non-Federal Land
- Interstate Highway
- State Highway
- State or County Road
- Other Road

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MAP 53

lzowada: ormd197/usr3/lz/natmonfinal/map53.aml

D11-05-2000:JR

Appendix A - Presidential Proclamation

June 9, 2000

ESTABLISHMENT OF THE CASCADE-SISKIYOU NATIONAL MONUMENT
BY THE PRESIDENT OF THE UNITED STATES OF AMERICA
A PROCLAMATION

With towering fir forests, sunlit oak groves, wildflower-strewn meadows, and steep canyons, the Cascade-Siskiyou National Monument is an ecological wonder, with biological diversity unmatched in the Cascade Range. This rich enclave of natural resources is a biological crossroads -- the interface of the Cascade, Klamath, and Siskiyou ecoregions, in an area of unique geology, biology, climate, and topography.

The monument is home to a spectacular variety of rare and beautiful species of plants and animals, whose survival in this region depends upon its continued ecological integrity. Plant communities present a rich mosaic of grass and shrublands, Garry and California black oak woodlands, juniper scablands, mixed conifer and white fir forests, and wet meadows. Stream bottoms support broad-leaf deciduous riparian trees and shrubs. Special plant communities include rosaceous chaparral and oak-juniper woodlands. The monument also contains many rare and endemic plants, such as Greene's Mariposa lily, Gentner's fritillary, and Bellinger's meadowfoam.

The monument supports an exceptional range of fauna, including one of the highest diversities of butterfly species in the United States. The Jenny Creek portion of the monument is a significant center of fresh water snail diversity, and is home to three endemic fish species, including a long-isolated stock of redband trout. The monument contains important populations of small mammals, reptile and amphibian species, and ungulates, including important winter habitat for deer. It also contains old growth habitat crucial to the threatened Northern spotted owl and numerous other bird species such as the western bluebird, the western meadowlark, the pileated woodpecker, the flammulated owl, and the pygmy nuthatch.

The monument's geology contributes substantially to its spectacular biological diversity. The majority of the monument is within the Cascade Mountain Range. The western edge of the monument lies within the older Klamath Mountain geologic province. The dynamic plate tectonics of the area, and the mixing of igneous, metamorphic, and sedimentary geological formations, have resulted in diverse lithologies and soils. Along with periods of geological isolation and a range of environmental conditions, the complex geologic history of the area has been instrumental in producing the diverse vegetative and biological richness seen today.

One of the most striking features of the Western Cascades in this area is Pilot Rock, located near the southern boundary of the monument. The rock is a volcanic plug, a remnant of a feeder vent left after a volcano eroded away, leaving an outstanding example of the inside of a volcano. Pilot Rock has sheer, vertical basalt faces up to 400 feet above the talus slope at its base, with classic columnar jointing created by the cooling of its andesite composition.

The Siskiyou Pass in the southwest comer of the monument contains portions of the Oregon/California Trail, the region's main north/south travel route first established by Native Americans in prehistoric times, and used by Peter Skene Ogden in his 1827 exploration for the Hudson's Bay Company.

Section 2 of the Act of June 8, 1906 (34 Stat. 225, 16 U.S.C. 43 1), authorizes the President, in his discretion, to declare by public proclamation historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest that are situated upon the lands owned or controlled by the Government of the United States to be national monuments, and to reserve as a part thereof parcels of land, the limits of which in all cases shall be confined to the smallest area compatible with the proper care and management of the objects to be protected.

WHEREAS it appears that it would be in the public interest to reserve such lands as a national monument to be known as the Cascade-Siskiyou National Monument:

NOW, THEREFORE, I, WILLIAM J. CLINTON, President of the United States of America, by the authority vested in me by section 2 of the Act of June 8, 1906 (34 Stat. 225, 16 U.S.C. 43 1), do proclaim that there are hereby set apart and reserved as the Cascade-Siskiyou National Monument, for the purpose of protecting the objects identified above, all lands and interests in lands owned or controlled by the United States within the boundaries of the area described on the map entitled "Cascade-Siskiyou National Monument" attached to and forming a part of this proclamation. The Federal land and interests in land reserved consist of approximately 52,000 acres, which is the smallest area compatible with the proper care and management of the objects to be protected.

All Federal lands and interests in lands within the boundaries of this monument are hereby appropriated and withdrawn from all forms of entry, location, selection, sale, or leasing or other disposition under the public land laws, including but not limited to withdrawal from location, entry, and patent under the mining laws, and from disposition under all laws relating to mineral and geothermal leasing, other than by exchange that furthers the protective purposes of the monument.

There is hereby reserved, as of the date of this proclamation and subject to valid existing rights, a quantity of water sufficient to fulfill the purposes for which this monument is established. Nothing in this reservation shall be construed as a relinquishment or reduction of any water use or rights reserved or appropriated by the United States on or before the date of this proclamation.

The commercial harvest of timber or other vegetative material is prohibited, except when part of an authorized science-based ecological restoration project aimed at meeting protection and old growth enhancement objectives. Any such project must be consistent with the purposes of this proclamation. No portion of the monument shall be considered to be suited for timber production, and no part of the monument shall be used in a calculation or provision of a sustained yield of timber. Removal of trees from within the monument area may take place only if clearly needed for ecological restoration and maintenance or public safety.

For the purpose of protecting the objects identified above, the Secretary of the Interior shall prohibit all motorized and mechanized vehicle use off road and shall close the Schoheim Road, except for emergency or authorized administrative purposes. Lands and interests in lands within the monument not owned by the United States shall be reserved as a part of the monument upon acquisition of title thereto by the United States.

The Secretary of the Interior shall manage the monument through the Bureau of Land Management, pursuant to applicable legal authorities (including, where applicable, the Act of August 28, 1937, as amended (43 U.S.C. 11 8 la-I 18 lj)), to implement the purposes of this proclamation.

The Secretary of the Interior shall prepare, within 3 years of this date, a management plan for this monument, and shall promulgate such regulations for its management as he deems appropriate. The management plan shall include appropriate transportation planning that addresses the actions, including road closures or travel restrictions, necessary to protect the objects identified in this proclamation.

The Secretary of the Interior shall study the impacts of livestock grazing on the objects of biological interest in the monument with specific attention to sustaining the natural ecosystem dynamics. Existing authorized permits or leases may continue with appropriate terms and conditions under existing laws and regulations. Should grazing be found incompatible with protecting the objects of biological interest, the Secretary shall retire the grazing allotments pursuant to the processes of applicable law. Should grazing permits or leases be relinquished by existing holders, the Secretary shall not reallocate the forage available under such permits or for livestock grazing purposes unless the Secretary specifically finds, pending the outcome of the study, that such reallocation will advance the purposes of the proclamation.

The establishment of this monument is subject to valid existing rights.

Nothing in this proclamation shall be deemed to enlarge or diminish the jurisdiction of the State of Oregon with respect to fish and wildlife management.

Nothing in this proclamation shall be deemed to revoke any existing withdrawal, reservation, or appropriation; however, the national monument shall be the dominant reservation.

Warning is hereby given to all unauthorized persons not to appropriate, injure, destroy, or remove any feature of this monument and not to locate or settle upon any of the lands thereof.

IN WITNESS WHEREOF, I have hereunto set my hand this ninth day of June, in the year of our Lord two thousand, and of the Independence of the United States of America the two hundred and twenty-fourth.

WILLIAM J. CLINTON

Appendix B - Antiquities Act of 1906

Act of June 18, 1906, 16 U.S.C. 431-433 (Popularly known as the AntiquitiesAct of 1906)

The following is the text of the Antiquities Act of 1906, under the authority of which President Clinton established Cascade-Siskiyou National Monument.

16 U.S.C. § 431 National monuments; reservation of lands; relinquishment of private claims:

The President of the United States is authorized, in his discretion, to declare by public proclamation historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest that are situated upon the lands owned or controlled by the Government of the United States to be national monuments, and may reserve as a part thereof parcels of land, the limits of which in all cases shall be confined to the smallest area compatible with the proper care and management of the objects to be protected. When such objects are situated upon a tract covered by a bona fide unperfected claim or held in private ownership, the tract, or so much thereof as may be necessary for the proper care and management of the object, may be relinquished to the Government, and the Secretary of the Interior is authorized to accept the relinquishment of such tracts in behalf of the Government of the United States.

16 U.S.C § 431a Limitation on further extension or establishment of national monuments in Wyoming:

No further extension or establishment of national monuments in Wyoming may be undertaken except by express authorization of Congress.

Appendix C - Memoirs of George Wright

Plant Community History

The non-conifer plant communities, (i.e. grasslands, shrublands, and woodlands) share several disruptive forces. These include historical livestock use over the past 100 years, fire suppression, road building, and consequent weed encroachment. The memoirs of George Wright provide a fascinating insight to past livestock management and plant community changes within the CSNM.

"During the spring of 1889 and 1890 ... hundreds of cattle had just been loosed on the rangeland to graze the southward slopes of hillsides between Hornbrook and the Pilot Rock area ..." (p.4 of "The truth about Reelfoot" George F. Wright).

Prior to Purl Bean purchasing the Horseshoe Ranch in about 1890, this area in Scotch Creek had been used as a summer camp to oversee the cattle grazing on the surrounding hillsides. The ranches appeared to change hands frequently, thus Purl Bean sold the horseshoe ranch to A.B.Smith in 1900, who sold it to Everett Elmore in 1912, who in turn sold it to the Hayes brothers in 1915. The ranch changed hands several more times before George Wright recorded his musings about the area (Horseshoe Ranch January 18th 1954, #582).

Another Ranch initially homesteaded in Camp creek in the year 1865 was home to 300 cattle when sold in 1932 by the De Soza family (The De Soza Ranch, January 22, 1954 #591).

The Madero ranch, located where Pine Creek joins Camp Creek, had 100 cattle with saddle and draft horses (The Madero Ranch, January 23, 1954 #592).

William A. Wright established his ranch where Salt Creek empties into Camp Creek in 1879. He was an active fellow, fenced off his 160 acre homestead, leased and fenced an adjoining section of land. He married in 1885, and had 6 children. He raised alfalfa hay and kept 300 cattle. (The McNew ranch, January 25, 1954 #594).

The left fork of Camp Creek is to the west of Bald Mountain. "Years ago, the area produced lots of grass which made it good range for cattle but it is not nearly as good now as it used to be ... now the grass is about gone and is becoming, like many other things, just a memory" (The left fork of Camp Creek, January 29, 1954 #600).

The area [Lone Pine Ridge] in the early days was a fine winter and spring range for cattle and horses because there was always a good supply of bunchgrass growing on the hillsides. Roaming bands of horses depleted the bunchgrasses but most of them have been rounded up so maybe the good old bunchgrass will get a second chance" (Lone Pine Ridge, January 29 1954 #601).

Referring to a cold spring on the southeast foot of Timber Mountain, George Wright mentions that "sheep men with their herd of sheep camped there thirty or forty years ago. The sheep killed about all the good grass ... (Timber Mountain, February 3 1954 #610)."

Years ago there was a sheep camp during the summer months on the west side of Bald [Soda] Mountain ... The Bald Mountain area was a wonderful place for grass but the sheep men would herd their sheep there year after year until the grass was killed out. Weeds of different kinds have taken the place of the grass. About 1923 after the sheep had ruined the range, the cattlemen banded together and bought the sheep camp and the land, probably 160 acres. They also leased more land around there in order to keep the sheep men away. (Bald Mountain, February 6, 1954 #614).

The name Salt Creek was derived from the fact that Charles M. Marsue provided a salt lick for his cattle. A corral was built to enclose cattle that had gone wild in that area prior to 1875 (Salt Creek, February 6 1954 #617).

The ridge between Camp Creek and Salt Creek became known as the Salt Creek ridge by the mid 1940's. George Wright reports that "It used to be a good place for deer and many big bucks have been taken there in past years. The upper part of the ridge was a good horse range but since the fine bunch grass has been killed out on the knolls and ridges the range horses are about a thing of the past" (Salt Creek Ridge February 6, 1954 #618).

George Wright reports that the plow land on Cold Spring Flat (Agate Flats) was sown with rye in the late 1880's (Cold Spring Flat, February 19 1954 #634). The Cold Spring was also a "watering place for cattle and horses. They came there by the hundreds." (Cold Spring February 20, 1954 #639).

George Wright refers to a livestock Ranch up Skookum Creek dating back to the 1900s (Whites Pasture, February 21, 1954 #641). Also reports a corral along the upper part of Skookum Creek for the purpose of corralling wild cattle (John's Camp February 22 1954 #645).

"Skookum ridge was a good cattle range but due to overgrazing is not near as good now" (Skookum Ridge, February 26, 1954 #651).

George Wright refers to a goat camp on the north side of Skookum ridge ... "too many goats and cattle killed out most of the grass" (The Goat Camp March 18, 1954 #680).

Kein Creek ... "around forty or more years ago that was a fine cattle range, but is not near so good now" (May 1929, 1954 Kein Creek # 688).

Appendix D - Soil Characteristics Table

Table AD -1. Soil Characteristics of the CSNM				
Map Unit #	**Soil Series Name**	**Soil Depth**	**Surface Texture**	**Subsoil Texture(s)**
14	Bogus	60+"	v. gravelly loam	clay loam
18	Bybee	60+"	loam	clay
19/20/ 190/191	Tatouche	60+"	gravelly loam	clay
24	Campfour	60+"	loam	clay loam
24	Paragon	20-40"	cobbly loam	gravelly clay loam
27	Carney	20-40"	clay	clay w/water table
28	Carney	20-40"	cobbly clay	clay w/water table
57/58/60	Farva	20-40"	very cobbly loam	cobbly loam
78	Greystoke	40-60"	stoney loam	ex.gr.clay loam
81	Heppsie	20-40"	clay	clay, stoney clay
82/113/ 116/125	McMullin	<20"	gravelly loam	gr.clay loam
84	Hobit	20-40"	loam	gr.clay loam
96	Kanutchan	40-60"	clay	clay
114/116/119	McNull	40-60"	clay loam	cobbly clay
119	Medco	20-40"	cobbly clay loam	clay
128	Medford	60+"	clay loam	clay
143	Pinehurst	60+"	loam	clay loam
145	Greystoke	40-60"	stoney loam	ex.gr.clay loam
152	Randcore	<12"	ex.stoney loam	loam
152	Shoat	20-40"	loam	loam
160	Rustlerpeak	20-40"	gravelly loam	cobbly clay loam
167	Sibannac	60+"	silt loam	clay loam
170/173	Skookum	20-40"	very cobbly loam	very cobbly clay loam
180	Steinmetz	60+"	sandy loam	sandy loam
207	Woodseye	<20"	very stoney loam	very cobbly loam

Appendix E - Plant Species in CSNM

This undocumented list was compiled by Frank Lang from a number of sources: Benoche (1999), Brock and Callagan (1999), Bradney (1999), Lang and others (1999a, 1999b), Lytjen and Otting (1999), Miller (1999), Wilson and others (1999), USDI-BLM (1999), USDI-BLM (1995) and personal observations (Lang). Nomenclature mostly follows Hickman (1993) and the NRCS Plant List for Oregon (NRCS 1999). The NRCS Plant List and some Sawyer and Keeler-Wolf (1995) recommendations are used for common names. To simplify and shorten common names the following conventions were adopted. Rather than -leaved and -flowered, -leaf and -flower are used. The possessive form ('s) for honorific names is not used, unless confusion would follow when spoken (Greene's mariposa lily rather than Greene mariposa Lily; is the lily green or Greene). We do not use the possessive for trees (Jeffrey pine) or for other plants (Howell false caraway). Hyphens are generally ignored.

Plants listed below may be widely distributed throughout the CSNM planing area or maybe very local. The following symbols are used to indicate geographical areas in the CSNM: cc = Cathedral Cliffs (Lower Camp Creek); cm = Chinkapin Mountain; hb = Hobart Bluff; jc = Jenny Creek; kc = Keene Creek area; lp = Lone Pine Ridge; lsr = former Jenny Creek Late Successional Reserve; mu = Mariposa Unit, Pilot Rock area; og = Oregon Gulch RNA; pbp = Parsnip Beaver Ponds; pdo = Porcupine / Dutch Oven Creek Ridge; plk = Parsnip Lakes; pr = Pilot Rock area; pru = Pilot Rock Unit, Pilot Rock; sc = Scotch Creek RNA; wsa = Soda Mountain Wilderness Study Area.

Native plants are indicated by italicized *New Times Roman*, alien plants by italicized *Arial*; noxious weeds by *italicized* and bold ***Arial*** scientific names.

Table AE -1. Plant Species in the CSNM

Scientific Name	Common Name	Place
Aceraceae		
Acer circinatum	vine maple	kc
Acer glabrum	Rocky Mountain maple	kc, pr
Acer macrophyllum	bigleaf maple	sc, kc
Alismataceae		
Alisma gramineum [lanceolatum]	narrowleaf water plantain	plk
Anacardiaceae		
Rhus trilobata	skunkbush sumac	sc
Toxicodendron diversilobum	Pacific poison oak	sc
Apiaceae		
Angelica sp.		pbp
Anthriscus caucalis	burr chervil	sc
Cicuta douglasii	western water hemlock	plk
Daucus pusillus	American wild carrot	sc
Eryngium alismifolium	Modoc eryngo	kc
Heracleum maximum [lanatum]	common cow-parsnip	pbp, kc
Ligusticum apiifolium	celeryleaf licorice-root	sc
Lomatium californicum	California lomatium, Iknish	sc, kc

Table AE -1. Plant Species in the CSNM		
Scientific Name	**Common Name**	**Place**
Lomatium dissectum	fernleaf biscuitroot	sc, og, kc
Lomatium macrocarpum	giantseed biscuitroot	sc, kc, pr, og
Lomatium nudicaule	barestem lomatium	sc, kc, og
Lomatium triternatum	nineleaf biscuitroot	og, kc
Lomatium utriculatum	common lomatium	sc, og, kc
Osmorhiza berteroi [chilensis]	sweetcicely	sc, kc
Osmorhiza occidentalis	western sweetroot	sc, kc
Perideridia gairdneri	Gairdner yampah	kc
Perideridia howellii	Howell false caraway, yampah	sc, og, kc
Perideridia oregana	squaw potato, Oregon yampah	sc, kc
Sanicula crassicaulus	Pacific blacksnakeroot	sc, kc
Sa nicula graveolens	northern sanicle	sc, kc
Torilis arvensis	spreading hedgeparsley	sc, kc
Yabea microcarpa	false carrot	sc, kc
Apocynaceae		
Apocynum androsaemifolium	spreading dogbane	sc, plk, kc, og
Aristolochiaceae		
Asarum hartwegii	Hartweg wildginger	kc
Asarum caudatum var viridiflorum [A.wagneri]	longtail wildginger	cm
Asclepiadaceae		
Asclepias speciosa	showy milkweed	kc, og
Asteraceae		
Achillea millefolium	common yarrow	sc, plk, og, kc
Adenocaulon bicolor	American trail plant	sc, kc, pr
Agoseris aurantiaca	orange agoseris	kc
Agoseris grandiflora	bigflower agoseris	sc, plk, kc
Agoseris heterophylla	annual agoseris	sc, og, kc
Agoseris retorsa	spearleaf agoseris	kc
Anaphalis margaritacea	western pearly everlasting	kc
Antennaria argentea	silver pussytoes	sc, kc
Arnica cordifolia	heartleaf arnica	og, kc
Arnica discoidea	rayless arnica	kc
Arnica latifolia	broadleaf arnica	sc
Artemisia douglasiana	Douglas sagewort	sc, kc
Artemisia ludoviciana	white sagebrush	kc
Artemisia tridentata	big sagebrush	kc
Aster [Symphyotrichum] foliaceus	alpine leafybract aster	kc
Aster [Eurybia] radulinus	roughleaf aster	sc
Balsamorhiza deltoidea	deltoid balsamroot	sc, kc, og
Blepharipappus scaber	blepharipappus	sc, og, kc
Cacaliopsis nardosmia	silvercrown	sc
Centaurea solstitialis	yellow star-thistle	sc, kc, og
Chrysothamnus [Ericameria] nauseosus	rubber rabbitbrush	sc, og, kc, pr
Cichorium intybus	chicory	og
Cirsium arvense	Canada thistle	kc, og
Cirsium cymosum	peregrine thistle	sc, kc
Cirsium occidentale	cobwebby, snowy thistle	sc
Cirsium vulgare	bull thistle	sc, plk, pbp, kc
Conyza canadensis	Canadian horseweed	kc
Crepis bakeri	Baker hawksbeard	kc
Crepis capillaris	smooth hawksbeard	sc

Table AE -1. Plant Species in the CSNM		
Scientific Name	**Common Name**	**Place**
Crepis monticola	mountain hawkweed	sc
Crepis occidentalis	largeflower hawksbeard	sc
Crocidium multicaule	common spring-gold	kc
Ericameria bloomeri	rabbitbrush goldenweed	kc
Erigeron compositus	cutleaf dasiy	sc
Erigeron eatonii	Eaton fleabane	kc
Erigeron foliosus	leafy daisy	sc
Erigeron inornatus	unadorned fleabane	sc
Erigeron philadelphicus	Philadelphia fleabane	sc
Eriophyllum lanatum	wooly sunflower	sc, plk, og, kc, pr
Gnaphalium palustre	western marsh cudweed	kc
Hieracium albiflorum	white hawkweed	sc, plk, kc
Hieracium cyanglossoides	houndstounge hawkweed	kc
Hieracium scouleri	Scouler's woolyweed	sc
Hypochaeris radicata	hairy catsear	kc
Lactuca serriola	prickly lettuce	sc, kc
Leucanthemum vulgare	oxeye daisy	kc
Madia citriodora	lemonscented madia	sc
Madia elegans	common madia	kc, og
Madia exigua	small tarweed	sc, kc
Madia glomerata	mountain tarweed	sc
Madia gracilis	grassy tarweed	sc, plk, kc
Micropus californicus	q tips, slender cottnweed	sc, kc
Microseris laciniata ssp. detlingii	Detling microseris	sc
Microseris nutans	nodding microseris	sc
Petasites frigidus	arctic sweet coltsfoot	kc
Rafinesquia californica	California plumbseed	sc
Rigiopappus leptocladus	wireweed, bristlehead	sc
Senecio integerrimus	lambstongue ragwort	sc, og, kc
Sonchus asper	spiny sowthistle	kc
Stephanomeria virgata	rod wirelettuce	sc
Taraxacum officinale	common dandelion	sc, og, kc
Tragopogon dubius	yellow salsify	sc, plk, kc
Tragopogon pratensis	jack-go-to-bed-at-noon	og
Uropappus lindleyi	silverpuffs	sc
Wyethia angustifolia	narrowleaf mule's ear	kc, og
Berberidaceae		
Achlys triphylla	sweet after death, vanillaleaf	kc
Berberis [Mahonia] aquifolium	hollyleaf barberry	og, kc
Berberis [Mahonia] nervosa	Cascade barberry	sc, kc
Berberis [Mahonia] piperiana	Piper barberry	sc, og
Berberis [Mahonia] repens	creeping barberry	og
Vancouveria hexandra	white insideout flower	sc, plk, kc

Table AE -1. Plant Species in the CSNM

Scientific Name	Common Name	Place
Betulaceae		
Alnus rhombifolia	white alder	sc, kc
Alnus incana ssp. tenuifolia	thinleaf alder	pbp
Corylus cornuta var. californica	California hazelnut	lsr, og
Boraginaceae		
Amsinckia menziesii var. intermedia	common fiddleneck	sc
Amsinckia menziesii var. menziesii	Menzies fiddleneck	kc
Cryptantha affinis	quill cryptantha	kc
Cryptantha intermedia	Clearwater cryptantha	sc, kc
Cryptantha torreyana	Torrey cryptantha	sc, kc
Cynoglossum grande	Pacific hound's tongue	sc, plk, og, kc
Lithospermum ruderale	western stoneseed, w. gromwell	kc
Myosotis discolor	changing forget-me-not	kc
Pectocarya pusilla	moth combseed	sc
Plagiobothrys cognatus [scouleri var. hispidulus]	sleeping popcornflower	sc
Plagiobothrys nothofulvus	rusty popcornflower	sc
Plagiobothrys stipitatus var. micranthus	stalked popcornflower	plk
Plagiobothrys tenellus	Pacific popcornflower	sc, kc
Brassicaceae		
Alyssum alyssoides	pale madwort	sc, kc, og
Arabidopsis thaliana	mouse-ear cress	sc
Arabis breweri	Brewer rockcress	sc
Arabis drummondii	Drummond rockcress	sc
Arabis glabra	tower rockcress	sc, kc
Arabis holboellii	Holboell rockcress	sc, kc
Arabis oregana	Oregon rockcress	sc
Arabis sparsiflora	sicklepod rockcress	kc
Athysanus pusillus	common sandweed	sc, og, kc
Barbarea orthoceras	American yellowrocket	kc
Cardamine nuttallii var. nuttallii	palmate toothwort	sc
Cardamine occidentalis	big western bittercress	pbp
Cardamine oligosperma	little western bittercress	sc, kc
Draba verna	spring draba, whitlowgrass	sc, og
Erysimum capitatum	sanddune wallflower	pr
Idahoa scapigera	oldstem idahoa, scalepod	kc
Isatis tinctoria	dyer's woad	wsa, or
Lepidium campestre	field pepperweed	plk, kc
Phoenicaulis cheiranthoides	wallflower phoeni., daggerpod	kc, pr
Rorripa curvisiliqua	curvepod yellowcress	sc, plk, kc
Thlaspi arvense	field pennycress	kc
Thysanocarpus curvipes	sand fringepod	sc, kc
Cactaceae		
Opuntia polycantha	plains prickly pear	cc
Campanulaceae		
Campanula [Asyneuma] prenanthoides	California harebell	plk, kc
Campanula scouleri	pale bellflower Scouler harebell	sc, plk, kc
Downingia sp.		kc
Githopsis specularioides	common bluecup	sc
Heterocodon rariflorum	rareflower heterocodon	sc, plk
Caprifoliaceae		
Linnaea borealis	twinflower	kc

Table AE -1. Plant Species in the CSNM		
Scientific Name	**Common Name**	**Place**
Lonicera ciliosa	orange honeysuckle	sc, plk, kc, pr
Lonicera hispidula	pink, hairy honeysuckle	sc, kc, og
Lonicera interrupta	chaparral honeysuckle	sc
Sambucus mexicana [*nigra* ssp. *cerulea*]	blue elderberry	sc, kc, pr
Symphoricarpos albus	common snowberry	sc, pbp, kc, pr, og
Symphoricarpos mollis	creeping snowberry	sc, plk, og, kc
Caryophyllaceae		
Arenaria serpyllifolia	thymeleaved sandwort	sc, kc
Cerastium fontanum ssp. vulgare	common mouse-ear chickweed	sc
Cerastium glomeratum	sticky chickweed	sc
Holosteum umbellatum	jagged chickweed	sc
Minuartia douglasii	Douglas stitchwort	sc
Moehringia macrophylla	bigleaf sandwort	sc, plk, og, kc
Pseudostellaria jamesiana	tuber starwort	sc, kc
Sagina saginoides	arctic pearlwort	sc
Silene campanulata	Red Mountain catchfly	kc
Stellaria media	common chickweed	sc
Stellaria nitens	shining chickweed	sc
Celastraceae		
Pachistima myrsinites	Oregon boxwood	sc, kc, pr
Convolvulaceae		
Calystegia occidentalis	chaparral false bindweed	sc, pr
Convolvulus arvensis	field bindweed	kc, og
Cornaceae		
Cornus glabrata	brown dogwood	sc
Cornus nuttallii	Pacific dogwood	kc
Cornus sericea ssp. sericea	redosier dogwood	sc, plk, kc
Crassulaceae		
Sedum obtusatum	Sierra, obtuse stonecrop	sc
Sedum stenopetalum	wormleaf stonecrop	sc, og, kc
Cucurbitaceae		
Marah oreganus	coastal manroot, wild cucumber	sc, og, kc, pr
Cupressaceae		
Calocedrus decurrens	incense cedar	sc, plk, og, kc
Juniperus occidentalis	western juniper	sc,og, pr, plk, kc
Cyperaceae		
Carex amplifolia	bigleaf sedge	pbp
Carex angustata	widefruit sedge	pdp
Carex aquatalis	water sedge	kc
Carex arcta	northern cluster sedge	plk
Carex athrostachya	slenderbeak sedge	plk
Carex aurea	golden sedge	sc, kc
Carex concinnoides	northwestern sedge	sc
Carex cusickii	Cusick sedge	plk, pbp
Carex densa	dense sedge	og
Carex disperma	soft leaved sedge	og
Carex deweyana ssp. leptopoda [*C. leptopoda*]	taperfruit shortscale sedge	sc, kc
Carex echinata	star sedge	sc
Carex feta	greensheath sedge	plk, pbp
Carex fracta	fragile sheath sedge	plk, pbp, kc
Carex geyeri	Geyer, elk sedge	kc

Table AE -1. Plant Species in the CSNM		
Scientific Name	**Common Name**	**Place**
Carex hoodii	Hood sedge	plk, kc
Carex inops	long stolon sedge	kc
Carex interrupta	greenfruit sedge	plk
Carex laeviculmis	smooth stem sedge	og
Carex livida	livid, pale sedge	pbp
Carex luzulina	woodrush sedge	pbp, kc
Carex microptera	smallwing sedge	plk
Carex mutlicaulis	manystem sedge	og
Carex nebrascensis	Nebraska sedge	jc
Carex nudata	torrent sedge	jc
Carex pachystachya	chamisso, thickhead sedge	plk, pbp, og
Carex pellita	wooly sedge	plk, pbp
Carex praticola	meadow sedge	kc
Carex rossii	Ross sedge	plk, pbp, kc
Carex serratodens (unconfirmed)	sawtooth sedge	sc
Carex simulata	short beaked sedge	jc
Carex stipata	awlfruit sedge	kc
Carex subfusca	brown, rusty sedge	plk, pbp
Carex utriculata [rostrata]	Northwest Territory, beaked sedge	pbp
Carex vesicaria	blister, inflated sedge	plk
Eleocharis acicularis var. acicularis	needle spikerush	plk, pbp, kc
Eleocharis macrostachya [palustris]	common spikerush	sc, plk, kc
Eleocharis obtusa	blunt spikerush	plk
Eleocharis palustris	common, creeping spikerush	plk
Scirpus microcarpus	smallfruit bulrush	plk, kc
Scirpus tabernaemontane	soft stem bulrush	jc
Dennstaedtiaceae		
Pteridium aquilinum	bracken fern	plk, kc
Dipsacaceae		
Dipsacus fullonum	fuller's teasel	mu
Dryopteridaceae		
Athyrium filix-femina	common ladyfern	pdp, kc
Cystopteris fragilis	brittle bladderfern	sc, og, kc
Polystichum imbricans	narrowleaf, imbricate swordfern	sc
Polystichum munitum	western swordfern	sc, kc
Woodsia oregana	Oregon cliff fern	sc
Equisetaceae		
Equisteum arvense	field horsetail	pbp, kc, og
Equisetum hyemale	scouringrush horsetail	sc, kc
Ericaceae		
Arbutus menziesii	madrone	plk, kc, lsr
Arctostaphylos nevadensis	pinemat manzanita	kc
Arctostaphylos patula	greenleaf manzanita	sc, kc
Chimaphila menziesii	little prince's pine	sc, kc
Chimaphila umbellata	pipsissewa, common prince's pine	sc, kc
Hemitomes congestum	coneplant, gnome plant	pr
Pterospora andromedaea	woodland pinedrops	kc, og
Pyrola dentata [P. picta]	toothed pyrola	kc
Pyrola picta	whitevein wintergreen	sc, kc
Pyrola picta var. aphylla	leafless pyrola	kc
Pyrola secunda [Orthillia]	side-bells wintergreen	sc, pr

Table AE -1. Plant Species in the CSNM		
Scientific Name	**Common Name**	**Place**
Euphorbiaceae		
Eremocarpus setigerus [*Croton*]	dove weed, turkey mullein	og
Euphorbia spathulata	warty spurge	kc
Fabaceae		
Astragalus accidens ssp. hendersonii	Henderson milkvetch	sc
Astragalus californicus	California milkvetch	sc
Astragalus purshii var. tincta	Pursh milkvetch	sc
Lathyrus lanszwertii var. tracyi	thickleaf pea	sc
Lathyrus nevadensis	Nevada pea	sc, kc
Lathyrus polyphyllus	leafy peavine	sc, plk, kc
Lathyrus torreyi	Torrey peavine	plk
Lotus corniculatus	birdfoot deervetch	plk, kc
Lotus crassifolius	big deervetch	kc, pr
Lotus denticulatus	meadow lotus	sc
Lotus micranthus	smallflower deervetch	sc, kc
Lotus nevadensis	Nevada deervetch	sc, plk, kc
Lotus oblongifolius	streambank bird's-foot trefoil	pbp
Lotus pinnatus	meadow bird's-foot trefoil	sc, kc
Lotus unifoliatus [*purshianus*]	American bird's-foot trefoil	sc, plk, kc
Lupinus albicaulus	pine lupine	sc, kc
Lupinus albifrons	whiteleaf lupine	sc
Lupinus arbustus	spur lupine	sc
Lupinus bicolor	miniature lupine	sc, kc
Lupinus latifolius	broadleaf lupine	kc
Lupinus lepidus	dwarf lupine	kc
Lupinus leucophyllus	velvet lupine	kc
Lupinus polyphyllus	largeleaf lupine	kc
Melilotus officinalis	yellow sweetclover	pr
Medicago lupulina	black medick	pr
Trifolium albopurpureum	rancheria clover	sc
Trifolium ciliolatum	foothill clover	sc
Trifolium cyathiferum	cup clover	plk, kc
Trifolium dubium	suckling, little hop clover, shamrock	sc, plk, kc
Trifloium eriocephalum	woolyhead clover	kc
Trifolium macrocephalum	largehead clover	sc, kc
Trifolium microcephalum	smallhead, wooly clover	kc
Trifloium oliganthum	fewflower clover	kc
Trifolium pretense	red clover	kc
Trifolium repens	white clover	sc, kc
Trifolium variegatum	whitetip clover	sc, kc
Vicia americana	American vetch	sc, plk, kc
Fagaceae		
Chrysolepis chrysophylla	giant chinquapin	plk, kc
Quercus garryana	Garry oak, Oregon white oak	sc, kc, pr, og
Quercus kelloggii	California black oak	sc, kc, og

Table AE -1. Plant Species in the CSNM		
Scientific Name	**Common Name**	**Place**
Fumariaceae		
Dicentra uniflora	longhorn steer's head	pru
Dicentra formosa	Pacific bleeding heart	sc, kc
Garryaceae		
Garrya fremontii	bearbrush	og
Gentianaceae		
Swertia albicaulis [*Frasera a.*]	whitestem frasera	kc, pr
Geraniaceae		
Erodium cicutarium	redstem storksbill, filaree	sc, og, kc
Grossulariaceae		
Ribes binominatum	ground gooseberry	sc
Ribes inerme ssp. klamathense	Klamath gooseberry	sc
Ribes lacustre	prickly current	sc, kc
Ribes lobbii	gummy gooseberry	sc, kc, pr
Ribes roezlii	Serria gooseberry	kc
Ribes sanguineum	redflower current	sc, kc, og
Ribes velutinum	desert gooseberry	sc, pr
Haloragaceae		
Myriophyllum verticillatum	whorlleaf watermilfoil	plk
Hydrangeaceae		
Philadelphus lewisii	Lewis mockorange	sc, kc
Whipplea modesta	whipplevine	sc, kc
Hydrophyllaceae		
Hydrophyllum capitatum	ballhead waterleaf	kc
Hydrophyllum fendleri var. albifrons	Fendler waterleaf	sc
Hydrophyllum occidentale	California waterleaf	sc, pr
Nemophila parviflora	smallflower nemophila	sc, og, kc, pr
Nemophila pedunculata	meadow nemophila	sc, og, kc
Phacelia hastata	silverleaf phacelia	sc, pr
Phacelia heterophylla	varileaf phacelia	sc, og, kc
Phacelia linearis	narrowleaf phacelia	sc
Phacelia ramosissima var. eremophila	branched phacelia	sc
Hypericaceae		
Hypericum anagalloides	tinker's penny	sc, pbp, kc
Hypericum perforatum	Klamath weed	sc, plk, pbp, kc,og
Iridaceae		
Iris chrysophylla	yellow iris	sc, og, kc
Sisyrinchium bellum	western blue-eyed grass	kc, og
Sisyrinchium douglasii [*Olsynium*]	Douglas grass widow	kc
Sisyrinchium idahoensis	Idaho blue-eyed grass	kc
Juncaceae		
Juncus bolanderi	Bolander rush	plk, pbp
Juncus brachyphyllus	tuftedstem rush	plk, kc
Juncus bufonius	toad rush	kc
Juncus effusus var. gracilis	soft rush	plk, kc
Juncus effusus var. pacificus	Pacific rush	plk, pbp,og
Juncus ensifolius	swordleaf rush	plk, pbp, kc
Juncus hymienditus	Herman dwarf rush	kc
Juncus orthophyllus	straightleaf rush	pbp, kc
Juncu oxymeris	pointed rush	kc
Juncus tenuis	slender rush	plk, pbp, kc

Table AE -1. Plant Species in the CSNM		
Scientific Name	**Common Name**	**Place**
Luzula campestris	field woodrush	sc, plk
Luzula comosa	common woodrush	kc
Lamiaceae		
Agastache urticifolia	nettleleaf horsemint	sc, pr
Mentha arvensis	wild mint	plk
Monardella glauca	pale, gray monardella	cm
Monardella odoratissima	mountain monardella,	sc, kc, pr
Prunella vulgaris	common self-heal, heal-all	og, plk
Satureja douglasii [*Clinopodium*]	yerba buena	sc, kc
Scutellaria angustafolia	narrowleaf skullcap	kc
Scutellaria antirrhinoides	nose, snapdragon skullcap	sc
Scutellaria siphocampyloides	skullcap	sc
Stachys ajugoides var. rigida [*S. rigida* var. *rigida*]	rough hedgenettle	sc, plk, pbp
Lemnaceae		
Lemna minor	common duckweed	plk, pbp, kc
Lemna minima	least duckweed	plk
Lemna trisulca	star, ivyleaf duckweed	plk
Spirodela polyrrhiza	common duckmeat, great d.weed	plk
Lentibulariaceae		
Utricularia vulgaris	common bladderwort	plk
Liliaceae		
Allium acuminatum	tapertip, Hooker onion	sc, kc
Allium amplectens	narrowleaf, paper onion	sc, kc
Allium siskiyouense	Siskiyou onion	hb, pdo
Allium tolmiei	Tolmie onion	kc
Brodiaea coronaria	harvest clusterlily	og
Calochortus greenei	Greene's mariposa lily	kc, pru, mu
Calochortus tolmei	Tolmei cat's ear	og, kc
Camassia quamash	small, common camas	kc
Clintonia uniflora	one-flower clintonia, beadlily	kc
Dichelostemma capitatum	bluedicks	sc, kc
Dichelostemma congestum	ookow	kc
Dichelostemma multiflorum	roundtooth snakelily, wild hyacinth	sc
Disporum hookeri	drops-of-gold, Oregon fairybell	sc, kc, pr, og
Erythronium hendersonii	Henderson fawnlily	og
Erythronium klamathense	Klamath fawnlily	pk, sm
Fritillaria affinis	checker lily	sc, og
Fritillaria gentneri	Gentner fritillary	wsa
Fritillaria glauca	Siskiyou fritillary	
Fritillaria pudica	yellow fritillary, yellow bells	kc
Fritillaria recurva	scarlet fritillary	sc, og
Lilium columbianum	Columbia lily	kc
Lilium pardalinum ssp. vollmeri	Vollmer lily	sc
Lilium washingtonianum ssp. purpurascens	Washington lily	sc, kc, pr, og
Smilacina [*Maianthemum*] *racemosa*	feathery false lily of the valley	sc, plk, kc, pr
Smilacina [*Maianthemum*] *stellata*	starry false lily of the valley	sc, kc
Streptopus amplexifolius	claspleaf twistedstalk	sc, kc
Trillium albidum	giant white wakerobin	sc, pr
Trillium ovatum	Pacific trillum	sc, kc, pr
Triteleia hendersonii	Henderson triteleia	kc

Table AE -1. Plant Species in the CSNM		
Scientific Name	**Common Name**	**Place**
Triteleia hyacinthina	white brodiaea	sc, plk, kc, og
Veratrum californicum	California false hellebore	kc, sm
Xerophyllum tenax	common beargrass	kc
Zigadenus venenosus	meadow death camas	kc, og
Limnanthaceae		
Floerkea proserpinacoides	false mermaidweed	pr
Limnanthes bellingeriana	Bellinger meadowfoam	og, kc
Linaceae		
Linum lewisii	prairie, Lewis flax	pr
Malvaceae		
Iliamna bakeri	Baker wild hollyhock, globemallow	kc
Sidalcea malviflora	dwarf checkerbloom, ch. mallow	plk, kc
Sidalcea oregana ssp. spicata	Oregon checkerbloom, ch. mallow	sc
Nymphaeaceae		
Nuphar leutea ssp. polysepala	yellow pond-lily	plk, pbp
Oleaceae		
Fraxinus latifolia	Oregon ash	plk, pbp, jc, kc, og
Onagraceae		
Circaea alpina	Enchanter's nightshade	sc, kc
Clarkia gracilis	slender clarkia	sc, kc
Clarkia purpurea ssp. quadrivulnera		sc
Clarkia rhomboidea	tongue clarkia	sc, kc
Gayophytum diffusum		kc
Epilobium [Chamerion] angustifolium	fireweed	kc
Epilobium brachycarpum	tall annual fireweed	sc, plk, kc
Epilobium ciliatum ssp. ciliatum	fringed willowherb	sc, pbp, kc
Epilobium densiflorum	dense flower willowherb	kc
Epilobium glaberrimum	glaucus willowherb	sc
Epilobium minutum	chaparral willowherb	sc, kc
Orchidaceae		
Calypso bulbosa	fairy slipper	sc, kc
Corallorhiza maculata	spotted coralroot	sc, plk, kc, pr
Corallorhiza striata	hooded coralroot	sc
Cypripedium fasciculatum	clustered lady's slipper	kc
Cypripedium montanum	mountain lady's slipper	sc, kc
Cephalanthera (Eburophyton) austinae	phantom orchid	sc, plk, kc, pr
Goodyera oblongifolia	rattlesnake plantain	sc, kc, og
Piperia transversa	royal rein orchid	sc
Piperia unalascencis	slender-spire rein orchid	kc
Planthera leucostachys	Sierra bog orchid	pbp, kc
Orobanchaceae		
Orobanche uniflora	one-flower broomrape	sc
Paeoniaceae		
Paeonia brownii	western peony	kc
Papaveraceae		
Eschscholtzia californica	California poppy	sc
Pinaceae		
Abies concolor	white fir	sc, plk, og, pr
Abies magnifica var. shastensis	Shasta red fir	pru
Pinus contorta	lodgepole pine	kc

Table AE -1. Plant Species in the CSNM		
Scientific Name	**Common Name**	**Place**
Pinus lambertiana	sugar pine	og, kc
Pinus ponderosa	ponderosa pine	sc, og, kc
Pseudotsuga menziesii	Douglas-fir	sc, plk, og, kc
Plantaginaceae		
Plantago lanceolata	narrowleaf plantain	kc
Plantago major	broadleaf plantain	sc, plk, kc
Poaceae		
Achnatherum (Stipa) lemmonii	Lemmon needlegrass	sc, plk, kc
Agrostis capillaris	colonial bentgrass	kc
Agrostis exarata	spike bentgrass	plk, pbp
Agrostis scabra	rough bentgrass	plk
Aira caryophyllea	silver hairgrass	sc, kc
Alopecurus aequalis	shortawn foxtail	plk
Alopecurus geniculatus	water foxtail	plk, pbp
Alopecurus pratensis	meadow foxtail	kc
Arrhenetherum elatius	tall oatgrass	kc
Bromus carinatus	California brome	sc, plk, kc
Bromus diandrus	ripgut brome	sc
Bromus hordeaceus	soft brome	sc, kc
Bromus japonicus	Japanese brome	sc, kc
Bromus laevipes		kc
Bromus madritensis ssp. rubens	foxtail chess	sc
Bromus secalinus	chess	sc
Bromus sterilis	sterile brome	sc
Bromus tectorum	cheat grass	sc, og, kc
Bromus vulgaris	Columbia brome	sc, kc
Calamagrostis canadensis	Canada reed grass	pbp
Cynosurus echinatus	hedgehog dogtail	sc, kc
Dacytlis glomeratus	orchard grass	kc
Danthonia californica	California oatgrass	plk, pbp, og, kc
Danthonia unispicata	one-spike oatgrass	kc
Deschampsia cespitosa	tufted hairgrass	kc
Deschampsia danthanoides	annual hairgrass	sc, kc
Deschampsia elongata	slender hairgrass	sc, plk, kc
Elymus elymoides	squirreltail	sc, kc
Elymus glaucus	blue wildrye	sc, plk, pbp, og, kc
Elytrigia intermedia	intermediate wheatgrass	sc, kc
Festuca arundinacea	tall fescue	og, kc
Festuca californica	California fescue	sc, og, kc
Festuca idahoensis	Idaho fescue	sc, kc, og
Festuca occidentalis	western fescue	sc, kc, og
Festuca pretensis	meadow fescue	kc
Festuca subulata	bearded fescue	kc
Glyceria elata	tall mannagrass	sc, plk, pbp, kc
Glyceria leptostachya	managrass	pbp
Hordeum brachyantherum ssp. californicum	meadow barley	sc, plk, pbp
Koeleria macrantha (cristata)	prairie junegrass	sc, kc
Melica harfordii	Harford oniongrass	sc
Melica spectabilis	purple oniongrass	kc
Melica subulata	Alaska oniongrass	sc, kc
Phleum pratense	timothy	plk, jc, kc, og

Table AE -1. Plant Species in the CSNM		
Scientific Name	**Common Name**	**Place**
Poa bulbosa	bulbous bluegrass	sc, plk, og, kc
Poa compressa	Canada bluegrass	kc
Poa howellii	Howell bluegrass	sc
Poa palustris	fowl bluegrass	sc
Poa pratensis	Kentucky bluegrass	sc, kc
Poa secunda	one-sided bluegrass	sc, kc, og
Pseudoegneria spicata ssp. spicata	bluebunch wheatgrass	sc
Taeniatherum caput-medusae	medusahead	sc, og, kc
Torreyochloa pallida var. paucifora	weak meadowgrass	plk, pbp
Trisetum canescens	tall trisetum	sc, kc
Trisetum spicatum	downy trisetum	plk
Vulpina bromoides	brome fescue	kc
Vulpia microstachys	Nuttall fescue	sc, og, kc
Vulpia myuros	rattail fescue	sc, kc
Polemoniaceae		
Collomia grandiflora	grand collomia	sc, plk, kc, og
Collomia heterophylla	variableleaf collomia	sc
Gilia capillaris	minature, smooth-leaf gilia	sc
Gilia capitata	bluehead gilia	sc, og, kc, pr
Ipomopsis aggregata	scarlet gilia	sc, pr
Linanthus bicolor	true babystars, bicolor linanthus	sc, kc
Linanthus bolanderi	Bolander linanthus	sc
Linanthus harknessii	Harkness linanthus	sc, plk, kc
Navarretia divericata	divaricate, mountain navarretia	kc
Navarretia intertexta var. intertexta	needleleaf navarretia	plk, kc
Phlox adsurgens	northern, woodland phlox	kc
Phlox gracilis	slender, pink annual phlox	sc, kc
Phlox speciosa	showy phlox	kc, pr
Polemonium carneum	royal Jacob's ladder, salmon pol.	sc, pr
Polygonaceae		
Eriogonum elatum	tall wooly buckwheat	kc
Eriogonum nudum	barestem buckwheat	sc, kc
Eriogonum umbellatum	sulphur-flower buckwheat	sc, kc, pr, og
Eriogonum sphaerocephalum	rock buckwheat	pr
Polygonium arenastrum (aviculare)	oval-leaf, common knotweed	kc
Polygonum douglasii	Douglas knotweed	sc,kc
Polygonum polygaloides	milkwort knotweed	kc
Rumex acetosella	common sheep sorrel, sour dock	plk, kc
Rumex crispus	curly dock	plk, pbp, kc
Rumex salicifolia	willow dock	kc
Portulacaceae		
Claytonia [*Montia*] *parviflora*	littleleaf, smallflower miner's lettuce	sc, kc
Claytonia perfoliata	miner's lettuce	sc
Claytonia rubra ssp. rubra	redstem springbeauty	sc, og
Claytonia sibirica	Siberian springbeauty candy flower	sc, kc, pr
Montia dicomota	dwarf montia	kc
Montia fontana	annual water minerslettuce	kc
Montia linearis	narrowleaf minerslettuce	kc
Portulaca oleracea	little hogweed, common purslane	kc

Table AE -1. Plant Species in the CSNM		
Scientific Name	**Common Name**	**Place**
Potomogetonaceae		
Potomogeton crispus	curly pondweed	jc
Potomogeton nutans	floating pondweed	plk
Primulaceae		
Dodecatheon sp.		kc
Trientalis latifolia [*borealis* var. *latifolia*]	starflower	og, kc, pr
Pteridaceae		
Cheilanthes gracillima	lace lipfern	sc, og
Pellaea brachyptera	Sierra cliffbrake	sc, og
Pentagramma [*Pityrogramma*] *triangularis*	goldback fern	sc
Ranunculaceae		
Aconitum columbianum	Columbia monkshood	kc
Actea rubra	red baneberry	kc, sm, pr
Anemone deltoidea	Columbian windflower	sc, kc, pr
Aquilegia formosa	western columbine	sc, kc, pr
Clematis ligusticifolia	western white clematis	sc
Delphinium menziesii	Menzies larkspur	kc, og
Delphinium nuttallianum	twolobe meadow, larkspur	sc
Isopyrum [*Enemion*] *stipitatum*	Siskiyou false rue anemone	sc, kc
Myosurus apetalus	bristly, least mousetail	kc
Ranunculus aquatilis var. hispidulus	whitewater crowfoot	plk, jc
Ranunculus flammula	greater creeping spearwort	plk
Ranunculus occidentalis	western buttercup	sc, og, kc
Ranunculus orthorhynchus	straightbreak buttercup	kc
Ranunculus repens	creeping buttercup	sc
Ranunculus uncinatus	woodland buttercup	sc, pbp, kc
Rhamnaceae		
Ceanothus cuneatus	buckbrush, wedgeleaf	sc, og, kc
Ceanothus integerrimus	deerbrush, wild lilac	sc, plk, og, kc, pr
Ceanothus prostratus	squaw carpet	plk, kc, og
Ceanothus sanguineus	redstem ceanothus	kc
Ceanothus velutinus	snowbrush	plk, kc
Rhamnus [*Frangula*] *purshiana*	cascara, Pursh buckthorne	sc
Rosaceae		
Amelanchier alnifolia	Saskatoon, western serviceberry	sc, plk, og, kc
Amelanchier utahensis	Utah serviceberry	sc
Aphanes occidentalis	western lady's mantle	sc, kc
Cercocarpus betuloides	birchleaf mountain-mahogany	sc, og, kc
Cercocarpus ledifolius	curlyleaf mountain-mahogany	sm, kc, hb, pdo
Crataegus douglasii	black hawthorn	sc, kc, og
Fragaria vesca	woodland strawberry	plk, og, kc
Fragaria virginiana	Virginia strawberry	kc
Geum macrophyllum	largeleaf avens	plk, pbp, kc
Holodiscus discolor	oceanspray	sc, kc, pr, og
Holodiscus microphyllus	dwarf oceanspray	sc
Horkelia congesta	Sierra, shaggy horkelia	kc
Horkelia daucifloia	carrotleaf horkelia	kc
Oemleria cerasiformis	Indian plum, osoberry	sc, kc
Physocarpus capitatus	Pacific ninebark	sc
Potentilla gracillis	slender cinquefoil	kc
Potentilla glandulosa	sticky cinquefoil	sc, plk, kc

Table AE -1. Plant Species in the CSNM		
Scientific Name	**Common Name**	**Place**
Prunus emarginata	bitter cherry	sc, kc
Prunus subcordata	Klamath plum	sc, og, kc
Prunus virginiana var. demissa	western chokecherry	sc, kc, og
Purshia tridentata	antelope bitterbrush	mu, og
Rosa californica	California wildrose	sc
Rosa gymnocarpa	dwarf, little wood rose	sc, plk, kc, og
Rosa cf. woodii	Wood's rose	plk
Rubus leucodermis	whitebark, blackcap raspberry	sc, kc
Rubus parviflorus	thimbleberry	sc, kc, og
Rubus ursinus	California, trailing blackberry	sc,kc
Sanguisorba minor	small, garden burnet	kc
Sanguisorba occidentalis	western burnet	plk, kc
Spiraea douglasii	Douglas spiraea	plk, kc, og
Rubiaceae		
Galium aparine	stickywilly, catchweed bedstraw	sc, og, kc
Galium bifolium	twinleaf, low mountain bedstraw	kc
Galium boreale	northern bedstraw	kc
Galium oreganum	Oregon bedstraw	kc
Galium parisiense	wall, small weedy bedstraw	sc
Galium porrigens	climbing bedstraw	kc
Galium trifidum	graceful, small bedstraw	kc
Galium triflorum	fragrant bedstraw	sc, kc
Salicaceae		
Populus balsamifera ssp. trichocarpa	black cottonwood	sc
Populus tremuloides	quaking aspen	plk
Salix exigua	narrowleaf willow	sc
Salix lasiolepis	arroyo willow	sc
Salix lucida ssp. lasiandra	Pacific, shining willow	sc, plk, kc
Salix scouleriana	Scouler willow	sc, plk, kc
Saxifragaceae		
Heuchera micrantha	crevice, small flower alumroot	sc, kc
Lithophragma affine	San Francisco woodland-star	sc
Lithophragma parviflorum	smallflower woodland-star	sc, kc, pr
Mitella diversifolia	angleleaf mitrewort	sc
Mitella trifida	threeparted, threetooth mitrewort	sc, kc, pr
Saxifraga ferruginea	russethair, rusty saxifrage	kc
Saxifraga integrifolia	wholeleaf, northwestern saxifrage	sc, kc
Tellima grandiflora	bigflower tellima, large fringecup	kc
Tolmiea menziesii	youth on age, pig-a-back plant	sc, kc
Scrophulariaceae		
Castilleja applegatei	wavyleaf Indian paintbrush	sc, kc
Castilleja [Orthocarpus] attenuata	attenuate Indian paintbrush	kc
Castilleja pruinosa	frosted Indian paintbrush	sc, kc
Castilleja [Orthocarpus] tenuis	hairy Indian paintbrush	kc, pr
Collinsia grandiflora	giant blue eyed Mary	pr
Collinsia linearis	narrowleaf blue eyed Mary	sc, kc
Collinsia parviflora	smallflower blue eyed Mary	sc, og, kc
Collinsia rattanii	sticky blue eyed Mary	sc, og
Mimulus alsinoides	wingstem monkeyflower	sc
Mimulus guttatus	seep, yellow monkeyflower	sc, pbp, kc, og
Mimulus moschatus	muskflower	sc, plk, kc

Table AE -1. Plant Species in the CSNM

Scientific Name	Common Name	Place
Orthocarpus bracteosus	rosy owl's-clover	og
Pedicularis densiflora	Indian-warrior	kc
Pedicularis racemosa	sickletop lousewort	kc
Penstemon deustus	scabland, hotrock penstemon	sc, og, kc, pr
Penstemon azureus var. *azureus* [*parvulus*]	azure penstemon	pr
Penstemon procerus	littleflower penstemon	kc
Penstemon roezlii	roezl, purple penstemon	sc, kc
Penstemon speciosus	showy penstemon	sc
Scrophularia lanceolata	lanceleaf figwort	sc
Synthyris reniformis	snowqueen, grouse flower	sc, plk, kc
Tonella tenella	smallflower tonella	sc, kc
Verbascum blatterae	moth mullein	kc
Verbascum thapsis	common, wooly mullein	plk, kc, og
Veronica americana	American brooklime, speedwell	pbp, kc
Veronica peregrina ssp. xalapensis	neckweed	sc
Veronica persica	birdeye, winter speedwell	sc
Veronica scutellata	skullcap speedwell	plk
Veronica serpyfolia	thymeleaf speedwell	kc
Selaginellaceae		
Selaginella wallacei	Wallace spikemoss	sc
Solanaceae		
Solanum parishii	Parish nightshade	sc, kc
Taxaceae		
Taxus brevifolia	western yew	kc
Typhaceae		
Sparganum emersum var. emersum [*angustifolium*]	narrowleaf, simple-stem burweed	plk, pbp
Typha latifolia	broadleaf cattail	plk,, pbp, jc, kc, mu, og

Table AE -1. Plant Species in the CSNM

Scientific Name	Common Name	Place
Valerianaceae		
Plectritis brachystemum [*congesta* ssp. *b.*]	shortspur seablush	sc
Plectritis congesta	shortspur seablush, rosy cornsalad	sc, kc
Valeriana sitchensis	Sitka valerian	pr
Valerianella locusta	Lewiston, European cornsalad	og, kc
Verbenaceae		
Verbena lasiostachys	western vervain	sc
Violaceae		
Viola douglasii	Douglas golden violet	kc
Viola glabella	pioneer, stream violet	sc, kc
Viola praemorsa	canary, Astoria violet	kc
Viola purpurea	goosefoot, purpletinged violet	kc
Viola sheltonii	Shelton violet	sc, og, kc
Viscaceae		
Arceuthobium abietinum	fir dwarf mistletoe	sc
Arceuthobium douglasii	Douglasfir dwarf mistletoe	sc
Arceuthobium campylopodium	western dwarf mistletoe	sc
Phorodendron densum	dense mistletoe	sc
Phorodendron libocedri	incense cedar mistletoe	sc
Phorodendron villosum	Pacific, oak mistletoe	sc
Vitaceae		
Vitis californica	California wild grape	sc

Appendix F - Introduced Plant Species in CSNM

Table AD -1. Introduced Plant Species

Scientific Name	Common Name	Scientific Name	Common Name
Agropyron intermedium	intermediate wheatgrass	*Holosteum umbellatum* ssp. *umbellatum*	jagged chickweed
Agrostis tenuis	colonial bentgrass	*Hordeum marinum*	Mediterranean barley
Aira caryophyllea	silver European hairgrass	*Hypericum perforatum*	klamathweed
Alyssum alyssoides	pale madwort	*Hypochaeris radicata*	false-dandelion
Anthemis cotula	mayweed	*Isatis tinctoria*	dyer's woad
Anthriscus caucalis	bur-chervil	*Lactuca serriola*	prinkly lettuce
Arenaria serpyllifolia ssp. *serpyllifolia*	thymeleaf sandwort	*Lactuca seligna*	least lettuce
Aribidopsis thaliana	mouse-ear cress	*Lepidium campestre*	field pepperweed
Brassica nigra	field mustard	*Leucanthemum vulgare*	oxeye daisy
Bromus diandrus	ripgut grass	*Linaria dalmatica*	dalmatian toadflax
Bromus hordeaceus	soft brome	*Lolium perenne*	perennial rye
Bromus japonicus	Japanese brome	*Lolium multiflorum*	annual ryegrass
Bromus madritensis ssp. *rubens*	foxtail chess	*Lotus corniculatus*	bird's foot trefoil
Bromus secalinus	rye brome	*Lythrum salicaria*	purple loosestrife
Bromus sterilis	poverty brome	*Melilotus alba*	white sweet-clover
Bromus tectorum	cheat grass	*Mentha pulegium*	pennyroyal
Capsella bursa-pastoris	shepard's purse	*Phleum pratense*	timothy
Centaurea maculosa	spotted knapweed	*Plantago major*	common plantain
Centaurea pratensis	meadow knapweed	*Plantago lanceolata*	English plantain
Centaurea solstitialis	yellow star-thistle	*Poa palustris*	fowl bluegrass
Centaurea diffusa	diffuse knapweed	*Poa bulbosa*	bulbous bluegrass
Centaurium erythraea	European centaury	*Poa pratensis* ssp. *pratensis*	Kentucky bluegrass
Cerastium glomeratum	mouse-ear chickweed	*Prunella vulgaris* var. *vulgaris*	self-heal
Cerastium fontanum ssp. *vulgare*	big chickweed	*Ranunculus repens*	creeping buttercup
Chenopodium botyrs	Jerusalem-oak goosefoot	*Rubus discolor*	Himalayan blackberry
Cichorium intybus	chicory	*Rumex acetosella*	sheep sorrel
Cirsium arvense	Canada thistle	*Rumex crispus*	curly dock
Cirsium vulgare	bull thistle	*Sonchus asper*	prickly sow-thistle
Convolvulus arvensis	field bindweed	*Stellaria media*	common chickweed
Conyza canadensis	horseweed	*Taeniatherum caput-medusae*	medusahead
Crepis capillaris	smooth hawksbeard	*Taraxacum officinale*	common dandelion
Cuscuta pentagona	dodder	*Torilis arvensis*	spreading hedgeparsley
Cynosurus echinatus	hedgehog dogtail	*Tragopogon dubius*	yellow salsify
Dactylis glomerata	orchard grass	*Tragopogon porrifolius*	blue salsify
Daucus carota	Queen Anne's lace	*Trifolium hirtum*	rose clover
Dianthus armeria	Deptford pink	*Trifolium pratense*	red clover
Dipsicus sylvestris	teasel	*Trifolium repens*	white clover
Elytrigia intermedia ssp. *intermedia*	intermediate wheatgrass	*Trifolium dubium*	shamrock
Erodium cicutarium	redstem stork's bill	*Verbascum blattaria*	moth mullein
Festuca arundinaceae	tall fescue	*Verbascum thapsus*	flannel mullein
Galium parisiense	wall bedstraw	*Veronica persica*	Persian speedwell
Geranium molle	dovefoot geranium	*Vulpia bromoides*	brome fescue
Holcus lanatus	velvet-grass	*Vulpia myuros* var. *hirsuta*	rat-tail fescue

Appendix G-
Soda Mountain WSA Fire Management Plan

BUREAU OF LAND MANAGEMENT
MEDFORD DISTRICT OFFICE
3040 Biddle Road
Medford, Oregon 97504

March 16, 1987

MEMORANDUM

TO:State Director, 944
FROM:District manager, Medford

SUBJECT:Fire Management Plan for Wilderness Study Areas

Attached is the Fire Management Plan for the Mountain Lakes and Soda Mountain Wilderness Study Areas. The Plan was prepared in response to Instruction Memorandum No. OR-87-143.

There are two major points about the plan that I would like to emphasize. First, the fire management policies and guidance stated in the plan meet or exceed the Bureau's Interim Management Plan for Wilderness Study Areas and the Field Guide for Management Actions in Wilderness Study Areas. Second, the Soda Mountain WSA, because of its established fire dependent ecosystem, presents an opportunity for us to establish an effective wilderness fire management program.

Both environmental groups and resource managers have realized that the total exclusion of fire may be more damaging to an ecosystem than periodic burning. In the years ahead, using this plan as a starting point, I hope we will more fully utilize fire as a wilderness management tool.

David A. Jones

Attachment:
Fire Management Plan

SODA MOUNTAIN, MOUNTAIN LAKES WILDERNESS STUDY AREAS FIRE MANAGEMENT PLAN 1987

Prepared by: Clay W. Moore, Fire Management Specialist, 3/16/87

Reviewed by: Dorothy Mason, Assistant Area Manager, 3/17/87

Fred Tomlins, Outdoor Recreation Planner, 3/18/87

L. Roger Van Buskirk, Fire Management Officer, 3/17/87

Recommended by:Lance Nimmo, Area Manager, 3/17/87

David A. Jones, District Manger, 3/18/87

Approved by: Charles W. Lusher, State Director, 6/11/87

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INTRODUCTION

This plan will provide direction and guidance to Bureau of Land Management (BLM) managers, Oregon State Department of Forestry (OSDF), U.S. Forest Service (USFS), and California Division of Forestry (CDF) fire protection personnel. The plan is designed to be of a protective, interim nature until the Soda Mountain and Mountain Lakes wilderness study areas (WSA) are either designated as wilderness or withdrawn from further study.

MANAGEMENT OBJECTIVE

In accordance with the Interim Management Plan (IMP) for wilderness study areas, prepared in 1979 and revised in 1983, the BLM and responsible protection agencies will continue all presuppression, suppression and post-suppression fire activities in wilderness study areas, using caution to avoid unnecessary impairment of the areas suitability for preservation as wilderness.

LEGAL DESCRIPTIONS

Soda Mountain WSA: The boundary of the Soda Mountain WSA, encompassing 5,640 acres, is defined as beginning at the southwest corner of Section 34, T. 40 S., R. 3 E., thence east along a line for one-quarter mile, thence north along a line for one-half mile, thence east along a line for one-quarter mile, thence north along a line for one-half mile, thence east along a line to the northeast corner Section 34, T. 40 S., R. 3 E., thence in an approximate southeasterly direction along the Pacific Power and Light Co. 115 KV powerline to where it intersects the Lone Pine Ridge Road on the east line of Section 12, T. 41 S., R. 3 E., thence in a westerly and northerly direction along the Lone Pine Ridge Road to where it intersects the Pilot Rock Jeep Road in the southwest portion of Section 31, T. 40 S., R. 3 E., thence east along the Pilot Rock Jeep Road to the northwest corner of Section 32, T. 40 S., R. 3 E., thence south along a line for one-quarter mile, thence S 870E to the east line of Section 35, T. 40 S., R. 3 E., thence south along a line to the point of beginning.

Because of the very irregular shape of this WSA, and prior use of the Lone Pine Ridge and Pilot Rock Jeep Roads for fire protection purposes, these road shall be considered the WSA boundary for fire management purposes.

Mountain Lakes WSA: The boundary of the Mountain Lakes WSA, encompassing 334 acres of public land, is defined as beginning at the northwest corner of Section 31, T. 37 S., R. 7 E., thence along a line for one-half mile, thence south along a line for one mile, thence west along a line to the southwest section corner of Section 30, T. 37 S., R. 7 E., thence north along a line to the point of beginning.

GENERAL DESCRIPTION

Soda Mountain WSA: The study area lies on the steep, south-facing slopes of Soda Mountain. It is comprised of ridges and peaks ranging in elevation from 2,800 to 6,000 feet. There are three major drainages bisecting the WSA, Camp Creek, Dutch Oven Creek, and Salt Creek. Soils consist of Skookum very cobbly clay and Heppsie clay below 4,000 feet with the Skookum series being the most common. McNull gravelly loam, Woodseye stony loam and McMullin-Rock outcrop are generally found at the 3,000 to 4,200 foot elevations; the McNull series would be the most common soil type found at this elevation. Farva cobbly loam and Hobit loam soil types are found at the 4,200 to 6,000 feet elevation with the Farva series being the most common soil type. Vegetation in the WSA consists primarily of perennial and annual grasses, shrubs and forbs at the lower elevations (2,800 to 3,500 feet). Shrubs and scattered patches of timber dominate at the higher elevations. Tree species such as Ponderosa Pine (*Pinus ponderosa*), Douglas-fir (*Pseudotsuga menziesii*), and Incense Cedar (*Libocedrus decurrens Torr*), are mostly found on slopes which have a northerly to westerly aspect.

Mountain Lakes WSA: The Mountain Lakes WSA is east of, and adjacent to the Mountain Lakes Wilderness Area administered by the Dept. of Agriculture, U.S. Forest Service. The study area lies on the steep east slope of Aspen Butte and is isolated from most other BLM administered land. Elevation of the area ranges from 5,000 to 6,300 feet. Soils in the WSA have a parent material of fine grained andesitic basalt, and are classed as Woodcock stony loam on the lower third of the WSA, and Oatman cobbly loam at the higher elevations. Vegetation of the study area is classed as being in the mixed conifer zone. Primary forest species found are White Fir (*Abies Concolor*), Douglas-fir, Ponderosa Pine and Shasta Red Fir (*Abies magnifica shastensis*). White Fir, Douglas Fir and Ponderosa Pine occur at 5,200 to 5,600 feet elevation. White Fir and Shasta Red Fir are dominant at 5,600 to 6,200 feet. This forest type is characteristically broken by brush patches consisting of Golden Chinquapin (*Castanopsis chrysophylla*), and Greenleaf Manzenita (*Arctostaphylos patula*). Pinemat Kinnikinnick (*Arctostaphylos uva-ursi*) is the ground cover type most commonly found in the Shasta Red Fir and White Fir zones.

From field examination, standing timber volume is estimated to be approximately 7.5 million board feet. No threatened or endangered plant species have been found within the Mountain Lakes WSA.

THE NEED TO PREVENT IMPAIRING ACTIONS, AND EXISTING WILDERNESS CHARACTERISTICS

The need to prevent impairing actions: The 1976 Federal Land Policy and Management Act (FLPMA) directs the BLM to manage Wilderness Study Areas in a manner which preserves their suitability for wilderness preservation, except in cases where the safety of persons or personal property are immediately threatened. For fire management considerations Immediately threatened shall mean the fire may cause damage to life or property within the same burning period. The BLM must ensure that proposed or mandatory fire management actions shall not create a situation that would impair the wilderness suitability of the area.

Existing Wilderness Characteristics, Soda Mountain WSA: Steep terrain, dense brush fields, limited stands of commercial timber and difficult access have all contributed to keeping this area in an essentially natural state. The three major drainages, Camp Creek, Dutch Oven Creek and Salt Creek, that bisect the area combined with dense vegetation provide topographic screening. The area provides outstanding opportunities for observing birds and other animals. Water is abundant and scenic vistas are numerous. The Pacific Crest National Scenic Trail borders the northwest portion of the study area. The south slopes are deer winter range with the southeastern portion designated as critical deer winter range. Wilderness-associated game species found in the area include black bear, mountain lion, bobcat and golden eagles. There is great ecological diversity in the area and it is suspected that *Calochorus greenei* and *Cirsium ciliolatum*, which are both candidates for the threatened or endangered federal lists, may be found in the WSA. (If observed, these plant species are to receive the same protection as federally listed threatened or endangered species).

Existing Wilderness Characteristics, Mountain Lakes WSA: There is a direct relationship between this WSA and the existing Mountain Lakes Wilderness Area. The fact that the two are adjacent is the reason this area is being studied. if designated as wilderness at the completion of the study, the area would help maintain the integrity of the Mountain Lakes Wilderness Area. When considered as an addition to the existing wilderness area, the Mountain Lakes WSA offers outstanding opportunities for solitude and primitive recreation in generally natural conditions. From an ecological view there are no unique features in the area. The primary uses of the area are currently wildlife habitat, watershed protection, hunting and back-country hiking. The steep slopes and limited access, has helped maintain the natural appearance of this area.

NATURAL ROLE OF FIRE AND FIRE CHARACTERISTICS

Soda Mountain WSA: Plant communities in this area are dynamic. In the past, fire has been a major natural component that ensured change. Though a detailed fire history study of the Soda Mountain WSA has not been undertaken, sufficient data has been collected so the role of fire and fire characteristics of the area can be discussed in generalized terms. Plant communities found in the area are classed as the Sclerophyllous hardwood type. Dominant genera include Arctosaphylos, Ceanothus and Quercus. These plants are characterized by extensive root systems, dense rigid branching and small leaves. Sprouting after fire is the most common reproduction strategy employed by the Sclerophyllous hardwood species. Most plants in the community have resistant seeds that retain their viability for decades and in some cases require fire or extreme heat before they can germinate. Because of this, fire serves as the major cause of succession by creating the conditions necessary for establishment and perpetuation of most species found. Different intervals between fires can shift species composition or with the total exclusion of fire, some species may disappear from the area entirely. Long intervals between fires may allow the Sclerophyllous hardwoods to mature and after 30 to 50 years, plants may contain 25 to 50 percent dead woody material. This is the stage vegetation is currently at in the Soda Mountain WSA. Thus, when a fire does start, it could be extremely intense and fast moving.

The effect of fire on the soils in the study area is dependent on fuel accumulations (duff and litter layers), soil moisture conditions and fire intensity. Soil erosion is usually accelerated following a fire in this area. Depending on the intensity and resident time of the fire on a given area, water repellent layers could be formed. Nutrients will be temporarily increased, but because of the generally high intensities encountered in this fuel type, nitrogen and potassium may be volatilized; here again, it would be dependent on the resident time of the fire on a given area. The chance of having sustained fire intensities for a period of time sufficient to damage the soil types identified in the WSA is minimal for the majority of the area.

Mountain Lakes WSA: The exact role of fire, and fire characteristics of the vegetation in this area is not known. This is true of all the mixed conifer zones found in south central and southwestern Oregon. Frequency of fire occurrence is low at the higher elevations and moderate to high at the lower elevations in the Ponderosa Pine zone. In the gradient from Ponderosa Pine to White Fir to Shasta Red Fir, species display a range of shade and fire tolerance. Pine needles form flammable fuel beds which are conducive to burning. The White Fir type has a compact fuel bed that burns less often. It is known that fire can and does create small openings where moisture becomes available after the death of one or more of the mature trees and if the opening is not too large, trees can compete with the Sclerophyllous hardwoods. The exact role of fire in the reproductive strategies of these forest species is now known, but it is not considered critical to perpetuation of these forest species. Brush fields may develop on burned areas depending on size of opening created and significantly slow the rate of forest succession. Repeated burning of these brush fields may make them semi-permanent communities. It is suspected by researchers that the most dramatic role of fire in this vegetative type is the maintenance of fire tolerant species over shade tolerant species.

Fires in this forest type do not result in universal burning over the entire soil surface; therefore, soil erosion seldom occurs. Nutrient levels will be temporarily increased after burning, and since fires are of generally low intensity, volatilization of nitrogen and potassium should not occur. Formation of water-repellent layers is also not critical in this area.

FIRE MANAGEMENT POLICY AND GUIDANCE

Past fire occurrence

According to Oregon State Forestry records, approximately fifteen fires occurred in the vicinity of the Soda Mountain WSA between the years 1976 to 1984. These fires were between one-quarter to five acres in size with an occurrence of one fire in 1976 to five fires in 1984.

Because of the small size of the Mountain Lakes WSA, records showing past fire occurrence in this area are not available. It is suspected that when fires did occur they were of a low intensity and one-quarter acre or less in size.

Prescribed Fire

Prescribed natural fire, resulting from unplanned ignitions, will not be allowed to occur in the WSAs at this time. Provisions for allowing prescribed natural fire in the Soda Mountain WSA may be incorporated into this fire management plan when the fire environment and fire regime that currently exist can be identified, and fire management areas established. The possible future use of prescribed natural fire shall pertain only to the Soda Mountain WSA.

Prescribed fire, resulting from planned ignitions, shall be permitted in the Soda Mountain WSA to maintain the natural condition of a fire dependent ecosystem. Use of prescribed fire, utilizing planned ignitions in the WSA, will require development and circulation of an Environmental Analysis. The U.S. Forest Service policy of not allowing planned ignitions in wilderness areas shall apply to the Mountain Lakes WSA.

Smoke Management

The Soda Mountain WSA is approximately seven miles southeast of the boundary of the Medford/Ashland non-attainment area. The Mountain Lakes WSA is approximately 40 miles south of Crater Lake National Park and 13 miles northwest of Klamath Falls, Oregon. Since prescribed fire resulting from planned or unplanned ignitions are not permitted in the Mountain lakes WSA, smoke intrusions in either Klamath Falls or Crater Lake National Park, will be the result of wildfire and considered unavoidable. Prescribed burning resulting from planned ignitions in the Soda Mountain WSA will be done in accordance with the Oregon Smoke Management Plan.

Pre-suppression and Suppression Guidance

Protection agencies will notify the Bureau of Land Management, Medford District Office, immediately when a fire is reported in, or has the potential to enter either the Mountain Lakes or Soda Mountain WSAs. Telephone numbers and names of individuals that may be contacted are listed in the appendix.

When a fire report is received, a BLM Resource Advisor shall be assigned to the fire and will contact the responsible protection agency as soon as possible. A list of qualified resource advisors and their telephone numbers are listed in the appendix. It will be the function of the Resource Advisor to:

1. Obtain the legal description of the fire, existing and expected fire behavior and current fire weather information.

2. Assist protection agency officials in identifying threatened resource, cultural or social values.

3. Act as a liaison between the protection agency and the BLM Medford District for specific fire management actions where District or Area manager approval is required.

4. Complete a Fire Behavior Report and Suppression Response Evaluation form which is attached to this plan (see appendix). These reports shall be completed as needed so an accurate record of fire activities may be kept. The reports will be given or sent to the Medford District Fire Management Officer in a timely manner to ensure BLM management officials are kept current of the on going fire situation. If the Resource Advisor is unable to bring the completed reports into the District Office, he/she will call the reports in by radio or telephone.

A suppression response used in a WSA shall be mutually agreed upon between the BLM Resource Advisor and the responsible protection agency official. This may be done in advance of fire season, by the BLM requesting a copy of each protection agencies dispatch cards for the WSA'S. Suppression tactics and methods will be based on safety considerations, existing and predicted fire behavior and existing and predicted fire weather conditions. Decisions made should be based on more than economics since political and social values are valid when deciding the appropriate suppression response in a wilderness study area.

If the initial suppression response dictated by the dispatch card and burning index is modified by the BLM so as not to impair wilderness suitability and/or values, and this results in a cost that would not normally be incurred by the protection agency, the BLM will pay the additional cost.

A BLM Resource Advisor shall be required to be on-site at the fire if:

1. BLM management officials feel it would be beneficial to have a resource advisor on site.

2. The fire exceeds, or is expected to exceed, the initial attack response.

3. The fire is not expected to be contained in the same burning period.

When a resource advisor is dispatched to the fire, he/she shall work directly with the assigned incident commander. The resource advisor may request a reconnaissance flight to appraise the fire situation. An official from the protection agency may accompany the resource advisor on this flight. Determination of whether a flight is required shall be made by BLM officials. Their decision shall be based on current fire behavior and fire weather conditions. The flight will be made in accordance with BLM regulations and at BLM's expense. A special use flight plan has been prepared, approved and is attached to this plan.

Specific Policies and Guidance for Suppression and Post-Suppression Activities

The following suppression activities will not impair wilderness values if carried out as specified, and reclamation satisfies IMP criteria as approved by the area manager in whose jurisdiction the fire occurred.

EARTH-MOVING EQUIPMENT SHALL NOT BE USED WITHOUT PRIOR APPROVAL OF THE BLM's MEDFORD DISTRICT MANAGER. THIS AUTHORITY MAY NOT BE DELEGATED AND THERE WILL BE NO EXCEPTIONS.

• Firelines will be located to take advantage of natural barriers, such as rock outcroppings, streams and changes in vegetative types.

• Firelines scraped to mineral soil shall be covered with the material removed from them and shall be no wider than minimum necessary to stop the spread of the fire.

• Unburned material may be left inside the fireline. All such material will be felt/tested with bare hands to ensure no sparks, or glowing embers remain. Limbs, logs and other material turned parallel to the slope to prevent rolling and spotting will be placed or scattered to resemble a natural condition.

• Waterbarring of firelines will be done if needed to prevent accelerated erosion.

• Limbing of trees along the fireline shall be done only if necessary for fire suppression and/or fire fighter safety.

• Burning snags or trees shall be felled only when they are a definite threat to fire containment or the safety of fire fighters. As a guide, snags inside the established fire control line a distance equal or exceeding their height may need not be cut.

• Logs within the proposed fireline will be rolled out of their beds. If rolling is not possible, let the log burn if a fireline can reasonably be constructed around it.

• Helicopters should land in natural openings where only minimal improvements are necessary. Heliports should be constructed outside WSA's if possible.

• Except for spot maintenance to remove obstructions, ways, trails or water sources should not be improved. If improved, they should be restored to their pre-fire condition if possible.

• Fire engines, tankers and other non-earth moving equipment should be used on existing ways to the extent feasible. Such equipment may be used cross country where necessary, but such use will be held to the absolute minimum. Crossing of streams, springs and seeps should be avoided.

• Use of fire retardants approved by the Dept. Agriculture, U.S. Forest Service may be used.

REHABILITATION GUIDELINES

Soil conservation and protection is the criterion to be used for rehabilitation decisions. Undesirable fire effects such as the return of poor forage or reduction of wildlife browse are not issues that would require emergency rehabilitation actions. It shall be assumed off-site values will be protected if soils are protected.

If seeding is proven to be necessary to protect soils, use of seed drills or planting of non-native species shall not be done without approval of the BLM's Oregon/Washington State Director. All proposals for rehabilitation projects shall have an Environmental Analysis prepared and distributed at the same time justification for emergency funding is sent to the BLM State Office for review.

SUMMARY

As stated in the introduction, this plan is designed to be of a protective, interim nature. The Mountain Lakes WSA, if designated as wilderness, may be incorporated into the existing Mountain Lakes Wilderness Area. Further fire management recommendations for the Mountain Lakes WSA shall not be made as this plan is supplemented and updated. It should be emphasized that the Dept. of Interior's IMP and Field Guide for Management Actions in WSA's shall apply until the area is designated as wilderness or withdrawn from further consideration.

The Soda Mountain WSA presents a greater challenge. Since the ecosystem of this area has evolved with fire, this plan should be supplemented to ensure fire remains a natural process within the area. Past fire protection programs have modified the ecosystem of the area and increased the potential of a catastrophic fire occurring. To correct this, it will be necessary when making future management recommendations to incorporate prescribed fire, both natural and planned into this fire management plan. Doing so will produce and maintain a dynamic ecosystem that will enhance the wilderness characteristics of the area as well as improving the habitat for wildlife that uses the area.

Appendix H - How Fire Risk Rating was Calulated

The following figure displays the fire occurrence and fire frequency within the CSNM.

Table AH-1. Fire Occurrence and Associated Fire Frequency.

Size Class	Number of Fires	Annual Fire Frequency
0.25 acres	186	8.01
.025 - 10 acres	41	1.76
10 - 100 acres	4	0.17
101-1000 acres	1	0.04

Fire history data (table AH-1) over the past 31 years show that 75 of the 232 fires which have occurred in the CSNM were on Bureau of Land Management land. These fires had an average size of 0.74 acres and the average response time to these fires was three hours. One hundred and fifty-seven fires started on private land with an average size of 3.7 acres and an average response time of 1 hour. Initial attack was done primarily (92%) with hand crews and engines. Sixty-five percent of the fires occurred under high to extreme fire danger ratings with an average size of 5.4 acres in extreme conditions and 1.4 acres in high conditions. The remaining fires which occurred during fire season averaged 0.47 acres. Refer to maps 23, 24, 25 and 26 for more specific information regarding attack type, fires by ownership, fire size, and fires by danger type.

A fire risk rating was developed for the CSNM. The following formula was used to arrive at the fire risk rating.

Risk Rating= {(x/y)10}/z
x= number of starts recorded for the area from the fire start data base.
y= period of time covered by the data base.
z= number of acres analyzed (displayed in thousands).

Low Risk = 0-0.49; this projects one fire every 20 or more years/thousand acres.
Moderate Risk = 0.5-0.99; this projects one fire every 11-20 years/thousand acres.
High Risk = greater than 0.99; this projects one fire every 0-10 years/thousand acres.

Risk Rating for the CSNM = {(232/32)10}/85,173 = .0008

Appendix I - Fire Hazard Rating

In the fall of 1995 a team of fuel management specialists was formed to develop a standard method which could be used to assign a fire hazard rating to an area. Specialist were from the Medford BLM and the Rogue River National Forest. Based on local knowledge of fire behavior of southwest Oregon the following factors were determined to be necessary in order to assign fire hazard rating to an area.

- Fuel Model
- Presence of Ladder Fuels
- Slope
- Aspect
- Elevation

The second step was to assign a point system to these factors. The following point system is what was developed by the team.

1) Fuel Models	
• Fuel Models 1,2,3,8	0 points
• Fuel Models 5,6,9	5 points
• Fuel Models 11,10	10 points
• Fuel Models 4,12,13	15 points
2) Slope	
• less than 20%	5 points
• 20%-45% slope	10 points
• greater than 45%	25 points
3) Aspect	
• 315-360 & 0-68 degrees	5 points
• 68-135 &293-315 degrees	10 points
• 135-293 degrees	15 points
4) Elevation greater than 4,500 feet	-10 points
5) Presents of Ladder Fuels	10 points

Hazard ratings were based on the summation of total points assigned to these factors. The following fire hazard rating was developed.

Appendix AI-1. Table 1. Hazard Rating Classes

Points	Hazard Rating
0-24	Low
25-50	Moderate
> 50	High

Field inventory and satellite data was used to establish fuel models and the presence of ladder fuels for all lands within the CSNM. This information was used to produce layers for fuel model and ladder fuels in GIS. These two layers along with layers on slope, aspect and elevation which already existed in GIS were used to give a hazard rating to all lands within the CSNM.

Appendix J - Prioritization of Fuels Treatments in CSNM

A major objective for fuels management treatments in the CSNM is to protect late-successional habitat (habitat 1 and 2). To achieve this objective several factors need to be considered in order to prioritize areas for treatment. The location and the Fire Hazard Ratings of an area are the two main criteria.

In regards to location, areas within 1/4 mile of LSOG habitat 1 and 2 would be given a high priority for fuels hazard reduction work. Another key criteria for prioritizing fuels reduction work is along the ridge line that runs from Pilot Rock to Soda Mountain and Keene Ridge which runs from Soda Mountain to Jenny Creek. This ridge line has been identified as a strategic natural feature by ODF for indirect fire suppression measures. Road access is limited or does not exist in the majority of areas south of these ridge lines. Without access response time to fires is increased and firefighter safety can be compromised due to the limitation of escape routes. Fires burning with moderate to high fire intensities would limit fire suppression efforts to indirect measures. Prioritizing fuels management work along and adjacent to this ridge line would reduce current fuel loadings which would increase the probability that indirect measures would be successful.

The Fire Hazard Ratings of an area would be used based on the rating of high, moderate and low respectively.

Prioritization of areas for treatment exclude the Soda Mountain Wilderness Study Area, Scotch Creek RNA and Oregon Gulch RNA.

Implementation Priorities for Alternative B

1. All areas classified as moderate and high fire hazard within Habitat 3 should be treated. Approximately 3,400 acres are in this category.

Implementation Priorities for Alternative C

1. All areas classified as high fire hazard within Habitat 1 and 2 should be treated. Approximately 1,770 acres are in this category and Map 43 shows the location of these areas.

2. All areas classified as high fire hazard within 1/4 mile of habitat types 1 and 2 should be treated. Approximately 3,955 acres are in this category and Map 43 shows the location of these areas. The prioritization of treatment would be as follows:

3.
- Habitat Type 3 (approximately 346 acres)
- Habitat Type 4 (approximately 2,614 acres)
- Habitat Type 5 (approximately 839 acres)
- Habitat Type 6 (approximately 157 acres)

4. Areas which have been classified as moderate hazard in habitat 3 and are within 1/4 mile of habitat types 1 and 2 (map 44). Approximately 2,000 acres are in this category.

Implementation Priorities for Alternative D

1. All areas classified as high fire hazard within Habitat 1 and 2 should be treated. Approximately 1,770 acres are in this category and Map 43 shows the location of these areas.

2. All areas classified as high fire hazard within 1/4 mile of habitat types 1 and 2 should be treated. Approximately 3,955 acres are in this category and Map 43 shows the location of these areas. The prioritization of treatment would be as follows:
- Habitat Type 3 (approximately 346 acres)
- Habitat Type 4 (approximately 2,614 acres)
- Habitat Type 5 (approximately 839 acres)
- Habitat Type 6 (approximately 157 acres)

3. Areas which have been classified as moderate hazard in habitat 3 and 5 and are within 1/4 mile of habitat types 1 and 2 (map44). Approximately 6,400 acres are in this category.

Fuels Management Treatments

An array of treatments can be utilized to modify vegetative patterns and reduce high fuel levels. Factors such as existing and projected fuel loadings, existing vegetative conditions, slope, and access have to be taken into consideration for prescribing the type of fuels management treatment that should be implemented. These treatments include mechanical methods, manual treatments, prescribed burning or a combination of these treatments.

Fuels have accumulated within the CSNM, due to the absence of fire, which precludes single entry fuels treatment in most areas. The energy release from prescribed fire as the initial entry would exceed desired intensity levels and have undesirable effects on vegetation and soil. A combination of mechanical or manual treatments with prescribed fire is necessary to insure all resource objectives are met.

Mechanical treatment of fuels is limited to slopes less than 40 percent. Manual treatment of fuels consist of hand cutting of existing ladder fuels and then hand piling this material so it can be burned.

Prescribed burning includes, underburning, broadcast and handpile burning. Handpile burning is utilized in areas which have been manually treated. This type of burning takes place in the late fall and winter after a significant amount of rainfall has occurred.

Underburning is the preferred method of fuels reduction work in stands of conifers and hardwoods. Underburning is a low intensity surface fire which can be highly effective in reducing a large amount of surface fuels and some ladder fuels. Prescribed underburning is conducted during weather conditions (usually late winter and spring) when the moisture levels in the ground fuels allow for low intensity fire. Current and predicted weather conditions such as wind, humidity, and temperature are monitored closely and taken into account prior to igniting a prescribed underburn and fire lines are constructed where needed around the perimeter of the unit. This attention allows for a controlled burning situation.

Broadcast burning is used in grasslands and shrublands to restore native vegetation and modify seral stages in vegetative communities. This type of burning would occur in the late summer, fall or early winter.

Access is a key factor that has to be taken into consideration when conducting prescribed burning. Without access there can be an increase risk of escape due to the lack of availability and mobility of people, equipment and water. This can be mitigated in some cases by burning at times of the year which decrease the chance of escape. These times are late fall, winter, and early spring. Limited access may preclude the use of prescribed burning in some cases.

Appendix K - Fuel Model Definitions

Fuels have been classified into four groups: grasses, shrubs, timber, and slash. The differences in these groups are related to the fuel load and distribution of fuel among size classes. Size classes are: 0-1/4" (1 hour fuels), 1/4-1" (10 hour fuels), 1-3" (100 hour fuels), and 3" and greater (1,000 hour fuels). A description of the fire behavior fuel models documented by Albini (1976) is contained in the following table:

Table AK-1. Description of fire behavior fuel models

FUEL MODEL Typical Fuel Complex	FUEL LOADING (tons/acre)				FUEL BED DEPTH (in.)
	1 Hr	10 Hr	100 Hr	Live	
GRASS AND GRASS-DOMINATED					
1-Short Grass (1 ft.)	0.74	0.00	0.00	0.00	1.0
2-Timber (Grass and understory)	2.00	1.00	0.50	0.50	1.0
3-Tall Grass (2 ft.)	3.01	0.00	0.00	0.00	--
CHAPARRAL AND SHRUB FIELDS					
4-Chaparral (6 ft.)	5.01	4.01	2.00	5.01	6.0
5-Brush (2 ft.)	1.00	0.50	0.00	2.00	2.0
6-Dormant Shrub & Hdwd. Slash	1.50	2.50	2.00	0.00	2.5
7-Southern Rough	1.13	1.87	1.50	0.37	2.5
TIMBER LITTER					
8-Closed Timber Litter	1.50	1.00	2.50	0.00	0.2
9-Hardwood Litter	2.92	0.41	0.15	0.00	0.2
10-Timber (Litter and Understory)	3.01	2.00	5.01	2.00	1.0
SLASH					
11-Light Logging Slash	1.50	4.51	5.51	0.00	1.0
12-Medium Logging Slash	4.01	14.03	16.53	0.00	2.3
13-Heavy Logging Slash	7.01	23.04	28.05	0.00	3.0

The following is a brief description of each of the 13 fire behavior fuel models.

GRASS GROUP

Fire Behavior Fuel Model 1 - Fire spread is governed by the very fine, porous, and continuous herbaceous fuels that have cured or are nearly cured. Fires are surface fires that move rapidly through the cured grass. Very little timber or shrub are present.

Fire Behavior Fuel Model 2 - Fire spread is primarily through cured or nearly cured grass where timber or shrubs cover one to two-thirds of the open area. These are surface fires that may increase in intensity as they hit pockets of other litter.

Fire Behavior Fuel Model 3 - Fires in this grass group display the highest rates of spread and fire intensity under the influence of wind. Approximately one-third or more of the stand is dead or nearly dead.

SHRUB GROUP

Fire Behavior Fuel Model 4 - Fire intensity and fast spreading fires involve the foliage and live and dead fine woody material in the crowns of a nearly continuous secondary over story. Stands of mature shrubs six feet tall or more are typical candidates. Besides flammable foliage, dead woody material in the stands contributes significantly to the fire intensity. A deep litter layer may also hamper suppression efforts.

Fire Behavior Fuel Model 5 - Fire is generally carried by surface fuels that are made up of litter cast by the shrubs and grasses or forbs in the understory. Fires are generally not very intense because the fuels are light and shrubs are young with little dead material. Young green stands with little dead wood would qualify.

Fire Behavior Fuel Model 6 - Fires carry through the shrub layer where the foliage is more flammable than Fuel Model 5, but requires moderate winds greater than eight miles per hour.

Fire Behavior Fuel Model 7 - Fires burn through the surface and shrub strata with equal ease and can occur at higher dead fuel mixtures because of the flammability of live foliage and other live material.

TIMBER GROUP

Fire Behavior Fuel Model 8 - Slow burning ground fuels with low flame lengths are generally the case, although the fire may encounter small "jackpots" of heavier concentrations of fuels that can flare up. Only under severe weather conditions do the fuels pose a threat. Closed canopy stands of short-needled conifers or hardwoods that have leafed out support fire in the compact litter layer. This layer is mostly twigs, needles, and leaves.

Fire Behavior Fuel Model 9 - Fires run through the surface faster than in Fuel Model 8 and have a longer flame length. Both long-needle pine and hardwood stands are typical. Concentrations of dead, down woody material will cause possible torching, spotting, and crowning of trees.

Fire Behavior Fuel Model 10 - Fires burn in the surface and ground fuels with greater intensity than the other timber litter types. A result of over maturing and natural events create a large load of heavy down, dead material on the forest floor. Crowning out, spotting, and torching of individual trees are more likely to occur, leading to potential fire control difficulties.

SLASH GROUP

Fire Behavior Fuel Model 11 - Fires are fairly active in the slash and herbaceous material intermixed with the slash. Fuel loads are light and often shaded. Light partial cuts or thinning operations in conifer or hardwood stands. Clearcut operations generally produce more slash than is typical of this fuel model.

Fire Behavior Fuel Model 12 - Rapidly spreading fires with high intensities capable of generating fire brands can occur. When fire starts, it is generally sustained until a fuel break or change in conditions occur. Fuels generally total less than 35 tons per acre and are well distributed. Heavily thinned conifer stands, clearcuts, and medium to heavy partial cuts are of this model.

Fire Behavior Fuel Model 13 - Fire is generally carried by a continuous layer of slash. Large quantities of material three inches and greater is present. Fires spread quickly through the fine fuels and intensity builds up as the large fuels begin burning. Active flaming is present for a sustained period of time and firebrands may be generated. This contributes to spotting as weather conditions become more severe. Clearcuts are depicted where the slash load is dominated by the greater than three inch fuel size, but may also be represented by a "red slash" type where the needles are still attached because of high intensity of the fuel type.

Appendix L - Fire Suppression Tactics

During suppression activities on all BLM lands within the Cascade-Siskiyou National Monument the following guidelines would be followed:

- BLM resource advisors will be dispatched to all fires which occur on BLM land. These resource advisors are utilized to ensure that suppression forces are aware of all sensitive areas and to insure damage to resources is minimized from suppression efforts.

- When feasible, existing roads or trails will be used as a starting point for burn-out or backfire operations designed to stop fire spread. Backfires will be designed to minimize fire effects on habitat. Natural barriers will be used whenever possible and fires will be allowed to burn to them.

- In the construction of fire lines, minimum width and depth will be used to stop the spread of fire. The use of dozers should be minimized and resource advisors will be consulted when appropriate. Live fuels will be cut or limbed only to the extent needed to stop fire spread. Rehabilitation of fire lines will be considered.

- The felling of snags and live trees will only occur when they pose a safety hazard or will cause a fire to spread across the fire line.

- The construction of helispots should be minimized. Past locations or natural openings should be used when possible. Helispots will not be constructed within riparian reserves, or areas of special concern.

- Retardant or foam will not be dropped on surface waters, or on occupied spotted owl or eagle nests.

- Resource advisors will determine rehabilitation needs and standards in order to reduce the impacts associated with fire suppression efforts.

Within the CSNM, several areas have been identified which limit suppression methods to assure that damage to all unique habitat is minimized. Maps identifying these areas are made available to suppression forces before the start of each fire season. Areas of special concern which require specific fire suppression tactics or limit tactics within the Cascade Siskiyou National Monument are displayed in the following table.

Table AL-1. Suppression tactics for designated special management areas within the CSNM.

Designation	Fire Suppression Tactics
Owl Core Areas	• Protect nest tree and adjacent trees from felling or any type of damage. • Minimize fire damage to owl core area.
Archaeological Sites	• No use of tractors or hand line construction on sites
Scotch Creek RNA	• Confine use of vehicles to existing roads which are adjacent to the RNA. • No use of retardant adjacent to Scotch Creek or other wet areas. • No use of tractors within the RNA boundary.
Oregon Gulch RNA	• Confine use of vehicles to existing roads adjacent to the RNA. • No use of tractors within the boundary of the RNA. • No use of retardant adjacent to creeks or wet areas.
Bean Cabin	• Minimize disturbance to recreation site.
Pacific Crest Trail	• Minimize impacts due to suppression efforts to trail and the immediate area that is visible from the trail. • Allow fire to burn across trail and in surrounding area rather than to put in major tractor lines to suppress fire.
Soda Mountain Wilderness	•Refer to Fire suppression guidelines which follows this table

The following are Fire Suppression Guidelines for the Soda Mountain Wilderness Study Area.

- Protection agencies will notify the BLM immediately when a fire is reported in, or has the potential to enter the WSA.

- A BLM resource advisor shall be dispatched to all fires within the WSA. This individual will assist in identifying threatened resource, cultural or social values within the WSA. They will act as a liaison between the protection agency and the BLM Medford District.

- Earth moving equipment shall not be used without prior approval of the Medford District Manager. This authority may not be delegated and there will be no exceptions.

- Fire lines will be located to take advantage of natural barriers such as rock outcrops, streams and changes in vegetation.

- Unburned material may be left inside the fire line. All such material will be felt/tested with bare hands to ensure no sparks or glowing embers remain. Limbs, logs or other material turned parallel to the slope to prevent rolling will be placed or scattered to resemble natural conditions.

- Water barring of fire lines will be done to prevent accelerated erosion.

- Limbing of trees adjacent to fire lines will be done only if needed for fire suppression and/or fire fighter safety.

- Burning snags or trees will only be felled when they pose a definite threat to the containment of the fire or the safety of fire fighters.

- Logs within the proposed fire line location will be rolled out of their beds. If rolling is not possible fire lines shall be constructed around these logs were possible.

- Helispots should use natural openings where only minimal improvements are necessary. Helispots should be constructed outside the WSA when possible.

- With the exception of removing obstructions, trails and waterways should not be improved. If improvement is necessary they should be restored to pre-fire conditions if possible.

- Fire engines and other non-earth moving equipment used in suppression efforts should use existing roads which are adjacent to the WSA. When this is not feasible efforts shall be taken to minimize crossings of streams, springs or wet areas. Steep slopes should be avoided.

- Use of fire retardant may be used but their use adjacent to existing water sources should be avoided.

Appendix M-Statistical and Demographic Data

A Statistical Overview of Selected Social and Economi Characteristics of the CSNM and of Jackson County

This appendix presents statistical and demographic data related to social and economic conditions in the CSNM area and in Jackson County, Oregon. Much of the discussion and conclusions related to these data is contained in Chapter 2.

Appendix M1--Data Census

Table AM - 1. 1990 Census Data

Category	Pinehurst/Greensprings		Jackson County		State of Oregon	
	#	(%)	#	(%)	#	(%)
Population	1205		146,389		2,842,321	
Population by Ethnic Group						
White	1182	99	140,188	95.8	2,636,787	92
Black	4	<1	340	<1	46,178	<1
American Indian	4	<1			38,496	<1
Asian/Pac Islander	7	<1			69,269	2
Hispanic	25	2.1	5861	4.0	112,707	4
Other	8	<1			51,591	1.8
Age Group Distribution						
0-17	335	27.8	36,705	25.1	724,130	25.8
18-64	744		85,972		1,726,867	
65+	126	10.5	23,712	16.2	391,324	13.8
Median age	38.7		36.7		34.5	
Education						
Postgraduate	125	15.5	5,806	5.9	129,545	6.9
College Degree	135	16.7	11,389	11.7	252,626	13.4
Some College	261	32.3	29,414	30.1	592,902	31.4
High School Diploma	145	17.8	31,547	32.3	536,687	28.5
Less than High School	143	17.7	19,448	19.9	343,609	18.2
Total 25+	809		97,604		1,885,369	
Household Income (1989)						
Households	409		57,400		1,105,362	
Less than $5,000	6	1.5	3,467	6.0	60,824	5.5
$5,000 to $9,999	36	8.8	6,511	11.3	108,006	9.8
$10,000 to $14,999	17	4.2	6,786	11.8	112,425	10.2
$15,000 to $24,999	74	18.1	11,856	21.0	222,693	20.1
$25,000 to $34,999	75	18.3	10,090	17.6	194,886	17.6
$35,000 to $49,999	93	22.7	10,191	17.8	194,702	18.1
$50,000 to $74,999	54	13.2	5,841	10.2	138,482	12.5
$75,000 to $99,999	30	7.3	1,427	2.5	37,088	3.4
$100,000 to $149,999	8	2.0	765	1.3	19,624	1.8
$150,000 or more	16	3.9	466	0.8	11,632	1.1
Median HH Income ($)	34,375		25,069		27,250	

Table AM - 1. 1990 Census Data

Category	Pinehurst/Greensprings #	(%)	Jackson County #	(%)	State of Oregon #	(%)
Income Type in 1989						
Households	409		57,400		1,105,362	
With wage/salary income	327	80.0	40,551	70.6	885,621	75.6
With nonfarm self-emp.	96	23.5	8,700	15.2	159,941	14.5
With farm self-emp inc.	38	9.3	1,392	2.4	33,146	3.0
With Social Security inc.	86	21.0	18,276	31.8	306,040	27.7
With public assistance inc	29	7.1	3,799	6.6	66,998	6.1
With retirement income	70	17.1	10,905	19.0	185,721	16.8
Poverty Rate/Persons						
	55 of 1,246	4.4	18,925/ 143,025	13.2	344,867/ 2,775,907	12.4
Housing						
Total Occupied Units	430		57,238		1,103,313	
Owner Total	346	80.5	37,920	66.2	695,957	63.1
Rental Total	84	19.5	19,318	33.8	407,356	36.9
Monthly Owner Cost as Percent of Household Income in 1989						
Total specified housing units	197		25,057		516,057	
Less than 20%	102	51.8	13,348	53.3	290,891	56.4
20-24%	0	0	3,988	15.9	79,398	15.4
25-29%	40	20.3	2,407	9.6	49,947	9.7
30-34%	13	6.6	1,309	5.2	28,884	5.6
35% or more	42	21.3	3,810	15.2	63,948	12.4
Not computed	0		195	0.8	2,989	0.6
Gross Rent as Percent of Household Income in 1989						
Total specified units	58		18,549		394,927	
Less than 20%	43	74.1	5,165	27.8	127,587	32.3
20-24%	7	12.1	2,449	13.2	56,614	14.3
25-29%	0		2,211	11.9	45,026	11.4
30-34%	0		1,532	8.3	30,105	7.6
35% or more	0		6,200	33.4	117,192	30.0
Not computed	8	13.8	992	5.3	18,403	4.7
Persons per Household (Housing units / pop)						
		2.94		2.55		2.57
Mean travel to work (min)						
		19.7		16.7		19.6
Self-employed						
	89 of 535	16.6	6,922/ 62,704	11.0	122,886/ 1,319,960	9.3

Source: 1990 Census Data, with assistance from Southern Oregon University Regional Services Institute and http://govinfo.orst.edu/stateis.html.

Appendix M2--Intercensal Estimate of Poverty

Table AM - 2. Estimates of Poverty by School District: 1995		
Area/District Name	**Poverty rate for children, 5 to 17 years of age**	**Statewide Rank***
Oregon	13.0	—
Jackson County	14.9	—
Eagle Point	21.4	208
Rogue River	17.9	189
Pinehurst	16.7	170
Ashland	15.4	149
Medford	14.8	138
Phoenix-Talent	13.9	127
Butte Falls	13.3	115
Prospect	9.4	67
Central Point	7.0	39
Josephine County	23.1	—
Grants Pass	22.6	218
Three Rivers	22.4	214

*Out of 236 districts reported
Source: U.S. Census Bureau, February 1999

Appendix M3--Occupational Census

Table AM - 3. A Comparison of Occupational Structures, Pinehurst/Greensprings, Jackson County and State of Oregon Using 1990 Census Data

Industry Category	Pinehurst/ Greensprings CT25, BG1 #	%	Jackson County #	%	State of Oregon #	%
Employed persons 16 yrs & over	535		62,704		1,319,960	
Agriculture, forestry, & fisheries	25	4.7	3,101	4.9	66,730	5.1
Mining	15	2.8	121	0.2	2,479	0.2
Construction	45	8.4	3,908	6.2	74,206	5.6
Manufacturing, nondurable goods	25	4.7	1,740	2.8	61,873	4.7
Manuracturing, durable goods	36	6.7	7,724	12.3	171,335	13.0
Transportation	8	1.5	2,527	4.0	55,283	4.2
Communication & othr pub util	9	1.7	1,261	2.0	31,006	2.3
Wholesale trade	9	1.7	2,667	4.3	61,938	4.7
Retail trade	88	16.4	14,094	22.5	239,010	18.2
Finance, insurance, real estate	25	4.7	3,319	5.3	78,671	6.0
Business and repair services	21	3.9	2,775	4.4	60,660	4.6
Personal services	41	7.7	2,245	3.6	40,768	3.1
Entertainment & recreation serv.	14	2.6	1,114	1.8	17,650	1.3
Health services	50	9.3	5,404	8.6	103,623	7.9
Educational services	81	15.1	4,840	7.7	112,018	8.4
Other professional, rel. services	37	6.9	3,482	5.6	88,577	6.7
Public administration	6	1.1	2,382	3.8	54,133	4.1

Source: 1990 Census, obtained through Southern Oregon Regional Services Institute (SORSI).

The Regional Economic Picture

The regional economy of southern Oregon has been undergoing profound shifts in the last thirty years. The traditional economic sectors of timber production, agriculture, fishing and mining have experienced modest to significant decline, while the trades and services sectors related to recreation, tourism, retirement and computer technology have shown dramatic increases. Regional economists have generally come to believe that the Northwest economy has diversified and matured because of these developments. The traditional sectors will continue to play an important role in the regional economy, while economic choices for average people are widening in significant ways.

A 1995 paper by over 30 economists of the Northwest, almost all affiliated with academic institutions, outlined a consensus position on economic well-being and environmental protection in the Northwest (Pacific Northwest Economists, 1995). They presented information that showed that personal income (labor income, dividends, rent, interest and retirement income) in the region as a whole grew 2.2 times faster than the national average between 1988 and 1994. They also pointed to migration studies that show people moving to this area for quality of life reasons.

Appendix M4 - - Jackson County Economy

Table AM - 4. Jackson County Occupational Structure, 1970-1998									
	1970	1980	1981	1982	1983	1984	1985	1986	1987
Civilian Labor Force	37,240	63,070	65,120	63,820	63,800	64,380	64,060	66,560	69,430
Unemployment	3,040	6,510	8,260	9,220	7,670	6,460	6,000	5,690	4,460
Total Wage and Salary Emp.	26,500	43,500	42,140	39,390	40,790	43,260	44,620	46,770	49,380
Total Manufacturing	6,010	7,690	7,240	6,280	7,550	8,430	8,240	8,390	8,990
Lumber & Wood Products	4,570	5,030	4,700	3,880	4,750	5,100	5,290	5,440	5,910
Other Manufacturing	1,440	2,660	2,540	2,400	2,800	3,330	2,950	2,950	3,080
Total Non-Manufacturing	20,490	35,810	34,900	33,110	33,240	34,830	36,380	38,380	40,390
Const. & Mining	810	1,960	1,320	990	1,040	1,120	1,470	1,780	1,700
Trans., Comm. & Utilities	1,590	2,240	2,160	2,090	2,160	2,350	2,550	2,720	2,790
Trade	6,600	11,890	11,840	11,000	11,280	11,970	12,450	13,240	14,160
Finance, Ins. & Real Est.	980	2,230	2,230	2,170	2,160	2,250	2,190	2,260	2,420
Services & Misc.	4,500	8,040	8,370	8,200	8,460	8,970	9,250	9,730	10,460
Government	6,010	9,450	8,980	8,660	8,140	8,170	8,480	8,650	8,860

Table AM - 4. Jackson County Occupational Structure, 1970-1998

	1970	1980	1981	1982	1983	1984	1985	1986	1987
Civilian Labor Force	37,240	63,070	65,120	63,820	63,800	64,380	64,060	66,560	69,430
Unemployment	3,040	6,510	8,260	9,220	7,670	6,460	6,000	5,690	4,460
Total Wage and Salary Emp.	26,500	43,500	42,140	39,390	40,790	43,260	44,620	46,770	49,380
Total Manufacturing	6,010	7,690	7,240	6,280	7,550	8,430	8,240	8,390	8,990
Lumber & Wood Products	4,570	5,030	4,700	3,880	4,750	5,100	5,290	5,440	5,910
Other Manufacturing	1,440	2,660	2,540	2,400	2,800	3,330	2,950	2,950	3,080
Total Non-Manufacturing	20,490	35,810	34,900	33,110	33,240	34,830	36,380	38,380	40,390
Const. & Mining	810	1,960	1,320	990	1,040	1,120	1,470	1,780	1,700
Trans., Comm. & Utilities	1,590	2,240	2,160	2,090	2,160	2,350	2,550	2,720	2,790
Trade	6,600	11,890	11,840	11,000	11,280	11,970	12,450	13,240	14,160
Finance, Ins. & Real Est.	980	2,230	2,230	2,170	2,160	2,250	2,190	2,260	2,420
Services & Misc.	4,500	8,040	8,370	8,200	8,460	8,970	9,250	9,730	10,460
Government	6,010	9,450	8,980	8,660	8,140	8,170	8,480	8,650	8,860

Appendix M5--Cattle Numbers in Jackson County

Table AM - 5. Number and Value of Cattle and Calves in Jackson County and Oregon for Selected Years

Year	Head All Cattle and Calves	
	Jackson	Oregon
1960	49,000	1,421,000
1970	44,000	1,514,000
1993	34,000	1,380,000
1994r	35,000	1,410,000
1995r	40,090	1,470,000
1996p	42,770	1,460,000
Year	Value of Cattle and Calves Sold (000's)	
	Jackson	Oregon
1960	2,446	80,324
1970	4,245	140,284
1993	9,874	402,700
1994r	8,783	376,683
1995r	8,783	376,683
1996p	7,906	252,141

Source: Oregon State University. August, 1997. Commodity Data Sheet, Cattle, Extension Economic Information Office. Publication 9140-96. Corvallis, OR. Also available on the web at: http://osu.orst.edu/dept/EconInfo/.

Recreation and Tourism

Unlike many other sectors, tourism is a category of economic activity that incorporates several Standard Industrial Classifications (SIC), and furthermore, it is derived not by the goods and services purchased, but by the residence of the consumer. Consequently, it is a sector whose contribution to the economy has always been difficult to measure. Estimates of tourism-related employment are based on the analysis of tourism expenditures and the allocation of such spending across several industrial categories, typically lodging, eating/drinking establishments, food stores, auto/transport expenses, recreation, and retail sales. In both Jackson and Josephine Counties, the overall rate of tourism employment was 4.5% of total employment in 1992. Tourism employment expanded by 16% in Jackson County between 1987 and 1992, comparable to the state's overall employment increase for the same period. Tourism employment in Jackson County increased its share of employment from 3.8% in 1987 to 4.5% in 1992 (Reid and Flagg 1995: 34).

SORSI developed a profile of summer visitors in 1996 based on interviews at Lithia Park, the Oregon Caves, Jacksonville, State and County Parks and other sites throughout the two-country region (Reid and Lucas 1997b). They compared results of this survey to a similar one of 1990 to determine if visiting patterns had changed. They had. The share of California visitation dropped from 51% to 46% and the share of visitation from Oregon and Washington correspondingly rose. Both surveys pointed to the preponderance of visitors from couple households and households without children. The share of repeat visitors increased from 71% to 80% between 1990 and 1996. Both studies showed a predominance of visitors who lived within a day's drive of the region. One third of summer visitors used motel accommodations, followed in order of importance by reliance on camping/RV, friends/relatives, day use, and bed and breakfast inns.

SORSI conducted a study of motel visitors to the cities of Jackson and Josephine Counties (Reid and Lucas 1997c) and found that travelers in the off season were more often without children, were senior citizens, or were business travelers. Off-season visitors were also wealthier and better educated than their summer counterparts. In terms of repeat business, 88% of off-season visitors had visited the area before, reflecting their business and pass-through reasons. Ashland had the highest percentage of repeat visitors, and Grants Pass the lowest. The primary reasons for off season visits were ranked as follows: traveling through, vacation/pleasure, business/work, friends/relatives, relocation, and shopping. Median length of stay for both summer and off-season visitors was 2 nights. Activities enjoyed most by visitors were ranked from most to least favorite: cultural, historic, passive outdoor, active outdoor, water-related, relax/sightseeing, and shopping and eating out. Visitors relied most on past experience and word of mouth in deciding to visit the area, but over 30% relied on automobile clubs, travel literature and chambers of commerce/visitors centers.

Appendix N - Other Economic Sectors

The health services sector increased by 2,500 jobs (44%) from 1987 to 1997 in the two county region, in such areas as managed care, specialty clinics, outpatient services, as well as physicians' and other practitioners' offices (Anderson 1998: 25).

Although state employment in health services averages 7% of the labor force, in Jackson County it was 9% in 1993, exceeding lumber and wood products employment. The average wages paid to a health services worker is 19% above the county overall per capita wage, more than keeping up with the inflation rate. Health services employment in Jackson County increased by 73% from 1986 to 1993, while the sector increased 61% for the state as a whole (Reid and Flagg 1995: 31).

Health services can have an important influence on the local economy. In addition to the direct jobs they generate, they generate a high number of secondary jobs, relatively speaking. One study reported a multiplier effect in Oregon of 3.75 for every physician and physician employee, so a community with 20 medical personnel could generate an additional 75 jobs (Doeksen et.al. n.d.). By contrast, a grocery store employee has a multiplying effect of 1.33 in the Rogue Valley and a worker in a plywood mill worker in the Rogue Valley will generate an additional 2.84 jobs (personal communication, Mary Wright, Oregon Employment Department [OED])

Modem cowboys and "lone eagles" are terms in the literature referring to the growing number of entrepreneurs who make their living linked to the global marketplace and who are not dependent on the local economy. A key feature of this economic activity is that it involves the export of goods and services in some way. Hence, some artists sell only to a local tourism market, while others sell to national or international markets. Another feature is reliance on telecommunications. The use of computer modems and the internet have opened the doors to commercial activity for many that would have no outlet otherwise. The term, "modem cowboy," can be misleading too because transportation (UPS, airports) educational institutions and other telecommunications are important also. Socially and economically, modem cowboys are changing the face of the rural landscape. Economists are calling it "the declining disadvantage of distance." A University of Washington study found that they contributed 2600 jobs in a one-year period, and were responsible for 3% of the state's economy (Fossum 1996). Byers and his associates (1995) found that these entrepreneurs rated quality of life as extremely important, and ranked as relatively less important more traditional factors of labor and land costs, the tax base and so on. Byers et.al. estimate that modem cowboys contribute up to 17% of the rural counties that they analyzed.

Appendix O - Soda Mountain Communication Site Photos

Fig. 1) View of Soda Mtn. Lookout owned by Oregon Dept. of Forestry. Communications building and tower owned by AT&T Wireless.

Fig. 2) View of communication facilities from Soda Mtn. Lookout. View is looking down main ridge (SW). Pilot Rock on right.

Appendix P - Linear and Site Authorzation Table

Table AP-1. Authorized Uses Occurring in the Cascade-Siskiyou National Monument			
OR\ORE #	**HOLDER**	**TYPE or USE**	**REMARKS**
20137	US West	Communication Site	
34999	Or. Highway Dept.	Communication Site	
36203	COBI*	Communication Site	with sub-lessee
38053	PP&L	Communication Site	
44980	ODF	Lookout & Communication Site	with sub-lessee
48563	AT&T Wireless	Communication Site	with sub-lessee
49604	US Cellular	Communication Site	
54336	SOU (JPR)**	Communication Site	with sub-lessees
17317	PP&L	Utility Line	
20544	PP&L	Utility Line	Line 19 (115 kV)
24416	PP&L	Utility Line	Line 59 (230 kV)
24876	US West	Utility Line	
26313	C. & H. Honingford	Road	Soda Mtn. Road
34269	US West	Utility Line	
37585	R. Taylor	Ditch	
42014	US Sprint	Fiber Optic Line	
43005	S. Young	Water Line	
43975	AT&T	Fiber Optic Line	
45363	L. Tynes	Road	Private Access Road
46542	PP&L	Fiber Optic Line	
47421	MCI	Road	Soda Mtn. Road
47454	PP&L	Utility Line	
48560	PP&L	Utility Line	
50516	C. & M. McLaughlin	Road	BLM Road #40-3E-3
54223	MGeorge\K Freeman	Road	Soda Mtn. Road
0497	US West	Utility Line	

Table AP-1. Authorized Uses Occurring in the Cascade-Siskiyou National Monument

OR\ORE #	HOLDER	TYPE or USE	REMARKS
03235	R. Taylor	Water Facility	
06936	Bur. of Reclamation	Canal & Laterals	Serves T.I.D.
013754	Or. Highway Dept.	Interstate Highway	I-5
R011947	US West	Utility Line	
R022462	Or. Highway Dept.	State Highway	Old Highway 99
R023045	Or. Highway Dept.	Interstate Highway	I-5
5439	US West	Utility Line	
13745	PacifiCorp	Transmission Line	500 kv line
14956	US West	Utility Line	
18550	SOPTV***	Communication Site	Chestnut Mtn.
23467	State of Oregon	Communication Site	Chestnut Mtn.
24498	M. McLaughlin	Water Line	
35917	US West	Utility Line	
36695	US West	Utility Line	
36784	State of Oregon	Airport Lease	Pinehurst Airstrip
37836	M. McLaughlin	Water Line	
41384	Grant Willey	Road	
42492	Corral Cr. HOA****	Road	
44943	D. Rowlett	Agricultural Lease	
44944	Don Rowlett	Road	
45379	Bur. of Reclamation	Canal	
45385	D. Cleland	Road	
45495	Roskamp Services	Water Line	
45999	Kurt Stark	Road	
46052	C. Russell	Road	
46135	J. Walt	Road	
48248	Don Rowlett	Ditch	
49214	D. Ragnell	Road	

Table AP-1. Authorized Uses Occurring in the Cascade-Siskiyou National Monument			
OR\ORE #	HOLDER	TYPE or USE	REMARKS
49413	Ed Milsom	Road	
50516	M. McLaughlin	Road	
50673	Roskamp Services	Road	
50687	H. Cassells	Road	
53772	S. Tall Hunter	Road	
53615	P. Smeenk	Water Line	
03490	PacifiCorp	Utility Line	
05569	US West	Communication Site	Chestnut Mtn.
05609	PacifiCorp	Utility Line	
55148	L.Neale	Event Permit	Sundance Group
06936	Bur. of Reclamation	Canal and Laterals	
012019	PacifiCorp	Utility Line	
013626	Pinehurst School	R&PP Lease*****	Elementary School
013794	Or. Highway Dept.	Maintenance Facility	Highway 66
R014637	Bur. of Reclamation	Hyatt Reservoir	

* California-Oregon Broadcasting, Inc.
*** Southern Oregon Public Television
***** Recreation and Public Purposes Act
* Southern Oregon University, Jefferson Public Radio
**** Home Owner's Association
"R" Roseburg General Land Office (GLO) cases

Appendix Q - Butterflies Identified in the CSNM

Table AQ-1. Butterfly Species recorded in the CSNM

SKIPPERS	HESPERIIDAE	KNOWN LOCALES
Silver-spotted Skipper	*Epargyreus clarus californicus*	Scotch, Porcupine, & Keene Creeks, Soda Mtn Rd
Northern Cloudywing	*Thorybes pylades indistinctus*	Porcupine Gap, Pilot Rock, Keene Cr., Soda Mtn Rd
Dreamy Duskywing	*Erynnis icelus*	Scotch Cr. canyon, Pilot Rock, Porcupine Cr., Hyatt
Propertius Duskywing	*Erynnis propertius*	widespread
Dyar's Duskywing	*Erynnis pacuvius lilius*	Hobart Peak
Persius Duskywing	*Erynnis persius "persius"*	Soda Mtn Rd., Scotch Cr. canyon, Hyatt
Two-banded Checkered Skipper	*Pyrgus ruralis ruralis*	Soda Mtn Rd.
Common Checkered Skipper	*Pyrgus communis*	Soda Mtn Rd, Porcupine Cr., Keene Cr., Oregon Gulch
Arctic Skipper	*Carterocephalus palaemon skada*	Soda Mtn Rd., Hyatt, Scotch Cr. canyon
Juba Skipper	*Hesperia juba*	widespread
Oregon Comma Skipper	*Hesperia "colorado" oregonia*	Pilot Rock, Hobart Peak, Boccard Point
Columbian Skipper	*Hesperia columbia*	Hobart Peak
Lindsey's Skipper	*Hesperia lindseyi septentrionalis*	widespread, mostly southern
Sandhill Skipper	*Polites sabuleti aestivalis*	Siskiyou Summit
Klamath Mardon Skipper	*Polites mardon klamathensis*	Soda Mtn Rd.
Sonoran Skipper	*Polites sonora sonora*	riparian (Soda Mtn Rd, Oregon Gulch, Keene Cr.)
Woodland Skipper	*Ochlodes sylvanoides sylvanoides*	widespread
Dun Skipper	*Euphyes vestris vestris*	Keene Cr., Emigrant Cr. Rd., Oregon Gulch
Roadside Skipper	*Amblyscirtes vialis*	Soda Mtn Rd, Porcupine Cr., Keene Cr., Oregon Gulch

SWALLOWTAILS	PAPILIONIDAE	KNOWN LOCALES
Clodius Parnassian	*Parnassius clodius clodius*	Soda Mtn, Chinquapin Mtn, Hobart Peak, Keene Cr.
Sternitzky's Parnassian	*Parnassius smintheus sternitzkyi*	Pilot Rock, Soda Mountain, Scotch Cr. canyon
Anise Swallowtail	*Papilio zelicaon zelicaon*	widespread (mountaintops & ridges)
Indra Swallowtail	*Papilio indra shastensis*	Siskiyou Summit
Western Tiger Swallowtail	*Papilio rutulus rutulus*	widespread
Two-tailed Swallowtail	*Papilio multicaudatus*	Scotch Cr. canyon, Porcupine Cr., Soda Mtn Rd.
Pale Tiger Swallowtail	*Papilio eurymedon*	widespread

Table AQ-1. Butterfly Species recorded in the CSNM

WHITES and SULFURS	PIERIDAE	KNOWN LOCALES
Pine White	*Neophasia menapia menapia*	widespread
Becker's White	*Pontia beckerii*	Siskiyou Summit
Spring White	*Pontia sisymbrii sisymbrii*	Pilot Rock, Soda Mountain, Hobart Peak
Checkered White	*Pontia protodice*	Siskiyou Summit
Western White	*Pontia occidentalis occidentalis*	Hobart Peak, Soda Mountain, Pilot Rock
Viened White	*Pieris marginalis castoria*	widespread
Cabbage White	*Pieris rapae*	widespread
Large Marble	*Euchloe ausonides ausonides*	widespread
Sara Orangetip	*Anthocharis sara ssp.*	widespread
Gray Marble	*Anthocharis lanceolata*	widespread
Clouded Sulfur	*Colias philodice eriphyle*	Scotch Cr., Keene Cr., Pilot Rock
Orange Sulfur	*Colias eurytheme*	widespread
Western ("Golden") Sulfur	*Colias occidentalis chrysomelas*	widespread

GOSSAMER-WINGS	LYCAENIDAE	KNOWN LOCALES
Tailed Copper	*Lycaena arota arota*	Scotch Cr. canyon
Great Copper	*Lycaena xanthoides xanthoides*	Hobart Peak, Oregon Gulch
Edith's Copper	*Lycaena editha pseudonexa*	Hobart Peak
Gorgon Copper	*Lycaena gorgon dorothea*	Scotch Cr., Cottonwood Cr., Hobart Peak, Pilot Rock

Table AQ-1. Butterfly Species recorded in the CSNM

GOSSAMER-WINGS	LYCAENIDAE	KNOWN LOCALES
Blue Copper	*Lycaena heteronea blend*	Scotch Cr. canyon, Hobart Peak, Pilot Rock
Purplish Copper	*Lycaena helloides helloides*	Soda Mtn Rd, Keene Cr., Hyatt
Nivalis Copper	*Lycaena nivalis blend*	widespread
Golden (Chinquapin) Hairstreak	*Habrodais grunus lorquini*	Boccard Point, Scotch Cr.
Sooty Hairstreak	*Satyrium fuliginosum blend*	Pinehurst, Boccard Point
California Hairstreak	*Satyrium californicum*	Scotch Cr., Oregon Gulch, Siskiyou Summit
Sylvan Hairstreak	*Satyrium sylvinum nootka*	widespread
Mountain-Mahogany Hairstreak	*Satyrium tetra*	Scotch Cr. canyon, Oregon Gulch
Hedgerow Hairstreak	*Satyrium saepium saepium*	widespread
Nelson's Hairstreak	*Callophrys grynea nelsoni*	widespread
Johnson's Hairstreak	*Callophyrs johnsoni*	Hyatt
Thicket Hairstreak	*Callophyrs spinetorum spinetorum*	Keene Creek
Bramble Hairstreak	*Callophrys perplexa*	Hobart Peak, Pilot Rock
Brown Elfin	*Callophyrs augustinus iroides*	Scotch Cr., Soda Mtn Rd., Keene Cr.
Western Pine Elfin	*Callophyrs eryphon eryphon*	Hyatt Lake, Scotch Cr., Oregon Gulch
Gray Hairstreak	*Strymon melinus atrofasciatus*	Scotch Cr. canyon, Soda Mtn Rd, Porcupine Cr.
Eastern Tailed Blue	*Everes comyntas sissona*	widespread
Western Tailed Blue	*Everes amyntula amyntula*	widespread
Spring Azure	*Celastrina "ladon" echo*	widespread
Square-spotted Blue	*Euphilotes battoides oregonensis*	Hobart Peak, Pilot Rock, Porcupine Cr.
Intermediate Dotted Blue	*Euphilotes intermedia*	Hobart Peak
Dotted Blue	*Euphilotes enoptes enoptes*	Scotch Cr. canyon, Oregon Gulch
Columbian Silvery Blue	*Glaucopsyche lygdamus columbia*	widespread
Rice's Blue	*Plebejus idas ricei*	Oregon Gulch, Pilot Rock, Soda Mtn Rd.
Greenish Blue	*Plebejus saepiolus rufescens*	widespread
Lupine Blue	*Plebejus icarioides icarioides*	widespread
Acmon Blue	*Plebejus acmon acmon*	widespread
Buckwheat Blue	*Plebejus lupini lupini*	widespread

METALMARKS	RIODINIDAE	KNOWN LOCALES
Mormon Metalmark	*Apodemia mormo mormo*	Scotch Cr. canyon, Siskiyou Summit, Boccard Point

Table AQ-1. Butterfly Species recorded in the CSNM

BRUSHFOOTS	NYMPHALIDAE	KNOWN LOCALES
Coronis Fritillary	*Speyeria coronis blend*	Soda Mtn Rd., Keene Creek
Zerene Fritillary	*Speyeria zerene conchyliatus*	widespread
Callippe (Elaine's) Fritillary	*Speyeria callippe elaine*	widespread
Egleis Fritillary	*Speyeria egleis mattooni*	Siskiyou Summit
Northwest Fritillary	*Speyeria hesperis dodgei*	Soda Mtn Rd., Siskiyou Summit
Hydaspe Fritillary	*Speyeria hydaspe blend*	widespread
Western Meadow Fritillary	*Boloria epithore chermocki*	widespread
Oregon Leanira Checkerspot	*Thessalia leanira oregonensis*	Hobart Peak, Porcupine Creek
Northern Checkerspot	*Chlosyne palla palla*	widespread
Hoffmann's Checkerspot	*Chlosyne hoffmanni segregata*	Hyatt, Keene Creek Res., Pinehurst
Field Crescent	*Phyciodes pratensis pratensis*	widespread
California Crescent	*Phyciodes orseis orseis*	Keene Creek Ridge, Siskiyou Pass
Mylitta Crescent	*Phyciodes mylitta mylitta*	widespread
Chalcedon Checkerspot	*Euphydryas chalcedona blend*	widespread
Edith's Checkerspot	*Euphydryas editha rubicunda*	Hobart Peak, Pilot Rock, Porcupine Cr.
Satyr Anglewing	*Polygonia satyrus*	Scotch Cr.
Green Anglewing	*Polygonia faunus rusticus*	Oregon Gulch, Soda Mtn Rd, Porcupine Cr.
Zephyr Anglewing	*Polygonia gracilis zephyrus*	widespread
Dark Anglewing	*Polygonia progne oreas*	Scotch Cr., Tubb Springs
California Tortoiseshell	*Nymphalis californica*	widespread
BRUSHFOOTS	**NYMPHALIDAE**	**KNOWN LOCALES**
Mourning Cloak	*Nymphalis antiopa antiopa*	widespread
Milbert's Tortoiseshell	*Nymphalis milberti milberti*	Hobart Peak, Pilot Rock
Red Admiral	*Vanessa atalanta rubria*	Soda Mountain
American Painted Lady	*Vanessa virginiensis*	widespread
Painted Lady	*Vanessa cardui*	widespread
West Coast Lady	*Vanessa annabella*	widespread
Buckeye	*Junonia coenia griseus*	Oregon Gulch, Hobart Peak
Lorquin's Admiral	*Limenitis lorquini lorquini*	widespread
California Sister	*Adelpha bredowii californica*	widespread
Ringlet	*Coenonympha tullia eryngii*	widespread
Large Wood Nymph	*Cercyonis pegala ariane*	widespread
Lesser Wood Nymph	*Cercyonis sthenele silvestris*	widespread
Dark Wood Nymph	*Cercyonis oetus oetus*	widespread
Great Arctic	*Oeneis nevadensis nevadensis*	widespread
Monarch	*Danaus plexippus plexippus*	widespread

Current Monument Total: 107 species

Compiled by Erik Runquist 12/27/2000

Appendix R - Bureau's RNA Guidelines in the CSNM

SUPPLEMENTAL PROGRAM GUIDANCE FOR LAND
RESOURCE

Table of Contents

<u>Appendices</u>

Memorandum of Understanding between the Bureau of Land Management,
Oregon/Washington State Office, and The Nature Conservancy, Oregon and Washington State Offices.

.01 Purpose

This Manual Section provides—basic guidance and information for the management of Research Natural Areas as part of the areas of critical environmental concern program in the States of Oregon and Washington.

.02 Objectives

The natural history resource management program responsibilities include identification, designation, and management of natural areas containing important scientific values located on appropriate lands administered by the BLM. The objectives of the Research Natural Area (RNA) program are to:

A. Recognize the scholarly uses of natural history resources.

B. Manage the public lands in a way that ensures attainment of appropriate uses of natural history resources.

C. Protect and preserve designated values that fulfill recognized RNA cell needs for the benefit of scholarly use.

.03 Authority

A. Federal Land Policy and Management Act of 1976 (P.L. 94-579; 90 Stat. 2743; 43 USC 1701) directs the BLM to manage public lands on the basis of multiple use, "in a manner that will protect the quality of scientific,... ecological, (and) environmental.. values... and where appropriate, will preserve and protect certain public lauds in their natural condition." The Act establishes that priority will be given to the designation and protection of areas of critical environmental concern (ACEC) in the development and revision of land use plans. The act also provides for the periodic inventory of public lands and resources, for long-range, comprehensive land use planning, and for enforcement of public land laws and regulations.

B. National Environmental Policy Act of 1969 (P.L. 91-190; 83 Stat. 852; 42 USC 4321) establishes national policy for protection and enhancement of the environment. Part of the function of the Federal Government in protecting the environment is to "preserve important ... natural aspects of our national heritage." The act is implemented by regulations of the Council on Environmental Quality, 40 CFR 1500-1508.

C. Endangered Species Act of 1973 [16 U.S.C. 1531 et seq.; 87 Stat 884; P.L. 93-205, as amended, P.L. 94-359, 90 Stat 913 (1974); P.L. 95-212, 92 Stat 3751 (1978) P.L. 96-159(1979) requires all Federal departments and agencies to conserve species, subspecies, or populations of plants and animals officially listed by the Secretary of the Interior or Secretary of Commerce as threatened or endangered. The Act also requires Federal agencies to ensure that the continued existence of listed species is not jeopardized and that designated Critical Habitat of listed species is not destroyed or adversely modified.

D. Executive Order No. 3 1988. Protection of Wetlands.

E. Executive Order No. 11990. Flood plain Management.

.04 Responsibility

A. State Director is responsible for guiding implementation of the research natural area program, providing technical direction for implementation of the program, and monitoring the progress and quality of work being completed at the field level.

B. District Managers and Area Managers are responsible for directing the identification, designation, and management of Research Natural Areas within their respective areas of authority.

C. Designated Resource Specialists are responsible for ensuring that inventory standards and recommended designations and management prescriptions are in conformance with accepted regional standards with appropriate coordination performed.

D. All personnel are responsible for complying with established management prescriptions in specific designated areas and avoiding inadvertent damage to the key identified natural values.

.05 References

A. Research Natural Area Needs in the Pacific Northwest, USDA Forest Service General Technical Report PNW-38, 1975.

B. Oregon Natural Heritage Plan, Natural Heritage Advisory Council to the State Land Board, March, 1981.

C. State of Washington Natural Heritage Plan, Washington State Department of Natural Resources, 1987.

D. 43 CFR 8223 - Research Natural Areas.

E. BLM Manual 1617.8

.06 Policy

A. Areas established as Research Natural Areas shall be of sufficient number and size to adequately provide for scientific study, research, and demonstration purposes.

B. RNAs will be managed to preserve and protect the key natural attributes for which the area was formally recognized.

C. All RNAs shall be designated ACECs and follow the ACEC designation guidance provided by BLM Manual 1617.8.

D. RNA management plans will normally be developed for each designated area, establishing detailed management objectives and prescriptions unless the degree of specificity is adequate in an RMP or plan amendment.

E. Formal withdrawal of designated areas from mineral entry, except by Congressional action, shall only be pursued in exceptional cases.

.07 Program Relationships

A. Relationship to BLM Programs

1. BLM Planning System. (See Manual Sections 1601 and 1623.5).

a. The designation, protection, management, and use of Research Natural Areas shall be guided by and in accordance with approved BLM land use plans, including but not limited to Resource Management Plans (RMP).

b. The BLM plain shall establish the appropriateness for designation of all potential Research Natural Areas, establish management objectives for those areas designated, consider the extent to which RNA objectives may affect other resource management programs and actions, and take into account the extent to which other potential land and resource uses may have effects on RNA values. The approved land use plan will also provide resource management objectives and include resource uses/allocations which are prohibited or conditionally permitted.

2. Recreation Management Program

a. Any recreational/educational use of RNAs must be compatible with RNA objectives established through planning.

b. Where recreational needs conflict with and take precedence over identified potential RNA values, the designation as an outstanding Natural Area should be considered.

c. Onsite interpretation of RNAs for public education may also satisfy the objective and have the effect of protecting the key scientific values identified in certain cases. The division of funding, staffing, and roles is determined on-a case specific basis, between the Recreation Management Program and the other program(s) involved.

3. Other Resource Programs.

a. BLM resource programs (Forestry, Wildlife, Range, Watershed, etc.) benefitting from the management of RNA values are responsible for providing funds as affected activities.

b. Other resource program obligations include support of inventory, identification, evaluation, designation, and management functions associated with Research Natural Area values.

B. Relationship to State and Other Federal Agencies. BLM actions are coordinated with other Federal agencies in the Pacific Northwest and the States of Oregon and Washington through participation in the interagency Pacific Northwest RNA Committee.

C. Relationship to Non-Governmental Organizations

1. BLM cooperates with The Nature Conservancy through a Memorandum of Understanding (Appendix A) which recognizes mutually benefitting results of natural area data sharing and special management of adjoining designated properties.

a. Through privately funded organizations, such as The Native Plant Society of Oregon, BLM receives volunteer assistance and participates on joint identification and protection projects as situations arise.

.3 (See BLM Manual)
.3l,through .34 (See BLM Manual)

.35 Establishment of RNA

A. Identification of Potential RNA . Natural areas are normally considered for RNA designation on an ad hoc basis as they are identified by RNA committee members, BLM, and public-at-large, and recommended by letter to the appropriate District Manager.

B. Designation of RNA

1. Designation Process. Designation shall follow the ACEC designation process (see Manual 1617.8).

2. Land User Implications. Designation neither constitutes a formal withdrawal from certain actions, nor does it in itself increase requirements of public land users, except requiring mining plans of operations for operations of less than five acres extent (see 3809.1-4(b)(3)).

3. Recognition of RNA Values. Designation establishes recognition that a RNA has important scientific and educational values and a commitment that utmost importance be paid to the natural feature for which it was designated.

4. Review of Existing Designations. Designated areas will be reviewed during preparation of new RMPs or RMP revisions. The reviews will be conducted by an interdisciplinary team and summarized in the RMP/DEIS, RMP/FEIS and RMP/ROD. Confirmation of designation may include RNA/ACEC boundary adjustments as well as management prescriptions, priorities, and monitoring requirements. Where resource values for which the areas were originally designated are no longer present or better examples satisfying call needs have been located elsewhere, designations are appropriate. Designation will be documented through analysis in the RMP/DEIS and FEIS and decision making in the RMP/ROD.

.36 Management of RNA

A. Planning Process. For each designated RNA, management prescription objectives for each designated RNA that permit natural processes to continue without interference shall be established and implemented through completion of a formal planning document, i.e., RMP, activity plan, or plan amendment.

B. Monitoring. Essential to implementation of management prescriptions is an adequate system of long term monitoring tailored to the specific character of the area to determine if management objectives are being accomplished. A relatively simple, systematic form of baseline sampling should be adopted to document trends and conditions of relevant area characteristics.

C. Compatibility of Other Uses. The appropriateness of various existing and foreseeable potential uses and impacts (including grazing, mineral exploration and development, fire, timber harvest, right-of-ways, public activities and other form of use) shall be addressed and specific conflict resolutions developed by a management plan.

.37 Use of RNA

A. Scientific and Educational. RNAs are established primarily with scientific and educational activities intended as the principal form of resource use for the short and long term. Research proposals should be submitted to the appropriate BLM field office prior to commencing work. Studies involving manipulations of environmental or vegetational characteristics or plant harvest must be BLM approved.

B. Manipulative Use. Because the overriding guideline for management of an RNA is that natural processes are allowed to dominate, deliberate manipulation such as experimental applications, is allowed only on a case specific basis when the actions either simulate natural processes or important information for future management of the RNA is gained.

C. Compatibility of Other Resource Uses. The appropriateness of various existing and foreseeable potential uses-shall be addressed and conflict resolutions developed by a management plan.

1. Livestock Grazing and Timber Harvests. Livestock. grazing and timber harvests should be managed within RNAs to promote maintenance of the key characteristics for which the area is recognized. These areas should be identified in a management plans as well as the appropriateness of mitigation measures (such as wind or shading buffers for nearby timber harvest units) for achieving management objectives.

2. Fire Management. Management plans should be coordinated with fire plans for identifying the following objectives:

 a. The need for wildfire protection measures based on the key natural values to be protected (preserving undisturbed, advanced stages of ecological development as opposed to maintenance of a dynamic seral ecosystem) and other relevant factors.

 b. The role of prescribed burns based an the fire history and past vegetative patterns known for the area. Application of prescribed burns normally should closely approximate the "natural" season of fire, frequency, intensity, and size of burn. The burn should have a carefully designed monitoring plan followed by a fire effects report.

 c. Types of fire fighting, fire hazard reduction, burn site preparation, and post-fire rehabilitation activities appropriate for the area, scarification for fire breaks or lines, and application of retardants should be avoided.

3. Public Uses. Public uses, including recreation, camping, woodcutting, trapping, plant gathering, and ORV use, are generally not compatible with maintenance of key RNA values unless shown not to hinder achievement of specific plan objectives. Education use, such as class field studies are encouraged, but repetitive consumptive class activities must have BLM approval. Applications to build roads, pipelines, communication sites, powerlines and similar developments should avoid the designated area.

4. Mineral Exploration and Development. Withdrawal from mineral entry is allowed only when the most outstanding or unique resource values are involved which ran tolerate no disturbance. Those areas not closed to location and entry under the mining laws are subject to Surface Management Regulations (43 CFR 3809). Protection from mineral leasing actions through non-surface occupancy stipulations or other measures, may be accomplished through the planning and approval process as provided by mineral leasing regulations and the Bureau planning system. The status of saleable minerals may be addressed through the planning system.

Appendix S - Integrated Weed Management Plan

FINDING OF NO SIGNIFICANT IMPACT (FONSI)
for the
INTEGRATED WEED MANAGEMENT PLAN
EA OR-110-98-14

FONSI DETERMINATION

On the basis of the information contained in the Integrated Weed Management Plan Environmental Assessment (EA) signed by the District Manager on April 21, 1998, specialists reports, and discussions with interested publics, it is my determination that the proposed action and/or the alternative selected herein, when implemented with the Project Design Features and selected mitigating measures, does not constitute a significant impact affecting the quality of the human environment greater than those impacts previously addressed in the Northwest Area Noxious Weed Control Program EIS (December 1985), Supplement (March 1987), and ROD (May 1987), and the Western Oregon Program-Management of Competing Vegetation FEIS (February 1989), to which this document is tiered, and does not, in and of itself, constitute a major federal action having a significant effect on the human environment. Therefore, an environmental impact statement or a supplement to the existing environmental impact statement is not necessary, and will not be prepared.

Signed:____________________________ **Date:**______________________
District Manager

DECISION RECORD
for the
INTEGRATED WEED MANAGEMENT PLAN
EA OR-110-98-14

DECISION

My decision is to implement the proposed action as described in the EA. No mitigating measures were proposed in addition to those included in the proposed action, except those included by reference. This plan is expected to be useful and viable for the next 5 years.

This decision will be stayed for a period of two weeks ending on June 22, 1998, to allow for a protest period. (43 CFR, Part 4)

DECISION RATIONALE

The decision stated above is consistent with the goals and objectives of the Medford District Resource Management Plan (RMP, June 1995), and the Northwest Area Noxious Weed Control Program EIS and Supplement. Two statutory mandates guide BLM in managing public lands. Section 302(b) of the Federal Land Policy and Management Act of 1976 directs BLM to "take any action necessary to prevent unnecessary or undue degradation of the lands" (43 U. S.C. 1732(b)). Section 2(b)(2) of the Public Rangelands Improvement Act of 1978 adds that BLM will "manage, maintain, and improve the condition of the public rangelands so that they become as productive as feasible . . ."(43 U.S.C. 1901 (b)(2)). The impacts created by the above decision do not require further analysis as noted in the FONSI determination.

Signed:____________________________ **Date:**____________________________

District Manager

MEDFORD DISTRICT
Environmental Assessment

Number OR-1 10-98-14
<u>Cover Sheet</u>

Action / Title : Integrated Weed Management Plan

<u>Location- Medford District, in portions of Jackson, Josephine, Douglas, Curry, and Coos Counties</u>

Originating Branch: X Operations Division X Forestry

By (signature)

Writer / Team Leader assigned: Bob Budesa

Reviewer	Assigned Resource Value	Reviewer	Assigned Resource Value
Dave Reed	Forestry Management	Joan Seevers	T & E Plants
Nabil Atalla	Forest Health, Weed science	Jim McConnell	EA Coordinator
Gerry Capps	Lands/Minerals	Kate Winthrop	Cultural/Historical
Tom Jacobs	Range Management	Ron Laber	Hazardous Materials
Dale Johnson	Fisheries	Julie Wheeler	Safety

MEDFORD DISTRICT
Integrated Weed Management Plan (IWMP)
and
Environmental Assessment (EA) OR-1 10-98-14
Tiered to the
Northwest Area Noxious Weed Control Program EIS (December 1985)
and Supplement (March 1987)

I. NEED FOR THE PROPOSAL

The Medford District of the Bureau of Land Management proposes to implement an integrated noxious weed control program within the Ashland, Butte Falls, Glendale, and Grants Pass Resource Areas, which lie within portions of Jackson, Josephine, Douglas, Coos, and Curry Counties. Noxious weeds have become established and are rapidly spreading on both public and private rangeland, woodlands, and farm land. Economic and ecological loss from noxious weeds is considerable and runs into the millions of dollars annually in each state in the EIS area, posing a serious menace to the public welfare and the state's economic stability (Northwest Area Noxious Weed Control EIS, 1985, pg 2).

Noxious weeds are also a major threat to the native vegetation of the region. As weeds encroach upon native plant populations, their competitive nature depletes the natives, creating a monoculture or single species landscape. Not only are wildlife forage species threatened, but so too are listed rare and endangered species. These impacts will increase if control measures are not implemented.

This proposal is consistent with the Northwest Area Noxious Weed Control Record of Decision (ROD) for the Final Environmental Impact Statement (EIS), Supplement EIS (FSEIS) dated April 7, 1986 and May 5, 1987 respectively. Copies of the ROD, the EIS, and the FSEIS are available for review at the Medford District Office. This proposal would meet the objectives for active weed control measures as set forth in the Purpose and Need section of the Northwest Area Noxious Weed Control EIS (pg. 2).

In addition, this proposed action is subject to the following land use laws and/or acts: Federal Policy and Management Act (FLPMA), October 1976, Public Rangelands Improvement Act (PRIA), October 1978, Carlson-Foley Act of 1968, Federal Noxious Weed Act of 1974.

Priorities are described for all acreages at the county level, rather than that for BLM lands alone. BLM's program is integrated with other ownerships through the Oregon State Department of Agriculture, which furnishes overall priorities and treatment prescriptions. Weed species on the target list, as well as those on the "A" list are of high concern to the Oregon State Department of Agriculture, and therefore also with the Medford District.

II. DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

A. OBJECTIVE OF THE PROGRAM

The objective of the Medford District Noxious Weed Program is to implement the Record of Decision of May of 1987, in accordance with the stipulated priorities for weed control. Those weeds that are known to be established on the public lands within the district are shown on the maps (on file). The underlying objective of the Medford District Noxious Weed Program is to eliminate or eradicate outlying populations of Target and "A" listed weeds when and where possible, and to reduce the number of infestations in the remaining area to a lower level, which can be accepted or tolerated by management.

B. PROPOSED ACTION ALTERNATIVE

The proposed action is to implement an Integrated Weed Management Program (IWMP) for all federally managed lands in the Medford District, beginning in 1997 as described in the preferred alternative in the FEIS. This proposed action would emphasize a proactive ecosystem-based approach for control and/or eradication of noxious weeds on all public lands. The long-term goal of this program is to reduce populations of alien plant species by any or all of the means listed below, to a level which will allow for the restoration of native plant species, and provide for overall ecosystem health. These IWM control measures, that may be employed in varying degrees, include cultural or preventative (seed testing, vehicle washing, etc), physical (handpulling, competitive planting, burning, etc), biological (insects, etc.), and chemical (herbicide), and may be found in greater detail in the Northwest Area Noxious Weed Control Program EIS, December 1985. Some factors for determining which method is best suited for use on a particular site can be found in Noxious Weed Strategy for Oregon/Washington, August 1994, Appendix 4, pgs. 29-3 1. An appropriate combination of methods, including manual, mechanical, biological, and chemical methods would be used to control noxious weed species. Any herbicide use will be in accordance with the program design features outlined on pages 1-7 of the ROD for the FEIS, and those listed in the Appendix of this document. Control actions will be implemented on the basis of the priorities addressed in the Need for the Proposal section of this document.

General features of the weed management treatments, monitoring, and interrelationships with state and local governments are described in pages 1-1 1 and 14-18 of the EIS, and on pages 2-9 of the 1987 ROD. Close cooperation will be maintained with the Oregon Department of Agriculture, the adjacent National Forests, and the noxious weed coordinators in each of the five counties in which the Medford District resides, to ensure cooperation and coordination in noxious weed control efforts. At this time, the Medford District is working with members of Jackson County to prepare a regional roadside vegetation control plan, a part of which will address noxious weeds.

Noxious weed species, listed by priority, may be found in the Noxious Weed Strategy for Oregon/Washington, August 1994, Appendix 3, pgs. 27-28. The priority categories are as follows:

Priority 1 - Potential New Invaders

Emphasize education of BLM employees and the general public to create an awareness of species which are potential new invaders into southern Oregon. On an annual basis, share information on noxious weed control programs and potential needs with the Oregon State Department of Agriculture and county weed control personnel. Once a population of a priority 1 invader is documented, it will be placed in priority 2 (as it is no longer a "potential" invader, and is actually here), and appropriate action would be taken as described in priority 2.

Priority 2 - Eradication of New Invaders

Emphasize appropriate and prompt action, including appropriate multi-year follow-up action, to eradicate infestations of new invading noxious weeds before they spread to the point where eradication is not possible.

Priority 3 - Established Infestations

Weed species in this category have become established to the extent that eradication is not practical or economically possible. Treatment emphasis would be on containing existing populations and treatment of small, outlying populations. Treatment will also emphasize biological control when effective agents are available. Other control measures may be considered if those measures are practical and cost effective.

Noxious weed control treatment, inventory and monitoring on the public land will be conducted in the following order of priority and zones:

1. Areas adjacent to private agricultural lands, major reservoirs and natural bodies of water, perennial drainways, timber sale units, and BLM and privately owned roads (see Appendix II for water quality/watershed project design features (PDF's).

2. Major public rights-of-way: Federal, state, and county highways and associated quarries and gravel stockpile sites, railroads, ditches, canals, pipelines, and powerlines.

3. Congressionally Reserved Areas (Rogue Wild and Scenic River, Pacific Crest National Scenic Trail), designated RNA'S, LSR'S, ACEC'S, and WSA'S.

4. Major BLM administrative sites: Developed recreation sites, office / warehouse / storage complexes, and aerial landing strips.

5. All other rights-of-ways, BLM and private roads, reservoirs and springs, perennial drainways, and administrative and recreation sites.

6. All remaining affected public lands.

The type of treatment may be limited on lands containing special Management Area designation, special status (including threatened and endangered) plants or animals, critical wildlife habitat, riparian-wetland areas, and where domestic water may be contaminated or sensitive row crops (organic gardens) damaged.

Only treatment methods that target individuals of noxious weed species will be performed in riparian and wetland areas. Generally, picloram will not be used within these treatment areas. Herbicides approved for aquatic use will be used where appropriate. Mechanical, biological, and manual treatments will be the preferred methods in these areas and their buffers where noxious weeds are present and control is required.

A cultural clearance would be conducted on any proposed treatment area that would require extensive digging or surface disturbance.

The U.S. Fish and Wildlife Service would be consulted for chemical use in proposed treatment areas containing proposed, threatened or endangered plant or animal species.

Chemicals would be applied in strict accordance with EPA approval label instructions.

Program Implementation

The Medford District IWMP would be implemented in accordance with the ROD priorities as follows:

1. Prevention and Detection of Potential New Invaders

Increased and continued efforts will be directed toward training district personnel, adjacent land management personnel (U.S.F.S., S.C.S., O.D.O.T., etc), and public land users to recognize noxious weed species, and the importance of preventing the spread of, and reporting the locations of new invaders. Usually, this is accomplished through forums such as Interagency Noxious Weed Workshops. The Oregon State Department of Agriculture weed specialists, through their contract with the Oregon BLM, will assist in the education effort for priority weeds. The BLM will notify the Oregon Department of Agriculture and local county weed agents of new locations of priority weeds in order to minimize and prevent the spread of noxious weeds. Techniques that could be implemented to accomplish this objective are found in the Appendix.

2. Eradication of New Invaders

The highest priority for treatment after prevention efforts, will be early detection, control and eradication of new invader populations. All methods described in this document, and those described in the EIS, FEIS, and ROD can and may be utilized. The selection of control methods will vary depending on species, as well as location.

As new techniques are developed, evaluations are conducted, or management emphasis changes, additional methods may be utilized. Personnel will continue to be trained and educated on state of the art weed control methods and procedures.

3. Control of Established Infestations

The next highest priority for treatment under the Medford District IWMP will be the containment of large populations, and treatment of outlying populations of established noxious weed species in order to prevent their further spread. Although all acceptable control methods are available, biological control (BC) agents will be the preferred method of treatment. Only those BC agents approved for use in the Medford District may be utilized. Manual, mechanical, and chemical control methods will be the primary methods of control for all outlying weed populations. Table 1 shows the weed species and sites targeted for herbicide application in the Medford District in 1998.

4. New Discoveries

Inventory and monitoring by weed specialists, as. well as program administration by other district personnel, will disclose new populations of previously classified, yet un-mapped noxious weed species within the district. These efforts may also detect new noxious weed species not yet mapped or classified. As these sites are discovered and reported, their locations and unique, characteristics will be logged into the district database, including species name, township, range and section, square footage, percent cover, and date of discover or Control actions would then be implemented in accordance with the general control plan and stipulated priorities for each weed in question. The control methods will be governed by site specific conditions, occurrences of threatened or endangered plants and animals, special management areas, proximity to croplands and surface waters, etc. Proper chemical selection for treatment will be governed by the effectiveness of control on the subject weeds, and the potential for impacting the above mentioned site factors / special conditions. All control efforts will be limited to the project design features listed in the Appendix.

5. Monitoring

See FSEIS, page 122 for Herbicide Application Monitoring Plan. Additional monitoring criteria involving permanent plots or transect plots may be developed. Photographs of treatment sites will be kept in the Medford District Office.

C. NO ACTION ALTERNATIVE

The alternative of no action is not consistent with Federal, state, and county regulations, which mandate active control measures for known and newly discovered noxious weed populations. The no action alternative would also be in direct conflict with the Oregon/Washington BLM Director's Records of Decision of April 1986 and May 1987. BLM policy relating to integrated weed management has been set forth in Manual Section 9015. However, if the no action alternative were selected, weed management and control actions would be governed by existing documents.

D. ALTERNATIVES CONSIDERED BUT NOT ANALYZED

The alternatives of no aerial herbicide application, no use of herbicides, and no action have been thoroughly analyzed in the Northwest Area Noxious Weed Control Record of Decision (ROD) for the Final Environmental Impact Statement (EIS), Supplement EIS (FSEIS) dated April 7, 1986 and May 5, 1987 respectively. Further discussion in this EA is unnecessary at his time since site specific conclusions and impacts would be essentially the same.

The no aerial herbicide application and no use of herbicides alternatives were analyzed. In the Medford District, the aerial herbicide application method will not be considered for use. Other herbicide application methods as listed in this document as well as in the Northwest Area Noxious Weed Control Environmental Impact Statement (EIS), and Supplement EIS (FSEIS) may be considered depending on weed species and location.

III. AFFECTED ENVIRONMENT

The Medford District is located in the southwest portion of Oregon, and includes approximately 859,100 acres of BLM-administered lands. A general description of the affected environment may be found in the Medford District RMP/EIS, October 1994, starting on page 3-3. More detailed descriptions of lands administered by the Medford District may be found in various watershed analysis documents. Both the Medford District RMP/EIS, and the various watershed analysis plans may be found in the Medford District Office.

The General Location Map (attached) shows the general location of the Medford District, and the area of affected environment covered by the cited planning and environmental documents.

IV. ENVIRONMENTAL CONSEQUENCES

The impacts of the actions described under section II of this document are analyzed in Chapter 3, and summarized in Table 1- 4 (Alternative 1) of the FSEIS. Analysis discussions within the FSEIS have no impacts of importance upon the following resources: topography, utilities, energy and mineral resources, or climate.

No impacts have been identified which exceed those already addressed in the FSEIS and noxious weed control decision referenced in Section I of this assessment. Site specific components of the environment which may be affected as the plan is implemented in the known and mapped treatment areas and new discoveries are as follows:

A. VEGETATION

Terrestrial broad-leafed plants may be mostly affected by the application of 2,4-D, dicamba, glyphosate, and picloram as proposed. These herbicides are non-selective for most broad-leafed plants (2,4-D is selective for only broad-leafed plants), and both target species and non-target species will be killed where herbicides are applied. Grasses may suffer slightly, but will recover and should increase due to the reduced competition by impacted weeds. The effects of killing non-target species will be inconsequential because only patches and small sites of noxious weeds will be targeted for spraying with ground equipment or hand spray, and the extensive occurrence of native species will largely remain unaffected.

The use of selective herbicides will affect only the area actually sprayed, and only the vegetation that is susceptible to the chemicals used in the area sprayed.

Manual treatments will generally only affect the targeted noxious weeds in the treatment area.

No known potential exists for biological control agents to damage crops, non-target native plant species, or other environmental values. In no instances have insects introduced against an exotic weed in North America become a pest itself or endangered a native plant species (Harris, 1988).

Much of the vegetation along rights-of-ways to be treated has been, and is continually being disturbed as a result of maintenance / use actions, and contains very little of the original native vegetation. Many weed species occupy sites along these roads.

B. SPECIAL STATUS SPECIES

No impacts to special status species (plant or animal) would be expected, since the project design features (PDF's) as outlined in the EIS and FSEIS, as well as those in this document will be implemented and strictly adhered to. These recommendations would be designed to avoid any negative effects to special status species.

C. RIPARIAN, WETLANDS, AND WATERSHEDS

The extent of any impacts to non-target riparian-wetland vegetation would depend on the closeness of desirable species to treated weeds, method and rate of herbicide application, and formulation of herbicide. Because herbicide application rates would be reduced in riparian/wetland areas, and/or herbicides approved for aquatic use would be applied, injury to non-target plants in these areas is expected to be minimal.

The proposed application of herbicides would involve relatively small, widely dispersed areas whose sizes would rarely exceed one (1) acre. Ephemeral stream channels in the upper reaches of watersheds, which range from a couple of feet to several yards wide, would not necessarily be excluded from herbicide application, but may be depending on specific site conditions. In these channels, one of two situations usually apply to preclude the flushing of herbicides downstream in amounts likely to cause impacts: 1) enough rain falls to induce runoff but not enough for the stream-flow to reach the next order stream, or 2) if the stream-flow is great enough to reach the next order stream, enough water flows to dilute the herbicide.
In addition, impacts to other resources due to the amount of overland water flow itself are more likely to cause damage more than the impacts from the herbicide. Larger ephemeral stream channels, typically near or in valley bottoms would be protected by restrictions similar to those that apply to other areas such as riparian zones or wetlands.

Under the proposed action, significant impacts to surface water quality are unlikely to occur from the normal use of herbicides. In herbicide spraying operations without riparian-wetland restrictions, the amount of herbicide entering the water has been in the parts-per-billion range, and not in the parts-per-million range that appears to be the level for most adverse effects (FSEIS, pgs. 86-87). Since most treatments would be applied not more than one time per year, little potential exists for herbicides to accumulate in harmful amounts.

Along streams and wetlands, ground water is often close to the surface. Depending on the hydraulic head of the aquifer, these areas can be gaining or losing head. If they are losing water to the aquifer, a potential exists for herbicides that are Rushed into these areas from overland flow to be introduced into the ground water. Studies have shown the concentration of herbicides in surface flow to be in parts-per-billion, and with the further dilution from entering into the stream or wetlands the concentration would be even lower. Also, streams and wetlands are normally high in microorganisms, the main agents for bio-degradation of herbicides.

No municipal watersheds will be impacted.

D. WILDERNESS STUDY AREAS

It is not anticipated that herbicides will be applied in any wilderness study areas (WSA's). The spraying of poisonous plants is not prohibited under limited circumstances, and it is not unreasonable to expect that noxious weeds might be discovered in these areas and be treated. The impacts of spraying would be consistent with the discussion on page 48 of the FEIS.

E. HUMAN HEALTH

Potential occupational and environmental human health impacts of the proposed action were fully analyzed in the FEIS, and considered in the ROD for the FSEIS. No further analysis is needed in this document.

V. AGENCIES, GROUPS, AND INDIVIDUALS CONSULTED

Oregon Department of Agriculture
Jackson County
Josephine County
Douglas County
Coos County
Curry County

VI. PARTICIPATING BLM EMPLOYEES

Bob Budesa - District Noxious Weed Coordinator, Rangeland Management Specialist
Nabil Atalla - District Forest Health Specialist, Weed Science
Tom Jacobs - District Rangeland Management Specialist
Joan Seevers - District Botanist
Dave Reed - District Forester
Jim Keeton - Human Resource Coordinator
Kate Winthrop - District Archaeologist
Dale Johnson - District Fisheries Biologist
Ron Laber - District Hazardous Materials Specialist
Jim McConnell - District Environmental Coordinator

Appendix S-II

WATER QUALITY / WATERSHED
PROJECT DESIGN FEATURES FOR NOXIOUS WEED CONTROL

1. Cultural (prevention) activities such as inspection (weed surveys), regulation (Right of Ways), sanitation (wash and clean vehicles) and education will be encouraged and enforced for all high priority multi-use areas, especially those along the Rogue River. Cultural practices include:

a. Clean all heavy equipment used on BLM-administered lands (including Rights-of-Ways) prior to moving onto BLM administered lands. This removes most of the dirt which may contain weed seeds.

b. Use only certified seed or straw mulch that has been checked for noxious weed seed prior to restoration projects on public lands (Cook 1 99 1).

c. Reclaim disturbed sites/areas as soon as practical with :
1) native seed, or if native seed is not available,
2) a BLM approved seed mixture. Temporary fencing of newly seeded sites within grazing allotments may be required to assure establishment of new seeding. Sites should be rested from grazing for at least two growing seasons after planting.

d. Monitor all vegetation manipulation and revegetation projects, i.e. prescribed fire areas, timber harvest activities, seeding, and other disturbed sites like rock (material) pits for noxious weed infestations

e. To reduce areas favorable for potential noxious weed invasion, evaluate sites for vegetative management practices and initiate changes in management in those areas where native or seeded vegetation is in a downward trend.

f. Limit, restrict or discourage recreational, especially Off Highway Vehicle (OHV) use in weed infested areas.

g. Require washing of all BLM vehicles at least twice per month in order to reduce the possibility of spreading weed seeds. Washing of vehicles would be expected to increase if vehicles are driven off road through weed infested sites more often.

2. Physical control practices (mechanical) such as mowing, tilling, discing, seedbed preparation, and prescribed burning treatments (because of the possible soil disturbing nature) will require a separate EA, specifically to assess the physical impacts to the land.

3 . All manual control practices (hand pulling and hand tools) will be done before seed ripe or seed dispersal, and the plant residue collected as needed for burning (piles) or bagged and removed from site(s). On small isolated sites manual control may be given priority consideration dependent upon weed species and site requirements, before any herbicide application especially, in WSAs, WAs and ACECs.

4. IWM biological control methods such as introduced insects, competitive seeding, pathogens, or livestock grazing will be given consideration district-wide. ODA approved biocontrol agents (insects or pathogens) will be given emphasis for release to control/contain larger infestations where containment is the major goal. The approval for release of beneficial insects or pathogens must complete a Biological Control Agent Release Proposal (BCARP) and Record (BCARR). Only ODA approved biological control agents will be allowed for release after District and State Office approval.

a. Domestic grazing as a control practice would have to meet specific allotment management resource and grazing objectives and approved District Plans.

b. Competitive seeding using either native or introduced species are subject to a separate site specific analysis if using mechanical seedbed preparation or seeding practices.

c. Those competitive seeding sites less than 5 acres in size using only manual methods of seeding are covered by this document. Seeding these small sites may be permitted after resource area staff review of the same site specific information and/or mitigation stipulations, as required for Pesticide Use Proposals (PUPs) and resource area management approval.

d. The District's use of its approved Biological Control Agents for treatment priorities will be coordinated closely with the ODA to introduce biological control agents to weed populations where site specific criteria meets management goals. Most BLM priority weeds do not have ODA approved biological control agents available for control efforts. All of the insects introduced as biological control have been through a battery of tests to determine their specificity to the target plant. If any insect is known or observed to migrate towards other plants during these tests, they are not introduced to the U.S.

e. The list of currently approved District Biological Control Release Proposals (1993) submitted by ODA for this District under BLM/ODA contract #1422h952-C-22073 are on file with USDA and Oregon State Dept. of Agriculture, and at the Medford District Office.

5. A Special Status and FSEIS Survey and Managed Plant and Animal survey or clearance will be done prior to any treatment.

6. A cultural survey or clearance is required before any soil surface disturbing activity (including Categorical Exclusions) from physical weed control practices (manual, mechanical or prescribed fire) occurs. Physical practices include:

a. Manual control practices (hand pulling and hand grubbing with hand tools such as shovel, hoe, pulaski) are covered by the above mentioned documents.

b. Manual control efforts (hand pulling and hand tools) would be limited to less than 5 acres per infestation site. Control efforts may be permitted after Resource Area staff review of the same site specific information and/or mitigation stipulations as required for Pesticide Use Proposals (PUP's)and Resource Area management approval.

c. Manual control practices may be used immediately, to prevent or reduce establishment of a weed seed source, where newly discovered sites involve just a few plants.

d. Mechanical control practices such as mowing, tilling, discing, plowing or competitive seedbed preparation activities may occur on slopes less than 10%.

e. All mechanical control with surface soil disturbing practices, such as mowing, tilling, discing, plowing or competitive seedbed preparation, would require a separate site specific environmental analysis.

f. Fire will be used as a clean up tool for piles of weeds collected for proper disposal under manual or mechanical methods.

g. All prescribed fire activities would be conducted in accordance with BLM's Fire Management Policy (BLM Manual 92 1 0). All prescribed fires would require the preparation of an approved prescribed bum plan before every bum. All prescribed fire over 5 acres in size would require a separate site specific analysis. The bum plan must be approved by the District Fire Management Officer and Resource Area Management. In addition, all required smoke management stipulations or burning permit requirements would be part of the approved prescribed bum plan.

7. All herbicide use will comply with USDI rules and policy, BLM policy and guidelines, Oregon State laws and regulations, Oregon Department of Agriculture (ODA) laws and regulations, Environmental Protection Agency (EPA) , federal pesticide laws (FIRCA), Oregon Department of Environmental Quality (DEQ) regulations, Local County Weed District Priorities and requirements, as well as product label requirements, and in strict accordance with the guidelines established in Managing Competing and Unwanted Vegetation Final Environmental Impact Statement (Nov. 1988).

8. All pesticide (herbicide) applicators are required to submit a Pesticide Use Proposal (PUP) form, which BLM may approve for use of up to 3 years, if same chemical, same target weed, and same area are applicable.

9. All herbicide applications will be applied by a Oregon State licensed and certified applicator.

10. Material Safety Data Sheets (MSDS) for each herbicide being applied will be at each project site with the applicator. Guidelines and information found in "Oregon Pesticide Applicator Manual" (Miller 1993) as updated, will be followed.

11. Areas of known or suspected sensitive amphibians will ha ve as a minimum 100 foot buffer strip from live water for all herbicide applications, with the exception of the use of Rodeo, which is allowed immediately adjacent to water.

12. Herbicide Use Restrictions are as follows:

a. No vehicle mounted boom sprayers or vehicle mounted handguns will be used within 20 feet of surface (live) water. (Western Oregon Program - Management of Competing Vegetation ROD, pg. 55). All buffer strips will be delineated on the ground by means of flagging or other similarly effective physical delineation.

b. No vehicle mounted booms will be used in riparian areas where weeds are closely intermingled with trees and shrubs.

c. Liquid herbicides may be applied (at a height of 0.5 ft to 2.5 ft. above ground) to areas for spot treatments with hand spraying (backpack) equipment (single nozzle, low pressure and volume) to within 10 feet of live water. (Northwest Area Noxious Weed Control Program ROD, pg. 2). Use of mule or horse mounted equipment would also be allowed.

d. Spreader equipment (broadcast) could be used to apply granular formulations applied at a height of about 3.5 feet, to within 10 feet of the high water line of live water.

e. Contact Systemic Herbicides (such as Glyphosate - Rodeo or Accord) may be allowed using hand wipe applications on individual plants up to the existing high waterline. No aerial application of Glyphosate is allowed. (Northwest Area Noxious Weed Control Program ROD, pg. 2).

f. When wind speeds exceed 5 mph, no spray equipment will be used in riparian areas or near water, and no aerial applications are allowed in riparian or wetland areas.

g. No application of herbicides will occur if wind speeds exceed 8 mph, with the exception of hand wipe applications.

h. Only 2,4-D, picloram (Tordon), dicamba, and glyphosate (Rodeo and Accord only) and approved combinations will be allowed as per ROD (1987) from Supplemental FEIS (1987). Acceptable formulations, EPA registration #s, maximum rates of application, and mixture stipulations are referenced from BLM Instruction Memo # OR-91-302 (as updated) and from Table 1-3 p. 9 FEIS (1985).

i. None of the products may be applied within 500 feet of any residence or other place of human occupation unless the occupant or resident gives his/her consent in writing. (Northwest Area Noxious Weed Control Program ROD, pg. 2)

j. All chemicals will be applied only in accordance with Environmental Protection Agency standards specified on the herbicide label, and the stipulations in this EA.

k. Pesticide Use Proposals for herbicide application within boundaries of Wilderness Study Areas (WSA's), Wilderness Areas (WA's), and Research Natural Areas (RNA's) will be reviewed and evaluated by Resource Area staff on a year to year basis. Application of herbicide for second or third year of an approved 3 year PUP is dependent upon effectiveness and Resource Area Management approval.

l. Monitoring pretreatment and post-treatment will be done yearly (pre and post spray applications) on all treated areas.

m. Additional herbicides (if approved) may be used subject to all the above mitigation measures, label restrictions and within limits of ROD or specific approval recommendations.

n. The maximum rates of application for the four approved herbicides are found in Table 3-1 (FEIS 1985): (ai = active ingredients of specific herbicide).

13. The provisions governing BLM's use of herbicides in this program require measures to mitigate possible environmental effects. More mitigation measures are included in the FEIS, the SEIS, and the policy statements and manuals they cite. All are incorporated by reference into this document. The purpose of the mitigation measures is to ensure the judicious use of the herbicide. The sited represented on the maps on file represent all the known sites that have been inventoried thus far, within the Medford District. The noxious weed sites depicted on the maps do not necessarily represent the sites that will be treated in fiscal year 1998. The sites that may be treated using herbicides are listed by township, range, section, square footage, and acreage towards the end of the document. Any other sites shown on the maps, not listed for herbicide treatment, may be treated using any or all other methods listed in this document.

Appendix T - OGEA Treatment Design based on Ecoregion Characteristics

Ecoregion Characteristics

Ecoregions are defined by a number of factors that include: physiography (including elevation and local relief), geology (surficial material and bedrock), soil (order, common soil series, temperature and moisture regimes), climate (mean annual precipitation, mean annual frost free days, mean January and July min/max temperature), potential natural vegetation, land use (recreation, forestry, watershed), and land cover (vegetation present). The following synopsis is based on Pater (1997a and 1997b). The ONHP plan lists important ecosystem cells by name and specifies the entity that protects them. [Note: In the CSNM, the Bureau's Oregon Gulch RNA represents a mixed conifer cell, not a white fir cell, as stated in the ONHP plan.] See Table 2-1 and Map 2-1 for CSNM Ecoregion IV locations and acreages.

Southern Cascades (4g)

The Southern Cascades Ecoregion (2,600-5,800 feet) in the southern portion of the Oregon Cascades is drier than the rest of the Cascades (4). It is characterized by gently sloping mountains, broad valleys, a long summer drought, and high vegetation diversity. White fir (*Abies concolor*) is common; at low elevations, Douglas-fir (*Pseudotsuga menziesii*) and ponderosa pine (*Pinus ponderosa*) become prevalent. Compared to the other ecoregions in the CSNM, the South Cascades Ecoregion contains more white fir climax plant communities and the highest percentage of LSOG/NSO NRF habitat referred to as the Old-growth Emphasis Area.

Southern Cascade Slopes (9i)

The Southern Cascade Slope Ecoregion (3,600-6,300 feet) is a transitional zone between the Cascades (4) and the drier Eastern Cascade Slopes and Foothills (9). Forests of ponderosa pine blanket the mountainous landscape; white fir, and Douglas-fir grow at higher elevations. Much of the Southern Cascade Slope Ecoregion typically receives more precipitation than other Level IV Eastern Cascade Slopes and Foothills Ecoregions. The South Cascade Slope Ecoregion within the CSNM tends to be predominantly gently sloping ponderosa pine dominated landscapes which had historically more open canopies than at present. Meadows and grasslands are often found associated with forest stands.

Siskiyou Foothills (78b)

The Siskiyou Foothills Ecoregion (1,500-4,000 feet) is affected by a Mediterranean climate similar to that of the Rogue Valley. The driest area occurs east of Medford and is dominated by oak woodlands, ponderosa pine, and Douglas-fir. This ecoregion is the western most and lowest in elevation. Few white fir are present. Pacific Madrone is a common hardwood component of the forest in this ecoregion while generally absent from the other ecoregions of the CSNM.

Klamath River Ridges (78g)

The Klamath River Ridges Ecoregion (3,800-7,000 feet) has a dry continental climate and receives on average 25 to 35 inches of annual precipitation. Low elevation and south-facing slopes have a more drought resistant vegetation than elsewhere in the Klamath Ecoregion (78), such as juniper, chaparral, and ponderosa pine. Mid-elevation forests are composed of sugar and ponderosa pine as well as incense cedar and Douglas-fir. Higher and north-facing ridges are covered by Douglas-fir, and white fir. A significant portion of the Klamath River Ridges in the CSNM does not have the potential capacity to become NSO suitable habitat and therefore is not part of the OGEA because it is comprised of low elevation, south facing slopes. Most of this ecoregion is in the Diversity Emphasis Area.

LSOG Forest Stand Tables from Habitat Types 1 & 2

A 1998 inventory measured forest tree structure/size and density within habitat type 1 and 2 in the CSNM. Conifer and hardwood tree data, representative of the old-growth seral stage, is summarized in tables AT-1 through AT-3. The variability of tree sizes is representative of 3-5 distinct age classes. Tree stands generally consist of dense small shade tolerant conifers and a uneven-aged overstory of conifers with individual trees exceeding 35 inches dbh. These tables provide a modeling guide to be used during the prescription development process within the major plant communities and Ecoregions which may vary by aspect and elevation. The drier mixed conifer community is more representative of the lower elevation Klamath River Ridges and Southern Cascade Slopes Ecoregions. The more xeric mixed conifer is typical of higher elevation Klamath River Ridges and the South Cascades Ecoregion. The white fir is primarily located in the Southern Cascades Ecoregion. The species mix and size classes are particularly important for thinning small sized diameters and underburning to reach desirable stand structure and preferred densities during protection and maintenance activities.

Table AT-1. LSOG/Habitat Types 1 & 2 in Dry Douglas-fir/Pine Community (xeric)

Species	Trees per Acre by Species and Size Class (dbh in inches)									
	00-06	07-10	11-14	15-18	19-22	23-26	27-30	31-34	35+	Total
Ponderosa Pine	16.0	39.5	7.7	17.5	10.6	1.1	1.3	1.4	0.0	**95.1**
Douglas-fir	78.0	54.9	24.6	11.5	8.4	2.4	0.5	0.4	1.1	**181.8**
Incense Cedar	25.0	0.0	0.0	1.5	1.7	1.1	0.4			**29.7**
Sugar Pine	0.0	0.0	0.0	4.1	1.6	1.4	0.9		0.8	**8.8**
White Fir	25.0	0.0	1.0							**26.0**
Summary	**144.0**	**94.4**	**33.3**	**34.6**	**22.3**	**6.0**	**3.1**	**1.8**	**1.9**	**341.4**
>10" dbh			33.3	34.6	22.3	6.0	3.1	1.8	1.9	**103.0**
>19" dbh					22.3	6.0	3.1	1.8	1.9	**35.1**
>30" dbh								1.8	1.9	**3.7**

Table AT-2. Mixed Conifer Plant Community – LSOG/Habitat Type 1 & 2 (mesic)

Species	Trees per Acre by Species and Size Class (DBH in Inches)									
	00-06	07-10	11-14	15-18	19-22	23-26	27-30	31-34	35+	Total
Ponderosa Pine	25.0	0.0	0.0	2.9	3.6	0.6	1.3	0.3	2.3	**36.0**
Douglas-fir	166.0	47.6	41.6	25.2	11.6	2.5	0.9	0.4	0.9	**296.7**
Incense Cedar	8.0	4.5	0.0	2.7	4.1	0.6	0.5	0.0	0.8	**21.2**
Sugar Pine	4.0	0.0	4.4	1.6	0.0	0.0	0.0	0.0	0.0	**10.0**
White Fir	29.0	0.0	8.7	0.0	0.8	0.0	0.0	0.0	0.0	**38.5**
California Black Oak	45.0	0.0	8.4	3.7	0.0	0.0	0.0	0.0	0.0	**57.1**
Summary	**277.0**	**52.1**	**63.1**	**36.1**	**20.1**	**3.7**	**2.7**	**0.7**	**4.0**	**459.5**
>10" dbh			63.1	36.1	20.1	3.7	2.7	0.7	4.0	**130.4**
>19" dbh					20.1	3.7	2.7	0.7	4.0	**31.2**
>30" dbh								0.7	4.0	

Table AT-3. White fir Plant Community – LSOG/Habitat Type 1 & 2

Species	Trees per Acre by Species and Size Class (DBH in Inches)									
	00-06	07-10	11-14	15-18	19-22	23-26	27-30	31-34	35+	Total
Ponderosa Pine	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.3	**0.7**
Douglas-fir	33.0	0.0	7.7	2.9	0.8	0.6	0.0	0.3	2.5	**47.8**
Incense Cedar	0.0	8.1	4.1	0.0	0.0	0.0	1.4	1.1	0.3	**15.0**
Sugar Pine	0.0	0.0	0.0	1.7	0.0	0.7	0.4	0.7	1.6	**5.1**
White Fir	132.0	32.7	21.0	17.5	9.2	7.3	3.6	2.0	4.4	**229.7**
Summary	**165.0**	**40.8**	**32.8**	**22.1**	**10.0**	**8.6**	**5.8**	**4.1**	**9.1**	**298.3**
>10" dbh			32.8	22.1	10.0	8.6	5.8	4.1	9.1	**92.5**
>19" dbh					10.0	8.6	5.8	4.1	9.1	**37.6**
>30" dbh								4.1	9.1	**13.2**

OGEA Treatment Designs

Treatment Guidelines for Habitat Types 3 & 5

Protection of LSOG forest habitat is the primary goal for managing habitat type 3 & 5 forest stands. Treating as many acres of these as possible within the next decade will be necessary to achieve this goal. Early seral forests are projected to diminish to approximately 15 percent of the federal landscape as these stands mature. Early seral conditions on interspersed private lands and non-forest vegetation types on BLM land are expected to provide varied habitats for the LSOG associated wildlife prey base.

Most of these young stands have become established and are developing under markedly different disturbance regimes than the older stands that currently represent LSOG habitats. Because of altered natural disturbance regimes, including fire suppression, the proliferation of pathogens, accelerated fragmentation, climate change, and shifts in species composition, many of these stands are on developmental trajectories that may not provide adequate or desirable structural LSOG characteristics. The overall objective of young stand manipulation is to create residual stands that will more closely pattern historic forest development to provide structure and habitat for LSOG associated species.

Treatments to reforest and/or promote desired revegetation which include site preparation, planting, release for survival, and animal damage control measures.

1. Release efforts that promote growth of desired species and usually occurs in young forest plantations (old harvest units).

2. Density management (precommercial thinning) in young plantations and young natural early seral (seedling/sapling) stands. Desired tree criteria provide for such things as culturing individual trees specifically for large crowns and limbs, disease resistance (sugar pine rust resistance), and other mortality or habitat attributes consistent with OGEA objectives.

3. Density management (commercial thinning) in habitat type 3 & 5 stands usually provides commercial produces and is risk reduction related.

- Leave tree criteria provide for such things as culturing individual trees specifically for large crowns and limbs, disease resistance (sugar pine rust resistance), and other mortality or habitat attributes consistent with CSNM objectives.

- Cutting older trees (80+ years) or trees 20+ inches in diameter would be the exception, not the rule. Most trees in Habitat 3 & 5 are younger trees anyway. Individual trees exceeding 20-inches dbh would not be harvested except for purpose of creating opening, providing other habitat structure such as down logs, elimination of a hazard from standing danger trees, or cutting minimal yarding corridors. Where trees larger than 20 inches dbh are cut, they will usually be left in place to contribute toward meeting the overall CWD objective.

- Treatments include substantially varied spacing in order to provide for some very large trees as quickly as possible, maintain areas of heavy canopy closure and decadence, and encourage the growth of a variety of species appropriate to the site and the LSOG objectives.

Treatment Guidelines for Habitat Types 1 & 2

Either through wildfire control or harvest, the composition of overstory species has been shifting from Douglas-fir, sugar and ponderosa pine, and incense cedar toward a higher white fir percentage. Additionally, a dense understory of small white fir have filled gaps

created by harvesting, disease, windfall and other disturbance factors, and stands are shifting toward less stability and fire resistance.
Some form of intervention is generally needed to protect and maintain Habitat Type 1 & 2 stands by accomplishing the following actions:

- Creating a favorable situation for improved vertical and horizontal canopy structure, pre-fire suppression species composition, and gap occupancy.
- Increasing patch size to protect un-entered stands and existing owl cores adjacent to entered stands.
- Creating snags and CWD where deficient.
- Removing ladder fuels adjacent to large trees and reducing fire hazard.
- Selecting for vigorous long-term stand components by encouraging large trees of preferred species, size, and vigor.

Treatments are considered site specific treatments and before treatments are implemented they will require an effectiveness monitoring plan .

The general recommended treatment guidelines listed below are intended as standards and guidelines to be followed during the planning of projects in the CSNM.

Standards and Guidelines

1. Ladder fuels will be reduced by reducing white fir stocking levels while thinning from below. Pile burning and prescribed broadcast burning will be designed in a manner to protect and maintain large tree components.

2. As a byproduct of protection treatments large tree vigor will be increased so as to maintain large cohorts for the long-term within the stand and on the landscape, while reducing the risk of large scale losses to fire, insects, and disease.

3. Gaps (less than 1/4 acre) will be created around and adjacent to pines for regeneration opportunities, particularly in Habitat Types 1 and 2. Blister rust resistant sugar pine seedlings will be used when planting is necessary because blister rust has greatly reduced the pole, sapling, and seedling component in natural stands. Large white fir may be harvested in previously entered or unentered stands where they compete with sugar pine and ponderosa pine. Thinning will emphasize retaining and enhancing the existing pine components and promoting opportunities for pine regeneration while retaining adequate canopy cover throughout the stands treated.

4. To promote stand diversity and structure as a secondary effect of protection and maintenance treatments projects would include the following design features:

- Twenty percent or more of any stand being treated will remain as untreated patches.
- Gaps (less than 1/4 acre) around individual or groups of large pines may be created; except within NSO activity centers.
- Thinning will be conducted in a manner that varies tree spacing with approximately 10% of the areas left unthinned and 10% widely spaced. Canopy layers should not be totally removed when thinning from below.
- Green trees may be snagged or felled and left where CWD is below the standards and guidelines discussed in the section below.
- Only thinning from below, prescribed underburns, and large pine release would be attempted in owl cores or unentered old-growth, and <u>only</u> if the cores exhibit overstocking of understory white fir.

Treatment Recommendation by Ecoregion and Habitat Type

Ecoregion: Klamath River Ridge Ecoregion (78a)

Habitat Type 1: Nesting

Description

Mixed Conifer Forest stands with LSOG character are unentered or lightly entered. Two or three age classes are prominent within the multilayered stand. White fir occupies most of the understory in the form of intermediate and suppressed trees. The overstory is primarily large, old sugar pine, ponderosa pine and Douglas-fir. Some larger white fir are found, but are generally smaller and younger than the other species. Douglas-fir dwarf mistletoe is present. Coarse woody debris and snags are not generally lacking although class 1 and 2 snags and coarse woody debris may be low due to the predominance of small sized white fir which rots quickly.

Objectives

Protect and maintain nesting function while reducing risks to stand from fire and insects. Reduce small white fir stocking levels. Maintain large tree components.

Recommended Treatment

Alternative B.

No management activities would occur within this habitat type. Reduce fuel loading adjacent to and within 1/4 mile of nesting habitat in order to reduce risk of loss due to catastrophic fire.

Alternative C.

Reduce the white fir component by thinning and prescribed burning. Only trees less than 7" dbh would be removed manually. A few larger white fir would suffer mortality during prescribed broadcast burns. Small white fir stocking levels will be reduced, but maintained at acceptable levels for multistoried habitat. Canopy levels would be maintained. Reduce fuel loading within 1/4 mile of habitat type 1.

Alternative D.

Suppressed understory (0"-7" dbh classes), particularly white fir, would be thinned to remove an acceptable portion of small tree stocking while continuing to maintain diverse stand structure. Thinning of understory white fir would occur across all small diameter classes while maintaining desirable stocking levels. Douglas-fir with dwarf mistletoe would be left. Commercial sized trees less than average size stand dbh would be thinned. Some larger commercial sized trees would be girdled or dropped where CWD and snags are deficient and where they compete with overstory trees (particularly pine).

This would be done to increase individual tree vigor and to reduce competition to larger residual trees. Gaps for pine reproduction would not be created. Canopy would be maintained at or near existing levels. Light underburning will occur . Piling slash (small material only) and burning some or all piles would be an option as well.

Habitat Type 2: Roosting/Foraging

Description

Most mixed conifer stands have been entered, a few have not. LSOG characteristics are present in varying amounts. Gaps exist where large trees have been removed. White fir most commonly fills gaps to the exclusion of pine. Large trees are still present in these stands, however, Quadriatic Mean Diameter and stand age is less than in Habitat Type 1. Many residual trees present are over 80 years old and often exceed 250 years of age. Canopy closure has been reduced. Canopy may or may not be single layer, but vertical forest structure is reduced and is more open and discontinuous than in un-entered stands. White fir grow around residual old-growth conifers. Sugar and ponderosa pine vigor is decreased due to white fir competition. Snags and CWD are often deficient due to past logging and yarding practices.

Objectives

Maintain roost/forage functions. Reduce small tree (post fire ingrowth) component. Maintain tree vigor. Encourage development of the large tree component. Reduce risk of stand loss to fire and insects. Maintain canopy closure at 60% or greater.

Recommended Treatments

Alternative B.
No actions within habitat type 2.

Alternative C.
Reduce white fir component by thinning small trees less than 7" dbh and prescribed burning. Maintain multiplestoried habitat for LSOG species. These activities will reduce ladder fuels and competition to dominant mixed conifers.

Alternative D.
Thin from below to maintain the residual large tree component and reduce risk to individual pine trees. Thin predominantly white fir trees 100 years or less in age and 20 inches or less in diameter. Favor pine species, incense cedar and Douglas-fir over white fir. Some Douglas-fir with dwarf mistletoe would be favored and encouraged. Commercial sized trees would be girdled or felled and left where snags and CWD are deficient. Intermediate trees of all species and diameter classes would be retained in the stand. Canopy closure would not go below 60% and increase over time. Clumps of small trees in existing canopy gaps would be thinned to increase growth and hasten canopy closure. Sugar pine would be planted in suitable canopy gaps to encourage its presence in the stand. Underburning or slash piling will be an option for habitat protection.

Habitat Type 3: Potential Habitat

Description

These habitat type is represented by mixed conifer advanced reproduction and pine plantations originating from clearcuts in the Lincoln Creek and Rosebud area. Age is generally less than 25 years. Stocking levels are currently to high to develop into LSOG. Understory vegetation is either grasses or manzanita and ceanothus.

Objectives

Reduce fuel loading while accelerating tree growth in order to develop LSOG characteristics as soon as possible. Encourage multiple species development (mixed conifer) in pine plantations.

Recommended Treatments Common to Alternatives B, C, and D.

Thin from below, reduce stocking levels significantly, accelerate tree growth. Prescribe burn excess fuel if necessary. After thinning, monitor growth for future cultural practice. Maximize tree growth. Create gaps and conditions necessary for ingrowth of mixed conifer component under pine plantations. Maintain stands at density levels that will best promote LSOG development trend. Stands are on a trajectory for over 350 feet of basal area reduce to approximately 200 BA.

Alternative B. Concentrate on pine plantations. No commercial thinning.

Alternative C. Commercial thinning allowed where applicable in larger sized stands.

Alternative D. Commercial thinning will be heavier than in Alternative C.

Habitat Type 5: Dispersal Habitat with LSOG Potential

Description

Many of these stands were more heavily thinned and often are a result of shelterwood cuts, overstory removal or multiple entries. Some are younger stands or are stocked at lower levels due to disturbance, poor soils or low site forest lands. Canopy cover is limited, little layering exists and understory stocking levels are often poor. CWD and snags are almost always deficient.

Objectives

Protect LSOG and develop forest stands with LSOG characteristics. Reduce fuel loading and accelerate stand development to encourage the creation of roosting/foraging habitat. Increase average stand diameter. Encourage development of vigorous open grown trees that maintain dispersal functions.

Recommended Treatments

Alternative B.
No management activities.

Alternative C.
Reduce white fir component and small tree stocking levels by thinning commercial and non-commercial trees generally less than the average size stand dbh through a combination of prescribed burning and manual thinning. Maintain acceptable distribution stand diameter classes for multistoried LSOG habitat of some larger trees would be girdled and /or felled to contribute toward snags and CWD. Favor pine and other fire dependent species.

Alternative D.

Thin trees (generally less than 20" dbh), particularly white fir, to increase residual tree growth. Intermediate tree growth would be encouraged. Individual tree culturing would be performed particularly in the case of individual pines. Larger commercial sized trees that are selected for cutting would either be harvested and removed or left on site as snags or CWD. Planting of gaps would be standard to increase the pine component and canopy quality over time. Canopy closure would be maintained at 40%, and preferably increased over time. Prescribe burn where applicable.

Ecoregion: Siskiyou Foothills Ecoregion (78b)

Habitat Type 1: Nesting

Description

Mixed conifer forest stands are unentered or lightly entered. Two or three size and age classes are found in a multistoried stand. There is a significant amount of black oak and madrone in the intermediate canopy level. Hardwoods are often overtopped by large mature conifers such as Douglas-fir, ponderosa pine and incense cedar. Few sugar pine or white fir are found in these stands although some white fir are present as seedlings and intermediate suppressed trees in the understory. Douglas-fir and incense cedar are the most common seedlings and pole sized conifers. Dwarf mistletoe is often heavy on Douglas-fir. Stands occur on steep slopes and display riparian features. CWD and snags are not generally lacking for hardwoods or conifers.

Objectives

Maintain nesting functions while reducing risks to stands from fire and insects. Maintain large trees in the stand.

Recommended Treatment

Alternative B

No actions within habitat type 1.

Alternative C

Reduce the Doug-fir (replaces white fir in this ecoregion at lower elevations) component by thinning small trees less than 7" in diameter and prescribed burning. These activities will reduce ladder fuels and competition to dominant mixed conifers. Maintain multistoried canopy and hardwoods as preferred habitat for LSOG species.

Alternative D

Suppressed understory conifers would be thinned from around dominant conifers and black oak in a manner so as to maintain canopy and stand structure. White fir found would be removed while maintaining the other species components. Some commercial sized trees would be girdled or dropped where they compete with dominant ponderosa pine and black oak. Residual tree vigor would be encouraged. No gaps would be created. Underburning or pile burning of slash may occur but would not be a priority this decade.

Habitat Type 2: Roosting/Foraging

Description

Most mixed conifer stands have been entered, some have not been managed. LSOG characteristics are present in varying amounts. Gaps exist where large trees have been removed. Douglas-fir is usually filling these gaps. Dwarf mistletoe on Douglas-fir is common and sometimes heavy due to past selective logging practices that opened the stands up. Canopy closure has been reduced. Canopy is generally not single layered although forest structural diversity is reduced, more open and discontinuous than in un-entered stands. Mean stand diameter is less than in Habitat Type 1. Ponderosa pine and black oak vigor is decreased due to heavy stocking and competition from Douglas-fir and incense cedar. Snags and coarse woody debris are sometimes deficient due to past management practices.

Objectives

Maintain roost/forage functions. Maintain tree vigor. Encourage the development of large tree components. Reduce the risk of stand loss to fire and insects. Increase canopy closure or maintain it at 60%.

Recommended Treatments

Alternative B.

No actions within habitat type 2.

Alternative C.

Reduce Doug- fir and brush component by prescribed burning and thinning small trees less than 7" dbh and prescribed burning. These activities will reduce ladder fuels and competition to dominant mixed conifers.

Alternative D.

Thinning from below would be performed to maintain the residual large tree composition of ponderosa pine and Douglas-fir. Thinning for all species would select trees less than 20" dbh. Thinning around individual black oak and subdominant pine would be accomplished to encourage vigor and development of old-growth trees. Douglas-fir with dwarf mistletoe would be favored across several size classes. Some infested trees would be removed where infection is heavy and threatens overall stand vigor. Intermediate trees of all species other than white fir would be maintained in the stand. Canopy cover would be maintained at 60% or increased above 60%. Clumps of small trees in existing canopy gaps would be thinned to increase growth and hasten canopy closure. Ponderosa pine would be planted in suitable gaps. Underburning and/or slash piling would be an option for habitat protection.

Habitat Type 3: Potential Habitat

Description
This habitat type is represented by mostly mixed conifer species, white fir is generally lacking. Black oak and madrone are common. A few pine plantations are present as well.

Objectives
Protect from catastrophic fire. Accelerate tree growth using the best management practices available in order to develop LSOG characteristics as soon as possible.

Recommended Treatments Common to Alternatives B, C, and D.

Thin from below, reduce stocking levels. Prescribe burn excess fuels if necessary. After thinning, monitor growth for future cultural practices and needs. Maximize tree growth. Maintain stands at density levels that will best promote LSOG development trends

Habitat Type 5: Dispersal Habitat with Potential

Description
Many of these stands were heavily and selectively thinned. These stands are now composed of heavy brush and hardwoods as well as residual conifers. Some stands are younger in age and/or are stocked at lower levels due to disturbance or poor soils. Residual Douglas-fir with dwarf mistletoe were often left in the stand. Canopy cover is limited, generally less than 40% and little layering exists at present. Coarse woody debris and snag numbers are usually limited.

Objectives
Maintain dispersal function while encouraging development of large trees. Increase or maintain canopy cover and structural diversity. Reduce risks to insects and catastrophic fires.

Recommended Treatments

Alternative B.
No management actions.

Alternative C.
Reduce the small conifer, hardwood and brush component stocking levels by noncommercially thinning trees less than 7" in diameter through a combination of prescribed burning and manual thinning. Some larger trees would be left on site for snags and CWD.

Alternative D.
Commercial and noncommercial thinning of small conifers, hardwoods and brush would encourage overall stand vigor. Individual tree culturing of ponderosa pine and black oak would be accomplished by thinning Douglas-fir from below. Canopy cover would always be maintained at or above 40%. Some larger trees selected for cutting would remain on site either as snags or CWD. Planting existing canopy gaps with ponderosa pine would be done to increase the stand pine component. Most dwarf mistletoe infected Douglas-fir would remain.

Ecoregion: Southern Cascades Ecoregion (4g)

Habitat Type 1: Nesting

Description
Forest stands are lightly entered or un-entered. The higher elevation stands are composed of almost pure, large old white fir stands. Gaps are common where ***Phellinus weirii*** has had a historical presence. White fir is filling these gaps as very dense clumps. Many white fir stands are associated with wet alpine meadows. Therefore, patch size may be smaller. Stand density is particularly high in association with meadow edges. White fir stands here have a greater tendency to be even-aged, single canopy where *Phellinus* is absent. At lower elevations individual large, sugar pine and ponderosa pine are older than white fir because they have remained as a stand component due to the pine's resistance to various root rots. Here sugar pine and ponderosa pine sometimes fills the canopy gaps along with incense cedar as white fir mortality occurs in root rot pockets. Douglas-fir trees are present as well. Douglas-fir dwarf mistletoe is not a factor as in the other ecoregions. Stocking density tends to be greater in the Southern Cascades than in the Klamath Ecoregion. CWD and snags are present in sufficient quantities. ***Phellinus weirii*** infection creates many snags and much coarse woody debris, although it is sometimes short lived.

Objectives
Maintain nesting functions while reducing competition on larger trees.

Recommended Treatment

Alternative B.
No management activities would occur within this habitat type.

Alternative C.
Reduce the white fir component by thinning and prescribed burning in mixed conifer stands. High elevation white fir stands would be less managed given that root rots are the primary disturbance factor. Only trees less than 7" on diameter would be removed. Reduce fuel loading within 1/4 mile of habitat type 1.

Alternative D.
Little thinning or other intervention would be proposed in the high elevation pure white fir stands. Lower elevation stands with a pine and Douglas-fir component would be thinned lightly around large old growth trees. Trees thinned would generally be less than 20" in diameter. Some commercial size trees would be girdled or fallen and left in place for snags and CWD. White fir would be the only species cut in these instances. Light underburning and pile burning would be a low priority option. Reduce fuel loading within 1/4 mile of this habitat type.

Habitat Type 2: Roosting/Foraging

Description
Most stands have been entered, or are younger in age and have smaller trees than Habitat Type 1 stands. Pure white fir stands that have been opened up by thinning suffer from wind throw and pockets of *Phellinus*. Additionally, they often have become infected with *Annosus* root rot through stumps from previous thinnings. Over time, all of these factors contribute to decreasing stocking levels and canopy cover. Seedling and intermediate tree stocking varies and depends on gap size. Understory stocking levels can be minimal. Intermediate canopy is usually not well developed.

Multi-species stands which includes sugar pine, incense cedar and white fir are more resilient and show some recovery with release of root rot resistant species after harvest. Multi-species composition stands tend to have more developed canopy levels. Stands are approaching 60% canopy cover. Canopy gaps are often filled with root rot resistant species. CWD and snags are sometimes deficient in numbers.

Objectives
Maintain roost/forage function while encouraging development of leave trees. Manage root rots to an acceptable level. Maintain canopy of at least 60%.

Recommended Treatments

Alternative B.
No management actions would occur.

Alternative C.
Reduce the white fir component in mixed conifer stands. High elevation white fir stands would receive less treatment. Noncommercial size trees less than7" in diameter would be thinned. Reduce fuel loading within 1/4 mile of this habitat type.

Alternative D.
Little or no thinning of trees greater than 20" dbh would be recommended other than around root rot resistant species in order to reduce risk in stands dominated by white fir. Planting of root rot resistant species would occur in canopy gaps when these stands open up due to root rot infection and windthrow. Thinning of existing reproduction would occur in gaps in order to hasten canopy closure. These stands would always be managed to maintain maximum cover. Thin commercially in mixed conifer forests to maintain large pine component. CWD would be left in canopy gaps for cover to encourage and protect natural or planted seedling growth. Reduce fuel loading within 1/4 mile of this habitat type by prescribed burning.

Habitat Type 3: Potential Habitat

Description
Young pine plantations with generally low stocking levels are found at higher elevations in white fir forests. Stocking levels are generally medium or low and not always candidates for thinning. CWD and snags are always deficient due to burning during site preparation after harvest.

Objectives
Accelerate tree growth using the best management practices available in order to develop LSOG characteristics as soon as possible.

Recommended Treatments

Thin from below, replant where necessary. Prescribe burn excees fuel if needed. After thinning, monitor growth for future cultural practices. Maximize tree growth. Create favorable conditions for ingrowth of mixed conifer component in the understory. Maintain stands at density levels that will best promote LSOG development trends.

Habitat Type 5: Dispersal Habitat with Potential

Description

Forest stands have often been thinned as shelterwoods. Some stands may be open grown, intertwined with meadows or exhibit naturally low stocking levels. Stands are open with little canopy development and have few seedlings due to exposure on cold, harsh sites even though canopy cover is greater than 40%. Root rots are a problem, particularly in stands dominated by white fir. Windfall is common and stands decrease in stocking levels, canopy closure, and complexity over time especially in white fir dominated stands. CWD and snags are deficient due to past logging, yarding, and burning practices.

Objectives

Maintain dispersal functions while encouraging growth of open full-crown trees. Manage root rot to acceptable levels.

Recommended Treatments

Alternative B.

No management actions would be allowed.

Alternative C.
Reduce small tree stocking levels in clumps. Reduce density where needed by thinning commercial and noncommercial trees less than the average size stand diameter. Prescribe burn in mixed conifer communities, but generally not in high elevation white fir stands. Plant seedlings in understocked gaps.

Alternative D.
Light thinning of white fir clumps in the open and under root rot resistant species would occur. Planting of species other than white fir would be done in suitable canopy gaps. Some commercial sized trees to be marked for "harvest" would be girdled or fallen into canopy gaps for cover for seedlings and wildlife where CWD and snags do not meet targets.

Ecoregion: Southern Cascades Slope Ecoregion (9i)

Habitat Type 1: Nesting

Description

Stands are ponderosa pine dominated. A mixture of white fir and Douglas-fir understory has developed in the absence of fire. These stands are located on the lee side of the Cascades. They are on very dry sites on generally flat terrain.

Objectives

Maintain nesting function while reducing risks to stand from fire and insects. Maintain large tree component.

Recommended Treatment

Alternative B.
No management activities.

Alternative C. and Alternative D.
Very little of this habitat is found in this ecoregion at present. The only treatment recommended would be a light pre-commercial tree thinning from below and/or underburning in order to maintain ponderosa pine vigor. Reduce fuels within 1/4 mile of habitat type 1.

Habitat Type 2: Roosting/Foraging

Description

Ponderosa pine dominated stands occur on the lee side of the Cascades. The sites are flat and dry. Douglas-fir and white fir understory has developed in the absence of fire. Overall the stands tend to be more open grown than forest stands in the other ecoregions. Tree diameter is less than in Habitat Type 1. Most of these stands have been entered, a few have not. Canopy closure has been reduced. The canopy may or may not be single layer, however forest cover has been reduced and may or may not be more open and discontinuous than in un-entered stands. CWD and snags are generally deficient due to past logging and yarding practices.

Objectives

Maintain roost/forage functions. Maintain tree vigor. Encourage development of the large tree component. Reduce risk of stand loss to fire and insects. Maintain canopy closure at 60% or increase it.

Recommended Treatment

Alternative B.
No management activities would be allowed.

Alternative C. and D.
Thinning from below will be done to maintain the large tree component in the stand. It is expected that these stands will be more open than similar stands in the other ecoregions given that these are ponderosa pine dominated stands. Generally, white fir and Douglas-fir less than 16" in diameter and less than 100 years of age will be thinned. Ponderosa pine, sugar pine and incense cedar will be favored. Existing tree clumps in canopy gaps will be thinned to increase their growth and to hasten canopy closure. Ponderosa pine will be planted or encouraged to grow whenever possible. Commercial sized trees would be girdled or felled and left where snags and CWD are deficient. Acceptable levels will be as in the Klamath River Ridges Ecoregion. Reduce fuels within 1/4 mile of this habitat type. Underburning or slash piling would be an option for habitat protection and risk reduction.

Habitat Type 3: Potential Habitat

Description

Little of this habitat type exists in this ecoregion. Most of it is young pine plantations.

Objectives

Accelerate tree growth using the best management practices available in order to develop LSOG characteristics as soon as possible.

Recommended Treatments

Thin from below, reduce current stocking levels. Prescribe burn excess fuels where needed. After thinning, monitor growth for future cultural needs. Maximize tree growth. Maintain stands at density levels that will best promote LSOG development trends.

Habitat Type 5: Dispersal Habitat with Potential

Description

Many of these stands are heavily thinned and some were selectively cut. A few are younger stands or are stocked at lower levels due to disturbance, poor soils or are intermixed with natural meadows. Stands are open and canopy cover is generally limited, little layering exists and stocking levels are poor. CWD and snags are often deficient.

Objectives

Develop forest stands with LSOG characteristics. These stands would become roosting/ foraging habitat. Encourage development of vigorous open grown trees that maintain dispersal functions.

Recommended Treatments

Alternative B.
No management activities would be allowed.

Alternative C. and D.
Stand character would be shifted more towards ponderosa pine. Light thinning of understory trees generally less than 20" in diameter would increase tree growth and vigor. Canopy gaps would sometimes result. Groups of pine in different age classes would be encouraged. Underburning and/or piling would be options. Canopy closure would be maintained at or above 40% encouraged in order to maintain diverse structure in ponderosa pine stands. Multistoried canopies would be encouraged and would have a full crowned pine character. Entries would favor a number of trees in several Dunnings pine classes (Dunning, 1928). Larger trees selected for cutting would be left on site where snags or CWD are deficient.

Salvage Guidelines

In all cases, planning for salvage should focus on long-range objectives, which are based on desired future condition of the forest. Because one monument goal is to provide high quality habitat for species associated with late-successional forest conditions, management following a stand-replacing event should be designed to accelerate or not impede the development of those conditions. The rate of development of this habitat will vary among forest types and will be influenced by a complex interaction of stand-level factors that include site productivity, population dynamics of live trees and snags, and decay rates of coarse woody debris. Because there is much to learn about the development of species associated with these forests and their habitat, it seems prudent to only allow removal of conservative quantities of salvage material from the monument and retain management opportunities until the process is better understood. The following guidelines are general. Specific snag and CWD guidelines have been developed for each ecoregion in the Monument (see Appendix JJ). The ecoregion specific guidelines were developed as targets for managed stands developing into LSOG habitat. They should be considered minimum standards for salvage projects considered after a stand replacing event.

1. The potential for benefit to species associated with late-successional forest conditions from salvage is greatest when stand-replacing events are involved. Salvage in disturbed sites of less than 10 acres is not appropriate because small forest openings are an important component of old-growth forests. In addition, salvage would occur only in stands where disturbance has reduced canopy closure to less than 40 percent, because stands with more closure are likely to provide some value for species associated with these forests.

2. Surviving trees provide a significant residual component of larger trees in the developing stand. In addition, defects caused by fire or wind break in residual trees may accelerate development of structural characteristics suitable for LSOG associated species. Also, those damaged trees that eventually die will provide additional snags. Consequently, all standing live trees would be retained, including those injured (e.g., scorched) but likely to survive. Inspection of the cambium layer can provide an indication of potential tree mortality.

3. Following stand-replacing disturbance, management would focus on retaining snags that are likely to persist until late-successional conditions have developed and the new stand is again producing large snags.

4. Following a stand-replacing disturbance, management would retain adequate coarse woody debris quantities in the new stand so that in the future it will still contain amounts similar to naturally regenerated stands. The analysis that determines the amount of coarse woody debris to leave must account for the full period of time before the new stand begins to contribute coarse woody debris. Because coarse woody debris decay rates, forest dynamics, and site productivity undoubtedly vary among provinces and forest types, the specifications also will vary. This standard and guideline represents one item to be considered and may indeed result in no salvage following windthrow in low density stands.

6. Removal of snags and logs may be necessary to reduce hazards to humans along roads and trails, and in or adjacent to campgrounds. Where materials must be removed from the site, as in a campground or on a road, a salvage sale may be is appropriate. In other areas, such as along roads, material would be left on site.

7. Where green trees, snags, and logs are present following disturbance, the green-tree and snag guidelines will be applied first, and completely satisfied where possible. The biomass left in snags can be credited toward the amount of coarse woody debris biomass needed to achieve management objectives.

8. These basic guidelines may not be applicable after disturbances in younger stands because remnant coarse woody debris may be relatively small. In these cases, diameter and biomass retention guidelines would be developed consistent with the intention of achieving late-successional forest conditions.

9. It seldom will be appropriate to remove logs present on the forest floor before a disturbance event. Where these logs are in an advanced state of decay, they will not be credited toward objectives for coarse woody debris retention developed after a disturbance event. Advanced state of decay is defined as logs not expected to persist to the time when the new stand begins producing coarse woody debris.

10. The coarse woody debris retained would approximate the species composition of the original stand to help replicate preexisting suitable habitat conditions.

Appendix U - Stream Temperature and Turbidity Data

Table U-1. CSNM Stream Temperature[1] Monitoring Sites in Jenny Creek Watershed			
Hydrologic Unit Code[2]	**Site Code**	**Site Location**	**Agency/ Organization[3]**
18 01 02 06 03 01	SDAL	Soda Creek above confluence with Grizzly Creek	FOG/BLM
18 01 02 06 03 01	JNYU	Jenny Creek above Johnson Creek	BLM
18 01 02 06 03 03	JNSL	Johnson Creek above Jenny Creek	FOG
18 01 02 06 03 04	JNYM	Jenny Creek above Beaver Creek	BLM[4]
18 01 02 06 03 04	BVRL	Beaver Creek above Corral Creek	BLM[4]
18 01 02 06 03 04	CRLL	Corral Creek @ confluence with Beaver Creek	BLM[4]
18 01 02 06 03 05	KNPS	Keene Creek below Parsnip Springs	FOG/BLM
18 01 02 06 03 05	KNAS	Keene Creek above South Fork Keene Creek	FOG/BLM
18 01 02 06 03 05	KNSF	South Fork Keene Creek @ confluence with Keene Creek	FOG/BLM
18 01 02 06 03 05	MILF	Mill Creek approx. 0.5 mi. above Keene Creek	FOG
18 01 02 06 03 05	LINL	Lincoln Creek above confluence with Keene Creek	BLM
18 01 02 06 03 05	LINF	Lincoln Creek above confluence with Keene Creek	FOG
18 01 02 06 03 05	BXDW	Keene Creek below Lincoln Creek	BLM
18 01 02 06 03 06	BXON	Jenny Creek below Keene Creek	BLM
18 01 02 06 03 06	PARK	Parker Creek above Jenny Creek	BLM
18 01 02 06 03 06	BXO1	Jenny Creek above Oregon Gulch @ Box O Ranch Reach 1	BLM
18 01 02 06 03 06	BXO2	Jenny Creek above Oregon Gulch @ Box O Ranch Reach 2	BLM
18 01 02 06 03 06	BXO3	Jenny Creek above Oregon Gulch @ Box O Ranch Reach 3	BLM
18 01 02 06 03 06	BXO4	Jenny Creek above Oregon Gulch @ Box O Ranch Reach 4	BLM
18 01 02 06 03 06	BXO5	Jenny Creek above Oregon Gulch @ Box O Ranch Reach 5	BLM
18 01 02 06 03 06	BXO6	Jenny Creek above Oregon Gulch @ Box O Ranch Reach 6	BLM
18 01 02 06 03 06	BXO7	Jenny Creek above Oregon Gulch @ Box O Ranch Reach 7	BLM
18 01 02 06 03 06	ORE2	Oreon Gulch @ Box O Ranch west boundary	BLM
18 01 02 06 03 06	OREG	Oregon Gulch above Jenny Creek	BLM
18 01 02 06 03 06	BXOS	Jenny Creek below Oregon Gulch	BLM
18 01 02 06 03 06	LWRX	Jenny Creek below Spring Creek	BLM

1/ Stream temperatures monitored with data loggers.

2/ See Table 2-7.

3/ BLM = Bureau of Land Management, Medford District; FOG = Friends of the Greensprings.

4/ 1999 temperature data was collected by FOG.

Table U-2. CSNM Summer Stream Temperature Monitoring Data for Jenny Creek Watershed										
Site Code[1]	7 Day Ave. Max. Temp. (°F) (# Times 7 Day Ave. Max. > 64°F)									
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000[2]
SDAL							61.8 (0)			
JNYU		71.0 (49)				73.9 (59)	73.3 (77)	74.2 (77)	71.0 (69)	73.3 (53)
JNSL						68.8 (29)				
JNYM		81.2 (108)				79.2 (87)	77.5 (85)	78.8 (80)	75.1 (70)	77.2 (53)
BVRL		75.2 (68)		73.3 (61)	69.9 (50)	73.0 (66)	74.7 (84)	76.9 (87)	73.8 (77)	76.2 (54)
CRLL		81.1 (88)		76.7 (63)	74.9 (45)	80.9 (85)	78.3 (87)	79.7 (91)	75.9 (65)	79.0 (59)
KNPS							49.1 (0)			
KNAS							63.4 (0)			
KNSF							66.8 (37)	69.6 (35)		
MILF								69.7 (57)		
LINL		70.9 (13)								
LINF								72.1 (34)		
BXDW					63.6 (0)	67.1 (29)	69.0 (47)	69.7 (48)	66.2 (20)	67.8 (43)
BXON	77.8 (81)	74.7 (19)[3]	75.5 (90)	72.0 (73)	71.9 (69)	75.8 (77)	76.4 (86)	75.4 (81)	72.4 (70)	75.7 (84)
PARK								67.2 (29)	63.5 (0)	67.0 (25)
BXO1							74.8 (80)	76.8 (82)	72.6 (70)	76.2 (85)
BXO2							76.5 (79)	77.2 (81)	73.0 (70)	76.3 (85)

Table U-2. CSNM Summer Stream Temperature Monitoring Data for Jenny Creek Watershed

Site Code[1]	7 Day Ave. Max. Temp. (°F) (# Times 7 Day Ave. Max. > 64°F)									
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000[2]
BXO3							76.8 (79)	78.0 (83)	73.5 (71)	76.9 (88)
BXO4							78.7 (82)	79.6 (85)	75.6 (94)	79.5 (94)
BXO5							79.0 (82)	80.2 (85)	75.9 (103)	80.4 (95)
BXO6							79.3 (86)	80.3 (86)	76.0 (94)	80.5 (95)
BXO7							80.1 (86)	80.8 (86)	77.2 (104)	81.7 (96)
ORE2								76.8 (11)		
OREG								76.0 (8)		
BXOS	81.1 (79)	82.2 (112)	80.5 (83)	84.2 (122)	79.9 (96)	82.2 (97)	79.6 (89)	80.8 (86)	76.9 (103)	80.7 (95)
LWRX		75.7 (103)			76.9 (104)	79.3 (102)	77.0 (102)	76.7 (82)	74.0 (99)	75.7 (92)

1/ See Table U-1 for site locations.
2/ Provisional data.
3/ Temperature monitoring only conducted for part of the summer season.

Table U-3. CSNM Stream Temperature[1] Monitoring Sites in Klamath-Iron Gate Watershed

Hydrologic Unit Code[2]	Site Code	Site Location	Agency/ Organization[3]
18 01 02 06 04 02	DOVN	Dutch Oven Creek above confluence with Camp Creek	BLM
18 01 02 06 04 02	CMPE	East Fork Camp Creek above confluence with West Fork	BLM
18 01 02 06 04 02	CMPW	West Fork Camp Creek above confluence with East Fork	BLM

1/ Stream temperatures monitored with data loggers.
2/ See Table 2-7.
3/ BLM = Bureau of Land Management, Medford District

Table U-4. CSNM Summer Stream Temperature Monitoring Data for Klamath-Iron Gate Watershed

Site Code[1]	7 Day Ave. Max. Temp. (°F) (# Times 7 Day Ave. Max. > 64°F)					
	1995	1996	1997	1998	1999	2000[2]
DOVN	61.1 (0)	63.8 (0)	55.1 (0)	61.3 (0)	61.5 (0)	65.5 (11)
CMPE			57.8 (0)	64.3 (2)		64.5 (1)
CMPW			63.1 (0)	65.5 (24)		65.4 (13)

1/ See Table U-3 for site locations.

2/ Provisional data.

Table U-5. CSNM Stream Temperature[1] Monitoring Sites in Bear Creek Watershed

Hydrologic Unit Code[2]	Site Code	Site Location	Agency/ Organization[3]
17 10 03 08 01 01	EMPC	Emigrant Creek above Porcupine Creek	BLM
17 10 03 08 01 01	PORC	Porcupine Creek @ confluence with Emigrant Creek	BLM
17 10 03 08 01 01	UTEM	Unnamed tributary to Emigrant Creek, above Green Mtn. Cr.	BLM
17 10 03 08 01 01	GRNU	Green Mountain Creek @ upper BLM bdry section 19	BLM
17 10 03 08 01 01	GRNL	Green Mountain Creek @ lower BLM bdry section 19	BLM
17 10 03 08 01 01	E13U	Emigrant Creek @ upper BLM line section 13	BLM
17 10 03 08 01 01	E13L	Emigrant Creek @ lower BLM line section 13	BLM
17 10 03 08 01 01	EMBD	Emigrant Creek above Baldy Creek	FOG
17 10 03 08 01 01	BDYU	Unnamed tributary to Baldy Creek @ section 17/20 line	BLM
17 10 03 08 01 01	B17L	Unnamed tributary to Baldy Creek @ section 17/18 line	BLM
17 10 03 08 01 01	BD17	Unnamed tributary to Baldy Creek @ section 19/20 line	BLM
17 10 03 08 01 01	B19U	Baldy Creek @ section 19/20 line	BLM
17 10 03 08 01 01	B19L	Baldy Creek @ section 18/19 line	BLM
17 10 03 08 01 01	B13U	Baldy Creek @ section 13/18 line	BLM
17 10 03 08 01 01	B13L	Baldy Creek above confluence with Emigrant Creek	BLM
17 10 03 08 01 01	BALD	Baldy Creek @ confluence with Emigrant Creek	FOG
17 10 03 08 01 01	BUCK	Buckhorn Springs Creek @ section 7/12 line	BLM
17 10 03 08 01 01	TYHB	Tyler Creek above Hobart Creek[4]	FOG
17 10 03 08 01 01	HBRT	Hobart Creek[4] @ confluence with Tyler Creek	FOG

1/ Stream temperatures monitored with data loggers.

2/ See Table 2-7.

3/ BLM = Bureau of Land Management, Medford District; FOG = Friends of the Greensprings

4/ Hobart Creek is not a named stream on the USGS topographic map, and the actual hydrography for the upper reaches of Tyler Creek and stream names for the TYHB and HBRT sites are in question.

Table U-6. CSNM Summer Stream Temperature Monitoring Data for Bear Creek Watershed

Site Code[1]	7 Day Ave. Max. Temp. (°F) (# Times 7 Day Ave. Max. > 64°F)				
	1996	1997	1998	1999	2000[2]
EMPC				61.9 (0)	63.7 (0)
PORC				58.8 (0)	
UTEM				61.3 (0)	
GRNU				59.5 (0)	
GRNL				52.9 (0)	
E13U				65.0 (10)	
E13L				66.2 (26)	69.2 (38)
EMBD	67.5 (24)	68.9 (46)		67.2 (36)	
BDYU				58.2 (0)	
B17L				59.0 (0)	
BD17				51.6 (0)	
B19U				60.0 (0)	
B19L				54.8 (0)	
B13U				61.6 (0)	
B13L				64.2 (2)	
BALD		65.3 (20)		63.6 (0)	
BUCK				62.2 (0)	

Table U-6. CSNM Summer Stream Temperature Monitoring Data for Bear Creek Watershed					
Site Code[1]	7 Day Ave. Max. Temp. (°F) (# Times 7 Day Ave. Max. > 64°F)				
	1996	1997	1998	1999	2000[2]
TYHB	68.6 (33)		70.1 (55)	64.9 (8)	
HBRT	68.6 (26)		68.3 (35)	64.4 (2)	

1/ See Table U-5 for site locations.

2/ Provisional data.

Table U-7. CSNM Dissolved Oxygen Grab Sample Data for Jenny Creek Watershed							
HUC 6[1]	Site Code	Site Location	Dissolved Oxygen (mg/l)				
			5/20/81	6/18/81	7/14/81	8/11/81	9/15/81
04	BVRU	Beaver Creek in SESE of section 13	10.20	10.40	9.40	8.60	9.00
05	KNEN	Keene Creek approx. 1/4 mile above confluence with S. Fork Keene Creek	10.30	9.40	9.30	8.50	9.50
05	KNEP	Keene Creek upstream of Parsnip Lakes in NENW of section 10	10.60	10.50	10.20	9.30	11.00

1/ HUC6 is the 6th field (subwatershed) in the Hydrologic Unit Code (HUC); the HUC5 is 1801020603 for Jenny Creek Watershed. See Table 2-7.

Table U-8. CSNM Fecal Coliform Grab Sample Data for Jenny Creek Watershed							
HUC 6[1]	Site Code	Site Location	Fecal Coliform (MPN[2]/100 ml)				
			5/20/81	6/18/81	7/14/81	8/11/81	9/15/81
04	BVRU	Beaver Creek in SESE of section 13	9.1	7.3	<3.0	43.0	240.0
05	KNEN	Keene Creek approx. 1/4 mile above confluence with S. Fork Keene Creek	9.1	11.0	43.0	240.0	75.0
05	KNEP	Keene Creek upstream of Parsnip Lakes in NENW of section 10	23.0	<3.0	<3.0	21.0	93.0

1/ HUC6 is the 6th field (subwatershed) in the Hydrologic Unit Code (HUC); the HUC5 is 1801020603 for Jenny Creek Watershed. See Table 2-7.

2/ MPN=most probable number

Table U-9. CSNM Turbidity Grab Sample Data Summaries for Jenny Creek Watershed

HUC 6[1]	Site Code	Site Location/Sampling Period	Number of Samples	Minimum Turbidity (NTUs)	Maximum Turbidity (NTUs)	Median Turbidity (NTUs)
01	**SDAL**	Soda Creek above confluence w/Grizzly Creek (7/91 - 9/00)	124	0.17	126	2.20
01	**GRZL**	Grizzly Creek above Soda Creek (7/91 - 9/00)	124	0.20	17.5	2.01
01	**JNYU**	Jenny Creek above Johnson Creek (7/91 - 10/00)	139	0.30	31.4	2.23
03	**JNSX**	Johnson Creek below road crossing (7/91 - 7/00)	97	0.64	41.0	6.46
04	**JNYM**	Jenny Creek above Beaver Creek (11/91 - 10/00)	156	0.20	40.4	3.43
04	**BVRL**	Beaver Creek above Corral Creek (7/91 - 10/00)	173	0.40	70.9	1.55
04	**CRLL**	Corral Creek @ confluence w/Beaver Creek (7/91 - 10/00)	173	0.40	126	2.70
05	**MILL**	Mill Creek above confluence with Keene Creek (7/91 - 9/00)	137	0.26	61.4	2.50
05	**LINL**	Lincoln Creek above confluence with Keene Creek (7/91 - 7/00)	141	0.90	35.9	5.50
05	**KNEX**	Keene Creek below Lincoln Creek (10/91 - 9/00)	163	0.10	86.7	3.04
06	**BXON**	Jenny Creek below Keene Creek (7/91 - 10/00)	161	0.50	61.2	2.60
06	**LWRX**	Jenny Creek below Spring Creek (7/91 - 10/00)	180	0.53	66.5	2.60

1/ HUC6 is the 6th field (subwatershed) in the Hydrologic Unit Code (HUC); the HUC5 is 1801020603 for Jenny Creek Watershed. See Table 2-7.

Table U-10. CSNM Turbidity Grab Sample Data for Klamath-Iron Gate Watershed						
Site Code[1]	Turbidity (NTU)					
	June 1998	October 1998	June 1999	October 1999	June 2000	October 2000
DOVN	1.52	0.44	1.50	0.78	1.67	1.31
CMPE	3.15	0.47			1.31	2.65
CMPW	1.54				2.61	

1/ See Table U-3 for site locations.

Table U-11. CSNM Turbidity Grab Sample Data for Bear Creek Watershed				
Site Code[1]	Turbidity (NTU)			
	June 1999	October 1999	June 2000	October 2000
EMPC	3.40	1.06	1.77	1.18
PORC	2.20	1.03		
UTEM	4.18	1.34		
GRNU	1.53			
GRNL	2.83	3.33		
E13U	3.26	0.90		
E13L	6.34	0.92	2.02	0.73
BDYU	3.89	0.84		
B17L	10.4			
BD17	1.41			
B19U	3.64	1.31		
B19L	5.71			
B13U	3.70	1.26		
B13L	5.63	1.39		
BUCK	1.17	2.18		

1/ See Table U-5 for site locations.

Appendix V - Visual Resource Management

The Bureau of Land Management's requirement to manage the scenic resources on public lands is established by law within the Federal Land Policy and Management Act of 1976 (FLPMA) and the National Environmental Policy Act of 1969 (NEPA). While the agency is entrusted with managing for multiple uses, the BLM is responsible for ensuring that the scenic values of these lands is considered before allowing, any uses that might create negative visual impacts. This is accomplished through the use of the agency's Visual Resource Management (VRM) system for the inventory, allocation, and analysis of scenic values.

Under the VRM system, lands are allocated to one of four visual resource management classes, based upon an inventory of sensitivity levels, viewer distances, and scenic quality. The objectives for these classes are described in the BLM VRM Manual, Section 8410 as:

Visual Resource Class I:

The objective for this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

Visual Resource Class II:

The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Visual Resource Class III:

The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Chances should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Visual Resource Class IV:

The objective of this class is to provide for management activities which require major modifications of the existing character of the landscape. The level of chance to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

Appendix W - Public Comments about Draft CSEAA/DEIS Compiled by Southern Oregon University

Comment Totals Table

There were 6,641 comments counted from 816 letters. These totals do not include those comments where the person said the same thing more than one time. It also does not include the comments of 133 form letters not provided to the compiler. This effects the validity of the percentages. Also, those comments that have zero as their total were detected at least once on the first reading of the comments, but somehow were not picked out on the reading to code the information.

Comment Code	Code Explanation	Total Comments	Percent of All Comments
1A	1 - National Monument/Wilderness Area Designations A. For The National Monument/Wilderness Area Designations	74	9
1A#1	1 - National Monument/Wilderness Area Designations A. For The National Monument/Wilderness Area Designations 1. With Strong and Logical Language	2	0.2
1B	1 - National Monument/Wilderness Area Designations B. For The National Monument/Wilderness Area Designations for both OR & CA	31	4
1C	1 - National Monument/Wilderness Area Designations C. Against The National Monument/Wilderness Area Designations	48	6
1D	1 - National Monument/Wilderness Area Designations D. Against Including HRWA/CA In National Monument	34	4
1E	1 - National Monument/Wilderness Area Designations E. Concerns About Jurisdictions	10	1
1E #1	1 - National Monument/Wilderness Area Designations E. Concerns About Jurisdictions 1. CA Laws Are Different & Governmental Structure is Different	4	0.5
1F	1 - National Monument/Wilderness Area Designations F. Against Pieces of The National Monument/Wilderness Area Designations *	2	2
1G	1 - National Monument/Wilderness Area Designations G. Distressed/Angry That The National Monument Designation Was Completed Before The CSNM Process Was Finished.	11	1
1H	1 - National Monument/Wilderness Area Designations H. For Separate CA Protection Plan	1	0.1
2A	2 -Land Acquisition Plans A. For Acquiring Private Property From Willing Sellers/For Acquiring More Land	218	27
2B	2 -Land Acquisition Plans B. For Acquiring As Much Adjacent CA Land As Possible/For Land Acquisition in HRWA	30	4
2C	2 -Land Acquisition Plans C. For Acquiring More Land for Wildlife To Provide Habitat Connectivity And/Or Water Quality	35	4

Comment Code	Code Explanation	Total Comments	Percent of All Comments
2D	2 -Land Acquisition Plans D. Opposed To Acquiring More Land	35	4
2E	2 -Land Acquisition Plans E. Against Acquiring CA Land	8	1
2E #1	2 -Land Acquisition Plans E. Against Acquiring CA Land 1. Private or Public	28	3
2F	2 -Land Acquisition Plans F. Concern Over The Land That Was Sold & The Land That Was to be Acquired to Replace It/Concerned BLM is Abandoning Acquisition Plans for HRWA	8	1
2G	2 -Land Acquisition Plans G. For Reduction of HRWA— Against Increase/Acquiring of HRWA	86	11
2H	2 -Land Acquisition Plans H. Against The Government Managing Anymore Land	3	0.3
2I	2 -Land Acquisition Plans I. Fear Of The Government Taking Private Land (“Land Grabbing”)/Federal And State Governmental Condemnation (Confiscation, Or Annexation)	24	3
2J	2 -Land Acquisition Plans J. Support A No Net Loss of Private Lands Policy	7	0.9
2K	2 -Land Acquisition Plans K. Concerned That CA/HRWA Won’t Be In The CSNM	5	0.6
2L	2 -Land Acquisition Plans L. Specific Acquisition Suggestions	64	8
3A	3 -Public Access To Area vs. Decommissioning of Roads A. For Closing All Unnecessary Non-Residential Roads/Right of Ways & Jeep Trails	209	26
3B	3 -Public Access To Area vs. Decommissioning of Roads B. Against Decommissioning of Roads	101	12
3B #1	3 -Public Access To Area vs. Decommissioning of Roads B. Against Decommissioning of Roads 1- For Upgrading existing roads to prevent erosion.	6	0.7
3C	3 -Public Access To Area vs. Decommissioning of Roads C. For A Middle Ground Approach—Some Roads Should Be Improved; Some Roads Should Be Closed Seasonally; Some Roads Should Just Be Closed.	7	0.8

Comment Code	Code Explanation	Total Comments	Percent of All Comments
3D	3 -Public Access To Area vs. Decommissioning of Roads D. Detailed Road-Use And Right-Of-Way Study Needed To Explain Which Roads To Keep Open/Road Should Be Closed On A Case By Case Basis.	7	0.8
3E	3 -Public Access To Area vs. Decommissioning of Roads E. Comments About Keeping The Area Open To Public /Public Lands Should Be Managed For All/Against Loss of Freedoms	99	12
3E #1	3 -Public Access To Area vs. Decommissioning of Roads E. Comments About Keeping The Area Open To Public /Public Lands Should Be Managed For All/Against Loss of Freedoms 1- Decisions to change land use from multiple use to preservation should be based on good science and sound logic. CSNM had none.	64	8
3F	3 -Public Access To Area vs. Decommissioning of Roads F. Specific Comments About Schoheim Road	0	0
3F #1	3 -Public Access To Area vs. Decommissioning of Roads F. Specific Comments About Schoheim Road 1- Keep it open.	20	2
3F #2	3 -Public Access To Area vs. Decommissioning of Roads F. Specific Comments About Schoheim Road 2- Close It.	215	26
3G	3 -Public Access To Area vs. Decommissioning of Roads G. CSNM Would Discriminate Against The Old, Young, and Handicapped...	29	3
3G #1	3 -Public Access To Area vs. Decommissioning of Roads G. CSNM Would Discriminate Against The Old, Young, and Handicapped... 1- It would benefit only a few wealthy and people with leisure time	1	0.1
3H	3 -Public Access To Area vs. Decommissioning of Roads H. For Having ORV's & Other Mechanized Recreation	8	1
3I	3 -Public Access To Area vs. Decommissioning of Roads I. Against Having ORV's & Other Mechanized Recreation	244	30
3J	3 -Public Access To Area vs. Decommissioning of Roads J. Limit OHVs To Designated Road/Reasonable Limits.	10	1
3K	3 -Public Access To Area vs. Decommissioning of Roads K. For Non-Motorized Recreation	18	2

Comment Code	Code Explanation	Total Comments	Percent of All Comments
3L	3 -Public Access To Area vs. Decommissioning of Roads L. For No Limits to Non-Motorized Recreation/Permitting— but not promoting— all forms of non-mechanized public lands recreation off gravel and paved roads throughout the area.	183	22
3M	3 -Public Access To Area vs. Decommissioning of Roads M. Concerns About Access to Hunting & Fishing	15	2
3N	3 -Public Access To Area vs. Decommissioning of Roads N. Concerns About Fire, Emergency and other Management Access and For Escape for Private Land Owners	36	4
3O	3 -Public Access To Area vs. Decommissioning of Roads O. Misc. About Roads and Access to Area	227	28
4A	4- All Commodity Use and Extraction A. For All Commodity Use and Extraction (Grazing, Timber, Mining, & Development)	74	9
4B	4- All Commodity Use and Extraction B. Against All Commodity Use and Extraction (Grazing, Timber, Mining, & Development)	214	26
5A	5- Comments and Concerns About Grazing A. For Grazing	114	14
5B	5- Comments and Concerns About Grazing B. Against Grazing	48	6
5B #1	5- Comments and Concerns About Grazing B. Against Grazing 1- Cattle Ranchers have been subsidized long enough.	2	0.2
5C #1	5- Comments and Concerns About Grazing C. Grazing As A Management Tool 1- For	19	2
5C #2	5- Comments and Concerns About Grazing C. Grazing As A Management Tool 2- Against	28	3
5C #3	5- Comments and Concerns About Grazing C. Grazing As A Management Tool 3- Allowed Only in Exceptional Circumstances or Research Purposes	1	0.1
5D	5- Comments and Concerns About Grazing D. Who Will "Monitor" To See That The Grazing Is Done In Proper Areas?/How Will The Management Be Done?/Cattle vs. Fences	7	0.8

Comment Code	Code Explanation	Total Comments	Percent of All Comments
5E	5- Comments and Concerns About Grazing E. Cattle & Noxious Weeds vs. Native Plants	9	1
5F	5- Comments and Concerns About Grazing F. Comments Concerning The Menke Report	15	2
5G #1	5- Comments and Concerns About Grazing G. The Box O Ranch Comments 1- Same-For Grazing There	26	3
5G #2	5- Comments and Concerns About Grazing G. The Box O Ranch Comments 2- Change-No Grazing There	9	1
5H	5- Comments and Concerns About Grazing H. Cattle Compete For Forage Needed By Deer, Elk, And Their Young	20	2
5I	5- Comments and Concerns About Grazing I. Misc. About Grazing and Ranching	32	4
5J	5- Comments and Concerns About Grazing J. Cattle & Water Quality	3	0.3
6A	6- Comments And Concerns About Timber A. For Timber Extraction	89	11
6B	6- Comments And Concerns About Timber B. Against Timber Extraction	23	3
6C	6- Comments And Concerns About Timber C. Comments About "Forest Health Reserves" (FHRs)	3	0.3
6C #1	6- Comments And Concerns About Timber C. Comments About "Forest Health Reserves" (FHRs) 1) Novel, New, Experimental, Questionable	13	2
6C #2	6- Comments And Concerns About Timber C. Comments About "Forest Health Reserves" (FHRs) 2) No documentation as to meaning, or what will happen with this designation	12	1
6C #3	6- Comments And Concerns About Timber C. Comments About "Forest Health Reserves" (FHRs) 3) FHRs is OK.	1	0.1
6D	6- Comments And Concerns About Timber D. Comments About Timber Matrixes	2	0.2
6D #1	6- Comments And Concerns About Timber D. Comments About Timber Matrixes 1- For	0	0

Comment Code	Code Explanation	Total Comments	Percent of All Comments
6D #2	6- Comments And Concerns About Timber D. Comments About Timber Matrixes 2- Against	11	1
6E	6- Comments And Concerns About Timber E. Late Successial Reserves	0	0
6E #1	6- Comments And Concerns About Timber E. Late Successial Reserves 1- For	13	2
6E #2	6- Comments And Concerns About Timber E. Late Successial Reserves 2- Against	2	0.2
6F	6- Comments And Concerns About Timber F. Forest, Insects, & Disease	1	0.1
6G	6- Comments And Concerns About Timber G. Support Some Thinning, Based on Scientifically defensible standards (Understory Thinning)	9	1
6H	6- Comments And Concerns About Timber H. Misc. About Timber	18	2
6I	6- Comments And Concerns About Timber I. Balanced Approach to Timber Harvesting. (No clear cutting, but no ban on all harvesting/Selective Logging)	11	1
6J	6- Comments And Concerns About Timber J. Timber Harvest for Scientific Research or Demonstration	2	0.2
7A	7- Costs to Taxpayers/ Local Economies A. CSNM Will Be Good For The Economy	6	0.7
7B	7- Costs to Taxpayers/ Local Economies B. CSNM Will Be Bad For The Economy	29	4
7C	7- Costs to Taxpayers/ Local Economies C. Specifics About CSNM and The Economy	1	0.1
7D	7- Costs to Taxpayers/ Local Economies D. Socio-Economic Impacts Have Not Been Addressed	67	8
7E	7- Costs to Taxpayers/ Local Economies E. Concerned About Costs to Taxpayers & Changes in Property Tax Rolls	17	2
7F	7- Costs to Taxpayers/ Local Economies F. Concerned About Cost And Agents To Monitor For ORV Violators	8	1

Comment Code	Code Explanation	Total Comments	Percent of All Comments
7G	7- Costs to Taxpayers/ Local Economies G. Concerned About Cost of Fencing and Management of Grazing	10	1
7H	7- Costs to Taxpayers/ Local Economies H. Concerned About Economic Effects Of Changing Grazing Practices From Commodity To Ecological	30	4
7H #1	7- Costs to Taxpayers/ Local Economies H. Concerned About Economic Effects Of Changing Grazing Practices From Commodity To Ecological 1- If no grazing cattlemen will sell land to developed/Cattle Producers Will Quit/ It will Put Them Out of Business.	35	4
7I	7- Costs to Taxpayers/ Local Economies I. Misc. Cost Comments	60	7
8A	8 -Small Vocal Group Ruling the Decision A. For Listening To Local Groups In Making The Decisions/Weighting The Comments Of Local Residents Within And Near CSNM More Heavily Than Out-Of-Area Users Or Recreationists/Locals Should Control The Decisions (Local Officials And People)	84	10
8B	8 -Small Vocal Group Ruling the Decision B. Land Belongs to All Americans and so Effects More Than Just Local People.	4	0.5
8C #1	8 -Small Vocal Group Ruling the Decision C. Against Letting A Small Vocal Group (of Ranchers) Ruling the Decision/Don't Let A Radical Group (of Environmentalist) Rule Over The Majority Of The Population 1- Don't Let A Small Group of Environmentalist Rule The Decision.	13	2
8C #2	8 -Small Vocal Group Ruling the Decision C. Against Letting A Small Vocal Group (of Ranchers) Ruling the Decision/Don't Let A Radical Group (of Environmentalist) Rule Over The Majority Of The Population 2- Don't Let A Small Group of Ranchers/Anti-Environmentalist Rule The Decision.	21	3
8D	8 -Small Vocal Group Ruling the Decision D. Concern Over The Mis-Information That Is Out There.	4	0.5
8E	8 -Small Vocal Group Ruling the Decision E. Let The Decision Be Made For The Ecological Biodiversity of The Region Over The Economy of Jackson County & the Area.	1	0.1
9	9 - Alternative A Comments	1	0.1

Comment Code	Code Explanation	Total Comments	Percent of All Comments
9A	9 - Alternative A Comments A. Comments For	10	1
9B	9 - Alternative A Comments B. Comments Against	66	8
10A	10 - Alternative B Comments A. Comments For	89	11
10B	10 - Alternative B Comments B. Comments Against	7	0.8
11	11 - Combine Alternatives A & B.	31	4
12	12 - Alternative C Comments	3	0.3
12A	12 - Alternative C A. Comments For	19	2
12B	12 - Alternative C Comments B. Comments Against	151	19
13	13 - Alternative D Comments	2	0.2
13A	13 - Alternative D Comments A. Comments For	43	5
13B	13 - Alternative D Comments B. Comments Against	146	18
14	14 -Combine Alternatives C & D.	32	4
15A	15 -Alternative E Comments A. Comments For B. Comments Against	4	0.5
15B	15 -Alternative E Comments B. Comments Against	68	8
16A	16 -Government/Management A. Too Much Big Government In Community Affairs	26	3
16A #1	16 -Government/Management A. Too Much Big Government In Community Affairs 1- Too much regulations	1	0.1
16A #2	16 -Government/Management A. Too Much Big Government In Community Affairs 2- The Government just does as it pleases with regard to local input/Decision is already made/Dictatorial/DEIS/EIS is a Sham	16	2

Comment Code	Code Explanation	Total Comments	Percent of All Comments
16B	16 -Government/Management B. Concerns Over The BLM's Management of Land It Already Has/Questions The BLM 's Ability To Manage The National Monument.	31	4
16B #1	16 -Government/Management B. Concerns Over The BLM's Management of Land It Already Has/Questions The BLM 's Ability To Manage The National Monument. 1- Washington D.C. Politicians Don't Know Daily Conditions.	2	0.2
16C	16 -Government/Management C. Private Property Owners Are The Best Stewards Of The Land/The Land Is The Way It Is Because Of The Past & Current Property Owners— By Private Citizen Involvement	14	2
16C #1	16 -Government/Management C. Private Property Owners Are The Best Stewards Of The Land/The Land Is The Way It Is Because Of The Past & Current Property Owners— 1- Please do not destroy this land by trying to save it.	75	9
16C #2	16 -Government/Management C. Private Property Owners Are The Best Stewards Of The Land/The Land Is The Way It Is Because Of The Past & Current Property Owners— 2- "An Area Which Has Escaped The Impact of Man" Is False... Shows No Knowledge of Area/It Got That Way By Being Managed For Multiple Use.	23	3
16D	16 -Government/Management D. Effects On Private Land/Threatens Property Rights	50	6
16E	16 -Government/Management E. For Management Practices Used Only To Prevent The Loss of Biological and Ecological Values and For Research or Scientific Purposes That Would Enhance The Area/Ecological Management	6	0.7
16F	16 -Government/Management F. The Plan Needs More Specifics As To How Preservation & Restoration Will Be Implemented	5	0.6
16G #1	16 -Government/Management G. Question the Science of the EIS 1- Too much emphasis on unproven experimental (unknown or poorly research) management prescriptions such as livestock grazing to control weeds, unsubstantiated or poorly defined forest health prescriptions, and unproven land designations (Forest Health Reserves).	15	2

Comment Code	Code Explanation	Total Comments	Percent of All Comments
16G #2	16 -Government/Management G. Question the Science of the EIS 2- Should Recognize and Use The "Core-buffer" Management Principle/Wild Core & Rural Interface Management	18	2
16G #3	16 -Government/Management G. Question the Science of the EIS 3- Should have high burden of proof before undertaking intensive management.	7	0.8
16G #4	16 -Government/Management G. Question the Science of the EIS 4- No Scientific Reason for Such Drastic Action As Described in CSNM DMP/EIS	95	12
16H	16 -Government/Management H. Law Violations	25	3
16H #1	16 -Government/Management H. Law Violations 1- CSNM is Unconstitutional	6	0.7
16H #2	16 -Government/Management H. Law Violations 2- Federal Land Policy & Management Act	33	4
16H #3	16 -Government/Management H. Law Violations 3- Sec. 302(b) of the Federal Land Policy & Management Act (not protecting it enough)	1	0.1
16H #4	16 -Government/Management H. Law Violations 4- NEPA (national Environmental Policy Act)	42	5
16H #5	16 -Government/Management H. Law Violations 5- Executive Order 12898 (1994)	53	6
16H #6	16 -Government/Management H. Law Violations 6- Oregon Forest Practices Act	0	0
16H #7	16 -Government/Management H. Law Violations 7- Taylor Grazing Act	30	4
16H #8	16 -Government/Management H. Law Violations 8- O&C Act	32	4

Comment Code	Code Explanation	Total Comments	Percent of All Comments
16H #9	16 -Government/Management H. Law Violations 9- Taking of Multiple Use Lands Must Have Legal Justification, Not Just on Executive Order.	65	8
16H #10	16 -Government/Management H. Law Violations 10. Northwest Forest Plan	6	0.7
16H #11	16 -Government/Management H. Law Violations 11. Misc.	3	0.3
16H #12	16 -Government/Management H. Law Violations 12. Civil Rights	4	0.5
16H #13	16 -Government/Management H. Law Violations 13. State & County Land Planning Laws	5	0.6
16I	16 -Government/Management I. Litigation Threatened Over National Monument Process	5	0.6
16J	16 -Government/Management J. Government Actions Must Be Heavily Monitored and checked	0	0
16K	16 -Government/Management K. Misc. Management Comments	25	3
17A `	17 -Protect the Wildlife/Bio-Diversity A. For Wildlife/Bio-Diversity Protection, Restoration & Stability	440	54
17A #1	17 -Protect the Wildlife/Bio-Diversity A. For Wildlife/Bio-Diversity Protection, Restoration & Stability 1- For The Maintenance and Preservation Of The Rare And Unique Ecological Processes, Conditions And Habitats **With Minimum Human Intervention**	110	13
17B	17 -Protect the Wildlife/Bio-Diversity B. Against Wildlife/Bio-Diversity Protection (Protection is not needed)	8	1
17C	17 -Protect the Wildlife/Bio-Diversity C. Balance Between Protection Of Bio-Diversity/Wildlife And People's Right To Live In, Enjoy And Use Public Land Such As The CSNM.	147	18

Comment Code	Code Explanation	Total Comments	Percent of All Comments
17D	17 -Protect the Wildlife/Bio-Diversity D. This Kind Of Protection Will Be Bad For Wildlife, Preserving The Land Will Not Save It, Only Damage It Due To Poor Management/All The Bio-Diversity Is There Because Of Changes man Has Made.	22	3
17D #1	17 -Protect the Wildlife/Bio-Diversity D. This Kind Of Protection Will Be Bad For Wildlife, Preserving The Land Will Not Save It, Only Damage It Due To Poor Management/All The Bio-Diversity Is There Because Of Changes man Has Made. 1- Grazing and Effective Timber harvest Practices Promote Biodiversity	49	6
17E	17 -Protect the Wildlife/Bio-Diversity E. EIS Pays Insufficient Attention To Sensitive Local And Endemic Species.	18	2
17F	17 -Protect the Wildlife/Bio-Diversity F. Concern for Fish	4	0.5
17G	17 -Protect the Wildlife/Bio-Diversity G. Concern for Deer & Elk Winter Range	67	8
17G #1	17 -Protect the Wildlife/Bio-Diversity G. Concern for Deer & Elk Winter Range 1- Let The Deer, Elk, & other Native Grazers Ensure Greater Biodivesty.	1	0.1
17H	17 -Protect the Wildlife/Bio-Diversity H. CSNM Needed For Northern Spotted Owl Habitat Recovery	6	0.7
17I	17 -Protect the Wildlife/Bio-Diversity I. Concern for Noxious Weeds vs. Native Plants	12	1
17J	17 -Protect the Wildlife/Bio-Diversity J. Concerns About Water Quality/Water Shed Restoration	20	2
17K	17 -Protect the Wildlife/Bio-Diversity K. Misc	70	9
18A	18 - Concerns About Fire As A Management Tool A. Prescribed/Controlled Fire	40	5
18B	18 - Concerns About Fire As A Management Tool B. No Prescribed/Controlled Fire— Active Fire Protection	183	22
18C	18 - Concerns About Fire As A Management Tool C. Fear of Catastrophic Fires with Prescribed/Controlled Fire	112	14

Comment Code	Code Explanation	Total Comments	Percent of All Comments
18D	18 - Concerns About Fire As A Management Tool D. Prescribed/Controlled Fire Threat To Wildlife	80	10
18E	18 - Concerns About Fire As A Management Tool E. Questions	32	4
18F	18 - Concerns About Fire As A Management Tool F. Prescribed/Controlled Fire OK If Handled With Great Care	1	0.1
19A	19 - Changes To Historical Culture Of Area vs. Saving Area For Future Generations A. National Monument/Wilderness Area Designations Will Change The Historical Culture of Area	71	9
19A1	19 - Changes To Historical Culture Of Area vs. Saving Area For Future Generations A. National Monument/Wilderness Area Designations Will Change The Historical Culture of Area 1- Gives Kids something to Do To Stay Out of Trouble	1	0.1
19B	19 - Changes To Historical Culture Of Area vs. Saving Area For Future Generations B. For Saving Area For Future Generations	19	2
20A	20- Comments On Map & Boundaries A. Ecological, Watershed Based Boundaries	20	2
20B	20- Comments On Map & Boundaries B. Boundaries Straight As Possible	3	0.3
20C	20- Comments On Map & Boundaries C. Comments On Map	27	3
21	21-Misc. Access Ideas	1	0.1
21A	21-Misc. Access Ideas A. Visitor center	0	0
21B	21-Misc. Access Ideas B. ORV Park	1	0.1
21C	21-Misc. Access Ideas C. Handicap Accessible Places	1	0.1
21D	21-Misc. Access Ideas D. Public Education Program	4	0.4
21E	21-Misc. Access Ideas E. Volunteer Program	1	0.1
21F	21-Misc. Access Ideas F. Trails	1	0.1

Comment Code	Code Explanation	Total Comments	Percent of All Comments
22	22- Misc. Suggestions to Change The Plan	14	2
23	23- Misc. Concerns & Questions	22	3
24	24-Stand Alone Letters That Report Writers Should Read Themselves	43	5
25	25- For None Of The Alternatives	30	4
26	26- The Draft Is Confusing, Ambiguous with Omissions, Has Errors, and Is Contradictory	81	10

Appendix X - Comments by Government Agencies

Note: The letters contained in this Appendix are Federal, State and local government comments on the Cascade Siskiyou Ecological Emphasis Area Draft Management Plan/ Environmental Impact Statement.

Oregon

John A. Kitzhaber, M.D., Governor

Parks and Recreation Department
State Historic Preservation Office
1115 Commercial St. NE
Salem, OR 97301-1012
(503) 378-4168
FAX (503) 378-6447

March 21, 2000

File Code: Jackson

Tom Sensenig
Bureau of Land Management
3040 Biddle Road
Medford, OR 97504

RE: Draft Management Plan and Environmental Statement for the Cascade Siskiyou Ecological Emphasis Area

Dear Mr. Sensenig:

Thank you for forwarding the Draft Environmental Impact Statement (DEIS) for the Cascade Siskiyou Ecological Emphasis Area (CSEEA). It is clear from the contents of the document that there are historic sites located in the management plan's area of potential effect (APE). While the DEIS represents compliance with the National Environmental Policy Act, it does not meet the requirements of Section 106 of the National Historic Preservation Act. Compliance with Section 106 will require a separate submittal addressing the National-Register eligibility of the historic sites in the APE and a description of the effects of the management plan on the individual sites.

If you should have any further questions, or need additional assistance, please feel free to contact me at the SHPO, extension 229.

Sincerely,

Christine A. Curran

Christine A. Curran
Preservation Specialist

United States Department of the Interior 000445

U.S. GEOLOGICAL SURVEY
Reston, Virginia 22092

MAY 11 2000

In Reply Refer To:
Mail Stop 423

MEMORANDUM

MAY 2000
Received
District Office
Medford BLM

To: Tom Sensenig, Bureau of Land Management Cascade Siskiyou Ecological Area Team Leader Medford, Oregon

From: for James F. Devine
Senior Advisor for Science Applications

Subject: Review of the Draft Management Plan/Environmental Impact Statement for the Cascade Siskiyou Ecological Emphasis Area

The U.S. Geological Survey has reviewed the Draft Management Plan (MP)/Environmental Impact Statement (EIS) and has the following observations and comments. As noted in the Draft MA/EIS, "The guiding principle for management of the Area (CSEEA) [Cascade Siskiyou Ecological Emphasis Area] is to maintain, protect, restore or enhance relevant and important cultural, biological and ecological resource values. All other considerations are secondary to this guidance." (page iii).

The preferred alternative (Alternative C) will work to the long-term positive benefit of this ecologically sensitive area, consistent with the above noted guiding principle. However, from a hydrologic perspective, Alternative D, which emphasizes "the maintenance and preservation of the rare and unique ecological processes, conditions, and habitats in the CSEEA with minimum human intervention," has fewer or less serious potential adverse and cumulative effects on streamflows (Tables 4-6, and 4-7, page 231) and water- quality (Table 4-8, page 232 and Table 4-9, page 233). From a hydrologic perspective, therefore, Alternative D is more consistent with the guiding principle than the preferred Alternative C.

Further, the potential water-quality impacts will result primarily from eroded roadways and from grazing and timber harvest practices. Thus, Alternative D also would appear to provide greater relief from the adverse water-quality impacts of these activities than would Alternative C.

Accordingly, the specific rationale for selection of Alternative C should be clearly stated as the basis for the proposed actions.

Thank you for the opportunity to review this Draft MA/EIS.

Copy to: Office of Environmental Policy and Compliance

628

JACKSON COUNTY
Oregon

Board of
County Commissioners

Ric Holt (541) 774-6117
Jack Walker (541) 774-6118
Sue Kupillas (541) 774-6119
Fax (541) 774-6705

10 South Oakdale, Room 200
Medford, Oregon 97501

JUN 2000
Received
District Office
Medford BLM

May 26, 2000

Tom Sensenig, BLM CSEEA Team Leader
Medford District
Bureau of Land Management
3040 Biddle Road
Medford, Oregon 97504

The following are comments from the Jackson County Board of Commissioners, Jackson County, Oregon on the Draft Management Plan and Environmental Statement (DEIS) for the Cascade Siskiyou Ecological Emphasis Area. We appreciate the opportunity to comment.

1. **SUMMARY OF COMMENTS**

As to the proposed range of actions, the Board of Commissioners supports a combination of Alternatives A and B of the CSEESA, one which adheres to the goals of the President's Forest Plan as outlined in The Northwest Forest Plan, Report to the President and Congress 1996.

The Forest Plan orders agencies to balance environmental, economic and social issues as required Federal Land Policy Management Act (FLPMA), NEPA and the O & C Act. Goals of the Plan are: 1) adhere to the nation's laws; 2) protect and enhance the environment; 3) provide a sustainable timber economy; 4) support the region's people and communities during the economic transition and, 5) ensure that federal agencies work together.

Alternatives C and D are extreme, and do not further the multiple-use goals of either the Forest Plan, or of the underlying federal statutes. Alternatives C and D do not recommend decisions that are based on the best science available and on existing studies.

As a vehicle merely for the management decisions it discusses, the DEIS is inadequate. As a vehicle for the Secretary's potential designation of a National Monument within the area, it is even more inadequate. NEPA applies to that potential designation.

2. **DEIS FOR THIS PROPOSAL IS INADEQUATE**

We believe the current DEIS is inadequate under NEPA, even for the stated purposes of the DEIS.

The Medford District of the Bureau of Land Management possesses information about the current and past condition of the Cascade Siskiyou Ecological Emphasis Area. That information has not been included in the DEIS. We believe it shows that the current condition of the analysis area has arisen under multiple use management (as described in Chapter 2, DEIS), and is due in major part to such management. We entered a Freedom of Information Act request for that information, and received a number of BLM documents on May 25. As of this writing, we have not had time to analyze them. We thank the Medford District for producing those documents, but it should not have been necessary to resort to an FOIA request when the agency is in the midst of complying with NEPA. Decisions should be based on the most current and complete information available.

We believe the social impacts of the various proposals need further attention. Specifically, BLM should apply its own **Guide to Social Assessment**, and interpret the proposed action in light of those guidelines.

We also believe that the anticipated report by Dr. Menke (which is apparently due in June) should be included in the DEIS, and that BLM should consider public comments to that report before making a decision.

As to the specific alternatives:

A combination of Alternatives A & B most closely implement the information and research described in the existing Menke Report (included in this DEIS). Carefully designed irrigation, management, and grazing are required for the pastures to fight off weed infestations, water hungry tap-rooted weeds, and the eventual downgrading of the Jenny Creek riparian areas.

Alternative C would manage aggressively to restore desirable grasses, but the negative inferences about grazing that support Alternative C are not born out in the research information.

Further, Alternative C does not address the economic effects of changing grazing practices from commodity based to ecologically based decisions. To meet the goals of the Northwest Forest Plan, and to comply with NEPA, Alternative C's economic,

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social and environmental objectives must be discussed. We have asked Dr. Frederick W. Obermiller, Oregon State University, (an expert on public land economics, policy and law) to assess the alternatives, their financial affects on local ranching operations and their cumulative economic effects on the cattle industry in Jackson County. We will gladly share with you the results of his analysis. BLM is, of course, free to consult its own experts; our point is that the DEIS should contain some more detailed consideration of those potential impacts.

Alternative C would limit public access and reduce the multiple uses available to the public (including recreation) in an expanded area. Alternative C thus does not meet the goals of the Northwest Forest Plan, the O & C Act, or FLPMA. In addition, the management envisioned by Alternative C is in direct violation of the agreement between Jackson County and BLM as to the management of the Box O Ranch area. As you may recall, the County voiced no objection to the land exchange between the Box O and Cascade Ranches, based on a specific promise by BLM as to management of those lands, namely "<u>no net loss of commercial timber base lands</u>" and the maintenance of multiple use.(original emphasis) (See Attachments A, B and C to this letter).

Alternative D also violates the multiple use goals of the Northwest Forest Plan, the O & C Act and FLPMA. Alternative D does not take into effect the cumulative social and economic effects of withdrawing grazing, harvest and recreational uses. As discussed above, there would be significant effects on the human environment with the cumulative effects of withdrawing uses for grazing, timber and recreation.

Alternative E changes current multiple uses to achieve RNA objectives. This significantly changes the land use and violates the Northwest Forest Plan, the O & C Act, FLPMA. The cumulative effects are not adequately addressed and mitigated, and there has not been adequate involvement with local governments on changes in land use.

As to all alternatives, the DEIS deals inadequately with the issue of fire. The most current map issued by the USFS and BLM shows that the entire area considered in the DEIS is in extreme fire danger area (See attachment D to this letter). The DEIS itself estimates that virtually all the acreage of the CSEESA faces moderate or high fire hazard. Yet, at p. 219 of the DEIS, the elimination of prescribed burns is eliminated from further discussion.

The lessons of the recent fire in the Los Alamos area should not be ignored. When prescribed fire was used there, the outcome was disastrous. Prescribed fire in this

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area would product significant risk to the entire area, including many homes.

There is need for removal of small diameter material for fire suppression and reduction of fire hazard. Reduction by harvest treatment is the scientifically acceptable solution. Discussion of other alternatives, or non-management puts ecosystems and private ranches at risk, and introduces significant financial risk and liability for Jackson County in fire-emergency response. Jackson County is the Emergency Management agency for the entire county. The proposed alternatives that propose anything but aggressive fire management in all proposed alternatives put the entire ecosystem and Jackson County at risk. This is especially troubling to us, since the Forest Service is now contemplating closure of the fire tanker base at the airport in Medford.

Finally, as to this DEIS, Jackson County opposes alternatives that expand the land base of the proposed alternatives, any larger that the original 29,159 acres. This was not a part of the original CSEEA proposal and is opposed by this board. This would clash with our land use planning objectives in Jackson County. As stated above, we support a reasonable combination of Alternatives A and B.

3. **DEIS IS ESPECIALLY INADEQUATE FOR NATIONAL MONUMENT DESIGNATION**

Though not discussed in the DEIS, it is apparent that the Secretary of the Interior is considering designation of some or all of the analysis area as a National Monument, pursuant to the Antiquities Act of 1906, 16 U.S.C. §431. We realize that the DEIS does not purport to analyze the Secretary's range of National Monument options. However, that is precisely the problem.

We believe that the Secretary is subject to NEPA when he considers such a designation. Under *State of Alaska v. Carter*, 462 F. Supp. 1155 (D. Alaska 1978), National Monument designations were exempted from NEPA only where the President initiates the action, and directs a cabinet member to study the proposal. Here, though, the situation is fundamentally different. It is clear that Secretary Babbitt has initiated the potential designation, not President Clinton. Thus, the limited NEPA exemption of *Alaska v. Carter* does not relieve the Secretary of his statutory obligations under NEPA.

Since no other document purporting to comply with NEPA has been published by the Secretary or BLM, we must assume the DEIS is all the federal government proposes in the way of NEPA compliance, as to the potential National Monument

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designation. We therefore must use these comments to address NEPA in that context.

The DEIS and process leading to it are inadequate for NEPA purposes, for several reasons. First, the DEIS does not disclose the contemplated boundaries of the potential designation. Second, the management of any designated monument is not discussed, nor are the environment, social, human and economic impacts of such a designation. Third, alternatives to the contemplated designation (as to size, management, etc.) receive no discussion. Fourth, there has been no organized method for public input into the merits of such a designation; §202(c)(9) of FLPMA requires the BLM to involve local and state government early in the development of decisions affecting land use, which such a designation surely would do. There should be early and timely notice, and a meaningful forum for those governmental entities to express their views..

Generally, all our comments above would seem to apply to a potential National Monument designation. It is impossible to comment more precisely for the simple reason that the Secretary has announced no formal proposal.

For these reasons, the Board of Commissioners of Jackson County opposes the designation of any part of the study area as a National Monument, unless and until scoping, public hearings and input, and all other steps of a proper NEPA process have occurred.

Sincerely,

Jack Walker

Jack Walker, Chair
Jackson County Board of Commissioners

Sue Kupillas

Sue Kupillas
Commissioner

Ric Holt

Ric Holt
Commissioner

C:\WINDOWS\TEMP\sodamtncomments no letterhead.wpd

State of California - The Resources Agency
GRAY DAVIS, Governor
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
601 Locust Street
Redding, CA 96001
(530) 225-2300

June 14, 2000

JUN 2000
Received
District Office
Medford BLM

Mr. Tom Sensenig, Team Leader
Cascade Siskiyou Ecological Emphasis Area
Bureau of Land Management
3040 Biddle Road
Medford, Oregon 97504

Dear Mr. Sensenig:

Draft Management Plan and Environmental Impact Statement (DMP/DEIS)
Cascade Siskiyou Ecological Emphasis Area (CSEEA)

Thank you for the opportunity to review the DMP/DEIS for the CSEEA. We are interested in this proposal with respect to its implications for the maintenance, protection and enhancement of natural resources and public recreational opportunities in California.

With respect to the CSEEA in California, the DEIS addresses only boundary issues regarding public lands existing within or adjacent to the Klamath-Iron Gate, Cottonwood Creek and the Jenny Creek watersheds. This area encompasses the Horseshoe Ranch Wildlife Area and the Jenny Creek ACEC/RNA identified in the 1993 Redding Resource Management Plan (RRMP). Management activities specific to these areas will be addressed in a future resource management plan amendment.

The Department of Fish and Game (DFG) has been concerned about the loss of public recreational opportunity in Siskiyou County in recent years. Our concern was mitigated by features of the current RRMP that provides for the acquisition of lands including property adjacent to the Horseshoe Ranch Wildlife Area from willing sellers. Several alternatives in the DEIS, including the preferred alternative, would significantly alter this direction and would severely limit the potential for expansion of these lands in Siskiyou County. Public use at the Horseshoe Ranch Wildlife Area is increasing and habitat projects completed on the area have resulted in improved habitat conditions for wildlife. Therefore, we believe it is important that the CSEEA provide direction to acquire lands adjacent to the Horseshoe Ranch Wildlife Area and Jenny Creek ACEC/RNA as willing sellers become available.

The DEIS describes four alternatives for lands in the CSEEA within California. With respect to the boundaries described under these alternatives, the DFG recommends the adoption of Alternative D. This alternative would maximize the size of the Horseshoe Ranch Wildlife Area and the Jenny Creek ACEC/RNA by acquiring unimproved privately owned land from willing sellers. This area provides significant winter range for mule deer and contains important habitat for a wide variety of wildlife.

Conserving California's Wildlife Since 1870

Mr. Tom Sensenig
June 14, 2000
Page Two

Although the DEIS does not address the management of lands within the proposed CSEEA in California, I would like to reiterate some of our recommendations prepared In response to your September 8, 1999, scoping letter. They were as follows: (1) management activities within the CSEEA should be designed to maintain and enhance deer winter range where it occurs, (2) continue to provide nonmotorized recreational opportunities on the Horseshoe Ranch Wildlife Area including hunting and fishing, (3) fire should be used as a management tool to maintain and improve vegetation health and diversity and (4) continue to cooperatively manage the Horseshoe Ranch Wildlife Area under the existing September 16, 1981, memorandum between the DFG and Bureau of Land Management.

Recreational opportunities within the Horseshoe Ranch Wildlife Area and surrounding public lands are important to the DFG and the public due to the exceptional hunting, fishing, camping, hiking and other recreational uses this area currently provides. We will continue to participate in the development of the RRMP amendment as needed with respect to these issues.

If you have any questions regarding our recommendations on the DEIS or require additional information, please feel free to contact Senior Wildlife Biologist Supervisor Tim Burton at (530) 225-2305.

Sincerely,

Donald B. Koch
Regional Manager

cc: Mr. Tim Burton
Department of Fish and Game
601 Locust Street
Redding, California 96001

Mr. Chuck Schultz
Redding Resource Area
Bureau of Land Management
355 Hemsted Road
Redding, California 96002

COUNTY OF SISKIYOU

Board of Supervisors

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JUN 2000
Received
District Office
Medford BLM

June 6, 2000

Tom Sensenig
BLM CSEEA Team Leader
3040 Biddle Road
Medford, OR 97504

Dear Sir:

Subject: Comment on the Draft Management Plan and Environmental Impact Statement (DEIS) for the Cascade Siskiyou Ecological Emphasis Area

The Board has great reservation and concern regarding the Draft Management Plan/Draft Environmental Impact Statement for the Cascade Siskiyou Ecological Emphasis Area (CSEEA). As you are aware, the Draft CSEEA Management Plan identifies lands within Siskiyou County for possible inclusion. BLM-Medford supports inclusion of over 9,000 acres as outlined in their Preferred Alternative "C." The Board considers the ramifications of the Draft Management Plan, DEIS, and Preferred Alternative to Siskiyou County and its constituents to be significant and adverse.

Having reviewed the DEIS, we are discouraged to learn that the socio-economic impacts of Plan implementation on Siskiyou County have not been addressed. The analysis appears to have stopped abruptly at the state line, ignoring California lands which the Preferred Alternative includes (page 91 of the DEIS indicates the CSEEA *"does not extend east into Klamath County or south to Siskiyou County, California"*). The Jackson County Board of Commissioners was consulted; however, the Siskiyou County Board of Supervisors was not. In fact, nowhere in the DEIS are impacts analyzed across the state line. Selection of the Preferred Alternative would be a violation of NEPA .

A single page is devoted to ranching interests. While the analysis included in the DEIS provides a broad look at economic values, it fails to address specific interests of the individuals most dramatically impacted by any decision. It is our belief that individual families will be confronted with insurmountable economic hardships resulting from grazing and timber harvest restrictions. Throughout the document reference is made to BLM's desire to control, reduce, curtail, or eliminate grazing opportunities. Similar activity such

Tom Sensenig
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as timber harvest and recreation, although less economically significant, are not adequately analyzed for their social and economic merits to permitees and leaseholders.

Siskiyou County prides itself on its history as a frontier county. We are blessed with myriad natural resources, resources which are becoming increasingly regulated through the rationale of "better" management. Unfortunately, recent history has demonstrated that such "enhanced" management techniques typically result in blanket use constraints, constraints which bear directly upon the local community and its economy and which are not rooted in science. Analysis is needed and required to determine whether the benefits truly outweigh the costs and whether there is any potential for a regulatory taking.

While this Board ardently supports wise, sustainable resource use, we cannot overlook the paramount importance of the values these resources provide to our heritage and economic well-being. Should BLM or any other governmental agency find it necessary to consider amendments to public lands management practices, it is absolutely crucial to analyze the fiscal and social ramifications such decisions may bear upon the public most directly influenced by those decisions.

The DEIS goes into considerable detail regarding management practices for each of the Alternatives identified; however, while the DEIS addresses the inclusion of the Horshoe Ranch and Jenny Creek areas in California, it specifically, as stated in its introduction, will not address management activities in those areas. Rather, such management decisions will be left to the Redding office of the BLM. This tactic appears to undermine the NEPA process. We question how BLM may consider identification and selection of lands for inclusion in the plan, yet neglect to address management activities. The sole purpose of the DEIS is to analyze and select management activities most suited to the area being studied. If the proposed action for the lands in California is only to make a boundary line adjustment, BLM needs to identify this action in the sections on purpose and need, and proposed agency action or decision.

As we have stated in prior correspondence to BLM on this issue, the plan itself points to the need for jurisdictional separation. The deference to Redding BLM seems to coincide with our desires. California should not be lumped together with Oregon for the sole purpose (as far as our records shows) of mollifying those who desire stricter governmental control, reduced resource use, and expanded public lands.

The DEIS is replete with citations stating potential expansion of federal lands will be limited to willing land owners. The document neglects to examine the effects of new resource-use regulations which may have a direct influence on neighboring owners. In essence,

Tom Sensenig
Page 3 of 3
June 6, 2000

implementation of new resource protection prescriptions will likely force adjacent landowners to become willing sellers, a position perhaps contrary to their own desires but fiscally prudent. We believe this impact must merit consideration in the EIS.

This Board recognizes the potential for National Monument designation of the Soda Mountain area and recognizes that portions of Siskiyou County are also being considered for inclusion. We view this potential action as a threat to our institution; a threat because it would undermine the public trust we've all worked so hard to build and maintain. Further, we understand that National Monument designation would disregard science in a cloaked attempt to gain political favor from a vocal minority, a minority who, for the most part, resides elsewhere. We urge that you assert these same concerns on this topic as well. We feel it would be negligent to proceed with such action, ignoring the vast time and fiscal resources (both public and private) in developing a management plan for this region. It would be a clear "thumbing of Federal bureaucratic noses" rendering all previous efforts futile. We ask you to take a strong professional stand against arbitrary designation.

It is imperative that BLM address any private land acquisition that are contemplated, and we wish to remind you of our strong concern over the resulting depletion of the County's tax base. Adequate PILT compensation must be made to ensure no net loss to our property tax base.

Thank you for the opportunity provide comment. We hope you modify your Management Plan and DEIS to reflect our comments. Should you have any questions or wish to have additional input, please contact us.

Sincerely,

Joan T. Smith

Joan T. Smith
Chair, Board of Supervisors

WV/wv

cc: Senator Dianne Feinstein
Senator Barbara Boxer
Representative Wally Herger
Elaine Zielinski, Oregon BLM Director
Al Wright, California BLM Director

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JOAN T. SMITH District 1 · *LA VADA ERICKSON* District 2 · *BILL HOY* District 3 · *JERRY GIARDINO* District 4 · *KAY M. BRYAN* District 5

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Yreka Fish and Wildlife Office
1829 So. Oregon Street
Yreka, California 96097
(530) 842-5763 Fax: (530) 842-4517

IN REPLY REFER TO:

June 14, 2000

1-11-00-TA-17

Memorandum

To: Tom Sensenig, CSEEA Team Leader, Bureau of Land Management
Medford, Oregon

From: Project Leader, Yreka Fish and Wildlife Office
Yreka, California

Subject: Cascade Siskiyou Ecological Emphasis Area Draft Management Plan/Environmental Impact Statement Review

The Yreka Fish and Wildlife Office of the U.S. Fish and Wildlife Service (Service) appreciates the opportunity to review and comment on the Cascade Siskiyou Ecological Emphasis Area (CSEEA) Draft Management Plan/Environmental Impact Statement. The document states that the guiding principle for management of the CSEEA is to maintain, protect, restore, or enhance relevant and important cultural, biological, and ecological resource values. Especially because of the area's high degree of species diversity and endemism, we fully support this objective for the CSEEA. In addition, this goal is very important in accomplishing the recovery of two species that are listed under the Endangered Species Act, of 1973, *as amended* (Act), the federally listed threatened northern spotted owl (*Strix occidentalis caurina*) and the endangered Gentner's fritillary (*Fritillaria gentneri*). While the document states that the underlying premise of each alternative is to "maintain, protect, restore, or enhance relevant and important ecological and biological value(s)", we disagree that this objective can be accomplished without greater focus on control of introduced and exotic weeds and the use of prescribed fire in all alternatives. In some alternatives, grazing may be incompatible with the above goal.

General Comments:
The Draft Management Plan/Environmental Impact Statement for the CSEEA (DEIS) does not provide sufficient information to evaluate Alternative A, the existing condition, especially in terms of introduced vegetation. The baseline established in the DEIS is based on the severely degraded condition of many of the habitats after 100 years of overgrazing (DEIS Volume 1 page 18 and Appendix A Volume 2) . The Bureau of Land Management (BLM) was directed to assess grazing allotments and assign ratings for the ecological potential and capability of each site (Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public lands Administered by the BLM the States of Oregon and Washington, 1997). The ecological

Tom Sensenig, CSEEA Team Leader

potential and capability as described in this 1997 document would provide a better baseline to assess the impacts of proposed alternatives than does the current baseline presented in the DEIS. The Service recommends that the BLM provide the ecological potential and capacity of the grazing allotments and the current status of each allotment as rated against this baseline.

The CSEEA is described in the DEIS as an area of national importance due to its biological diversity, in particular the botanical resources, and the CSEEA should be managed to recover these these resources and prevent degradation of their habitat. The BLM has been directed in Section 302(b) of the Federal Land Policy and Management Act of 1976 to "take any action necessary to prevent unnecessary or undue degradation of the lands (43USC 1732(b)). Section 2(b)of the public Rangelands Improvement Act of 1978 adds that the BLM will "Manage, maintain, and improve the condition of the public rangelands so that they become as productive as feasible..." (43 USC1901(b)(2)). The Fundamentals of Rangeland Health as stated in 43 CFR 4180 number 4, state that "Habitats are, or are making significant progress toward being, restored or maintained for Federal threatened and endangered species, Federal Proposed, Category 1 and 2 Federal candidate and other special status species". Further, BLM Manual 6840.06C directs BLM to take no action which may further the need to list species under the Endangered Species Act (ESA).

One of the greatest environmental threats facing these native plant species and their ecosystems in the western U.S. is the continued introduction and spread of nonindigenous plants (noxious weeds) (Belsky and Gelbard 2000). Recent research is persuasive in showing that livestock significantly increase invasions by nonindigenous plants in the these (Belsky and Gelbard 2000). The DEIS, however, is not consistent in addressing livestock grazing as an important factor in the establishment and spread of nonindigenous plants. Alternatives A, B, C, and E continue to graze livestock, thus degrading range and habitat conditions and furthering the need to list native plants and wildlife under the ESA. Alternative B will increase the amount of grazing which would exacerbate the problem and threaten the biological diversity of the area. The Service recommends that the BLM develop an Alternative between C and D which would decrease or eliminate livestock grazing and implement an aggressive noxious weed control program with all methods such as fire, mechanical manipulation, and herbicide application which provide non-selective controls.

Alternative C Pages 186- 188 Table 3-3. Many of the objectives to be accomplished by prescribed livestock use are not realistic and are based on incorrect assumptions. Objectives that call for intensive grazing for short periods of time during the spring to remove annual grass or other weeds and to prepare the seed bed would compact damp soil. According to the literature (Belsky and Gelbard 2000), soil disturbed in this manner favors the establishment and spread of annual grasses and noxious weeds, not native bunch grasses. One objective proposes to use cattle to restore riparian plant communities (DEIS page 188). However, the literature indicates that livestock exclusion has consistently resulted in the most dramatic and rapid rates of ecosystem recovery (Vavra et al. 1994). Objectives (DEIS page 188) also suggest that livestock grazing

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Tom Sensenig, CSEEA Team Leader

could be used to replace fire. However in reality cattle are selective grazers and will remove the nutritional forage first (usually native grasses and forbs) and will only remove weeds such as star-thistle and medusahead after all other vegetation is gone, again a process that favors noxious weeds, and does not mimic the effects of fire.

These objectives do not seem to consider the effects of native grazers. The native species of grazers which evolved with the native grasses are still present and would probably resume their natural migrations and use of vegetation if livestock were removed from the area. Riparian areas and wetlands are extremely important for calving and fawning for deer and elk. Cattle that are allowed to graze in these areas in the spring compete for forage and displace calving and fawning deer and elk, increasing the potential for predation and decreasing the overall fitness of the does, cow elk and their offspring. Finally, on page 283 of the DEIS it is stated that "Alternatives C and D would be presumed to eliminate public land grazing because of additional restrictions. It is worth noting that the use of grazing to accomplish resource management objectives, called for in Alternatives C and D, is unlikely to occur". If these alternatives are not expected to be feasible, the BLM should develop an alternative that does not include grazing to accomplish the goals of alternative C and D.

Northern Spotted Owl Recovery. Both the critical habitat designation for the northern spotted owl under the Act (57 FR 1796) and the Northwest Forest Plan depend on protection of late successional forest habitat in the area of the CSEEA to recover this species. The designation of critical habitat unit, OR-38, and the Jenny Creek Late Successional Reserve (Northwest Forest Plan), are important to maintaining genetic exchange between spotted owl populations in the Oregon and California Cascades and the Klamath Mountains Provinces. Indeed, the document states that there is evidence of such genetic exchange between populations to the north, east, and west of the CSEEA. The document also states that currently there are 13,588 acres (26%) of habitat that is suitable for northern spotted owl nesting, roosting, or foraging. The DEIS identifies an additional 12,605 acres (24%) on Federal lands within the CSEEA that has the potential to become suitable northern spotted owl habitat. Management of such habitat for the benefit of northern spotted owls represents a unique opportunity to recover the species in Northern California and Southern Oregon. As you are aware, the Act requires all Federal agencies to assist in the recovery of listed wildlife and plants. Therefore, alternatives that encourage increased timber harvest or grazing practices that lead to increased risk of stand-replacing fire in forested habitat (see specific comment below) should be avoided.

Gentner's Fritillary Protection. While a recovery strategy for Gentner's fritillary has not yet been developed, the final rule (64 FR 69195) listing this species as endangered identifies fire suppression as one important threat to the species. Fire suppression results in the conversion of oak woodland with a grassy understory, *F. gentneri*'s preferred habitat, to oak woodland with a shrub understory, thereby excluding the species. Introducing prescribed fire would help to restore oak woodlands with grassy understories and therefore, may represent an important tool that could be used to recover this endangered species, as well as many other species that are native to this

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Tom Sensenig, CSEEA Team Leader

traditional oak woodland vegetation community. In addition, control of yellow star-thistle (*Centaurea solstitialis*) and other introduced weed species before they become a direct threat to the single population of *F. gentneri* that is known to occur within the CSEEA, is very important.

Specific Comments:
Page 37: The first sentence in the second paragraph states that the Service considers the redband trout to be a sensitive species. On March 20, 2000, the Service published a 12-month finding that listing the Great Basin redband trout (*Oncorhynchus mykiss* ssp.) as threatened or endangered is not warranted at this time. In addition, this 12-month finding addressed only redband trout populations in Catlow, Fort Rock, Harney, Goose Lake, Warner, and Chewaucan Basins. Although, the redband trout in the Jenny Creek watershed are physically isolated from other populations and may indeed be a distinct genetic group, they do not enjoy any Federal protective status under the Act at this time.

Page 52-53: Table 2-8, describes the actions that must be taken to protect seeps, springs, and stream-side vegetation in the CSEEA. Table 2-9 predicts the trends for such wetlands under each proposed alternative. Since the Northwest Forest Plan requires that wetlands be protected under the Aquatic Conservation Strategy, why don't all alternatives show the same trend of steadily increasing improvement?

Page 62: The second paragraph does not mention livestock grazing as a forest disturbance agent. Belsky and Blumenthal (1997) have postulated that livestock grazing reduces the biomass and density of grasses and sedges, thereby reducing competition with conifer seedlings. This reduction in competition by grasses and sedges leads to denser tree recruitment. The change in forest structure and resulting species composition change often leads to increased fire hazard.

Page 74: Please include a map of critical habitat unit OR-38, and other surrounding critical habitat units in an appendix.

Appendices: Please make sure references to specific appendices match each lettered appendix found in Volume II.

Again, we appreciate the opportunity to comment. Should you have any questions about these comments please contact Cliff Oakley or Nadine R. Kanim of this office.

Ronald A. Iverson
Project Leader

Tom Sensenig, CSEEA Team Leader

cc: California/Nevada Operations Office, Sacramento, CA, Attn: J. Engbring
Oregon State Office, Portland, OR, Attn: N. Lee
Klamath Falls FWO, Klamath Falls, OR
AFWO-HCP, Attn: P. Detrich
KFFWO, Attn: Jean Elder

Literature Cited:

Belsky, A.J. and D.M. Blumenthal. 1997. Effects of livestock grazing on stand dynamics and soils in upland forests of the Interior West. Conservation Biology 11(2):315-327.

Belsky, A.J. and J.L. Gelbard. 2000. Livestock Grazing and Weed Invasions in the Arid West. A Scientific Report Published by the Oregon Natural Desert Association.

Vavra, M., W.A. Laycock, and R.D. Pieper. 1994. Ecological Implications of Livestock Herbivory in the West, Society of Range Management Denver, CO.

Appendix Y - Aquatic Macroinbertebrates in the CSNM

Table AY-1: Aquatic macroinvertebrates in Dutch Oven Creek
(orders, families, and subfamilies are in normal text; genera or species are italicized)

Non-Insects	Trichoptera:	Diptera:
Hydrobiidae	*Agapetus sp.*	*Dixa sp.*
Oligochaeta	*Apatania sp.*	*Meringodixa sp.*
	Ecclisomyia sp.	Simuliidae
Ephemoptera:	*Glossosoma sp.*	*Dicranota sp.*
Ameletus sp.	*Gumaga sp.*	Forcipomyiinae
Baetis tricaudatus	*Heteroplectron californicum*	
Cinygmula sp.	*Hydropsyche sp.*	Chironomidae:
Drunella doddsi	*Lepidostoma sp.*	Chironomidae (pupae)
Ephemeralla inermis/infrequens	*Neophylax splendens*	*Brilla sp.*
Ironodes sp.	*Neothremma sp.*	*Corynoneura sp.*
Paraleptophlebia sp.	*Parapsyche almota*	*Diamesa sp.*
	Pseudostenophylax edwardsi	*Micropsectra sp.*
Plecoptera:	*Rhyacophila sp.*	Orthocladiinae
Calineuria californica	*Rhyacophila hyalinata Gr.*	*Orthocladius complex*
Capniidae	*Rhyacophila iranda Gr.*	*Pagastia sp.*
Isoperla sp.	*Rhyacophila narvae*	*Paramerina sp.*
Malenka sp.	*Rhyacophila grandis*	*Parametriocnemus sp.*
Pteronarcella sp.		*Paratrissocladius sp.*
Sweltsa sp.	Coleoptera:	*Rheotanytarsus sp.*
Yoraperla brevis	*Eubrianax edwardsi*	*Synorthocladius sp.*
Zapada cinctipes	*Heterlimnius sp.*	*Thienemanniella sp.*
Zapada columbiana	Hydrophilidae	*Tvetenia sp.*
Zapada Oregonensis Gr.	*Narpus sp.*	
	Zaitzevia sp.	
	Megaloptera:	
	Corydalidae	

Samples were collected in erosional, detrital, and margin habitat found at DOVN on October 7, 1993 (Aquatic Biology Associates 1993).

Table AY-2. Aquatic Macroinvertebrates in Keene Creek
(orders, families, and subfamilies are in normal text; genera or species are italicized)

Non-Insects	Trichoptera:	Diptera:
Acari	*Agapetus sp.*	*Antocha sp.*
Copepoda	*Apatania sp.*	Ceratopogoninae
Hydrobiidae	*Arctopsyche grandis*	*Chelifera sp.*
Juga sp.	*Ecclisomyia sp.*	*Dicranota sp.*
Lymnaeidae	*Glossosoma sp.*	*Dixa sp.*
Oligochaeta	*Gumaga sp.*	*Hexatoma sp.*
Physella sp.	*Heteroplectron californicum*	*Meringodixa sp.*
Planorbidae	*Hydropsyche sp.*	Simuliidae
Turbellaria	*Hydroptila sp*	
	Lepidostoma sp..	Chironomidae:
Ephemoptera:	*Micrasema sp.*	*Brillia sp.*
Ameletus sp.	*Neophylax sp.*	Chironomidae (pupae)
Baetis tricaudatus	*Neophylax occidentis*	*Corynoneura sp.*
Caudatella hystrix	*Neophylax rickeri*	*Diamesa sp.*
Cinygmula sp.	*Onocosmoecus unicolor*	*Eukiefferiella sp.*
Drunella doddsi	*Pseudostenophylax edwardsi*	*Macropelopia sp.*
Drunella grandis/spinifera	*Psycoglypha bella*	*Micropsectra sp.*
Epeorus sp.	*Rhyacophila betteni Gr.*	Orthocladiinae
Ephemeralla inermis/infrequens	*Rhyacophila brunnea Gr.*	*Orthocladius complex*
Ironodes sp.	*Rhyacophila coloradensis Gr.*	*Pagastia sp.*
Paraleptophlebia sp.		*Paramerina sp.*
Paraleptophlebia bicornuta	Coleoptera:	*Parametriocnemus sp.*
Rhithrogena sp.	*Apumixis dispar*	*Pentaneura sp.*
	Cleptelmis sp.	*Phaenopsectra sp.*
Plecoptera:	*Eubrianax edwardsi*	*Polypedilum sp.*
Calineuria californica	*Heterlimnius sp.*	*Rheotanytarsus sp.*
Capniidae	Hydrophilidae	*Stempellinella sp.*
Hesperoperla pacifica	*Optioservus sp.*	*Symposiocladius sp.*
Isoperla sp.		*Synorthocladius sp.*
Perlodidae	Megaloptera:	*Thienemannimyia sp.*
Skwala sp.	Corydalidae	*Tvetenia sp.*
Yoraperla brevis		
Zapada cinctipes	Odonata:	
Zapada columbiana	*Argia sp.*	
Zapada oregonensis Gr.	Coenagrionidae	

Samples were collected in erosional, detrital, and margin habitat found at **BXDW on October 7, 1993** (Aquatic Biology Associates 1993).

Table AY-3. Aquatic Macroinvertebrates in Beaver Creek
(orders, families, and subfamilies are in normal text; genera or species are italicized)

Non-Insects	Trichoptera:	Diptera:
Acari	*Arctopsyche grandis*	Ceratopogoninae
Copepoda	*Glossosoma sp.*	*Chelifera sp.*
Hydrobiidae	*Hydropsyche sp.*	*Dicranota sp.*
Oligochaeta	*Hydroptila sp*	*Hemerodromia sp.*
	Lepidostoma sp.	*Limnophora sp.*
Ephemoptera:	*Micrasema sp.*	Simuliidae
Ameletus sp.	*Parapsyche elsis*	*Tipula sp.*
Baetis tricaudatus	*Rhyacophila sp.*	
Cinygmula sp.	*Rhyacophila betteni Gr.*	Chironomidae:
Diphetor hageni	*Rhyacophila iranda Gr.*	Chironomidae (pupae)
Ephemeralla inermis/infrequens	*Rhyacophila rotunda Gr.*	*Boreochlus sp.*
Ironodes sp.		*Corynoneura sp.*
Paraleptophlebia sp.	Coleoptera:	*Cricotopus nostococladius*
	Apumixis dispar	*Eukiefferiella sp.*
Plecoptera:	*Cleptelmis sp.*	*Lauterborniella sp.*
Capniidae	*Heterlimnius sp.*	*Micropsectra sp.*
Hesperoperla pacifica	Hydrophilidae	Orthocladiinae
Isoperla sp.	*Lara avara*	*Orthocladius complex*
Malenka sp.	*Zaitzevia sp.*	*Pagastia sp.*
Zapada cinctipes		*Paramerina sp.*
Zapada oregonensis Gr.	Odonata:	*Parametriocnemus sp.*
	Argia sp.	*Paratrissocladius sp.*
	Enallagma/Ischnura sp.	Pentaneurini
	Octogomphus sp.	*Thienemannimyia sp.*
		Tvetenia sp.

Samples were collected in erosional and detrital habitat found at BVRL on October 7, 1993 (Aquatic Biology Associates 1993).

Table AY-4. Aquatic Macroinvertebrates in Corral Creek
(orders, families, and subfamilies are in normal text; genera or species are italicized)

Non-Insects	Trichoptera:	Diptera:
Acari	*Hesperophylax sp.*	*Antocha sp.*
Oligochaeta	*Heteroplectron californicum*	Ceratopogoninae
Ostracoda	*Hydropsyche sp.*	*Chelifera sp.*
Physella sp.	*Hydroptila sp*	*Clinocera sp.*
	Lepidostoma sp.	*Dixa sp.*
Ephemoptera:	*Micrasema sp.*	*Hemerodromia sp.*
Baetis tricaudatus	*Rhyacophila sp.*	Simuliidae
Cinygmula sp.	*Rhyacophila bettini Gr.*	
Diphetor hageni	*Rhyacophila hyalinata Gr.*	Chironomidae:
Ephemeralla inermis/infrequens		*Brillia sp.*
Paraleptophlebia sp.	Coleoptera:	Chironomidae (pupae)
	Ampumixis dispar	Chironomini
Plecoptera:	*Cleptelmis sp.*	*Corynoneura sp.*
Capniidae	*Optioservus sp.*	*Eukiefferiella sp.*
Isoperla sp.	*Zaitzeva sp.*	*Macropelopia sp.*
Zapada cinctipes		*Micropsectra sp.*
		Microtendipes sp.
		Orthocladiinae
		Orthocladius complex
		Pagastia sp.
		Parametriocnemus sp.
		Paramerina sp.
		Pentaneura sp.
		Phaenopsectra sp.
		Rheocricotopus sp.
		Rheotanytarsus sp.
		Tanytarsini
		Thienemanniella sp.
		Thienemannimyia sp.
		Tvetenia sp.

Samples were collected in erosional, and detrital habitat found at CRLL on October 7, 1993 (Aquatic Biology Associates 1993).

Table AY- 5. Aquatic Macroinvertebrates in Jenny Creek
(orders, families, and subfamilies are in normal text; genera or species are italicized)

<u>Non-Insects</u>	<u>Trichoptera:</u>	<u>Diptera:</u>
Acari	*Glossosoma sp.*	*Antocha sp.*
Ferrissia sp.	*Hesperophylax sp.*	*Brachycera sp.*
Hyalella azteca	*Hydropsyche sp.*	*Dixa sp.*
Juga sp.	*Rhyacophila sp.*	Ephydridae
Nematoda	*Rhyacophila coloradensis Gr.*	*Hemerodromia sp.*
Oligochaeta		*Limnophera sp.*
Ostracoda	<u>Coleoptera:</u>	*Limonia sp.*
Pacifasticus sp.	*Duberaphia sp.*	Simuliidae
Physella sp.	*Eubrianax edwardsi*	Tipulidae
Sphaeriidae	*Microcylloepus sp.*	
Turbellaria	*Optioservus sp.*	<u>Chironomidae:</u>
	Zaitzeva sp.	*Brillia sp.*
<u>Ephemoptera:</u>		Chironomidae (pupae)
Acentrella sp.	<u>Lepidoptera:</u>	*Chaetocladius sp.*
Acentrella turbida	*Petrophila sp.*	*Coryoneura sp.*
Baetis tricaudatus		*Cricotopus sp.*
Callibaetis sp.	<u>Odonata:</u>	*Diamesa sp.*
Centroptilum sp.	*Aeshna sp.*	*Einfeldia sp.*
Cinygmula sp.	*Argia sp.*	*Eukiefferiella sp.*
Diphetor hageni	*Enallagmna/ishnura sp.*	Orthocladiinae
Epeorus sp.		*Orthocladius complex*
Heptagenia/Nixe sp.		*Parametriocnemus sp.*
Isonychia sp.		*Paratrichocladius sp.*
Rhrithrogena sp.		*Pentaneura sp.*
Tricorythodes minutus		*Polypedilum sp.*
		Rheocricotopus sp.
<u>Plecoptera:</u>		*Rheotanytarsus sp.*
Calineuria californica		*Synorthocladius sp.*
Hesperoperla pacifica		*Thienemannimyia sp.*
Pteronarcys sp.		*Tvetenia sp.*
Pteronarcys californica		
Taeniopterygidae		
Taeniopteryx sp.		
Zapada cinctipes		

In 1991, samples were collected at LWRX on October 9, 1991 in erosional habitat only. In 1995, samples were collected in erosional, margin, and macrophyte habitats found and October 10, 1995 (Aquatic Biology Associates 1991, 1995).

Table AY-6. Aquatic Macroinvertebrates in Jenny Creek
(orders, families, and subfamilies are in normal text; genera or species are italicized)

Non-Insects	Trichoptera:	Diptera:
Acari	*Glossosoma sp.*	*Antocha sp.*
Feressia sp.	*Hydropsyche sp.*	*Hemerodromia sp.*
Hyallela azteca	*Micrasema sp.*	*Maruina sp.*
Juga sp.	*Rhyacophila coloradensis Gr.*	Simuliidae
Oligochaeta	*Rhyacophila hyalinata Gr.*	
Ostracoda		Chironomidae:
Pacifasticus sp.	Coleoptera:	Chironomidae (pupae)
Physella sp.	*Cleptelmis sp.*	*Cardiocladius sp.*
Planorbidae	*Optioservus sp.*	*Diamesa sp.*
Turbellaria	*Zaitzeva sp.*	*Eukiefferiella sp.*
		Micropsectra sp.
Ephemoptera:	Odonata:	*Orthocladius complex*
Acentrella turbida	*Argia sp.*	*Rheotanytarsus sp.*
Baetis tricaudatus		*Tvetenia sp.*
Epeorus sp.		
Plecoptera:		
Taeniopteryx		

Samples were collected in erosional, detrital, and margin habitat found at BXON on October 10, 1995 (Aquatic Biology Associates 1995).

Table AY-7. Aquatic Macroinvertebrates in Jenny Creek
(orders, families, and subfamilies are in normal text; genera or species are italicized)

Non-Insects	Trichoptera:	Diptera:
Acari	*Cheumatopsyche sp.*	*Antocha sp.*
Hyallela azteca	*Dicosmoecus gilvipes*	*Clinocera sp.*
Juga sp.	*Glossosoma sp.*	*Dixa sp.*
Lymnaeidae	*Hydropsyche sp.*	Ephydridae
Nematoda	*Hydroptila sp.*	*Hemerodromia sp.*
Oligochaeta	*Lepidostoma sp.*	Forcipomyiinae
Ostracoda	*Neophylax rickeri*	*Simulium sp.*
Physella sp.		Stratiomyiidae
Sphaeriidae	Coleoptera:	
	Optioservus sp.	Chironomidae:
Ephemoptera:	*Zaitzeva sp.*	*Apedilum sp.*
Acentrella turbida		*Chaetocladius sp.*
Baetis tricaudatus	Lepidoptera:	Chironomidae (pupae)
Isonychia sp.	*Petrophila sp.*	Chironomini
Tricorythodes minutus		*Corynoneura sp.*
	Odonata:	*Dicrotendipes sp.*
Plecoptera:	*Aeshna sp.*	*Eukiefferiella sp.*
Taeniopteryx sp.	*Argia sp.*	*Micropsectra sp.*
	Enallagmalischnura sp.	*Microtendipes sp.*
	Ophiogomphus sp.	*Orthocladius complex*
		Parametriocnemus sp.
		Paratanytarsus sp.
		Pentaneura sp.
		Potthastia gaedil Gr.
		Pseudoorthocladius sp.
		Rheocricotopus sp.
		Rheotanytarsus sp.
		Synorthocladius sp.
		Tanytarsini
		Thienemannimyia sp.
		Tvetenia sp.

Samples were collected in erosional, detrital, and margin habitat found at BXOS on October 10, 1995 (Aquatic Biology Associates 1995).

Table AY-8. Aquatic Macroinvertebrates in Jenny Creek
(orders, families, and subfamilies are in normal text; genera or species are italicized)

Non-Insects	Trichoptera:	Diptera:
Acari	*Dicosmoecus gilvipes*	*Brachycera sp.*
Copepoda	*Gumaga sp.*	Ceratopogonidae
Hydrobiidae	*Heteroplectron californicum*	*Dixa sp.*
Hyalella azteca	*Hydropsyche sp.*	Empididae
Hydra sp.	*Hydroptila sp*	Ephydridae
Lymnaeidae	Hydroptilidae	Forcipomyiinae
Nematoda	*Lepidostoma sp.*	*Limonia sp.*
Oligochaeta	*Micrasema sp.*	*Hemerodromia sp.*
Physella sp.	*Oecetis sp.*	*Meringodixa sp.*
Planorbidae	*Polycentropus sp.*	Simuliidae
Sphaeriidae	*Rhyacophila brunnea Gr.*	Tipulidae
Turbellaria	*Rhyacophila hyalinatas Gr.*	
		Chironomidae:
Ephemoptera:	Coleoptera:	*Apedilum sp.*
Baetis tricaudatus	Dytiscidae	Chironomidae (pupae)
Callibaetis sp.	*Eubrianax edwardsi*	*Cricotopus sp.*
Epeorus albertae	*Optioservus sp.*	*Cricotopus nostococladius*
Ephemeralla inermis/infrequens	*Ordobrevia nubifera*	*Eukiefferiella sp.*
Paraleptophlebia sp.	*Zaitzeva sp.*	*Microtendipes sp.*
		Parametriocnemus sp.
Plecoptera:	Megaloptera:	*Procladius sp.*
Calineuria californica	Corydalidae	*Psectrocladius sp.*
Capniidae		*Pseudochironomus sp.*
Malenka sp.	Odonata:	*Rheocricotopus sp.*
Sweltsa sp.	*Argia sp.*	*Rheotanytarsus sp.*
Zapada cinctipes	Coenagrionidae	*Tanytarsus sp.*
Zapada oregonensis Gr.	*Enallagmna/Ishnura sp.*	*Thienemannimyia sp.*
	Octogomphus sp.	*Tvetenia sp.*
	Hemiptera:	
	Corixidae	
	Veliidae	

Samples were collected in erosional, detrital, and margin habitat found at FRED on September 23, 1992 (Aquatic Biology Associates 1992).

Appendix Z - Standards and Guidelines for Special Status Species including Survey and Manage, Protection Buffer and Special Interest Species

Management of Threatened, Endangered and Sensitive Species.

Management of these species would be in accordance with applicable federal laws and regulations and Bureau policy. This includes the Endangered Species Act, Migratory Bird Treaty Act and Bald and Golden Eagle Protection Acts as well as BLM Manual section 6840.

Survey and Manage/ Protection Buffer Species

The Northwest Forest Plan's (NWFP) Record of Decision (ROD) (USDA 1994a) established the Survey and Manage and Protection Buffer programs in order to ensure the viability of certain rare and locally endemic species within the range of the northern spotted owl. The Survey and manage ROD of January 2001(USDA 2001) amended the NWFP ROD and revamped the Protection Buffer and Survey and Manage species management direction. The Protection Buffer species category was eliminated and those species were incorporated into the new Survey and Manage species direction. The designation of the Cascade-Siskiyou National Monument (CSNM) nullifies the application of the Northwest Forest Plan and all Survey and Manage guidelines for the Monument lands. However, in order to help ensure the health and viability of these rare and locally endemic species in the Monument, a sub-set of the Survey and Manage ROD provisions have been incorporated into all of the action alternatives for the Monument Resource Management Plan. Pursuant to implementation of the NWFP ROD, and the Survey and Manage ROD, interagency survey protocols and management recommendations have been developed for some of the Survey and Manage species, and are currently being developed for the rest. The protocols and recommendations are evolving documents. The most recent, current, official survey protocols and management recommendations would be applied to projects in the Monument for selected species. The Survey and Manage provisions from the NWFP ROD that would be incorporated into the action alternatives are described below. The set of provisions that would be applied would be identical across all action alternatives.

Provision for each species would be directed to the range of that species and the particular habitats that it is known to occupy.

The standards and guidelines contains 6 strategies, and each survey and manage species is placed into one of the six. There are twelve terrestrial Survey and Manage species known or suspected to occur in the Cascade-Siskiyou National Monument. Three species are terrestrial mollusks (slugs and snails). The great gray owl is now a survey and manage species. Eight are vascular plants, lichens, mosses, liverworts, or fungi, and their strategies are outlined below. The strategy(s) assigned to any species is subject to change. Any future policy, regulation or guideline change coming from the Regional Ecosystem Office that enhances the protection of these species would be incorporated into the management of the Monument.

Survey and Manage Strategies for Terrestrial Wildlife in the Monument

Great Gray Owl

This is a category C species. The management direction for this species in the Monument would be to :

1) Manage high priority sites so as to maintain their suitability for the species. High priority sites would be identified based on the most current interagency criteria for making such a determination. This criteria has not yet been developed for this species. In the absence of such criteria and subsequent determination of high and low priority sites, all known sites would be managed so as to maintain their suitability for the species.

Specific protection measures for the Great Gray Owl include the following:

- provide a no-commercial harvest buffer of 300 feet around meadows and natural openings
- establish 1/4-mile protection zones around known nest sites
- implement the standardized interagency survey protocol (including any future modifications) prior to design of ground disturbing activities
- protect all future discovered nest sites as previously described
- incorporate any future interagency Management Recommendations for this species into the management of the Monument.

2) Perform pre-disturbance surveys using the most current interagency survey protocol. Surveys would be completed within the habitat types or vegetation communities associated with the species, and the information gathered from the surveys would be used to establish managed sites for the species. These surveys would precede the design of all activities with a high potential to adversely affect the species or it's habitat.

3) Perform strategic surveys in the Monument if the interagency Great Gray Owl Taxa Team and or the REO determine that such surveys are necessary in the area.

Terrestrial Mollusks

The table AZ-1 displayes the status of the special status terresteial mollusks in the Monument.

Table AZ-1 Special Status Terrestrial Mollusks known or suspected in the CSNM.

Species	Status	Presence
Helminthoglypta hertleini (land snail)	S&M Category (B4)	Suspected
Monadenia Chaceana (land snail)	S&M Category (B4)	Probable
Trilobopsis tehemana (land snail)	S&M Category A	Suspected

Trilobopsis tehemana (land snail)

This is a Survey and Manage category A species. The management direction for this species in the Monument would be to:

1) Manage all known sites so as to maintain their suitability for the species. Management of known sites would follow the most current interagency Management Recommendations for this species.

2) Perform pre-disturbance surveys using the most current interagency survey protocol. Surveys would be completed within the habitat types or vegetation communities associated with the species, and the information gathered from the surveys would be used to establish managed sites for the species. These surveys would precede the design of all ground disturbing activities.

3) Perform strategic surveys in the Monument if the interagency Mollusk Taxa Team and or the REO determine that such surveys are necessary in the area.

Helminthoglypta hertleini and Monadenia chaceana (land snails)

These are Survey and Manage category B (foot note 4) species. The management direction for these species in the Monument would be to:

1) Manage all known sites so as to maintain their suitability for the species. Management of known sites would follow the most current interagency Management Recommendations for these species.

2) Perform pre-disturbance surveys using the most current interagency survey protocol. Surveys would be completed within the habitat types or vegetation communities associated with the species, and the information gathered from the surveys would be used to establish managed sites for the species. These surveys would precede the design of all ground disturbing activities.

3) Perform strategic surveys in the Monument if the interagency Mollusk Taxa Team and or the REO determine that such surveys are necessary in the area.

Survey and Manage Strategies Plants, Lichens and Fungi.

Following the Northwest Forest Plan, areas in the Monument were surveyed from 1997-1999 for survey & manage plants, lichens and fungi. Eight species were documented to occur (table AZ-2), although surveys were limited to conifer dominated communities in the northern portion of the Monument, especially later successional communities. Several of these species are also now Bureau Special Status species (Sensitive, Assessment and Tracking) and will be managed accordingly. Below are the strategies to be used for Survey & Manage Plants, lichens and fungi documented for Cascade Siskiyou National Monument.

Category A. Survey and Protect

All species in this category are also Bureau Special Status species (BSSS) and will be managed accordingly. Bureau 6840 policy requires that Bureau actions will not contribute to the need to list any of these species. Surveys prior to implementation of ground disturbance will be done for any of these species. Surveys will occur in habitats that are considered likely to support these species. These surveys will be conducted at a scale and timing most appropriate to the species biology, as determined by the Agency Botanist. Multi-species surveys would be used wherever they would be most efficient. To the degree possible, surveys would be designed to minimize the number of site visits needed to acquire credible information, which for most species is a single visit during the growing, flowering or fruiting period, depending on the taxa. Protection or mitigation of the activity to maintain population viability will likely be the most common management measure. Actions to maintain or enhance habitat are allowed, and may be required to maintain the viability of BSSS species through time. Listing and delisting of species will follow the established BLM BSSS list process which tiers to the Oregon Natural Hertitage Program listing process. New species will be managed accordingly.

Category B. Manage known sites

All existing species in this category in the monument will be managed to maintain viability of the existing populations, even though individual plant or fungus species could be affected. Activities in occupied habitat will be allowed only if the viability of the documented population is maintained. Surveys to locate additional sites prior to ground disturbing activities are not required, however efforts to relocate the documented site (relocation surveys) may need to occur prior to implementation of the activity. In many cases, the appropriate management action will be protection of relatively small sites, on the order of tens of acres. Management actions in occupied habitat that would maintain or enhance habitat for these species are allowed, based on the professional judgement of the Botanist, existing protocols, and existing information. New sites found in the future will also be managed.

Table AZ-2. Survey and Manage Plants, Lichens and Fungi Found within the CSNM			
Species	**Taxa Group**	**CSNM Category***	**TNC Rank****
Bondarzewia mesenterica	fungus	A	G3/S1
Cypripedium fasciculatum	vascular plant	A	G3G4/S2
Cypripedium montanum	vascular plant	A	G4G5/S4
Dendriscocaulon intricatulum	lichen	B	NR
Phlogiotis helvelloides	fungus	B	NR
Pithya vulgaris	fungus	B	G4/S1
Plectania milleri	fungus	B	G1/S1
Sarcosphaera eximia	fungus	1	NR

*Management Categories
Category A = Surveys and Protect
Category B = Manage known sites

**TNC (The Nature Conservancy) Ranks
G = Global rank S = State rank NR = Not Ranked
1 = Critically imperiled because of extreme rarity or because it is somehow especially vulnerable to extinction or extirpation.
2 = Imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (extirpation).
3 = Rare, uncommon or threatened but not immediately imperiled.
4 = Not rare and apparently secure but with cause for long-term concern. 5 = Demonstrably widespread, abundant, and secure.

Special Interest Species

Special interest species in the Monument include deer and elk. The Big Game Management Emphasis Areas established in the NWFP ROD and discussed in the wildlife section in Chapter 2 of this document would be retained as part of the management direction for the monument.

Appendix AA - Best Management Practices for the CSNM

Table of Contents

I. Introduction

A. Purpose

Best management practices (BMPs) are required by the Federal Clean Water Act (as amended by the Water Quality Act of 1987) to reduce nonpoint source pollution to the maximum extent practicable. BMPs are considered the primary mechanisms to achieve Oregon water quality standards.

Best management practices are defined as methods, measures, or practices selected on the basis of site-specific conditions to ensure that water quality will be maintained at its highest practicable level. BMPs include, but are not limited to, structural and nonstructural controls, operations, and maintenance procedures. BMPs can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters (40 CFR 130.2, EPA Water Quality Standards Regulation).

Nonpoint sources of pollution result from natural causes, human actions, and the interactions between natural events and conditions associated with human use of the land and its resources. Nonpoint source pollution is caused by diffuse sources rather than from a discharge at a specific single location. Such pollution results in alteration of the chemical, physical, and biological integrity of water. Erosion from a harvest unit or surface erosion from a road are some examples of nonpoint sources.

The BMPs in this document are a compilation of existing policies and guidelines and commonly employed practices designed to maintain or improve water quality. Objectives identified in this BMP Appendix also include maintenance or improvement of soil productivity and fish habitat since they are closely tied to water quality. Selection of appropriate BMPs will help meet Monument Aquatic Conservation Strategy objectives (Appendix BB) during management action implementation. Practices included in this Appendix supplement the Management Actions/Directions for Riparian Reserves (Appendix BB) and they should be used together.

B. Organization and Use

This document is organized by management activities plus separate sections that address activity planning and design, riparian reserves, wetlands, and fragile soils. Objectives are stated under each management activity followed by a list of practices designed to achieve the objectives.

BMPs are selected and implemented as necessary based on site-specific conditions to meet water quality, soil, or fish objectives for specific management actions. BMPs and Riparian Reserve Management Actions/Direction (Appendix BB) may be modified to meet site specific situations. This Appendix does not provide an exhaustive list of BMPs. Additional nonpoint source control measures may be identified during watershed analysis or during the interdisciplinary process when evaluating site-specific management actions. Implementation and effectiveness of BMPs need to be monitored to determine whether the practices are correctly designed and applied to achieve the objectives. BMPs will be adjusted as necessary to ensure objectives are met.

Review and update of this Appendix will be an ongoing process. Updates will be made as needed to conform with changes in Bureau of Land Management policy, direction, or new information.

II. Project Planning and Design

A. Planning

Objective: To include soil productivity, water quality, aquatic habitat, and hydrologic considerations in project planning.

Practices:

1. Use information from the Cascade-Siskiyou National Monument (CSNM) Resource Management Plan (RMP) and appropriate watershed analyses to prepare project level plans.

2. Use timber production capability classification (TPCC) inventory to identify areas classified as fragile due to slope gradient, mass movement potential, surface erosion potential, and high ground water levels.

3. Use the planning process to identify, evaluate, and map potential problems (e.g., slump-prone areas, saturated areas and slide areas) that were not addressed in the watershed analysis.

4. Analyze watershed cumulative impacts and provide mitigation measures if necessary to meet water quality requirements (see section II. D.).

5. Use the CSNM Resource Management Plan and appropriate watershed analysis information to determine potential for natural and activity-created high intensity wildfires at the project level. Reduce potential for high intensity wildfires through proposed management activities.

B. Design

Objective:To ensure that management activities maintain favorable conditions of soil productivity, water flow, water quality, and aquatic habitat.

Practices:

1. Design proposed management activities to mitigate potential adverse impacts to soil, water, and aquatic habitat. Evaluate factors such as soil characteristics, watershed physiography, current watershed and stream channel conditions, proposed roads, skid trails, logging system design, etc., to determine impacts of proposed management activities.

2. Design mitigation measures if adverse impacts to water quality/quantity, aquatic habitat, or soil productivity may result from the proposed action.

C. Maps/Contract Requirements

Objective: To identify riparian reserves to be protected and to ensure their protection on the ground.

Practices: Include the following on activity maps and/or contracts:

1. Locate all stream channels, lakes, ponds, reservoirs, and wetlands (springs, seeps, bogs, etc.) with appropriate riparian reserves on project map and/or contracts.

2. Include protection required for identified water bodies on project maps and/or contracts.

D. Cumulative Impacts

Objective: To minimize detrimental impacts on water and soil resources resulting from the cumulative impact of land management activities within a watershed.

Practices:

1. Coordinate scheduling of management activities such as timber sales, road construction, and watershed restoration activities with other landowners in the watershed.

2. Use information from the CSNM RMP, appropriate watershed analysis, and water quality management plans to identify areas with a high level of cumulative impacts.

   a. Use the following general guidelines to delineate areas for cumulative impact analyses.
      1) Natural drainage boundaries.
      2) Third to fifth order drainages (approximately 500 to 10,000 acres).
      3) Lower boundary location based on a state-designated beneficial use.
   b. The extent to which any or all of the following criteria exist would determine which drainage areas have a high risk for water quality degradation due to cumulative impacts. The criteria are not listed in order of priority.
      1) Highly erodible soils (i.e., subject to surface erosion, landslides, or slumps).
      2) Large percent of forest vegetation harvested.
      3) Large area of compacted soil.
      4) Large percent of nonrecovered openings in transient snow zone.
      5) High sedimentation potential.
      6) Poor to fair channel stability or condition.
      7) Poor to fair riparian condition (nonfunctional or functional-at risk with down ward trend).
      8) High impact from catastrophic event (e.g., wildfire).
      9) High road density.
      10) Potential for adverse impact on a beneficial use.
      11) Waterbody included on State water quality limited 303(d) list.
      12) Monitoring data shows that water quality does not meet state water quality standards.

3. For drainage areas identified as having a high risk for water quality degradation, an intensive evaluation should follow the initial analysis and include the nature of the problem, the cause of the problem, and a specific plan with objectives and alternatives for recovery and mitigation. Water monitoring may also be initiated to validate the conclusion of the impact analysis and to establish baseline data.

4. Based on site-specific conditions, select and apply special management practices such as the following to mitigate water quality impacts in high risk drainage areas.

   a. Develop and implement a watershed/riparian restoration plan and encourage coordination with landowners.
   b. Require management plans for rights-of-way construction and grazing.
   c. Defer the drainage area for approximately five years from management activities that could potentially degrade water quality. Reanalyze the drainage area at the end of five years.

d. Increase widths of riparian reserves.
e. Utilize ecosystem-based concepts for vegetation management.
f. Require helicopter yarding for vegetation management treatments.
g. Require full suspension cable yarding for vegetation management treatments.
h. Require seasonal restrictions with no waivers for timber falling and yarding.
i. Minimize existing and prevent additional road caused impacts:
   1) reduce road density;
   2) minimize road width and clearing limits;
   3) require transport of excavated materials to appropriate disposal site (end hauling);
   4) prohibit new road construction;
   5) no unsurfaced roads;
   6) require seasonal restrictions with no waivers for construction, renovation, and hauling;
   7) require special low impact maintenance and construction techniques;
   8) no roadside brushing/grubbing with excavator;
   9) no blading and ditch pulling in the winter unless essential to provide drain age;
   10) rock ditch lines;
   11) pull back sidecast from road construction and recontour roadway; and
   12) remove culverts and reshape drainageway crossings.
j. Enforce closure for off-highway vehicle use.
k. Implement regular compliance reviews on all activities in the drainage area.
l. Assess trade-offs between wildfire suppression impacts and wildfire damage; plan suppression levels accordingly. Limit use of heavy equipment during wildfire suppression.

III. Riparian Reserves

Objective: To meet the Monument Aquatic Conservation Strategy objectives in Appendix BB.

Practices:

1. Comply with riparian reserve widths described in Appendix BB.

2. Follow the Management Actions/Direction for riparian reserves in Appendix BB.

IV. Wetlands

Objective: To meet the Monument Aquatic Conservation Strategy objectives in Appendix BB.

Practices:

1. Comply with riparian reserve widths described in Appendix BB.

2. Follow the Management Action/Direction for riparian reserves in Appendix BB.

V. Fragile Soils

The BMPs in this section are to be used in addition to those in other sections.

Four categories of fragile soils sensitive to surface-disturbing activities are identified in Medford District's timber production capability classification (TPCC) and shown on map 9 of CSNM DRMP (USDI 2001):

Fragile Slope Gradient (FG)
These sites consist of steep to extremely steep slopes that have a high potential for surface ravel. Gradients commonly range from 60 to greater than 100 percent.

Fragile Mass Movement (FP)
These sites consist of deep seated, slump, or earth flow types of landslides with undulating topography and slope gradients generally less than 60 percent. Soils are derived from volcanic tuffs or breccias.

Fragile Surface Erosion (FM)
These sites have soil surface horizons that are highly erodible. Soils are derived from granite or schist bedrock.

Fragile Groundwater (FW)
These sites have high water tables where water is at or near the soil surface for sufficient periods of time that vegetation survival and growth are affected.

Objective:To minimize surface disturbance on fragile soils.

A. Roads - Fragile Soils

1. Planning

Practice:Avoid fragile soils when planning road systems unless approved by an interdisciplinary team that includes a soil scientist and hydrologist.

2. Design

Practices:

a. Design haul roads with rock surface on FM, FP, and FW soils.

b. Use slotted risers, trash racks, or over-sized culverts to prevent culvert plugging on FM and FP soils.

3. Erosion Control

Practices:

1. Stabilize cutbanks, fillslopes, and ditchlines on FM soils using methods such as vegetation (grass seeding, deep rooted plants, etc.), terracing, rock buttressing, and rock armoring ditchlines.

2. Stabilize cutbanks on FP soils using rock buttressing.

3. Decommission or obliterate temporary spur roads as appropriate for site-specific condition using methods such as scarifying the road bed, planting tree seedlings or grass, restoring the natural ground contour, and water barring.

4. Maintenance

Practice: Minimize ditch cleaning on FM and FP soils to retard slumping of road and cutbanks.

5. Access Restrictions

Practice: Block unsurfaced roads on fragile soils to prohibit motorized vehicle use.

B. Timber Management Activities - Fragile Soils

1. Yarding Methods - Cable

Practices:

a. Use full or partial suspension when yarding on FG, FM, and FW soils.

b. Construct hand waterbars in cable yarding corridors on FM soils where gouging occurs immediately after use according to guidelines in section VIII.B.1.

c. Restrict yarding and hauling to dry season (generally May 15 to October 15) on FM, FP, and FW soils.

2. Yarding Methods - Tractor

Practice: Avoid tractor yarding unless approved by an interdisciplinary team that includes soil scientist and hydrologist.

3. Yarding Methods - Helicopter

Practice: Employ helicopter yarding to avoid or minimize new road construction on fragile soils.

C. Silviculture - Fragile Soils

1. Prescribed Fire - Underburn

Practice: Prescribe cool burns and only burn in the spring on FG and FM soils.

2. Prescribed Fire - Piling

a. Hand - Practices

1. Put slash in yarding corridors on FG and FM soils to control erosion, allowing adequate space to plant trees.

2. Burn handpiles on FG and FM soils only if they prevent planter access.

b. Machine - Practices

1. Avoid machine piling or ripping on FM, FP, and FW soils unless approved by an interdisciplinary team that includes a soil scientist and hydrologist.

D. Wildfire - Fragile Soils

1. Suppression - Practices

a. Apply suppression on fragile soils based on environmental and operational conditions that exist at time of ignition.

b. Limit the use of tractors and other major surface-disturbing activities on all fragile soils.

2.Rehabilitation - Practice

a. Assure prompt rehabilitation on fragile soils through seeding or planting of native species.

E. Rights-of-Way - Fragile Soils

Practices:

1. Avoid facility construction on FM and FP soils unless approved by an interdisciplinary team that includes a soil scientist and hydrologist.

2. Design rights-of-ways to minimize surface disturbance on FM and FP soils.

VI. Roads and Landings

A. Planning

Objective: To plan road systems that meet resource objectives and minimize detrimental impacts on water and soil resources and aquatic habitat.

Practices:

1. Follow the transportation management plan in Appendix CC.

2. Implement transportation management objectives that minimize adverse environmental impacts.

3. Use an interdisciplinary team to perform a project level, site-specific analysis for any proposed road construction.

4. Avoid fragile and unstable areas unless approved by an interdisciplinary team that includes an engineer, soil scientist, and hydrologist.

5. Avoid new road construction or landings within riparian reserves and wetlands unless approved by an interdisciplinary team that includes an engineer, fisheries biologist, hydrologist, and soil scientist.

6. Obtain necessary fill/removal permits from Division of State Lands and/or U.S. Corp of Engineers.

7. Plan in-stream work to coincide with the Oregon Department of Fish and Wildlife (ODFW) work period:
   Bear Creek Watershed June 15 - September 15
   Jenny Creek Watershed July 1 - January 31
   Klamath River-Iron Gate Watershed July 1 - March 31
   Cottonwood Creek Watershed June 15 - September 15

8. Encourage use of BMPs where not specifically required in reciprocal right-of-way agreements.

B. Location

Objective: To minimize soil erosion, water quality degradation, and disturbance of riparian vegetation or aquatic habitat.

Practices:

1. Locate roads on stable positions (e.g., ridges, natural benches, and flatter transitional slopes near ridges and valley bottoms). Implement extra mitigation measures when crossing unstable areas is necessary.

2. Avoid headwalls, midslope locations on steep unstable slopes, seeps, old landslides, slopes in excess of 70 percent, and areas where the geologic bedding planes or weathering surfaces are inclined with the slope.

3. Locate roads to minimize heights of cutbanks. Avoid high, steeply sloping cutbanks in highly fractured bedrock.

4. Locate roads on well-drained soil types. Roll the grade to avoid wet areas.

5. Locate stream crossing sites where channels are well defined, unobstructed and straight.

C. Design

1. General

Objective: To design the lowest standard of road consistent with use objectives and resource protection needs.

Practices:

1. Base road design standards and design criteria on road management objectives such as traffic requirements of the proposed activity and the overall transportation plan, an economic analysis, safety requirements, resource objectives, and the minimization of damage to the environment.

2. Consider future maintenance concerns and needs when designing roads.

3. Preferred road gradients are 2 to 10 percent with a maximum grade of 15 percent. Consider steeper grades only in those situations where they will result in less environmental impact. Avoid grades less than 2 percent.

4. Road Surface Configurations

a. Outsloping - sloping the road prism to the outside edge for surface drainage is normally recommended for local spurs or minor collector roads where low volume traffic and lower traffic speeds are anticipated. It is also recommended in situations where long intervals between maintenance will occur and where minimum excavation is desired. Outsloping is not recommended on gradients greater than 8 to 10 percent.

b. Insloping - sloping the road prism to the inside edge is an acceptable practice on roads with gradients more than 10 percent and where the underlying soil formation is very rocky and not subject to appreciable erosion or failure.

c. Crown and Ditch - this configuration is recommended for arterial and collector roads where traffic volume, speed, intensity and user comfort are a consideration. Gradients may range from 2 to 15 percent as long as adequate drainage away from the road surface and ditchlines is maintained.

5. Minimize excavation through the following actions: use of balanced earthwork, narrow road width, and endhauling where slopes are greater than 60 percent.

6. Locate waste areas suitable for depositing excess excavated material.

7. Consider slope rounding on tops of cut slopes in clayey soils to reduce sloughing and surface ravel. Avoid this practice in erosion classes I, II, VII and VIII.

8. Surface roads if they will be subject to traffic during wet weather. The depth and gradation of surfacing will be determined by traffic type, frequency, weight, maintenance objectives, and the stability and strength of the road foundation and surface materials.

9. Provide vegetative or artificial stabilization of cut and fill slopes in the design process. Avoid establishment of vegetation where it inhibits drainage from the road surface or where it restricts safety or maintenance.

10. Prior to completion of design drawings, field check the design to assure that it fits the terrain, drainage needs have been satisfied, and all critical slope conditions have been identified and adequate design solutions applied.

2. Surface Cross Drain Design

Objective: To design road drainage systems that minimize concentrated water volume and velocity and therefore to reduce soil movement and maintain water quality.

Practices:

1. Design cross drains in ephemeral or intermittent channels to lay on solid ground rather than on fill material to avoid road failures.

2. Design placement of all surface cross drains to avoid discharge onto erodible (unprotected) slopes or directly into stream channels. Provide a buffer or sediment basin between the cross drain outlet and the stream channel.

3. Locate culverts or drainage dips in such a manner to avoid discharge onto unstable terrain such as headwalls, slumps, or block failure zones. Provide adequate spacing to avoid accumulation of water in ditches or surfaces through these areas.

4. Provide energy dissipators (e.g., rock material) at cross drain outlets or drain dips where water is discharged onto loose material or erodible soil or steep slopes.

5. Place protective rock at culvert entrance to streamline water flow and reduce erosion.

6. Use the guide for drainage spacing by soil erosion classes and road grade shown in Tables AA-1.

7. Use drainage dips in place of culverts on roads that have gradients less than 10 percent or where transportation management objectives result in blocking roads. Avoid drainage dips on road gradients greater than 10 percent.

8. Locate drainage dips where water might accumulate or where there is an outside berm that prevents drainage from the roadway.

9. When sediment is a problem, design cross drainage culverts or drainage dips immediately upgrade of stream crossings to prevent ditch sediment from entering the stream.

10. Rolling the gradient is recommended in erodible and unstable soils to reduce surface water volume and velocities and culvert requirements.

3. Stream Crossing Design

Objective: To prevent stream crossings from being a direct source of sediment to streams thus minimizing water quality degradation; to provide unobstructed access to spawning and rearing areas for anadromous and resident fish.

Practices:

1. Design stream crossing structures to ensure passage of juvenile and adult fish and other aquatic species.

2. Design stream crossing approach to be as near a right angle to the stream as possible to minimize streambank and riparian habitat disturbances.

3. Minimize the number of crossings on any particular stream.

4. Where feasible, design culvert placement on a straight reach of stream to minimize erosion at both ends of the culvert. Design adequate stream bank protection (e.g., rip-rap) where scouring would occur. Avoid locations that require a stream channel to be straightened beyond the length of a culvert to facilitate installation of a road crossing.

5. Design stream crossings for fish-bearing streams to maintain natural streambed substrate and site gradient where feasible.

6. Design stream crossing structure width to be at least as wide as the bankfull width of the crossing site.

7. Consider lining the bottom of the crossing structure with boulders sized to withstand a 100- year flood event to restore streambed habitat complexity.

8. Consider designing a control weir or rock apron for a culvert outlet if needed to prevent downcutting below the culvert.

9. Evaluate on a case-by-case basis the need to maintain aquatic connectivity on nonfish-bearing streams to ensure upstream movement of other aquatic species.

4. Temporary Stream Crossing Design

Objective: To design temporary stream crossings that minimize disturbance of the stream and riparian environment.

Practices:

1. Evaluate the advantages and disadvantages of a temporary versus permanent crossing structure for access to the area during all seasons over the long term in terms of economics, maintenance, and resource requirements.

2. Design temporary structures such as prefabricated temporary timber bridges, multiple culverts with minimum fill height, cattleguard crossings, or log cribs to keep vehicles out of the stream.

3. Consider using 1 to 3 inch diameter washed, uncrushed river rock as culvert fill material to provide good spawning substrate after the culvert is removed. Place geotextile fabric over the rock.

4. Minimize the number of temporary crossings on a particular stream.

5. Avoid temporary stream crossings on fishery streams unless approved by an interdisciplinary team that includes a fisheries biologist.

5. Low Water Ford Stream Crossing Design

Objective: To design low water fords that minimize disturbance of the stream and riparian environment.

Practice: Use only when site conditions make it impractical or uneconomical to utilize a permanent or temporary crossing structure.

D. Construction

Objective: To create a stable roadway while minimizing soil erosion and potential degradation of water quality or aquatic habitat.

1. Roadway Construction

Practices:

1. Limit road construction to the dry season (generally between May 15 and October 15). When conditions permit operations outside of the dry season, keep erosion control measures current with ground disturbance to the extent that the affected area can be rapidly closed/blocked and weatherized if weather conditions warrant.

2. Manage road construction so that any construction can be completed and bare soil can be protected and stabilized prior to fall rains.

3. Confine preliminary equipment access (pioneer road) to within the roadway construction limits.

4. Construct pioneer road so as to prevent undercutting of the designated final cutslope and prevent avoidable deposition of materials outside the designated roadway limits.

Conduct slope rounding, if required, at the first opportunity during construction to avoid excess amounts of soil being moved after excavation and embankment operations are completed.

5. Use controlled blasting techniques that minimize amount of material displaced from road location.

6. Locate waste stockpile and borrow sites outside of riparian reserves.

7. Construct embankments, including waste disposal sites, of appropriate materials (no slash or other organic matter) using one or more of the following methods:

   a. layer placement (tractor compaction),
   b. layer placement (roller compaction), and
   c. controlled compaction (85 to 95 percent maximum density).

Slash and organic material may remain under waste embankment areas outside the road prism and outside units planned for broadcast burning.

8. Avoid sidecasting where it will adversely effect water quality or weaken stabilized slopes.

9. Provide surface drainage prior to fall rains.

10. Clear drainage ditches and natural watercourses of woody material deposited by construction or logging above culverts prior to fall rains.

2. Stream Crossing Construction

Practices:

1. Confine culvert installation to the low flow period in accordance with Oregon Department of Fish and Wildlife guidelines for timing of in-stream work (VI.A.7.) to minimize sedimentation and the adverse effects of sediment on aquatic life.

2. Divert the stream around the work area to minimize downstream sedimentation. Require the contractor to submit an approved plan for water diversion before in-stream work begins. Maintain diversion until all in-stream work has been completed.

3. Use material such as straw bales, geotextile fabric, or coconut fiber logs/bales immediately downstream from the work area to reduce sediment movement downstream.

4. Prevent wet or green cement and new or old asphalt from entering a stream.

5. Place culverts in the streambed at the existing slope gradient on larger nonfish-bearing streams. Place energy dissipators (e.g., large rock) at the outfall of culverts on small nonfish-bearing streams to reduce water velocity and minimize scour at the outlet end.

6. Countersink culvert at least 6 to 8 inches below the streambed to minimize scouring at the outlet. Increase culvert diameters accordingly.

7. Limit activities of mechanized equipment in the stream channel to the area necessary for installation.

8. Notify contractors that they are responsible for meeting all state and federal requirements for maintaining water quality including the following:

a .Inspect and clean heavy equipment as necessary before moving onto the project site in order to remove oil and grease, noxious weeds and excessive soil.
b. Ensure that hydraulic fluid and fuel lines on heavy mechanized equipment are in proper working condition in order to prevent leakage into streams.
c. Remove from the site and dispose any waste diesel, oil, hydraulic fluid and DEQ regulations. Excavate areas that have been saturated with toxic materials to a depth of 12 inches beyond the contaminated material or as required by DEQ.
d. Conduct equipment refueling within a confined, secured area outside the stream channel such that there is minimal chance that toxic materials could enter a stream.
e. Use spill containment booms or as required by DEQ.
f. Bar storage of equipment containing toxic fluids in a stream channel anytime.

9. Place permanent stream crossing structures in fishery streams before heavy equipment moves beyond the crossing area. Where this is not feasible, install temporary crossings to minimize stream disturbance.

10. Place rip-rap on fills around culvert inlets and outlets.

11. Stabilize fill material over a stream crossing structure as soon as possible after construction is completed.

12. Cover bare soil areas with appropriate material (e.g. hydro-seeding, native seed, weed-free straw, bark chips, etc.) prior to fall rain or when moisture conditions are adequate.

3. Temporary Stream Crossing Construction

Practices:

1. Where possible, limit the installation and removal of temporary crossing structures to only one time during the same year and within the prescribed work period. Installation and removal should occur in accordance with Oregon Department of Fish and Wildlife guidelines for timing of in-stream work (VI.A.7.).

2. Use backfill material that is as soil-free as practicable over temporary culverts. Whenever possible use washed river rock covered by pit run or one inch minus as a compacted running surface.

3. Spread and reshape clean fill material to the original lines of the streambed after a crossing is removed to ensure the stream remains in its channel during high flow.

4. Use log cribbing in tractor logging units when it is impractical to use a culvert and rock backfill material. Remove upon completion of logging the unit.

5. Limit activities of mechanized equipment in the stream channel to the area that is necessary for installation and removal operations.

6. Remove stream crossing drainage structures and in-channel fill material during low flow and prior to fall rains. Reestablish natural drainage configuration, including the bankfull width.

4. Low Water Ford Stream Crossing Construction

Practices:

1. Restrict construction and use to low flow period in accordance with Oregon Department of Fish and Wildlife guidelines for timing of in-stream work.

2. Use washed rock/gravel or concrete slab in the crossing.

3. Apply rock on road approaches (normally within 150 feet of each side of the ford) to prevent washing and softening of the road surface.

E. Landings

Objective: To minimize soil disturbance, soil erosion, soil productivity losses, and water quality degradation.

Practices:

1. Locate landings at sites approved by an interdisciplinary team that includes a soil scientist, hydrologist, and fisheries biologist.

2. Avoid placing landings adjacent to or in meadows or wetland areas.

3. Clear or excavate landings to minimum size needed for safe and efficient opertions.

4. Select landing locations considering the least amount of excavation, erosion potential, and where sidecast will not enter drainages or damage other sensitive areas.

5. Deposit excess excavated material on stable sites where there is no erosion potential. Construct waste disposal sites according to guidelines in VI.D.1.7.

6. Restore landings to the natural configuration or shape to direct the runoff to preselected spots where water can be dispersed to natural, well-vegetated, gentle ground.

F. Road Erosion Control

Objective: To limit and mitigate soil erosion and sedimentation.

Practices:

1. Apply protective measures to all areas of disturbed, erosion-prone, unprotected ground, including waste disposal sites, prior to fall rains. Protective measures may include water bars, water dips, grass seeding, planting deep rooted vegetation, and/or mulching. Armor or buttress fill slopes and unstable areas with rock which meets construction specifications. See section VII.B.1. for water bar (water dip) spacing and construction guidelines.

2. Surface roads that are to be left open to traffic from October 15 through May 15.

3. Close roads that are not adequately surfaced from October 15 through May 15.

G. Road Renovation/Improvement

Objective: To restore or improve a road to a desired standard in a manner that minimizes sediment production and water quality degradation.

Practices:

1. Improve flat gradients to a minimum of two (2) percent or provide raised subgrade sections (turnpike) to avoid saturation of the road prism.

2. Reconstruct culvert catchbasins to specifications. Catchbasins in solid rock need not be reconstructed provided water flow is not restricted by soil, rock, or other debris.

3. Identify potential water problems caused by off-site disturbance and add necessary drainage facilities.

4. Identify ditchline and outlet erosion caused by excessive flows and add necessary drainage facilities and armoring.

5. Replace undersized culverts and repair damaged culverts and downspouts.

6. Add additional full-rounds, half-rounds, and energy dissipators as needed.

7. Correct special drainage problems (e.g., high water table, seeps) that effect stability of subgrade through the use of perforated drains, geotextiles, or drainage bays.

8. Eliminate undesirable berms that retard normal surface runoff.

9. Restore outslope or crown sections.

10. Avoid disturbing backslope while reconstructing ditches.

11. Surface inadequately surfaced roads that are to be left open to traffic during wet weather.

12. Require roadside brushing be done in a manner that prevents disturbance to root systems (i.e., avoid using excavators for brushing).

H. Road Maintenance

Objective: To maintain roads in a manner that protects water quality and minimizes erosion and sedimentation.

Practices:

1. Provide basic custodial care to protect the road investment and to ensure minimal damage to adjacent land and resources.

2. Perform blading and shaping to conserve existing surface material, retain the original crowned or outsloped self-draining cross section, prevent or remove rutting berms (except those designed for slope protection) and other irregularities that retard normal surface runoff. Avoid wasting loose ditch or surface material over the shoulder where it can cause stream sedimentation or weaken slump prone areas. Avoid undercutting backslopes.

3. Keep road inlet and outlet ditches, catchbasins, and culverts free of obstructions, particularly before and during winter rainfall. However, keep routine machine cleaning of ditches to a minimum during wet weather.

4. Promptly remove slide material when it is obstructing road surface and ditchline drainage. Save all soil or material useable for quarry reclamation and stockpile for future reclamation projects. Utilize remaining slide material for needed road improvement or place in a stable waste area (outside of riparian reserves). Avoid sidecasting of slide material where it can damage, overload, saturate embankments, or flow into downslope drainage courses. Reestablish vegetation in areas where more than 50 percent of vegetation has been destroyed due to sidecasting.

5. Retain vegetation on cut slopes unless it poses a safety hazard or restricts maintenance activities. Cut roadside vegetation rather than pulling it out and disturbing the soil.

6. Minimize disturbance of existing vegetation in ditches and at stream crossings to the greatest extent possible.

7. Minimize soil disturbance and displacement, but where sediment risks warrant, prevent off-site soil movement through the use of filter materials (such as weed-free straw bales or silt fencing) if vegetation strips are not available.

8. Replace stream crossing structures needing to be upgraded with structures designed to accommodate at least the 100-year flood, including associated bedload and debris.

9. Refuel power equipment (or use absorbent pads for immobile equipment) and prepare concrete at least 100 feet away from water bodies to prevent direct delivery of contaminants into a water body.

10. Remove snow on haul roads in a manner that will protect roads and adjacent resources. Remove or place snow berms to prevent water concentration on the roadway or on erodible sideslopes or soils.

11. Patrol areas subject to road or watershed damage during periods of high runoff.

I. Dust Abatement

Objective: To minimize movement of fine sediment from roads; to prevent introduction into waterways of chemicals applied for dust abatement.

Practices:

1. Use dust palliatives or surface stabilizers to reduce surfacing material loss and buildup of fine sediment that may wash off into water courses.

2. Closely control application of dust palliatives and surface stabilizers, equipment cleanup, and disposal of excess material to prevent contamination or damage to water resources.

3. Avoid application of dust abatement materials (such as lignon or mag-chloride) during or just before wet weather and at stream crossings or other locations that could result in direct delivery to a water body.

J. Road Access Restrictions

Objective: To reduce road surface damage and therefore minimize erosion and sedimentation.

Practices:

1. Barricade or block roads using gates, guard rails, earth/log barricades, boulders, logging debris, or a combination of these methods. Avoid blocking roads that will need future maintenance (i.e., culvert cleaning, slide removal, etc.) with unremovable barricades. Use guardrails, gates, or other barricades capable of being opened for roads needing future maintenance.

2. Provide maintenance of blocked roads in accordance with design criteria.

3. Install waterbars, cross drains, cross sloping, or drainage dips if not already on road to assure drainage.

4. Scarify, mulch, and/or seed for erosion control.

K. Road and Landing Decommissioning

Objective: To reduce soil compaction, minimize or reduce sedimentation, and improve site productivity by decommissioning roads and landings and rehabilitating the land.

Practices:

1. Use an interdisciplinary team to identify and prioritize roads, skid roads, and landings for decommissioning. Assign highest priorities to roads in unstable areas and riparian reserves.

2. Conduct activities during dry conditions. Maximize activities during late summer and early fall to best avoid wet conditions.

3. Rip roads and landings by an approved method to remove ruts, berms, and ditches while leaving or replacing surface cross drain structures.

4. Minimize disturbance of existing vegetation in ditches and at stream crossings to the extent necessary to restore the hydrologic function of the subject road.

5. Minimize soil disturbance and displacement, but where sediment risks warrant, prevent off-site soil movement through use of filter materials (such as weed-free straw bales or silt fencing) if vegetation strips are not available.

6. Revegetate decommissioned areas with native species.

L. Water Source Development

Objective: To supply water for various resource programs while protecting water quality and riparian vegetation.

Practices:

1. Design and construct durable, long-term water sources.

2. Avoid reduction of downstream flow which would detrimentally effect aquatic resources, fish passage, or other uses.

3. Direct overflow from water-holding developments back into the stream.

4. Locate road approaches to in-stream water source developments to minimize potential impacts in the riparian zone. Apply rock to surface of these approaches to reduce the effects of sediment washing into the stream.

5. Avoid use of road fills for water impoundment dams unless specifically designed for that purpose. Remove any blocking device prior to fall rains.

6. Construct water sources during the dry season in accordance with the Oregon Department of Fish and Wildlife guidelines for timing of in-stream work (VI.A.7.).

M. Rock Quarry Reclamation

Objective: To minimize sediment production from quarries and associated crusher pad developments susceptible to erosion due to steep sideslopes, lack of vegetation, or their proximity to water courses.

Practices:

1. Prior to excavation, remove topsoil and place at a site with minimal erosion potential. Stockpile topsoil for surface dressing during the post-operation rehabilitation.

2. Use culverts and rip-rap for crusher pad drainage when necessary.

3. Stabilize quarry cutbanks and general quarry area.

4. Revegetate with native species, apply mulch, and provide adequate drainage to minimize erosion.

5. Rip, waterbar, block, fertilize, and revegetate access roads to quarries where no future entry is planned.

VII. Timber Management Activities

A. Yarding Methods

1. Cable

Objective: To minimize soil damage and erosion caused by displacement or compaction.

Practices:

a. Use full or partial suspension when yarding on erodible or ravel prone areas where practical.

b. Use full or partial suspension with seasonal restrictions on areas of high water tables.

c. Use seasonal restriction if required suspension cannot be achieved by yarding equipment.

d. Avoid downhill yarding.

2. Tractor

Objective: To minimize loss of soil productivity and reduce potential for surface runoff and subsequent water quality degradation.

Practices:

a. In previously unentered stands, use designated skid roads to limit soil disturbance to less than 12 percent of the harvest area.

b. Minimize width of skid roads.

c. For stands previously logged with tractors, utilize existing skid roads. Rip all skid roads used in final entry harvest.

d. Rip skid roads discontinuously, preferably with winged ripper teeth when the soil is dry. Rips should be spaced no more than 36 inches apart and from 12 to 18 inches deep or to bedrock, whichever is shallower. Designated skid roads should be ripped if they will not be used again until the next rotation.

e. Avoid placement of skid roads through areas with high water tables.

d. Use appropriate seasonal restrictions that would result in no off-site damage for designated skid roads.

e. Allow logging on snow when snow depth is 18 inches or greater and negligible ground surface exposure occurs during the operation.

f. Restrict tractor operations to slopes less than 35 percent.

g. Construct waterbars on skid roads according to guidelines in section VII.B.1.

3. Helicopter

Objective: To minimize surface disturbance on high risk watersheds.

Practice: Employ helicopter yarding to avoid or minimize new road construction in high risk watersheds.

4. Horse

Objective: To minimize soil disturbance, soil compaction, and soil erosion.

Practices:

a. Limit horse logging to slopes less than 20 percent.

b. Construct hand waterbars on horse skid trails according to guidelines in section VII.B.1.

c. Limit harvest activity to times when soil moisture content at a six-inch depth is less than 25 percent by weight.

B. Erosion Control for Timber Management Activities

1. Waterbars

Objective: To minimize soil erosion.

Practices:

1. Construct adequate waterbars on skid roads, yarding corridors, and fire lines prior to fall rains.

2. Use the following table for waterbar spacing, based on gradient and erosion class.

Table AA-1. Water Bar Spacing by Gradient and Erosion Class

Gradient (%)	Water Bar Spacing[1] (feet) by Erosion Class[2]		
	High	Moderate	Low[3]
2-5	200	300	400
6-10	150	200	300
11-15	100	150	200
16-20	75	100	150
21-35	50	75	100
36+	50	50	50

1/Spacing is determined by slope distance and is the maximum allowed for the grade.
2/ The following guide lists rock types according to erosion class:
High: granite, sandstone, andesite porphyry, glacial or alluvial deposits, soft matrix conglomerate, volcanic ash, pyroclastics;
Moderate: basalt, andesite, quartzite, hard matrix, conglomerate, rhyolite;
Low: metasediments, metavolcanics, hard shale.

3. Use the following techniques to construct waterbars:

a. Open the downslope end of the waterbar to allow free passage of water.

b. Construct the waterbar so that it will not deposit water where it will cause erosion.

c. Compact the waterbar berm to prevent water from breaching the berm.

d. Skew waterbars no more than 30 degrees from perpendicular to the centerline of the trail or road.

2. Revegetation of Disturbed Areas

Objective: To establish an adequate vegetative cover on disturbed sites to prevent erosion.

Practice: Use native vegetation that allows natural succession to occur. Avoid interference with reforestation operations. Include application of seed, mulch, and fertilizer as necessary. Complete prior to fall rains.

VIII. Silviculture

A. Site Preparation

1. Gross Yarding

Objective: To achieve cool burn on sensitive soils and maintain protective duff layer.

Practice:

1. Consider the following in writing a prescription for gross yarding to reduce burn intensities: long-term site productivity, ecosystem dynamics, regeneration success, prescribed fire intensities, and smoke emissions.

2. Prescribed Fire - Underburn and Concentration Burn

a. General Guidelines

Objective: To maintain long-term site productivity of soil.

Practice: Evaluate need for burning based on soils, plant community, and site preparation criteria. Burn under conditions when a light burn can be achieved (see guidelines below) to protect soil productivity.

1. Category 1 Soils (highly sensitive): burn only in spring-like conditions when soil and duff are moist. Maximize retention of duff layer. Assure retention of minimum levels of coarse woody debris and recruitment snags as specified in Appendix JJ.

2. Category 2 Soils (moderately sensitive): burn only in spring-like conditions when soil and duff are moist. Maximize retention of duff layer. Assure retention of minimum levels of coarse woody debris and recruitment snags as specified in Appendix JJ. Write fire prescriptions that reduce disturbance and duration and achieve low fire intensity.

3. Category 3 Soils (least sensitive): burn to avoid high intensity (severe) burns to protect a large percentage of the nutrient capital. Maximize retention of duff layer. Assure retention of minimum levels of coarse woody debris and recruitment snags as specified in Appendix JJ.

Table AA-2. Guidelines for Levels of Prescribed Burn Intensity

Visual Characterization	Site-Specific Results	Proportional Area
Light burn	The surface duff layer is often charred by fire but not removed. Duff, crumbled wood or other woody debris is partly burned, logs not deeply charred.	Less than 2 percent is severely burned. Less than 15 percent is moderately burned.
Moderate burn	Duff, rotten wood, or other woody debris partially consumed; logs may be deeply charred but mineral soil under the ash not appreciably changed in color.	Less than 10 percent is severely burned. More than 15 percent is moderately burned.
Severe burn	Top layer of mineral soil significantly changed in color, usually to reddish color; next 1/2 inch blackened from organic matter charring by heat conducted through top layer.	More than 10 percent is severely burned. More than 80 percent is moderately burned. Remainder is lightly burned.

b. Firelines

Objective: To minimize soil disturbance, soil compaction, soil erosion, and disturbance to riparian reserves.

Practices:

1. Construct firelines by hand on all slopes greater than 35 percent.

2. Utilize one-pass construction with a brush blade for tractor firelines.

3. Construct waterbars on tractor and hand firelines according to guidelines in section VII.B.1.

4. No machine constructed firelines in riparian reserves.

3. Prescribed Fire - Piling

a. Hand Piling

Objective: To prevent soil damage due to high burn intensity.

Practice: Burn piles when soil and duff moisture are high.

b. Tractor Piling

Objective: To protect soil productivity and to prevent soil damage due to compaction, displacement, and high burn intensity.

Practices:

1. Restrict tractor operations to dry conditions with less than 25 percent soil moisture content in the upper six inches of soil.

2. Restrict tractors to slopes less than 20 percent.

3. Construct small diameter piles or pile in windrows using brush blades.

4. Avoid piling concentrations of large logs and stumps.

5. Pile small material (3 to 8 inches diameter size).

6. Burn piles when soil and duff moisture are high.

7. Rip entire area to maintain soil productivity except that occupied by piles. Use winged ripper teeth and rip on contour to minimum depth of 12 inches. No ripping on clayey soils (i.e., soil series 706, 708, 840, 850).

8. Avoid displacement of duff and topsoil into piles or windrows.

9. Make only two machine passes (one round trip) over the same area wherever practical.

10. Use the lowest ground pressure machine capable of meeting objectives.

B. Fertilization

Objective: To protect water quality and to avoid impacts that retard or prevent attainment of the Monument Aquatic Conservation Strategy objectives.

Practices:

1. Avoid aerial application when wind speeds would cause drift.

2. Locate heliports and storage areas away from riparian reserves.

3. No application within riparian reserves.

4. Avoid direct application to ephemeral stream channels.

IX. Special Forest Products

A. Roads

Objective: To prevent erosion and water quality degradation.

Practices:

1. Utilize seasonal restriction on harvesting if access is by an unsurfaced road.

2. Clean all road surfaces, ditches, and catchbasins of debris from harvesting.

B. Harvest

Objective: To minimize soil damage, soil erosion, and aquatic and riparian habitat degradation.

Practices:

1. Follow practices listed in section VII. A.

2. Use an interdisciplinary team that includes a soil scientist, hydrologist, and fisheries biologist to review proposed special forest product collection/harvest activities within a riparian reserve.

X. Livestock Grazing

Objective: To protect, maintain, or improve water quality, aquatic habitat, riparian-wetland areas and upland plant communities; to achieve properly functioning riparian ecosystems.

Practices:

1. Consider fencing springs, seeps, and water developments to protect water quality, aquatic habitat, and riparian ecosystems.

2. Ensure rest for plant growth and vigor during the critical growing period.

3. Monitor, evaluate, and adjust livestock management practices to meet resource objectives.

4. Resolve management conflicts through the development of grazing management plans.

5. Promote ecological recovery through appropriate forage utilization levels.

6. Develop and implement recovery plans for riparian areas.

XI. Wildfire

A. Prevention

Objective: To minimize occurrence of severe intensity wildfires in riparian reserves, on category 1 soils, and high risk drainage areas.

Practice: Utilize prescribed burning to reduce both natural and management related slash (fuel) adjacent and/or within these areas.

B. Suppression

Objective: To minimize water quality degradation while achieving rapid and safe suppression of a wildfire.

Practices:

1. Apply the appropriate level of wildfire suppression which considers impacts of the wildfire as well as the suppression action.

2. Construct firelines by hand within riparian reserves.

3. Apply aerial retardant adjacent to riparian reserves by making passes parallel to riparian reserves.

C. Rehabilitation

Objective: To protect water quality and soil productivity with consideration for other resources.

Practices:

1. Utilize vegetation classification information as the framework for prescribing rehabilitation activities.

2. Develop a fire rehabilitation plan through an interdisciplinary process.

3. Select treatments on the basis of on-site values, downstream values, probability of successful implementation, social and environmental considerations (including protection of native plant community), and cost as compared to benefits.

4. Erosion control seeding should attempt to meet the intent of ecosystem based management objectives. Use seed availability information to prioritize erosion control seeding. First priority should be native seed sources for grasses and forbs, followed by annual grasses and forbs, and the lowest priority should be the use of perennial grasses.

5. Examples of emergency fire rehabilitation treatments include:

   a. Seeding or planting native species or other nitrogen fixing vegetation that accomplishes necessary erosion control and meets site restoration objectives.

   b. Mulch with straw or other suitable material.

   c. Fertilize.

   d. Place channel stabilization structures.

   e. Place trash racks above road drainage structures.

   f. Construct waterbars on firelines.

   g. Install stream channel structures to trap sediment in intermittent streams or dry draws.

XII. Watershed Restoration

Watershed restoration is a key component of the Monument Aquatic Conservation Strategy and is based on watershed analysis.

A. Roads

See sections VI. F., VI. G., and VI. K.

B. Riparian Vegetation

Objective: To restore the species composition and structural diversity of plant communities in riparian areas and wetlands that will provide adequate vegetative cover for shade and erosion control.

Practices:

1. Consider riparian treatments such as planting unstable areas along streams and flood terraces, planting riparian areas lacking vegetation due to past management activities, fencing to exclude livestock, and thinning densely-stocked young stands to encourage development of large conifers.

2. Assign high priority for restoration to riparian areas adjacent to water quality limited streams.

C. In-Stream Habitat Structures

Objective: To minimize damage to streambanks and riparian habitat during construction of in-stream habitat improvement projects.

Practices:

1. Carefully plan access needs for individual work sites within a project area to minimize exposure of bare soil, compaction, and possible damage to tree roots. Utilize existing trails to the extent practical.

2. Base design of habitat improvement structures on state-of-the-art techniques and local stream hydraulics.

3. Follow ODFW guidelines for timing of in-stream work (section VI.A.6.).

4. Follow applicable practices in section VI.D.2.

5. Keep equipment out of streams to extent possible. Inspect all mechanized equipment daily to help ensure toxic materials such as fuel and hydraulic fluid do not enter the stream.

6. Minimize the number and length of access points through riparian areas.

7. Limit the amount of streambank excavation to the minimum necessary to ensure stability of enhancement structures. Place excavated material as far above the high water mark as possible to avoid entry into the stream.

8. Obtain logs for habitat improvement structures from outside the riparian reserve or at least 200 feet from the stream channel, whenever possible, to maintain integrity of riparian habitat and streambanks.

9. Stabilize bare soil areas and control sedimentation through methods such as waterbars, barricades, planting, and seeding with native seed mixes.

D. Uplands

Objective: To increase soil stability, reduce soil erosion, and improve hydrologic functions.

Practice: Use corrective measures to repair degraded watershed conditions and rehabilitate with an ecologically appropriate vegetative cover that will maintain or improve soil stability, reduce surface runoff, increase infiltration, and reduce flood occurrence and flood damages.

Appendix BB - Monument Aquatic Conservation Strategy

The Monument Aquatic Conservation Strategy was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within the CSNM. This conservation strategy employs several tactics to approach the goal of maintaining the "natural" disturbance regime. Land use activities need to be limited or excluded in those parts of the watershed prone to instability. Management activities within the Monument must minimize increases in peak streamflows. Headwater riparian areas need to be protected, so that when debris slides and flows occur they contain coarse woody debris and boulders necessary for creating habitat farther downstream. Riparian areas along larger channels need protection to limit bank erosion, ensure an adequate and continuous supply of coarse woody debris to channels, and provide shade and microclimate protection.

Any species-specific strategy aimed at defining explicit management actions for habitat elements would be insufficient for protecting even the targeted species. The Monument Aquatic Conservation Strategy (MACS) must strive to maintain and restore ecosystem health at watershed and landscape scales to protect habitat for fish and other riparian-dependent species and resources and restore currently degraded habitats. This approach seeks to prevent further degradation and restore habitat over the Monument landscape in conjunction with ACS objectives in watersheds outside the Monument. Because it is based on natural disturbance processes, it may take decades, possibly more than a century, to accomplish all of its objectives. Some improvements in aquatic ecosystems, however, can be expected within 10 to 20 years.

The important phrases in these management actions are "meet Monument Aquatic Conservation Strategy objectives," "does not retard or prevent attainment of Monument Aquatic Conservation Strategy objectives," and "attain Monument Aquatic Conservation Strategy objectives. " These phrases, coupled with the phrase "maintain and restore" within each of the Monument Aquatic Conservation Strategy objectives, define the context for agency review and implementation of management activities. Complying with the Monument Aquatic Conservation Strategy objectives means that an agency must manage the riparian-dependent resources to maintain the existing condition or implement actions to restore conditions. The baseline from which to assess maintaining or restoring the condition is developed through a watershed analysis. Improvement relates to restoring biological and physical processes within their ranges of natural variability.

Proposed activities will be evaluated to determine their compatibility with Monument Aquatic Conservation Strategy objectives during the implementation phase. The evaluation of management actions will also focus on "meeting" and "not preventing attainment" of Monument Aquatic Conservation Strategy objectives. The intent is to ensure that a decision maker must find that the proposed management activity is consistent with the Monument Aquatic Conservation Strategy objectives. The decision maker will use the CSNM Plan and watershed analysis to support the finding. In order to make the finding that a project or management action "meets" or "does not prevent attainment" of the Monument Aquatic Conservation Strategy objectives, the analysis must include a description of the existing condition, a description of the range of natural variability of the important physical and biological components of a given watershed, and how the proposed project or management action maintains the existing condition or moves it within the range of natural variability. Management actions that do not maintain the existing condition or lead to improved conditions in the long term would not "meet" the intent of the Monument Aquatic Conservation Strategy and thus, would be amended or not implemented.

Monument Aquatic Conservation Strategy Objectives

The CSNM will be managed to:

1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.

2. Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.

3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.

4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.

5. Maintain and/or restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.

6. Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.

7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.

8. Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.

9. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

Components of the Monument Aquatic Conservation Strategy

Riparian Reserves: Lands along streams and unstable and potentially unstable areas where special Monument guidelines direct land use.

Key Watersheds: A system of large refugia comprising watersheds that are crucial to at risk fish species and stocks and provide high quality water.

Watershed Analysis: Procedures for conducting analysis that evaluates geomorphic and ecologic processes operating in specific watersheds. This analysis should enable watershed planning that achieves Monument Aquatic Conservation Strategy objectives. Watershed Analysis provides the basis for monitoring and restoration programs and the foundation from which Riparian Reserves can be delineated. Watershed analyses have been written for the Jenny Creek and Klamath River-Irongate Watersheds and the Upper Bear Creek Watershed Analysis area. The Klamath National Forest has the lead for preparing the Cottonwood Creek watershed analysis, which they anticipated will be completed in 2003.

Watershed Restoration: A comprehensive, long-term program of watershed restoration to restore watershed health and aquatic ecosystems, including the habitats supporting fish and other aquatic and riparian-dependent organisms.

These components are designed to operate together to maintain and restore the productivity and resiliency of riparian and aquatic ecosystems. The Old-Growth Emphasis Area is an important component of the Monument Aquatic Conservation Strategy. The management actions under which the Old-Growth Emphasis Area is managed will provide long-term increased protection for all stream types and may offer core areas of high quality stream habitat that will act as refugia and centers from which degraded areas can be recolonized as they recover. Streams in the Old-Growth Emphasis Area may be particularly important for endemic or locally distributed fish species and stocks.

Riparian Reserves

Riparian Reserves are portions of watersheds where riparian-dependent resources receive primary emphasis and where special management actions apply. These management actions prohibit and regulate activities in Riparian Reserves that retard or prevent attainment of the Monument Aquatic Conservation Strategy objectives. Riparian Reserves include those portions of a watershed directly coupled to streams and rivers, that is, the portions of a watershed required for maintaining hydrologic, geomorphic, and ecologic processes that directly affect standing and flowing waterbodies such as lakes and ponds, wetlands, streams, stream processes, and fish habitats. Riparian Reserves are primary source areas for wood and sediment such as unstable and potentially unstable areas in headwater areas and along streams. Riparian Reserves occur at the margins of standing and flowing water, intermittent stream channels and ephemeral ponds, and wetlands. Riparian Reserves generally parallel the stream network but also include other areas necessary for maintaining hydrologic, geomorphic, and ecological processes.

Under the Monument Aquatic Conservation Strategy, Riparian Reserves are used to maintain and restore riparian structures and functions of intermittent streams, confer benefits to riparian-dependent and associated species other than fish, enhance habitat conservation for organisms that are dependent on the transition zone between upslope and riparian areas, improve travel and dispersal corridors for many terrestrial animals and plants, and provide for greater connectivity of the watershed. The Riparian Reserves will also serve as connectivity corridors within the Monument.

Interim widths for Riparian Reserves necessary to meet Monument Aquatic Conservation Strategy objectives for different waterbodies are established based on ecologic and geomorphic factors. These widths are designed to provide a high level of fish habitat and riparian protection until watershed and site analysis can be completed. Watershed analysis identified critical hillslope, riparian, and channel processes that must be evaluated in order to delineate Riparian Reserves that assure protection of riparian and aquatic functions. Riparian Reserves are delineated during implementation of site-specific projects based on analysis of the critical hillslope, riparian, and channel processes and features. Although Riparian Reserve boundaries may be adjusted on permanently-flowing streams, the prescribed widths are considered to approximate those necessary for attaining Monument Aquatic Conservation Strategy objectives. Post-watershed analysis Riparian Reserve boundaries for permanently-flowing streams should approximate the boundaries prescribed in these management actions. However, post-watershed analysis Riparian Reserve boundaries for intermittent streams may be different from the existing boundaries. The reason for the difference is the high variability of hydrologic, geomorphic and ecologic processes in a watershed affecting intermittent streams. At the same time, any analysis of Riparian Reserve widths must also consider the contribution of these reserves to other, including terrestrial, species. Watershed analysis should take into account all species that were intended to be benefitted by the prescribed Riparian Reserve widths. Those species include fish, mollusks, amphibians, lichens, fungi, bryophytes, vascular plants, American marten, bats, and Northern Spotted Owls. The specific issue for Northern Spotted Owls is retention of adequate habitat conditions for dispersal.

Surveys to determine riparian reserves have been completed in portions of Upper Emigrant, Keene Creek, and Middle Jenny Creek Subwatersheds. The prescribed minimum widths of Riparian Reserves, listed below, apply to all watersheds in the CSNM. A site-specific analysis may be conducted and the rationale for adjusting Riparian Reserve boundaries may be presented through the appropriate NEPA decision-making process during the implementation of project level activities. The adjustments of Riparian Reserve boundaries would consistent with attaining Monument Conservation Strategy objectives.

Riparian Reserve Widths

Fish-bearing streams

Riparian reserves consist of the stream and the area on each side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet total, including both sides of the stream channel), whichever is greatest.

Permanently flowing non-fish-bearing streams

Riparian reserves consist of the stream and the area on each side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance (300 feet total, including both sides of the stream channel), whichever is greatest.

Constructed ponds and reservoirs, and wetlands greater than 1 acre

Riparian reserves consist of the body of water or wetland and the area to the outer edges of the riparian vegetation, or to the extent of seasonally saturated soil, or to the extent of unstable and potentially unstable areas, or to a distance equal to the height of one site-potential tree, or to 150 feet slope distance from the edge of a wetland greater than one acre or the maximum pool elevation of constructed ponds and reservoirs, whichever is greatest.

Lakes and natural ponds

Riparian reserves consist of the body of water and the area to the outer edges of the riparian vegetation, or to the extent of seasonally saturated soil, or to the extent of unstable and potentially unstable areas, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance, whichever is greatest.

Seasonally flowing or intermittent streams, wetlands less than 1 acre, springs, and unstable and potentially unstable areas

This category applies to features with high variability in size and site-specific characteristics. At a minimum the riparian reserves will include:

The extent of unstable and potentially unstable areas;

The stream channel and the area extending to the top of the inner gorge;

The stream channel or wetland and the area from the edges of the stream channel or wetland to the outer edges of the riparian vegetation;

The area extending from the edges of the stream channel to a distance equal to the height of one site-potential tree, or 100 feet slope distance, whichever is greatest.

A site-potential tree height is the average maximum height of the tallest dominant trees (200 years or older) for a given site class.

Intermittent streams are defined as any nonpermanent flowing drainage feature having a definable channel and evidence of annual scour or deposition. This includes what are sometimes referred to as ephemeral streams if they meet these two criteria.

Swales or dry draws. Riparian reserves in these hydrologic features will extend for approximately 25 feet on either side of the middle of the draw. Dry draws are identified as any hydrologic feature that does not meet the criteria for consideration as a perennial or intermittent stream. No surface disturbing activities such as yarding and road construction would occur, and woody vegetation should not be removed from the inside of dry draws and swales. A defined riparian reserve may not be necessary but these areas should be evaluated by an interdisciplinary team before any such management.

Wetlands, Seeps and Springs

The combinations of hydrology, soils, and vegetative characteristics are the primary factors influencing the development of wetland habitats. There must be the presence of surface water or saturated soils to significantly reduce the oxygen content in the soils to zero or near zero concentrations. These low or zero soil oxygen conditions must persist for sufficient duration to promote development of plant communities that have a dominance of species adapted to survive and grow under zero oxygen conditions. These wetland characteristics apply when defining wetlands for regulatory jurisdiction or for technical analysis when conducting inventories or functional assessments. Seeps and springs can be classified as streams if they have sufficient flow in a channel or as seasonal or perennial wetlands under the criteria defined in the 1987 Corps of Engineers Wetlands Manual. The management actions for wetlands, which are based on the hydrologic, physical and biologic characteristics described in the manual, apply to seeps and springs regardless of their size.

Formal definition for implementing section 404 of the Clean Water Act, adopted by the Environmental Protection Agency, is as follows:

The term wetlands means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

Detailed technical methods have been developed to assist in identification of wetlands that meet the above definition. Currently, the field manual being used for implementing the Clean Water Act is the "1987 Corps Manual. "

For purposes of conducting the National Wetland Inventory, the Fish and Wildlife Service has broadly defined both vegetated and non-vegetated wetlands as follows:

Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes, (2) the substrate is predominantly undrained hydric soil, and (3) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year.

Wetlands typically occur within and adjacent to riparian zones. It is frequently difficult to differentiate wetlands from riparian areas based on the definitions. Most typically, and particularly in forested landscapes, the riparian zone is defined by its spatial relation to adjacent streams or rivers. However, riparian zones are also commonly considered to be lands integrally related to other aquatic habitats such as lakes, reservoirs, intermittent streams, springs, seeps, and wetlands.

Because of such conceptual and definitional vagaries, there is spatial overlap between wetlands and riparian zones. This then results in only a portion of the riparian zone associated with rivers and streams being considered as wetlands. The extent of that portion will depend on the specifics of hydrologic, vegetation, and soil features. The functions of the wetland portion may also be distinct from the nonwetlands. For example, wetlands may provide habitat for specialized plant species or reproductive habitat for amphibians or other organisms that would not be provided by riparian areas.

Once the Riparian Reserve width is established, land management activities allowed in the Riparian Reserve will be directed by management actions for managing Riparian Reserves. The management actions for Riparian Reserves prohibit or regulate activities in Riparian Reserves that retard or prevent attainment of the Monument Aquatic Conservation Strategy objectives.

Summary of Monument Aquatic Conservation Strategy for Riparian Reserves:

- Involves portions of the landscape where riparian-dependent and stream resources receive primary emphasis.

- Riparian Reserves are designated for all permanently-flowing streams, lakes, wetlands, intermittent streams, and dry draws.

- Riparian Reserves include the body of water, inner gorges, all riparian vegetation, 100-year floodplain, landslides and landslide prone areas.

- Reserve widths are based on some multiple of a site-potential tree or a prescribed slope distance, whichever is greater. Reserve widths may be adjusted, based watershed analysis or site specific analysis during the project implementation phase, to meet Monument Aquatic Conservation Strategy objectives.

- Management actions prohibit programmed timber harvest, and manage roads, grazing, mining and recreation to achieve objectives of the Monument Aquatic Conservation Strategy.

Key Watersheds

Jenny Creek watershed is the only watershed within the CSNM that has a Tier 1 key watershed designation. Jenny Creek is a Tier 1 key watershed because it meets the qualifications of either providing, or expected to provide, high quality habitat. A system of Key Watersheds that serve as refugia is crucial for maintaining and recovering habitat for at-risk stocks of anadromous salmonids and resident fish species. These refugia include areas of high quality habitat as well as areas of degraded habitat. The high quality conditions of Jenny Creek watershed will serve as anchors for the potential recovery of depressed stocks. The areas of lower quality habitat have a high potential for restoration and will become future sources of high quality habitat with the implementation of a comprehensive restoration program (see Watershed Restoration later in this section of these management actions).

Roadless Areas and Key Watersheds

The amount of existing system and non-system roads within the Jenny Creek Key Watershed should be reduced through decommissioning. Road closures with gates or barriers do not qualify as decommissioning or a reduction in road mileage. If funding is insufficient to implement reductions, there will be no net increase in the amount of roads in Key Watersheds. That is, for each mile of new road constructed, at least one mile of road would be decommissioned, and priority given to roads that pose the greatest risks to riparian and aquatic ecosystems.

Watershed Analysis

Watershed Analysis has followed the process described in Ecosystem Analysis at the Watershed Scale, Federal Guide for Watershed Analysis, version 2.2.

Watershed Restoration

Watershed restoration will be an integral part of a program to aid recovery of fish habitat, riparian habitat, and water quality in the CSNM. Restoration will be based on watershed analysis and planning. In many watersheds the most critical restoration needs occur on private lands downstream from federally managed lands. Efforts would be made to work with private land owners adjacent to the CSNM in addressing restoration needs.

The most important components of a watershed restoration program are control and prevention of road-related runoff and sediment production, restoration of the condition of riparian vegetation, and restoration of in-stream habitat complexity. Other restoration opportunities exist, such as meadow and wetland restoration and mine reclamation, and these may be quite important in some areas. Decisions to apply a given treatment depend on the value and sensitivity of downstream uses, transportation needs, social expectations, risk assessment of probable outcomes for success at correcting problems, costs, and other factors.

Roads

Road treatments range from full decommissioning (closing and stabilizing a road to eliminate potential for storm damage and the need for maintenance) to simple road upgrading, which leaves the road open. Upgrading can involve practices such as removing soil from locations where there is a high potential of triggering landslides, modifying road drainage systems to reduce the extent to which the road functions as an extension of the stream network, and reconstructing stream crossings to reduce the risk and consequences of road failure or washing out at the crossings.

Riparian Vegetation

Active silvicultural programs will be necessary to restore large conifers in Riparian Reserves. Appropriate practices may include planting unstable areas such as landslides along streams and flood terraces, thinning densely-stocked young stands to encourage development of large conifers, releasing young conifers from overtopping hardwoods, and reforesting shrub and hardwood-dominated stands with conifers. These practices can be implemented in conjunction with silvicultural treatments in adjacent uplands areas, although the practices will differ in objective and, consequently, design.

In-Stream Habitat Structures

In-stream restoration, based on the interpretation of physical and biological processes and deficiencies identified during watershed analysis, can be an important component of an overall program for restoring fish and riparian habitat. In-stream restoration measures are inherently short-term and must be accompanied by riparian and up-slope restoration to achieve long-term watershed restoration. Maintaining desired levels of channel habitat complexity, for example, may best be achieved in the short-term by introducing structures. In this context, the word structures refers to logs and/or boulders strategically placed to enhance aquatic habitat quality. However, a riparian area with the complete array of functions and processes should provide coarse woody debris to the channel in the long-term.

In-stream restoration will be accompanied by riparian and up-slope restoration if watershed restoration is to be successful. In-stream restoration, including in-channel structures, will not be used to mitigate for management actions that degrade existing habitat, as a substitute for habitat protection, or to justify risky land management activities and practices. Priority must be given to protecting existing high quality habitat.

Summary of Monument Aquatic Conservation Strategy for Watershed Restoration:

- Watershed restoration restores watershed processes to recover degraded habitat.
- Watershed restoration should focus on removing and upgrading roads.
- Silvicultural treatments may be used to restore large conifers in Riparian Reserves.
- Watershed restoration should restore channel complexity. In-stream structures should only be used in the short term and not as a mitigation for poor land management practices.

Management Actions/Direction for Riparian Reserves

As a general rule, management actions / direction for riparian reserves prohibits or regulates activities that retard or prevent attainment of Monument Aquatic Conservation Strategy objectives and riparian reserve objectives. Watershed analysis and appropriate NEPA compliance will be required to change riparian reserve boundaries in all watersheds.

Management Actions/Direction - General

Apply the management actions / direction in the Special Status Species Standards and Guidelines (Appendix Z of CSNM DRMP).

Management Actions/Direction - Vegetation Management

1. Prohibit timber harvest including fuelwood cutting in riparian reserves, with the following exceptions:

   a. Allow salvage and fuelwood cutting if required to attain Monument Aquatic Conservation Strategy and Riparian Reserve objectives where catastrophic events such as fire, flooding, volcanic, wind, or insect damage results in degraded riparian conditions;

   b. Remove salvage trees only when present and future woody debris needs are met and other Monument Aquatic Conservation Strategy and Riparian Reserve objectives are not adversely affected; and

   c. Apply silvicultural practices for Riparian Reserves to control stocking, reestablish and manage stands, and acquire desired vegetation characteristics needed to attain Monument Aquatic Conservation Strategy and Riparian Reserve objectives.

Management Actions/Direction - Roads Management

1. Cooperate with Federal, State, and county agencies and work with private parties with road use agreements to achieve consistency in road design, operation, and maintenance necessary to attain Monument Aquatic Conservation Strategy and riparian reserve objectives.

2. For each existing or planned road, meet Monument Conservation Strategy and riparian reserve objectives by:

a. Avoiding the construction of roads and landings in Riparian Reserves unless approved by interdisciplinary team consisting of fisheries biologist, hydrologist and soil scientist.

b. preparing road design criteria, elements, and standards that govern construction and reconstruction.

c. preparing operation and maintenance criteria that govern road operation, maintenance, and management;

d. minimizing disruption of natural hydrologic flow paths, including diversion of streamflow and interception of surface and subsurface flow;

e. restricting sidecasting as necessary to prevent the introduction of sediment to streams; and

f. avoiding wetlands entirely when constructing new roads.

3. Determine the influence of each road on the Monument Aquatic Conservation Strategy and Riparian Reserve objectives through watershed analysis. Meet Monument Aquatic Conservation Strategy and Riparian Reserve objectives by:

a. reconstructing roads and associated drainage features that pose a substantial risk;

b. prioritizing reconstruction based on current and potential impact to riparian resources and the ecological value of the riparian resources affected; and

c. closing and stabilizing, or obliterating and stabilizing roads based on the ongoing and potential effects to Monument Aquatic Conservation Strategy and riparian reserve objectives and considering short-term and long-term transportation needs.

New culverts, bridges and other stream crossings shall be constructed, and existing culverts, bridges, and other stream crossings determined to pose a substantial risk to riparian conditions will be improved to accommodate at least a 100-year flood, including associated bedload and debris. Priority for upgrading will be based on the potential impact and the ecological value of the riparian resources affected. Crossings will be constructed and maintained to prevent diversion of streamflow out of the channel and down the road in the event of crossing failure.

Minimize sediment delivery to streams from roads. Outsloping of the roadway surface is preferred, except in cases where outsloping would increase sediment delivery to streams or where outsloping is infeasible or unsafe. Route road drainage away from potentially unstable channels, fills, and hill slopes.

Provide and maintain fish passage at all road crossings of existing and potential fish-bearing streams (e.g., streams that can be made available to anadromous fish by removing obstacles to passage).

Develop and implement a road management plan or a transportation management plan that will meet the Monument Aquatic Conservation Strategy and riparian reserve objectives. As a minimum, this plan will include provisions for the following activities:

- inspections and maintenance during storm events;
- inspections and maintenance after storm events;

- road operation and maintenance giving high priority to identifying and correcting road drainage problems that contribute to degrading riparian resources;

- traffic regulation during wet periods to prevent damage to riparian resources; and

- establishing the purpose of each road by developing the road management objectives.

Management Actions/Direction - Grazing Management

Through a planning and environmental analysis process appropriate to the action, adjust or eliminate grazing practices that retard or prevent attainment of Monument Aquatic Conservation Strategy and Riparian Reserve objectives.

Locate new livestock handling and / or management facilities outside Riparian Reserves. For existing livestock handling facilities inside Riparian Reserves, ensure that Monument Aquatic Conservation Strategy and Riparian Reserve objectives are met. Where these objectives cannot be met, require relocation or removal of such facilities.

Limit livestock trailing, bedding, watering, loading, and other handling efforts to those areas and times that will ensure Monument Aquatic Conservation Strategy and Riparian Reserve objectives are met.

Management Actions/Direction - Recreation Management

If new recreational facilities are designed within Riparian Reserves, including trails and dispersed sites, so as not to prevent meeting Monument Aquatic Conservation Strategy and riparian reserve objectives. Construction of these facilities should not prevent future attainment of these objectives. For existing recreation facilities within Riparian Reserves, evaluate and mitigate impacts to ensure that these do not prevent, and to the practicable extent contribute to, attainment of Monument Aquatic Conservation Strategy and riparian reserve objectives.

Adjust dispersed and developed recreation practices that retard or prevent attainment of Monument Aquatic Conservation Strategy and riparian reserve objectives. Where adjustment measures such as education, use limitations, traffic control devices, increased maintenance, relocation of facilities, and / or specific site closures are not effective, eliminate the practice or occupancy.

Address attainment of Monument Aquatic Conservation Strategy, riparian reserve objectives in wilderness management plans.

Management Actions/Direction - Fire/Fuels Management

Design fuel treatment, fire suppression strategies, practices, and activities to meet Monument Aquatic Conservation Strategy and Riparian Reserve objectives, and to minimize disturbance of riparian ground cover and vegetation. Strategies will recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management activities could be damaging to long-term ecosystem function.

Locate incident bases, camps, helibases, staging areas, helispots and other centers for incident activities outside of Riparian Reserves. If the only suitable location for such activities is within the riparian reserve, an exemption may be granted following a review and recommendation by a resource advisor. The advisor will prescribe the location, use conditions, and rehabilitation requirements. Utilize an interdisciplinary team to predetermine suitable incident base and helibase locations.

Minimize delivery of chemical retardant, foam, or other additives to surface waters. An exception may be warranted in situations where overriding immediate safety imperatives exists, or following a review and recommendation by a resource advisor when an escape would cause more long-term damage.

Design prescribed burn projects and prescriptions to contribute to attainment of Monument Aquatic Conservation Strategy and Riparian Reserve objectives.

Immediately establish an emergency team to develop a rehabilitation treatment plan needed to attain Monument Aquatic Conservation Strategy and Riparian Reserve objectives whenever Riparian Reserves are significantly damaged by a wildfire or a prescribed fire burning outside prescribed parameters.

Consider rapidly extinguishing smoldering coarse woody debris and duff.

Locate and manage water drafting sites (e.g., sites where water is pumped to control or suppress fires) to minimize adverse effects on riparian habitat and water quality as consistent with Monument Aquatic Conservation Strategy and riparian reserve objectives.

Management Actions/Direction - Land Management

Issue leases, permits, rights-of-way, and easements to avoid adverse effects that retard or prevent attainment of Monument Aquatic Conservation Strategy and Riparian Reserve objectives. Where legally possible, adjust existing leases, permits, rights-of-way, and easements to eliminate adverse effects that retard or prevent the attainment of Monument Aquatic Conservation Strategy and Riparian Reserve objectives. If adjustments are not effective and where legally possible, eliminate the activity. Priority for modifying existing leases, permits, rights-of-way and easements will be based on the actual or potential impact and the ecological value of the riparian resources affected.

Use land acquisition, exchange, and conservation easements to meet Monument Aquatic Conservation Strategy and Riparian Reserve objectives to facilitate restoration of fish stocks and other species at risk of extinction.

Management Actions/Direction - General Riparian Area Management

Identify and attempt to secure instream flows needed to maintain riparian resources, channel conditions, and aquatic habitat.

Fell trees in Riparian Reserves when they pose a safety risk. Keep felled trees on site when needed to meet coarse woody debris objectives.

Apply herbicides, insecticides, other toxicants, and other chemicals only in a way that avoids impacts that retard or prevent attainment of Monument Aquatic Conservation Strategy and Riparian Reserve objectives.

Locate water drafting sites to minimize adverse effects on stream channel stability, sedimentation, and instream flows needed to maintain riparian resources, channel conditions, and fish habitat.

Management Actions/Direction - Watershed and Habitat Restoration

Design and implement watershed restoration projects in a manner that promotes long-term ecological integrity of ecosystems, conserves the genetic integrity of native species, and attains Monument Aquatic Conservation Strategy and Riparian Reserve objectives.

Cooperate with Federal, State, local, and Tribal agencies, and private landowners to develop watershed-based coordinated resource management plans or other cooperative agreements to meet Monument Aquatic Conservation Strategy and Riparian Reserve objectives.

Prevent watershed and habitat degradation rather than relying on mitigation measures or planned restoration.

Management Actions/Direction - Fish and Wildlife Management

Design and implement fish and wildlife habitat restoration and enhancement activities in a manner that contributes to attainment of Monument Aquatic Conservation Strategy and Riparian Reserve objectives.

Design, construct and operate fish and wildlife interpretive and other user-enhancement facilities in a manner that does not retard or prevent attainment of Monument Aquatic Conservation Strategy and Riparian reserve objectives. For existing fish and wildlife interpretative and other user-enhancement facilities inside Riparian Reserves, ensure that Monument Aquatic Conservation Strategy and Riparian Reserve objectives are met. Where Monument Aquatic Conservation Strategy and Riparian Reserve objectives cannot be met, relocate or close such facilities.

Cooperate with Federal, Tribal, and State wildlife management agencies to identify and eliminate wild ungulate impacts that are inconsistent with attainment of Monument Aquatic Conservation Strategy and Riparian Reserve objectives.

Cooperate with Federal, Tribal, and State fish management agencies to identify and eliminate impacts associated with habitat manipulation, fish stocking, harvest and poaching that threaten the continued existence and distribution of native fish stocks occurring on Federal lands.

Management Actions/Direction - Key Watersheds

Reduce existing road mileage within key watersheds. If funding is insufficient to implement reductions, neither construct nor authorize through discretionary permits a net increase in road mileage in key watersheds. Give highest priority to watershed restoration in key watersheds.

Research

A variety of research activities may be ongoing and proposed in Key Watersheds and Riparian Reserves. These activities must be analyzed to ensure that significant risk to the watershed values does not exist. If significant risk is present and cannot be mitigated, study sites must be relocated. Some activities not otherwise consistent with the objectives may be appropriate, particularly if the activities will test critical assumptions of these management actions; will produce results important for establishing or accelerating vegetation and structural characteristics for maintaining or restoring aquatic and riparian ecosystems; or the activities represent continuation of long-term research. These activities should be considered only if there are no equivalent opportunities outside of Key Watersheds and Riparian Reserves.

Current, funded, agency-approved research, which meets the above criteria, is assumed to continue if analysis ensures that a significant risk to Monument Aquatic Conservation Strategy objectives does not exist.

Monitoring

The following monitoring section is specific to achieving the stated objectives of the Monument Aquatic Conservation Strategy. Implementation, effectiveness, and validation monitoring need to be conducted consistent with the monitoring discussion in the Components of the Monument Monitoring Strategy (Appendix LL).

General objectives of monitoring will be to: (1) determine if Best Management Practices have been implemented, (2) determine the effectiveness of management practices at multiple scales, ranging from individual sites to watersheds, and (3) validate whether ecosystem functions and processes have been maintained or improved as predicted. In addition, monitoring will provide feedback to fuel the adaptive management process.

Specific monitoring objectives will be derived from the Monument Monitoring Strategy (Appendix LL). Monitoring at the watershed level will link monitoring for ecosystem management objectives for multiple scales of province, river basin, smaller watershed and site-specific levels. Specific locations of unstable and potentially unstable areas, roads, and vegetative management activities will be identified. In addition, the spatial relationship of potentially unstable areas and management actions to sensitive habitats such as wetlands will be determined. This information provides a basis for targeting watershed monitoring activities to assess outcomes associated with risks and uncertainties identified during watershed analyses.

Under natural conditions, stream habitats within the CSNM exhibit an extremely wide diversity of conditions depending on past disturbances, topography, geomorphology, climate and other factors. Consequently, riparian area monitoring must be dispersed among the various landscapes rather than concentrated at a few sites and then extrapolated to the entire monument. Logistical and financial constraints require a stratified monitoring program that includes:

- Post-project site review
- Reference to subwatersheds and drainage areas
- Watershed monitoring
- A water quality network
- Landscape integration of monitoring data

A stratified monitoring program examines watersheds at several spatial and temporal scales. Information is provided on hillslope, floodplain, and channel functions, water quality, fish and wildlife habitat and populations, and vegetation diversity and dynamics.

Parameters selected for monitoring depend on the activities planned for a given watershed designed to specifically address management activities with the Monument. Two of the more extensive activities related to water quality are vegetative management and road related operations. In addition to chemical and physical parameters, biological criteria may be appropriate to monitor using techniques such as Rapid Bioassessment Protocols for macroinvertebrates or the index of biotic integrity for fish diversity.

Long-term systematic monitoring in selected watersheds will be necessary to provide reference points for effectiveness and validation monitoring. These watersheds should represent a range of forest and stream conditions that have been exposed to natural and induced disturbance. Reference watersheds, sub-basins, and individual sites will be selected as part of the overall adaptive management process described as part of these management actions.

Study plans will be cooperatively developed based on province, river basin, and/or watershed level analyses. Long-term data sets from reference watersheds will provide an essential basis for adaptive management and a gauge by which to assess trends in in-stream condition.

Monitoring plans must be tailored for each watershed within the Monument. Significant differences in type and intensity of monitoring will occur based on watershed characteristics and management actions. For example, carefully targeted restoration activities may only require effectiveness monitoring of single activities, whereas watershed-scale restoration would be accompanied by extensive riparian and in-stream monitoring. The specific design of monitoring programs can best be accomplished by the local interdisciplinary teams working in cooperation with state programs. Pooling the monitoring resources of federal and state agencies is a necessity to provide interagency consistency and to increase available resources.

Appendix CC - CSNM Transportation Management Plan

The purpose of this Transportation Management Plan (TMP) is to provide goals, objectives, and guidelines for managing the Bureau of Land Management's (BLM) road and trail transportation system throughout the Cascade-Siskiyou National Monument (CSNM). The transportation system provides access across the CSNM to major points of interest, resource management areas, and other public and private lands. While the TMP supplies general guidance and direction, Transportation Management Objectives (TMOs) recommend specific management on individual roads.

Implementation of the TMP requires a detailed analysis of individual roads through the TMO process. The purpose of this process is to provide for safe access for users, to protect natural resources, to enable private property access, and to fulfill other land management objectives. Due to the complex checkerboard land/road ownership pattern in the CSNM, budgetary, and environment analysis requirements it is anticipated that complete implementation of this TMP (with accompanying TMOs) may take a few years. This plan will be used to update maintenance plans, to identify potential road management/restoration projects, to prioritize funding for maintenance or other transportation related projects, and to coordinate with other agencies in their transportation planning.

The management and direction of the CSNM would require some roads to be removed from the system, closed until needed, kept at low maintenance levels, or converted to trails (see TMOs). In addition, road density would be reduced to improve water quality and enhance wildlife habitat. Transportation planning considers the importance and interdependency of all resources, including people, and is an important element in ecosystem management.

A major element of the TMP is the management and protection of the basic resources of water, soils, fish, wildlife, and vegetation. The road and trail systems along with people's desire to use and enjoy them affect these resources. Access into habitat areas can increase disturbance to wildlife and sensitive plants.

The TMP in the CSNM considers: 1) the protection of resources, 2) access requirements of adjacent landowners, 3) fire suppression needs on BLM lands as well as adjacent public and private lands, 4) roads that access fire suppression facilities such as pump chances, ponds, and other water sources, 5) the need for legal public access when acquiring new or reviewing existing access rights.

The transportation system within the CSNM will be managed to maintain the ecological health of the environment while providing existing legal access for private individuals. The TMO process will be used for road management recommendations and to prioritize road maintenance needs.

ACCESS

BLM roads are not public roads and are best described as "private government roads." A factor in this determination is that the BLM is not a public road authority and cannot dedicate public roads. BLM roads also do not fit the criteria for public roads as established by the Secretary of Transportation. Public use of BLM roads is dictated by BLM policy or administrative decision and not by right. The United States, as proprietor of the public lands, may construct roads and prescribe the type, manner, and extent of use which they receive.

Due to BLM's checkerboard land ownership, the Bureau has entered into numerous reciprocal right-of-way and road use agreements. These agreements do not include rights for the general public to use roads constructed under these reciprocal right-of-way agreements. These agreements enable the BLM to use private roads to access BLM lands and private landowners to access their lands over BLM roads. The agreements are an essential part of a complete transportation system and have resulted in significant cost savings to the public, environmental benefits, and fewer roads. There are five reciprocal right-of-way and road use agreements in the Monument with Boise Cascade Corporation, U. S. Timberlands Services company, LLC and three private landowners. The lands under reciprocal right-of-way and road use agreements are display on map 34.

Private landowners rely on a significant portion of the transportation system to gain access across BLM lands for access to their property. Private hauling of timber or rock on BLM controlled roads requires a permit from the BLM.

Service roads are used to access and maintain land use authorizations such as fences, ponds, utility lines, and irrigation ditches. These roads are normally high clearance 4-wheel drive roads that are normally not part of the transportation system.

The existing BLM transportation system provides access to a variety of dispersed and developed recreation facilities and areas, trails and trails heads, scenic landscapes, and special areas. Public demand for recreation increases with population increases. Therefore, the important role that recreation plays will be considered as the current transportation system changes. While the BLM promotes the safety of all the users of the public lands, it should be noted that the BLM's transportation system is not designed to the same safety standards as public roads. Under State law (ORS 105.699), "the [BLM] owes no duty of care to keep the lands safe for entry or use by others for any recreational purposes or to give any warning of a dangerous condition, use, structure, or activity on the land to persons entering thereon for any such purpose."

ROAD MAINTENANCE

BLM is responsible for maintaining roads under its control to standards set forth in BLM 9100 Series Manuals and the CSNM BMPs. Maintenance is intended to provide for resource protection and reasonable accommodation of its users. Each road within the transportation system is assigned a level of maintenance designed to meet its TMO. The levels provide a progressive system of maintenance with even the lowest level ensuring resource protection by controlling surface erosion and sedimentation. Roads will be prioritized for maintenance needs or may be maintained at lower levels depending upon funding. See the TMO section of this TMP for maintenance descriptions.

All roads maintained by the BLM may receive a higher maintenance level during periods of intense use such as commercial hauling of forest products. The benefitting activity / party will normally be responsible for funding the work required. After completion of such activity, the road will be allowed to return to the lower maintenance level. Snow removal is not considered part of normal maintenance.

Existing rock quarries may be used for restoration, stabilization, or other projects which serve to protect the objects identified in the proclamation. No new quarries would be developed. Roads not owned or controlled by the BLM, but constructed on BLM administered lands under right-of-way grants or permits, will be maintained in accordance with the terms of the grant or permit. Roads and trail access across BLM lands is authorized by the Federal Land Policy Management Act (FLPMA), through rights-of-way grants, or reservations.

ACCESS CONTROLS

The primary objectives of access controls (gates, barricades) are to reduce sedimentation, to restore hydrologic processes, and to reduce impacts to wildlife and botanical resources. Special designated areas also benefit from road closures. In addition, compliance with the Monument Aquatic Conservation Strategy (MACS) warrants a reduction in the miles of roads within the Jenny Creek Key Watershed.

BLM controlled roads will be managed in varying states of accessibility. The goals and objectives of the various resources are incorporated into the TMO process to determine the status of each road. The BLM will coordinate with potentially affected rights-of-way holders on decisions to change road access status.

All methods of road closures are appropriate measures to reduce the amount of open road density for wildlife and may also be used to for water quality concerns. The appropriate method of road closure to address wildlife and water quality issues will normally be determined through the interdisciplinary process based upon a site specific considerations.

The following are road closure methods:

Temporary/Seasonal Road Closure - These are generally local roads, temporarily closed with a gate or similar barrier. The road will be seasonally closed to the general public but may be open at times for authorized activities. The road may or may not be closed to BLM administrative uses on a seasonal basis depending upon impacts to the resources. Drainage structures will be left in place.

Long Term Road Closure - These will be based on resource protection needs identified through analysis and directives. The road will be closed to vehicles on a long-term basis, but may be used again in the future. Prior to closure, the road will be prepared to avoid future maintenance needs; the road will be left in an "erosion-resistant" condition by establishing cross drains, removing stream crossing structures, and repair potentially unstable areas. Exposed soils will be treated to reduce sedimentation by practices such as seeding, mulching, or rock armoring. The road may be closed with a device similar to an earthen barrier (trench barricades) or equivalent.

Natural Decommission - Roads determined through an interdisciplinary process to have no future need would be allowed to decommission naturally. Treatments may include selective ripping, removal of drainage structures, providing for natural drainage by constructing water bars, and by constructing barricades. This treatment would normally be used for stable natural surfaced roads that have not been used very often and are re-vegetating naturally. The road should not require future maintenance.

Decommission - Roads determined through an interdisciplinary process to have no future need may be ripped (or tilled), seeded, mulched, and may be planted to reestablish vegetation. Cross drains, crossing structures and fills in stream channels, and potentially unstable fill areas will be removed to restore natural hydrologic flow. The road will be closed with a device similar to an earthen barrier (trench barricades) or equivalent. The road should not require future maintenance.

Obliteration (full site restoration) - These roads will have all drainage structures removed. Fill material used in the original road construction will be excavated and placed on the sub grade in an attempt to reestablish the original ground line (re-contoured). Exposed soil will be re-vegetated with trees or other native species. Roads receiving this level of treatment would not be planned for use at any time in the future.

TRAIL MANAGEMENT

In some alternatives trails may be provided for users on the public lands, including hiking, horseback riding, cross-country skiing, and administrative purposes. Trails crossing BLM administered lands must be located, designed, constructed, and maintained to preserve natural, historic, cultural, scenic values and meet Monument Aquatic Conservation Strategy (MACS) objectives. Unauthorized trails should be identified and appropriate measures undertaken to close and rehabilitate the location.

Trail Construction - Trails will be designed and constructed in accordance with the policies and standards set forth in BLM Manual 9114.

Trail Closure - Trails may be closed or use restricted to fulfill management objectives such as protecting public health and safety or preserving resources. Trails may also be subject to State and other Federal Regulations as necessary to protect public health or resources.

Trail Restrictions - Limitations that may be placed on the use of trails include: no bicycles, no equestrians, no motorized vehicles, permit required for use, and seasonal closure.

Trail Maintenance - The BLM is responsible for maintaining trails under its control in accordance with the policies and standards set forth in BLM Manual 9114. Maintenance provides for resource protection and reasonable safety of users. Trail maintenance is divided into 5 levels. Each trail within the transportation system is assigned a level of maintenance designed to meet management objectives. The levels provide a progressive system of maintenance with all levels ensuring resource protection by controlling surface erosion and sedimentation.

Trail Maintenance Levels - The assigned maintenance level reflects the appropriate level of maintenance required to meet management objectives.

Level 1 - These trails are closed to motorized and non-motorized use. This level is the minimum maintenance required to protect adjacent lands and resource values. The objective is to remove these trails from the trail system.

(Minimum standards for Level 1) - Emphasis is given to maintaining drainage and runoff patterns as needed to protect adjacent lands. Brushing and removal of hazards is not performed unless trail drainage is being adversely affected, causing erosion. Closure devices are maintained.

Level 2 - Low use trails with little or no contact between parties. Little or no monitoring or management of visitor use. Visitors may encounter obstructions like brush and dead fall.

(Minimum standards for Level 2) - Trail would require condition surveys once every year. Repairs will be done at the beginning of the use season to prevent environmental damage and maintain access. Emphasis is given to maintaining drainage and mitigating hazards. The trail may be signed "Not Regularly Maintained". Major repair may not be done for several seasons.

Level 3 - Moderate use trails with visitor use on a seasonal and/or peak use period with frequent contact between parties. Trail management is conducted with occasional monitoring or management of visitor use. Visitors are not likely to encounter obstructions.

(Minimum standards for Level 3) - The trail shall a minimum of one condition survey 1 to 2 times per season. Major repairs shall be completed annually. Maintenance shall be scheduled two or three times per season, if required, to repair the trail for environmental damage and to maintain access. The trail is kept in fair to good condition.

Level 4 - High use trails used during specific times of the year with high frequencies of contact between parties. Regularly scheduled monitoring or management of visitor use.

(Minimum standards for Level 4) - Scheduled maintenance shall occur frequently during the use season (three or four times per season). Trail condition and accessibility for persons with disabilities is a major concern. Significant repairs shall be completed within 10 working days. Trail is kept in good to very good condition.

Level 5 - A special high use trails with routine monitoring or management of visitor use.

(Minimum standards for Level 5) - Has a scheduled maintenance program. Trail condition and accessibility for persons with disabilities is a major concern. Trails are kept in excellent condition.

IMPLEMENTATION OF THE TMP

Successful implementation of the TMP depends on many factors. The TMP will be implemented by working cooperatively with regional and local governments, permittees, commercial operators, and private individuals. The Plan will follow applicable laws and BLM policies. This TMP offers guidance for the TMO process. TMO recommendations will be carried forward to other management planning processes and implemented over time. Monitoring the effectiveness and impacts of the TMP will be ongoing and changes to the Plan will reflect new information. Consistent application of the TMP is essential to its success.

TRANSPORTATION MANAGEMENT OBJECTIVES (TMO)

Transportation Management Objectives (TMOs) are a major component of the TMP. TMOs are created on all existing BLM controlled roads. Key items such as resource protection, private land access, road stability, erosion potential, recreation needs, and specific resource management objectives are examined through an interdisciplinary team approach to identify the needs and objectives of each road segment. The TMO recommends one or several management actions for each BLM controlled road within CSNM as determined by present and future road management needs. This process can be used to effectively identify the current/future use and constraints of each road.

As new information becomes available or after various land management activities occur within the CSNM, TMOs will be reassessed to ensure that the recommended management is in compliance with directives. The impacts from the transportation system will likely surface during analysis as an issue in terms of resource impacts and access needs for recreation, fire suppression, and other land management activities. Decisions regarding the management of the transportation system will likely be necessary to resolve issues identified by analysis.

The following are TMO definitions for the CSNM. See Plate 1 and Maps 30, 31, 32, and 33 for individual road TMO designations.

TMO 4_OPEN (BP-OP) - This is assigned to roads where management objectives require the road to be open all year (except maybe closed or have limited access due to snow conditions) and which connect major administrative features (recreation sites, local road systems administrative sites, etc.) to county, state, or federal roads. Typically these roads are single or double lane, aggregate, or bituminous surface, with a higher volume of commercial and recreational traffic than administrative traffic. Minimum standards are for the entire roadway to be maintained at least annually, although a preventive maintenance program may be established. Problems are repaired as discovered.

TMO 3_OPEN (BP-OP) - This is assigned to roads where management objectives require the road to be open year-round (except maybe closed or have limited access due to snow conditions) for commercial, recreation, and public access. Typically, these roads are aggregate surfaced, but may include low use bituminous surfaced roads. These roads have a defined cross section with drainage structures (e.g., rolling dips, culverts, or ditches). These roads may be negotiated by passenger cars traveling at prudent speeds. User comfort and convenience are not considered a high priority. Minimum standards are for drainage structures to be inspected at least annually and maintained as needed. Grading is conducted to provide a reasonable level of riding comfort at prudent speeds for the road conditions. Brushing is conducted as needed to improve sight distance. Slides adversely affecting drainage would receive high priority for removal, otherwise they will be removed on a scheduled basis.

TMO 3_SEASONAL (BP-SC) - This is assigned to roads where management objectives require the road to be open seasonally for commercial, recreation, and public access. Typically, these roads are natural or aggregate surfaced, but may include low use bituminous surfaced roads. These roads have a defined cross section with drainage structures (e.g., rolling dips, culverts, or ditches). These roads may be negotiated by passenger cars traveling at prudent speeds. User comfort and convenience are not considered a high priority. Minimum standards are for drainage structures to be inspected at least annually and maintained as needed. Grading is conducted to provide a reasonable level of riding comfort at prudent speeds for the road conditions. Brushing is conducted as needed to improve sight distance. Slides adversely affecting drainage would receive high priority for removal, otherwise they will be removed on a scheduled basis.

TMO 3_RESTRICTED (BA, BR-OP) or (BA-SC, ST) - This is assigned to roads where management objectives require the road to be open seasonally or year round for permittee, commercial, and administrative access. Typically, these roads are natural or aggregate surfaced, but may include low use bituminous surfaced roads. These roads have a defined cross section with drainage structures (e.g., rolling dips, culverts, or ditches). These roads may be negotiated by passenger cars traveling at prudent speeds. User comfort and convenience are not considered a high priority. Minimum standards are for drainage structures to be inspected at least annually and maintained as needed. Grading is conducted to provide a reasonable level of riding comfort at prudent speeds for the road conditions. Brushing is conducted as needed to improve sight distance. Slides adversely affecting drainage would receive high priority for removal, otherwise they will be removed on a scheduled basis.

TMO 3_RESTRICTED SEASONAL (BR-SC) - This is assigned to roads where management objectives require the road to be open seasonally for permittee, commercial, and administrative access. Typically, these roads are natural or aggregate surfaced, but may include low use bituminous surfaced roads. These roads have a defined cross section with drainage structures (e.g., rolling dips, culverts, or ditches). These roads may be negotiated by passenger cars traveling at prudent speeds. User comfort and convenience are not considered a high priority. Minimum standards are for drainage structures to be inspected at least annually and maintained as needed. Grading is conducted to provide a reasonable level of riding comfort at prudent speeds for the road conditions. Brushing is conducted as needed to improve sight distance. Slides adversely affecting drainage would receive high priority for removal, otherwise they will be removed on a scheduled basis.

TMO 2_OPEN (BP-OP) - This is assigned to roads where the management objectives require the road to be opened for limited commercial, recreation, and public access. Typically, these roads are passable by high clearance vehicles. Minimum standards are for drainage structures to be inspected within a 3-year period and maintained as needed. Grading is conducted as necessary to correct drainage problems. Brushing is conducted as needed to allow administrative access. Slides may be left in place provided they do not adversely affect drainage.

TMO 2_SEASONAL (BP-SC) - This is assigned to roads where the management objectives require the road to be opened seasonally for limited commercial, recreation, and public access. Typically, these roads are passable by high clearance vehicles. Minimum standards are for drainage structures to be inspected within a 3-year period and maintained as needed. Grading is conducted as necessary to correct drainage problems. Brushing is conducted as needed to allow administrative access. Slides may be left in place provided they do not adversely affect drainage.

TMO 2_RESTRICTED (BA, BR-OP) - This is assigned to roads where the management objectives require the road to be opened for permittee, commercial, and administrative access. Typically, these roads are passable by high clearance vehicles. Minimum standards are for drainage structures to be inspected within a 3-year period and maintained as needed. Grading is conducted as necessary to correct drainage problems. Brushing is conducted as needed to allow administrative access. Slides may be left in place provided they do not adversely affect drainage.

TMO 2_RESTRICTED SHORT TERM (BR-ST) - This is assigned to roads where the management objectives require the road to be closed seasonally except for permittee, commercial, and administrative access. Typically, these roads are passable by high clearance vehicles. Minimum standards are for drainage structures to be inspected within a 3-year period and maintained as needed. Grading is conducted as necessary to correct drainage problems. Brushing is conducted as needed to allow administrative access. Slides may be left in place provided they do not adversely affect drainage.

TMO 2_RESTRICTED SEASONAL (BR-SC) - This is assigned to roads where the management objectives require the road to be open seasonally for permittee, commercial, and administrative access. Typically, these roads are passable by high clearance vehicles. Minimum standards are for drainage structures to be inspected within a 3-year period and maintained as needed. Grading is conducted as necessary to correct drainage problems. Brushing is conducted as needed to allow administrative access. Slides may be left in place provided they do not adversely affect drainage.

TMO 2_TEMPORARY CLOSURE (BA-SC, ST) - This is assigned to roads where the management objectives require the road to be closed except commercial and administrative access. Typically, these roads are passable by high clearance vehicles. Minimum standards are for drainage structures to be inspected within a 3-year period and maintained as needed. Grading is conducted as necessary to correct drainage problems. Brushing is conducted as needed to allow administrative access. Slides may be left in place provided they do not adversely affect drainage.

TMO 1_PERMANENT CLOSURE (BA, BR-ST) - This level is assigned to roads where minimum maintenance is required to protect adjacent lands and resource values. These roads are no longer needed and are closed to traffic. The objective is to remove these roads from the transportation system. Minimum standards are to maintain drainage and runoff patterns as needed to protect adjacent lands. Grading, brushing, or slide removal is not performed unless roadbed drainage is being adversely affected, causing erosion. Closure and traffic restrictive devices are maintained.

TMO 1_DECOMMISSIONED (BA, BR, BP-DR, FD, OB) - This level is assigned to roads where no maintenance is required. These roads are no longer needed and are closed to traffic. The objective is to remove these roads from the transportation system. Closure and traffic restrictive devices are maintained.

IMPLEMENTATION of TMOs

The TMO process determines among other things road maintenance levels and recommended actions (i.e., road improvement or closure). These items will be utilized and prioritized in several BLM planning and budgetary processes and are the first steps in implementation of the TMO recommendations.

If needed, road maintenance levels would be revised based upon critical resource needs in order to adjust the work load to the available funding. Maintenance of road closure devices should also be incorporated into this step.

The recommended actions identified by TMOs are analyzed by management through the appropriate environmental assessment process at the time of project implementation, as required under the National Environmental Policy Act (NEPA). NEPA analysis incorporates interdisciplinary and public review of the proposed projects and alternatives before a final decision is approved. New road/trail construction will be analyzed through the NEPA process. New roads will also be assessed by the TMO process to ensure that they are properly incorporated into the transportation system.

MONITORING

The main objectives of monitoring are to determine whether management practices are being implemented and their effectiveness.

TMO Process - As TMOs are dynamic, periodic reviews of the information and recommendations are necessary. Changes in TMOs may occur to ensure that the recommended transportation management is in compliance with overall resource management direction.

Construction - Roads & Trails - Monitoring of construction is performed by BLM project inspectors. It is their responsibility to ensure compliance with contractual stipulations (including the design features) associated with contracts. If a problem arises due to adverse environmental impacts, the problem will be brought to the attention of the Contracting Officer and the resource specialist for resolution. Final inspection and reports will be completed to help determine if management objectives have been met.

Maintenance - Special inspections and maintenance will be conducted after large storm events to correct any problems that might occur; if safety permits, inspections may occur during storm events. On roads where the TMOs or minimum maintenance standards are not being met, efforts will be taken to re-prioritize maintenance work loads, reevaluate the maintenance level, or pursue means to obtain sufficient funding.

Roads - Monitoring the effectiveness of road maintenance will be performed by appropriate resource area specialists (i.e., engineers, hydrologists, soil scientists). Routine maintenance and inspections are conducted on the schedule prescribed by the assigned maintenance level or TMO. Agency personnel using the transportation system are responsible for reporting maintenance needs. Such reports are directed to the resource area engineering staff.

Trails - Monitoring trail use will help determine the appropriate BLM trail maintenance level. Condition surveys will be conducted according to the assigned maintenance level to determine the maintenance needs.

Road Closure - Roads that are closed and remain part of the road inventory will continue to be monitored as existing roads in accordance with their maintenance level. Roads that are removed from the road inventory will revert back to the appropriate land base allocation. Monitoring will be conducted to ensure that the decommissioning practices have been effective. Monitoring should be conducted by the appropriate disciplines.

Bridges/Major Culverts shall be inspected in accordance with BLM Manual 9112.

AUTHORITY

A number of federal laws and internal regulations give BLM the authority to develop and manage an integrated road and trail system:

The following laws and Executive Orders address transportation planning, operation, and maintenance:

FLPMA - Federal Land Policy and Management Act of 1976, Public Law 94-579, Sections 202 and 502. Provides for resource management rehabilitation, protection, improvement, planning, and administration on the basis of a sustained yield. It provides for the management of transportation systems on public lands in a manner that will protect the ecological, air, water, scientific, scenic, historical, and archaeological values, and Areas of Critical Environmental Concern (ACEC). It requires the preparation and maintenance of the inventory of public land resources, including the transportation system, on a continuing basis. It also provides for receiving fair market value for the use of the transportation system.

Title 23, U.S.C. (as amended by the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)) - Public Law 102-240. The ISTEA of 1991 requires State Transportation Agencies to develop a Statewide Transportation Plan, which includes transportation plans of Federal agencies. As part of the ISTEA implementation initiative, the Bureau is required to identify and include land management highways as part of its transportation plans.

Executive Order 12088, October 13, 1978, Federal Compliance with Pollution Control Standards. Requires that BLM ensure that all necessary actions are taken for prevention, control, and abatement of environmental pollution with respect to transportation facilities and activities.

Executive Order 11644, February 8, 1972, Use of Off-Road Vehicles on Public Lands
Executive Order 11989, May 24, 1977, Off-Road Vehicles on Public Lands. Requires that BLM provides procedures that will ensure that the use of off highway vehicles on public lands will be controlled and directed to protect the resources of those lands, to promote the safety of all users, and to minimize conflicts among the various users of those lands.

Executive Order 11514, March 5, 1970, Protection and Enhancement of Environmental Quality, as amended by Executive Order 11991, (Secs. 2(g) and 3(h), May 24, 1977). Requires BLM to provide leadership in protecting and enhancing the quality of the Nation's environment to sustain and enrich human life. Requires BLM transportation policies, plans, and programs to meet national environmental goals.

National Environment Policy Act (NEPA) of 1969. Requires the preparation of Environmental Impact Statements for any transportation project that may have significant affect on the environment. It requires systematic and interdisciplinary planning in making decisions about major BLM actions or proposals from the public that may have significant influence on the environment.

Clean Water Act as amended in 1987 and Clean Air Act of 1990 as amended. Requires BLM to protect air and water quality, maintain Federal and State designated water and air quality standards, and abide by the requirements of the state implementation plans.

The U.S. Code of Federal Regulations (CFR) contains traffic and engineering regulations that BLM must follow in the management and operation of Bureau roads. Through the CFR, the Managers have the authority to implement traffic rules and issue Federal Orders that close or restrict road and trail use.

- 43 CFR 2800 Rights-of-Way, Principles and Procedures
- 43 CFR 2810 Tram Roads and Logging Roads
- 43 CFR 3809 Surface Management
- 43 CFR 8340 Off-Road Vehicles
- 43 CFR 8350 Wild and Scenic Rivers and the National Trails System
- 43 CFR 8360 Visitor Services

POLICY

The TMP is based on the following policies and responsibilities taken from various BLM Manuals and documents:

- BLM Handbook H-2812-1 - Logging Road Rights-of-Way
- BLM Manual 9110 - Transportation Facilities, BLM Handbook H-9110-1- Transportation Planning, and BLM
- Handbook H-9110-2 - Land Management Highways
- BLM Manual 9112 - Bridges and Major Culverts
- BLM Manual 9113 - Roads
- BLM Manual 9114 - Trails and BLM Handbook 9114-1
- BLM Manual 8357 - ByWays and Handbook 8357-1
- BLM Manual 8342 - Designation of Areas and Trails (Off-Road Vehicles)

Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl, April 1994 (Northwest Forest Plan)

Standards and Guidelines for Management of Habitat for Late-Successional nd Old-Growth Forest Related Species within the Range of the Northern Spotted Owl, April 1994

Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl, February 1994

Decision Record for the Interim Strategies for Managing Anadromous Fish-Producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California

District's Fish & Wildlife 2000 Plan, A Strategy for the Management of Biological Resources

Approved District (includes Klamath Falls Resource Area) Resource Management Plans/ Record of Decision identify how the transportation system will be managed and operated.

District Manuals and Handbooks addressing transportation planning, operation, and maintenance for each District.

Western Oregon Road Fee Collection Pilot Project (October, 1992), I.M. OR-93-49 (December 17, 1992). Implemented procedures to improve tracking, monitoring, and verification of hauling of forest products over BLM roads, fee collection accountability, and collection of road use and maintenance fees.

Appendix DD - Oregon Gulch RNA Plan

Management Plan
for
Oregon Gulch Research Natural Area

Ashland Resource Area
Medford District
Bureau of Land Management
United States Department of the Interior

February 15, 2001

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I. INTRODUCTION

Research Natural Areas (RNAs) are part of a federal system of land tracts identified and designated to preserve and protect certain natural features for research and educational purposes. The overall goals for establishing RNAs are to provide:

1) baseline areas against which the effects of human activities can be measured;
2) sites for study of natural processes in an undisturbed ecosystem;
3) a gene pool for all types of organisms, especially rare and endangered species.

The interagency Pacific Northwest Research Natural Area Committee, composed of federal, state and private organizations in Oregon and Washington, has identified a set of natural elements, or "cells", representing terrestrial and aquatic habitats, plant communities, and ecosystem processes targeted for protection through the RNA system.

The 1,056 acre (427.4 ha) Oregon Gulch RNA is located in southeastern Jackson County, Oregon between Randcore Pass on the west and the former Box-O Ranch (BLM) at the east and is bound on the north by the ridge from the Pass to Rosebud Mountain and on the south by the ridge that separates Oregon Gulch from Agate Flat. Oregon Gulch enters Jenny Creek on the former Box-O Ranch.

The area was originally nominated by the Nature Conservancy in 1990, analyzed and evaluated by the RMP process in 1992 by the Ashland Resource Area, BLM, proposed as a new RNA in the Medford District Proposed Resource Management Plan / Environmental Impact Statement (USDI 1994b) and designated a new RNA under the Record of Decision and Resource Management Plan (USDI 1995a). One of the management actions required by ROD for Special Areas, including RNAs, is development of site-specific management plans. Research Natural Area Management Policy (Appendix R) requires development of a management plan that establishes operational objectives to maintain or enhance the unique values of the designated RNA. In addition to operational objectives, a monitoring strategy should be developed to evaluate progress made toward meeting resource management objectives. These requirements establish the basis for preparation of this draft management plan.

II. POLICY

The documents and policy of authority now guiding decisions for RNAs are in Appendix R of the CSNM Draft Resource Management Plan. Management objectives for RNAs, addressed in the Plan include directives to:

Preserve, protect, or restore native species composition and ecological processes of biological communities (including Oregon Natural Heritage Plan terrestrial or aquatic cells) in research natural areas. These areas will be available for short- or long-term scientific study, research, and education and will serve as a baseline against which human impacts on natural systems can be measured.

RNAs should ideally be undisturbed by human impacts, however, because pristine examples of significant ecosystems may not exist, the least altered sites should be selected. They should be sufficiently large to protect key features from significant impacts judged inappropriate for the area and natural processes should be allowed to dominate. In situations where human activities have interfered with natural processes, deliberate manipulations which simulate natural processes are allowed (USDI 1986b; Appendix R).

Research Natural Area Management Policy (USDI 1986b) requires development of a management plan establishing operational objectives to maintain or enhance the unique values of the RNA for each designated area. In addition to operational objectives, a monitoring strategy should be developed to evaluate progress made toward meeting resource management objectives. These requirements establish the basis for preparation of this draft management plan.

III. BASIS FOR DEDICATION AND SETTING OBJECTIVES

A. RNA History

The Nature Conservancy, under contract with the BLM State Office, nominated Oregon Gulch as an RNA 10 August 1990 (Schaaf 1990). The RNA filled Cell 7, a Rogue Valley mixed conifer forest (Douglas-fir probably dominant) and Cell 27, a Rogue Valley Manzanita-wedgeleaf ceanothus/bunchgrass chaparral as designated in the 1988 Oregon Natural Heritage Plan (Oregon Natural Heritage Advisory Council 1988). The Oregon Natural Heritage Plan (Oregon Natural Heritage Advisory Council 1998) now indicates that Oregon Gulch RNA fills Cell 18, Douglas-fir/ponderosa pine forest with a poison oak, hairy snowberry, or Piper Oregon grape understory and Cell 37 a white fir moderately dry site forest with baldhip rose, hairy snowberry, and star flower understory. They list Cell 53 (1988 Cell 27) Manzanita-wedgeleaf ceanothus/bunchgrass as unfilled.

The area was analyzed and evaluated by the RMP process in 1992 by the Ashland Resource Area, BLM, was proposed as a new RNA in the Medford District Proposed Resource Management Plan/Environmental Impact Statement (USDI 1994b) and designated as new RNA under the Record of Decision (ROD) and Resource Management Plan (USDI 1995a). One of the management actions required by the ROD for Special Areas, including RNAs, is development of site-specific management plans. Oregon Gulch RNA has been under interim management requirements since 11 August 1992.

The RNA is now a part of the Cascade-Siskiyou National Monument and is under the management guidelines in the Presidential Proclamation (Appendix A) and the CSNM RMP (see Management Restrictions, below).

B. Basis for Dedication

Oregon Gulch was nominated as an RNA because it represents two RNA cell needs for: a mixed conifer forest dominated by Douglas-fir and ponderosa pine with large scattered sugar pine and incense cedar also prominent in the over-story and a manzanita-wedgeleaf ceanothus/bunchgrass chaparral at the eastern boundary of the Klamath River Ridges of the Klamath Mountains Ecoregion. The area was selected for its natural values and its accessability. It also includes several rare species: Greene's mariposa lily (*Calochortus greenei*), Howell false-caraway (*Perideridia howellii*), and Bellinger meadow-foam (*Limnanthes bellingeriana*).

C. Management Restrictions

The CSNM Resource Management Plan withdraws lands within the Monument from mineral location, entry, and patent and mineral and geothermal leasing; prohibits commercial harvest of timber or other vegetative material except for science-based restoration purposes aimed at meeting the protection and enhancement of old-growth objectives; prohibits unauthorized OHV use of designated roads. The Plan permits continued livestock grazing at current levels within the Monument until completion of a study of grazing impacts on natural ecosystem dynamics.

IV. NATURAL AREA DESCRIPTION

A. Oregon Gulch Area Description

1. Location

The 1,056 acre Oregon Gulch RNA is located in southeastern Jackson County, Oregon (T.40S.,R.04E., Secs.29, 30 NE1/4NE1/4, 19 S1/2, 20 S1/2SE1/4, 32 N1/2N1/2) along the slopes and bottom of Oregon Gulch in the Jenny Creek Watershed, a part of the Klamath River Basin (map 2) in the eastern portion of the Cascade-Siskiyou National Monument. The RNA begins at Randcore Pass and extends southeast to what was formerly designated as the Box-O Ranch. It is located in the eastern portion of the Cascade-Siskiyou National Monument. The RNA is approximately 18 air miles southeast of Ashland, Oregon.

2. Access

Two public points of entry to Oregon Gulch RNA are:

1) by vehicle from the northwest via Oregon Route 66 to BLM Mill Creek Road 40-3E-12.0 to the Lincoln Creek Road 40-3E-12.1 to Randcore Pass; and

2) by foot from the southeast from the Box-O Ranch via Route 66, the Copco Rd and a short unnamed road to the west at Mile 5.2 (see Plate 1).

The Box-O entry requires fording Jenny Creek. Public vehicle access is possible only via the Mill Creek Road and Randcore Pass. Access is seasonal due to snow depth at Randcore Pass and water depth at Jenny Creek. Roads are surfaced and maintained to Randcore Pass as is the private Copco Road to the Box-O turn-off. The roads down to the former Box-O Ranch and below Randcore Pass and within the RNA are unsurfaced and closed to unauthorized or public vehicle use.

3. Ecoregions

Ecoregions are defined by a number of factors that include physiography (including elevation and local relief), geology (surficial material and bedrock), soil (order, common soil series, temperature and moisture regimes), climate (mean annual precipitation, mean annual frost free days, mean January and July min/max temperature), potential natural vegetation, and land use (recreation, forestry, watershed) and land cover (present vegetation).

Oregon Gulch RNA lies at the east end of the Klamath River Ridges Ecoregion at its confluence with the Southern Cascade Slopes Ecoregion. Because environmental variation, particularly where ecoregions meet, generalized descriptive statements do not always apply. An area such as Oregon Gulch RNA some of the elements of adjacent ecoregions apply. The following synopsis of the ecoregions associated with Oregon Gulch RNA is based on Pater (1997a, 1997b).

78g Klamath River Ridges. (3800-7000 ft) The Klamath River Ridges Ecoregion has a dry continental climate and receives on average, 25 to 35 inches of annual precipitation. Low elevation and south-facing slopes have a more drought resistant vegetation than elsewhere in the Klamath Ecoregion (78) such as juniper, chaparral, and ponderosa pine. Higher and north-facing ridges are covered by Douglas-fir (*Pseudotsuga menziesii*), and white fir (*Abies concolor*). Shasta red fir (*Abies procera var. shastensis*) is found at higher elevations to the west. Ecoregion 78g has less precipitation, more sunny days, and greater number of cold clear nights than the Inland Siskiyou Ecoregion (78e) to the west.

9i Southern Cascade Slope. (3600-6300 ft) The Southern Cascade Slope ecoregion is a transitional zone between the Cascades (4) and the drier Eastern Cascade Slopes and Foothills (9). Forests of ponderosa pine blanket the mountainous landscape; white fir (*Abies concolor*), and Douglas-fir (*Pseudotsuga menziesii*) grow at higher elevations. Shasta red fir (*Abies procera var. shastensis*) is absent from the Oregon Gulch RNA. Much of Ecoregion 9i typically receives more precipitation than other Level IV Eastern Cascade Slopes and Foothills Ecoregions.

4. Climate

No climatic data has been collected at Oregon Gulch RNA. The RNA lies within the influence of the continental climate of the Great Basin and the more moderate, wetter, oceanic influences of to the west. Summers are usually long and dry (most of the precipitation falls between November and March), with occasional wet or dry thunderstorms. Winters are probably drier and colder than areas to the west because of the Great Basin influence. Based on isohyetal maps (map 11) average annual precipitation probably varies from 25 inches at higher elevations to 20 inches at Jenny Creek. Precipitation during the winter months occurs as rain or snow. The transient snow zone lies between 3,000 to 4200 feet elevation (USDI 1995b). The closest National Oceanic and Atmospheric Administration (NOAA) weather station with air temperature is found at Howard Prairie Dam (elevation 4,568 ft.) which is approximately 10 miles north of the RNA. Average monthly maximum, minimum, and mean air temperatures for the Howard Prairie Dam NOAA weather station are shown in Table ADD-1.

Table ADD-1. Ave. Monthly Max, Min, and Mean Air Temperatures at Howard Prairie Dam

	Air Temperature (°F)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Max	37.5	42.4	45.9	52.2	61.0	70.2	78.6	78.4	71.6	60.7	43.7	36.5	56.5
Min	18.9	21.1	23.8	27.5	33.1	40.0	43.6	43.2	37.7	32.3	26.7	21.1	30.7
Mean	28.2	31.8	34.8	39.8	47.1	55.1	61.1	60.8	54.7	46.5	35.2	28.8	43.6

Source: NOAA Station (1961-1990) , Oregon Climate Service 2000

5. Topography

The northwest/southeast valley formed by Oregon Gulch lies between between Keene Creek Ridge to the south and the divide between the Oregon Gulch/Rosebud Mountain Ridge and Keene Creek to the north. The valley bottom is at 4,400 feet elevation at Randcore Pass and 3,240 ft. elevation at the eastern boundary. Elevations along the north ridge line are from 4,466 ft. elevation northeast of Randcore Pass to 4,386 ft. at Rosebud Mountain. Elevations along Keene Creek Ridge to the south range from 4,119 ft. elev. to 4,200 ft. elev. The lower elevations are characterized open rocky exposures and bench grasslands interspersed with oak/conifer forests. Special topographic features include steep rocky bluffs below Rosebud Helipond; flat, grassy benches with decreased drainage between forested areas on the slopes south-facing slopes; and exposed, bare scabland hummocks.

6.Geology

Oregon Gulch RNA is made up of Miocene and Oligocene Western Cascade volcanic, pyroclastic, volcanoclastic, and sedimentary rocks (Smith and others, 1982) (Map6). Oregon Gulch is on the south edge of a fairly complex geological island surrounded by vast areas mapped as Western Cascade Oligocene basalt, basaltic andesite, and andesite

(Tb2) on the west and southwest and Pliocene and Upper Miocene basaltic andesite flows (Tba) of the High Cascades Range to the east.

The Western Cascade Oligocene flows are interbedded with volcanic breccias, pyroclastic deposits and other rock types too thin, discontinuous, or poorly exposed to map separately (Smith and others 1985). The Pliocene and Upper Miocene basaltic andesite flow (Tba) commonly is a fine-grained , high-alumina olivine. Except for a few small exposures, Oregon Gulch is separated from the larger, canyon filling flow by Jenny Creek

Four mapped formations are found in Oregon Gulch RNA. With the exception of a slender northeast trending exposure Oligocene intermediate and silicic ash-flow tuff (Ti2, Unit 2) the south half of T.40S.,R.04E.,Sec.29 is Western Cascade Oligocene basalt, basaltic andesite, and andesite (Tb2). To the north, the RNA is mapped as coarse grained Miocene pyroclastic, volcaniclastic, and sedimentary rocks (Tc4). Between the two units is an east-west band of Miocene and Oligocene salicic ash-flow tuff (Ti3, Unit 3). The different rock types in these formations are not mapped because of the scale of the map and the complexity of the formations.

7. Soils

Soil information (map 48) for Oregon Gulch RNA is based on Soil Survey of Jackson County Area, Oregon (USDA 1993). There are twelve mapped general soil units in the RNA. Because of the small scale of the map and the large area covered, mapped units are often presented as complexes of different soil types. Number of acres, percent of RNA, productivity class and site index (if any) of the soil types found in the RNA are summarized in Table ADD-2. About 60 percent of the RNA consist of rock outcrop soil complexes. The balance (40 percent) is soil types capable of supporting mixed conifer stands.

Table ADD-2. Oregon Gulch RNA Soil Units (USDA 1993)

Unit #	Unit Name	Percent Slope	Acres	Percent Acres	Productivity Class *	Site Index **
19E	Bybee-Tatouche complex	12 to 35	6	0.58	PSME*** 8, 8	85, 90
113 E	McMullin-Rock outcrop complex	3 to 35	78	7.48	-	-
113 G	McMullin-Rock outcrop complex	35 to 60	46	4.4 1	-	-
114 E	McNull loam, south slopes	12 to 35	310	29.72	PSME 7	80
115 E	McNull gravelly loam, south slopes	12 to 35	9	0.86	PSME 6	70
116 E	McNull-McMullin gravelly loam, south slopes	12 to 35	48	4.60	PSME 6	70
116 G	McNull-McMullin gravelly loam, south slopes	35 to 60	17	1.63	PSME 6	70
117 G	McNull-McMullin complex, north slopes	35 to 60	13	1.25	PSME 7	80
119F	McNull-Medco complex	1 to 12	9	.86	PSME 7	70, 65
170 C	Skookum very cobbly loam	1 - 20	2	.19	-	-
173 D	Skookum-Rock outcrop-McMullin complex,	1 to 20	40	3.84	-	-
173F	Skookum-Rock outcrop-McMullin complex	20 to 50	465	44.58	-	-

*Site Index. Height and age of selected trees in stands of a given species. A designation of the quality of a forest site based on the height of the dominate stand at an arbitrarily chosen age. Average height at 50 yrs = 75 feet. SI is 75. Age varies with species and soil type: 100 yrs. PSME on Pokegama and Woodcock units, PIPO all units; 50 yrs. PSME on all other units, ABMASH, and ABCO. ** Productivity Class. Yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands. ***PSME = *Pseudotsuga menziesii*, Douglas-fir.

8. Hydrology

The Oregon Gulch RNA lies within the 2,000 acre Oregon Gulch drainage area and comprises 52 percent of the drainage area. Oregon Gulch flows from its headwaters in the wetlands at Randcore Pass just outside the established RNA boundary, in a southeasterly direction for approximately 2.7 miles until it joins Jenny Creek on the former Box-O Ranch. Water is contributed to the stream from springs and seeps along its course. There are two unnamed springs marked on the USGS 7.5 Soda Mountain Quad. and one on the Parker Mountain Quad, below Rosebud Mountain (42.03.58W, 122.22.25N). Of the two springs on the Soda Mountain Quad, one (42.04.09N, 122.23.53W) is just outside the RNA boundary to the southwest. The other spring (42.03.57N, 122.22.36W) is just below the Rosebud Helipond. Rosebud Spring just north of the Rosebud Helipond on the south-facing slopes of the Oregon Gulch / Keene Creek ridge is not shown on the USGS maps. Miller (1999) observed three springs in the RNA (one shown on the USGS quad and two others) that maintained flowing water throughout the summer.Oregon Gulch is an intermittent stream that dries up as early as mid May or not until July, but typically by the second week of June, depending on the distribution and amount of rain in any given year. Parker (1999) and Miller (1999) both reported small pools of water in Oregon Gulch in the summer of 1999. Oregon Gulch passes through several reaches of narrow, steep-walled rocky canyons (Miller 1999). The bedrock substrate allows pools to form and remain filled after reaches upstream and downstream of the canyon sections have dried up. The narrow canyon and dense riparian vegetation protect the pools from evaporation. Oregon Gulch is classified as a Rosgen type A stream (Rosgen 1996) through the RNA. This section of the stream is entrenched and confined.

The lower reach of Oregon Gulch flows through an alluvial fan into Jenny Creek. The channel in this reach is deeply entrenched (Rosgen type G), with evidence of stream straightening and bank riprap. Remnant riparian vegetation is very sparse. Aerial photos from 1939 and the early 1960s show substantially more large riparian vegetation, with little evidence of channel entrenchment. Aerial photos for 1966 show evidence of channel change from the 1964 flood, including new deposits of gravel and reductions in vegetation (USDI 2000a).

There is little data concerning streamflows and water quality for Oregon Gulch. Water temperature data were collected in late June and early July, 1998 (an unusually high water year) at two sites in Oregon Gulch, at the former Box-O Ranch/RNA border (17 days) and downstream near the Jenny Creek confluence (14 days). The number of days at each site reflects the number of days that the temperature recorders operated prior to the stream drying up. At the former Box-O Ranch west boundary site the 7-day average daily temperature was 76.81 F (max 80.11 F - min 58.21 F). At the Jenny Creek site the 7-day average daily temperature was 76.01 F (max 77.91 F - min 52.81 F).

The Jenny Creek Watershed Assessment and Analysis (USDI 1995b) states that poor road location has created major problems for Oregon Gulch, however, no specific concerns are identified. Road restoration work occurred on the Rosebud road (40-3E-19.0, 19.1) in 1999 on BLM lands, stabilizing this portion of the road. The eastern portion of the 40-3EE-19.1 road toward the Rosebud helipond is on private lands and sediment from this road could be a concern for Oregon Gulch and its tributaries.

9. Vegetation

Miller (1999) recognized five major plant communities in her mid-summer vegetation reconnaissance of Oregon Gulch RNA:

- Oregon white oak/Wedgeleaf ceanothus grass or scrubland
- Western Juniper/Oregon white oak scrubland
- Oregon white oak/Ponderosa Pine forest
- Mixed Conifer/California Black Oak forest
- Riparian

Riparian species were found along Oregon Gulch and some of the tributaries. Miller did not describe the manzanita-wedgeleaf ceanothus /bunchgrass chaparral community described in the nomination document (USDI 1989c); the occurrence of this community type was an error in the original RNA nomination. Manzanita communities are not documented to occur in the RNA.

Oregon white oak/Wedgeleaf ceanothus grass or scrubland

The balance between Oregon white oak and wedgeleaf ceanothus cover varies widely in this community in a mosaic that includes relatively flat wet meadows. Miller (1999) found the community covered wide stretches of land following a more or less homogenous slope and aspect. Oregon white oak frequently formed a dense canopy with few other tree species, although occasional ponderosa pine, western juniper, California black oak, and Douglas-fir are scattered in the community. The percent cover of shrubs is usually greater than the tree coverage. The shrub layer often consists of Oregon white oak sprouted from the base of older trees although wedgeleaf ceanothus usually dominates. Other shrubs, serviceberry (*Amelanchier alnifolia*), mountain mahogany (*Cercocarpus betuloides*), and hazelnut (*Corylus cornuta var. californica*) are common. Grasses include the nearly ubiquitous bulbous bluegrass (*Poa bulbosa)* and medusahead (*Taeniatherum caput-medusae*) and natives such as, Idaho, western and California fescue (*Festuca idahoensis, F. occidentalis, F. californica*, respectively), and California oatgrass (*Danthonia californica*). Forbs vary from relative xeric species associated with the oaks and wedgeleaf ceanothus like balsam-root, *Balsamorhiza deltoidea*; wooly sunflower, *Eriophyllum lanatum*; *Lomatium macrocarpum* to seasonally wet meadow species (heal-all, *Prunella vulgaris;* death camas, *Zigadenus venenosus*).

Western Juniper/Oregon white oak scrubland

This community is found on the driest sites. Western juniper is the dominate tree with a few ponderosa pine and Oregon white oak. Tree coverage is less than 10 percent. Shrub cover varies between 15 to 60 percent with considerable bare rock. Rabbitbrush (*Chrysothamnus nauseous*) is the most significant shrub, although wedgeleaf ceanothus (*Ceanothus nauseous*) may dominate in some areas. The herbaceous layer is sparse, dominated by annual grasses [medusa-head rye, (*Taeniatherum caput-medusa*); nodding brome, (*Bromus tectorum*)] and the perennial alien grass, bulbous bluegrass (*Poa bulbosa*). Forbs include scattered wild buckwheats (*Eriogonum spp.*) and biscuitroots (*Lomatium spp.*).

Oregon white oak/Ponderosa Pine forest

This community consists primarily of Oregon white oak with greater diversity of conifers, particularly ponderosa pine than the tree composition in the Oregon white oak / wedgeleaf ceanothus community. Other common conifers include Douglas-fir, incense cedar, and sugar pine. Shrubs include wedgeleaf ceanothus, tall Oregon-grape (*Berberis aquifolium*), mountain mahogany (*Cercocarpus betuloides*), snowberry (*Symphoricarpos mollis*) and serviceberry (*Amelanchier alnifolia*). Grasses include aliens; bulbous bluegrass (*Poa bulbosa*), medusa-head rye (*Taeniatherum caput-medusae*), and hedgehog dogtail (*Cynosurus echinatus*); and natives; Idaho fescue (*Festuca idahoensis*), California oatgrass (*Danthonia californica*). Forbs include larkspur (*Delphinium menziesii*), strawberry (*Fragaria vesca*), arnica (*Arnica latifolia*), sweet-cicely (*Osmorhiza chilensis*), and yarrow (*Achillea millefolium*).

Mixed Conifer/California Black Oak Forest

Conifers dominate that tree layer in this community. They include Douglas-fir, ponderosa pine, incense cedar, and sugar pine. There is very little white fir. Both oaks are also present. Oregon white oak is present around the margins and in openings. California black oak is found among the conifers but is overtopped by them. The large, old, decadent California black oaks appear to be remnants of a different looking, much more open community. Shrubs include snowberry (*Symphoricarpos albus*), tall Oregon-grape (*Berberis aquifolium*), serviceberry (*Amelanchier alnifolia*), mountain mahogany (*Cercocarpus betuloides*), oceanspray (*Holodiscus discolor*), little woodrose (*Rosa gymnocarpa*), and deerbrush (*Ceanothus intergerrimus*). There are few grasses in the forested areas except for patches of bulbous bluegrass (*Poa bulbosa*), and California fescue (*Festuca californica*). Medusa-head rye (*Taeniatherum caput-medusae*), hedgehog dogtail (*Cynosurus echinatus*), Idaho fescue (*Festuca idahoensis*), and California oatgrass (*Danthonia californica*) occur in or near openings. Forbs include pathfinder plant (*Adenocaulon bicolor*), strawberry (*Fragaria vesca*), arnica (*Arnica latifolia*), sweet-cicely (*Osmorhiza chilensis*), rattlesnake orchid (*Goodyear oblongifolia*) and Scouler harebell (*Campanula scouleri*).

Riparian

Riparian vegetation is confined to Oregon Gulch, its sometimes steep narrow canyon and tributaries. Riparian herbaceous vegetation is found around some of the seeps and springs. Trees are Oregon ash (*Fraxinus latifolia*), willows (*Salix spp.*), and Douglas hawthorn (*Crataegus douglasii*). Shrubs include chokecherry (*Prunus virginiana*), Douglas spiraea (*Spiraea douglasii*) and deerbrush (*Ceanothus intergerrimus*) stands on shady banks near the stream. There are a number of herbaceous species: horsetail (*Equisetum arvense*), sedges (Carex spp.), cattail (*Typha latifolia*), and yellow monkeyflower (*Mimulus guttatus*). The rare species Howell's false-caraway (*Perideridia howellii*), and Bellinger meadowfoam (*Limnanthes floccosa ssp. bellingeriana*) occur in the riparian zone. Howell's false caraway is fairly common, however, Bellinger's meadow for is only known for a single site.

10. Alien plants

With the exception of grasses such as bulbous bluegrass (*Poa bulbosa*), medusa-head rye (*Taeniatherum caput-medusae*), hedgehog dogtail (*Cynosurus echinatus*), and Downy brome (i.e. cheatgrass, *Bromus tectorum*) the RNA is relatively free of invasive noxious weeds. Miller (1999) found yellow alyssum (*Alyssum alyssoides*), bull thistle (*Cirsium vulgare*), and dyers woad (*Isatis tinctoria*) in the RNA. She apparently did not find starthistle (*Centaurea solstitialis*). Yellow starthistle is in close proximity to the RNA, mostly along existing roads and in open grassland/scrubland habitats. Medusa-head rye is the most widespread alien plant in the RNA.

11. Special status plants

Three Bureau special status plant species that are endemic to southwest Oregon and adjacent northern California are known in the RNA: Bellinger's meadowfoam (*Limnanthes floccosa ssp. bellingeriana*), Greene's Mariposa lily (*Calochortus greenei*) and Howell's false-caraway (*Perideridia howellii*). No formal surveys for rare plants have occurred within the RNA; habitat exists for other rare plant species like Genter's fritillary (*Fritillaria gentneri*).

Bellinger's meadowfoam is found along a vernal tributary stream at a single location in the RNA. There are other populations of this endemic riparian species in the surrounding monument, to the east in Klamath county, and south into Siskiyou county in northern California. Greene's Mariposa lily grows in open Oregon white oak thickets in deep high clay content soils south of Oregon Gulch creek and into the former Box-O Ranch, at several other sites within the Cascade-Siskiyou National Monument, and immediately south into extreme northern California. These are the only known sites for this endemic species in the world. Howell's false-caraway is most common in and along the upper reaches of Oregon Gulch, and is known from Scotch Creek RNA, as well as several other drainages in southwest Oregon and northern California.

According to the Oregon Natural Heritage Program database, Bellinger's meadowfoam and Green's mariposa lily are Federal Species of Concern (i.e. old candidates for federal listing) and have an ONHP status of Category 1 (rare and imperiled in the State). Green's mariposa lily has a Natural Heritage system global rank of G2, which means this species is globally imperiled and vulnerable to extinction. Howell's false-caraway has an ONHP status of Category 4. While this endemic is rare, it has apparently stable populations across its range.

It is Bureau policy to protect, manage, and conserve Special Status Species and their habitats on lands administered by the BLM in such away that any bureau action will not contribute to the need to federally list these species.

12. Forest Health

The mixed conifer forest stands in Oregon Gulch RNA have a large mature sugar pine component that was previously open grown. Douglas-fir, incense cedar and ponderosa pine are found as well. Average age of these mature trees is estimated to exceed 250 years. Much of the stand is composed of younger co-dominant and suppressed Douglas-fir that originated after the last fire event approximately 100 years ago. A few white fir are also found in the understory. The Douglas-fir is currently overstocked and competing directly with the sugar pine and other dominant tree species for water and nutrients. Sugar pine are being attacked by mountain pine beetle (*Dendroctonus ponderosae*) and red turpentine beetle (*Dendroctonus valens*) due to dense stand conditions and low vigor. Average decadal growth rates for sugar pine in these stands is well below the 1.5 inch diameter growth needed to maintain tree vigor at a level considered necessary to pitch out bark beetles. The stand is currently carrying over 220 square feet of basal area which is well above the 150 feet level preferred for pine. The rate of sugar pine mortality has increased in the area during the last ten years. Most of the mortality occurred in 1995 during a localized mountain pine beetle outbreak.

13. Animals

There are no large-scale vertebrate surveys for Oregon Gulch RNA. However, there are lists for the general area that indicate species that might be expected in the RNA [see for all terrestrial vertebrates Nelson (1997) for Soda Mountain Area and Appendix 10 (USDI 1995b) for the Jenny Creek Watershed; St. John (1984) for herps and reptiles, and Trail (1999) for birds]. Other workers have inventoried the RNA for breeding birds (Alexander 1999), aquatic organisms (Parker 1999) and butterflies (Runquist 1999).

Mollusks

Parker (1999) found the gastropod Stagnicola (*Lymnaeidae*) in the main channel and the Rosebud tributary and in the upstream meadow. Physella (*Physidea*) was present in sunlit stream pools in the lower reaches of Oregon Gulch. The springs in the RNA apparently do not support populations of pebblesnails.

Insects

Runquist (1999) collected 43 species of butterflies (Appendix Q) in the RNA the summer of 1999. The relatively high species count is a direct reflection of the ecological diversity of the RNA and the number and kind of plant communities upon which the butterflies rely for larval host plants and adult nectar sources. The wet meadow just to the south-east of Randcore Pass adds another seven species for a total of 50. Runquist noticed the sudden disappearance of several butterfly species in mid-July that correlated with the appearance of cattle in the wet meadow at the upper end of the RNA below the Randcore Pass road just outside the RNA boundary. He attributed this to trampling of vegetation and cattle consuming flowers that had been used by butterflies.

Parker (1999) sampled aquatic insects in Oregon Gulch. Those found were generally those that can survive warm water, are common in pool environments, or are adapted to survive summer drought. This is unsurprising, given Oregon Gulch's low summer flows and warm water temperatures (see Hydrology section).

Amphibians

Parker (1999) observed Pacific treefrog (Pseudacris regilla) and rough-skinned newts (*Taricha granulosa*) in the headwater meadow and among pools along Oregon Gulch. Rough skinned newts have also been seen in the stock-pond / pump chance near the decommissioned road along the north facing slopes of the RNA toward the former Box-O Ranch. The treefrog tadpoles and metamorphic juveniles were observed in the isolated pools. It was the only breeding population of either species observed in the survey area that did not occur in artificial impoundments.

Fish

BLM electrofishing and visual surveys in Oregon Gulch have found many trout fry in approximately the first mile of stream (USDI 1999c), only the last few hundred meters of which is within the Oregon Gulch RNA. A bedrock falls just within the RNA boundary appears to be a fish barrier. No fish have been observed above it (USDI 1999c; Parker 1999). Jenny Creek suckers (*Catostomus rimiculus*) have never been observed in Oregon Gulch.

The fry in the lower mile of Oregon Gulch, presumably redband trout (*Oncorhynchus mykiss ssp.*), are usually present in May and June. By July, the stream is often dry at the mouth. Some fry probably migrate into mainstem Jenny Creek; others are trapped in pools where chances of predation by raccoons or birds is high. Water temperatures in the lower mile of Oregon Gulch have been measured to be 85 degrees F, extremely high for fish survival (Bjornn and Reiser 1991). These temperatures may decrease fry survival in Oregon Gulch.

Birds

Alexander (1999) conducted a breeding bird survey of the RNA in June 1999. Seventeen monitoring stations were established and sixteen were visited twice. A total of forty-two species were encountered. Thirteen species are conservation focal species for Oregon and/or California.

The area has been surveyed for Great Gray Owls and Spotted Owls. Great Gray owls were not seen during surveys in the RNA. Northern Spotted Owls are known to nest in the RNA. Timbered portions of the RNA have been mapped as roosting and foraging habitat using modified McKelvie Spotted Owl habitat criteria.

Small game species in the general area include Ruffed grouse (*Boudosa umbellus*), Blue Grouse (*Dendragapus obscurus*), Wild Turkey (*Meleagris gallopavo*), Mountain Quail (*Oreortyx pictus*), and Valley Quail (*Callipepla californicus*).

Mammals

The Black bear (*Ursus americanus*), Cougar (*Felis concolor*) and Black-tailed deer (*Odocoileus hemionus columbianus*) are known to occur within the RNA. Elk also use the RNA seasonally. Small game species in the general area include Western Grey Squirrel (*Sciurus griseus*).

14. Alien Animals

Several alien animals are known or suspected to be present in the RNA. These include birds, pigs, and cattle. Opossum (*Didelphis marsupialis*) have not been observed within the RNA, however they are present in the low elevation valleys in the Rogue and Klamath river basins.

Birds

Turkeys (*Meleagris gallopavo*) have been observed on the former Box-O ranch and in the vicinity of Hobart Bluff. It is likely that they are also found in the RNA because of the oak communities. The native animals affected or displaced by these birds are unknown but likely include mast eaters such as western gray squirrels, black-tail deer, acorn woodpeckers.

Starlings (*Sturnus vulgaris*) are also suspected in the area. These birds compete with native species, especially western blue birds (Sialia mexicana) for cavity nesting sites.

Pigs

The Randcore pot-bellied pig (i.e. *Sus "ventricosus Randcorensis"*) was observed and photographed along the Rosebud Helipond road in the fall of 1997. It is assumed that the female pig was pet that escaped from a hunting camp at Randcore Pass or from a ranch near Lincoln (a pig jaw was collected near the Pinehurst Airport). The establishment of feral pigs could have a major adverse ecological impact on local terrestrial ecosystems. There have been no observations of feral pigs since 1997 in or near the RNA.

Cattle

Livestock grazing currently occurs within the RNA. According to BLM RNA policy (BLM Manual 1623.37C), this activity should be managed within RNAs to promote maintenance of the key characteristics for which the area is recognized. Oregon Gulch RNA is also known as Oregon Gulch Pasture and is a part of the Ashland Resource Area grazing plan. As previously noted, cattle may impact butterfly populations in the wet meadow that supplies water to Oregon Gulch (Runquist 1999). There have been no studies in Oregon Gulch RNA to monitor or establish the effect of grazing on the watershed, the ecosystem, or the sensitive plants.

15. Site history

Native Americans who may have visited the Oregon Gulch area and utilized its resources include the Klamath, the Shasta, and the Takelma. All of these Native American groups came to this area during the warmer months of the year to hunt, gather vegetable foods, trade, and to meet with each other for various social purposes (USDI 1999a p.26).

Jenny Creek lies to the east of the RNA. Jenny Creek, a major perennial stream, contained riverine resources and adjacent environments that were conducive to hunting and gathering. Agate Flat which is located south of the RNA, was a major source of toolstone material (cryptocrystalline silicates or CCS). Good quality material occurs in great quantities and is exposed on the surface where it could be easily gathered and utilized.

There were numerous resources upon which these native peoples depended. Roots and bulbs, such as camas (*Camassia*) and various forms of *Perideridia* (e.g. *ipos, yampa*) provided starchy staples as did acorns from oak trees. Fish, deer, elk, and small mammals provided staple proteins, augmented by a wide variety of berries, nuts, seeds (e.g. tarweed seeds, *Madia spp.*). Other plants and animals were used for fiber, tools clothing, and medicines.

Fire probably was the most significant tool used by native peoples to enhance those resources useful to them. Fire assisted in promoting, maintaining, and harvesting staple crops, such as acorns and tarweed, and maintained open meadows and prairies, which were crucial locations for subsistence resources including game, roots, bulbs, berry patches, and grass seeds. Fire also promoted habitat important to large game. Burning took place during the spring or fall and at specific intervals, and contributed to the development and maintenance of prairies and savannahs, oak and oak/pine woodlands, and upland meadows.

Settlement of southern Oregon by Euro-Americans increased substantially after gold was discovered in Jacksonville in 1852. Newcomers settled throughout the Rogue Valley, utilizing open savannas and grasslands for agriculture and livestock ranching. Conflicts over land between miners and settlers and Native Americans culminated in removal of the remaining Native Americans. The Klamath Indians were confined to the Klamath Reservation east of the Cascades. Some Shasta families however, managed to remain in the Shasta Valley and along the Klamath River, or escaped from the northern reservations to find their way home.

Settlers in the Rogue Valley began seeking summer pastures in these uplands by the 1860s. Livestock grazing was the major use of these uplands for much of the last half of the nineteenth century. Both cattle and sheep ranged through these upland pastures. The latter decades of the nineteenth century witnessed uncontrolled expansion of sheep and cattle grazing, provoking continual "bickerings and wranglings" among rival grazers for the best range. Creation of the Forest Reserves in 1893 and later the Forest Service in 1907 brought some order to the range.

Like the Native Americans before them, these local ranchers and settlers often set fire to large areas to promote the growth of berries, browse for game, and forage for their stock. Sometimes these fires swept through the areas of heavy timber; it seems the fire management of historic settlers was less discriminate than the practices of their Native American predecessors.

George Wright, long time area resident, typed up his recollections in 1954 and mentioned the Oregon Gulch area on several occasions. This anecdotal history contains important information regarding place names, and the early history of the area. This information is in attached at the end of this document and can be found in Appendix C of the CSNM Plan.

16. Human Features

Features in the RNA were built for commodity extraction and enhancement, fire control, transportation, and administrative purposes. These include roads, fire control, and livestock facilities.

Transportation

Road density is about 1.9 miles per square mile. Although road density is not high, poor road location has created major problems for Oregon Gulch (USDI 1995b). There are currently three roads in the RNA: BLM Road 40-3E-19 and 19.1, Lincoln Creek Road 40-3E-12.1. BLM Roads provide access to private land in T.40S.,R.4E., Sections 20 and 30.

BLM Roads 40-3E-19 and 19.1 leave Lincoln Creek Road 40-3E-12.1 just top the south of Randcore Pass. -19.0 leads to private and BLM lands in the Keene Creek drainage. -19.1 leads to the Rosebud Helipond. Both roads are natural, unsurfaced, badly rutted, and become extremely slick when wet.

Lincoln Creek Road 40-3E-12.1 extends beyond Randcore Pass through the southwest corners of the RNA where it enters private land at the SW corner of the NE1/4 of the NE1/4, T.40S.,R.4E., Sec.30. The road continued to Agate Flat until 1996 when a section through BLM land at T.40S.,R.4E., Sec.30, W1/2SE1/4 was decommissioned, effectively ending the road. From Randcore Pass to private land the road is rocked. On private land it is a natural (unsurfaced) road. It also leads to the decommissioned Road 40-4E-30 and offers access to the RNA in T.40S.,R.4E., Sec. 29.

BLM Road 40-4E-30 along the north-facing south slopes of the RNA was effectively decommissioned in 1996 and is blocked by barricades at the east RNA boundary and by a locked gate at the former Box-O ranch boundary to the east. The lower portion of the road was not decommissioned to reduce the possibility of the spread of noxious weeds.

Water Developments

There are four small, operational, livestock watering facilities with water rights in the RNA (Table ADD-3). The BLM also retains water rights on several springs within the RNA.

Table ADD-3. RNA Water Developments with Water Rights

Name	Township	Range	Section	QtrQtr	Size (acre-feet)
Oregon Gulch Reservoir #1	40 S.	4 E.	29	NWSE	0.08
Oregon Gulch Reservoir #2	40 S.	4 E.	29	NESW	0.06
Root Spring Reservoir	40 S.	4 E.	30	NENE	0.01
Twin Pines Spring Reservoir	40 S.	4 E.	19	SESW	0.02

Oregon Gulch Reservoirs #1 and #2 (Range Files #0066, #0065, Ashland Resource Area, Medford BLM). Both earthen detention dams were built in 1958 to check erosion, provide water for livestock, and fire purposes. Reservoir #1 is located above the decommissioned Oregon Gulch Road 40-4E-30 in an unnamed tributary of Oregon Gulch just below a small seep in T.40S., R.04E., Section 29, NW1/4SE1/4. Reservoir #2 is located below the decommissioned Oregon Gulch Road 40-4E-30 at the site of a small spring on an unnamed intermittent tributary of OregonGulch in T.40S., R.04E., Section 29, SW1/4NE1/4. Reservoir #1 is entitled to store 0.08 acre-foot. The dam at Reservoir #1 failed during an unusually heavy runoff, probably during the 1964 flood year. Reservoir #2 is entitled to store 0.06 acre-foot and was described in 1973 as a good stable water source.

Rosebud Helipond is used as a water source for fire fighting and has a total storage volume of 0.14 acre-feet. It is shown as a feature on the USGS 7.5 minute Soda Mountain Quad. map and is located in T.40 S., R.04 E., Section 29, NE1/4NW1/4. Water is piped from a spring development to the helipond via a livestock watering tank. The helipond supports standing water marsh vegetation with various emergent rushes, sedges, and cattails around its margin and floating duckweed on it surface. There is no defined channel below the helipond.

Fences

Fence 505 passes through the upper part of the RNA in a southwest northeast direction through T.40S.,R.4E., Sec.30, NE1/4, NW1/4 29, S1/2 20 to below the summit of Rosebud Mountain to the SW1/4 of 21. The fence is used to control movement of livestock to the lower portion of the RNA. An historic maintained fence separates the RNA from the former Box-O Ranch along the section line between Sec. 28 and 29.

B. Surrounding Land Use

BLM manages most of the surrounding lands, however there are small parcels of private land adjacent to the RNA. The acquisition of several of the private parcels would have been desirable in order to include all of the Oregon Gulch drainage basin in the RNA. However, most of these lands have experienced fairly intensive management (logging and roads) and are generally no longer suitable to be included in the RNA other than to protect the RNA from potentially damaging activities that can occur on private land (substandard road construction, soil erosion, wildlife habitat destruction, development).

Public land.

Until the establishment of the National Monument, most of the surrounding land was in the BLM Jenny Creek Late-Successional Reserve established by the Northwest Forest Plan. The LSR was to be managed according to Jenny Creek Late-Successional Reserve Management Plan (USDI 1999a). Land to the east, acquired by the BLM in 1995, was the private Box-O ranch which was operated for many years as a private cattle ranch.

Private land.

Private land in T.40S.,R.4E.,Sec.20,30. was formerly owned by Roseburg Lumber Company. The current owner is Larry D. Olson and was recently logged.

V. MANAGEMENT CONSIDERATIONS

A. Botanical/Plant Communities

Policy and Agency Standards

The following directives regard maintaining, protecting or restoring relevant and important botanical values of RNAs:

• RNAs are established primarily with scientific and educational activities intended as the principal form of resource use for the short and long term. Research proposals should be submitted to the appropriate BLM field office prior to commencing work. Studies involving the manipulations of environmental or vegetational characteristics or plant harvest must be approved. Because the overriding guidelines for management of an RNA is that natural processes are allowed to dominate, deliberate manipulation, such as experimental applications, is allowed only on a case specific basis when the actions either simulate natural processes or important information for future management of the RNA is gained (BLM Manual, 1623.37 (A)(B)).

• Preserve, protect or restore native species composition and ecological processes of biological communities (including Oregon Natural Heritage Plan terrestrial and aquatic cells) in research natural areas. These areas will be available for short or long-term scientific study, research, and education and will serve as a baseline against which human impacts on natural systems can be measured (PNW 1991).

RNA Management Goal

• Preserve natural features in as nearly an undisturbed state as possible for scientific and educational purposes. Natural processes should dominate, although deliberate manipulations which simulate natural processes are allowed in specific cases (USDI 1987).

Current Information

The ecological condition of all plant communities identified as key elements at within the RNA were considered to be of overall high quality when the area was nominated as an RNA in the 1990's (Schaaf 1990). Non-native weedy species, particularly hedgehog dogtail, (*Cynosurus echinatus*), medusa-head (*Taeniatherum caput-medusae*), dyers woad (*Isatis tinctoria*) and yellow star thistle (*Centaurea solstitialis*)(if present) in some of the savanna and woodland areas threaten the integrity of these plant communities. The spread of these and other non-native species into the RNA from surrounding private land is an ongoing threat.

Exclusion of a natural fire regime has resulted in encroachment of shrubs and conifers into the edges of open oak/grass savanna areas, decreasing the extent of this plant community in the RNA. Underbrush and tree density have increased in woodlands and forest areas, increasing fire fuel loads and the risk of high-intensity, stand-replacement fires.

The main plant community management objective within the Oregon Gulch RNA is to maintain or enhance their key attributes. Ideally this would be accomplished by allowing succession to occur as a result of a natural disturbance regime, which could include wildfire, storms, normal mortality, drought, etc. However, because of past human interference, in the form of fire suppression and livestock grazing, pro-active management is necessary to re-establish some of these natural processes.

All plant communities are subject to natural disturbances and corresponding succession over time. It is not the intention of RNA management actions to halt this natural succession and disturbance process at one particular stage. Using prescribed burning as a management tool is an attempt to re-introduce fire as a natural process. Excluding fire during the past 100 years has resulted in a build-up of fire fuel loads and encroachment of trees and shrubs into savannas and meadows. Reintroducing fire in small areas under controlled circumstances would reduce fire fuel loads, as well as improve the ecological condition of plant communities in which fire has historically been a component by restoring native species composition. Allowing naturally-occurring fires to run their course at the RNA is constrained by the proximity of private property surrounding the RNA. Utilizing fire in small areas at different times throughout the RNA is intended to resemble the patchiness of natural disturbances. With this approach, at any one time different areas of each plant community will be in different successional stages, mirroring normal ecosystem conditions.

Outlined below are goals, objectives, and management actions for each plant community requiring management within the RNA. Other important management considerations affecting plant communities within the RNA are discussed under separate headings (e.g. introduced and noxious weedy species, insects and disease, livestock grazing, timber harvest, etc.). Continuing monitoring of plant communities, discussed in Section VI, is vital to the process of tracking and evaluating responses to natural or prescribed disturbances, determining the effectiveness of management actions or research activities, and making necessary adjustments to insure that management goals continue to be met.

Oregon white oak/Wedgeleaf ceanothus/Grass or Scrubland

Goals and Objectives

- Maintain open meadows by reducing the encroachment of conifers and shrubs
- Decrease non-native and increase native species.
- Re-introduce fire as a natural ecological process, especially in chaparral / grassland component.

Issues

- Competition from non-native weedy species.
- Current fire suppression tactics
- Encroachment of trees and shrubs into meadows from surrounding woodlands.
- High densities of shrub mosaic
- Limited access to the site
- Limited funding to accomplish objectives.
- Constraints to prescribed burning, including air quality controls, proximity to adjacent private landowners, season of burn, availability of native plant seeds and starts for re-planting after burning, restrictions on using equipment.
- The RNA is utilized in an existing grazing allotment
- Existing populations of Green's mariposa lily in open grassland / scrubland inclusions.

Management actions

- Collect and propagate native grass and forb seeds from savanna areas within the RNA.
- Establish pre-project monitoring plots to gather baseline data for post-project comparison to determine the effectiveness of the management activity.
- Prescribe burn meadows to reduce non-native weedy species and encroaching trees and shrubs or manually thin trees and shrubs, particularly seedlings and saplings, in and around the perimeter of meadows / savannas. Design activities to maintain or enhance Green's Mariposa lily or other rare special status species.
- Prescribe burn chaparral component to reduce fuels and regenerate shrubs.
- Re-seed burned areas with native grasses and forbs.
- Conduct post-project vegetation surveys and periodic monitoring, especially in chaparral component.

Western Juniper/Oregon white oak scrubland

Management goals, issues, and actions are similar to Oregon white oak / Wedgeleaf ceanothus grass or scrubland. However, more attention needs to be focused on the relationship between Oregon white oak and juniper . Since juniper is considered fire sensitive, the extensive use of prescribed fire would reduce its abundance across the landscape over time. A more detailed fire history and better understanding of community changes are required before the application of prescribed fire within this plant association.

Oregon white oak/Ponderosa Pine forest

1. Woodland component

Goals & Objectives

- Maintain open woodland, dominated by Oregon white oak, ponderosa pine and associated native species.
- Reduce Douglas-fir and incense cedar conifer seedlings.
- Reduce fire fuel loads.

Issues

- Fire suppression resulting in conifer recruitment and increased fuel loads and ladders.
- Presence and competition from non-native plant species.
- Limited access to the site.
- Limited funding to accomplish objectives.
- Constraints to prescribed burning, including air quality controls, proximity to adjacent private landowners, season of burn, availability of native plant seeds and starts for re-planting after burning, restrictions on using large mechanized equipment.

Management Actions

- Establish pre-project monitoring plots to gather baseline data for post-project comparison to determine the effectiveness of the management activity.
- Utilize prescribed burning or manual thinning to reduce conifer recruitment and fire fuel loads.
- Re-seed between trees after burning with native grasses and forbs.

2. Grasslands and meadow component

Goals

- Maintain open meadows by reducing the encroachment of conifers and shrubs.
- Decrease non-native and increase native species.

Issues

- Competition from non-native weedy species.
- Encroachment of trees and shrubs into meadows from surrounding woodlands.
- Limited access to the site.
- Limited funding to accomplish objectives.
- Constraints to prescribed burning, including air quality controls, proximity to adjacent private landowners, season of burn, availability of native plant seeds and starts for re-planting after burning, restrictions on using mechanized equipment.
- Cattle grazing
- Existing sites for the rare Green's Mariposa lily

Management actions

- Collect and propagate native grass and forb seeds from savanna areas within the RNA.

• Establish pre-project monitoring plots to gather baseline data for post-project comparison to determine the effectiveness of the management activity.
• Prescribe burn meadows to reduce non-native weedy species and encroaching trees and shrubs or manually thin trees and shrubs, particularly seedlings and saplings, in and around the perimeter of meadows/savannas. Design activities to protect or enhance Green's Mariposa lily sites.
• Re-seed burned areas with native grasses and forbs.

Mixed Conifer/California Black Oak forest

Goals

• Maintain ecosystem function in the mixed conifer/California black oak plant community cell.
• Protect mature forest stands from catastrophic disturbance events such as wildfire and insect outbreaks, including monitoring for Sudden Oak Death disease.
• Design management activities that restore natural ecosystem and disturbance processes.

Issues

• Once open grown sugar pine stands now contain overly dense component of Douglas-fir.
• Fire suppression has resulted in increased stand densities
• Increased mortality from insect attacks on sugar pine

Management Actions

• Decrease stand densities and improve health of Sugar pine stands by understory thinning of douglas-fir and re-introduction of prescribed fire
• Monitor health of conifer stands

Riparian (also see Hydrology and Aquatic Habitat section)

Goals

• Maintain and restore the function, structure and vegetative composition of the riparian zones, including seeps and springs.

Issues

• Riparian areas subject to grazing and localized areas of periodic high utilization
• Disrupted hydrologic function from past road building and culverts
• Isolated riparian impacts from grazing and water impoundments on springs/seeps
• Lack of riparian survey data

Management Actions

• Perform riparian surveys documenting hydrologic and riparian vegetation condition.
• As part of the Cascade-Siskiyou National Monument grazing study, survey and document the effects of current grazing on the riparian system, including effects to the rare Bellinger's meadowfoam.
• Fence impacted riparian sites if needed.
• Restore riparian areas within the RNA that not properly functioning based on results of Riparian surveys.

B. Introduced Species and Noxious Weeds

Policy and Agency Standards

The introduction of exotic plant and animal species is normally not compatible with the maintenance or enhancement of key RNA features. Certain re-introductions of formerly native species using proper controls may be specified in plans (USDI 1986b).

Take any action necessary to prevent unnecessary or undue degradation of the lands (FLPMA 1976).

The public Rangelands Improvement Act of 1978 directs the BLM to Amanage, maintain, and improve the condition of public rangelands so they become as productive as feasible.

Goals

- Maintain and / or restore native plant communities
- Contain or eradicate exotic and noxious weeds
- Prevent the introduction of new exotic or noxious weed species

Current information

Several areas within the RNA are dominated by introduced (alien) grasses, namely medusa-head rye (*Taeniatherum caput-medusae*), hedgehog dogtail (*Cynosurus echinatus*), bulbous bluegrass (*Poa bulbosa*), and cheat grass (*Bromus tectorum*). Occurrences of yellow alyssum (*Alyssum alyssoides*), bull thistle (*Cirsium vulgare*), and small populations of dyers woad (*Isatis tinctoria*) are also documented. Yellow starthistle (*Centaurea solstitialis*) populations are in close proximity but are not documented in the RNA. No weed treatments have occurred in the RNA.

Issues

- Exotic plants and noxious weeds threaten the integrity of key features within the RNA
- Disturbance as a result of wildfire, vegetation treatments (burning or thinning), or livestock grazing can create optimum habitat for exotic and noxious weeds
- High cost for weed treatments due to poor access
- Lack of detailed weed surveys within the RNA
- Lack of proven methods for controlling large infestations of exotic grasses like cheatgrass or bulbous bluegrass.
- Lack of large quantities of native grass and forb seed for restoration

Management Actions

- Survey and map existing weed infestations
- Control weeds within and adjacent to the RNA using a integrated weed management approach utilizing mechanical, cultural, biological, and chemical means.
- Collect and propagate native seed sources within the watershed.
- Vegetative treatments to enhance key RNA features must be tailored so as to reduce weed infestations and not increase existing populations
- As part of the grazing study, evaluate wether grazing is increasing noxious or exotic weeds.

C. Endangered and Rare Species

Policy and Agency Standards

The Endangered Species Act (USDI 1973) governs and provides for the conservation of listed and proposed species, and their habitats, on federal lands. The BLM Policy regarding Special Status Species, including federally listed and proposed species, state listed species, and species designated as Sensitive is to protect and conserve federally listed and proposed species, manage their habitat to promote recovery, and (for sensitive and state listed species) to ensure that Bureau actions will not contribute to the need to list sensitive or state listed species as federally listed (BLM Manual 6840).

Goals

- Maintain or enhance Bureau Special Status Species occurrences and habitat within the RNA

1. Wildlife

Current information

Suitable habitat and a spotted owl center of activity exists in the RNA. The nest stand used by a pair of owls falls inside the RNA boundary. No other federally listed wildlife species are known to occur within the RNA.

Issues

- Habitat manipulation activities (burning, vegetation manipulation, etc) proposed to occur in the RNA must be designed to protect, maintain or enhance owl habitat.

Management Action

- Periodic monitoring of nest sites

2. Plants

Current Information

Three species are documented in the RNA, Bellinger's meadowfoam (*Limnanthes floccosa ssp. bellingeriana*), Greene's Mariposa lily (*Calochortus greenei*), and Howell's false-caraway (*Perideridia howellii*). Two of these species, Bellinger's meadowfoam and Howell's false-caraway, are found within the riparian zone of Oregon Gulch creek. Howell's false-caraway is fairly "common" within the RNA and within the surrounding watersheds in the Monument. This species is not in immediate danger of extinction, but it is rare. Bellinger's meadowfoam is quite rare, and is known for a single location in the RNA. It has an Oregon Natural Heritiage ranking of G4/S2, which means it globally secure but it is imperiled within the State because of rarity or because other factors demonstrably make it vulnerable to extinction. Green's mariposa lily is extremely rare, globally and within the state. This species has an ONHP ranking of G2/S2, meaning that range wide it is imperiled because of rarity or because other factors demonstrably make it vulnerable to extinction. The status of these three species occurrences in the RNA is not known; recent monitoring has not occurred. No formal rare plant surveys have occurred within the RNA. Suitable habitat does exist for several other Bureau Special Status plants, including the Federally listed Gentner's fritillary (*Fritillary gentneri*).

Issues

- No formal rare plant surveys within the Monument
- No monitoring of existing populations
- Affects from periodic grazing are not known for existing populations

Management Actions

- Complete rare plant surveys within the RNA
- Establish monitoring plots, as part of the grazing study, for Bellinger's meadowfoam and Green's mariposa lily.
- Protect populations from grazing if needed to maintain viability of these populations.

D. Insects and Pathogens

Policy and Agency Standards

Catastrophic natural events, such as insect infestations should ideally be allowed to take their course. Insect or disease control programs should not be carried out except where infestations threaten adjacent vegetation or will drastically alter natural ecological processes within the tract (USDI 1986b).

Goals and Objectives for Insects and Pathogens

- Maintain historic ecosystem functions in the mixed conifer / California black oak plant community cell.
- Protect mature forest stands from catastrophic disturbance events such as wildfire and insect outbreaks.
- Design management activities that restore natural ecosystem and disturbance processes.

Current Information

The Oregon Gulch mixed conifer / California black oak plant communities are at risk of beetle infestation. Two variants of mixed conifer are found in the RNA. Most of the stands to the north are more mesic, have a dominant sugar pine component and dense Douglas-fir reproduction. The forests to the south are drier with few sugar pine and are more ponderosa pine and incense cedar dominated. The young Douglas-fir component in the south is not as dense.

The stands are overstocked with subdominant Douglas-fir due to fire exclusion for the last 100 years. It appears that parts of the RNA were burned about 60 years ago. A localized mountain pine beetle (*Dendroctonus ponderosae*) outbreak in 1995 caused mortality of approximately 30 percent of dominant old growth sugar pine component as well as a few large ponderosa pine. Red turpentine beetle (*Dendroctonus valens*) is also common in the stand. The summer of 2000, Masters candidate Cori Francis (Oregon State University and Medford District BLM) characterized stand structure while writing a prescription for the forest types in Oregon Gulch. Her data indicates the mixed conifer / California black oak forest type continues to be at risk because of slow growth and overly dense stocking. Pine mortality presently continues at a high, although not epidemic, rate annually. Pine will continue to be replaced by Douglas-fir and occasionally white fir in gaps that result from pine mortality. Further, white pine blister rust (*Cronartium ribicola*) is present in areas near the RNA which reduces the likelihood that young sugar pine will grow to maturity.

Currently, individual sugar and ponderosa pine databases have been developed in an effort to follow growth rates, ages and tree vigor. Annual aerial surveys are used to track insects (beetles).

Needed information

Annual monitoring of all types of disturbance agents is needed. Revisiting permanent plots established in 2000 at 5 year intervals is desirable in order to monitor potential insect and disease problems in the future. The individual large sugar and ponderosa pine database needs to be updated every 3-5 years.

Insects:

- Mountain pine beetle (*Dendroctonus ponderosae*)
- Western pine beetle (*Dendroctonus brevicomis*)
- Red turpentine beetle (*Dendroctonus valens*)

Recent aerial flight survey data and ground checking indicates localized epidemics and increased mortality rates due to overly dense stands (often up to 300 feet of basal area) with individual large dominant old growth pine showing reduced (< than 1/2") decadal radial growth rates. Both of these parameters indicate stands and individual trees are at risk for beetle infestation. Generally, forest stands in the vicinity at the ecoregion level (Klamath River Ridges) are at risk for beetle epidemics. The unique structure of the heritage stand (6-8 dominant sugar pine per acre) with hundreds of small Douglas-fir per acre puts the RNA at an even higher risk for beetle infestation as shown by the 1995 outbreak. All three beetles currently put the forests at risk.

Management Actions

Risk reduction management activities will involve thinning small Doug-fir, piling and burning and then conducting a prescribed underburn. The thinning would not involve cutting trees greater than12" dbh. The stand would be treated at a level that would reduce risk to catastrophic fire and beetle infestation by reducing ladder and fine fuels, reducing competition for water and opening up the stand while maintaining the large tree stand component. Costs to accomplish these activities are well known from other similar projects. Funding can be obtained through forest health monies. Management activities regarding insect risk reduction and fuels reduction need to occur simultaneously in the near future.

Pathogens:

- White pine blister rust (*Cronartium ribicola*)
- Western dwarf mistletoe of ponderosa pine (*Arcuethobium campylopodum*)
- Douglas-fir dwarf mistletoe (*Arcuethobium douglasii*)
- Shoestring root rot (*Armellaria mellea*)
- Black stain (*Verticicladiella wagonerii*)
- Velvet top fungus (*Phaeolus schweinitzii*)

White pine blister rust (*Cronartium ribicola*) is an exotic pathogen introduced to the Pacific Northwest about 80 years ago. It causes mortality by girdling small sugar pine due to stem cankers. Larger trees are generally resistant given their size. At present sugar pine reproduction up to pole sized trees has decreased in the Klamath River Ridges Ecoregion (78g) because of the rust. Forest gaps that historically would have been partly filled by sugar pine are now being filled with Douglas-fir, white fir, incense cedar and ponderosa pine only. The result is a "future forest" with decreasing amounts of sugar pine in the stand. Stand dynamics and resilience will change over time due to its absence. Oregon Gulch RNA has very little evidence of blister rust likely due to some microclimate effect due to moisture. Gooseberries and currents (*Ribes sp.*), that are the alternate host for blister rust, are present in the RNA. Sugar pine is a species that lends unique biodiversity attributes to mixed conifer forests because of its general resistance to drought and fire. The RNA will be monitored for blister rust incidence.

Western dwarf mistletoe in ponderosa pine is common in the RNA, but is not considered a problem because it is present at a natural level. Many of the old growth trees exhibit dwarf mistletoe in the lower crown only indicating that they out grew the infections earlier.

Douglas-fir dwarf mistletoe is present in heavy amounts in some groups of old growth Douglas-fir within the RNA. It has contributed to mortality of mature trees. Douglas-fir mistletoe is a naturally occurring parasitic plant that is beneficial to wildlife in old growth forests. Its presence in the RNA is not considered a problem. Groups of Douglas-fir infected by mistletoe will contribute to diverse canopy structure. Mortality of tree groups will result in gaps being formed and will contribute to coarse woody debris.

Shoestring root rot (*Armellaria mellea*) is present at low levels around ponderosa pine. It is a secondary pathogen that is occasionally attacking stressed trees. It is not a significant problem currently. Stand density reduction and prescribed burning will reduce shoestring root rot levels.

Blackstain (*Verticicladiella wagonerii*) was observed on one isolated Douglas-fir in1999 in the RNA. It is spread by root grafts or beetles. So far very little blackstain has been noted in the Monument. It is unlikely to be a significant problem in the RNA. Its presence should be monitored as it may infect the Douglas-fir in or near existing roads or disturbed areas. Ponderosa pine can also be infected.

Velvet top fungus was noted in association with groups of dwarf mistletoe killed Douglas-fir. It is a commonly found pathogen (saprophyte) found in old growth stands. In this instance it is not considered a problem.

Management Actions

Thinning small trees, primarily Douglas-fir, from below and prescribed burning will increase overall forest stand vigor. As water deficit stress is reduced, susceptibility to diseases will be reduced as well. The pathogens listed above, with the exception of *Cronartium ribicola* are not currently present at a level that will cause significant impacts to RNA forest types. Blister rust is not currently found to be a significant influence in the RNA.

Summary Insect and Disease

Bark beetles pose the most significant threat to the integrity of the Oregon Gulch forests. Overly dense stands are present due to the suppression of fire over the last 100 years. Dense stocking levels of Douglas-fir are causing stress to dominant pine by competing for available moisture. Tree stress increases with increasing water deficits making pine more susceptible to beetle outbreaks. A mountain pine beetle outbreak in 1995 is a precursor to further problems in Oregon Gulch as well as surrounding areas. Natural processes must be reestablished in order to keep the RNA forest community cells viable. Not all insects and pathogens present in the RNA were listed. Only those thought to be significant factors were discussed. No information is available for insect and pathogen issues for oak woodlands or chaparral communities. Obtaining this information will be important in planning to maintain RNA values.

E. Lands & Boundary/Edge Effects

Policy and Agency Standards

- Maintain or increase public land holdings in Zone I by retaining public lands and acquiring non-federal lands with high public resource values.
- Acquire lands and interests in lands needed to manage, protect, develop, maintain, and use resources on public lands... in conformity with land-use plans that apply to the area involved (BLM Manual, 2100.05, 1984).

Goals and Objectives

- Maintain the integrity of the RNA.

Current Information.

The Oregon Gulch RNA covers an area of 1,056 acres of public land. The boundary is defined by the limits of the watershed and property lines between the public and private lands. Approximately 290 acres of private lands are in the drainage, however the key plant communities that the RNA was designated for are no longer intact on the adjacent lands.

Management Actions.

- Periodic inventory to assure no trespass from activities on private lands.

F. Roads and Utilities Rights-of-Way

Policy and Agency Standards

Public uses such as roads, pipelines, communication sites, and powerlines should avoid the designated area and be anticipated in activity plans. Road closures or restrictions maybe considered appropriate in some instances (USDI 1986b). Roads are generally prohibited in RNAs, however, old roads or un-improved tracks often exist. (PNW 1991).

Goals

Ensure that existing roads do not contribute to any loss of integrity of the RNA communities, including the riparian area.

Current Information.

There are no utility rights of way in the RNA. Several old jeep roads exist within the RNA and most have been closed, stabilized and are no longer maintained. One open road (40-4E-19.2) which provides access to the private parcel in Section 30 from Randcore pass serves as the boundary along the NW edge of the RNA. This road is under a reciprocal agreement. A portion of road 40-4E-19.0 is also under a reciprocal agreement and provides access to the private parcel in Section 20. No future ROW permit requests are anticipated through the RNA.

G. Fire Management

Policy and Agency Standards

In 1995, the latest Federal Fire Policy (USDA 1995) was issued directing federal land managers to expand the use of prescribed fire in order to reduce the risk of large wildfires due to unnatural fuel loadings and to restore and maintain healthy ecosystems.

Base the use of prescribed fire on the risk of high intensity wildfire and the associated cost and environmental impacts of using prescribed under-burning to meet protection, restoration, and maintenance of crucial stands that are currently susceptible to large-scale catastrophic wildfire.

Reintroduce under-burning across large areas of the landscape over a period of time to create a mosaic of vegetative conditions and seral stages. This is accomplished by using prescribed fire under specific conditions in combination with the timing of each burn to reach varying fire intensities. Treatments should be site-specific because some species with limited distribution are fire intolerant (USDA 1995).

Where perpetuating a seral stage of plant succession is important, prescribed fires may be specified in the activity plan; but only where they provide a closer approximation of the natural vegetation and governing processes than would otherwise be possible. Application of prescribed burns normally should be performed closely approximating the "natural" season of fire, frequency, intensity, and size of burn. The burn should be followed by a fire effects report documenting vegetative response (USDI 1986b).

Adhere to smoke management and air quality standards of the Clean Air Act and State Implementation Plan for prescribed burning (USDA 1995).

Goals and Objectives

Reintroduce fire into the RNA to re-establish a natural ecological process and to maintain, enhance or restore the structure and composition of the key plant communities. Specific objectives include:

- Increasing the extent of oak / pine savannas by removing encroaching hardwood and conifer seedlings and shrubs.
- Reduce non-native and increase native grass and forb species.
- Invigorate chaparral stands by removing decadent shrubs and creating openings for native grasses and forbs.
- Maintain and improve existing grasslands and meadows by using prescribed fire to invigorate native grasses, provide a good bed for reseeding, and reduce encroaching shrubs and conifers.
- Control wildfire in mixed conifer stands to protect losses to surrounding land owners.
- Reduce fuel loadings created from thinning activities.

Current Information

Fire is recognized as a key natural disturbance process throughout Southwest Oregon (Atzet and Wheeler 1982). Human-caused and lightning fires have been a source of disturbance to the landscape for thousands of years. Native Americans influenced vegetation patterns for over a thousand years by igniting fires to enhance values that were important to their culture (Pullen, 1995). Early settlers to the Rogue and Klamath Valleys used fire to improve grazing and farming and to expose rock and soil for mining. It is not known if fire was used in this manner historically in the RNA. Fire has played an important role in influencing successional processes. Large fires were a common occurrence in the area based on fire scars and vegetative patterns and were of varying severities.

In the early 1900s, uncontrolled fires were considered to be detrimental to forests. Suppression of all fires became a major goal of land management agencies. From the 1950s to present, suppression of all fires became efficient because of an increase in suppression forces and improved techniques. As a result of the absence of fire, there has been a build-up of unnatural fuel loadings and a change to fire-prone vegetative conditions. Fire frequency also decreased as the use of fire by native peoples decreased due to their disappearance from the landscape by disease or translocation to reservations.

Based on calculations using fire return intervals, five fire cycles have been eliminated in the southwest Oregon mixed conifer forests that occur at low elevations (Thomas and Agee 1986). Species, such as ponderosa pine and oaks, have decreased. Many stands, which were once open, are now heavily stocked with conifers and small oaks which has changed the horizontal and vertical stand structure. Surface fuels and laddering effect of fuels have increased, which has increased the threat of crown fires which were once historically rare.

Many seedling and pole size forests of the 20th century have failed to grow into old-growth forests because of the lack of natural thinning once provided by frequent fire. Frequent low intensity fires serve as a thinning mechanism, thereby, naturally regulating the density of the forests by killing unsuited and small trees. Consequently, much old-growth forest habitat has been lost along with diminished populations of old-growth dependent and related species. In addition, ponderosa pine trees that thrive in fire prone environments are quickly shaded out by the more shade tolerant Douglas-fir or white fir species in the absence of fire. As a result, some late-successional forests have undergone a rapid transition from ponderosa pine stands to excessively dense true fir stands. Trees growing at lower densities, as in ponderosa pine stands, tend to be more fire-resistant and vigorous. Eventually they grow large and tall, enhancing the vertical and structural diversity of the forest. Some populations of organisms that thrive in the more structurally diverse forests that large trees provide are becoming threatened.

Many forests developed high tree densities and produced slow growing trees rather than faster growing trees after abrupt fire suppression became policy in about 1900. Trees facing such intense competition often become weakened and are highly susceptible to insect epidemics and tree pathogens. Younger trees (mostly conifers) contribute to stress and mortality of mature conifers and hardwoods. High density forests burn with increased intensity because of the unnaturally high fuel levels. High intensity fires can damage soils and often completely destroy riparian vegetation. Historically, low intensity fires often spared riparian areas, which reduced soil erosion and provided wildlife habitats following the event.

The absence of fire has had negative effects on grasslands, shrublands, and woodlands. Research in the last few decades has shown that many southern Oregon shrub and herbaceous plant species are either directly or indirectly fire-dependent.

Several shrub species are directly dependent on the heat from fires for germination, without fire, these stands of shrubs cannot be rejuvenated. Grass and forbs species may show increased seed production and/or germination associated with fire.

Indirectly fire-dependent herbaceous species are crowded out by larger-statured and longer-lived woody species. This is particularly so for grasses and forbs within stands of wedgeleaf ceanothus and whiteleaf manzanita with a high canopy closure. High shrub canopy closure prevents herbaceous species from completing their life-cycle and producing viable seed. Many grass species may drop out of high canopy shrub lands in the absence of fire because of their relatively short-lived seed-bank.

Climate and topography combine to create the type of fire regime found in the Oregon Gulch RNA. Fire regime is a broad term and is described as the frequency, severity and extent of fires occurring in an area (Agee 1990). Vegetation types are helpful in delineating different fire regimes. The Oregon Gulch RNA is classified as a low-Severity (68%) and moderate-Severity (32%) fire regimes based on the vegetation types found within the RNA. The low-severity regime is characterized by vegetation types such as grasslands, shrub-lands, hardwoods, mixed hardwoods, and pine which are similar to the Interior Valley Vegetative Zone of Franklin and Dyrness (1988). These plant communities are adapted to recover rapidly from fire and are directly or indirectly dependent on fire for their continued persistence. A low-severity regime is characterized by nearly continual summer drought, fires are frequent (1-25 years), burn with low intensity and are widespread. The dominant trees within this regime are adapted to resist fire due to the thick bark they develop at a young age. The intermixture of pine-oak within the RNA suggests the fire return interval of about 10 years (Agee 2000). The moderate-severity regime is associated with the Mixed Conifer Vegetative Zone of Franklin and Dyrness (1988). A moderate-severity regime is characterized by long summer dry periods, fires are frequent (25-100 years), burn with different degrees of intensity and burn in a mosaic pattern across the landscape. Some stand replacement fires as well as low-intensity fires may occur depending on burning conditions.

The Bureau of Land Management has a master cooperative fire protection agreement with the Oregon Department of Forestry (ODF). This agreement gives the responsibility of fire protection of all lands within the Oregon Gulch RNA to the Oregon Department of Forestry. This contract directs ODF to take immediate action to control and suppress all fires. Their primary objective is to minimize total acres burned while providing for fire fighter safety. The agreement requires ODF to control 94 percent of all fires before they exceed 10 acres in size.

Between the years 1967 and 1999, there have been three fires within the Oregon Gulch RNA. All three fires were started by lightning and occurred in the years 1989, 1996 and 1999. Suppression action was taken by ODF resulting in two fires contained at 0.1 acre in size while one fire was contained at 1 acre in size.

Currently, some fire suppression techniques are not allowed within the Oregon Gulch RNA in order to minimize disturbance to the area. All vehicles are restricted to existing roads and the use of tractors are not allowed within the RNA.

Prescribed fire can be used to meet resource management objectives which include but are not limited to wildfire hazard reduction, restoration of desired vegetation conditions, management of habitat and silvicultural treatments. When utilizing prescribed fire it should be based on the fire history of the area and past vegetation patterns known for the area. The application of prescribed fire should closely approximate the frequency, intensity, size, and the "natural" season of fire when possible.

Many factors influence fire behavior and the effects fire will have on a resource. Some are beyond our ability to control such as the location of where a fire starts, weather and topography. Fuels management programs focus on the factors which we have influence over such as fuels and vegetation. Prescribed fire is one tool that can be utilized to regulate fuels and vegetation. A primary objective of any fuels management activity in the RNA is to alter existing fuels in order to protect or minimize damage to existing late-successional habitat from wildfires which may occur.

All prescribed burning would comply with the guidelines established by the Oregon Smoke Management Plan (OSMP) and the Visibility Protection Plan. In compliance with the Oregon Smoke Management Plan, any prescribed burning activities within the RNA require pre-burn registration of all prescribed burn locations with the Oregon State Forester. Registration includes specific location, size of burn, topographic and fuel characteristics. Advisories or restrictions are received from the State Forester on a daily basis concerning smoke management and air quality conditions.

Prescribed burns would be conducted within the limits of a Burn Plan which describes prescription parameters so that acceptable and desired effects are obtained.

Issues

- Limited access to and within the RNA.
- Restrictions against using large equipment in fire treatment or suppression activities.
- Constraints to season of prescribed burning due to air quality and fire season restrictions.
- Seasonal constraints due to growth period for rare plant species (Green's mariposa lily)
- Limited funding for repetitive treatments and restoration projects.
- Limited availability of native grass, forb, and shrub seed or seedlings for re-planting.

Management Actions

- Develop a fire management plan and memorandum of understanding for the entire RNA, coordinated between BLM and ODF, including a plan for prescribed burning.
- Use fire to enhance known sites of special status plant populations where applicable.
- Establish pre-burn plots in targeted plant communities to gather baseline data of vegetation species composition, density, etc. to determine the effects of fire on affected plant communities.

- Through prescribed burning, reintroduce fire as a natural process, based on past fire regimes.
- Conduct post-project monitoring of plant communities to determine the effectiveness of management activities in achieving RNA goals. Adapt management activities as necessary.

H. Aquatic Ecosystems: Hydrology and Habitat

Policy/Agency Standards

Two major planning efforts have set the objectives for aquatic ecosystems. Objectives for water resources include compliance with State water quality requirements to restore and maintain water quality necessary to protect designated beneficial uses for the Klamath River Basin. In addition, the overall goal of the Monument Aquatic Conservation Strategy (MACS), is to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands (Appendix BB). Included in the MACS are specific goals:

- Maintain and restore the physical integrity of the aquatic system.
- Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems.
- Maintain and restore the sediment regime under which aquatic ecosystems evolved.
- Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion and channel migration, and to supply amounts and distribution of coarse woody debris sufficient to sustain physical complexity and stability.
- Maintain and restore habitat to support well-distributed populations of native plant, invertebrate and vertebrate riparian-dependent species.
- Maintain and restore a properly functioning watershed condition within the Oregon Gulch RNA.
- Maintain and restore the ecological health of aquatic ecosystems within the Oregon Gulch RNA.

Objectives

- Reduce or eliminate sediment input into streams and wetlands as disturbed areas regenerate.
- Reduce or eliminate surface disturbing activities such as roads/jeep trails.
- Restore and maintain native riparian vegetation along streams and springs/seeps.
- Achieve properly functioning riparian areas.
- Restore and maintain natural water flow (ground water and overland) into streams and spring/seeps.

Current Information

Hydrologic features in the Oregon Gulch RNA include intermittent streams (Oregon Gulch and unnamed tributaries), four known springs, and four constructed ponds. Current hydrologic condition of the RNA is unknown. A stream survey is necessary to determine if there are any watershed concerns affecting water quantity, water quality or aquatic habitat. The Jenny Creek Watershed Assessment and Analysis (USDI 1995b) states that poor road location has created major problems for Oregon Gulch, however, no specific concerns are identified.

Although timber harvest or OHV use is not allowed in the RNA, potential adverse impacts to the streams, springs and seeps could occur on BLM-administered lands as a result of erosion from existing or new roads, current grazing, or a severe wildfire. Approximately 532 acres of the Oregon Gulch drainage area are private lands that lie above the RNA. Management actions such as road building, timber harvest, burning, pesticide treatments, and livestock grazing on these private lands could negatively affect streamflows and water quality in the RNA. Sediment increases would be the most likely adverse impact associated with these types of activities.

Management Actions

- Conduct stream/riparian survey to determine waterbody category, current channel and riparian conditions, aquatic fauna habitat condition, and locations of unmapped waterbodies.
- Assess need for water/riparian monitoring based on stream/riparian survey results.
- Undertake restoration projects as needed to comply with the objectives of the Monument Aquatic Conservation Strategy and to prevent further damage to hydrologic and ecological values.

I. Mining and Geothermal Resources

Mining and geothermal rights have been withdrawn within the Cascade-Siskiyou National Monument and are not an issue. There are no goals, objectives or actions necessary for this resource.

J. Cultural Resources

Policy and Agency Standards

- Protect cultural resource values including information and significant sites for public and/or scientific use by present and future generations. Sites with significant values will be protected from management actions and from vandalism to the extent possible.
- Develop project plans to preserve, protect and enhance archeological, historical and traditional use sites, and materials under the district's jurisdiction. This would include protection from wildfires (USDA 1995).

Goals

- Protect cultural resources at Oregon Gulch RNA from theft and human disturbance.

Current Information

Several cultural resource surveys have been conducted within the Oregon Gulch RNA. A number of both historic and pre-historic sites have been recorded both within and adjacent to the RNA.

Issues

- The isolated location of the RNA makes enforcement of restrictions and protection of archeological sites difficult.

Management Actions

- Protect sites as needed from management activities and vandalism.

K. Livestock Grazing

Policy and Agency Standards

• "Watersheds are in, or are making significant progress toward, properly functioning physical condition, including their upland, riparian-wetland, and aquatic components; soil and plant conditions support infiltration, soil moisture storage and the release of water that are in balance with climate and land-form and maintain or improve water quality, water quantity and the timing and duration of flow..."
"Habitats are, or are making significant progress toward being restored or maintained for federal threatened and endangered species, federal proposed, category 1 and 2 federal candidates (Federal Species of Concern), and other special status species" (Fundamentals of Rangeland Health, 43 CFR 4180)
• "Habitats support healthy, productive and diverse populations and communities of native plants and animals (including special status species and species of local importance) appropriate to soil, climate, and landform (Standard 5, Standards for Rangeland Health, USDI 1997)."
• "Livestock grazing should be managed within RNAs to promote maintenance of the key characteristics for which the area is recognized (USDI 1987. BLM Manual, RNAs, 1623.37)."

Goals and Objectives

• Preserve natural features in as nearly an undisturbed state as possible for scientific and educational purposes. Natural processes should dominate, although deliberate manipulations which simulate natural processes are allowed in specific cases (USDI 1987).
• Maintain or improve the designated values of the RNA, especially native plant community composition and structure, soils, riparian areas, stream health and function, and nutrient cycling.

Current Information

Grazing in the area encompassed by the Oregon Gulch RNA dates back to the 1850s when large herds of cattle, horses and sheep utilized the area. Control of these ranges did not occur until the passage of the Taylor Grazing Act in 1934. The long term goal of this law was the improvement of range conditions and the stabilization of the western livestock industry. Prior to the enactment of the Taylor Grazing Act unregulated grazing occurred. During this period rangeland resources and ecological conditions suffered significant harm from overgrazing.

The Oregon Gulch RNA is currently part of the Oregon Gulch Pasture of the Soda Mountain Allotment #10110. The pasture is utilized on alternative years under a rest-rotation grazing plan that includes the rest of Soda Mountain Allotment. Cattle numbers on the Soda Mountain Allotment have been reduced by 34% since the 1970s. Cattle utilize the RNA approximately between June 1 into early July on alternating years. The current Animal Unit Months (AUMs) is 1174. Utilization data within the Soda Mountain allotment shows overall utilization of the pasture to be 6 percent with portions of the pasture unused. Several range monitoring plots occur within the RNA. Past monitoring has shown slight utilization (21-40%) and moderate (41-60%) utilization in portions of the RNA.

The Oregon Gulch RNA contains significant areas of native grassland communities, especially in the Oregon white oak / Wedgeleaf ceanothus / grass or scrubland, and the Western Juniper / Oregon white oak scrubland communities . Grasslands are also a component under the Oregon white oak / Ponderosa pine communities and along the narrow Riparian zone. In the RNA, large native herbivores (deer and Elk) play an important evolutionary and ecological role. Different grazing animals vary in their foraging preferences, season, duration, and intensity of use, which can have significantly different effects on plant communities, particularly when considering introduced versus non-introduced species. Grazing modifies vegetation height, frequency, and density; influences vegetation composition and succession; and, alters water retention and drainage characteristics. To plants, critical factors are the severity, frequency, duration, and seasonality of defoliation. These factors can be controlled through proper grazing management.

Livestock grazing could have a significant impact in Oregon Gulch RNA if not managed in a manner appropriate for the particular plant communities. Uncontrolled grazing by domestic livestock is not compatible with the maintenance of key RNA features, however, controlled grazing could offer an ecological management tool to maintain or improve the some of the biological features (e.g. grassland component) for which the RNA was established.

Exotic and noxious weed populations do occur in the RNA. With the exception of Medusa head rye (*Taeniatherum caput-medusae*), cheatgrass (*Bromus tectorum*), and bulbous bluegrass (*Poa bulbosa*), most weeds currently have overall low densities [Dyers woad (*Isatis tinctoria*), bull thistle (*Cirsium vulgare*), yellow alyssum (*Alyssum alyssoides*), and hedgehog dogtail (*Cynosurus echinatus*)]. Soil and vegetation disturbance from over grazing utilization can increase exotic plant densities, and affect the plant communities for which the RNA was established.

Issues

- Existing noxious weed populations that can increase as a result of soil disturbance from grazing over- utilization or congregating livestock.
- Terms and conditions in the existing grazing permit will likely need to be modified to protect or maintain key elements in the RNA
- Only a few utilization plots exist in the RNA. Other areas (e.g. riparian) have not had formal surveys documenting utilization or impacts. Several photo-points were recently established in the riparian area.

Management Actions

- Collect data in grassland / shrubland / riparian communities within the RNA as part of the three year grazing study within the Monument. This information will determine if grazing is maintaining or enhancing key communities. Make recommendations on how to utilize grazing, if appropriate, as tool to maintain these communities.
- In the interim, continue existing grazing in the RNA.
- After the recommendations from the grazing study are a made, it may be necessary to require current permit holders to change grazing patterns in the RNA so as to maintain or improve condition of key plant communities, or remove the RNA from the allotment plan.
- Install additional monitoring plots in utilized areas within the RNA to ensure that grazing promotes maintenance or enhancement of key plant communities.

L. Timber Management

Policy and Agency Standards

Regulated timber harvest within the RNA and salvage removal of downed trees are not compatible with the RNA values. For RNAs adjacent to timber harvest units, buffer zones should be considered in order to meet plan objectives (USDI 1986b).

Timber harvesting should be managed within RNAs to promote the maintenance of the key characteristics for which the area is recognized.

Current Information
Few trees have been removed in the past. A road runs east and west through the RNA. An occasional tree was removed during road construction. Timber harvesting in the RNA is not consistent with overall goals for the mixed conifer/black oak cell or for the ponderosa pine/white oak cell. An overstory removal occurred in private ownership in Section 30 during summer of 2000 to the west directly adjacent to the mixed conifer cell. Potentially, windthrow could occur during winter storms on the west boundary of the RNA. Private lands in Section 20 also abuts the RNA to the north, few of the conifer communities are found here. No BLM sales are planned in the area. Nor are any other forest stands adjacent to the RNA.

Timber harvesting in RNAs is not consistent with overall RNA management goals. However, non-merchantable Douglas-fir, less than 12" in diameter and less than 90 years old, will be removed and burned to reduce stand density and insect risk. These trees have become established in the absence of fire. Occasionally, individual trees larger than this will be girdled and/or felled when competing directly with individual mature sugar pine.

Goals and Objectives
- Maintain viable ecosystem functions and protect RNA community cells from catastrophic disturbance events.

Management Actions Needed
- In conjunction with fuels treatments/understory burning, treat conifer stands to promote health of key communities.
- No commercial timber harvesting will occur in the RNA unless it is part of an ecological protection or enhancement project. All trees felled or girdled for forest health reasons will be left on site. Small diameter Douglas-fir will be cut and burned in order to reduce fuel hazard and beetle outbreak risk.

M. Public Use/Recreation

Policy and Agency Standards
Recreation, camping, wood cutting, trapping, plant gathering, and OHV use are not compatible with the key RNA values unless shown not to hinder achievement of specific plan objectives. Incidental hunting and fishing use is typically permitted, but not hunter camps (see Wildlife sub-section below). Educational use - class field studies are encouraged but repetitive consumptive class activities are allowed only with BLM approval. Development of peripheral nature trails and interpretive signs may be appropriate in some cases, but with consideration for protection of the values without attracting undue attention. Public use roads, pipelines, communication sites, or powerlines should avoid the RNA. Road closures or way closures or restrictions may be considered appropriate in some instances (see Rights of Way section). (USDI 1986b)

Current Information
Recreational use in the Oregon Gulch RNA is mostly by hunters or local residents. The RNA was accessible by road until 1998 when the road was blocked to eliminate vehicle use of the area. The closed road now serves as a hiking trail. The entire RNA is closed to all off-road travel by motorized and mechanized vehicles.

Potential problems arising from public use of the RNA include the threat of human-caused stand-replacement fire; damage to grasses, forbs and soils by compaction from hikers; and the introduction of undesirable non-native species. Current recreational use is very light and low-impact. Periodic monitoring should be conducted to evaluate the impacts of recreational use on the protected plant communities and to determine if signs are necessary to protect against adverse effects.

1. Camping

Policy and Agency Standards
(See Public Use/Recreation)

Goals
Protect designated values of the RNA.

Educate the public to the ecological significance of the RNA and the restrictions required to protect the designated natural resources.

Current Information
No established camping facilities exist in Oregon Gulch RNA although dispersed hunter camps were present when the road was open. Camping occurs during hunting season at Randcore Pass which is close to the RNA boundary. In general, camping is not compatible with protection of the key elements of the RNA. However, unless camper use becomes evident, no actions are needed at the present time. If it does become a problem, and camping signs could be posted around the RNA.

Issues
- Isolated location of the RNA and difficulty in enforcing restrictions.
- Historical use of the area.

Management Actions
- Conduct periodic monitoring to determine if camping has occurred that has had a negative impact on the protected elements.
- Promote environmentally sensitive use of area to visitors via education (signs and personal contact).

2. Hiking

Policy and Agency Standards
(See Public Use/Recreation)

Goals
- Protect designated values of the RNA.
- Educate the public to the ecological significance of the RNA and the restrictions required to protect the designated natural resources.

Current Information
The closed access road through the RNA is now an existing hiking trail. The RNA receives the greatest amount of foot traffic during the fall hunting season and, to a lesser extent, during spring turkey hunting season.

Features at the RNA that might appeal to hikers are wild flowers, wild game, and diverse plant communities, however, the RNA is not well-known or easily accessible to the general public. For these reasons, developing hiking trails or promoting the area as a recreational hiking destination would not be practical or recommended. Casual hiking itself does not pose a threat to the resources of the RNA. However, if done by a large number of people, native grasses and wild flowers could be trampled and destroyed and soils compacted, jeopardizing the integrity of the protected elements of the RNA.

Issues
- Isolated location of the RNA making enforcement of restrictions difficult.
- Historical use of the area.

Management Actions
- Conduct periodic monitoring to evaluate the extent and effects of hiker use.
- Promote environmentally sensitive use of area to visitors via education (signs and personal contact).

3. Equestrian

Policy and Agency Standards
There are no specific BLM guidelines or policies restricting equestrian activities within RNAs. However, any activities should be avoided that threaten protection of the key elements for which the RNA has been designated (USDI 1987).

Goals
- Protect soils, vegetation, roads, streams and other resources from damage caused by equestrian use in the RNA.
- Educate the public to the ecological significance of the RNA and the restrictions required to protect the designated natural resources.

Current Information
Oregon Gulch RNA currently receives occasional equestrian use, probably by neighbors and the grazing allotment lessee involved with cattle ranching activities. Equestrian activities in this management plan refers to horses, llamas, mules, and other pack animals. Recreational animals could threaten the values of the RNA by trampling vegetation and soil, particularly in meadows with thin, fragile soils, or by carrying in seeds of exotic weedy species on their hooves, hair, or in their feces. During wet conditions horses can push root crops, used by Indian tribes as food, too far into the soil to dig and use. The use of horses and other pack or riding stock is generally not seen as compatible with the key elements of the RNA. Horse use by the grazing allotment lessee should be evaluated as part of the three year grazing study.

Issues
- Isolation of area and difficulty in enforcing closures or restrictions.
- Historical use in the area.

Management Actions
- Periodically monitor the RNA to ensure that horse or other stock use is not occurring.
- Promote environmentally sensitive use of area to visitors via education (signs and personal contact with equestrian groups).
- Post signs at entrances to the RNA, stating the goals of the RNA and closure to equestrian use.

4. Off-Highway Vehicles

Policy and Agency Standards
Management directions for all RNA's specifies closure to off-highway vehicle (OHV) use. Off-highway vehicles include, but are not limited to, motorcycles, all-terrain vehicles, and mountain bikes.

Goals

- Prevent intrusions into the RNA by motorized and mechanized vehicles.
- Educate the public to the ecological significance of the RNA and the restrictions required to protect the designated natural resources.

Current Information

Oregon Gulch received some OHV use in the past, but recent road closures and blocking has eliminated most if not all motorized vehicle use within the RNA. OHV use is prohibited in RNAs because of the damage they cause to plant communities, individual plants and streams via erosion.

Issues

- Isolated location makes enforcing restrictions or road closures difficult.
- Historical use of the area.

Management Actions

- Conduct periodic monitoring to assess off-highway vehicle violations.
- Promote environmentally sensitive use of area to visitors via education (signs and personal contact).

5. Hunting, Fishing and Trapping

Policy and Agency Standards

(See also Public Use/Recreation)

Incidental hunting and fishing are typically permitted, although not encouraged, in RNAs, Trapping is viewed as an activity not consistent with RNAs (USDI 1986b). Management of fish and wildlife populations is controlled by ODFW with regulations for hunting, fishing and trapping set on a yearly basis. Regulations regarding seasons, bag limits, stream stocking, licenses and techniques are dictated by the Department through the Fish and Wildlife Commission and are applicable on all lands within the state, including private property. Specific areas may be closed to activities in order to protect human life or natural resources.

Goals

- Protect designated values of the RNA, including plant, soil and wildlife resources with minimal disturbance and interference from people.

Current Information

Wildlife is abundant in Oregon Gulch RNA. Most of the RNA is very good deer hunting country and receives a fair amount of pressure, especially on the western edge where there is vehicle access right up to the edge of the RNA near Randcore pass. Big game in the general area of the RNA consists of Black bear (*Ursus americanus*), Cougar (*Felis concolor*) and Black-tailed deer (*Odocoileus hemionus columbianus*). Elk (*Cervus canadensis*) also use the RNA seasonally. Small game species in the general area include Ruffed grouse (*Bonasa umbellus*), Blue Grouse (*Dendragapus obscurus*), Wild Turkey (*Meleagris gallopavo*), Mountain Quail (*Oreortyx pictus*), Valley Quail (*Callipepla californicus*), Western Grey squirrel (*Sciurus griseus*). It is unknown what, if any, trapping activity is occurring in this area. There is no indication that any trapping currently occurs. Fur bearing species in the area include Bobcat (*Felix rufus*), Coyote (*Canis latrans*), Raccoon (*Procyon lotor*), and Grey fox (*Urocyon cinereoargenteus*), and possibly Pine Marten (*Martes americanus*). Redband trout (*Oncorhynchus mykiss ssp.*) appear to spawn in the lower mile of Oregon Gulch, because trout fry have been found throughout this stretch of stream. Fish use of Oregon Gulch appears to be limited by a natural barrier just inside the RNA boundary (see Fish Section).

Issues

- Dispersed camping and OHV use are often associated with hunting and could negatively impact RNA resources if these activities occur illegally.
- The isolation of the area makes enforcing restrictions difficult.
- Historical use of the area.
- Prohibition of hunting and trapping in the RNA would require a change to the Oregon State Game Regulations and would be difficult to enforce due to unclear boundaries (on the ground).
- Minimal impact to wildlife populations in the area. No impact to the values for which the RNA was designated.

Management Actions

- Restrict hunting and trapping to foot traffic only, no vehicles or stock use.
- Prevent intrusions into the RNA by motorized and mechanized vehicles.
- Educate the public to the ecological significance of the RNA and the restrictions required to protect the designated natural resources.

N. Special Forest Products

Policy and Agency Standards

Commercial or personal harvest of Special Forest Products (SFPs) like boughs, burls, fungi, medicinal plants, etc..., within RNAs are not compatible with the over all goals to "Preserve natural features in as nearly an undisturbed state as possible for scientific and educational purposes. Natural processes should dominate, although deliberate manipulations which simulate natural processes are allowed in specific cases (USDI 1987)."

Current Information

No use permits are currently issued for this area. Historical personal use within this area is not well documented. No information is available to determine the abundance of SFPs within the RNA. Future research within the RNA may require the collection of certain animal and plant specimens.

Issues

- The isolation of the area makes enforcing SFP collection restrictions difficult.

Management Action

- Prohibit any commercial or person use collection of Special Forest Products within the RNA. Permits for collection of specimens for research will be allowed on a case by case basis.
- Educate the public to the ecological significance of the RNA and the restrictions required to protect the designated natural resources.

O. Interpretation and Research

Policy and Agency Standards

The purpose for RNAs is for research, observation, and study. Studies involving manipulations of environmental or vegetation characteristics or plant harvest must have prior approval of the BLM.

Goals

- Protect the designated values for which the RNA was nominated to provide baseline information against which the effects of human activities in other areas may be compared.
- Provide a site for study of natural processes in as undisturbed (by human activities) an ecosystem as possible.

Current Information

Oregon Gulch RNA is only accessible on foot which protects it from overuse by the public, but also makes it impractical as an interpretive or educational site. One of the main objectives for RNAs is to provide educational and research areas for ecological and environmental studies. The following specific research topics have been suggested for Oregon Gulch:

- Evaluating the effects and the role of domestic livestock grazing on key elements in the RNA (plant communities, butterflies, and rare plant species) as part of the three year grazing study.
- The role of fire in plant and animal community development, composition and production.

Other potential areas for research include the effectiveness of prescribed fire and seeding of native species in reducing non-native plant species, and studies of the effects of prescribed fire or vegetative manipulation on plant community composition, insects, wildlife, or special status plant populations.

When researchers plan to use an area, they have certain obligations to:

(1) notify the appropriate BLM field office, submit a research plan, and obtain permission where needed;
(2) abide by regulations and management prescriptions applicable to the natural area; and,
(3) inform the agency of the research progress, published results, and disposition of collected materials.(USDI 1986b).

Issues

- Lack of funding for treatments in RNAs
- Impacts from surrounding land use activities.

Management Actions

- Evaluate all proposed research projects and approve only those that will not adversely affect the RNAs resources or short-term and long-term viability of species.
- Maintain a list of projects and research in the RNA, including findings and conclusions.
- Incorporate pertinent new findings from research projects into management actions.
- Maintain copies of all surveys, inventories, monitoring and activities conducted within the RNA.

VI. MONITORING

A. Definition and Role of Monitoring

Monitoring is defined as a process of repeated recording or sampling of similar information for comparison to a reference. The role of monitoring in Research Natural Areas is to collect information in order to evaluate if objectives and anticipated or assumed results of a management plan and management actions are being realized or if implementation is proceeding as planned. Because monitoring may be so costly as to be prohibitive, priority should be given to monitoring mandated by legislation and to focusing on management actions aimed at maintaining, protecting and restoring key elements and minimizing disturbance in the RNA (USDI 1995). All monitoring activities must include the following steps:

- Establish monitoring objectives.
- Collect baseline information.
- Repeat consistent standardized monitoring procedures over time.
- Interpret monitoring results relative to the baseline information and monitoring and implementation objectives.
- Modify management objective actions and monitoring procedures as necessary based on reliable monitoring data to continue to achieve goals of the RNA.

The monitoring plan should be tailored to the unique characteristics of the RNA. Two types of monitoring activities are outlined below. Ecological status monitoring is designed to track the ecological condition of the natural elements protected within the RNA. Defensibility monitoring should detect impacts from outside factors on the protected elements in the RNA. These monitoring activities are general in nature and should not be used in lieu of more complex research strategies. Detailed monitoring protocols should also be developed in conjunction with specific management projects to measure their effectiveness in achieving RNA objectives. For each element, monitoring objectives, unit and frequency of measurement, responsible personnel, and location for data storage are stated.

B. Ecological Status Monitoring

Ecological status monitoring involves tracking species and plant communities relative to the stated objectives of the RNA. Ecological status monitoring at Oregon Gulch RNA should assess the current status of RNA elements and track trends or changes over time to determine if any RNA values are at risk. Monitoring results provide the basis for evaluating the effectiveness of management actions and determining if changes are required. Where possible, monitoring within the RNA should be tiered to the monitoring for the Cascade-Siskiyou National Monument.

Element: PLANT ASSOCIATIONS
Monitoring Objectives: Track successional changes in the key RNA plant associations or communities to determine if native species are protected, if ecological processes are properly functioning, and if RNA management actions are achieving desired outcomes. Information collected during monitoring provides the basis for making adjustments to management actions.

Frequency of Measurement: After initial baseline, every 5 years.
Responsible Personnel: Botanists, Ecologists, Foresters
Data Storage: Oregon Gulch RNA File

Element: SPECIAL STATUS PLANTS
Monitoring Objectives: Perform formal surveys of the RNA for Bureau Special Status Plants. Monitor populations of special status plants in order to maintain or enhance populations and associated habitats. Utilize the RNA to collect base-line biological data for sensitive species. Evaluate effects from grazing on Green's mariposa lily.

Unit of Measure: Revisit known sites and record population demographics on site reports. As part of the grazing study include monitoring of Greens mariposa lily.
Frequency of Measurement: Revisit known sites of special status plants every 5 years.
Responsible Personnel: Botanists
Data Storage: Oregon Gulch RNA File, Medford Rare Plant Database

Element: SPECIAL STATUS WILDLIFE
Monitoring Objectives: Perform surveys for Special status wildlife species and monitor species within the RNA in order to maintain or enhance populations.
Unit of Measure: Determined by established protocols for specific species.
Frequency of Measurement: According to established protocols.
Responsible Personnel: Field Office Lead Wildlife Biologist
Data Storage: Oregon Gulch RNA File, Wildlife database

Element: FIRE
Monitoring Objectives: Determine the need to restored key plant communities using prescribed fire. Perform fuel surveys in key plant communities following established protocols. Monitor following prescribed burning results.
Unit of Measure: Determined by established wildland burning protocols .
Frequency of Measurement: According to established protocols.
Responsible Personnel: Prescribed fire specialists
Data Storage: Oregon Gulch RNA File, Fire database

Element: NON-NATIVE SPECIES
Monitoring Objectives: Assess the need for management actions to reduce or minimize the impact, introduction and/or spread of non-native weedy species. Identify problem areas. Collect baseline data. Non-native species of concern include all currently identified noxious and exotic weeds known within the Monument and in the adjacent watersheds.
Unit of Measure: Presence/absence and abundance of non-native weedy species by random surveys. Target highly susceptible points of invasion (along borders and roads).
Frequency of Measurement: Every 5 years; casual observations during other site visits.
Responsible Personnel: Botanists, Range Specialists, Ecologists.
Data Storage: Oregon Gulch RNA File, Medford District Noxious Weed Database

Element: INSECTS, DISEASES OR PESTS
Monitoring Objectives: Monitor harmful insects, diseases or pests that could cause long-term negative changes in plant communities, especially the Mixed conifer/California black oak community. Determine if treatments are needed to reduce the negative effects of these insects, diseases or pests.
Unit of Measure: Periodic evaluation of the RNA to discover presence/absence and extent of harmful insects, diseases or pests. Initial evaluations may be accomplished by walking through the RNA, or through photo interpretation.
Frequency of Measurement: Every 5 years or as needed based on casual observations during other site visits.
Responsible Personnel: Foresters, Ecologists.
Data Storage: Oregon Gulch RNA File, Southwest Oregon Insect and Disease Center if appropriate.

Element: HYDROLOGY
Monitoring Objectives: Evaluate hydrological conditions (channel stability, erosion, sedimentation, slumping potential, etc.) and riparian vegetation of all streams to determine the functioning condition and need for habitat improvement or restoration activities. Monitor the influence of grazing on riparian vegetation and channel stability as part of the three year grazing study.
Unit of Measure: Established riparian stream survey protocols.
Frequency of Measurement: Establish baseline, then every 10 years
Responsible Personnel: Hydrologist / Riparian Coordinator
Data Storage: Oregon Gulch RNA File, Riparian Database

Element: NATURAL DISTURBANCE
Monitoring Objectives: Document type, extent, intensity, and frequency of natural disturbances in the RNA and resulting changes in ecosystem structure or composition.
Unit of Measurement: Intuitively controlled surveys after disturbance, photos of affected plant communities or areas.
Frequency of Measurement: After significant disturbance, wildfires, landslides, insect and disease outbreaks
Responsible Personnel: Botanist, Ecologist and Foresters
Data Storage: Oregon Gulch RNA File

C. Defensibility Monitoring

Defensibility monitoring involves on-the-ground assessment of factors which affect the manager's ability to protect the Research Natural Area and its elements. Considered are current and anticipated land uses within and adjacent to the RNA and their potential negative effects on the protected elements or their governing ecological processes. Defensibility monitoring also involves checking for evidence of prohibited use, encroachment or degradation within the RNA.

Element: CULTURAL RESOURCES
Monitoring Objectives: Detect vandalism or disturbance to known archeological or historical sites at the RNA.
Unit of Measure: Visual assessment to detect evidence of disturbance.
Frequency of Measurement: Every 5 years or as needed based on observations during periodic site visits.
Responsible Personnel: Cultural Resource Manager / Archaeologist
Data Storage: Oregon Gulch RNA File, District Archaeology files

Element: PUBLIC USE OF RNA (camping, hiking, equestrian, trapping, OHV, special forest products, interpretation and research, trespass livestock grazing, timber harvesting)
Element Objectives: Determine if the level of public use jeopardizes protection of RNA values or key elements.
Unit of Measure: Observations made during other surveys or during periodic site visits. Indications of problem areas include evidence of vehicular use (on or off existing roads in the RNA), refuse, signs of campfires or campsites, trampled meadows, significant erosion or rutting on or off roads. If problems are noted during casual visits to the site, conduct more extensive surveys to determine if actions should be taken to prevent damage to the protected elements.
Frequency Measurement: Every 5 years
Responsible Personnel: RNA Coordinator
Data Storage: Oregon Gulch RNA file

Element: ROADS
Element Objectives: Determine condition of roads, track erosion and gullying of road surfaces.
Unit of Measurement: Subjective evaluation by knowledgeable personnel. Establishment of photo-points of marginal spots to compare condition over time.
Frequency of Measurement: Every 5 years during periodic site-evaluation visits to the RNA.
Responsible Personnel: RNA Coordinator, Road Engineers
Data Storage: Oregon Gulch RNA file

Element: FENCES AND GATES
Monitoring Objectives: Determine if existing fences and gates adequately protect the RNAs elements. If not, determine if repairs, additional fencing or gates are needed.
Unit of Measurement: Walk fence lines to discover broken fences.
Frequency of Measurement: Every 5 years or as needed if trespass grazing or excessive OHV use is observed during other visits to the site.
Responsible Personnel: Rangeland Specialists, Road Engineers
Data Storage: Oregon Gulch RNA file

Element: GRAZING
Element Objectives: Determine if permitted grazing is maintaining or enhancing key plant community elements within the RNA, including Special Status Plants. Meet the intent of the overall goals for the RNA. Adjust grazing permit accordingly.
Unit of Measurement: Establishment of monitoring plots following standardized protocols in livestock utilized plant communities (grasslands / riparian) within the RNA. Where possible monitor grazing in conjunction with plant community and Special Status plant monitoring plots. Establish photo-points in areas of concern to compare condition over time.
Frequency of Measurement: Monitor for three years as part of the monument grazing study. Monitor utilization transects every year that livestock use the RNA.
Responsible Personnel: Ecologists, Range Specialists, Botanists
Data Storage: Oregon Gulch RNA file

VII. Historical Attachment for Oregon Gulch RNA

Recollections of George Wright

March 3, 1954, **THE WITCHERLY RANCH,** 666
It was probably around 1923 when Louis Miller located his homestead at Apple Jack along Jenny Creek. Later he bought George A. Grieve's homestead on the north, and located a grazing homestead joining on the west.

Miller sold his holdings in a bout 1943 and its changed hands several times since. "Bert" Dodendoaph bought it from Miller, but about three months, sold it to Jesse B. Kidwell, who had it for a few years, in which time he sold the timber and it was logged off, and then sold to Jack Stoddard, and after a year or two, Stoddard sold to a man by the name of Witcherly, and in another year or two sold to George W. McCullum, however, it still seems to go by the name of the Witcherly Ranch.

March 4, 1954, **OREGON GULCH,** 669

I don't know how Oregon Gulch got its name. It runs into Jenny Creek on the ranch now owned by George McCullum, but is still called the Witcherly Ranch and heads west from Jenny Creek about two miles, on the east end of Skookum [Keene Creek Ridge] Ridge.

There are several place names in the Oregon Gulch area, Bark Spring about one half mile on the hill north of Oregon Gulch, and near Rose Bud, Shady Spring is on the south side, and so is Smith's Camp. Root Spring and Valentine Spring is in the south head part, while Rancour's Homestead and Shake Spring is in the north head part, and in the divide that slopes toward Kein [Keene] Creek. The Shake Road which is usually called the Oregon Gulch Road these days goes through the head of Oregon Gulch, by Root Spring and Rancour's Homestead.

March 7, 1954, **SHADY SPRING,** 670

South of Oregon Gulch about a quarter of a mile or less, is a spring located in a timbered place, and sort of a pretty place.

It was about 1921 when Roy Hartwell, his father and myself camped there for a few days and made some shakes. During the many years that I was ranger rider for the Pilot Rock Grazing District I salted cattle there.

From the obsidian chips scattered around there shows the place was the camping place for the Indians before the white man came.

The spring didn't have any name till about twenty-five years ago, when Con G. Mulloy and myself were discussing the range and place names, and Mulloy suggested that the spring should have a name, and that Shady Spring would be a good name, because of the shady place where the spring is located, and I agreed.

March 7, 1954, **SMITH'S CAMP,** 671

Near the upper south part of Oregon Gulch, a man by the name of Smith located a timber claim, or homestead, probably in 1908 or before. He built a log cabin and lived there some, and made a lot of posts, and sold them to D. Marshall Horn, of Hornbrook, California. Horn hauled the posts to his ranch with teams or wagons, with four or more horses to the wagon, as was customary with long teams in the early days, they had bells on their hames [manes] which was there to serve about the same purpose as the horns did on the early automobiles, on narrow and crooked roads.

The cabin burned many years ago, and the spot as grown up with trees and brush till it don't look like anyone has ever lived there, and the name Smith's Camp has been almost forgotten.

March 8, 1954, **ROOT SPRING,** 672

In the head of Oregon Gulch by the side of the Shake Road is a spring that's been known as Root Spring, as far back as I can remember. The spring was well named, for there is a tanglement of roots around the edge of the spring. About twenty-five years ago the cattlemen of this area sort of boxed the spring in to make it a better place for the cattle to drink water, and three years ago, some other cattlemen re-boxed the spring with new logs in the same manner. About 1916 Thos. J Hearn and I camped there and made a few shakes near Shake Spring about a half mile northward, also about the same place and made shakes. Root Spring is a well known name place among the Cattlemen of this area.

March 7, 1954, **BARK SPRING,** 673

It was a long time ago when a little group of riders of the range dismounted from there (sic) horses at a spring a little west of Rose Bud not far from Oregon Gulch. One of the riders, Robert Bruce Grieve cleaned the leaves and mud out of the nice cold spring and from a piece of bark from a tree he placed there for the water to run out in, hence the name, Bark Spring, which is still a popular name among cattlemen of the area. As far back as I can remember [sic] there has been a little log cabin there, probably some ones timber claim taken before my time.

March 8, 1954, **VALENTINE SPRING,** 674

Many new calendars have been hung on the wall, probably about seventy of them, since a little group of buckaroos rode up to a little spring in the head of Oregon Gulch. Included in this group was Valentine Griffith, my uncle, Wm. A. Wright, and my father, Thos. J. Wright. It was a dry and hot summer day, and they wanted a drink of water. Griffith cleaned the leaves and mud from the spring, and they soon had a drink of water.

Griffith passed on a dozen or so years ago at the age of eighty-six years. Even in such a short space of time, and as well known as he was in this region, as a buckaroo of the days of old, the name Griffith is being forgotten as time goes by, but his given name, Valentine, still lives among the buckaroos of today, as Valentine's Spring, but few, in any, know how the spring got its name.

March 8, 1954, **CEDAR SPRING,** 675

On the east end of Skookum Ridge, on the south slope, a nice spring comes out of the earth in a cluster of cedar trees, hence the name Cedar Spring, a name well known among the cattlemen.

March 9, 1954, **RANCOUR'S HOMESTEAD,** 676

During the mid-1920's, Ireane Wehhli, a young lady of Ashland, Oregon, located a homestead in the head of Oregon Gulch at Shake Spring and built a little log cabin there. After a year of two she gave it up. In about 1931, George Rancour established his homestead there in the same place, and built a nice, three-room house from logs, He and Mrs. Rancour lived there for about three years during the summer months. After he got his homestead patent he sold the timber, and the place was then logged off. At this time they built a road from Kein Creek which connected with the Shake Road to haul logs out on. A year or two later, Wade H. Wallis aquired the homestead. After a few years Wallis traded it to the United States government, for some land joining his ranch along Jenny Creek.

That was a beautiful place before it was logged off. It is, however, growing up again, so it don't look as bad as it did.

There used to be some fine timber on the place, and in earlier years there were lots of shakes made from the sugar pine trees. Shake Springs is located there, which was usually the camping place of the people while they were making shakes. The shakes were hauled by team and wagons over the Shake Road to their ranches and homesteads.

March 10, 1954, **SHAKE SPRING,** 677

Up till the mid 1930's the end of the road going north to Oregon Gulch, known as the Shake Road, ended at Shake Spring. In the mid-1930's a logging road was built from Kein Creek, to Shake Spring, or Rancour's Homestead, and connected on the Shake Road.

Shake Spring was the camping place for ranchers and homesteaders in the early days, while they were making shakes to cover their buildings with. Shake Springs was located in the timber and was a pretty spot to camp. In about 1916, I camped there with Thos. J. Hearn and made some shakes, and a little later, Walter Herzog and I camped there and make shakes. At this time Herzog went hunting, and killed a deer, and of course, killed it to eat. He made one of his favorite mulligan stews, in it was several different kinds of vegetables, and the parts of the deer, liver, lungs, kidney, heart and brains went in too. That was his way of making stew, cooked in an old iron kettle over a camp fire, it was a pretty good stew. Herzog was a good game shot with his old 38-55 Ballard single shot rifle.

Also during the early 1920's Roy Hartwell, his father, and I camped there and made shakes.

I believe it was in 1888 when Mr. and Mrs. Thos. J. Hearn were camping at Shake Springs to make shakes. With their little baby daughter in her cradle at camp, they left for an hour or two a few hundred yards away to make shakes, and while returning on a cattle trail they saw the tracks of a cougar made minutes before, heading for camp. They hurried to camp and found the baby unharmed, although the cougar tracks were within a few feet of the cradle holding their baby daughter.

May 15, 1954, **ROSE BUD,** 684

Rose Bud is a large knoll, or sort of a butte, west of what used to be the Wallis Ranch. There is quiet a lot of bluffy places on the south and east sides.

A number of years ago John H. Miller reported finding a rattlesnake den there in the rocks while he was hunting deer. No wonder, for it is an ideal place for rattlesnake dens.

I don't know how the place got its name. Its been called Rose Bud as far back as I can remember, however, in late years, some people call it Rose Bush.

Table ADD-4 siaplays the plant community distribution in Oregon Gulch RNA.

ADD-4. Plant Communities within the Oregon Gulch RNA

Plant Community	Acres
Western Juniper/Oregon white oak	115
Oregon white oak/Wedgeleaf Ceanothus	316
Oregon white oak/Ponderosa pine	95
Mixed conifer/California black oak	530

Appendix EE - Scotch Creek RNA Plan

Management Plan
for
Scotch Creek Research Natural Area

Ashland Resource Area
Medford District
Bureau of Land Management
United States Department of the Interior

February 16, 2001

Table of Contents

INTRODUCTION

Research Natural Areas are part of a federal system of land tracts identified and designated to preserve and protect certain natural features for research and educational purposes. The overall goals for establishing RNAs are to provide 1) baseline areas against which the effects of human activities can be measured; 2) sites for study of natural processes in an undisturbed ecosystem; and 3) a gene pool for all types of organisms, especially rare and endangered species. The interagency Pacific Northwest Research Natural Area Committee, composed of federal, state and private organizations in Oregon and Washington, have identified a set of natural elements, or "cells", representing terrestrial and aquatic habitats, plant communities, and ecosystem processes targeted for protection through the RNA system.

The 1,800 acre Scotch creek RNA is located in extreme southern Oregon in Jackson County along the border with California in Scotch Creek.

The area was originally nominated by the Nature Conservancy in 1991, analyzed and evaluated by the Medford District RMP process in 1992 by the Ashland Resource Area, BLM, proposed as a new RNA in the Medford District Proposed Resource Management Plan/Environmental Impact Statement (USDI 1994b) and designated a new RNA under the Record of Decision and Resource Management Plan (USDI 1995a). One of the management actions required by ROD for Special Areas, including RNAs, is development of site-specific management plans. Research Natural Area Management Policy (USDI 1986b) requires development of a management plan that establishes operational objectives to maintain or enhance the unique values of the designated RNA. In addition to operational objectives, a monitoring strategy should be developed to evaluate progress made toward meeting resource management objectives. These requirements establish the basis for preparation of this management plan.

I. POLICY

This management plan references the guidelines established by the Pacific Northwest Interagency Natural Area Committee (PNW 1991), the Medford District Bureau of Land Management (BLM) Management Plan and Record of Decision (USDI BLM 1995a) and BLM Manual Supplement, 1623 Supplemental; Program Guidance for Land Resources (USDI 1987).

Management objectives for RNAs and ACECs, addressed in both plans under the category Special Areas, include directives to:

> Preserve, protect, or restore native species composition and ecological processes of biological communities (including Oregon Natural Heritage Plan terrestrial or aquatic cells) in research natural areas. These areas will be available for short- or long-term scientific study, research, and education and will serve as a baseline against which human impacts on natural systems can be measured.

RNAs should ideally be undisturbed by human impacts, however, because pristine examples of significant ecosystems may not exist, the least altered sites should be selected. They should be sufficiently large to protect key features from significant impacts judged inappropriate for the area and natural processes should be allowed to dominate. In situations where human activities have interfered with natural processes, deliberate manipulations which simulate natural processes are allowed (USDI 1986b).(also see Appendix R)

Research Natural Area Management Policy (USDI 1986b) requires development of a management plan establishing operational objectives to maintain or enhance the unique values of the RNA for each designated area. In addition to operational objectives, a monitoring strategy should be developed to evaluate progress made toward meeting resource management objectives. These requirements establish the basis for preparation of this draft management plan

II. BASIS FOR DEDICATION AND SETTING OBJECTIVES

A. RNA History

The Nature Conservancy, under contract with the BLM State Office, nominated lower Scotch Creek as an RNA in February 1991 because it filled Cell 53, a typical eastern Siskiyou chaparral community, as designated in the 1988 Oregon Natural Heritage Plan (ONHAC 1998). This area was originally nominated as the Slide Creek Ridge RNA and the name was changed when designated. The Oregon Natural Heritage Advisory Council (1998) now refers to Cell 56, Birch-leaf mountain mahogany-ceanothus-rosaceous mixed chaparral. The NHA Council considers that the cell is adequately represented by the Scotch Creek RNA.

The area was analyzed and evaluated by the RMP process in 1992 by the Ashland Resource Area, BLM, was proposed as a new RNA in the Medford District Proposed Resource Management Plan/Environmental Impact Statement (USDI 1994b) and designated as new RNA under the Record of Decision and Resource Management Plan (USDI BLM 1995a). One of the management actions required by ROD for Special Areas, including RNAs, is development of site-specific management plans. Scotch Creek RNA has been under interim management requirements since January 5, 1989.

The RNA is now a part of the Cascade-Siskiyou National Monument and is under the management guidelines in the Proclamation (Clinton 2000 and CSNM RMP) (see Management Restrictions, below).

B. Basis for Dedication

The lower half of Scotch Creek drainage to the California border was nominated as an RNA because it satisfied cells for two Eastern Siskiyou chaparral types: a Rosaceous type dominated by *Quercus garryana* (not mentioned in the original nomination), *Prunus subcordata, P. virginiana, P. emarginata*, and *Cercocarpus betuloides* and a different chaparral community dominated by *Ceanothus cuneatus, Arctostaphylos species* and *Cerocarpus betuloides*. Access was also a consideration in the selection of this particular area.

C. Management Restrictions

The Presidential Proclamation (Clinton 2000) withdraws lands within the Monument from mineral location, entry, and patent and mineral and geothermal leasing; prohibits commercial harvest of timber or other vegetative material; prohibits unauthorized OHV use; but permits continued grazing until completion of a study of grazing impacts on natural ecosystem dynamics.

D. Setting Objectives

The Scotch Creek RNA was established for scientific research and as a baseline study area for chaparral vegetation represented in the area.

III. NATURAL AREA DESCRIPTION

A. Scotch Creek Area Description

1. Location

The RNA is a 1,800 acre (728.5 ha) parcel located in southeastern Jackson County (T.41S.,R.3E., Secs.5 SW1/4;06S1/2;07NE1/4;08;09SW1/4) along Scotch Creek, a tributary of the Klamath River that flows into Iron Gate Reservoir through the Horseshoe Ranch Wildlife Area (California Department of Fish and Game and Redding Resource Area, BLM). Scotch Creek flows to the southeast from the ridge that separates the Klamath and Rogue River below Porcupine Mountain to the north. The area is bounded on the north by the closed Schoheim Road BLM Road 41-2E-10.1, on the west by Slide Creek Ridge, on the east by Lone Pine Ridge, and the Oregon-California border on the South. The Schoheim Road forms a common boundary between the Scotch Creek RNA and the Soda Mountain Wilderness Study Area to the northeast. The small parcel of privately owned land is isolated at the southeast corner of the RNA (T.41S.,R.3E., Sec.16) was recently given to the U.S. Department of the Interior by the Soda Mountain Wilderness Council. This will be incorporated into the Scotch Creek RNA.

2. Access

In the past the Schoheim Road 41-2E-10.1 has provided relatively easy vehicle access to Scotch Creek RNA. However, the National Monument Proclamation closed the Schoheim Road to all mechanized travel except for authorized administrative access for emergency or management purposes. Authorized OHV use is allowed, weather and road conditions permitting. Public access to the RNA by foot or horseback is not restricted.

Scotch Creek RNA is most easily accessed from U.S. 99 via BLM Pilot Rock Road 40-2E-33 to the headwaters of Scotch Creek via Porcupine Gap, then south on the closed Scotch Creek connector road (foot travel only) along Scotch Creek to the north RNA boundary at the Schoheim Road or from the south through the California Department of Fish and Game's Horseshoe Ranch Wildlife Area via the Copco-Irongate Road in Siskiyou County, California. The road north from Irongate Reservoir has a locked gate (California Department of Fish and Game, Shasta Valley Wildlife Area Headquarters, Montague CA) at the south end of the canyon. The road is passable as far as the stone spring house, except when for periods of high water when the ford below the spring house is impassable. The SCRNA southern boundary at the Oregon-California border is reached by a two mile walk on an old road along Scotch Creek. Except for the Horseshoe Ranch Wildlife Area access other routes to the RNA are unavailable much of the year because of snow. Other authorized administrative access or public access (on foot or horseback) is available from the east via the closed BLM Schoheim Road 41-2E-10.1 from the east via Skookum Creek (from Oregon Route 66 to BLM Soda Mountain Road 39-3E-32.2 to 39-3E-28.0 to 39-3E-27.2 to Schoheim Road, Randcore Pass (from Oregon Route 66 to BLM Mill Creek Road 40-3E-12.0 to 12.1 to 19.2 to Schoheim Road or the Jenny Creek Crossing from the Copco Road (private) and BLM Road 40-4E-3.1 to the Schoheim Road. From the west the RNA can be reached from U.S. 99 via the BLM Pilot Rock Road 40-2E-33 to 41-2EB3.0 to the Schoheim Road. The upper northeast part of the RNA can also be reached from Baldy Creek Rd. 40-3E-5 and 40-3E-30, down Lone Pine Ridge Rd to the Schoheim Rd.

3. Ecoregion

The Scotch Creek RNA is located in the Klamath River Ridges Ecoregion (78 of Klamath Mountains (78) Level III Ecoregion (Pater and others 1997a and 1997b). Ecoregions are defined by a number of factors that include: physiography (including elevation and local relief), geology (surficial material and bedrock), soil (order, common soil series, temperature and moisture regimes), climate (mean annual precipitation, mean annual frost free days, mean January and July min/max temperature), potential natural vegetation, land use (recreation, forestry, watershed), and land cover (vegetation present). The following synopsis of the Klamath River Ridges Ecoregion is based on Pater (1997a and 1997b).

78g Klamath River Ridges. (3,800-7,000 feet) The Klamath River Ridges Ecoregion has a dry continental climate and receives on average 25 to 35 inches of annual precipitation. Low elevation and south-facing slopes have a more drought resistant vegetation than elsewhere in the Klamath Ecoregion (78), such as juniper, chaparral, and ponderosa pine. Higher and north-facing ridges are covered by Douglas-fir (*Pseudotsuga menziesii*), white fir (*Abies concolor*), and Shasta red fir (*Abies procera var. shastensis*). Ecoregion 78g has less precipitation, more sunny days, and greater number of cold, clear nights than the Inland Siskiyou Ecoregion (78e) to the west. Shasta red fir is not present in the RNA.

4. Climate

Scotch Creek RNA lies within the influence of the continental climate of the Great Basin and the more moderate wetter oceanic influences to the west. Local climate is further influenced by mountain topography and elevation and tends to be more like that of the Shasta Valley to the south than the Rogue Valley to the north. Winter storms generally come from the ocean. Periodic floods of some magnitude occur when warm wet storms melt existing snow pack. Summers are usually long and dry, with occasional thunderstorms with lightning and with or without precipitation. These summer events are usually more frequent than in the Rogue Valley due to the influence moisture laden air drawn up from the southwest along the eastside of the Sierra Nevada and Cascade Mountains.

Map 11 shows average annual precipitation varying from a low of 24 inches at the southeast corner of the RNA to a high of 34 inches at the northwest boundary. Average annual precipitation at Copco Dam (elevation 2,700 ft.) on the Klamath River to the southeast in California is 19.8 inches (WorldClimate 2000). There is also a National Oceanic and Atmospheric Administration (NOAA) weather station at Howard Prairie Dam (elevation 4,568 ft.) located approximately 13 miles northeast of the RNA in the Jenny Creek Watershed. Average annual precipitation is 32.8 inches at the Howard Prairie Dam station (NOAA 1996). Precipitation during the winter months occurs as rain or snow.

The Howard Prairie Dam NOAA station is the closest weather station with air temperatures (Table AEE-1).

Table AEE-1. Average Air Temperatures at Howard Prairie Dam

NOAA Station (1961-1990)

	Air Temperature (°F)												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Year**
Max	37.5	42.4	45.9	52.2	61.0	70.2	78.6	78.4	71.6	60.7	43.7	36.5	56.5
Min	18.9	21.1	23.8	27.5	33.1	40.0	43.6	43.2	37.7	32.3	26.7	21.1	30.7
Mean	28.2	31.8	34.8	39.8	47.1	55.1	61.1	60.8	54.7	46.5	35.2	28.8	43.6

Source: Oregon Climate Service 2000

5. Topography

Scotch Creek is in a northwest/south east trending steep sided valley that extends from Pilot Rock and Porcupine Mountain on the Rogue/Klamath Divide to the Klamath River where it empties in Iron Gate Reservoir. The watershed is bounded on the west by Slide Creek/Hutton Creek Ridge and the east by Lone Pine Ridge. There is one major tributary that joins the main stem of Scotch Creek at the end of a narrow ridge just above the waterfall in the SE 1/4 NE 1/4 of Section 7. The 30 foot waterfall on the main stem of Scotch Creek is a special topographic feature that prevents the upstream migration of fish. Slide Creek, a major tributary that enters Scotch Creek in the Horseshoe Ranch Wildlife Area in California, is not included in the RNA. The elevation of Scotch Creek in the RNA varies from 3,960 feet where Scotch Creek crosses the Schoheim Road to 3,080 feet at the lower boundary of the RNA at the California border. Highest elevations in the drainage are 5,908 feet at Pilot Rock, 5,200 feet at Porcupine Mountain, 5,403 feet on upper Lone Pine Ridge. Lone Pine Ridge is 3,640 feet at the California border, Slide Ridge, 4,000 feet.

The Scotch Creek RNA comprises about 25 percent of the Scotch Creek subwatershed (see Hydrology section). The RNA is bounded on the north and east by the Schoheim Road, on the south by the Oregon/California border, and on the west by the small ridge between Scotch and Slide Creeks. In the center of the RNA, Scotch Creek splits into two forks, the east and west. Approximately 1/2 mile downstream from the forks is a 30' bedrock waterfall, which prevents upstream migration of fish (Parker 1999). The elevation of Scotch Creek within the RNA varies from 3,960 feet where the east fork of Scotch Creek crosses the Schoheim Road, to 3,080 feet at the Oregon/California border. West-facing slopes are characterized by open grasslands with oaks in the draws; densely vegetated east-facing slopes are dominated by small oaks and brush.

6. Geology

Scotch Creek RNA is mapped as Western Cascade Oligocene basalt, basaltic andesite, and andesite (Tb2) (Smith and others 1985). These flows are interbedded with volcanic breccias and pyroclastic deposits and other rock types too thin, discontinuous, or poorly exposed to map separately. Different rock types in these formations are not mapped because of the scale of the map and the complexity of the formations. Pilot Rock, at the head of the Scotch Creek watershed, and Cathedral Cliffs just to the east of Lone Pine Ridge on Camp Creek are mapped as mafic intrusive rocks (Tm) and are outside the present RNA boundaries (Smith and others 1985).

7. Soils

Soil information for Scotch Creek RNA is based on the Soil Survey of Jackson County Area, Oregon (USDA 1993). There are six mapped general soil units in the RNA (map 50). Because of the small scale of the map and the large area covered, mapped units are often presented as complexes of different soil types. Number of acres, percent of RNA, productivity class and site index (if any) of the soil types found in the RNA are summarized in Table AEE-2. About 79 percent of the RNA consist of clay or rock outcrop soil complexes. The balance (21%) are soil types capable of supporting mixed conifer stands.

Table AEE-2. Scotch Creek RNA Soil Units

Soil #	Unit Name	Percent Slope	Acres	Percent Acres	Productivity Class *	Site Index **
14G	Bogus very gravelly loam, north slopes	35 to 65	323.2	18.1	***PSME 70 PIPO 90	6 6
81G	Heppsie clay, north slopes	35 to 70	151.9	8.5	-	-
82G	Heppsie-McMullin complex	35 to 70	403.5	22.5	-	-
113G	McMullin-Rock outcrop complex	35 to 60	865.6	48.4	-	-
114G	McNull gravelly loam, north slopes	35 to 60	15.2	0.8	PSME 80	7
116E	McNull-McMullin gravelly loam	12 to 35	15.2	0.5	PSME 70	6

(USDA,1993)*Site Index. Height and age of selected trees in stands of a given species. A designation of the quality of a forest site based on the height of the dominate stand at an arbitrarily chosen age. Average height at 50 yrs = 75 feet. SI is 75. Age varies with species and soil type: 100 yrs. PSME on Pokegama and Woodcock units, PIPO all units; 50 yrs. PSME on all other units, ABMASH, and ABCO. ** Productivity Class. Yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands. ***PSME = *Pseudotsuga menziesii*, Douglas-fir; PIPO = *Pinus ponderosa*, ponderosa pine; ABCO = *Abies concolor*, white fir.

8. Hydrology

Scotch Creek Subwatershed is 11,503 acres (18 sq. mi.); 62.5 percent of the ownership is BLM, 30.3 percent State of California, and 7.2 percent private. There are 109.5 total stream miles with a stream density of 6.1 miles per square mile. Scotch Creek Subwatershed contains 4.7 miles of fish-bearing streams and based on aerial photo estimates, 5.5 miles of perennial non-fish bearing streams, 60 miles of intermittent streams for a total of 70.2 miles of stream with riparian reserves (USDI-BLM 2000a). Scotch Creek enters the Klamath River system as a fifth order stream at Iron Gate Reservoir. There are no mapped springs on the USGS 7.5 Quad maps for the RNA. There are no water developments within the RNA, however there is a 0.033 acre-foot reservoir used for livestock watering on an unnamed tributary to Scotch Creek above the RNA.

Stream gradient of Scotch Creek is low to moderate from Iron Gate Reservoir to the Oregon border, but steepens beyond that point. The channel meanders through a narrow valley near the confluence with Slide Creek, then it is confined in a narrow V-shaped valley with steep hillslopes to its headwaters (USDI-BLM 2000a). Substrate material in Scotch Creek is cobble and boulders over bedrock with some gravel and fines. Riffles and cascades dominate the average stream profile. Three stream channel morphology types were identified for the Scotch Creek Subwatershed using the Rosgen classification system (Rosgen 1996): Aa+ (74 miles), A (10 miles), and B (25 miles). The main stem of Scotch Creek, and the lower reaches of Slide Creek and the main unnamed tributary above the waterfall are classified as B type channels. B stream types are moderately entrenched, having a moderate gradient, riffle dominated channel with infrequently spaced pools. These channel types have a very stable plan and profile with stable banks. The A channel types are steep, entrenched, cascading, step / pool streams. They are high energy streams located in the headwaters of Scotch Creek. The Aa+ channel types are very steep (greater than 10 percent slope) and deeply entrenched.

There is little data available on water quality or quantity in Scotch Creek, except for a few water quality measurements taken on July 29, 1975 by a BLM fish survey crew and what Parker obtained during his aquatic surveys on June 30 and July 1, 1999 (Parker 1999). Throughout the RNA, Scotch Creek was quite cool: 50-52°F above the falls, and 56°F below (USDI 1999c). At one spring in the upper watershed, water temperatures were a healthy 48-49°F (Parker 1999). At the time of the survey, Scotch Creek was intermittent above the junction of the two forks with a permanent flow below.

The 1975 measurements, taken 50 yards upstream from the mouth of Scotch Creek, were air temperature 68°F, water temperature 66°F, dissolved oxygen 8.5 ppm, pH 9.0, CO_2 60 ppm, free acidity 0 for both high and low range, and total hardness 205.2 ppm. Parker (1999) found that water temperatures varied from 9-9.5°C (48.2-49.1°F) at cold water inputs to 14.5-16.5°C (58.1-61.7°F) at the reservoir and in open meadows near the upper reaches of the stream. Temperatures ranged from 10.0-11.5°C (50-52.7°F) throughout the rest of the stream. Parker also noted that at the time of his survey, Scotch Creek was intermittent above the junction of Scotch Creek and the major tributary and perennial below.

Water quality in the RNA has probably been affected by road building and past logging in the upper portion of the Scotch Creek Subwatershed. The decommissioned Porcupine Gap / Schoheim Road connector is within the riparian zone adjacent to the upper reach of Scotch Creek. The natural surfaced Schoheim Road with its culvert crossings on the main stem of Scotch Creek and many tributaries had a detrimental affect on the sediment regime in the Scotch Creek system. In the fall of 1998, the BLM improved drainage structures and seasonally blocked the section of the Schoheim Road within the Scotch Creek Subwatershed. This road work reduced the amount of sediment moving into the Scotch Creek system.

9. Vegetation

Scotch Creek RNA was established on the basis of a large area of chaparral dominated by members of the Rosaceae (*Prunus species, Amelanchier, Cercocarpus, Holodiscus*) primarily located on the east-facing slopes of Slide Ridge. The grassy, west-facing slopes of Lone Pine Ridge contained stands of perennial native grass which were dominate grassland species in former times. Little was known of the nature of the plant communities and their plant species.

Brock and Callagan (1999a) conducted a general inventory of plant community types in April-August 1999 that greatly increased our knowledge of Scotch Creek RNA plant communities. A list of plant species is provided in Appendix E. They point out several interesting floristic features of the RNA. Poison oak occurs at a single location, in a steep rock outcrop formation in the far northeast corner of the RNA. Poison oak is common at similar elevations both north and south of the RNA. Madrone is also absent, although it is common in the Rogue River watershed to the north. The grasslands contain native perennial grasses with low cover. Small areas of nearly pure Idaho fescue and bluebunch wheatgrass were found. Other grasslands best described as "mixed annual-perennial dominance" have 10-15 percent cover of native species, and a high percentage of cover by introduced grasses species, and weeds. They also describe an important broadleaf maple-black oak forest riparian community associated with the perennial Scotch Creek stream system.

In their study they distinguished 11 different community types of varying degrees of cohesiveness of five different types: Riparian, Oregon white oak woodland, Grassland, Chaparral, and Conifer. Map 32 shows the distribution of the community types in the RNA. The following description is taken with some modification from Brock and Callagan (1999a).

Riparian Types

Two riparian communities are present: one dominated by trees; another by shrubs.

California Black Oak-Bigleaf Maple Riparian Woodland

This distinctive riparian woodland type occupies a wide zone in the alluvial bottoms of Scotch Creek and a more narrow zone in the lower reaches of several of the smaller side streams. On Scotch Creek these woodlands extend upslope on cool aspects for 100-200 feet above the creek bottoms. The alluvial soils sometimes form wide low terraces. Elevations range from 3,000 feet to 4,400 feet. This riparian zone forms a major wildlife corridor through the RNA.

Bigleaf maple (average 38% cover), black oak (18%) and Oregon white oak (16%) dominates the tree layer with occasional Douglas-fir, ponderosa pine and rarely black cottonwood or white alder. The shrub layer is usually dense with mock orange, tall Oregon grape, tall snowberry and serviceberry. The herb/grass layer varies, typically dominated by *Claytonia spp., Galium aparine, Tonella tenella, Vicia americana* and, in drier spots, *Bromus sterilis*. Two special Status species are associated with this type, *Ribes inerme ssp. klamathense* and *Isopyrum stipitatum.*

Riparian Shrub Community

On the middle and upper portions of the many tributaries which dissect the west slopes of Lone Pine Ridge (and the entire reaches of the southern-most tributaries that traverse the rocky "Lower Slope Complex") is a distinctive shrub-dominated community which typically occupies a very narrow band (50 ft. wide) with dry grasslands or rock outcrop beyond its margins. These riparian zones typically also have open exposed stretches between shrub patches. Most of these streams are perennial. A very high level of butterfly activity was observed at these sites (Brock and Callagan, 1999a)

Oregon white oak and western juniper are usually present with low percent cover. Mock orange (average 40% cover) dominates the shrub layer with willow, tall Oregon grape, and chokecherry common. *Rosa californica* is occasional. The herb layer is dominated by *Mimulus guttatus* and *Trifolium variegatum* (in the aquatic zone) with *Bromus sterilis* and *Poa bulbosa* (on the drier margins). Howell false-caraway (*Perideridia howellii*) is common.

Oregon white oak / Woodland Type

Brock and Callagan (1999a) describe a single oak woodland type.

Oregon white oak / Tall Oregon Grape Woodland

While Oregon white oak (also known as white oak) is a common co-dominant species in virtually all of the forest and chaparral plant communities in the RNA, it forms nearly pure stands in much of the area; these areas are mapped as Oregon white oak woodland. This type is found in several situations; it forms the outer margin of the riparian woodlands, extending upslope when soil depth allows; it extends up sidestream canyons in wide bands, it forms patches in open grassland communities (apparent clonal patches), and it is a component of the large chaparral-complexes which cover the upper slopes of Lone Pine Ridge and the east slopes of Slide Ridge. It occurs on Bogus (very gravelly loam) and Heppsie (clay) soils.

Oregon white oak cover is nearly always very dense (average 85%). Western juniper is often present at low cover. California black oak is present in draws or moist areas. The shrub layer is dominated by tall Oregon grape and tall snowberry with covers of each averaging 10-12 percent. Klamath plum and chokecherry are often present. The herb layer is variable depending on the density of the shrub layer; where shrubs are dense, the herb layer is sparse. The herb layer cover varies from under 10 percent to over 50 percent. Typical species include *Claytonia*, *Nemophila parviflora*, *Viola sheltonii*, *Bromus sterilis*, *Yabea microcarpa*, *Lithophragma parviflora* and *Marah oregana*. Isopyrum stipitatum, a rare species, is fairly frequent. This Oregon white oak woodland is not adequately described in current plant association guides for southwest Oregon.

In much of this community the oaks are dense and stunted, averaging 15-20 feet in height. Stems in many of these stands are 60-70 years old with diameters of only 4-6 inches. Occasional large trees are encountered but small diameter trees are the rule. Apparently, these stands developed under a frequent fire regime. It is possible that many of the patches are clonal and of very great (undeterminable) age. Many of the more stunted trees have a resemblance to *Quercus garryana var. breweri* but the length of the leaves consistently indicates that these are *var. garryana*.

Rock Outcrops

Rock outcrops are sparsely vegetated with the most frequent species being Juniperus occidentalis, Prunus subcordata, *Bromus tectorum* (cheatgrass), *Pseudoroegneria spicata*, *Alyssum alyssioides*, *Penstemon deustus* and *Lomatium californicum*. At higher elevations, *Sedum obtusatum* is common. A large population of Woodsia oregana also occurs at the higher elevations. A large sprawling member of the *Hydrophyllaceae*, *Phacelia ramosissima var. eremophila*, an interesting eastern Oregon species that is uncommon here, was found in protected (shady) areas of rock outcrops. The distinctive Scotch Creek RNA rock outcrop plant community is frequently associated with grassland complexes and with outcrops in tree and shrub dominated communities.

Grassland Types

Brock and Callagan (1999a) recognize grassland complexes based on elevation and their association with rock outcrops or Oregon white oak Woodlands.

Low Elevation Grassland-Rock Outcrop Complex

Lower elevations have a well defined zone which is significantly more shallow and rocky than higher elevations. The zone's upper limit is at approximately 3,350 ft. elevation, the same elevation as the major waterfall on Scotch Creek and the series of rock outcrops west of Scotch Creek. This may represent a geological break between old and "new" volcanic flows. Soils are all classified as McMullin-Rock Outcrop Complex (the proportion of rock outcrop is quite high). The elevation ranges from 3,000-3,350 feet. This grassland here forms a mosaic with rock outcrop communities, Oregon white oak woodland and wedgeleaf ceanothus-Klamath Plum chaparral in approximately the following proportion:

20% - Rock Outcrop
60% - Dry grassland
15% - Oregon white oak Woodland
5% - Oregon white oak / Klamath Plum-Wedgeleaf Ceanothus Chaparral

The grassland component in this area is dominated by annuals with a regular low cover of bluebunch wheatgrass. It differs significantly from the mid to upper slope grasslands in several respects including:

- dominance by the exotic grasses *Bromus tectorum* and *B. japonicus*
- *Bromus hordeaceus* much less abundant.
- high frequency of *Prunus subcordata*
- high frequency of *Lomatium californicum*
- higher frequency and cover of *Lupinus albifrons*
- very low frequency and cover of Medusahead (*Taeniatherum caput-medusae*)
- low frequency of star thistle (*Centaurea solstitalis*)
- relatively higher frequency and cover of *Agoseris heterophylla, Lomatium macrocarpum* and *Trifolium ciliolatum.*

The area is on a southeast aspect with significant due south and due west aspects represented. On the east slopes of Slide Ridge are several small rock outcrop openings which should be classified as this type though several of these support dense stands of Idaho fescue which is sparse east of the creek where heavy grazing has been continuous for 150 years. Significant surface erosion has occurred due to grazing but no rills or gullies are obvious. The surface layer is very gravelly with 30-50 percent exposed gravels and soil.

Middle and Higher Elevation Grassland-Oregon white oak Woodland Complex
Soils are significantly deeper, slopes tend to be more moderate with occasional "bench" topography above approximately 3,350 feet elevation. The grasslands here tend to have denser cover than the lower grasslands. Most of the area is still dominated by exotic annual grasses and forbs. Idaho fescue or bluebunch wheatgrass dominates the occasional patch of grass. However, patches of star thistle which is rapidly moving-in from the south and east are more frequent.

All soils are McMullin-Rock Outcrop Complex although the proportion of rock outcrop is much lower than in the Lower Grassland Complex. Elevation ranges from 3,350 to 4,200 feet. The plant community is on a southwest aspect with significant due south and due west aspect represented. Significant surface erosion has occurred due to grazing but no rills or gullies are obvious. The surface layer is gravelly with 20-30 percent exposed gravels and soil. The type is a mosaic of grassland with Oregon white oak woodland and a small amount of wedgeleaf ceanothus- Klamath plum chaparral.

5% - Rock Outcrop
65% - Dry grassland
18% - Oregon white oak Woodland
2% - Oregon white oak / Klamath Plum-Wedgeleaf Ceanothus Chaparral

Astragalus californicus, a species previously considered "possibly extinct in Oregon", was found in this grassland community. It is often associated with fairly dense patches of bluebunch wheatgrass. This is the only known Oregon location for this species.

This community is at serious risk of further invasion by star thistle. Many incipient populations are present in the northwest half of the area. The southeast half is already infested by large star thistle populations. The soils have the right combination of adequate depth and periodic exposure (through erosive mechanisms) to allow for the continued spread of starthistle. This should be considered the biggest threat to the integrity of the community.

Chaparral Types

Brock and Callagan (1999a) discovered that the eastern Siskiyou rosaceous chaparral for which the RNA was established consists of three relatively distinct plant communities.

Oregon white oak/Klamath Plum-Wedgeleaf Ceanothus

This community is a minor component of the RNA, occurring on the lower and middle slopes of the west aspects of Lone Pine Ridge and extending south across the Oregon/ California border. It is a typical dry-site chaparral but appears to be fairly localized in occurrence. It differs significantly from similar communities in the Applegate Valley because poison oak is absent here. This community may extend up the Klamath River Canyon to the east.

Oregon white oak is always present, usually in shrub form, at a cover which can vary widely depending on soil depth. Wedgeleaf ceanothus and Klamath plum are both usually present with covers averaging 23 percent and 57 percent, respectively. Klamath plum is clearly the more abundant species on most sites. Birchleaf mountain mahogany is common at the higher elevations with covers of up to 5 percent. Annual grasses (*Bromus japonicus, B. tectorum and B. mollis*) dominate the grass/forb layer with frequent *Lomatium californicum, Claytonia perfoliata* and *Dichelostemma capitata.*

The soils supporting this type are classified as McMullin-Rock Outcrop complex. Elevation ranges from 3,000 to 4,000 feet. The aspect is south to southwest. Slope position is lower to mid-slope. This community typically has very gravelly surface soils.

Oregon white oak/Mountain Mahogany-Klamath Plum Chaparral Complex (Lone Pine Ridge)

The upper slopes of the west face of Lone Pine Ridge are covered with a dense chaparral consisting of a mix of Oregon white oak, birchleaf mountain mahogany, with a regular presence (but low cover) of Klamath plum. Some areas are dominated by Oregon white oak with reduced levels of mountain mahogany; other areas are dominated by mountain mahogany with Oregon white oak cover reduced; much of the area is a more or less equal mix of these two. Where mountain mahogany is the dominant (and Oregon white oak cover low), canopy gaps are frequent and the herb layer is significantly more dense as well as more diverse with several dry-site (grassland) species occurring in the canopy gaps. Most of the area is very dense and extremely difficult to walk through.

Throughout the area, the dominant herb-layer species are Claytonia (both *perfoliata* and *parviflora*), *Galium aparine*, and *Nemophila parviflora*. These species are the same as are found to be dominant in the Oregon white oak Woodland type and in the chaparral on Slide Ridge. However, three other species were found in high frequency in this complex; *Hydrophyllum occidentale* (average 2% cover), *Osmorhia chilensis* (1%) and *Clarkia rhomboidea* (average 2% cover). These elements are significantly different than the Slide Ridge chaparral complex.

The complex consists of roughly the following proportions:

40%"Mixed Type" with Oregon white oak averaging 60 percent cover and mountain mahogany averaging 50 percent cover with 3 percent chokecherry and 3 percent Klamath plum and with 4 percent tall snowberry. This type closely resembles some of the drier, mountain. mahogany dominant chaparral) found on Slide Ridge.
30% "Dry Type" with Mountain mahogany averaging 65 percent and Oregon white oak

averaging 5 percent. Klamath plum is usually present a 1 to 2 percent cover. Chokecherry and snowberry are usually absent. This type has frequent small open spots with dry-site species such as *Collomia grandiflora, Bromus sterilis, Lomatium californicum* and *Eriophyllum lanatum*.
10% Oregon white oak Woodland: see separate description for the type; it occurs here fairly randomly often in the form of a large (apparent) clone in the middle of one of the other types.
10% Grassy openings; with typical mid-slope annual-grassland species; star thistle was not seen in this part of the RNA.
10% Rock outcrops

There does not seem to be any apparent aspect affinities in this complex except that the "Dry" Type (mountain mahogany dominant) seems to prefer the more southerly aspects. For the most part, the types are apparently randomly mixed.

The soils supporting this type are mapped as Heppsie-McMullin complex. The elevations ranges between 4,200 and 5,100 feet. The aspects is mainly southwest with some due west and some due south.

<u>Oregon white oak/ Mountain Mahogany-Snowberry Chaparral Complex (Slide Ridge)</u>
On the entire east slope of Slide Ridge (west of Scotch Creek) is a complex similarly dominated Oregon white oak and mountain mahogany but is more moist than the Lone Pine Ridge complex. There is considerable variation in species composition across the slope and some patterns are discernable. However, there are no clear delineations, and all of the "types" more or less intergrade. The vegetation is fairly uniformly short-statured (10-20 feet in height) and moderately dense. It can be traversed on foot with reasonable ease, though fairly slowly. The tree/shrub layer cover is consistently high, averaging 90 percent. Oregon white oak is always present with an average cover of 54 percent. Mountain mahogany is usually present with an average cover of 30 percent. Snowberry is usually present with an average cover of 18 percent. Serviceberry, tall Oregon grape, Klamath plum and chokecherry all have high frequency and average 2-9 percent cover. Mock orange (*Philadelphus*) and Indian plum (*Oemleria*) occasionally occur. Claytonia (*perfoliata* and *parviflora*) and Galium aparine dominate the herb layer with Smilacina racemosa usually present. Other high frequency species include *Nemophila parviflora, Viola sheltonii* and *Clarkia rhomboidea*. This complex differs from the Lone Pine Ridge chaparral complex in the consistent high cover of snowberry (average 18%), the consistent presence of *Smilacina racemosa* and *Viola sheltonii* and the significantly lower cover of *Hydrophyllum, Clarkia rhomboidea* and *Osmorhiza* chilensis. It also lacks the dry grassland species which are fairly frequent in the Lone Pine Ridge chaparral.

While it is difficult to distinguish distinct types in this complex, there are some patterns which can be described. The complex is roughly composed of the following mix of community types:

40% - Oregon white oak-Mt. Mahogany; Oregon white oak Dominant: This type averages 60-70 - percent Oregon white oak and 20 percent mountain mahogany with 20 percent snowberry; it is fairly moist and occurs on northeast, east, southeast aspects.
20% - Oregon white oak-Mt. Mahogany- Mt. Mahogany dominant: This type averages 30-35 percent Oregon white oak and 60 percent Mountain mahogany with snowberry much less abundant; it is fairly dry and usually occurs on southeast aspects. This type is closely related to the "mixed" type of the Lone Pine Ridge upper complex.
10% - Oregon white oak Woodland: see the separate description for this type. It occurs here on east and southeast aspects, typically on lower slope position..
5% - Riparian: in each of the small draws which dissect the area there is a narrow band dominated by dense Philadelphus, with Holodiscus and occasional bigleaf maple.
5% - Rocky grassy openings: typically on southeast aspects, often with a strong native Idaho fescue component.

20% - Sites with Douglas-fir-Oregon white oak or Douglas-fir/Serviceberry-Oregon Grape conifer potential are mostly currently dominated by Oregon white oak (40-50% cover), mountain mahogany (20-25% cover) and snowberry (32% cover) like the previous two types, but also have consistent serviceberry cover (20%). Also distinctive in this more moist type is the regular presence of chokecherry, baldhip rose, silktassle, *Oemleria*, *Lonicera ciliosa* and occasional thimbleberry. The herb layer also has some distinctive species such as *Trientalis latifolia* and *Moehringia macrophylla* which are both usually present with a 2 percent cover. Douglas-fir, black oak and ponderosa pine are present in some of the areas. The potential for some of this area is for a open canopied Douglas-fir or ponderosa pine overstory with Oregon white oak or black oak in the understory and continued fairly dense shrub layers. Some areas are trending toward the Douglas-fir/ Serviceberry-Oregon Grape (PSME/AMAL-BEPI) type. Other areas seem to be more trending toward keeping Oregon white oak as a co-dominant. It is probable that most of this area has not seen much more than scattered conifers for a long time due to repeated fires, but given enough time without disturbance, the conifer component would develop. This does not mean that the area "should" be pushed toward conifer dominance, it just means that the ecology of the area is more difficult to interpret than was formerly thought. These conifer-potential sites are on north and northeast aspects, often clearly delineated by ridge lines.

The soils in this area are mapped as Bogus very gravelly loam with large inclusions of Heppsie-McMullin complex. Aspect includes north through southeast with northeast dominant. The elevation ranges from 3,000 feet to 4,100 feet.

Conifer Types

Two distinct conifer communities are present in the RNA.

Douglas-fir/Serviceberry-Tall Oregon Grape

This plant association occasionally occurs in the Applegate Valley (though in limited areas). Brock and Callagan (1999a) use this name for this particular Scotch Creek RNA plant community. They have not seen it in the Southern Cascades except in this area. The community is characterized by a lack of white fir, a consistent cover of serviceberry and tall Oregon grape and a lack of poison oak (the latter is not unique here, of course, but in the Applegate Valley its absence would be quite distinctive for the Douglas-fir series). Even though Scotch Creek RNA has totally different soils, this community appears to be nearly identical to the stands found in the Applegate Valley, west of the planning area.

The community occurs on north and northeast slopes mostly at the north end of the RNA. Soils are mapped as Bogus and McNull gravelly loams.

Some of the conifer stands on Slide Ridge, currently dominated by ponderosa pine, are probably best combined with this community. High black oak cover, low Oregon white oak cover and a regular, fairly dense cover of serviceberry and Oregon grape are good characteristics to use identify the community.

White Fir/Dwarf Oregon Grape

This type occupies a small portion of the RNA, at the north end near the east fork of Scotch Creek and at the summit of Lone Pine Ridge on a northeast aspect. The soils are McNull gravelly loam and Farva cobbly loam. Conditions are cool and moist and soils are sufficiently deep to support dense conifer growth. This area represents the lower edge of a typical forest type in the area to the north outside of the RNA. White fir is dominant with an average of 60 percent cover; Douglas-fir is co-dominant (30%). The shrub layer has dwarf Oregon grape (24% cover). The herb layer has *Smilacina stellata* (3%) and *Trientalis latifolia* (2%) as dominants.

10. Exotic Plants and Noxious Weeds

Scotch Creek RNA has a number of exotic plants (annual grasses) and yellow starthistle, a listed noxious weed. Because of disturbed soil from grazing practices, and the adjacent Schoheim Road, the RNA is at risk to invasion by other weeds, most immediately Dyer's woad.

Starthistle

Brock and Callagan (1999a) consider the active invasion of starthistle in the mid to high elevation grassland communities to be the main management concern in the RNA. They have discovered that approximately 200 acres in the southeast portion of the RNA is currently seriously infested with star thistle. About 10 percent of that area is heavily infested while 30 percent has light to moderate cover. Patch size varies from 200 sq. ft. to up to 2 acres. Another 200-300 acres of similar habitat is vulnerable to invasion in the near future. Incipient populations are also present along the Schoheim Road. South of the state line fence in California the situation is much worse with most of the grasslands already occupied by star thistle. This area will continue to act as a seed source. Annual-dominated grasslands offer a fertile place for establishment due to the periodic availability of bare soil. One strategy for management may be to establish a higher level of native grass cover to limit the bare soil available for star thistle.

Dyer's Woad

This noxious weed was recently collected along Lone Pine Ridge Road above the Schoheim Road less than 1,500 feet up hill from Scotch Creek RNA. This noxious weed has the potential to colonize dry hill sides very rapidly.

Medusahead

Brock and Callagan (1999a) found that low elevation grassland were somewhat resistant to invasion by Medusahead that they attributed to shallow soils. They suggest that these might be good areas to seed with bluebunch wheatgrass and Idaho fescue.

Other exotic weeds and annual grasses include such species as Japanese brome (*Bromus japonicus*), cheatgrass (*Bromus tectorum*), chess (*Bromus secalinus*), bulbous bluegrass (*Poa bulbosa*), Klamath weed, (*Hypericum perforatum*), and hedgehog dog-tail (*Cynosurus echinatus*)

11. Special Status Plants

In addition to their plant community study, Brock and Callagan (1999b) surveyed for special status plants. They found nine species listed by ONHP (Table AEE-3). The listing of Saw-tooth sedge (*Carex serratodens*) is tentative, awaiting confirmation. Other occurrences of this species have been found in the Applegate River drainage.

Brock and Callagan (1999b) searched the Scotch Creek RNA for three other plants with special status in Oregon, Ashland thistle (*Circium ciliolatum*), Gentner fritillary (*Fritillaria gentneri*), and Siskiyou four-o'clock (*Mirabilis greenei*), but could not find them. Other plants of interest found in the RNA include Tracy pea (*Lathyrus lanzwertii* var. *tracyi*), Parish nightshade (*Solanum parishii*), and Klamath Basin milkvetch (*Astragalus californicus*). The milkvetch is the most significant, since this is the only known Oregon location. Mountain lady's-slipper (*Cypripedium montanum*) is also Northwest Forest Plan Survey and Manage species.

12. Forest Health

The Scotch Creek RNA has few conifer communities. A few riparian areas have white fir stands, Douglas-fir and Ponderosa pine occur on northerly slopes, and in scattered pockets on the ridgelines. The few older stands present have a high density shade tolerant conifers in the understory, likely a result of fire suppression activities. Insects and disease have been documented but are not at epidemic levels.

Table AEE-3. Scotch Creek RNA Special Status Plants				
Scientific Name	**Common Name**	**TNC Rank**	**BLM / Federal Status**	**ONHP List**
Astragalus californicus	California milk-vetch	G4?/S1	A	2
Carex serratodens	Saw-tooth sedge	G4?/S2	A	2
Cypripedium montanum	Mountain Lady's-slipper	G4G5/S4	T	4
Isopyrum stipitatum	Dwarf isopyrum	G4?/SU	A	3
Lathyrus lanszwertii var. tracyi	Tracy peavine	G?/T3/S1	T	3
Microseris laciniata ssp. detlingii	Deling microseris	G4T2/S2	S	1
Ribes inerme ssp. klamathense	Klamath gooseberry	G5T3?/SU	T	3
Perideridia howellii	Howell false-caraway	G4/S3	T	4
Solanum parishii	Parish nightshade	G4/S?	T	3

13. Animals

There have been no large-scale vertebrate surveys done Scotch Creek RNA. However, there are lists for the general area that indicate species that might be expected in the RNA (see for all terrestrial vertebrates Nelson (1997) for Soda Mountain Area and Trail (1999) for birds. Other workers have inventoried the RNA for breeding birds (Alexander 1999), aquatic organisms (Parker 1999) and butterflies (Runquist 1999).

Mollusks

Parker (1999) discovered pebblesnails (*Hydrobidea, Fuminicola*) in the main channel of Scotch Creek and in the main tributary at T.40S.,R.2E.,Sec.1,NE1/4. The snails were at discreet locations in the stream associated with cold water inputs detailed in the Hydrology discussion above. The sites were also associated with flow rates that would prevent the settling of fine sediments on the surfaces of coarse sediments, and where enough sunlight penetrated the canopy to stimulate diatom growth. Parker suggests that the pebblesnails might be localized or endemic species since they have no way to move between streams.

Aquatic Insects

Cursory visual surveys of aquatic insects in the Scotch Creek RNA found that the aquatic insect community seemed similar to those in nearby Dutch Oven and Camp Creeks (Parker 1999). If so, it is possible that the insect community in Scotch Creek reflects glacial isolation. Intensive sampling in Dutch Oven Creek (in October, 1993) discovered many species that are more typical of moist, coastal, higher-elevation streams in the western Cascades (Aquatic Biology Associates 1993). Due to the isolation of Dutch Oven and Scotch Creek, there is a high probability that some of the aquatic insects are endemic to these streams. Further sampling may provide answers in the next few years.

Terrestrial Insects
Runquist (1999) collected 60 species of butterflies (Appendix Q) in the Scotch Creek watershed the summer of 1999. Because of access problems only the northern section of the RNA was sampled. Fifty butterflies were collected in the RNA. An additional 10 species were collected along the decommissioned Scotch connector road from Porcupine Gap to Schoheim road at the north end of the RNA. The remarkable butterfly diversity is a reflection of the geographic location of where ecoregions meet, the diversity of host plants, and the variety of ecological niches.

Amphibians
Parker (1999) surveyed Scotch Creek for stream-dwelling amphibians in early July, 1999. He found none within the RNA. This seemed unusual, since all aquatic habitat requirements were present for Pacific giant salamanders (*Dicamptodon tenebrosus*) and tailed frogs (*Ascaphus truei*). Dicamptodon is found in upper Jenny, Keene, and Cottonwood Creeks (Parker 1999). However, these two species appear to be very sensitive to aspect in southern Oregon. It is likely that the combination of dry terrestrial environment predominately hot, dry, south-facing slopes and the low summer water flow makes it difficult for adults to migrate into the watershed from adjacent populations, and for aquatic juveniles to persist during droughts (Parker 1999).

Fish
The falls on Scotch Creek appear to be a fish barrier. Surveys in July, 1999 found no fish above the falls (Parker 1999; USDI 1999c). Therefore, within the RNA, fish reside in only about the first 1 km (0.6 mile) of Scotch Creek.

Fish in Scotch Creek appear to be redband trout (*Oncorhynchus mykiss* ssp.) (Parker 1999). Genetic studies will have to be completed in order to determine whether this population of trout is the closely-related but more common rainbow trout (Oncorhynchus mykiss), or is, indeed, redband trout.

Birds
Alexander (1999) conducted a breeding bird survey of the RNA in June 1999. Twenty monitoring stations were established. Sixteen were visited twice. A total of 47 species were encountered. Sixteen species are conservation focal species for Oregon and / or California.

Spotted Owls are known to nest in the immediate vicinity of the RNA. Timbered portions of the RNA have been mapped as roosting and foraging habitat using modified McKelvie Spotted Owl habitat criteria.

14. Alien Animals
There are no alien animals known in the area with the exception of cattle. Opossum and starlings are documented from the lowlands in the Rogue and Shasta Valley, but haven't been documented in the RNA.

Cattle. This area is part of the Camp Creek Pasture of the Soda Mountain allotment.

15. Site History
There have been no cultural resource surveys of the Scotch Creek RNA and no archeological or historical sites have been recorded. Native Americans who may have visited the Scotch Creek and utilized its resources include the Klamath and the Shasta.

There were numerous resources upon which these native peoples depended. Roots and bulbs, such as camas (*Camassia*) and various forms of Perideridia (*e.g. ipos, yampa*) provided starchy stapes as did acorns from oak trees. Fish, deer, elk, and small mammals provided staple proteins, augmented by a wide variety of berries, nuts, seeds (e.g. tarweed seeds, *Madia* spp.). Other plants and animals were used for fiber, tools clothing, and medicines.

Native peoples employed a number of techniques to enhance those resources useful to them. Fire was probably the most significant tool. Fire assisted in promoting and maintaining staple crops, such as acorns and tarweed, and maintained open meadows and prairies, which were crucial locations for subsistence resources including game, roots, bulbs, berry patches, and grass seeds. Fire also promoted habitat important to large game. Burning took place during the spring or fall and at specific intervals, and contributed to the development and maintenance of prairies and savannahs, oak and oak/pine woodlands, and upland meadows (Pullen 1996).

Settlement of southern Oregon by Euro-Americans increased substantially after gold was discovered in Jacksonville in 1852. Newcomers settled throughout the Rogue Valley, utilizing open savannas and grasslands for agriculture and livestock ranching. Conflicts over land between miners and settlers and native Americans culminated in removal of the remaining Native Americans. The Klamath Indians were confined to the Klamath Reservation east of the Cascades. Some Shasta families however, managed to remain in the Shasta Valley and along the Klamath River, or escaped from the northern reservations to find their way home.

Historical land use of the Scotch Creek area by Euro-Americans has been predominantly grazing in the open meadows and pine/oak savannas. Reports indicate the area was heavily grazed by cattle for more than 100 years.

16. Human Features

There are no human-made features in the RNA with the exception of the Schoheim Road and the short unnamed spur road south of the Schoheim between the two branches of Scotch Creek. An old road remnant is present in the bottom of Scotch creek.

B. Surrounding Land Use

The RNA is surrounded by Monument lands on the north, west and east. The Soda Mountain Wilderness Study Area is adjacent to the northeast and is managed to maintain its wilderness values (USDI 1995d). The Horseshoe Ranch Wildlife Area (Redding BLM and California Department of Fish and Game) along the southern boundary is managed by the California Department of Fish and Game primarily as deer winter range.

IV. MANAGEMENT CONSIDERATIONS

Botanical/Plant Communities

Agency Standards

The following standards, policies, and directives regard maintaining, protecting or restoring relevant and important botanical values of RNAs:

- The overall goal of RNAs is to preserve natural features in as nearly an undisturbed state as possible for scientific and educational purposes. Natural processes should dominate, although deliberate manipulations which simulate natural processes are allowed in specific cases (USDI 1986b).

- RNAs are established primarily with scientific and educational activities intended as the principal form of resource use for the short and long term. Research proposals should be submitted to the appropriate BLM field office prior to commencing work. Studies involving the manipulations of environmental or vegetational characteristics or plant harvest must be approved. Because the overriding guidelines for management of an RNA is that natural processes are allowed to dominate, deliberate manipulation, such as experimental applications, is allowed only on a case specific basis when the actions either simulate natural processes or important information for future management of the RNA is gained (BLM Manual, 1623.37 (A)(B)).

• Preserve, protect or restore native species composition and ecological processes of biological communities (including Oregon Natural Heritage Plan terrestrial and aquatic cells) in research natural areas. These areas will be available for short- or long-term scientific study, research, and education and will serve as a baseline against which human impacts on natural systems can be measured. (USDI 1995a)

• Manage Oregon white oak woodlands to maintain or enhance values for wildlife habitat, range, botanical values, and biological diversity. Utilize prescribed fire to maintain habitat conditions within the Oregon white oak woodland community (USDI 1995a).

Current Information

The ecological condition of all plant communities identified as key elements of the RNA were considered to be of overall high quality when the area was nominated as an RNA 1991 (Schaaf, 1991). Brock and Callagan (1999a) found that with the exception of some weed issues, the plant communities in the RNA are in good condition. Non-native weedy species, particularly yellow star thistle (*Centaurea solstitialis*), hedgehog dogtail, (*Cynosurus echinatus*), medusa-head (*Taeniatherum caput-medusae*), and Bull thistle (*Cirsium vulgare*) occur in some of the savanna and woodland areas and threaten the integrity of these plant communities. The spread of these and other non-native species into the RNA from surrounding lands, especially from the south in California and along the Schoheim road is an ongoing threat.

Exclusion of a natural fire regime has resulted in encroachment of shrubs and conifers into the edges of open oak / grass savanna areas, decreasing the extent of this plant community in the RNA. Underbrush and tree density have increased in woodlands and forest areas, increasing fire fuel loads and the risk of high-intensity, stand-replacement fires.

The main objective in managing plant communities within the RNA is to maintain or enhance their key attributes. Ideally this would be accomplished by allowing succession to occur as a result of a natural disturbance regime, which could include wildfire, storms, normal mortality, drought, etc. However, because of past human interference, in the form of fire suppression and livestock grazing, proactive management is necessary to re-establish natural processes.

Over time all plant communities are subject to natural disturbances and corresponding succession. It is not the intention of RNA management actions to halt this natural succession and disturbance process at one particular stage. Using prescribed burning as a management tool is an attempt to re-introduce fire as a natural process. Excluding fire during the past 100 years has resulted in a build-up of fire fuel loads and encroachment of trees and shrubs into savannas and meadows. Re-introducing fire in small areas under controlled circumstances would reduce fire fuel loads, as well as improve the ecological condition of plant communities in which fire has historically been a component by restoring native species composition. Allowing naturally-occurring fires to run their course in the RNA (and outside) is somewhat constrained by the proximity of private property to the northwest of the RNA north of Pilot Rock. Utilizing fire in small areas at different times throughout the RNA is intended to resemble the patchiness of natural disturbances. With this approach, at any one time different areas of each plant community will be in different successional stages, mirroring normal ecosystem conditions.

Outlined below are goals, issues relating to those goals, and management actions for each plant community requiring management within the RNA. Additional important aspects affecting the management of plant communities within the RNA are discussed under separate headings (e.g. introduced and noxious weedy species, insects and disease, livestock grazing, timber harvest, etc.). Monitoring of plant communities, discussed in Section VI, is also a vital process of tracking and evaluating responses to natural or prescribed disturbances, determining the effectiveness of management actions or research activities, and making necessary adjustments to insure that management goals continue to be met.

Riparian (California Black Oak-Bigleaf Maple Riparian Woodland & Riparian Shrub Community)

Goals

- Maintain the function, structure and vegetative composition of the riparian zones, including seeps and springs.

Current Information

These two plant communities are currently in good condition. Open galleries of Black oak show limited juniper establishment. This may become a problem in the future necessitating prescribed fire or manual treatment. Livestock impact is no longer a threat to this plant community, as little utilization occurs.

Issues

- Riparian areas are currently little utilized by livestock grazing although localized areas historically received periodic high utilization
- Lack of riparian survey data.

Management Actions

- Perform riparian surveys documenting hydrologic and riparian vegetation condition.
- Restore riparian areas within the RNA that is not properly functioning based on results of riparian surveys.
- Remove livestock grazing from riparian communities if necessary.

Oregon white oak woodland (Oregon white oak /Tall Oregon Grape Woodland)

Goals

- Maintain open woodland, dominated by Oregon white oak, ponderosa pine and associated native species.
- Reduce Douglas-fir and incense cedar conifer seedlings.
- Reduce fire fuel loads.

Issues

- Fire suppression resulting in conifer recruitment and increased fuel loads and ladders.
- Competition from non-native plant species, especially annual grasses and scattered patches of yellow star-thistle.
- Limited access to the site.
- Limited funding to accomplish objectives.
- Constraints to prescribed burning, including air quality controls, proximity to adjacent private landowners, topography, season of burn, availability of native plant seeds and starts for re-planting after burning, restrictions on using large equipment.
- Oak phytopthora is present in oak woodlands in California. This disease is affecting vast areas of oak woodlands in central and northern California.

Management Actions

- Establish pre-project monitoring plots to gather baseline data for post-project comparison to determine the effectiveness of the management activity.
- Utilize prescribed burning or manual thinning to reduce conifer recruitment and fire fuel loads.
- Eliminate patches of yellow starthistle using all available tools.
- Re-seed between trees after burning with native grasses and forbs.

Rock Outcrops

Goals

Maintain these sparsely vegetated but important niche communities.

Current Information

Plant communities associated with Rock outcrops are likely stable. These fine feature communities are important as they provide a unique niche for certain plant species, including lichens and mosses. Certain weedy species (i.e. annual grasses such as cheatgrass) can occur in these communities.

Issues

None.

Management Actions

Survey these sites with future Botanical inventories.

Grasslands (Low Elevation Grassland-Rock Outcrop Complex & Middle and Higher Elevation Grassland-Oregon white oak Woodland Complex)

Oak Woodland component

Goals

- Maintain open canopied oak woodlands, and understory grasslands, dominated by native perennial grasses and forbs.
- Reduce noxious weeds and invasive annual grasses.
- Reduce fire fuel loads.

Issues

- Competition from non-native plant species
- Conifer encroachment as a result of fire suppression.
- Limited access to the site.
- Limited funding to accomplish objectives.
- Constraints to prescribed burning, including air quality controls, proximity to adjacent private landowners, season of burn, availability of native plant seeds and starts for re-planting after burning, restrictions on using heavy equipment.

Management Actions

- Establish pre-project monitoring plots to gather baseline data for post-project comparison to determine the effectiveness of the management activity.
- Utilize all management tools available reduce conifer invasion, thin dense stands of Oregon white oak, and favor the abundance of native herbaceous understory species over invasive annual grasses.
- Contain and eradicate patches of yellow starthistle using all available means
- Re-seed after weed treatment/burning with native grasses and forbs.

Grassy meadow component

Goals

- Maintain open meadows/grassland by reducing the encroachment of conifers and shrubs.
- Decrease non-native and increase native species.
- Protect and maintain the rare Astragalus californicus population. It is the only population in Oregon.

Issues

- Competition from non-native weedy species. Yellow starthistle is especially dominant in the mid-high elevation grassland; expansion of this species is likely. Annual grasses (Japanese brome and cheatgrass) are a dominant species in the low elevation grasslands.
- Encroachment of trees and shrubs into meadows from surrounding woodlands.
- Limited access to the site.
- Limited funding to accomplish objectives.
- Constraints to prescribed burning, including air quality controls, proximity to adjacent private landowners, season of burn, availability of native plant seeds and starts for re-planting after burning, restrictions on using large equipment.
- Presence of a rare plant that can complicate restoration activities

Management actions

- Collect and propagate native grass and forb seeds from savanna areas of the RNA.
- Establish pre-project monitoring plots to gather baseline data for post-project comparison to determine the effectiveness of the management activity.
- Tailor management activities to maintain the Astragalus californica population in mid-high elevation grasslands, and to decrease the yellow starthistle populations
- Eradicate large patches of yellow starthistle using all available means
- Prescribe burn meadows to reduce non-native weedy species and encroaching trees and shrubs or manually thin trees and shrubs, particularly seedlings and saplings, in and around the perimeter of meadows/savannas.
- Re-seed burned areas with native grasses and forbs.

Rosaceous Chaparral (Oregon white oak/Klamath Plum-Wedgeleaf Ceanothus Oregon white oak/Mountain Mahogany-Klamath Plum Chaparral Complex (Lone Pine Ridge)

Goals

Maintain healthy chaparral communities

Current Information

These plant communities are commonly described as rosaceous chaparral. Long-term plant community dynamics are not yet fully understood. The mollic epipedon described by the SCS manual suggests past domination by grass. The abundance of this plant community could be attributed to fire suppression. The presence of oak within the rosceous chapparal, and fire dependent species, such as buckbrush, imply the importance of fire within these plant communities. The rare plant Tracy peavine (Lathyrus lanzwertii var. tracyi) occurs in very small populations in Oregon white oak/mountain mahogany chaparral in the RNA. This rare endemic is only known for a few sites in Oregon. The role of fire for this species is also not well understood; it could benefit from periodic disturbance events.

Issues

- Lack of ecological information and understanding of the relationship of fire within these communities.
- Dense fuel loads

Management Action
More study of these plant communities, and key species within them is needed before any implicit management action is formulated.

Conifer Communities (Douglas-fir/Serviceberry - Tall Oregon Grape & White fir dwarf Oregon Grape)

Goals

- Maintain ecosystem function in the limited Douglas-fir and White fir communities.
- Protect mature forest stands from catastrophic disturbance events such as wildfire and insect outbreaks.
- Design management activities that restore natural ecosystem and disturbance processes.

Issues

- Limited access to the site
- High cost and uncertain funding to accomplish objectives.
- Constraints to prescribed burning, including air quality controls, proximity to adjacent private landowners, season of burn, restrictions on using large equipment.
- Restrictions on commercial harvest.

Management Action

- Periodic surveys and monitoring of conditions in conifer communities
- Reduce fuel loads and risk of catastrophic event by manual understory thinning, and understory burning

Introduced and Noxious Weed Species

Policy and Agency Standards
The introduction of exotic plant and animal species is not compatible with the maintenance or enhancement of key RNA features. Certain re-introductions of formerly native species using proper controls may be specified in plans (Appendix R).

Take any action necessary to prevent unnecessary or undue degradation of the lands (FLPMA, 1976).
The public Rangelands Improvement Act of 1978 directs the BLM to "manage, maintain, and improve the condition of public rangelands so they become as productive as feasible..." (RIA, 1978, Section 2(b)(2)). The priority on managing this area is for productive plant community not rangeland productivity.

Goals:

- Maintain and/or restore plant communities.
- Contain or eradicate exotic and noxious weeds.
- Prevent the introduction of new exotic or noxious weed species.

Current information
Several areas within the RNA (see Botanical section) are dominated by introduced (alien) grasses, namely medusa-head rye (*Taeniatherum caput-medusae*), hedgehog dogtail (*Cynosurus echinatus*), bulbous bluegrass (*Poa bulbosa*), Japanese brome (*Bromus japonicus*) and cheat grass (*Bromus tectorum*). Small occurrences of yellow alyssum (*Alyssum alyssoides*), bull thistle (*Cirsium vulgare*), and dyers woad (*Isatis tinctoria*) are also documented. There are large yellow starthistle (*Centaurea solstitialis*) populations in the mid-high elevation grasslands and along the Schoeheim road (Brock and Callagan 1999a). No weed treatments have occurred in the RNA.

Issues

- Exotic plants and noxious weeds threaten the integrity of key features within the RNA. These occurrences were mapped in 1999.
- Disturbance as a result of wildfire, vegetation treatments (burning or thinning), or livestock grazing can create optimum habitat for exotic and noxious weeds.
- High cost for weed treatments due to poor access.
- Lack of proven methods for controlling large infestations of exotic grasses like cheatgrass or bulbous bluegrass.
- Lack of large quantities of native grass and forb seed for restoration.

Management Actions

- Control weeds within and adjacent to the RNA using a integrated weed management approach utilizing all appropriate means (mechanical, cultural, biological, and chemical).
- Collect and propagate native seed sources for use within the RNA.
- Vegetative treatments to enhance key RNA features must be tailored so as to reduce weed infestations and not increase existing populations.
- Evaluate wether grazing can be used as a tool to promote maintenance of the key features of the RNA in the grazing study, especially reducing non-native species. If it is not, remove SCRNA from the Soda Mountain allotment.

Threatened, Endangered, Sensitive, and Rare Species

Policy and Agency Standards

The Endangered Species Act (USDI 1973) governs and provides for the conservation of listed and proposed species, and their habitats, on federal lands. The BLM Policy regarding Special Status Species, including federally listed and proposed species, state listed species, and species designated as Sensitive is to protect and conserve federally listed and proposed species, manage their habitat to promote recovery, and (for sensitive and state listed species) to ensure that Bureau actions will not contribute to the need to list sensitive or state listed species as federally listed (BLM Manual 6840).

Goals

- Maintain or enhance Bureau Special Status Species occurrences and habitat within the RNA.

Current Information

Nine Bureau Special Status Species are documented in the RNA, California milk-vetch, (*Astragalus californicus*), saw-tooth sedge (*Carex serratodens*), mountain lady's-slipper, (*Cypripedium montanum*), dwarf isopyrum (*Isopyrum stipitatum*), Tracy peavine (*Lathyrus lanszwertii var. tracyi*), Detling's microseris (*Microseris laciniata ssp. detlingii*), Klamath gooseberry (*Ribes inerme ssp. klamathense*), Howell false-caraway (*Perideridia howellii*), and Parish nightshade (*Solanum parishii*).

Two of these species, Klamath gooseberry and Howell false caraway were found in the riparian zone of Scotch Creek. Howell false-caraway is fairly "common" within the RNA and within the surrounding watersheds in the Monument.

Three species were found in grassland habitats, saw-toothed sedge, Detling microseris, and the California milk-vetch. All three occur in areas with fairly high levels of exotic species or noxious weeds. This is the only known site for the occurrence of the California milk-vetch in Oregon, and Brock and Callagan (1999b) documented a competitive relationship between this species and yellow star thistle. The ability of this species to persist in the RNA is a concern unless the grasslands are restored. A small population of Detling microseris was also found in one location. The identification of saw-toothed sedge has not been confirmed to date.

Three species are documented for the chaparral communities, dwarf isopyrum, Tracy peavine, and Parish nightshade. The dwarf isopyrum is documented for several locations in the RNA, and has been found in several locales within the Monument. Several patches of Tracy peavine are present in the Oregon white oak chaparral, but all are very small in size. Only two plants of Parish nightshade were seen in the chaparral at the outer rocky edge of the riparian zone, south of the falls.

Only one occurrence of mountain lady's slipper was found in a conifer community. The occurrence was fairly large for this orchid (45 plants) and was in a Ponderosa pine and black oak stand on a northerly slope. Suitable habitat exists for several other Bureau Special Status plants, including the Federally listed Gentners fritillary (Fritillary gentneri), however no populations were found.

Issues

• No monitoring of existing populations.
• Affects from the limited grazing are not known.
• Exotic and noxious weeds are likely threatening rare plants in the grasslands.

Management Actions

• Periodic monitoring of existing occurrences.
• Establish formal monitoring plots in the grasslands to evaluate the affects of noxious weed invasion and treatment (especially for Astragalus californicus).
• Tailor management actions (noxious weed treatment, fire) to protect or enhance rare plant populations.

Wildlife Species

Current Information

There is a Northern Spotted Owl center of activity in the immediate vicinity of the RNA. Part of the nest stand used by this pair of owls falls inside the RNA boundary.

Management Action

Any habitat manipulation activities (burning, vegetation manipulation, etc) proposed to occur in the RNA should take the habitat and security requirements of this owl site into account. Such projects should be planned with the same or more stringent constraints as would be placed on such activities outside the Monument/ RNA.
Insects and Pathogens

Agency Standards

Catastrophic natural events, such as insect infestations. Should ideally be allowed to take their course. Insect or disease control programs should not be carried out except where infestations threaten adjacent vegetation or will drastically alter natural ecological processes within the tract (Appendix R).

Goals

• Maintain historic ecosystem functions in the forested plant communities.
• Protect mature forest stands from catastrophic disturbance events such as wildfire and insect outbreaks.
• Design management activities that restore natural ecosystem and disturbance processes.

Current Information

The Scotch Creek RNA has few areas occupied by conifer communities. Most occur on north and northeast slopes in the northern portion of the RNA. A dense understory of young conifers is found in much of the area, which is likely a result of fire suppression activities. As a result increased, but not epidemic level mortality due to beetle outbreak has been noted. Some true fir engraver incidence is present in the white fir/dwarf Oregon grape association which occurs in the Northern portion of the RNA along the creek. Individual ponderosa pine are being attacked by bark beetle in conifer and non conifer plant communities.

Insects:

- Mountain pine beetle (*Dendroctonus ponderosa*)
- Western pine beetle (*Dendroctonus breviconis*)
- Red turpentine beetle (*Dendroctonus valens*)

Individual pines are being infested at a higher than normal level by these species of beetles. Generally, this is not a serious problem within the RNA. Within the Klamath River Ridges ecoregion plant communities that support pine are often too dense thereby creating a higher risk for beetle outbreak. Both the short term and long term outlook is that mature ponderosa pine will be subject to increased beetle risk. Prescribed burning and thinning small trees around pine could reduce this risk. Given the inaccessibility of the area, efforts should be made to protect the most highly valued areas by proactive thinning/burning projects.

- Fir engraver (*Scolytus ventralis*)

Beetle and root rot often occur in association with white fir forests. Dense stands of white fir and associated pockets of laminated root (*Phellinus weirii*) often show increased levels of fir engraver. Root rot and fir engraver are the common disturbance agents in high elevation white fir in contrast to fire events in lower elevation mixed conifer. Very light noncommercial thinning and low level prescribed burns should be done on a trial basis at the SCRNA stand in an effort to reduce engraver incidence. The laminated root rot is not found at a sufficient level for concern. Further baseline data collection may identify other areas where it is present.

Management Actions
Thinning small trees and brush and prescribed burning will increase overall forest stand vigor while reducing risks to beetle infestation and stand replacement fires. These activities should follow collection of baseline data and development of specific objectives at a forest stand level or plant association level.

Pathogens:

Annosus root rot (*Heterobasidion annosum*)

Previously harvested areas at the northern extreme of the RNA, mainly those near roads may have detectable but as yet undetermined amount of annosus root rot present. This incidental occurrence is considered serious. White fir trees removed for hazard control or other reasons should be treated with Sporax to prevent annosus spread. While it is unlikely that very many trees of sufficient size would be cut for any reason, all effort should be made to prevent this root rot from entering new areas.

- True fir dwarf mistletoe (*Arceuthobium abietinum*)
- Doug-fir dwarf mistletoe (*Arceuthobium douglasii*)
- Western dwarf mistletoe on ponderosa pine (*Arceuthobium campylopodum*)
- Juniper mistletoe (*Phorodendron densum*)
- Incense cedar mistletoe (*Phorodendron libocedri*)
- Oak mistletoe (*Phorodendron villosum*)

Dwarf mistletoe is present on white fir, Doug-fir and ponderosa pine in the RNA. Three mistletoe species have been identified occurring on Incense cedar, Oregon white oak and juniper. While these parasitic plants sometimes cause mortality, they are present at endemic levels and are not considered to be a problem.

Management Activities

Thinning small trees and brush, and prescribed burning will increase forest stand vigor thereby reducing susceptibility to pathogens that cause forest diseases. These activities should be preceded by collection of baseline data and development of specific objectives at a forest stand or plant association level.

Needed Information

More baseline data is needed for the conifer plant communities in the RNA. This will serve to inventory and document insects and pathogens. Five year inventories are needed to assess overall stand conditions.

Summary

This is not a comprehensive list of all insects and pathogens in the RNA. For instance, little specific information is known on insects and pathogens occurring in the Oregon white oak woodlands, other deciduous trees or shrubs. The species thought to present the most likely problems to conifers or effecting the RNA were included. Any management activity proposed in the RNA needs to evaluated further before enacted. The insects and pathogens listed here typify those found at the Klamath River Ridges ecoregional level. Generally, forest stand densities and fuel loading are at a level where beetle outbreak risks and fire behavior threaten forest plant associations at a greater than historic natural level.

Boundary/Edge Effects

Policy and Agency Standards

- Maintain or increase public land holdings by retaining public lands and acquiring non-federal lands with high public resource values.
- Acquire lands and interests in lands needed to manage, protect, develop, maintain, and use resources on public lands ... in conformity with land-use plans that apply to the area involved (BLM Manual, 2100.05, 1984).

Goals and Objectives

- Maintain the integrity of the RNA.

Current Information.

The Scotch Creek RNA covers an area of 1,800 acres of public land. The boundary is defined by the limits of the watershed and property lines along the California border. Immediate property to the west, north and east is all BLM public lands.

Management Actions.

- Periodic inventory to assure no trespass from activities on non-federal lands along the California border

Roads and Utilities Rights-of-Way

Policy and Agency Standards

...public uses such as roads, pipelines, communication sites, and power lines should avoid the designated area and be anticipated in activity plans. Road closures or restrictions maybe considered appropriate in some instances (USDI, 1986). Roads are generally prohibited in RNAs however old roads or un-improved tracks often exist. (PNW Interagency Natural Area Committee, 1991).

Goals
Ensure that existing roads do not contribute to any loss of integrity of the RNA communities, including the riparian area.

Current Information.
There are no utility rights of way in the RNA. The Schoheim road (BLM 41-2E-10.1) serves as the boundary along the northern and eastern edge. This road has been closed. No future ROW permit requests are anticipated through the RNA. An old abandoned road exists along Scotch Creek on the California side on private land.

Goals and Objectives.
Maintain the roadless character of the RNA.
Insure that the Schoheim road does not cause any resource damage to features in the RNA

Management Actions
Monitor the existing Schoheim road

Fire Management

Agency Standards
In 1995, the latest Federal Fire Policy (USDA and USDI 1995) was issued directing federal land managers to expand the use of prescribed fire in order to reduce the risk of large wildfires due to unnatural fuel loadings and to restore and maintain healthy ecosystems.

Base the use of prescribed fire on the risk of high intensity wildfire and the associated cost and environmental impacts of using prescribed underburning to meet protection, restoration, and maintenance of crucial stands that are currently susceptible to large-scale catastrophic wildfire.

Reintroduce underburning across large areas of the landscape over a period of time to create a mosaic of vegetative conditions and seral stages. This is accomplished by using prescribed fire under specific conditions in combination with the timing of each burn to reach varying fire intensities. Treatments should be site-specific because some species with limited distribution are fire intolerant (USDI 1995).

Where perpetuating a seral stage of plant succession is important, prescribed fires may be specified in the activity plan; but only where they provide a closer approximation of the natural vegetation and governing processes than would otherwise be possible. Application of prescribed burns normally should be performed closely approximating the "natural" season of fire, frequency, intensity, and size of burn. The burn should be followed by a fire effects report documenting vegetative response (USDI 1986).

Adhere to smoke management and air quality standards of the Clean Air Act and State Implementation Plan for prescribed burning (USDI 1995).

Goals

- Reintroduce fire into the RNA to re-establish a natural ecological process and to maintain, enhance or restore the structure and composition of the protected plant communities. Specific objectives include:

a) Increasing the extent of oak/pine savannas by removing encroaching hardwood and conifer seedlings and shrubs.
b) Reduce non-native and increase native grass and forb species.

c) Invigorate chaparral stands by removing any decadent shrubs and creating openings for native grasses and forbs.
d) Maintain and improve existing grasslands and meadows by using prescribed fire to invigorate native grasses, provide a good bed for reseeding, reduce encroaching shrubs and conifers.
e) Control wildfire in mixed conifer stands to protect losses to surrounding land owners.
f) Reduce fuel loadings created from thinning activities.

Current Information

Fire is recognized as a key natural disturbance process throughout Southwest Oregon (Atzet and Wheeler 1982). Human-caused and lightning fires have been a source of disturbance to the landscape for thousands of years. Native Americans influenced vegetation patterns for over a thousand years by igniting fires to enhance values that were important to their culture (Pullen, 1995). Early settlers to this area used fire to improve grazing and farming and to expose rock and soil for mining. Fire has played an important role in influencing successional processes. Large fires were a common occurrence in the area based on fire scars and vegetative patterns and were of varying severities.

In the early 1900s, uncontrolled fires were considered to be detrimental to forests. Suppression of all fires became a major goal of land management agencies. From the 1950s to present, suppression of all fires became efficient because of an increase in suppression forces and improved techniques. As a result of the absence of fire, there has been a build-up of unnatural fuel loadings and a change to fire-prone vegetative conditions.

Based on calculations using fire return intervals, five fire cycles have been eliminated in the southwest Oregon mixed conifer forests that occur at low elevations (Thomas and Agee 1986). Species, such as ponderosa pine and oaks, have decreased. Many stands, which were once open, are now heavily stocked with conifers and small oaks which has changed the horizontal and vertical stand structure. Surface fuels and laddering effect of fuels have increased, which has increased the threat of crown fires which were once historically rare.

Many seedling and pole size forests of the 20th century have failed to grow into old-growth forests because of the lack of natural thinning once provided by frequent fire. Frequent low intensity fires serve as a thinning mechanism, thereby, naturally regulating the density of the forests by killing unsuited and small trees. Consequently, much old-growth forest habitat has been lost along with diminished populations of old-growth dependent and related species. In addition, ponderosa pine trees that thrive in fire prone environments are quickly shaded out by the more shade tolerant Douglas-fir or white fir species in the absence of fire. As a result, some late-successional forests have undergone a rapid transition from ponderosa pine stands to excessively dense true fir stands. Trees growing at lower densities, as in ponderosa pine stands, tend to be more fire-resistant and vigorous. Eventually they grow large and tall, enhancing the vertical and structural diversity of the forest. Some populations of organisms that thrive in the more structurally diverse forests that large trees provide are becoming threatened.

Many forests developed high tree densities and produced slow growing trees rather than faster growing trees after abrupt fire suppression became policy in about 1900. Trees facing such intense competition often become weakened and are highly susceptible to insect epidemics and tree pathogens. Younger trees (mostly conifers) contribute to stress and mortality of mature conifers and hardwoods. High density forests burn with increased intensity because of the unnaturally high fuel levels. High intensity fires can damage soils and often completely destroy riparian vegetation. Historically, low intensity fires often spared riparian areas, which reduced soil erosion and provided wildlife habitats following the event.

The absence of fire has had negative effects on grasslands, shrublands, and woodlands. Research in the last few decades has shown that many southern Oregon shrub and herbaceous plant species are either directly or indirectly fire-dependent.

Several shrub species are directly dependent on the heat from fires for germination - without fire, these stands of shrubs cannot be rejuvenated. Grass and forbs species may show increased seed production and/or germination associated with fire.

Indirectly fire-dependent herbaceous species are crowded out by larger-statured and longer-lived woody species. This is particularly so for grasses and forbs within stands of wedgeleaf ceanothus and whiteleaf manzanita with a high canopy closure. High shrub canopy closure prevents herbaceous species from completing their life-cycle and producing viable seed. Many grass species may drop out of high canopy shrub lands in the absence of fire because of their short-lived seed-bank.

Climate and topography combine to create the type of fire regime found in the Scotch Creek RNA. Fire regime is a broad term and is described as the frequency, severity and extent of fires occurring in an area (Agee, 1990). Vegetation types are helpful in delineating different fire regimes. The Scotch Creek RNA is classified as a low-severity (80%) and moderate-severity (20%) fire regimes based on the vegetation types found within the RNA. The low-severity regime is characterized by vegetation types such as grasslands, shrublands, hardwoods, mixed hardwoods, and pine which are similar to the Interior Valley Vegetative Zone of Franklin and Dyrness (1988). These plant communities are adapted to recover rapidly from fire and are directly or indirectly dependent on fire for their continued persistence. A low-severity regime is characterized by nearly continual summer drought, fires are frequent (1-25 years), burn with low intensity and are widespread. The dominant trees within this regime are adapted to resist fire due to the thick bark they develop at a young age. The intermixture of pine-oak within the RNA suggests the fire return interval of about 10 years (Agee 2000). The moderate-severity regime is associated with the Mixed Conifer Vegetative Zone of Franklin and Dyrness (1988). A moderate-severity regime is characterized by long summer dry periods, fires are frequent (25-100 years), burn with different degrees of intensity and burn in a mosaic pattern across the landscape. Some stand replacement fires as well as low-intensity fires may occur depending on burning conditions.

The Bureau of Land Management has a master cooperative fire protection agreement with the Oregon Department of Forestry (ODF). This agreement gives the responsibility of fire protection of all lands within the Scotch Creek RNA to the Oregon Department of Forestry. This contract directs ODF to take immediate action to control and suppress all fires. Their primary objective is to minimize total acres burned while providing for fire fighter safety. The agreement requires ODF to control 94 percent of all fires before they exceed 10 acres in size.

Between the years 1967 and 1999, there have been two fires within the Scotch Creek RNA. Both fires were started by lightning and occurred in the years 1984 and 1992. Suppression action was taken by ODF resulting in both fires being contained at 0.1 acre in size.

Currently, some fire suppression techniques are not allowed within the Scotch Creek RNA in order to minimize disturbance to the area. All vehicles are restricted to existing roads, the use of tractors are not allowed within the RNA, Scotch Creek is not be utilized as a water source and the use of retardant is prohibited near the creek.

Prescribed fire can be used to meet resource management objectives which include but are not limited to wildfire hazard reduction, restoration of desired vegetation conditions, management of habitat and silvicultural treatments. When utilizing prescribed fire it should be based on the fire history of the area and past vegetation patterns known for the area. The application of prescribed fire should closely approximate the frequency, intensity, size, and the "natural" season of fire when possible.

Many factors influence fire behavior and the effects fire will have on a resource. Some are beyond our ability to control such as the location of where a fire starts, weather and topography. Fuels management programs focus on the factors which we have influence over such as fuels and vegetation. Prescribed fire is one tool that can be utilized to regulate fuels and vegetation. A primary objective of any fuels management activity in the RNA is to alter existing fuels in order to protect or minimize damage to existing late-successional habitat from wildfires which may occur.

All prescribed burning would comply with the guidelines established by the Oregon Smoke Management Plan (OSMP) and the Visibility Protection Plan. In compliance with the Oregon Smoke Management Plan, any prescribed burning activities within the RNA require pre-burn registration of all prescribed burn locations with the Oregon State Forester. Registration includes specific location, size of burn, topographic and fuel characteristics. Advisories or restrictions are received from the State Forester on a daily basis concerning smoke management and air quality conditions.

Prescribed burns would be conducted within the limits of a Burn Plan which describes prescription parameters so that acceptable and desired effects are obtained.

Issues

- Limited access to and within the RNA.
- Restrictions against using large equipment in fire treatment or suppression activities.
- Constraints to season of prescribed burning due to air quality and fire season restrictions.
- Limited funding for repetitive treatments and restoration projects.
- Limited availability of native grass and forb seed or starts for re-planting.
- Concerns that fire can create conditions optimal for the expansion of annual grasses and noxious weeds like yellow starthistle.

Management Actions

- Develop a fire management plan and memorandum of understanding for the entire RNA, coordinated between BLM and ODF, including a plan for prescribed burning.
- Maintain or enhance known sites of special status plant populations
- Establish pre-burn plots in targeted plant communities to gather baseline data of vegetation species composition, density, etc. to determine the effects of fire on affected plant communities.
- Through prescribed burning, reintroduce fire as a natural process, based on past fire regimes.
- Conduct post-project monitoring of plant communities to determine the effectiveness of management activities in achieving RNA goals. Adapt management activities as necessary.

Hydrology

Policy/Agency Standards

Objectives for water resources include compliance with State water quality requirements to restore and maintain water quality necessary to protect designated beneficial uses for the Klamath River Basin. The overall goal of the Aquatic Conservation Strategy, is to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands. Included are specific objectives to:

- Maintain and restore the physical integrity of the aquatic system.

• Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems.
• Maintain and restore the sediment regime under which aquatic ecosystems evolved.
• Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion and channel migration, and to supply amounts and distribution of coarse woody debris sufficient to sustain physical complexity and stability.
• Maintain and restore habitat to support well-distributed populations of native plant, invertebrate and vertebrate riparian-dependent species.

Goals and Objectives

• Restore and maintain a properly functioning watershed condition and the ecological health of aquatic ecosystems within the Scotch Creek RNA.
- Reduce or eliminate surface disturbing activities such as roads/jeep trails.
- Restore and maintain native riparian vegetation along streams and springs/seeps.
- Achieve properly functioning riparian areas.

Current and Needed Information

Hydrologic features in the Scotch Creek RNA include intermittent and perennial streams. Current hydrologic condition of the RNA is unknown. A stream/riparian survey is necessary to determine watershed concerns affecting water quantity or quality.
Except for 129.4 acres of timber land owned by Boise Cascade Corporation east of Porcupine Mountain in the south half of section 36, the remainder of the Scotch Creek Subwatershed above and including the RNA is managed by the BLM. Management of the approximately 0.7 intermittent stream miles on the private timber land follows the Oregon State Forest Practice Administrative Rules, which do not require protection of vegetation along small, intermittent stream channels. Management actions within or above the RNA having the greatest potential to adversely affect Scotch Creek and its tributaries include existing or newly constructed roads, timber harvest, or grazing. Sediment and stream temperature increases would be the most likely adverse impacts to water quality associated with these types of activities. A severe wildfire could also result in sediment increases to the stream system.

Management Actions

• Conduct stream/riparian survey to determine waterbody category, current channel and riparian conditions, and locations of unmapped waterbodies.
• Assess need for water/riparian monitoring based on stream/riparian survey results.
• Undertake restoration projects as needed to comply with the objectives of the Aquatic Conservation Strategy and to prevent further damage to hydrologic values.

Mining and Geothermal Resources

Mining and geothermal rights have been withdrawn within the Cascade-Siskiyou National Monument and are not an issue. There are no goals, objectives, issues, or actions necessary for this resource.

Cultural Resources

Agency Standards

Protect cultural resource values including information and significant sites for public and/or scientific use by present and future generations. Sites with significant values will be protected from management actions and from vandalism to the extent possible. Develop project plans to preserve, protect and enhance archeological, historical and traditional use sites, and materials under the district's jurisdiction. This would include protection from wildfires (USDI 1995).

Goals

- Protect cultural resources at Scotch Creek RNA from theft and human disturbance.

Current Information

No cultural resources have been recorded within the Scotch Creek RNA.

Issues

- The isolated location of the RNA makes enforcement of restrictions and protection of archeological sites difficult.

Management Actions

- Conduct surveys for archeological values within the RNA
- Protect sites as needed from management activities and vandalism.

Livestock Grazing

Agency Standards

"Watersheds are in, or are making significant progress toward, properly functioning physical condition, including their upland, riparian-wetland, and aquatic components; soil and plant conditions support infiltration, soil moisture storage and the release of water that are in balance with climate and land-form and maintain or improve water quality, water quantity and the timing and duration of flow..." "Habitats are, or are making significant progress toward being restored or maintained for federal threatened and endangered species, federal proposed, category 1 and 2 federal candidates (Federal pecies of Concern), and other special status species" (Fundamentals of Rangeland Health, 43 CFR 4180)

"Habitats support healthy, productive and diverse populations and communities of native plants and animals (including special status species and species of local importance) appropriate to soil, climate, and landform (Standard 5, Standards for Rangeland Health, USDI, 1997a)."

"Livestock grazing should be managed within RNAs to promote maintenance of the key characteristics for which the area is recognized (USDI, 1987. BLM Manual, RNAs, 1623.37)."

Goals

- Preserve natural features in as nearly an undisturbed state as possible for scientific and educational purposes. Natural processes should dominate, although deliberate manipulations which simulate natural processes are allowed in specific cases (USDI 1987).
- Maintain or improve the designated values of the RNA, especially native plant community composition and structure, soils, riparian areas, stream health and function, and nutrient cycling
- Prevent spread of noxious and invasive weed species and control/eradicate existing populations

Current Information

Grazing in the area encompassed by the Scotch Creek RNA dates back to the 1850's when large herds of cattle, horses and sheep utilized the area. Control of these ranges did not occur until the passage of the Taylor Grazing Act in 1934. The long term goal of this law were the improvement of range conditions and the stabilization of the western livestock industry. Prior to the enactment of the Taylor Grazing Act unregulated grazing occurred. During this period rangeland resources and ecological conditions are reported to have suffered significant harm from overgrazing.

The Scotch Creek RNA is currently part of the Camp Creek Pasture of the Soda Mountain Allotment #10110. Cattle numbers on the Soda Mountain Allotment have been reduced by 34% since the 1970's. The current animal unit months on the entire Soda Mountain Allotment are currently 1791, with about 366 cattle on the allotment. Utilization in the area of the pasture encompassing Scotch Creek RNA is extremely light with only the very northern part of Scotch Creek RNA receiving any utilization. Much of the RNA is unaccessible to livestock because of dense rosaceous chaparral. No formal utilization plots are currently occur in the RNA.

The Scotch Creek RNA contains significant areas of native grassland communities. In the RNA, large native herbivores (deer and Elk) play an important evolutionary and ecological role. Even more important was the role played by now extinct large late Pleistocene herbivores. How these herbivores behaved should play an important role in how domestic livestock are used to obtain ecological objectives. Different grazing animals vary in their foraging preferences, season, duration, and intensity of use, which can have significantly different effects on plant communities, particularly when considering introduced versus non-introduced species. Grazing modifies vegetation height, frequency, and density; influences vegetation composition and succession; and, alters water retention and drainage characteristics. To plants, critical factors are the severity, frequency, duration, and seasonality of defoliation. These factors can be controlled through proper grazing management.

Livestock grazing is likely a significant impact in the RNA if not managed in a manner appropriate for the particular plant community. Uncontrolled grazing by domestic livestock is not compatible with the maintenance of key RNA features, however, controlled grazing could offer an ecological management tool to maintain or improve some of the biological features (e.g. grassland component, noxious weeds) for which the RNA was established. Because of the topography and existing vegetation densities (rosaceous chaparral), much of the RNA is not currently utilized by grazing cattle.

Exotic and noxious weed populations do occur in the RNA, especially Medusa head rye (*Taeniatherum caput-medusae*), cheatgrass (*Bromus tectorum*), and bulbous bluegrass (*Poa bulbosa*), and (*Centaurea solstitialis*) yellow star-thistle. Other weeds currently have overall low densities dyers woad (Isatis tinctoria), bull thistle (*Cirsium vulgare*), yellow Alyssum (*Alyssum alyssoides*) and hedgehog dogtail (*Cynosurus echinatus*). Disturbance created by historic overgrazing grazing may have lead to weed introduction and expansion in the RNA, especially in the grasslands. Soil and vegetation disturbance from over grazing utilization can increase exotic plant densities, and affect the plant communities for which the RNA was established. However, because of limited utilization within the RNA, current livestock grazing practices do not appear to be increasing noxious weeds within the Scotch Creek RNA. Livestock grazing could be utilized as a tool under an integrated weeds management plan to control noxious weeds within the RNA.

Issues

- Populations of dyers woad (Isatis tinctoria), Medusa-head rye (*Taeniatherum caput-medusae*), and yellow starthistle (*Centaurea solstitialis*) currently exist within the RNA. Soil disturbance from grazing in these areas could increase weed densities.
- Grazing permits are currently held for the area encompassed by the RNA. The terms and conditions in the existing permit will likely need to be modified to protect or maintain key elements in the RNA
- Current vegetation densities preclude grazing from much of the RNA. Future management actions (thinning/fire) intended to improve the condition of the vegetation, could result in more area being accessible to grazing cattle.

- No formal utilization plots exist in the RNA. No riparian surveys (see Hydrology section) have been done documenting the condition of the riparian vegetation.

Management Actions

- Collect data in grassland/scrubland/riparian communities within the RNA as part of the three year grazing study within the monument. Baseline information has been collected.
- Until the completion of the grazing study, continue to allow the RNA to remain in the allotment management plan
- Make recommendations on how to use grazing, if appropriate, as tool to maintain or improve these communities
- If needed, modify current grazing permits to change grazing patterns in the RNA so as to maintain or improve condition of key plant communities, or remove the RNA from the allotment plan.

Timber Management

Agency Standards

Regulated timber harvest within the RNA and salvage removal of downed trees are not normally compatible with RNA values. For RNA's adjacent to timber harvest units, buffer zones should be considered in order to meet plan objectives. (USDI 1986)

Goals

Maintain viable ecosystem functions and protect RNA community cells from catastrophic disturbance events.

Current Information

Few trees have been removed in the past. The Schoheim road that runs along the current northern boundary of the RNA resulted in removal of some trees. No private land is found next to the RNA since BLM acquired 160 acres of private land in section 2. No commercial logging adjacent to the RNA will occur.

Timber harvesting in RNA's is not consistent with overall RNA management goals. However, non merchantable sized trees less than 12" in diameter will be cut to reduce stand density and insect risk. Most of these will be Douglas-fir that is less than 90 years old that has established itself in the absence of fire. Occasionally, individual trees larger than this will be girdled and/or felled when competing directly with individual mature pine.

Management Actions Needed

No timber harvesting will occur in the RNA. Harvesting of small trees will only occur to support thinning/prescribed burning activities designed to maintain or protect forested communities from catastrophic events and to restore historic ecosystem processes. Trees that are felled or girdled for forest health reasons will be left on site. Small Diameter Douglas-fir will be cut and burned in order to reduce fuel hazard and beetle outbreak risk.

Public Use/Recreation

Agency Standards

Recreation, camping, horse use, wood cutting, trapping, plant gathering, and OHV use are not compatible with the key RNA values unless shown not to hinder achievement of specific plan objectives. Hunting and fishing is typically permitted (but not hunter camps). Educational use - class field studies are encouraged but repetitive consumptive class activities are allowed only with BLM approval. Development of peripheral nature trails and interpretive signs may be appropriate in some cases, but with consideration for protection of the values without attracting undue attention. Public use roads, pipelines, communication sites, or powerlines should avoid the RNA. Road closures or way closures or restrictions may be considered appropriate in some instances.(USDI 1986). Equestrian use is not specifically prohibited in the RNA policies, however use is generally felt to not be compatible with the overall goal of RNAss to "Preserve natural features in as nearly an undisturbed state as possible for scientific and educational purposes. Natural processes should dominate, although deliberate manipulations which simulate natural processes are allowed in specific cases" (USDI 1986b).

Goals

- Protect the designated values of the RNA. Prevent equestrian, motorized and mechanized vehicles, and high impact recreation.
- Educate the public to the ecological significance of the RNA and the restrictions required to protect the designated natural resources.

Current Information

Recreational use in the Scotch Creek RNA is almost non-existent. There are no existing roads or trails within the RNA. The Schoheim Road is the northern boundary of the RNA and it is now closed to all vehicle use and will be decommissioned. The entire RNA is closed to all off-road travel by motorized and mechanized vehicles. Hiking from Porcupine Gap down Scotch Creek could become a major recreational hike, since hikers would have access to vehicles on public land without trespassing.

Potential problems arising from public use of the RNA include the threat of human-caused stand-replacement fire; damage to grasses, forbs and soils by compaction from hikers and horses; and the introduction of undesirable non-native species. Current recreational use is very light and low-impact. Periodic monitoring should be conducted to evaluate the impacts of recreational use on the protected plant communities and to determine if signs are necessary to protect against adverse effects.

1. Camping

Current Information

No established camping facilities exist in Scotch Creek RNA. Camping is not compatible with protection of the key elements of the RNA. However, unless camper use becomes evident, no actions are needed at the present time. If it does become a problem, "no camping" signs could be posted around the RNA.

Issues

- Isolated location of the RNA and difficulty in enforcing restrictions.
- Historical use of the area.

Management Actions

- Conduct periodic monitoring to determine if camping has occurred that has had a negative impact on the protected elements.
- Promote environmentally sensitive use of area to visitors via education (signs and personal contact).

2. Hiking

Current Information

There is an existing spur road between east and west forks of Scotch Creek but no designated trails within Scotch Creek RNA. Features at the RNA that might appeal to hikers are wild flowers, wild game, and diverse plant communities, however, the RNA is not well-known or easily accessible to the general public. For these reasons, developing hiking trails or promoting the area as a recreational hiking destination would not be practical or recommended. Casual hiking itself does not pose a threat to the resources of the RNA. However, if done by a large number of people, native grasses and wild flowers could be trampled and destroyed and soils compacted, jeopardizing the integrity of the protected elements of the RNA.

Issues

- Isolated location of the RNA making enforcement of restrictions difficult.
- Historical use of the area.

Management Actions

- Conduct periodic monitoring to evaluate the extent and effects of hiker use.
- Promote environmentally sensitive use of area to visitors via education (signs and personal contact).

3. Equestrian

Current Information

Scotch Creek RNA currently receives little, if any, equestrian use. What use occurs is likely occasional use by riders under the grazing permit. Equestrian activities in this management plan refers to horses, llamas, mules, and other pack animals. Recreational animals could threaten the values of the RNA by trampling vegetation and soil, particularly in meadows with thin, fragile soils; or by carrying in seeds of exotic weedy species on their hooves, hair or in their feces. During wet conditions horses can push root crops, used by Indian tribes as food, too far into the soil to dig and use. For these reasons, horse and other pack or riding stock use is not considered compatible with the values in the RNA.

Issues

- Isolation of area and difficulty in enforcing closures or restrictions.
- Historical use of the area.

Management Actions

- Periodically monitor the RNA to ensure that recreational horse or other stock use is not occurring
- Horse use under the Grazing permit should be evaluated as part of the three year grazing study
- Promote environmentally sensitive use of area to visitors via education (signs and personal contact with equestrian groups)
- Post signs at entrances to the RNA, stating the goals of the RNA and closure to equestrian use.

4. Hunting, Fishing and Trapping

Agency Standards

Hunting and fishing are typically permitted, although not encouraged, in RNAs, whereas trapping is not permitted (USDI 1986b).

Management of fish and wildlife populations is controlled by ODFW with regulations for hunting, fishing and trapping set on a yearly basis. Regulations regarding seasons, bag limits, stream stocking, licenses and techniques are dictated by the Department through the Fish and Wildlife Commission and are applicable on all lands within the state, including private property. Specific areas may be closed to activities in order to protect human life or natural resources.

Current Information

Wildlife is abundant in and around Scotch Creek RNA. The area contains big game like deer, black bear, and cougar. Elk may occasionally pass through the RNA. Small game include grouse, quail, grey squirrel and wild turkey. Since there are no roads or trails, actual hunting within the RNA is extremely low. Most of Scotch creek contains no trout due to falls that acts as a natural barrier preventing up stream migration. However, fishes are present in the creek for the last 1/2 mile before Scotch creek enters California. Scotch creek doesn't support fish big enough or in big enough numbers to be of interest to anglers. Recreational fishing is nearly non-existent. It is unknown what, if any, trapping activity is occurring in this area. Fur bearing species area include Bobcat, Coyote, Raccoon, Grey fox, and possibly Pine Marten. Due to the limited access, steep terrain, thick vegetation, relative scarcity of water and distance from town, this is probably not an area where extensive trapping has occurred recently. Since vehicular access to this area is no longer available, it is anticipated that any recent trapping activity in the area will no longer occur. There is no indication that any trapping currently occurs. Since there is only one spur road between east and west forks of Scotch Creek and no trails within the RNA, hiking is only allowed on existing roads/trails; horse use is generally prohibited; hunting, fishing and trapping in Scotch Creek RNA is not likely an issue.

Issues

- Dispersed camping and OHV or Horse use are often associated with hunting and could negatively impact RNA resources if these activities occur illegally.
- The isolation of the area makes enforcing restrictions difficult.
- Historical use of the area.
- Prohibition of hunting and trapping in the RNA would require a change to the Oregon State Game Regulations and would be difficult to enforce.
- Minimal impact to wildlife populations in the area. No impact is anticipated on the values for which the RNA was designated.

Management Actions

- Monitor use to determine if any impacts from Hunting are occurring.

5. Off-Highway Vehicles

Agency Standards

Management directions for all RNAs specifies closure to off-highway vehicle (OHV) use. Off-highway vehicles include, but are not limited to, motorcycles, all-terrain vehicles, and mountain bikes.

Current Information

Because of the dense vegetation, lack of roads, remote location, and limited access, there has been no noticeable OHV activity within this RNA. In the past OHV use occurred on high open grassy slopes below the Schoheim along the lower end of Lone Pine Ridge to the California Border.

Issues

- Isolated location makes enforcing restrictions or area closures difficult.
- Historical use of the area.

Management Actions

Conduct periodic monitoring to assess off-highway vehicle violations.
Promote environmentally sensitive use of area to visitors via education (signs and personal contact).

Special Forest Products

Policy and Agency Standards

Commercial or personal harvest of Special Forest Products (SFPs) like boughs, burls, fungi, medicinal plants, etc..., within RNAs are not compatible with the over all goals to "Preserve natural features in as nearly an undisturbed state as possible for scientific and educational purposes. Natural processes should dominate, although deliberate manipulations which simulate natural processes are allowed in specific cases" (USDI 1987).

Current Information

No use permits are currently issued for this area. Historical personal use within this area is not well documented. Little information is available to determine the abundance of SFPs within the RNA, although numerous plants used in the medicinal herb industry are present. The lack of access to the RNA would limit the removal of any significant quantities of SFPs. Future research within the RNA may require the collection of certain animal and plant specimens.

Issues

• The isolation of the area makes enforcing SFPs collection restrictions difficult.

Management Action

• Prohibit any commercial or person use collection of Special Forest Products within the RNA. Permits for collection of specimens for research will be allowed on a case by case basis.

• Educate the public to the ecological significance of the RNA and the restrictions required to protect the designated natural resources.

Interpretation and Research

Policy and Agency Standards

The purpose for RNAs is for research, observation, and study. Studies involving manipulations of environmental or vegetation characteristics or plant harvest must have prior approval of the BLM.

Goals

• Protect the designated values for which the RNA was nominated to provide baseline information against which the effects of human activities in other areas may be compared.

• Provide a site for study of natural processes in as undisturbed (by human activities) an ecosystem as possible.

Current Information

Scotch Creek RNA is only accessible on foot or horseback which protects it from overuse by the public, but also makes it impractical as an interpretive or educational site. The RNA is accessible all year via the Horseshoe Ranch Wildlife Area (California). It can be used by investigators and classes willing to walk the several miles to the RNA. One of the main objectives for RNAs is to provide educational and research areas for ecological and environmental studies. The following specific research topics have been suggested for Scotch Creek:

• Evaluating the effects and the role of domestic livestock grazing on key elements in the RNA (plant communities and rare species) as part of the three year grazing study.

• The role of fire in plant community development, composition and production

Other potential areas for research include the effectiveness of prescribed fire and seeding of native species in reducing non-native plant species, and studies of the effects of prescribed fire or vegetative manipulation on plant community composition or special status plant populations. BLM encourages any nondestructive research that leads to a further understand of RNA ecosystems and is not limited to restoration or the study of politically signification plants and animals.

When researchers plan to use an area, they have certain obligations to:

(1) notify the appropriate BLM field office, submit a research plan, and obtain permission;
(2) abide by regulations and management prescriptions applicable to the natural area; and,
(3) inform the agency of the research progress, published results, and disposition of collected materials (Appendix R)

Issues
• Lack of funding for treatments in RNAs
• Impacts from surrounding land use activities.

Management Actions
• Evaluate all proposed research projects and approve only those that will not adversely affect the RNA's resources or short-term and long-term viability of species.
• Maintain a list of projects and research in the RNA, including findings and conclusions.
• Incorporate pertinent new findings from research projects into management actions.
• Maintain copies of all surveys, inventories, monitoring and activities conducted within the RNA.

V. MONITORING

A. Definition and Role of Monitoring

Monitoring is defined as a process of repeated recording or sampling of similar information for comparison to a reference. The role of monitoring in Research Natural Areas is to collect information in order to evaluate if objectives and anticipated or assumed results of a management plan and management actions are being realized or if implementation is proceeding as planned. Because monitoring may be so costly as to be prohibitive, priority should be given to monitoring mandated by legislation and to focusing on management actions aimed at maintaining, protecting and restoring key elements and minimizing disturbance in the RNA (Appendix R). All monitoring activities must include the following steps:

1. Establish monitoring objectives.
2. Collect baseline information.
3. Repeat consistent standardized monitoring procedures over time.
4. Interpret monitoring results relative to the baseline information and monitoring and implementation objectives.
5. Modify management objective actions and monitoring procedures as necessary based on reliable monitoring data to continue to achieve goals of the RNA.

The monitoring plan should be tailored to the unique characteristics of the RNA. Two types of monitoring activities are outlined below. Ecological status monitoring is designed to track the ecological condition of the natural elements protected within the RNA. Defensibility monitoring should detect impacts from outside factors on the protected elements in the RNA. These monitoring activities are general in nature and should not be used in lieu of more complex research strategies. Detailed monitoring protocols should also be developed in conjunction with specific management projects to measure their effectiveness in achieving RNA objectives. For each element, monitoring objectives, unit and frequency of measurement, responsible personnel, and location for data storage are stated.

B. Ecological Status Monitoring

Ecological status monitoring involves tracking species and plant communities relative to the stated objectives of the RNA. Ecological status monitoring at Round Top RNA should assess the current status of RNA elements and track trends or changes over time to determine if any RNA values are at risk. Monitoring results provide the basis for evaluating the effectiveness of management actions and determining if changes are required. Where possible, monitoring within the RNA should be tiered to the monitoring for the Cascade-Siskiyou National Monument.

Element: PLANT ASSOCIATIONS
Monitoring Objectives: Track successional changes in the key RNA plant associations or communities to determine if native species are protected, if ecological processes are properly functioning, and if RNA management actions are achieving desired outcomes. Information collected during monitoring provides the basis for making adjustments to management actions.
Frequency of Measurement: Every 5 years and after any management action
Responsible Personnel: Botanists, Ecologists, Foresters
Data Storage: Scotch Creek RNA File

Element: SPECIAL STATUS PLANTS
Monitoring Objectives: Monitor populations of special status plants that were documented in surveys done in 1999, in order to maintain or enhance populations and associated habitats. Utilize the RNA to collect base-line biological data for rare plant species. Evaluate effects from any vegetation treatments (burning/thinning) and grazing.
Unit of Measure: Revisit known sites and record population demographics on site reports. Include monitoring of for the rare *Astragalus californica*.
Frequency of Measurement: Revisit known sites of special status plants every 5 years.
Responsible Personnel: Botanist
Data Storage: Scotch Creek RNA File, Medford Rare Plant Database

Element: SPECIAL STATUS WILDLIFE
Monitoring Objectives: Perform surveys for special status wildlife species and monitor species within the RNA in order to maintain or enhance populations.
Unit of Measure: Determined by established protocols for specific species.
Frequency of Measurement: According to established protocols.
Responsible Personnel: Wildlife Biologist
Data Storage: Scotch Creek RNA File, Wildlife database

Element: FIRE
Monitoring Objectives: Determine the need to restored key plant communities using prescribed fire. Perform fuel surveys in key plant communities following established protocols. Monitor following prescribed burning results and the plant community response, in conjunction with Plant association monitoring .
Unit of Measure: Determined by established wildland burning and vegetation protocols.
Frequency of Measurement: According to established protocols
Responsible Personnel: Fire specialists, ecologist, botanist
Data Storage: Scotch Creek RNA File, Fire database

Element: NON-NATIVE SPECIES
Monitoring Objectives: Assess the need for management actions to reduce or minimize the impact, introduction and/or spread of non-native weedy species. Monitor identified treatment and problem areas. Non-native species of concern include all currently identified noxious and exotic weeds known within the Monument and in the adjacent watersheds.
Unit of Measure: Presence/absence, abundance and spread. Treatment results of non-

native weedy species by fixed plots. Target highly susceptible points of invasion (along borders and roads), susceptible habitats, and areas that receive vegetation treatments.
Frequency of Measurement: Monitor treatment plots for 2 years following the treatment. Demographic monitoring every 3 years (presence/spread); casual observations during other site visits.
Responsible Personnel: Botanists, Range Specialists, Ecologists.
Data Storage: Scotch Creek RNA File, Medford District Noxious Weed Database

Element: INSECTS, DISEASES OR PESTS
Monitoring Objectives: Monitor harmful insects, diseases or pests that could cause long-term negative changes in plant communities, especially the Mixed conifer/California black oak community. Monitoring for the presence of the oak phytophthora. Determine if treatments are needed to reduce the negative effects of insects and diseases.
Unit of Measure: Periodic evaluation of the RNA to discover presence/absence and extent of harmful insects, diseases or pests. Initial evaluations may be accomplished by walking through the RNA, or through photo interpretation.
Frequency of Measurement: Every 5 years or as needed based on casual observations during other site visits.
Responsible Personnel: Foresters, Ecologists, Entomologists, Pathologists, Botanists.
Data Storage: Scotch Creek RNA File, Southwest Oregon Insect and Disease Center.

Element: HYDROLOGY
Monitoring Objectives: Evaluate hydrological conditions (channel stability, erosion, sedimentation, slumping potential, etc.) and riparian vegetation of all streams to determine the functioning condition and need for habitat improvement or restoration activities.
Unit of Measure: Established riparian stream survey protocols.
Frequency of Measurement: Establish a baseline, then every 10 years
Responsible Personnel: Hydrologist / Riparian Coordinator
Data Storage: Scotch Creek RNA File, Riparian Database

Element: NATURAL DISTURBANCE
Monitoring Objectives: Document type, extent, intensity, and frequency of natural disturbances in the RNA and resulting changes in ecosystem structure or composition.
Unit of Measurement: Intuitively controlled surveys after disturbance, photos of affected plant communities or areas.
Frequency of Measurement: After significant disturbance, wildfires, landslides, insect and disease outbreaks
Responsible Personnel: Botanist, Ecologist and Foresters
Data Storage: Scotch Creek RNA File

C. Defensibility Monitoring

Defensibility monitoring involves on-the-ground assessment of factors which affect the manager's ability to protect the Scotch Creek Research Natural Area and its elements. Considered are current and anticipated land uses within and adjacent to the RNA and their potential negative effects on the protected elements or their governing ecological processes. Defensibility monitoring also involves checking for evidence of prohibited use, encroachment or degradation within the RNA.

Element: CULTURAL RESOURCES
Monitoring Objectives: After initial baseline surveys, detect vandalism or disturbance to known archeological or historical sites at the RNA.
Unit of Measure: Visual assessment to detect evidence of disturbance.
Frequency of Measurement: Every 5 years or as needed based on observations during periodic site visits.
Responsible Personnel: Cultural Resource Manager/ Archaeologist
Data Storage: Scotch Creek RNA File, District Archeology files

Element: PUBLIC USE OF RNA (camping, hiking, equestrian, trapping, OHV, special forest products, interpretation and research, trespass livestock grazing, timber harvesting)
Element Objectives: Determine if the level of public use jeopardizes protection of RNA values or key elements.
Unit of Measure: Observations made during other surveys or during periodic site visits. Indications of problem areas include evidence of vehicular use (on or off existing roads in the RNA), refuse, signs of campfires or campsites, trampled meadows, over grazing, significant erosion or rutting on or off roads. If problems are noted during casual visits to the site, conduct more extensive surveys to determine if actions should be taken to prevent damage to the protected elements.
Frequency Measurement: Casual visits yearly
Responsible Personnel: RNA Coordinator
Data Storage: Scotch Creek RNA file

Element: ROADS
Element Objectives: Determine condition of Schoheim road, track erosion and gullying of road surfaces, or other problems associated with the closed road.
Unit of Measurement: Subjective evaluation by knowledgeable personnel. Establishment of photo-points of marginal spots to compare condition over time.
Frequency of Measurement: Every 5 years during periodic site-evaluation visits to the RNA.
Responsible Personnel: RNA Coordinator, Road Engineers
Data Storage: Scotch Creek RNA file

Element: FENCES AND GATES
Monitoring Objectives: Determine if existing fences and gates adequately protect the RNAs elements. If not, determine if repairs, additional fencing or gates are needed.
Unit of Measurement: Walk fence lines to discover broken fences.
Frequency of Measurement: Every 5 years, or as needed if trespass grazing from California or any OHV use is observed during other visits to the site.
Responsible Personnel: Rangeland Specialists, Road Engineers
Data Storage: Scotch Creek RNA file

Element: GRAZING
Element Objectives: Determine if permitted grazing is maintaining or enhancing key plant community elements within the RNA, including Special Status Plants. Meet the intent of the overall goals for the RNA. Adjust grazing permit accordingly.
Unit of Measurement: Establishment of monitoring plots following standardized protocols in livestock utilized plant communities (grasslands / riparian) within the RNA. Where possible monitor grazing in conjunction with plant community and Special Status plant monitoring plots. Establish photo-points in areas of concern to compare condition over time.
Frequency of Measurement: Monitor for a minimum of three years as part of the Monument grazing study. Monitor utilization transects every year that livestock use the RNA.
Responsible Personnel: Ecologists, Range Specialists, Botanists
Data Storage: Scotch Creek RNA file

AEE-4. Plant Communities in the Scotch Creek RNA

Plant Communities	Acres
Roads	6
Lower slopes grassland/rock outcropping	119
Middle slope grassland/Oregon white oak woodlands	592
Oregon white oak/Klamath Plum/Wedgeleaf Ceanothus	45
Oregon white oak/Hollyleaved Barberry	212
Riparian Bigleaf maple/Oregon white oak	130
Oregon white oak/Birchleaf Mountain Mahogany	275
Rock Outcropping	21
White fir/Hollyleaved Barberry	18
Douglas-fir/Serviceberry/Hollyleaved Barberry	22
Oregon white oak/Birchleaf Mountain Mahogany	276
Douglas-fir/Oregon white oak	84

VI. RECOMMENDATIONS FOR FUTURE RESEARCH

None at this time.

VII. REFERENCES

Clinton WJ. 2000. Establishment of the Cascade-Siskiyou National Monument. Washington (DC): Office of the President of the United States. June 9, 2000. 3 p.

Schaaf DL 1991. RNA Nomination Letter from The Nature Conservancy to Medford BLM. Oregon Field Office. Portland, Oregon.

Appendix FF - Post-designation Community Interview Results

The information below was collected during a series of small group meetings and individual interviews conducted in early December 2000. Meetings and interviews were facilitated by social scientists from The University of Idaho (UI), College of Natural Resources. BLM representatives were not present and no formal public testimony was given. Instead, interviewees aresponded to open-ended questions posed by neutral facilitators regarding social and economic effects of CSNM designation on local communities.

The UI social scientists asked BLM to suggest a list of community members with a spectrum of positions on the monument that could provide a wide variety of perspectives on CSNM and its impacts on local communities. BLM provided the UI with contact information for several community members who expressed interest in participating.

Three small group (6-8 people) interviews, organized and hosted by different community leaders, and several individual interviews, were conducted over a 3-day period. Participants included local business owners, ranchers, retirees, landowners, individuals involved in restoration forestry, a county commissioner, a representative of an environmental group, and others. The intent of these meetings and interviews was not to contact everyone in the community. Rather, it was to identify the range of perspectives in the community related to two main questions:

- What have been the effects of CSNM on you and your community?
- How do you think CSNM will affect you and your community over the next 1 to 5 years?

The facilitators conducted the meetings and interviews so that the focus was clearly on CSNM's effects on individuals and the community since designation, and the likely effects over the short-term, not on future management decisions or desired conditions.

Effects Since CSNM Designation

Negative

Lack of consultation with CSNM residents before designation

Top down designation, lack of BLM contact with local residents, and ineffective means of communication has led to a lack of trust in BLM on the part of the public and a deterioration of relationship between BLM and the public.

- lack of BLM contact with local residents(within CSNM/ Greensprings)
- Deterioration of relationship w/ BLM and enviros (CSNM supporters)
- Top down designation led to lack of trust
- BLM did not contact all interested parties because of ineffective means (i.e. those off the grid)
- BLM ignores public input
- Poor dissemination of information by BLM

• CSNM management has begun before mgt plan is written. The CSNM currently exists without a management plan, but still effects public use of area (i.e. hunting access).

Feelings of uncertainty of future management

Lack and/or vagueness of CSNM management information has raised concerns about a variety of issues, helped the spread of misinformation and rumors, and has helped to galvanize opposition to CSNM.

- Road access on public land to pvt. property, hunting areas, recreation areas, etc
- Created/galvanized opposition to CSNM
- Vagueness of information and lack of management document besides declaration of CSNM
- Uncertainty about which local BLM official is ultimately responsible for CSNM
- Uncertainty about loss of local control
- Misinformation/ rumors re: impacts to pvt. property
- Concerns about the need for larger BLM staff to manage and protect CSNM and that funding will not be available, which may result in adverse impacts to local communities (more visitors may result in increased trespass on pvt. property, increased fire danger in campgrounds, etc.).

Division/polarization of the community

Designation has exacerbated divisions in an already division-prone community resulting in "more people unwilling to come to the table" and collaborate on shared concerns regarding the CSNM. Community is less friendly as people take pro and anti CSNM sides.

- People not speaking to people with opposing views on CSNM
- Exacerbated divisions in an already division-prone community
- More people "unwilling to come to the table" now to work collaboratively
- Some residents threatened to move away because of CSNM
- Loss of some clientele at pro-CSNM business
- Galvanized opposition to CSNM
- Community less friendly
- Some business owners support CSNM, some oppose

Access

Road access is a critical issue for local residents and users.

- Road maintenance has not kept up with increased visitation
- Uncertainty of road closures (access both to CSNM and private property)
- OHV users want access
- Hunting's infringed by closures
- No clear point of entry for visitors
- Disabled hunters disenfranchised
- Road closures will affect emergency access to private land/inholdings
- Good for hunters who don't want OHVs in hunting areas

Increased visitation

Many residents have observed increased numbers of visitors/vehicles in the area leading to new and increased impacts to the environment.

- More cars and trucks on Soda Mtn. Rd., Pilot Rock Rd., and other forest roads
- More hunters (which presumably reduces wildlife populations)
- Negative impacts to road surface conditions
- Increase in visitors to fire tower
- Vehicular trespass on private land has increased causing soil erosion and ruts

Safety

Concern for personal safety due to increased visitation, hunting, and newcomers in area.

- More hunters equals more guns near houses
- Hunting from road increased
- Concern for personal safety and property due to newcomers (crime/vandalism)

Private Property/Boundaries

Inclusion of private property within outer CSNM boundaries promotes trespassing and has created inholders of some whom would rather not be.

- Increased visitor trespass on private property
- Increased BLM trespass on private property
- Some BLM maps appear to include pvt property in CSNM
- No indication to public where private land is located
- Has created inholders

Changes in logging practices

There is anecdotal evidence that the CSNM has increased logging on private land having a variety of impacts.

- More logging and more irresponsible logging on private land
- Increased heavy log truck traffic on Hwy. 66
- Increased fire hazard from slash
- Negative effects on water quality
- Will make it harder to restore land later
- Heavy cutting on private land has forced some to take a stand for preservation and has led to polarization

Law enforcement

CSNM has changed law enforcement in the area leading to feeling of intimidation of some local residents and tension in the community.

- Local law enforcement supplemented by increased fed law presence and enforcement and more stringent laws creates fear and tension in community

Positive

Recognition of CSNM as worthy of preserving

Some local people are pleased that the place where they live is being recognized nationally as a special area, and that this will lead to special protection.

- Sense of pride
- Consideration of CSNM's maintenance carried to national level
- Relief that fire hazard will be addressed by BLM
- Relief that area will remain wild and protected
- More concrete assurance of future protection
- People feel their values are being protected/ don't need to worry about being ignored anymore
- OHV issue resolved on paper (the law)
- Logging on CSNM land has stopped
- Increased protection of biodiversity/forest
- Increased protection for PCT
- Reduction in road building

Unifying like-minded community members

The designation has drawn together groups both in support of and opposed to the CSNM and given greater voice to each.

- Unified supporters to voice support for increased protection of area
- Pro and anti CSNM sides unified independently
- Good community discussions amongst parties who agree on CSNM, neighbors getting to know each other
- New pro CSNM group forming
- Increased local voice in decision making
- Motivating more people to get involved

Greater awareness of CSNM biodiversity

- Information brought to light by designation has increased awareness of biodiversity within the CSNM both for community and population at large.

Future Effects: Change in the Overall Character of the Community

People were asked for their perceptions on how the management of the CSNM over the next 1 to 5 years would affect their community. In order to facilitate discussion and stimulate thought on the subject, we asked participants to consider 4 specific aspects of community (economy, physical character, social make-up, and organization and leadership capacity).

Jobs and wealth: The Community's Economy

This dimension refers to the major businesses and sources of jobs in the community, and the diversity of the economy in terms of the variety of businesses, industries, and financial assets (the amount of capital or wealth) available to support the community's services and activities.

The major businesses and industries of the community, such as manufacturing, services, retail and wholesale trade, agriculture, forestry, and government are interrelated and provide a source of jobs and income. The relative mix of jobs and income in these industries is an indication of the community's economic diversity.

Positive

- Increase in job opportunities (private sector seasonal jobs, public sector jobs, jobs in thinning/ small diameter logging)
- Service/tourism related businesses will benefit
- Tax base should increase
- Property values should increase because of increased desirability of living in CSNM
- Increased opportunity for new businesses
- Easier to get more grants for tourism/restoration enterprises
- Possible to move towards a restoration economy
- Increased tax revenue for county from new businesses in area

Negative

- Property values may go down near critical habitat, or due to new building regs
- Taxes will increase
- Concerns about over-commercialization of CSNM
- Stricter grazing rules will force ranchers to manage differently, which could jeopardize economic viability of grazing due to increased regulation (new costs to ranchers) causing a loss of ranching jobs or businesses.
- Change from commodity based economy to a recreation and tourism-based economy. (Local economic opportunities will decrease)
- Loss of some recreation opportunities (esp. motorized vehicle restrictions) will have negative economic effect on some recreation-dependent businesses.
- Will cause mill closures
- Cumulative effect of other possible CSNMs in OR will hurt state economy
- CSNM will result in more BLM employees and waste more tax dollars
- Will reduce pvt property value where it's surrounded by CSNM
- O & C lands in CSNM will provide less revenue (no logging) to county
- County tax base could fall if feds buy pvt. land

Neutral or both

- More transfer payment/unearned income
- More tele-commuting
- Minimal economic effects overall
- Restrictions on use of property (moratorium on future building)
- No change in cost of living (most people buy everything in town)
- Won't have much negative effect locally because most people aren't earning money from resource extraction jobs
- Will not have big effect on timber harvest which is already in decline on public land
- Economic boost at county level, but at smaller scale, some individuals might not benefit

Physical Character of the Community

This dimension refers to the characteristics of the human-built and natural environment of the community. The community's physical infrastructure and built environment includes characteristics such as the attractiveness of the downtown, the quality of the community's roads, and traffic safety and congestion, as well as the level of social services provided. The community's natural environment includes characteristics such as parks, fields and rivers, as well as the attractiveness of the surrounding scenery.

Positive

- Will protect the scenery
- Knowledge by locals of good land use practices should increase
- Probable better management of cattle
- End of cut and run logging on public land
- BLM will shift from short-term to long-term emphasis/perspective assuring protection in perpetuity
- Will make someone in BLM accountable for stewardship of CSNM and thus accountable to local concerns for protection of CSNM
- Facilitates regional conservation efforts (CSNM compliments other protected areas in the region)
- More holistic management by BLM will encourage likeminded landowners to increase their own restoration management on private land
- Management plan will allay uncertainty and allow private individuals to undertake long-term planning (i.e. environmental restoration, estate planning).

Negative

- Increased/faster traffic
- Will increase absentee ownership/vacation homes
- Increase in crime (vandalism, trespassing)
- More ugly signage will come
- Greater risk of accidental fire caused by visitors
- In-migration of "urban types" increase risk of fire due to ignorance of fire risks (also noxious weeds)
- End to multiple use management in favor of conservation will reduce biodiversity, increase noxious weeds, and contribute to fuel loading
- Reduce working landscapes and economic engine
- Road closures will reduce recreation opportunities
- Gates will hamper personal visits to local residents' property
- End to multiple-use mgt of BLM owned Box O Ranch
- Could lead to increased development on pvt. land (esp. already logged land)
- Will be difficult for BLM to manage checkerboard of land ownership
- Displacement of multiple use management from the CSNM area to other public lands (i.e. Making up for timber not cut in CSNM)
- New endangered species will be found, which will reduce pvt property freedom
- Concerns about water rights and increased water quality monitoring on pvt property
- Will result in de facto BLM control/regulation of pvt property
- Limiting thinning in CSNM may increase fire hazard and jeopardize pvt. property
- Closing roads will decrease ability of locals to get to and fight fires
- Increased use of prescribed burns by BLM will increase possibility that fires will get out of control and damage private property
- Locals will have to install signs and fences to stop trespassing because visitors will not know boundaries of inholdings
- Will precipitate increased public scrutiny of public and pvt. land management by outsiders

Neutral or both

- Decrease in number of ranches
- Increase or decrease development
- Improvement of water quality and air quality (or not)
- Bikes will be banned from closed roads (or not)
- Grazing will be phased out (no new grazing permits will be issued)
- Taking farmland in land swaps is more likely
- No BLM commercial logging in CSNM
- More control of ORV use
- BLM now will consider purchase/exchange of pvt. land
- BLM will be forced to change from commodity to protection orientation

People: The Community's Social Make-up

This dimension refers to characteristics of individuals or households in the community. Characteristics relating to the individual or household might include the community's population size, how rapidly it is growing or losing population, its age and family structure, as well as the make-up of various groups of people, including their ethnicity, their values and lifestyles, and other kinds of diversity.

Positive

- Reduced need for public assistance (community composition will be more affluent)
- Increased sense of place attachment because CSNM status is one more amenity
- Newcomers bring new opinions about how to do things

Negative

- Decrease in extended families living in area
- School enrollment will decrease as population gets older
- CSNM will change character of community and economy
- More non-southern Oregon values due to in-migration may conflict with values of long-time residents
- Decreased multi-generational ownership of land
- People who use their land to earn a living will be most heavily impacted by CSNM because of increased regulation (CSNM forcing land-using people to change their way of life)
- Some younger people will move away because "freedom" has been taken away

Neutral or both

- Older population (more retirees)
- Increase in ethnic diversity, or not
- Community will become more urbanized (in terms of attitude) -- people more isolated with ex-urbanite social patterns; less friendly also, or not
- Population will increase, or not
- CSNM will draw more environmentally-minded residents to area (this will lead to reduced friction but also reduced diversity of perspectives)
- CSNM not expected to greatly increase visitation in area
- Some ranchers want to be bought out

Vision and Vitality: The Community's Organization and Leadership Capacity

This dimension refers to the characteristics of the community's social organizations, including the number of civic groups and their level of activity. This dimension also refers to the community's cohesiveness -- the extent to which people identify with the community, are committed to it, and work together to get things done. In addition, this dimension refers to the effectiveness and vitality of the community's government and its ability to accomplish its goals. Finally, this dimension refers to the community's vision for the future and the desire and preparedness to make that future a reality.

Positive

- Membership and activity of civic organizations concerned with CSNM management will increase
- Quality of political and civic leadership will increase as CSNM management issues spur more people to get involved
- County tax revenues will increase
- CSNM could eventually bond the community together (In long-term fears and divisiveness will dissipate)
- Could unify locals to defend pvt. property from BLM eminent domain "takings"
- Opportunity to bring people together around love for the land
- Increased continuity in communication between BLM and public regarding resource management
- Increased possibility of collaboration between BLM and private landowners

Negative

- More zoning laws will restrict pvt property use
- Loss of a chance for BLM to deal with landscape holistically considering both pvt. and public lands
- Loss of options for doing collaborative (public/pvt.) projects
- Loss of local control over land use decisions

Appendix GG - CSNM Weed Management Strategy

INTRODUCTION

Weed invasion poses a serious threat to many plant communities of the CSNM. Several weeds (noxious and others) commonly found throughout the CSNM are often associated with areas of disturbance.

Annual grasses such as medusahead (*Taeniatherum asperum*) and cheatgrass (*Bromus tectorum)* are ubiquitous throughout open plant communities of the CSNM. Yellow starthistle is frequently associated with medusahead, particularly on the Agate Flat. Isolated patches of medusahead can also be found within otherwise native dominated herbaceous understories of the Jenny Creek uplands and other open areas of the CSNM. Dyers woad (*Isatis tinctoria*) is a threatening newcomer to the monument's grasslands, shrublands and woodlands. Recent surveys have shown that bulbous bluegrass (*Poa bulbosa*) has expanded its range and foliar cover within open hardwoodlands and conifer communities considerably over the last 30 years. Canada thistle is a serious problem in acutely disturbed areas along roads, stock ponds, and tree harvest areas.

This document presents a summary management strategy and a literature review of important life-cycle characteristics and control measures for the most prevalent weeds of the CSNM. Desired native perennial herbaceous plants are frequently interspersed with weeds, the objects of control. Since control methods may affect adjacent non-weed plants, a short literature review is provided to describe the effects of commonly used weed control measures on desired native grasses, forbs, and shrubs.

Guiding Principles for Weed Management

- Emphasize on maintenance of healthy native vegetation;
- Prioritize treatment of small weed patches over large areas of weed domination;
- Two to three years of weed control may be necessary before native plants become competitive against weeds;
- Focus weed control on plants and seedbanks;
- Reintroduce Native plants where they are lacking;
- In drier areas (Klamath River Ridges) manage native vegetation to exploit soil moisture so as to prevent weed growth and proliferation
- Maintain a range of weed treatment options to suit local conditions (e.g. within and outside of riparian areas) and varied requirements over time (e.g. fire can only be implemented during the first year of a multi-year treatment series)
- Implement pilot studies

Most apparent is the need to integrate weed control / management into all aspects of land management, including vegetation manipulation, prescribed fire, livestock management, recreational activities, and the transportation system. The literature supports the formulation of a general management strategy incorporating aspects of vegetation management and weed control in (roughly) the following order of priority :

A General Vegetation Management Strategy Incorporating Weed Control

1. Maintain healthy herbaceous plant communities as a barrier to weed invasion.

2. Limit ground-disturbing activities.

3. Maintain source of native herbaceous seed for emergency restoration; sow with native herbaceous seed (from local seed source) where natural or ground-disturbing management activities do take place.

4. Improve condition of stands with mixture of weeds and remnant native herbaceous species (mowing, fire, herbicides, cultural, hand-pulling, grazing, bio-control, no-action).

5. Restore isolated weed patches to native herbaceous plant domination
   - hand-pull (only works for small populations)
   - spot herbicide application on target plants (away from water, other important biological features)
   - seed with native grass

6. Isolate extensive weed areas (>1 acre) to prevent spreading
   - ensure no motorized vehicle, cycling, hiking, livestock thoroughfare, particularly during the wet season when mud acts as an adhesive.

7. Create a long-term restoration / management plan for extensive weedy areas (>1 acre)
   - apply treatment method(s) most suited to species and location on landscape
   - monitor efficacy of treatment(s)
   - alter management strategy as needed
   - several years of treatment application are necessary for control of seedbank

8. Survey wet meadows, seeps, and springs to quantify restoration needs. Initiate restoration of hydrological functioning where necessary.

9. Design long-term management plan for maintaining a range of conditions / habitats within plant communities of the Monument.

Some of the major ecological problems associated with grass / shrub / woodlands involve annual grasses and yellow starthistle. Table AGG-1 summarizes control options for these species, which are described in greater detail in the literature review. See the literature review for more detail. However, the treatments described in this text are a disturbance in themselves, and can result in some undesired consequences. These area summarized in Table AGG-2. Any application of these control measures would comply with the Integrated Weed Management Plan / EIS (Appendix S) also supplied as an appendix within this DEIS.

Table AGG-1. Summary of Management Technique effectiveness for cheatgrass, medusahead, and yellow starthistle:

	Consequences to Target Species		
Technique	**cheatgrass**	**medusahead**	**starthistle**
No-action	Plant communities with a healthy herbaceous component are able to compete against weeds and offer the best prevention of weed invasion. Depending on initial conditions, plant communities may show an increased native grass abundance following livestock removal. Other areas may show sudden increase in weed abundance following removal of grazing constraint.		
Manual Weeding	Effective on small scale for new plantings only		Very effective for small populations
Cultural (disking, ploughing)	Can be an effective treatment, control of timing of treatment application is essential; needs to be combined with native seed application; will require alternative treatments in subsequent years		
Mowing	Can be effective treatment, control of timing of treatment application is essential, can contribute to the maintenance of native herbaceous understory, needs to be combined with other control methods, difficult to apply on rough terrain		
Grazing	In some situations, cattle grazing can be effective treatment, however, control of timing and intensity of treatment application are essential. Can contribute to the maintenance of native herbaceous understory, but needs to be combined with other control methods		Cattle grazing during the rosette stage favors starthistle. Partial control can be achieved during the bolting stage. Control on timing and intensity are critical; goat browsing very effective
Herbicide	Individual plant species or growth-form specific herbicides are available; apply early summer before flowers/inflorescences mature, but after summer drought prevents regrowth; second application may be necessary		
Bio-control	None available		Effective in certain locations only; bio-control release program already underway
Fire	Can be effective treatment, control of timing and intensity of treatment application is essential; also critical for maintenance of healthy native herbaceous understory, particularly at lower elevation		
Native plant seed application	rarely effective on its own; best after at least two years of weed plant and seedbank control		

Table AGG-2. An assessment of the advantages and disadvantages of control methods used for reducing weed seed production and establishment within the CSNM

Treatment	Advantages	Disadvantages
No-action	-depending on initial conditions, no-action may favor competitive native vegetation the best preventative of weed invasion.	- evidence from relict data suggests that weed invasion also occurs under no-action
Manual weeding - whole target plant removal	- remove target species only	- effective over small areas only - severe damage to micro-topography and microphytic crust by trampling - could lead to soil surface instability
Cultural treatments -entire plant removal	- precise control of timing	- acute disturbance may destroy remnant native vegetation - may promote weed invasion - difficult to apply in wildlands, especially rough or rocky terrain
Mowing - removal of above-ground parts of all plants	- harmless to bunchgrasses	- light to moderate damage to soil surface depending on technique used - may lead to soil surface instability - may need 2 or more applications
Grazing - timing and intensity may allow targeting of specific plants/weeds	- reduces litter - can rejuvenate bunchgrasses - treat large areas - timing and intensity may allow targeting of specific plants/weeds	- Insufficient livestock control may result in degradation of adjacent biological resources (wetlands, springs, riparian areas) - livestock are a vector for spread of weeds
Herbicide application -whole plant death	- target specific areas - target specific plants - 1 treatment per year - most cost effective - low soil surface disturbance	- may harm other life-forms if timing and targeting of application not correct
Bio-control	- target-plant specific	- could harm plants closely related to target plants
Prescribed Fire - removal of above-ground parts of all plants	- reduces litter - rejuvenate bunchgrasses - treat large areas	- potential damage to property if fire escapes - much planning required - kills woody plant species - kills lichens - intense summer burns may lead to soil instability
Native plant reintroduction	- may be no alternative to re-establishing native species	- none, if guidelines for maintaining genetic integrity of local natives plants are followed

Many of the observations on weed management in this review are derived from research conducted in the Great Basin. Pilot studies are necessary to ensure that treatment methods suite local conditions. Other weeds not included within this literature review have different life-cycles and may favor specific control measures. For example, since Canada Thistle can propagate vegetatively, hand-pulling and cultural techniques may aide propagation of new plants. Systemic herbicide treatments appear the most effective control measure. Further literature review for Canada thistle, dyers woad, and other weed species will be completed as necessary.

Literature Review of Annual Grass Life-History and Control Measures

A brief review of the life histories of cheatgrass and medusahead provides a better understanding of the annual grass control methods described in this document.

Life histories and control of cheatgrass and medusahead

Cheatgrass (*Bromus tectorum*) and medusahead (*Taeniatherum asperum*) share many life-history characteristics. Both are introduced annual grasses that have substantially impacted ecosystem functioning in a way that ensures their persistence. An important life-history trait that enables persistence is their ability to germinate in the fall. A tolerance for cool soil temperatures allows root development and resource capture earlier in the spring than other plant species. Early maturation and senescence provide fine fuel allowing more frequent, and destructive early fires (Whisenant 1989).

Table AGG-3 enumerates some of the life-history stages of cheatgrass. Cheatgrass shows a high number of individual plant species per unit area. Though no data from a single site corresponds with all of the attribute headings of Table AGG-3 exists for medusahead the literature suggests a similar pattern of reproduction. Medusahead has been reported to have a slightly higher seed production per unit area than cheatgrass. The greater seed production and inhibition of cheatgrass germination by mat formation are thought to be two reasons allowing medusahead to invade cheatgrass infested areas.

Cheatgrass recruitment is concentrated in the late summer / fall, but may continue through to early summer the following year (Mack and Pyke 1983). This results in an excess of 20 cohorts, their fate dependent on season of emergence and the vagaries of precipitation (Mack and Pyke 1984). Late summer and early fall cohorts are often killed by drought in September or October (Mack and Pyke 1984). Frost heaving and grazing by voles accounted for many winter deaths. Fungal infestation of the seedhead (smut - *Ustilago bullata*) predominated amongst spring cohorts resulting in up to 30% mortalities (Mack and Pyke 1984). Low seed production by fall cohorts may be offset through increased seed production by later cohorts (Mack and Pyke 1983). This implies that control measures should be applied in the spring after most cohorts with a high probability of seedset success have germinated, but before their inflorescences have had a chance to mature. Control measures for cheatgrass need to be applied before the red stage, since such plants are able to mature on the ground (Hulbert 1955). Since only 45 days are required for seed production (Mack and Pyke 1983), single applications of control methods may not be successful in years with extended spring / early summer precipitation.

Table AGG-3. Life history attributes (attribute/m^2) of cheatgrass, derived from Larson and Sheeley (1994).

Attribute	Cheatgrass
Mature plants	660
Seed production	7000
Seed rain	7000
Seed bank	300
Fall seedlings	6200
Spring seedlings	2000
Mature Plants	543

An important factor of cheatgrass and medusahead seedbank dynamics is the high seasonal fluctuation in germination rates (Murphy and Turner 1959). Fewer than 13% of caryopses produced in the summer may remain in the seedbank until the following winter (Mack and Pyke 1983). This carryover varies, and is no doubt dependent on precipitation and site specific characteristics. Though cheatgrass may remain viable in laboratory conditions for up to 12 years, seeds show less persistence under field conditions (Hulbert 1955, Hull 1973). Medusahead seedbank shows similar fluctuation, with up to 90% germination of the annual seed production (Sharp et al. 1957). Hironaka et al. (1963, in Turner 1969) found that though medusahead seeds can remain viable in the soil for up to three years, that germination was reduced to 3 percent.

Of significance to management is the limited spatial dispersal by the majority of cheatgrass seeds. Most cheatgrass seed disperse less than 1 meter from the mother plant (Hulbert 1955). This is supported by observations that infestations are often spotty (Furbush 1953, Tausch et al. 1994). Such limited dispersal implies that the seedbanks are spatially discrete, and that immediate treatment needs only to be focused in the direct vicinity of mother plants.

Cheatgrass and medusahead show different patterns of seed maturation, release and dormancy. Cheatgrass generally matures two weeks prior to medusahead. In addition, seeds are able to disseminate as soon as they mature, and generally require only a short after-ripening period before being germination ready (Thill et al. 1984). Medusahead seed may be retained within the seedhead for up to one month following maturation (Mckell et al. 1962b), and also requires an after-ripening period before germination (Murphy and Turner 1959, Young et al. 1968). The germination, dormancy, and dispersal characteristics discussed above make both cheatgrass and medusahead susceptible to management strategies aimed at preventing seed production and maturation (Pyke 1994). However, medusahead has been found to be phenotypically plastic to the extent that a single plant can produce more than a 1000 seeds (Young 1992), indicating the importance of continued monitoring.

Of equal importance to the actual technique of annual grass reduction, is the strategy within which the technique is used.

Management strategies suggested for use against cheatgrass and medusahead

A review of the literature reveals that effective management needs to consider several factors. First, the reduction of the seedbank (Goebel et al. 1969, Young et al 1999), and second, the establishment of an alternative (desired) species to prevent the re-establishment of annual grass domination (Higgens and Torell 1960, Major et al. 1960, Goebel et al. 1969, Baker 1972, Christenson et al. 1974, Hilken and Miller 1980, Antognini et al. 1995). Since high cover by litter has been shown to inhibit seed germination of other species (Goebel et al. 1969), litter removal may be necessary if revegetation by seeding is proposed (Torell et al. 1961, Goebel et al. 1969).

The literature also indicates that management depends on the extent and pattern of infestation by annual grasses (Major et al. 1960) and precipitation regime (Monsen 1994, Sanders 1994). Since healthy stands of perennial bunchgrasses appear to be the most effective deterrent to invasion (Dahl and Tisdale 1975, Horton 1991), emphasis needs to be placed on the maintenance of existing stands. This includes ungrazed and relict areas, since these are also susceptible to cheatgrass invasion (Lovejoy 1980, Passey et al. 1982, Anderson and Inouye 1988, Svejcar and Tausch 1991, Tausch et al. 1994, Hosten 1995b). Initial invasions often appear spotty (Furbush 1953, Tausch et al. 1994). Efficient management should aim at removing such infestations (Furbush 1953, Turner et al. 1963), since costs rise with the seriousness and size of the infestation (Furbush 1953).

Sanders (1994) lists three options for managing areas already converted to annual grasslands. First, to manage the area as an annual grassland. Second, to convert to a perennial grassland through manipulation of grazing. This is only possible if remnant bunchgrasses remain, and the rainfall is greater than 356 mm per annum. Third, to convert back to an annual grassland by reseeding. Sanders (1994) advises that in areas having less than 305mm precipitation that only crested wheatgrass (Hycrest) should be used. Monsen (1994) notes that seeding within cheatgrass infected areas is hazardous with an annual precipitation of less than 254mm. Success may depend on the spring precipitation following the seeding event (Sanders 1994).

Past successful revegetation techniques frequently involve more than a single control method depending on climate, topography and phenology of the plants involved (Young 1992). Ogg (1994) indicates a need for the integration of control methods (cultural, mechanical, biological and chemical) for sustainable weed control, and to recognize biological, economical and environmental factors. While several papers cite references using cultural treatments (Hilken and Miller 1980, Lancaster et al. 1987), these are not considered suitable for the CSNM because of their excessive disturbance and high probability of colonization by the widespread annual grasses.

Fire as a management tool

While the utility of fire as a weed control mechanism is well established, its misuse can result in considerable harm. Fire has generally been associated with cheatgrass invasion at larger scales (Stewart and Hull 1949, Whisenant 1989) due to mortality of individual bunchgrasses. In spite of these results, fire has been suggested as a suitable tool for combating cheatgrass (Rasmussen 1994) and medusahead (Murphy and Lusk 1961, McKell et al. 1962b, Goebel et al. 1969, Hilken and Miller 1980). Fire trials aimed specifically at controlling medusahead are ambiguous, showing both increases and reductions in abundance (Turner et al. 1963), perhaps indicating site specificity. Reductions in annual grasses may also be temporary (Rasmussen 1994), depending on whether remnant bunchgrasses remain (Hosten and West 1994).

The literature indicates that timing of fire application is critical for annual grass reduction. For treatment of both cheatgrass and medusahead, fire is advocated prior to seedfall when seeds are still in the dough stage (Murphy and Lusk 1961, Mckell et al. 1962a). Several papers reporting research on Californian annual grasslands advocate burning while associated species are in the seed shatter stage (Furbush 1953, McKell et al. 1962a, McKell et al 1962b, Murphy and Lusk 1961). This results in medusahead reduction, and dominance by those species whose seeds have already fallen to the ground. While these authors discuss the topic of reducing medusahead, they do so in an environment already converted to annuals and devoid of native perennial grasses. In ecosystems where bunchgrasses are present and susceptible to fire, this is not a recommended procedure. In general, dormant season burns favor remnant perennial bunchgrasses (Young 1992). Wright and Klemmedson (1965) consider summer burns undesirable. Burning after medusahead seed has disseminated promotes dominance by this species. An alternative prescription is spring burning (Rasmussen 1994). This may only be possible if sufficient litter remains from previous years, and if the litter has dried out sufficiently to act as fuel. This situation may only occur on south facing slopes in years of limited spring precipitation. Since the soil moisture remains high following an early spring burn, the remaining annual grass seed pool may germinate, necessitating a follow-up treatment. With follow up treatment (herbicide, manual removal, mowing, grazing), a substantial proportion of the seedbank could be removed. Medusahead tends to retain its seeds within the inflorescences longer than cheatgrass. This may provide an opportunity to burn the less favored medusahead grass seed while favoring cheatgrass.

The fact that cheatgrass germination is repressed below sagebrush canopy following fire (Blank et al 1994) may be an indication that high temperatures may kill seeds. The effectiveness of fire for the removal of seed may thus be dependent on the amount of fuel available, and consequent nature of the fire. Where sufficient fuel is available, slow fires with high ambient temperatures are suggested for maximum effective killing of seeds (Harwood 1960, Murphy and Turner 1959, Murphy and Lusk 1961, Mckell et al 1962b). Seedbanks of both cheatgrass and medusahead are thought to be considerably reduced with a single fire event, since a major portion of the seedbank germinates every year. In addition, neither cheatgrass nor medusahead seed appears long-lived within the soil. However, a small proportion of the initial seed pool may still represent a considerable number of seeds and consequent crop of plants during the ensuing growing season. Furthermore, the high seed production of these plants may result in a rapid recruitment of the seed bank and annual crop of individual plants, unless precautions are taken.

Plant defoliation as a management tool

Annual grass defoliation (clipping, mowing, livestock and small mammal grazing) have been shown to decrease seed set in annual grasses (Pyke 1986, Tausch et al. 1994, Turner 1969). Single, or even repeat defoliations, do not appear to completely suppress annual grasses. As suggested in the introduction, the establishment of an alternative, perennial vegetation, is a necessity for long-term rehabilitation.

Turner (1969) found that early and late mowing and grazing schedules improved vigor of California oatgrass (*Danthonia californica*) in the foothill ranges of western Oregon by reducing competition with medusahead. Early grazing and mowing schedules remained ineffective. This implies that at least two defoliation events are required for annual grass seedset control.

Tausch et al. (1994) examined the effect of fall and early spring, early-spring-only, and late-spring clipping only on cheatgrass and perennial bunchgrass phytomass in western Nevada. Late-spring clipping yielded the largest decrease in cheatgrass phytomass. Fall-clipping increased cheatgrass production, while phytomass was not different for the fall-plus-spring treatment and controls. All treatments reduced bunchgrass phytomass. Fall-clipping appeared to reduce bunchgrass ability to compete with cheatgrass in the following year. Late-spring-clipping (while cheatgrass was in the boot stage), had the least negative effect on perennial bunchgrass phytomass. Since the latter treatment was the most harmful to cheatgrass, and the least harmful to bunchgrasses, it appears to be the best choice of clipping regime within cheatgrass impacted areas, regardless of perennial bunchgrass presence.

A disadvantage of grazing is the confounding effect of trampling, though this can also be used as a seedbed treatment for perennial grass seeding (Winkel and Roundy 1991, Winkel et al. 1991). Unequal distribution of livestock may also result in localized degradation at watering points and under shade trees. Vallentine and Stevens (1994) imply that lack of absolute control of livestock is probably the major reason for not using grazing as a cheatgrass control technique. Caution needs to be used with mowing, since inflorescences can mature on the ground once they have started to turn red (Hulbert 1955).

The high silica content of medusahead makes grazing an ineffective tool for medudahead management, unless applied early in the spring.

Herbicide application as a management tool

The effectiveness of herbicide treatment of medusahead increases with removal of litter (Higgins and Torell 1960, Torell and Erickson 1967). Burning is thought to allow remaining seed to come into contact with mineral soil, resulting in germination and more effective subsequent control (Torell et al. 1961). Herbicide application at the boot stage has been shown to be effective for cheatgrass (Whitson 1994 a,b) and medusahead (Goebel et al. 1969, Kay 1963, Morton et al 1958).

The literature identified two major scenarios within which chemical treatment may be applied for the control of annual grasses. These are areas completely dominated by annual grasses versus areas with remnant bunchgrasses. The first situation calls for herbicide treatment followed by a year of chemical of mechanical fallow (Lancaster et al. 1987, Young 1992). For the latter situation, several herbicides have been reported to be effective in controlling annual grasses while leaving perennial bunchgrasses unharmed (Hosten 1996). Hilken and Miller (1980) tabulate numerous herbicides and their relative success, while Ogg (1994) lists an updated list of registered herbicides for cheatgrass.

Climate may play an important role in the utility of herbicides. For example, paraquat (effective in California) was shown to be ineffective in the temperate desert climate of the Great Basin (Young 1992). Bunting (1994) and Ogg (1994) strongly recommend further research using glyphosate on rangelands. Whitson et al. (1994a) found that more than one application of glyphosate was necessary for 100% annual grass control, while a single application resulted in 90% control. The use of Quizalfop is relatively recent, and may deserve experimentation in the rangeland environment. Quizalfop has proven particularly effective against cheatgrass when dissolved in oil and applied using air assisted application techniques (Ogg 1994). As with other control methods, multiple year applications of herbicide are necessary for seedbank control (Whitson et al. 1994a). Fertilizing with potassium nitrate ($KNO_{3)}$ can enhance medusahead seedling emergence to improve the efficiency of seedbank harvest (Young et al 1999).

Table AGG-4. Herbicides used to control cheatgrass or medusahead in the presence of perennial bunchgrasses.

Herbicide	Target Species	Application Rate	References
Atrazine	annual grass in established perennial grass; annual grass during perennial grass establishment	0.56 - 0.84 kg/ha 0.6 kg/ha	Turner 1969,Currie et al. 1987, Young 1992, Lawrence et al. 1995
Dalapon		1.1 - 2.2 kg/ha	Young 1992
Glyphosate	cheatgrass associated with native perennial bunchgrasses of Wyoming	0.2 - 0.3 kg/ha	Whitson et al. (1994a,b)
Glyphosate + 2,4D	cheatgrass associated with crested, western, intermediate and thick spike wheatgrasses	0.4 - 0.7 kg/ha	Bunting 1994
Paraquat	revegetation of annual grass dominated rangelands	0.56 kg/ha	Young 1992
Pronamide	annual bromes in perennial grass stands	0.6-0.8 kg/ha	Currie et al. 1987
Propham	annual bromes in perennial grass stands	3.4 kg/ha	Currie et al. 1987
Quizalofop + COC	cheatgrass associated with new seedings of Covar sheep fescue	0.11 kg/ha	Bunting 1994, Ogg 1994
Quizalofop + bromoxynil + COC	cheatgrass associated with new seedings of Covar sheep fescue	0.11 + 0.28 kg/ha	Bunting 1994, Ogg 1994

Literature Review for Yellow Starthistle Control

Several excellent resources on the subject of yellow starthistle control exist on the internet (http://soils.ag.uidaho.edu/yst/Control/control.htm; http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7402.htm; http://www.efn.org/~ipmpa/Noxystar.html; http://www.tasteldorado.com/transline.htm). The following text is summarized from these resources and other papers derived from scientific journals.

Many of the conceptual underpinnings of weed management discussed for annual grasses apply also to yellow starthistle. However, there are a few fundamental differences in the ecology of yellow starthistle versus annual grasses that may alter the timing of control measures.

Similar to annual grasses, yellow starthistle has a phenomenal rate of seed production per unit area from 5200 to 21600 seeds m^{-2} (Sheley and Larsen 1994b). Yellow starthistle differs from the annual grasses in terms of its phenology and root development. While the plant can function as a winter annual, it tends to persist in a rosette form through the colder months of the year and puts on a growth spurt later in the spring/early summer. Its longer root system allows it to extract moisture from deeper down in the soil profile in comparison to cheatgrass and medusahead. The plant is competitive against native bunchgrasses, as can be seen from its invasion within the Scotch Creek RNA. On most of the Agate Flat area and the former Box-O Ranch, starthistle invasion is occurring in altered plant communities. At risk are bottomland pastures that are going through plant community changes consequent to the cessation of irrigation. The loss of perennial plant place-holders due to summer drought allows yellow starthistle to gain a foothold. This is probably due to its ability to utilize deeper lying water resources. Annual grass dominated areas on the lower south-facing slopes of the CSNM are readily invaded by yellow starthistle. Surveys indicate a high abundance of yellow starthistle along roads. Interference studies indicate that rangelands with both cheatgrass and yellow starthistle show greater resource partitioning, potentially increasing the difficulty of restoration towards perennial grass cover (Sheley and Larsen 1994a).

Yellow starthistle seedheads contain two kinds of seeds. Bristled seeds are rapidly dispersed while seeds without bristles tend to persist within the seed head eventually dropping to the ground (Oregon Dept. Agric. 1997). Most seeds appear to fall close to the parent plant (Roche 1991), though studies do not cover phenomenological events such as whirlwinds, windstorms, or overland waterflow. Dispersal vectors likely include livestock, wildlife (birds and mammals), wind, hikers, and motor vehicles. The ability for seeds to remain dormant for up to 10 years means that seeds can still germinate several years after herbicide or other treatments (Oregon Dept. Agric. 1997). As a result of the prevention of seed-rain, seed and seedling density were reduced to 3.9 and 1.1 percent of their former values after 36 months. Restoration practitioners find that smaller patches
of yellow starthistle can be eliminated within a few years by hand-pulling.

Seed production is impacted by dry spring conditions (Sheley and Larsen1994b) suggesting that type ans timing of control measures may need to vary with precipitation pattern and abundance. Yellow starthistle is a facile weed able to respond to late season flowering and seedset if moisture is available (Roche et al 1997).

Comparative life-history studies suggest that cheatgrass and yellow starthistle occupy different rooting depths, resulting in a partitioning of resources (water and nutrients) (Sheley and Larsen1994b). This is likely to create an even less hospitable environment for native plants (in comparison to the presence of only a single weed) and further complicate restoration. Total eradication of yellow starthistle may not be possible (Oregon Dept. Agric. 1997). As with annual grasses, the best protection against yellow starthistle treatment is probably to retain a healthy herbaceous plant community (Oregon Dept. Agric. 1997).

Several yellow starthistle control techniques have been examined within plant communities similar to those found within the CSNM. In general, most treatments are aimed at preventing established weeds from setting seed. Treatment application is timed late enough in the season to prevent successful regrowth, flowering and seedset by weed plants. Limited soil moisture or timing relative growing season can thus be used to reduce seed production. Repetition of treatments are aimed at depleting the soil seedbank. Site specific prescriptions should include seed application by native species able to fill in the niche vacated by the weeds so as to prevent re-invasion.

Cultural control methods involve acute soil disturbance. Ploughing, disking, or harrowing can be used to disrupt the growth cycle, bury weed plants, or facilitate the germination of the seedbank for future control. Deep ploughing can also bury seeds to depth where they cannot effectively germinate and reach the soil surface for plant establishment. Such methods create an unstable soil surface susceptible to erosion. This method is also excessively destructive to existing native plants. Seed application with a desired native species is essential for the success of this technique. The destructive nature of these treatments relegates it to small-scale application to areas of weed mono-cultures.

Mowing has been used to reduce seed set by yellow starthistle. This treatment is generally not considered as effective for the eradication of weeds. Plants re-sprout and may flower within a few weeks of mowing if sufficient soil moisture is available. Repeat treatments are usually necessary to treat regrowth. Second-growth flowers are located close to the ground thus reducing the effectiveness of repeat mowing. Thomsen et al (1997) found that mowing combined with sub-clover seeding effectively reduced yellow starthistle. Timing was critical, since early mowing allowed plants to re-sprout, while late mowing aided in the dissemination of seeds.

Competition provided by existing native vegetation is thought to be effective in reducing invasion by yellow starthistle. Clipping experiments using sod and non-sod forming grass cultivars in eastern Washington suggest that any foliage removal increase the invasion of a perennial grassland (Roche et al 1994). Sod forming grasses (intermediate wheatgrass and pubescent wheatgrass) were invaded less than bunchgrasses (crested wheatgrass and bluebunch wheatgrass). All four grasses resisted starthistle invasion if left un-clipped. Patterns of starthistle invasion were thought to be related to the amount of light available for sustaining winter starthistle rosettes and soil moisture available during the summer at the time of maximum growth Roche et al 1994). Rest from grazing may thus be an effective treatment for reducing yellow starthistle invasion.

Hand-pulling/hand-tools have been shown to be very effective for eradicating yellow starthistle. Hand weeding is best applied by combining the strategies of containment and reduction. Careful planning of weeding allows impacted areas to be invaded by desired native plants (Woo 1999). The greatest limitation of this technique is the limited area able to be treated.

Herbicide weed control has been shown to be very effective for eradicating weeds. The biggest concern with this method is the potential for chemicals to enter the hydrological cycle and damage other organisms proximal to target species. Careful definition of the treatment area, use of target specific herbicide and target specific herbicide application (spot spraying or wand application) can limit these undesirable effects. Cox (1998) suggests it is difficult to manage yellow starthistle with herbicide, while other authors retain herbicide used in conjunction with other tools, including the application of desired replacement plants. Woo (1999) favors the use of all tools except herbicide. Studies in Washington suggest that yellow starthistle is acquiring resistance to herbicide (Fuerst et. al 1996).

Fire has been shown to be very effective at reducing yellow starthistle abundance. As with all treatments, repeat application is necessary for controlling existing weeds and their associated seedbank. DiTomaso et al (1999) burned two study sites within Sugarloaf Ridge State Park for three consecutive years to achieve a 91% summer reduction in cover. Patchy burning may leave sufficient seed source to maintain seed production. Several years of litter accumulation are necessary to create a fuel load sufficient to generate enough heat on combustion to incinerate the plants and their seeds, particularly in drier climates. In most of our grass / shrub / woodland communities, effective use of fire requires integration with other treatment methods. Fire does have the advantage of facilitating the germination of the seedbank, allowing for more efficient weed control across several years.

Controlled grazing on annual grassland has been found useful for reducing yellow starthistle seedset (Thomsen et al 1992). As with other treatments timing must be carefully controlled to maximize its effect on weed plants but maintain desired native plants. Spring grazing may facilitate yellow starthistle. Cattle grazing is most useful as a short duration and high intensity treatment during the bolting stage of yellow starthistle growth and before spines develop (Thomsen et al 1994). At this phenological stage, earlier maturing species will have set seed, and thus have a competitive advantage over yellow starthistle. Goats may seek out yellow starthistle plants in preference to native herbaceous species during some stages of growth. Eradication using this technique is unlikely. Local examples of using goats exist. Integration with other management tools appears to improve starthistle control. A combination of grazing, mowing, and sowing of subclover was considered successful (Thomsen 1996). Grazing and herbicide resulted in large reductions of yellow starthistle (Thomsen et al 1989).

Several **bio-control** vectors have been released within the Pacific Northwest and within the CSNM. While some localized success have been reported, more time is needed for an adequate assessment of bio-control efficacy (Thomsen et al. 1994, Larsen et al.1994). Bio-control vectors include three weevils and two fly species released in the Pacific Northwest (Larsen 1994, Oregon Dept. Agric. 1997).

Native plant response to weed control methods

While areas of complete dominance by weeds exist within the CSNM area, the interspersion of weeds and native plants is a more common, particularly at higher elevations. Also, since maintaining, enhancing and restoring native plant communities are management objectives for the CSNM, it becomes important to understand the interactions between native plants and weeds. Contrasting reactions of native plants to weed control measures may help design weed management strategies that place native plants at a competitive advantage over weeds.

The effect of fire on native plant species

Fire is often thought to have a devastating effects on native vegetation. In reality, most plant communities are adapted to fire, and may be classed as fire dependent. For example, grasslands and woodlands may show historical fire return intervals of 2 to 15 years. Ceanothus shrublands have been postulated to burn at intervals of around 25 years, though their association with oak trees point towards shorter fire return intervals.

General characteristics that mark local plants as fire adapted include: ability to re-sprout, requirement for heat stratification, increased germination following smoke treatment, and improved vigor and seed production following fire. In addition, several species of trees and grasses germinate and establish more readily following improved seed-mineral earth contact as a consequence of the combustion of the litter layer.

The most visible short-term effect of fire is the removal of species sensitive to fire and dependent on seed for re-establishment (Wright et al. 1979, Blaisdell et al. 1982, Humphrey 1984). These fire intolerant species include various sagebrush species, bitterbrush (Blaisdell 1953, Blaisdell and Mueggler 1956), and juniper (Burkhardt and Tisdale 1976, Dealy et al. 1978, Miller and Wigand 1994). Species that show physiological intolerance to fire re-invade sites through existing seedbanks or seed dispersal from unburnt areas. Some shrubs (*Chrysothamnus spp*, *Ceanothus spp*) may increase in abundance within two to three years following the fire event (Blaisdell 1953, Harniss and Murray 1973, Wright et al 1979, West and Hassan 1985). Juniper reestablishment is typically much slower over the course of several decades.

Bunchgrasses establish themselves primarily through vegetative growth, providing a more uniform response to fire within this growth-form (West and Hassan 1985). The smaller statured bunchgrasses (*Poa* and *Sitanion*) survive fire more easily because of their smaller fuel load which generates less heat to the below-ground component (Wright and Klemmedson 1965). Coarser grasses (*Agropyron spicatum* and *Sitanion hystrix*) generate less heat on combustion and are thereby favored over finer leaved species such as *Festuca*

idahoensis and various *Stipa*'s (Wright 1971). Reports on Idaho fescue vary from low to significant mortality (DeFosse and Robberecht 1996, Hosten 1996).
Pechanec et al. (1954) classifies forbs into three classes of fire susceptibility. As with grasses, fall fires appear to cause the least harm (Wright et al. 1979), though species staying green longer in the summer may be more susceptible to fire (Frischknecht 1978). Recovery, whether by seed or re-sprouting, is dependent on the seasonality of the burn, and moisture distribution following the fire (Wright et al. 1979).

Table AGG-5. Fire-response for Grasses Common to the CSNM

Grass species	Reaction to fire (local observation; Wirka 1999; FEIS database
needlegrasses Achnatherum spp	reported to be the least fire tolerant of perennial bunchgrasses
California brome (*Bromus carinatus*)	top killed; full recovery by following year; recovery similar for spring and fall fire
California oatgrass (Danthonia unispicata)	described as moderately resistant to fire
Tufted hairgrass (*Deschampsia cespitosa*)	root crown survive range of fire intensities; recovers to pre-fire abundance in a few years; also regenerates from seed
Squirreltail (*Elymus elymoides*)	fire tolerant; may increase after fire; fire during summer dormant season best
Blue wildrye (*Elymus glaucus*)	re-sprouts readily from basal buds; positive post-fire seeding response; fire creates favorable seedbed; survive moderate intensity fire
California fescue (*Festuca californica*)	culms and leaves may be killed by fire; re-sprouts from basal buds; may form dense stands following fire
Idaho fescue (*Festuca idahoensis*)	fire sensitive, especially slow moving fires; seeding response following fire; germination enhanced by smoke compounds
Junegrass (*Koeleria macrantha*)	fire resistant grass; no re-sprouting; strong seeding response by fire survivors; re-occupies site through reseeding
one-sided bluegrass (*Poa sekondi*)	small stature and early summer dormancy allows escape from fire; fire kills seeds within top layer of soil; reduced competition enhances re-establishment

Combustion products have been shown to enhance seed germination and/or growth of several Great Basin species that are present or closely allied to local plant species (Blank R.R and Young 1998, Patton et al 1988). These include bluebunch wheatgrass (*Pseudoregneria spicatum*), Thurbers needlegrass (*Achnatherum thurberianum*), Columbia needlegrass (*Stipa columbiana*), needle-and-thread (*Hesperostipa comata*), Sierra Nevada needlegrass (*Achnatherum occidentalis*), Idaho fescue (*Festuca idahoensis*) and antelope bitterbrush (*Purshia tridentata*).

Fire has been shown to increase the species richness of an area by facilitating establishment of native broadleaf (forb) species (DiTomaso et al 1999).

Defoliation treatments (clipping, mowing, grazing)

Stoddart et al. (1975) suggest that defoliation may benefit native bunchgrasses by improving their vigor and seedset response by returning dead foliage to the nutrient cycle, allowing light to penetrate to the live foliage, and by breaking up the duff. Regular long-term defoliation prevents range improvement and may be detrimental to the bunchgrasses, particularly when bunchgrasses are still green (Eckert and Spencer 1987). Forage conditioning treatments (defoliation) may improve the viability of overwintering elk in areas where forage quality is limiting (Clark et. al 1999; Westenskow-Wall et. al 1994).

Re-establishment of native plants

Existing or seeded perennial grasses are usually the best life-form for stabilizing soils following fire. Ideally, revegetation plans for particular projects should be developed several years ahead of time. This would allow for the identification of locally important grasses, the collection of suitable seed, the cultivation of seed in preparation for sowing immediately following disturbance or weed seedbank reduction. This would also follow guidelines for the preservation of genetic diversity.

The varied growth patterns of weeds and limitations on the ability to apply different treatments to the landscape emphasize a need for maintaining the full range of discussed management tools. For the maintenance of native perennial grasslands, Menke (1992) advocates the strategic use of fire and grazing to achieve three important goals. First, to enhance the vigor and longevity of the mature perennial grasses. Second, to break up the decadent grasses and promote vegetative growth. Lastly, to maximize seed production, and thus increase successful sexual reproduction. Menke (1992) emphasizes the active management of ecological processes to maintain existing perennial grass stands to alleviate weed invasion.

Choice of grasses

Where native grasses remain on site, their presence should dictate the composition of the seed species cocktail used for restoration. Field trials on Darrow silty clay loam and Carney clay in Southwest Oregon indicate that Idaho fescue appears to be one of the best native grasses to plant in areas where annual grasses are present because it best emulates annual growth patterns enabling competition with annual grasses once properly established (Borman et al. 1990; Borman et. al 1991). This is supported by the persistence of Idaho fescue in the presence of cheatgrass and intense grazing within sagebrush steppe vegetation of the Great Basin (Goodwin et. al 1999). In addition, this species is long-lived, a fact that might contribute to it's persistence at a particular site (Dremann 1992). Berber Orchard grass was determined to be the best non-native grass species for rehabilitation of annual dominated grasslands (Borman et. al 1991). In general, early growing species are more effective at suppressing annual grass. Research in the great Basin has shown that squirreltail (*Elymus elymoides*) is a potential competitor with medusahead (Jones 1998).

Lack of availability of native seed source may force managers to use exotic plants for revegetation in the belief that providing plant cover will reduce erosion. Using species such as orchardgrass or crested wheatgrass produces artificial plant communities with limited long-term species richness counter to the goals an objectives of ecosystem management (Brown and Amacher 1999). Such monocultures may be susceptible to insect and disease outbreak. Land managers are also discovering that livestock and wildlife may congregate in these artificial conditions at particular times of the year thereby contributing to soil instability (Brown and Amacher 1999).

Seedbed preparation

Options for seedbed preparation are limited in wildland situations where weeds are present. Grazing, mowing, and fire can sometimes be used for weed control, but these are rarely successful, because a minimum of three years of treatment are required to reduce the weed seedbank to acceptable levels. Rocky substrates and the presence of trees usually prevents the use of cultural treatments. Livestock are sometimes used to break up the soil surface, and to provide safe-sites for seeds. However, such treatments (including imprinting, root ploughing, and ripping) resulted in the seeds being buried too deeply for effective germination (Winkel et al. 1991). Smooth soil surfaces favor small seeds, while large seeds are favored by coarse soil surfaces (Von K. and Roundy 1991). Small seeded grasses thus establish better where no seedbed preparation has taken place because of the seed reserves and the energy requirements of seedlings to emerge from the soil. Imprinting of the soil surface (using rollers) has also been found to be successful in other circumstances, as depressions in the soil surface collect moisture, thus aiding plant establishment. Clary (1989) found that imprinted sites had better grass establishment than sites that had been drilled. The success of these mechanical treatments is likely to vary over the landscape and between years.

Brown et al (1999) found that successful native bunchgrass establishment followed an interaction between nutrient status and competition from weeds. Mulch and slow release nitrogen fertilizers were useful for establishing native grasses. The presence of weeds was a strong detractor of perennial grass establishment. Weed-free native straw was particularly favorable for establishing species of the same plants from which the straw was derived. Rice straw was favorable because imported weeds were less likely to be adapted to the restoration site. High nutrient sites are frequently associated with weed invasion. Remnant native grass species may be associated with poor soils.

Timing of Brush Removal and/or Fire

The timing of prescribed fire is very important, since native bunchgrasses are susceptible to die-back if burnt while they are still green. At sites where native grasses can still be found, fall fires are best unless fuel loads dictate an excessively hot fire which would be harmful to the grasses. Where no native grasses persist and annuals dominate the herbaceous layer, spring/summer fires prior to annual grass seed drop are recommended. In all cases, fire should be followed by late fall seeding, using native grass seeds.

The timing of manual treatments could have an effect on native species restoration. In areas where annual grasses are present, spring early summer disturbance may substantiate their presence. These annual species can complete their life-cycle and increase their presence in the seedbank in a short time. Clearing later in the summer, fall, or winter followed by native seed application may alleviate the impact of these weeds. Sites with a heavier cover by native perennial grasses are a better candidate for spring clearing.

Where fire is used to reduce slash, the burn piles could be placed in interspaces already dominated by annual grasses. Burning would thus kill the annual grass seeds in the soil, and free up more space for seeding by native perennial grasses. Indiscriminate placement of burnpiles could further reduce the distribution of native perennials. Burning in the fall would prevent the colonization of the burn spots by annual seed. It is very important that all bare areas be seeded in the late fall! A simple monitoring system could be instituted to gauge whether these management practices are successful.

Prescribed and wildfires may provide an opportunity for seeding if a large component of the vegetation cover has been removed (Agee 1993). Seed should be applied prior to rainfall, to ensure optimal seed burial by ash (Agee 1993, Hull and Holmgren 1964). In areas of mixed grassland and shrubland, re-seeding should be concentrated in areas demarcated by white ash, where excessively high temperatures have probably killed the native seedbank. This allows natural revegetation in adjacent areas (Agee 1993). Heavily forested areas and shrublands may need to be seeded over their entirety. Where fire has not occurred, raking (or other manual / mechanical disturbance) also serves to ensure seed-mineral soil contact, essential for good germination of seeds (Torrel et al. 1961) as well as desired grasses (Goebel et al 1969). This also reduces seed loss due to predation. In drier climates where decomposition processes are slow, litter removal is considered to be an important step in revegetation by perennial grasses (Torrel et al. 1961, Goebel et al 1969). A general recommendation is to sow seed wherever there is not suitable plant cover for holding the soil and litter in place.

<u>Some important soil characteristics affecting plant growth</u>

Hester et. al (1997) report a temporary increase in hydrophobic properties of soil following prescribed fire within oak woodland,-juniper-bunchgrass communities on the Edwards plateau in Texas. This has been observed following local prescribed burns, and may affect soil runoff, the potential for erosion depending on topography, and the short-term ability for soils to absorb moisture.

Shrink-swell clay soils (of which there is a preponderance in the CSNM) create a particularly difficult environment for reestablishing native grasses (Young et. al 1999). The churning action of the soil prevents the establishment of desired native seedlings. The authors tried a range of organic mulches to ameliorate soil conditions in their northeastern California research sites without success. Only the application of 1 to 2 inches of sand created an environment suitable for seedling germination and establishment.

Conclusions

It becomes apparent from the above literature review that weed management requires a careful consideration of individual species ecology (both weeds and existing native vegetation), stage of weed invasion, juggling of control measures (type, timing, and intensity of application), and a reintroduction of native plants to prevent weed re-invasion.

Several authors place an emphasis on preventing weed invasion by careful maintenance of existing healthy plant communities using a range of management tools. The literature indicates that management strategy should be adjusted to match the degree of weed infestation. Monitoring and treatment of new weed infestations is a high priority. Restoration of large areas of weed mono-cultures may not be possible or economically viable.

Strategies of weed containment and reduction must be practiced for successful control of weeds in large areas. Where feasible, weed management within extensive annual populations call for the enhancement of weed seedbank germination followed by harvesting using a variety of control measures (integrated management) targeted at specific weeds. Prescribed fire provides an opportunity for introducing desired native plants into plant communities with small seedbanks of desired native herbaceous plants.

While many weed problems exist on the CSNM, the most pervasive weeds within the grass/shrub/woodlands are annual grasses and yellow starthistle. High annual seed germination makes annual grasses susceptible to seedbank management strategy for reducing weed impact. Yellow starthistle grows rapidly in the mid-summer, thus remaining green when much of the surrounding vegetation has completed its life-cycle or has entered summer dormancy. This makes yellow starthistle more susceptible to control measures preventing seedset while other intermingled species have already completed their life-cycle, or reproduce vegetatively. Roche (1997) suggests that because of the late phenology of yellow starthistle, the maintenance of a plant community capable of depleting soil moisture is the best management strategy available. In existing stands of herbaceous vegetation where the depletion of soil moisture is not possible, the maintenance of winter shading of rosettes becomes the best management strategy.

The literature also describes the extreme difficulty in restoring annual grasslands to native grass dominated communities, particularly on soils with shrink-swell clays. The Agate Flat area of the CSNM provides such a management dilemma. However, past rehabilitation efforts have successfully introduced non-native pubescent and other wheatgrass to provide vegetation structure and forage.

As with all weed species, the choice and timing of management treatments need to be tailored to local conditions and the plant community within which weeds are found. The management strategy described in this document is designed to be flexible and incorporate the literature referenced within this manuscript and new knowledge as it becomes available.

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Appendix HH - Hyatt Lake Recreation Complex Management Plan

INTRODUCTION

Background

Purpose and Scope

This recreation area management plan serves a dual purpose. First, it establishes management direction by prescribing a comprehensive set of compatible actions which will, when implemented, provide the Hyatt Lake Recreation Complex (HLRC) with the overall resource protection, development, and level of public utilization intended by the planning effort participants. Second, this plan sets forth a general sequence for implementing the identified management actions.

Because this is an issue-oriented document, its scope is intentionally limited to a discussion of actions required to resolve issues and take advantage of opportunities provided by the area. Detailed site planning and facility design efforts will be undertaken for the area following approval of the specific management actions identified in this plan.

Relationship to District Planning

The Hyatt Lake Recreation Complex includes 474 acres which were part of the Hyatt Howard Special Recreation Management Area. This area was established to protect the viewshed around Hyatt Lake and Howard Prairie Reservoir. Now this portion of the SRMA is within the Monument and includes the Hyatt Lake Campground and all facilities, the Wildcat Campground, and the Watchable Wildlife Site at Hyatt Lake. The snowmobile trails east of Hyatt Lake are also included within the Monument.

The SRMA designation was the preferred alternative of the Medford District Resource Management Plan (UDSI 1995a). The designation and management as a special recreation management area was therefore, consistent with the District's current land use planning effort. The inclusion of the Hyatt Lake Recreation Complex within the Monument was accomplished by President Clinton in his Proclamation.

Setting and Multiple Resource Values

Location

The Hyatt Lake Recreation Complex is located on the shore of Hyatt Lake on the Dead Indian plateau, approximately 18 miles east of Ashland, Oregon.

Access

The HLRC can be accessed from the Rogue Valley through Ashland by either the Dead Indian Memorial Road or the Greensprings Highway (Hwy 66). From Klamath Falls, the area is reached by taking Highway 140 to the Dead Indian Memorial Road, the Keno Access Road, or the Greensprings Highway.

Other Suppliers of Recreation Opportunities

Two private resorts exist on the shores of Hyatt Lake; these are Camper's Cove and Hyatt Resort. These resorts provide boat launching facilities, camping facilities and food and beverage service.

Importance of the HLRC from a Recreation Standpoint

The HLC serve users from throughout the nation and Canada but most use is regional in nature, from the Rogue Valley, the Klamath Basin, and northern California. The HLRC provides high-elevation lake and forest recreation opportunities year-round and is a major provider of winter recreation opportunities within Jackson County.

Landscape Character

Hyatt Lake is on the Dead Indian Plateau in a valley surrounded by moderate to steep slopes of the western Cascades. Elevations range from 5,026 feet at Hyatt Lake Dam, to over 6,100 feet on surrounding peaks.

Physiography

The Dead Indian Plateau lies in the Cascade Province which forms a steep north-south ridge on the east side of the Bear Creek Valley. This ridge is composed of north-south trending volcanics which form the mountains in this planning area. Soils have formed mainly from andesite and other basic igneous rocks. Textures are dominated by low shrink-swell clays on gentle slopes. Ridges have soils with stony, loam textures.

Annual precipitation ranges from 25 to 45 inches with most of it coming as snow. Winter snow depths vary from 18 inches in a bad year to 10 feet in a great year. Because of the elevation, summer months are usually mild and sunny with afternoon thunderstorm activity common.

Because the HLRC is at high elevation, and far enough from major population centers, air quality is generally excellent.

Existing Recreation Facilities and Designations

Facilities around Hyatt Lake include Hyatt Lake and Wildcat campgrounds, which are managed by BLM. The Hyatt Lake Campground has showers and boat launching facflities, but no hookups. Wildcat Campground is more primitive, with a restroom, tables, and fire pits. A BLM Watchable Wildlife site is located on the west side of Hyatt Lake.

There are two privately operated resorts around Hyatt Lake, Campers Cove and Hyatt Lake Resort. These provide camping with hookups, showers, restaurant facilities, boat launching facilities, and limited groceries. Hyatt Lake Resort also provides gasoline and boat rentals.

Seasons and Times of Use

The HLRC is used year-round by recreationists. Most use occurs during summer with camping and fishing being primary activities. During the fall and early winter, hunting and camping associated with hunting are the primary activities. Winter use is growing faster than any other season. The HLRC is close to the Rogue Valley, the area is at high elevation, and the snow is fairly reliable.

The lack of services, especially gasoline, is a major factor limiting winter use. Should this change, winter use could equal or exceed summer use.

Length of Stay

Length of stay varies by activity and season. People camp as long as 14 days on public lands and there are year-round residents within the area who recreate daily. Conversely, as little as 15 minutes is spent at the Watchable Wildlife site by some users.

Party Size

Party size is as variable as activity preference or length of stay. There have been 200 people in one group at the winter play area and 150 people at family reunion barbecues all the way down to individuals recreating.

Place of Origin

Most use comes from Rogue Valley residents with significant use also coming from northern California and Klamath Basin residents. Although mostly regional in nature, at any given time, the visitors to the HLRC represent a blend of local, regional, statewide, national, and international populations.

MAJOR ISSUES

The management objectives presented can only be achieved by recognizing issues and implementing specific actions to resolve them. Since issue resolution is the key to successful management, a comprehensive issues statement was developed and analyzed during the planning effort. The major issues identified below influenced the development of the management action program presented in Part III.

PART I

Issue I - Future Developments in the Hyatt Lake Campground

Comment
The main Hyatt Lake Campground receives more use every year, and as use patterns and preferences change, changes within the campground are necessary to meet demand and better utilize the facilities.

Issue 2 - Wildcat Campground

Comment
Wildcat Campground was designed as an overflow facility for use when the main campground was full. It is more primitive than the main campground. What improvements, redesign, or restrictions should be planned for this site?

Issue3- Winter Use

Comment
Winter Use is increasing yearly.

Issue 4- Visual Resource Management (VRM)

Comment
What actions will be undertaken to improve the visual resources of the HLRC?

Issue 5- Cooperation between Managing Agencies and Private Corporations.

Comment
The existing good relationship between the various providers of the recreation experience at Hyatt Lake must continue. This will result in the greatest benefit to our "customers."

PART II -- MANAGEMENT OBJECTIVE AND CONSTRAINTS

The HLRC was recognized as an area where a commitment has been made to provide specific recreation activities on a sustained basis in Cascade-Siskiyou National Monument.

To conform with Bureau policy as it relates to planning for special recreation management areas, management objectives should be stated in terms of the Recreation Opportunity Spectrum. Therefore, in keeping with the intent of BLM recreation program planning policy, the following management objective has guided the planning effort.

Management Objective

The HLRC shall be managed to provide recreation opportunities ranging from 'semi-primitive motorized' (SPM) to 'roaded natural' (RN) in a manner that will:
1. Promote public use and enjoyment of the public lands;
2. Protect natural resource values on the public lands;
3. Minimize conflicts among users;
4. Protect the health and safety of recreationists who use the public lands.

Management Constraints

Constraining factors which, because of law, policy, regulation, or circumstance, influenced the development of the management program presented in Part III include:

1.The spotted owl recovery plan;
2.The Endangered Species Act;
3.BOR controls the concessions and surface rights on Hyatt Reservoir;
4.T.I.D. controls the water releases from both Hyatt and Howard Prairie reservoirs;
5.Cooperative agreements exist between BLM and private timber companies for winter trails.

PART III - The Management Plan

The management plan is a composite of separate actions which need implementation to resolve issues and accomplish the management objective. The major issues previously identified and discussed in Part I are listed below along with management actions planned to resolve them.

Issue I - Developments in the Hyatt Lake Campground

Action 1.1. Construct an amphitheater for campfire type programs and presentations.

Discussion There is no facility within the campground where programs can easily be presented. A small amphitheater with approximately 50 seats would meet this need.

Action 1.2 Construct one to three tent cabins with screened porches, in what is now the walk-in tenting area.

Discussion These cabins would be available by reservation or if vacant, they could be rented at the site.

Action 1.3 Purchase a 14' boat, a 25 hp motor and trailer for use on Hyatt Lake.

Discussion A motorboat is needed to move and maintain the fishing piers, to assist with free fishing day, to patrol the shoreline, and to assist in search and rescue.

Issue 2 -- Wildcat Campground

Action 2.1. Drill a well to provide water for the campground.

Discussion There is no drinking water provided at the site now. With increasing use and the development of additional campsite, the provision of water is necessary. This action encompasses drilling, casing, pump, etc. to provide potable water.

Action 2.2 Explore the possibility of developing a trail from the campground to the PCNST.

Discussion The PCNST is a popular equestrian trail and with the addition of horse camp facilities, a trail might be needed to direct users to the PCNST. Now that the horse camp units are built use will be analyzed to determine if a trail is needed.

Issue 3 -- Winter Use

Action 3.1. Maintain and improve trail opportunities for winter use throughout the HLRC

Discussion As desires and equipment change, users are constantly seeking new trail opportunities. BLM will maintain, improve, and develop winter trails on a continuing basis.

Action 3.2. Maintain gates on nine roads, to be locked when snow levels are sufficient for snowmobiling.

Discussion When snow levels are sufficient for winter use but not too deep to prohibit some 4x4 vehicles, severe rutting of trail systems can occur. This ruins trail grooming efforts and also makes trails unsafe because of the ruts. Signs have been used but are ineffective with some less cooperative users.

Action 3.3. Improve ice-skating opportunities within the HLRC.

Discussion Design the main campground play field to allow flooding. During winter months, the field could be flooded using a nearby fire hydrant to create an ice rink. Unlike the lake, there would be no danger of falling through the ice, and conditions would be more controllable. The play field / rink could be plowed by BLM with a small tractor and blade.

Action 3.4. Provide for snowplowing to the watchable wildlife site, the Hyatt Lake administration site, and if possible, the East Hyatt Road from Highway 66 to the Hyatt Lake Campground.

Discussion Roads to the winter play area and the administration site are plowed yearly. The watchable wildlife site is paved and has a restroom so it makes a good location for a winter trailhead. The road from Highway 66 to Hyatt Lake has not been plowed by BLM on a regular basis. As demand for winter use of the HLRC increases, reliable snowplowing of this primary access road might be necessary.

Issue 4 - Visual Resource Management (VRM)

Action 4.1. Discuss powerline maintenance with Pacific Power to lessen visual impacts.

Discussion Pacific Power has been very cooperative in efforts to minimize visual impacts from hazard tree removal where the powerline crosses the East Hyatt Road. Trees were topped rather than removed, leaving a more scenic corridor.

Action 4.2. Plant hardwood trees and shrubs that produce fall colors.

Discussion Driving for pleasure is the number one recreational activity of Americans, and areas with bright fall foliage are extremely popular. By planting maples, oaks, aspen, etc., along the main roads and recreation sites, fall color will be added to the views.

Issue 5 - Cooperation between Managing Agencies and Private Corporations

Action 5.1 Contact the U.S. Bureau of Reclamation (BOR) regarding surface management of Hyatt Lake.

Discussion The BOR controls the surface activities on both Hyatt Lake and Howard Prairie reservoirs as well as the Hyatt Lake Resort concession. Discussions have been ongoing concerning transferring surface management of Hyatt Lake to BLM. This matter needs to be resolved.

Action 5.2. Maintain a level of cooperation that exists between BLM and Hyatt Lake Resort and Camper's Cove Resort.

Discussion A good relationship existing between resort operators and BLM benefits all who provide or use the recreational facilities within the HLRC.

Issue 6 - Area Monitoring, Use Supervision, and Administration

Action 6.1. Increase monitoring and supervision duties of seasonal BLM personnel within the HLRC

Discussion With this new Monument designation comes the added workload of patrolling and maintenance. This will be particularly important during hunting season when cross country travel is common.

Appendix II - Questions and Answers from Meeting with Jackson County Commissioner

1. Are the Cascade-Siskiyou National Monument (CSNM) boundaries open for discussion? The way the monument boundary is drawn gives the impression that all CSNM lands are open to the public. How can the BLM contend that private lands shown inside the CSNM boundary are not part of the monument? Can the boundary be drawn around just the federal lands to clarify that only federal lands are in the monument? If the government acquires additional property inside the boundary, will it impact private land owners?

The Cascade-Siskiyou National Monument designation applies only to federally managed land. The external boundary depicted on the CSNM proclamation map is for planning purposes only. All federal lands within this planning area have become the CSNM by presidential proclamation, a designation which can only be changed by an act of Congress. The BLM does not have the authority to modify the Proclamation so the boundaries are not open for discussion.

Privately owned property within the planning boundary is not encumbered by, or in any way part of the CSNM designation. Approximately 38% of the land within the CSNM planning area is private property, owned by various individuals and companies. Again, the CSNM designation does not include, involve, restrict, encumber or have bearing on privately owned (non-federal) property. Privately owned parcels, by definition, are not, and cannot be part of, or within the CSNM. The CSNM policies, rules and regulation do not apply to private property.

The CSNM proclamation permits acquisition of private property within the planning area to further protect the objects for which the CSNM was designated. However, acquisitions would occur with voluntary participants only, and be conducted in accordance with existing laws and regulations pertaining to federal land exchanges and acquisition of non-federal property. In the event additional property is acquired, it will become part of the CSNM and managed in accordance with the monument plan to further the values for which it was acquired.

2. The CSNM proclamation states, "The Federal land and interests in land reserved consist of approximately 52,000 acres..." The boundary on the accompanying Cascade-Siskiyou National Monument map encloses an area of approximately 92,000 acres, of which there are 40,000 acres privately-owned. The numbers are different in other places. There seem to be inconsistencies between the CSNM proclamation wording and maps.

The 92,000 acres identified in the CSEEA scoping letter included the total landscape area that was analyzed (i.e. wildlife habitat connectivity, vegetation typing, transportation system) in the CSEEA/DEIS and included lands in Oregon and California. The CSNM proclamation did not include lands in California. Also, the land designated CSNM within Oregon differs from the area identified in the CSEEA/DEIS. A total of 52,951 acres of federal land were designated as the CSNM.

3. How will the CSNM designation influence the valuation of adjacent private land?

The effect on values of private land adjacent to, or among CSNM parcels is unknown. The director of the Southern Oregon Regional Services Institute at Southern Oregon University and noted regional economist, Rebecca Reid, was previously consulted on this issue. She wrote, "it is plausible to argue that private land values may either increase or decrease. Land values may increase in cases where contiguous public lands remain undeveloped and ecologically improved, and are therefore perceived as special and unique as well. On the other hand, restrictions in uses of contiguous properties that implicitly added value to the private lands may lead to a decline in the private land values."

4. What will be the likely effect of the CSNM designation on the county tax base?

If no additional land is added to the CSNM there will be no impact to the tax base. If private land is acquired, there will be some effect, however the degree would depend on the amount and type of land involved. If the acquired lands are unimproved, woodland, forest or grazing lands, the impact would be minimal because the assessed values per acre are relatively low. For example, in the unlikely scenario every single undeveloped/unimproved parcel within the CSNM was acquired, we calculated from records provided by the Jackson County tax assessor (September, 2000), that the taxes forgone to Jackson County for tax year 1999-2000 would be approximately $25,000.

5. The CSNM Proclamation states "should grazing permits or leases be relinquished by existing holders, the Secretary shall not reallocate the forage available under such ..." What specifically does "relinquish" mean?

If deleterious impacts by livestock are identified within the CSNM, grazing privileges and livestock management will be modified, reduced or eliminated. If livestock grazing is modified, reduced, eliminated or voluntarily relinquished by a permittee, the resultant available vegetation/forage (AUMs) will be reapportioned to benefit natural ecological processes (deer and elk forage, wildlife habitats etc.). A relinquishment is voluntary, referring to when a permittee chooses to reduces or "give up" AUMs. Only the permit holder can initiate a relinquishment. However, the Agency has the imperative to modify, reduce or eliminate livestock grazing where found incompatible with the objects (as described in #14) for which the CSNM was designated.

6. If someone sells their property would their grazing permit be relinquished?

In order for grazing privileges to be transferred, the recipient must qualify under regulation (43 CFR 4110). Contingent upon qualification, grazing permits would be transferred unless voluntarily relinquished. (see #5)

7. How does the CSNM designation affect O&C lands? Does the CSNM proclamation override the O&C Act?

The CSNM proclamation states "nothing in this proclamation shall be deemed to revoke any existing withdraw, reservation or appropriation; however the national monument is the dominate reservation." Further, "the Secretary of the Interior shall manage the monument through the Bureau of Land Management, pursuant to applicable legal authorities including, where applicable, the (O&C) Act of August 28, 1937, as amended (43U.S.C. 1181a-1181j) to implement the purposes of this proclamation." The CSNM proclamation does not change the O&C status of the land, it simply withdraws it from all forms of entry or disposal under the mining, land and mineral leasing laws and removes the timber volume within the CSNM from the Medford Distric's sustainable harvest level calculations (Allowable Sale Quantity). The O&C lands within CSNM remain O&C.

8. What is the status of the commercial size timber within the CSNM? Also, how will dead/hazard tree problems be addressed ? Can these trees be felled?

The harvesting of timber or other vegetative material within the CSNM for commercial purposes is prohibited except when part of an authorized science-based project or for public safety. In addition, the Proclamation removes all timber volume within the CSNM from the Medford District's sustainable harvest level calculations (Allowable Sale Quantity). However, the felling and sale of trees, for non-commercial purposes, where select trees endanger facilities, visitors or public safety may be authorized. Such situations are anticipated along roads, utility right-of-ways, trails, property lines, parking areas, campgrounds and high visitor use areas within the Hyatt-Howard Special Recreation Management Area (SRMA).

9. How does the BLM define "existing roads?"

The term "existing roads" pertains to roads on federal land whose origin, construction and/or use has been authorized. Unauthorized existing vehicle use over an area which has the appearance of a road is termed trespass and not recognized as an existing road. Existing roads were identified and inventoried for the preparations of the CSEEA/Plan. In the CSNM all existing roads will become "designated", then analyzed and categorized. A designated road is "a linear transportation facility on which state-licensed, four wheeled vehicles can travel." By definition, trails are not roads. When pertaining to access, the transportation plan for the CSNM will refer to designated roads in these categories:

- designated for public access all year long
- designated for seasonal public access
- designated for administrative access only
- designated closed
- designated for decommissioning

Roads will be designated in the CSNM plan based on their transportation management objectives, which take into account the need for access, resource protection, type of right-of-way and reciprocal agreements with other property owners. There is no intent to block access to private land. CSNM maps provided to the general public will only show open CSNM roads and those having exclusive easements with public rights.

10. Explain "interest in" as stated in the sentence, "Lands and interest in lands within the monument not owned by the United States shall be reserved as a part of the monument upon acquisition of title thereto by the United States."

The phrase "interest in lands" refers to lands where the U.S. holds less than fee title. "Interest in lands," refers to a reserved interest such as minerals or timber. It could also refer to an acquired interest such as a scenic easement. In the CSNM proclamation "interest in lands" applies to reserved minerals. There are no reserved minerals in the CSNM.

11. Does the phrase "all forms of entry" include vehicle access?

The Glossary of Public Land Terms defines entry as "an allowed application which was submitted by an applicant who will acquire title to the land by payment of cash or its equivalent and/or by entering upon and improving the lands." Specifically, "entry" was used in the settlement Acts such as homesteading which were eventually repealed by FLPMA. The only form of "entry" now recognized is under the 1872 mining law. The term "entry" as used in the Proclamation does not refer to vehicle access to into the CSNM.

12. What does the phrase "quantity of water sufficient to ..." in the Proclamation mean?

The CSNM Proclamation does not interfere with valid existing water rights. The statement in the CSNM Proclamation, "There is hereby reserved, as of the date of this proclamation and subject to valid existing rights, a quantity of water sufficient to fulfill the purposes for which this monument is established," stipulates that the CSNM has a federally reserved water right with a priority date of June 9, 2000 for an amount of water that is necessary to support the aquatic and terrestrial species identified in the CSNM proclamation (i.e. fresh water snails, three endemic fish species, important populations of small mammals, reptile and amphibian species, and ungulates). The sufficiency of the amount of water reserved will be determined in the future by the BLM and based on the requirements of the species involved. Federally reserved water rights include both springs and in-stream flows.

13. The CSNM Proclamation mentions the Applegate Trail, but it was not included in the Draft CSEEA plan.

The CSNM Proclamation does not mention the Applegate trail, however it addresses the Oregon/California trail and it's significance as an historic site. At the time the CSEEA plan was prepared, there was only anecdotal information as to the exact location of the Applegate trail. Although accurate information is still lacking, any known portions of the Applegate Trail that cross federal land will be addressed in the CSNM management plan.

14. Southern Oregon Timber Industry Association (SOTIA) believes it is important for the Draft Resource Management Plan/DEIS to specify the "objects to be protected" so that they can evaluate the Plan and its sufficiency to accomplish the task at hand.

The CSNM proclamation describes the many objects to be protected. These include:

• Biological Diversity and Richness
This refers to the abundance and richness of all endemic and native species of plants and animals and the diversity of habitats necessary to protect and sustain them. Specifically mentioned are small mammals, reptiles, amphibians, ungulates and butterflies.

• Rare Species of Plants and Animals
Many rare species of both plants and animals, deserving of special attention, have been identified within the CSNM (see DRMP/DEIS). Although not inclusive, the CSNM Proclamation provides examples including, Green's Mariposa lily, Gentner's fritillary and Bellinger's meadowfoam.

• Ecological Integrity
Ecological integrity refers to the extent of habitat disturbance, intrusion, fragmentation or continuity. The maintenance and recovery of many rare and sensitive wildlife and plant populations such as the black tailed deer, Northern Spotted Owl and native perennial grasses depend on the recovery and continued ecological integrity of their habitats.

• Special Plant Communities
Several special assemblages of plant communities exist in the CSNM. The examples specifically mentioned in the CSNM proclamation are the rosaceous chaprarral, oak-juniper woodlands, and juniper scabland communities.

• Aquatic Species and Habitats
Aquatic species and habitats include fresh water snail species diversity, which are found in the many isolated springs and seeps, wet meadows and riparian areas. They also include endemic fish species such as the redband trout, the Jenny Creek sucker and the

speckled dace. Throughout the Monument, important riparian habitats support broad-leaf deciduous trees and shrubs.

• **Old-Growth Habitats**
Of particular importance are old-growth forests and the unique habitats that they provide. Many old-growth related or dependent species have been identified within the CSNM including Northern Spotted Owl, Flammulated Owl, western bluebird, pileated woodpecker, and the pygmy nuthatch.

• **Historic and Cultural Structures and Sites (Oregon-California trail)**
Historic and cultural sites and structures are objects of the monument requiring special protection and management.

• **Unique Geology**
Areas of unique geology include Pilot Rock, the Miocene epoch fossil beds, Cathedral Cliffs and the area rich in agate gemstones, Agate Flat.

15. How does the road closure required by the CSNM proclamation affect the Americans with Disabilities Act requirements?

The Americans with Disabilities Act requirements do not pertain to road closures. They are only relevant to facilities and infrastructures such as bridges, restrooms and walkways. Recreational activities in primitive and/or undeveloped areas are not included.

Appendix JJ - Snags and Coarse Woody Debris Standards and Guidelines

Snags and Coarse Woody Debris

Snags

Target densities (snags per acre) for each size class were developed for each of the four ecoregions. See tables AJJ-1 through AJJ-3 for snag density, size and species targets for each ecoregion. Target densities were calculated by adding one standard deviation to the mean observed number of snags in the size class in the ecoregeion. This was done in order to avoid establishing the mean number as the target. Establishment of the mean as the target would be to ignore the natural variability in snag numbers observed in the stands, particularly at the high end of the snag density spectrum. The intent is to ensure that at least some stands retain and or develop relatively very high snag densities.

Table AJJ-1. Siskiyou Foothills Ecoregion observed Snag Density Targets. (5 sample sites)

Size Class (dbh)	Observed Mean Snags (per acre)	Target level (Snags per acre)
8-15.9	4.58	4.5
16-23.9	1.08	2.5
24-31.9	0.32	1
32+	0.48	1
All	6.46	
16+	1.88	**4.5**

Mean snags per acre 6.6 (n = 5 sites)
Sample standard deviation of snag density 3.80 (n = 5 sites)
Snag density at most snag-rich site 10.6 per acre
Snag density at snag-poorest site 1.8 per acre

Table AJJ-2. South Cascades Ecoregion observed Snags and Snag Density Targets (5 sample sites)		
Size Class (dbh)	**Observed Mean Snags (per acre)**	**Target levels (Snags per acre)**
8-15.9	7.96	8
16-23.9	2.72	5
24-31.9	1.94	4
32+	2.52	4.5
All	15.14	
16+	**7.18**	**14**

Mean snags per acre 15.20 (n = 5 sites)
Sample standard deviation of snag density 5.73 (n = 5 sites)
Snag density at most snag-rich site 24.5 per acre
Snag density at snag-poorest site 10.1 per acre

Table AJJ-3. Klamath River Ridges Ecoregion* observed Snags and Snag Density Targets (5 sample sites)		
Size Class (dbh)	**Observed Mean Snags (per acre)**	**Target levels (Snags per acre)**
8-15.9	7.02	7.02
16-23.9	3.74	6.06
24-31.9	2.4	4.47
32+	0.76	1.96
All	13.92	
16+	**6.9**	**12.5**

* Snag density targets in this table also apply to the South Cascade Slopes Ecoregion.
Mean snags per acre 14.10 (n = 5 sites)
Sample standard deviation of snag density 2.94 (n = 5 sites)
Snag density at most snag-rich site 17.2 per acre
Snag density at snag-poorest site 9.7 per acre

Applying the Target Density Figures for Snags

Target snag densities would be applied on a unit by unit basis whenever management activities which may affect current snag densities, and/or future snag recruitment potential are proposed. Density management activities in the form of understory thinnings, plantation thinnings, large tree culturing, small group selections, and underburning are the activities that are most likely to affect current and future snag numbers. As part of these activities, some excess trees would be considered for removal from stands in order to meet stand protection, fuels management, or other objectives. Before these trees are actually selected for removal, an analysis would be performed to determine if, and how many of, these excess trees would be necessary to retain in order to meet current and future snag and CWD targets. Only material in excess of current and future snag, CWD, and canopy closure needs would be removed from the site. Projected rates of snag decay and recruitment would be used in determining if ,and how many, green trees would need to be left for future snag and CWD needs.

Stands proposed for treatments would be subject to a 2.5 percent sample of snags. For example, a 44 acre unit would be sampled with 1.1 acres of snag transect. The pre-treatment densities observed would be compared to target snag densities for the ecoregion. Hazard trees along open roads would be exempt from the snag density targets. They could be felled as necessary for safety purposes.

Prescriptions for selecting treatments under three situations as follows:

Situation #1 Early and mid-successional stands that are below snag target levels

— No activities would be undertaken which would preclude or retard the development of sufficient numbers of snags to meet and maintain the target levels and simultaneously maintain canopy closure target levels through time. Trees identified for possible removal would be designated for snag creation until snag size class targets are met. Material (trees) excess to current and future snag, CWD and canopy closure needs could be removed from the site.

Situation #2 LSOG stands which are currently below snag target levels

— Any activity that would remove trees from the site would be designed to provide for the creation of sufficient numbers of snags to meet the target levels as an integral component of the treatment. No activities would be undertaken which would preclude the recruitment of sufficient numbers of snags to maintain the target levels and simultaneously maintain sufficient canopy closure through time. Only material excess to current and future snag, CWD and canopy closure needs could be removed from the site.

Situation #3 LSOG stands which are currently at or above the snag target levels

— No activities would be undertaken which would reduce the existing snag levels below the target levels. No activities would be undertaken which would preclude the recruitment of sufficient numbers of snags to maintain the target levels and simultaneously maintain sufficient canopy closure through time.

Snag Attribute Criteria

Short snags with a height (in feet) that is less than 2-1/2 the dbh (in inches) would not be counted towards attainment of snag target densities. For example:

- Short snag A is 20 inches in diameter and 35 feet tall and counts.
- Short snag B is 20 inches in diameter and 8 feet tall and does not count.

Hollow or green cull trees could be counted as snags as long as they don't make up more than 1/4 of snags on the site. Existing large snags could be substituted for smaller snags when trying to meet size class based density targets. However, this substitution does not work in reverse. Two "extra" 15" size class snags could not substitute for a 30" class snag. If a stand is deficient in a size class, no snags in that size class would be removed from the stand unless a suitable number of green trees of appropriate size are going to be made into snags as part of the project. These green trees could only be made into snags if doing so does not bring the canopy closure down below the target level for the stand.

Worker safety must be considered when planning and implementing projects on the ground. Accordingly, in thinning operations, no trees should be marked to cut adjacent to snags that would require the snag to be felled as a hazard tree. Also during understory thinning, "leave islands" would be left around all hazardous snags.

Salvage activities would occur only when consistent with the 10+ acre salvage guidelines for LSR's (found in NFP/ROD,pg. C-13), and as amended by existing and future Regional Ecosystem Office directives pertinent to LSR snag management.

Coarse Woody Debris (Down Wood)

In stands being treated, retain all existing CWD on site consistent with targets listed below, and hazard reduction criteria. Based on the current/observed information, target levels for decay class 1 and 2 coarse wood in the respective ecoregions were prepared and summarized in Table AJJ-4. Observed snag numbers are also shown in that table to indicate potential future contribution to coarse woody debris amounts.

Density management treatments would use the amounts observed in the 1989 inventory as a minimum or threshold level. If this minimum amount of wood is not present in a stand pre-treatment, the two largest trees marked for removal would be made into snags and left in addition to the target snag level as future CWD. This will ensure that wood contributed to the forest floor ecosystem is adequate to meet habitat needs and other ecosystem functions. Material under 3" is not considered CWD. Activity created slash (limbs and tops) less than 3" diameter could be removed for fuel hazard reduction. In order to retain existing CWD, slash piled immediately adjacent to or on logs should not be burned.

The target CWD density on lands where management occurs will be relatively higher than the observed level. This target level, given in the table below, is the desired level for mature stands. Stands should be monitored following treatment to determine if the target levels and the desired species mix are developing. In most cases the higher numbers of snag or blowdown will provide the desired down woody debris over time. If, after five years following stand manipulation, the CWD levels, averaged over a 40 acre area basis, are not reaching the target levels, additional trees within the larger average diameter range will be "snagged" in order to attain the target CWD level.

During any salvage operations retain a high level of snags and down woody debris to carry the new stand from the stand re-initiation stage through to the stand maturity stage when CWD will again develop as a result of natural mortality. The snag numbers and down woody debris amounts would be managed to meet or exceed the target levels per acre from the largest diameters available on site.

The standard of 16 inch diameter by 16 foot length as a measure of CWD is a baseline (USDI 1995b). Large diameter pieces shorter than 16 feet do not meet the 16' X 16" standard and as such could theoretically be removed from stands because they don't "count." Biologists recommend the retention of these larger diameter, but shorter length logs in most cases. If these large diameter segments provide the desired CWD form and function despite the fact that their length is shorter than the specified minimum, they may be counted toward the target piece requirement when:

• Large end diameters are greater than 30 inches and log length is greater than 10 feet;

OR

• Log diameters are in excess of 20 inches and volume is in excess of 32 cubic feet; (see Appendix H BLM Information Bulletin No. OR-97-064 Question 3 and attached table)

OR

• They are the largest (by volume) material available for the site in question.

Table AJJ-4. Coarse Woody Debris and Snag Observations and Target levels

Ecoregion	Observed Ave (Minimum) Coarse Wood on ground 16"dia.*/16'+ in decay class 1 or 2 (Ave. # pieces/acre)	Target Range Density for Coarse Wood 16"dia.*/16'+ in decay class 1 or 2 (Ave. # pieces/acre)	Observed Ave (Minimum) Snags 16"dia.*/16'+ (mean snags per acre)	Target snag level 16"dia.*/16'+ (Ave. per acre)
Siskiyou Foothills	1.4	**2-4**	1.9	**4.5**
Klamath River Ridges	5.2	**6-8**	6.9	**12.5**
South Cascades	4.2	**5-7**	7.2	**14**
South Cascade Slopes**	n/a	**6-8**	n/a	**12.5**

* Diameter is measured at the large end

** As a result of not having an adequate number of transects in the Southern Cascade Ecoregion, the target density for that ecoregion will be the same as the adjacent Klamath River Ridges Ecoregion which is similar in elevation and plant associations.

Appendix KK - Land Acquisition Criteria

The following land acquisition criteria is listed in priority:

1. Habitat currently occupied by a threatened, endangered, or proposed wildlife or plant species, and expected future management under current or expected ownership would be detrimental to the site. Parcel borders Monument lands and is within CSNM Proclamation boundary.

2. Habitat currently occupied by a threatened, endangered, or proposed wildlife or plant species, and expected future management under current or expected ownership would be detrimental to the site. Parcel does not border Monument lands but is within CSNM Proclamation boundary.

3. Habitat currently occupied by a locally endemic or Survey and Manage or Bureau Sensitive wildlife or plant species, and expected future management under current or expected ownership would be detrimental to the site. Parcel borders Monument lands and is within CSNM Proclamation boundary.

4. Habitat currently occupied by a locally endemic or Survey and Manage or Bureau sensitive wildlife or plant species, and expected future management under current or expected ownership would be detrimental to the site. Parcel does not border Monument lands but is within CSNM Proclamation boundary.

5. Habitat currently occupied by a threatened, endangered, or proposed wildlife or plant species, and expected future management under current or expected ownership would be detrimental to the site. Parcel is within CSNM Proclamation boundary.

6. Currently late-successional habitat (Habitat Type 1 or 2) within 0.5 miles of a Northern Spotted Owl site. Parcel is within CSNM Proclamation boundary.

7. Currently Northern Spotted Owl dispersal habitat (Habitat Type 5 or 6) within 0.5 miles of a Norhtern Spotted Owl site. Parcel borders CSNM OGEA lands and is within CSNM Proclamation boundary.

8. Currently late-successional habitat (Habitat Type 1 or 2) within 1.2 miles of a Northern Spotted Owl site. Parcel borders OGEA lands and is within CSNM Proclamation boundary.

9. Currently Northern Spotted Owl dispersal habitat (Habitat Type 5 or 6) within 1.2 miles of a Northern Spotted Owl site. Parcel borders OGEA lands and is within CSNM Proclamation boundary.

10. Jenny Creek riparian habitat (i.e., the stream runs through parcel). Parcel is within CSNM Proclamation boundary and borders Monument land.

11. Currently late-successional habitat (Habitat Type 1 or 2). Parcel borders OGEA lands and is within CSNM Proclamation boundary.

12. Currently spotted owl dispersal habitat (Habitat Type 5 or 6). Parcel borders OGEA lands and is within CSNM Proclamation boundary.

13. Currently late-successional habitat (Habitat Type 1 or 2) within 0.5 miles of a Northern Spotted Owl site. Parcel does not border OGEA lands but is within CSNM Proclamation boundary.

14. Currently Northern Spotted Owl dispersal habitat (Habitat Type 5 or 6) within 0.5 miles of a Northern Spotted Owl site. Parcel does not border OGEA lands but is within CSNM Proclamation boundary.

15. Currently late-successional habitat (Habitat Type 1 or 2) within 1.2 miles of a Northern Spotted Owl site. Parcel does not border OGEA lands but is within CSNM Proclamation boundary.

16. Currently Northern Spotted Owl dispersal habitat (Habitat Type 5 or 6) within 1.2 miles of a Northern Spotted Owl site. Parcel does not border OGEA lands but is within CSNM Proclamation boundary.

17. Jenny Creek riparian habitat (i.e., the stream runs through parcel). Parcel is within CSNM Proclamation boundary but not adjacent to Monument land..

18. Currently late-successional habitat (Habitat Type 1 or 2). Parcel does not border OGEA lands but is within CSNM Proclamation boundary.

19. Currently Northern Spotted Owl dispersal habitat (Habitat Type 5 or 6). Parcel does not border OGEA lands but is within CSNM Proclamation boundary.

20. Parcel contains perennial or long duration intermittent stream (and associated riparian area) and is within CSNM Proclamation boundary.

21. Lands with potential to develop late-successional habitat at some point in the future. Parcel does not border OGEA lands but is within CSNM Proclamation boundary.

22. Lands with potential to develop late-successional habitat at some point in the future. Parcel is within CSNM Proclamation boundary.

23. Other lands bordering the Monument lands and is within CSNM Proclamation boundary.

24. Parcel is within CSNM Proclamation boundary.

Appendix LL - Monitoring Strategy and Projects

I. INTRODUCTION

The Presidential Proclamation for the Cascade-Siskiyou National Monument (CSNM) calls for protecting the objects considered special to the Monument. These include Greene's Mariposa lily, Gentner's fritillary, Bellingers meadowfoam, populations of long isolated fish species, special plant communities (rosaceous chapparral and Oregon white oak-juniper woodlands), Mixed conifer, winter deer habitat, "old growth conifer habitat crucial for spotted owl," as well as the diversity of butterfly and snail species associated with the assemblage of plant communities dispersed across the landscape.

The call to consider ecosystem dynamics (change over time) and ecosystem integrity (whether all the components of the ecosystem are present and functioning) requires the BLM to consider biological objects and ecosystem variables relative to the range of processes occurring within the CSNM landscape. The monitoring of key species (for example, old-growth sugar pine) and variables indicative of ecosystem functioning (nutrient and water cycling, water temperature) is critical to understanding the health of the ecosystems within the Monument. While most monitoring projects identified in Table ALL-1 contribute to an understanding of ecological integrity and ecosystem functioning, other important processes that need to be monitored include forest succession, weed invasion, hydrology, and monitoring of individual species considered indicative of habitat conditions required by a broader suite of species.

Of particular concern within the Monument is the impact of livestock on the biological elements considered characteristic of the CSNM and mentioned within the Presidential Proclamation. The subset of projects examining potential livestock impacts are listed in table ALL-1 and presented in greater detail in Draft Study of Livestock Impacts on the Objects of Biological Interest in the Cascade-Siskiyou National Monument. The remainder of this document describes some of the themes of information that the range of monitoring projects will supply, as well as more detailed descriptions of the critical projects defined.

There are four primary categories of monitoring need to assess the array of values and potential impacts of management actions throughout the CSNM. Monitoring within each category is necessary to provide a comprehensive ecological perspectives at the landscape scale. Each of the described monitoring efforts contribute to one or more of the following:

Baseline Data

Forest systems in the Monument will be monitored to determine trends related to disturbance agents such as insects, disease, and fire. Non-forest plant communities are effected by grazing and fire exclusion in the Monument. A study that determines impacts of livestock grazing in the Monument with specific attention to sustaining the natural ecosystem dynamics is required and under way. Landscape level plant community surveys will be conducted on the ground and supported by satellite imagery in order to determine long term trends. Baseline data gathering methodologies will be initiated as soon as possible.

In addition to ongoing surveys and old aerial photographs, the semi-annual collection and archival of satellite imagery will provide the baseline data for examining plant compositional changes consequent to wildfire and management activities across the Monument landscape in the longer term.

Historical Plant Community Change

Several monitoring projects/surveys are planned to provide a better understanding of historical and more recent impacts of livestock, human, and natural disturbance on ecosystem dynamics across the CSNM landscape. Monitoring/surveying will be conducted to examine present landscape-level condition, past plant community changes, the distribution of special plant community/wildlife habitat, and noxious weed invasion. Imagery (aerial and satellite) may provide additional baseline data to examine the above dynamics in more detail in the future.

Landscape-level surveys of plant community, wildlife habitat, weed abundance, surface hydrology, riparian condition, and livestock utilization will provide the context for more intense monitoring at specific sites on the landscape. Full use is being made of existing data to provide seamless maps of plant communities across the CSNM landscape.

Fence-line contrasts and existing livestock exclosures coupled with ground-nesting bird surveys will allow limited assessment of past plant community change and wildlife nesting habitat associated with livestock impact. A re-examination of vegetation plots associated with old soil and vegetation surveys will allow further assessment of long-term change for the range of plant communities within the Monument. 1939 Aerial photos have been purchased to provide visual evidence of change at specific locations within the CSNM.

Ecosystem Dynamics

Several projects will provide insight to "ecosystem dynamics" as defined by the Proclamation. Studies of insect and arthropod populations, changes in plant community composition, weed invasion, coarse woody debris, tree vigor and disease & insects within Northern Spotted Owl cores and adjacent areas within the context of past disturbance/ecological process (timber harvest, grazing, wildfire, weed invasion, etc) will provide inference about ecosystem dynamics.

Monitoring of Management Activities

The Monument supports a variety of forest and non-forest plant communities with changing compositional and structural characteristics. Any activities initiated within the Monument that change or effect plant communities require monitoring and research that support or validate management objectives. Issues related to this are Grass/Shrubs/Woodland Plant Community Health, Forest Health and Livestock Grazing. Plant community trends need to be measured with the best technology available in a manner that will identify environmental processes over time creating a long term archive in the process.

Future management activities (prescribed fire, weed eradication, small tree thinning, and others) will be monitored using permanently marked monitoring sites following standard protocols established for the CSNM. Where feasible, care will be taken to establish monitoring protocols that maintain compatibility with existing data.

Past, Current, and Proposed Monitoring

A detailed list of all past, ongoing, and proposed monitoring within the Monument is presented in Table ALL-1. Several past monitoring projects listed in Table ALL-1 are a source of baseline information also providing a historical context for the Monument. Compilation of historical and current monitoring projects (Map 46) will help identify knowledge gaps and provide guidance for the selection of new monitoring projects and sites. A full compilation of past and current monitoring efforts will also aide the integration of new monitoring projects with historical information.

Table ALL-1. Existing and Proposed Monitoring Projects in the CSNM.

Monitoring Project	Objectives	Data Type	Replication	Scale	Monitoring type
LIVESTOCK ENCLOSURE/EXCLOSURE STUDY					
Existing enclosures	Examine past influence of livestock on plant communities	Point cover data and photo-monitoring	3	Project	Baseline
New enclosure and paired grazed site to examine the effects of livestock on butterfly community	Examine the effect of livestock on butterfly abundance and richness	Butterfly abundance and richness during timed intervals before and after grazing	2	Landscape	Validation
New enclosure to test native plant seeding strategies	Examine feasibility of restoring weed infested/native plant depauperate plant communities	Canopy cover, permanent photo-point	Determined at the time of project implementation	Project	Validation
New enclosures and paired grazed site to examine the effects of livestock on the proliferation of weeds	Determine if livestock enhance the proliferation of annual grasses and yell0ow starthistle on poor/fair condition range sites	Point cover and photo- monitoring	5	Landscape	Validation

Table ALL-1. Existing and Proposed Monitoring Projects in the CSNM.

Monitoring Project	Objectives	Data Type	Replication	Scale	Monitoring type
New enclosures and paired grazed site to protect and/or study the effect of livestock on special status species	Examine the effect of livestock on Calochortus greenei, *Limnanthes floccosa*, and the Fredenberg pebble snail	Plant and seedhead counts, photo-monitoring, snail counts and habitat data where applicable	5	Landscape	Validation
New enclosures to examine the effect of livestock on a range of plant communities	Examine the effect of livestock on conifer understory, riparian, wet meadows, dry meadows, shrub and oak woodland plant communities	Point cover and photo- monitoring	Approximately 30	Landscape	Effective-ness validation
STUDIES SUPPORTING THE LIVESTOCK ENCLOSURE/EXCLOSURE STUDY					
Landscape plant community surveys	Provide general landscape condition, fuels, context for other studies	Tree & shrub canopy cover and herbaceous foliar cover estimates	Synoptic for Klamath River Ridges	Landscape	Baseline
Re-examination of historic plot/stand plant species compositional data	Provide objective data for examining plant community change across time by repeating old SCS (NRCS) and SVIM vegetation plots/transects	Phytomass and/or cover by species	90 existing plot locations	Landscape	Validation
Existing rangeland condition/trend data	Determine if rangeland trend is moving towards a desired future condition	Nested frequency data and utilization data	6	Landscape	Effective-ness
Utilization by livestock based on stubble height	Determine riparian/upland utilization by livestock based on stubble height	Percentage utilization by species	Throughout the monument.	Landscape	Baseline
Existing utilization plots	Determine percent forage utilization by livestock	Percent utilization by species	16	Landscape	Effective-ness

Table ALL-1. Existing and Proposed Monitoring Projects in the CSNM.

Monitoring Project	Objectives	Data Type	Replication	Scale	Monitoring type
Recreate historic Riparian/ wetland/ spring utilization surveys	Repeat historic surveys from 1983	Numerous variables	50+ sites	Landscape	Baseline
Existing fenceline contrast	Examine past influence of livestock on plant communities and bird nesting habitat	Point cover data and photo-monitoring, nesting bird surveys	To be determined	Project	Validation
Aerial photo-derived plant community change	Determine plant community change and site specific disturbance history using aerial photos: focus on all past and present monitoring plots/enclosures, special plant communities, key functional areas	Digitally ortho-corrected GIS layer photo mosaics of Jenny Creek and tributaries in 40s 4e sections 22,27, and 28 using photos from 1939, 1953, 1962, 1966, 1975, 1980, 1985, 1991, 1996, ~2001, and ~5 year intervals after that.	~5-year intervals	Project	Baseline effective-ness validation
Rare plant monitoring and surveys	Generalize monitoring for rare plant species	Perform walk through of known sites	Annually	Landscape	Baseline
Weed monitoring	Several sources of information will provide understanding of weed dynamics	Fixed transects, re-examination of vegetation plots, other existing surveys	1-3 years	Landscape	Baseline
Dietary overlap between livestock and native ungulates	Examine diets of large herbivores collecting information about potential interaction/competition for food	Re-analysis of fecal composition data collected in the late 1970s and early 1980s	one time	Landscape	Baseline

Table ALL-1. Existing and Proposed Monitoring Projects in the CSNM.

Monitoring Project	Objectives	Data Type	Replication	Scale	Monitoring type
Winter deer habitat - shrub demographics studies	Determine correlation between range of shrub age classes and condition and suitability of deer winter range	Re-examination of shrub demographic data collected in the late 1970s	one time	Landscape	Baseline
Fish habitat and riparian condition monitoring within grazed and ungrazed streams	Project dovetails with other riparian projects & water quality monitoring	channel width/depth ratio residual pool depth pool frequency plant community structure shading	one time	Landscape	Baseline
Photo plot monitoring	Database of photo plots	Changes in life-form abundance	every 1-5 years	Landscape	Baseline

Table ALL-1. Existing and Proposed Monitoring Projects in the CSNM.

Monitoring Project	Objectives	Data Type	Replication	Scale	Monitoring type
INDIVIDUAL MONITORING PROJECTS CONTRIBUTING TO UNDERSTANDING THE CSNM LANDSCAPE: TERRESTRIAL					
Oregon Gulch RNA: protecting, maintaining, and restoring natural values	Sugar pine tree vigor, density, prescribed fire effects	Stand exam, fuels inventory, canopy, tree vigor and age	Permanent plots replicated throughout stand	Project	Effective-ness, validation
Influence of commercial thinning on white fir stands on...arthropod communities in SW Oregon.	Arthropod communities	Transects, soil samples, pitfall traps, CWD sampling	6-12 replications	Project	Validation
Historic fire frequence in old-growth forests	Quantify fire occurrence in old-growth forest stands, the frequency of fire occurrence among stands and among forest types, and the length of fire free periods. Compare the frequency of fire with tree recruitment. Determine developmental tree and stand characteristics in relation to their fire environment.	Growth ring analysis	one site	Landscape	Validation
The effect of thinning on the decomposition food web	Understand how thinning affects the decomposition food web.	Transects, soil samples, catch traps, pieces of CWD	8 paired sites in spotted owl cores and adjacent Habitat type 5.	Project	Validation
Habitat Type "1" & "2" vs. "5" effectiveness monitoring	Determine effects of treatments in habitat types in the same areas as the arthropod studies	Measure structure, stand density, canopy, fuels, CWD and snags over time using slivicultural and fuels databases. CO ov Var. pre and post treatment	8 paired site in spotted owl cores and adjacent forest stands	Project	Effective-ness

Table ALL-1. Existing and Proposed Monitoring Projects in the CSNM.

Monitoring Project	Objectives	Data Type	Replication	Scale	Monitoring type
Root rot incidence and insect activity	Monitor disturbance agents annually and note trends. Review CVS plots for structural and disturbance characteristics	Tree vigor, mortality and forest changes.	15 CVS plots, throughout the monument, RNAs	Project	Baseline
Aerial and satellite imagery	Imagery of plant cover and long term plant community changes; Several potential applications.	Canopy cover by plant community, shrub-interspace mosaic dynamics	Focus on enclosures & key areas, synoptic for monument, annual flights	Landscape	Baseline

Table ALL-1. Existing and Proposed Monitoring Projects in the CSNM.

Monitoring Project	Objectives	Data Type	Replication	Scale	Monitoring type
INDIVIDUAL MONITORING PROJECTS CONTRIBUTING TO UNDERSTANDING THE CSNM LANDSCAPE: AQUATIC (PHYSICAL AND BIOLOGICAL)					
Landscape hydrologic/ riparian surveys	Provide general hydrologic/riparian spatial information, morphologic description, flow regime, and condition as context for other studies, input to the Monument transportation plan, and protection of aquatic/riparian objects identified. Baseline for long- term monitoring.	Location, flow duration, channel classification/ morphology data for streams, wetlands, and other hydrologic features; instream large wood; impact descriptions and restoration opportunities, especially related to livestock, transportation, and vegetation	Keene Creek, portion of Middle Jenny Creek subwatersheds completed 1999. Upper Emigrant Creek subwatershed to be completed 2000. Fall, Camp, Scotch, Upper Cottonwood, Lower Cottonwood, Upper Jenny, Lower Jenny, remainder of Middle Jenny Creek subwatersheds proposed repeat at 10-25 year intervals.	Landscape	Baseline
Baseline stream temperature monitoring	Monitor for long term changes in stream temperatures, as context for judging success of riparian/aquatic management, restoration, and protection	Seasonal 30-minute interval data	13 sites in addition to the 9 project-specific sites listed above 10 proposed new sites	Landscape	Baseline
Gaging station and staff gages: flow and water quality assessment	Provide flow and water quality information at key locations as context for other types of aquatic condition assessment	15-minute interval gage height, air temperature, water temperature at gaging station Monthly grab sample collection of turbidity, air temperature, water temperature, pH, flow, fecal coliform, dissolved oxygen	1 gaging station ongoing 11 staff gage-only sites ongoing 5 new staff gage- only sites proposed	Landscape	Baseline

Table ALL-1. Existing and Proposed Monitoring Projects in the CSNM.

Monitoring Project	Objectives	Data Type	Replication	Scale	Monitoring type
Stream channel cross sections throughout the CSNM	Provide site- specific trend of width/depth ratios, entrenchment, and other indicators of channel form, and provide reference points for assessment of large flood flows.	Cross-section measurement to calculate entrenchment, width/depth ratio; bankfull channel length to calculate slope and sinuosity.	12 existing monumented sites 5 new sites proposed measured at ~5-year intervals and after major flood events	Landscape	Baseline
Lower Jenny Creek rain gage	Provide rainfall data as context for flow assessment and other types of monitoring	15-minute interval rainfall data	1 site. Precipitation stations also located at Howard Prairie Dam (NOAA), Parker Mountain (RAWS), Buckhorn Springs (RAWS)	Landscape	Baseline
Jenny Creek riparian restoration aerial photo monitoring	Aerial photo monitoring of change in riparian and morphologic condition portion of Jenny Creek undergoing restoration activities.	Digitally ortho-corrected GIS layer photo mosaics of Jenny Creek and tributaries in 40s 4e sections 22,27, and 28 using photos from 1939, 1953, 1962, 1966, 1975, 1980, 1985, 1991, 1996, ~2001, and ~5 year intervals after that.	Not applicable	Project	Baseline, effective-ness
Jenny Creek riparian restoration stream temperature monitoring	Document long- term change in WATER temperatures resulting from passive and active restoration activities attempting to reverse past management impacts	Seasonal 30 minute interval data	9 monumented sites along 2.5 miles of Jenny Creek, repeated annually. Two sites monitored since 1991, seven additional sites monitored since 1997.	Project	Effective-ness

Table ALL-1. Existing and Proposed Monitoring Projects in the CSNM.

Monitoring Project	Objectives	Data Type	Replication	Scale	Monitoring type
Jenny Creek riparian restoration channel morphology monitoring	Document long-term change in stream dimension, pattern, and profile resulting from passive and active restoration activities attempting to reverse past management impacts. Provide context for other aquatic monitoring activities	Cross-section measurement to calculate entrenchment, width/depth ratio; bankfull channel length to calculate slope and sinuosity.	8 monumented cross-sections along 2.5 miles of Jenny Creek, measured at ~ 5-year intervals or after major flood events	Project	Effective-ness
Aquatic macro-invertebrate monitoring	Long term monitoring of aquatic macroinvertebrate community change as indicator of habitat/water quality.	Taxa abundance, taxa richness, other metrics	12 sites ongoing 10 new sites proposed Monitored at 5-6 year intervals	Landscape	Baseline
Fish distribution surveys	Determine upstream limits of fish distribution.	Electrofishing, visual observations, snorkeling.	All potentially fish-bearing streams.	Landscape	Baseline
Fish habitat use monitoring: watershed scale, responses to watershed change	Quantify Jenny Creek sucker habitat use for all age classes. Further explore the relationship between habitat use and various environmental variables. Further understand how the patterns of habitat use vary between years, in order to provide a basis for the other projects aimed at understanding "why."	"Habitat-type" based surveys, snorkeling.	5 sites on Jenny and Keene Creeks, approximately 400 - 800 m long.	Landscape Reach	Validation
Fish population monitoring	Estimate population levels within Jenny Creek for the three native fish species: Jenny Creek suckers, redband trout, and speckled dace.	Snorkeling.	At least 5 sites scattered throughout Jenny and Keene Creek watersheds; perhaps up to 5 additional sites.	Landscape	Baseline, Validation

Table ALL-1. Existing and Proposed Monitoring Projects in the CSNM.

Monitoring Project	Objectives	Data Type	Replication	Scale	Monitoring type
Fish habitat use monitoring: reach-scale responses to riparian and channel restoration on the former Box-O ranch	Track changes in the fish community to physical changes in the channel through the former Box-O Ranch, as restoration projects restore floodplain connectivity.	Habitat-type stream surveys, snorkeling	4 established sites along the former Box-O ranch	Reach	Validation
Jenny and Keene Creeks channel restoration monitoring	See if original project objectives were met. Look for unforseen impacts. Detemine how (or if) fish habitat responds to channel changes as a consequence of these projects.	Stream channel mapping, photo points, channel cross sections, habitat-type surveys, snorkeling.	2 sites, one at the Lower Crossing on Jenny Creek and one on Keene Creek.	Site-specific	Effective-ness
Identifying Jenny Creek sucker spawning areas	Confirm suspected spawning locations of Jenny Creek suckers	Specially-made drift nets	4 sites downstream of assumed spawning areas	Landscape	Baseline
OTHER					
Yellow starthistle invasion in grass/shrub/ woodlands	Long-term monitoring of yellow starthistle on susceptible sites	Frequency data and photo- monitoring	20	Landscape	Baseline
Visitation impacts	Monitor visitor impacts on plant communities at potentially high impact/sensitive sites	Canopy cover, permanent photo-point	Determined at the time of project implementation	Landscape	Baseline
Sedge community assessment	Examine composition and condition of sedge meadows/springs	Walk-through - species list	Not applicable	Landscape	Baseline

Table ALL-1. Existing and Proposed Monitoring Projects in the CSNM.

Monitoring Project	Objectives	Data Type	Replication	Scale	Monitoring type
Spring/wetland photo-monitoring	Visual trends of structural and compositional changes in springs and wetlands, livestock impact	Permanent photo-points	50% of perennial springs & wetlands	Landscape	Baseline
Aquatic mollusk distribution	Identify spring characteristics and history important to the distribution of aquatic molluscs	Plant life-form point cover, photo monitoring, and modified proper functioning condition	To be determined	Landscape	Baseline
Fire regimes/ fire effects (baseline data)	Long term effects of prescribed burning and wildfires in forest plant communities.	Pre- and post-fuels and vegetation inventory	Representative plant communities	Landscape	Baseline
Herbicide treatment of Canada thistle	Examine the feasibility of using herbicide to treat Canada thistle	Canopy cover, photo	10 paired plots, 3 sites	Project	Effective-ness
Management activities	Monitor all future management activities using permanently marked plots and transects	The most appropriate variable	Determined at the time of project implementation	Project	Effective-ness
Special habitat delineation	Identify special plant community habitats, determine distribution	Satellite imagery	Synoptic, once only	Landscape	Baseline
Bird point count transects and associated vegetation	Repeat SVIM bird point count transects	Bird point counts and associated vegetation transects	8	Project	Baseline
Neotropical bird dynamics	Monitor neotropical birds utilizing riparian areas of Box-O	Continuous effort mist netting	1 site, repeated mist netting, banding	Landscape	Baseline
Neotropical bird monitoring	Identify neotropical birds utilizing riparian areas of Box-O	Random Ornithological Inventory	1 site, 1-15 hours mistnetting	Rroject	Baseline
Noxious weed surveys	Add to existing noxious weed database	Weed presence/absence	Synoptic	Landscape	Baseline

II. Individual Monitoring Projects Contributing to Understanding the CSNMLandscape: Terrestrial

A. Oregon Gulch RNA: Protecting, Maintaining and Restoring Natural Values

Note: Project Lead on this study is Coreen Francis, who is pursuing a Master's Degree in Forestry at Oregon State University. This study is part of the work towards her degree and is subject to change before implementation.

Introduction

In 1989 Oregon Gulch was nominated by the Natural Heritage Program for Research Natural Area (RNA) designation because it contains two Natural Heritage Program cells: Rogue Valley mixed conifer and chaparral vegetation (USDI, 2000). A cell is defined as a "unique ecosystem type used by the Natural Heritage Plan to inventory, classify and evaluate natural areas" (Oregon Natural Heritage Advisory Council, 1998). The United States Department of the Interior (USDI) Bureau of Land Management (BLM) Resource Management Plan (RMP) established the following restrictions: no timber harvest, no off-highway vehicle (OHV) use, and no mineral entry (USDI, 1995). RNAs are intended as scientific research and baseline study areas. One objective is to preserve its natural values and lack of accessibility (USDI, 2000).

Two unique communities prompted the RNA designation (USDI, 1992). The first is a mixed conifer community that occurs mostly on the north facing slopes south of the Gulch. These stands contain scattered old-growth sugar pine (*Pinus lambertiana*), incense cedar (*Calocedrus decurrens*), Douglas-fir (*Pseudotsuga menziesii*), and ponderosa pine (*Pinus ponderosa*). These species are also found in the understory with Douglas-fir the dominate species. Oregon White Oak (*Quercus garryana*) is found around stand edges and in openings. California Black Oak (*Quercus kelloggii*) is found scattered among conifers and overtopped by them (USDI, 2000). The second community is a wedgeleaf ceanothus/bunchgrass chaparral found mostly on the north facing slopes above the Gulch. The mixed conifer stands are the focus because of concerns about maintaining a healthy overstory and a heterogeneous understory. The integrity of these stands needs to be maintained by protecting them from catastrophic fire. The long-term objective is to manage the stands with prescribed fire.

Justification and Expected Accomplishments

This project was originally suggested by Dave Russell, silviculturist, Ashland Resource Area, Medford BLM because of concerns for the health of the old-growth sugar pine in the RNA. In 1995 mountain and western pine beetles, attacked and killed approximately one- third of these old-growth dominant sugar pine. Russell recognized that high tree densities due to fire suppression should be addressed. He also noted Douglas-fir was the dominant understory species which would eventually become the dominate overstory species without intervention.

The Medford District Resource Management Plan (RMP) states that the Oregon Gulch RNA will be managed according to the values and the goals of the Natural Heritage Program (USDI, 1995). The RMP states that management objectives will be to "preserve, protect, or restore native species composition and ecological processes of biological communities in research natural areas."

In the spirit of the RNA program it is imperative to investigate the natural processes that created and maintained this uneven-aged, old growth mixed conifer forest. The scattered nature of the overstory indicates the pre-European settlement condition was more open (Walstad et al. 1990). Fire scars on these trees indicate fire was a natural process that may have served to maintain the species mix. Initial observations noted the high understory density resulting from fire exclusion. Douglas-fir, a the more shade-tolerant species, has been successful at regenerating in the understory during the last 80-100 years. This project will investigate the stand conditions, reference them to pre-European settlement conditions, and attempt to create a more open, fire resistant, truly mixed conifer community by using various silviculture treatments over a period of time. The purpose of the outlined project is to protect and maintain Oregon Gulch as a healthy mixed conifer ecosystem in the Natural Heritage Program.

Objectives

Objective 1: The primary objective of this project is to develop a serious of site-specific silviculture prescriptions for mixed conifer stands in the Oregon Gulch RNA that support the RMP objectives. The prescriptions will address the following issues: high fuel loading, mortality to overstory sugar pine, high stocking densities, and the dominance of Douglas-fir in the understory. The five objectives of the prescriptions are:

Prescription Objective 1: Reduce the risk of a stand-replacing fire. Maintaining the Oregon Gulch RNA as a representative mixed conifer ecosystem is crucial. The inaccessibility of the RNA and the high fuel loading sets it up as a prime candidate for a stand-replacing fire. The current understory structure and composition either sets it up for a stand-replacing fire or conversion to Douglas-fir through succession without intervention.

Prescription Objective 2: Reduce stocking densities and minimize mortality from insects and disease. Reducing densities serves to increase the vigor of remaining trees. Increasing vigor will make the stand more resistant insect populations or root diseases thus increasing the long-term integrity of the stands (Filip et al., 1999; Knutson et al., 1986; Larsson et al., 1983).

Prescription Objective 3: Perpetuate the historic mixture of sugar pine, ponderosa pine, Douglas-fir, incense cedar, and black oak. Currently, the overstory of the RNA provides evidence of the complex natural mixture of sugar pine, ponderosa pine, Douglas-fir, incense cedar, and black oak that is found in the mixed conifer stand type. The understory however, is much different because Douglas-fir is the dominant understory tree species. Typically sugar pine and ponderosa are the dominant overstory with only a few scattered old-growth Douglas-fir and incense cedar.

Prescription Objective 4: Provide a multi-layered stand structure for wildlife and plant diversity. Oregon Gulch is used by several wildlife species that depend on the multi-layered canopy structure that it currently provides. These structural needs will be integrated into the prescriptions. Plant diversity will be maintained by opening up the understory, allowing shrubs and herbs to become reestablished.

Prescription Objective 5: Reintroduce the range of natural variability. It is important to investigate the range of natural variability if these stands are to be restarted in the direction that they were going prior to European settlement. Old-growth trees in these stands may be able to indicate whether the disturbance regime was patchy or uniform across the landscape.

Methods and Materials

The overall approach to prescription development is to: 1) collect stand and tree data, 2) summarize the current stand condition, 3) define the desired stand condition, 4) utilize several models to evaluate the effectiveness of the treatment, 5) evaluate models outputs for meeting the five objectives of the prescription, and 6) selection of the preferred treatment. Other considerations to be evaluated are adjacency to private land, riparian corridor management, sensitive species, cost, and operational constraints.

The Oregon Growth Analysis and Projection (ORGANON) growth-and-yield model (Hann et al. 1997) will be used. For each plot, a fuels inventory transect method (Brown, 1974) will be done. This was added because of the need for a quantitative assessment of the fuels. This will be used to project tree mortality in response to prescribed burning. The last element of data collection is the coring, measuring and mapping of all old-growth pines in the heritage stand. This is intended as a reference to pre-European settlement growth and stand dynamics. The data collected from the plots in each of the six stands will be entered into ORGANON (Hann et al. 1997), Forest Vegetation Simulator (FVS)(Teck et al. 1996), and Fire Area Simulator (FARSITE)(Finney, 1998) models to assess current and future growth, mortality, species composition, stand structure, and fire behavior. Silviculture treatments such as thinning, modified group and single tree selection, pruning, and burning will be applied and their effects will be projected with these models (Smith, 1997). The outputs will be evaluated based on the five objectives of the prescription. Alternative treatments will be developed and the preferred treatment will be discussed in the final prescription.

Inventory Design

The first step in designing the inventory is to delineate the stands from aerial photos. The digital orthophotos can be used to digitize the stand boundary in the GIS. Approximate acres are calculated by GIS and a scaled map generated. Plot locations can be placed on the aerial photo by using a dot grid. The sampling intensity for this project will be a plot every 5 to 6 acres. The permanent plots will be used by the BLM for long-term monitoring of the RNA. Each plot center will be mapped with a GPS machine.

Standard Inventory

The standard inventory method will be to evaluate the current stand structure and composition. This inventory will provide data that will used in analysis for the five objectives. Table ALL-2 provides a summary of all variables examined in each plot and the plot design. Aspect, slope, topographic position, percent crown closure, and plant association are recorded for each plot in addition to the tree, log, and vegetation variables listed in the Table ALL-2.

Table ALL-2. Standard Inventory Plot Measurements

Type	Size	Variables	Measurements Taken
Fixed	r = 7.8 ft.	Trees 0.0-4.0" dbh	species, DBH, height, crown ration, crown class, damage, mortality, decay class
Fixed	r = 15.56 ft.	Trees 4.0-8.0" dbh	species, dbh, height, crown ration, crown class, damage, mortality, decay class
Variable	20 BAF	Trees > 8.0" dbh	species, dbh, height, crown ration, crown class, damage, mortality, decay class, site tree type, age of site tree, radial growth
Fixed	r = 11.8 ft.	Seedlings	species, height, amount
Fixed	r = 11.8 ft.	Vegetation	species, height, percent cover
Transect	100 ft.	Downwood >5.0" at intersect	species, diameter at intercept, length, decay class, small and large end diameters

Data in Table ALL-2 will be used in the growth and yield model, ORGANON, in order to develop treatment options. Another model, FVS, will be also be used because in addition to growth and mortality, it also projects impacts from insects, pathogens, and fire. The FARSITE model will be discussed later because its use is specific to objective 1. Model outputs for the various treatment options will be evaluated for the best fit to the five objectives and a selection of the best option will be made. The evaluation of data specific to each objective is essential to choosing the best option. The methods for these are discussed below.

Prescription Objective 1: Reduce the risk of a stand-replacing fire

The fuel inventory method selected for this project is a transect method developed by (Brown 1974). He revised this method in (Brown et al. 1982) to include live fuels, but this method will not be used because live fuel data is collected in the stand inventory (Brown et al. 1982). The direction of the transect is chosen by spinning the compass three random turns at plot center. A logger's tape is laid out 50 ft. in each direction. Fuel depths are collected at 38, 44, and 50 ft. along this transect. Duff depths are collect at 44 and 50 ft. Down dead material in the 0-0.25 and 0.25-1 inch size classes are counted if they transect the tape between 44 and 50 ft. 1-3 inch material is counted between 38 and 50 ft. along the transect. Material 3 inches and larger are recorded by diameter at transect by size and categorized as rotten or sound. The calculations for computing tons/acre are:

$$\text{0-3 in. material:} \quad \frac{11.64 \text{ x n x } d^2 \text{ x s x a x c}}{N\ell}$$

$$\text{3+ in. material:} \quad \frac{11.64 \text{ x } \sum d^2 \text{ x s x a x c}}{N\ell}$$

Where: 11.64 = constant; n = number of pieces; d^2 = diameter squared; s = specific gravity; a = non-horizontal angle.

Prescription Objective 2: Reduce stocking densities and minimize mortality from insects and disease

The standard inventory plot data can be used to evaluate density and mortality. All dead trees are measured and insects and diseases on live trees are noted. ORGANON and FVS provide density information in the form of basal area, trees per acre, relative density, and stand density indexes (Hann et al. 1997; Teck et al. 1996). Site trees that are cored at each plot can provide a relationship between density and tree vigor.

Prescription Objective 3: Perpetuate the historic mixture of tree species
The data on the overstory composition provided by the standard inventory will provide for an analysis of the historic species composition. This will be the target composition for analyzing model outputs for the various treatments. Ponderosa pine, white oak, Douglas-fir, incense cedar, black oak, and sugar pine are the tree species that will be evaluated.

Prescription Objective 4: Provide a multi-layered stand structure for wildlife and plant diversity
The data specific to this objective is collected on the plots and represented by the model outputs. The vegetation portion of the inventory provides information on vegetative species, height and percent cover. This information can be compared with the canopy cover which is also collected on each plot to identify the relationship between canopy cover and vegetation. The plot data also provides information on the stand structure such as average diameter at breast height (DBH), and heights. Prior to data analysis, desired structure and vegetation composition will be developed according to wildlife structural needs and vegetative response thresholds.

Prescription Objective 5: Reintroduce the range of natural variability
The old-growth ponderosa pine and sugar pine trees are a testimony to the growth patterns of this stand over several centuries. A separate inventory of these trees in the heritage stand can be used to determine the growth patterns of the stand over time. The heritage stand was chosen for this because it contains the best overstory old-growth pines in the RNA. The contiguous nature of the stand will also allow for a spatial analysis of within stand dynamics. The old-growth Douglas-firs were not chosen for this because they have too much rot to be useful in this analysis. Each pine will be cored and standard tree measurements will be collected.

Analytical Process

Prescription Objective 1: Reduce the risk of a stand-replacing fire
The information from the fuels inventory will be used by the fuels specialist to develop a burn plan for the prescribed burns in the implementation phase of this project. It will also be used in the FARSITE model. The FARSITE model requires the use of five GIS layers:

- elevation
- slope
- aspect
- fuels
- canopy cover

The elevation, slope, aspect, and canopy cover layers are created from plot data collected in the standard inventory. The fuels layer will be created from the fuel inventory data. The model will be applied to the existing stand in order to demonstrate the risk of a severe wildfire. In addition to this, a number of simulations will be done on the treatment alternatives as identified by the other ORGANON and FVS. These simulations will identify the effectiveness of the treatment in reducing the risk of a severe wildfire. They can also aid in identifying potential "hot spots" during prescribed burns.

As mentioned earlier, the FVS model has an extension that assesses fire risk, behavior, and impacts. It simulates the dynamics of live tree growth and mortality, snags and surface fuels, and fire (Table ALL-3). All the standard silviculture tools are offered with the bonus fuel treatments and prescribed burns also available to the user. This extension will be used to evaluate the impacts of prescribed burning on the structure and compositon of the treated stands.

Table ALL-3. FVS Simulation of the Effects of Fire on a Stand (Beukema et al. 1999).

First Order Effects	Second Order Effects
Fuel consumption Tree mortality Crown consumption Smoke production Mineral soil exposure	Reduced growth of scorched living trees Increased fall rate of snags Potentially altered growth, mortality or regeneration

Prescription Objective 2: Reduce stocking densities and minimize mortality from insects and disease
In the data analysis phase the first step is to identify an acceptable level of stocking. This will be determined by examining the overstory stocking, making the assumption that these were the natural stocking densities, and utilizing research indices of basal areas that are most likely to promote tree resistance to insects and disease (Filip et al., 1999; Knutson et al., 1986; Larson et al., 1983). ORGANON and FVS will be utilized to identify the appropriate treatments to achieve lower densities and more resistance to insects and diseases. Specifically, the insect and disease extension of FVS will provide a more detailed analysis of these impacts (Teck et al., 1996).

Prescription Objective 4: Provide a multi-layered stand structure for wildlife and plant diversity
ORGANON and FVS models the change in vegetation over time and for each treatment. The outputs will be evaluated against the desired structure and vegetation cover.

Prescription Objective 5: Reintroduce the range of natural variability
In order to determine spatial dynamics on tree growth, a GPS point file will be collected at each sample tree (or at a group of sample trees). These locations will be mapped in the GIS. Spatial distribution of these trees can be used to determine the patterns of disturbance and growth within the stand.

B. Influence of Commercial Thinning of White Fir Stands on Soil, Litter and Coarse Wood-Chewing Arthropod Communities in southwest Oregon

Introduction

Plant growth and the long-term sustainability of forest ecosystems depends on the interaction of soil fungi, microbes and invertebrates due to their roles in nutrient cycling and decomposition (Coleman & Crossley 1996; Freckman 1994). The soil and litter foodweb is among the most biologically diverse part of any terrestrial ecosystem. Beyond numeric abundance, these organisms play critical roles in maintaining soil fertility, health and productivity (Coleman et al. 1992). Arthropods both above and below ground are essential to the shredding of plant material, making nutrients available for microbial digestion. Through their grazing on bacteria and fungi, invertebrates also play a fundamental role in mineralizing the immobilized nutrients pooled within the microbial biomass, making them once again available to plants. Coarse wood chewers (CWC) as a functional group are extremely important to nutrient cycling, decomposition, and serve as an important source of food for other wildlife species. Although there are several orders of wood chewing arthropods, we will focus on ants as they are early invading representatives of this guild and have been demonstrated to be valuable indicator taxa that are readily discernable for future monitoring (Torgersen and Bull 1995). More specifically their ability to bore into the wood not only begins the process of structural breakdown of a fallen tree, and hence release of bound nutrients, but their entrance holes serve as infection courts for many decomposing fungi and bacteria which they often transport on their bodies (Harmon et al. 1986; Shaw et al. 1991). The effects of forest management practices on these organisms and consequently on long-term soil productivity are largely unknown.

Problem

As part of the Record of Decision for the Northwest Forest Plan, federal land management agencies are directed to survey for four guilds of arthropods in the southern range of the Northern Spotted Owl. Designation of these four guilds was based on an assessment that under the land allocations for Alternative 9, there is a considerable likelihood that the key ecological functions of these groups would not be maintained over much or all of the federal landscape (Holthausen et al. 1994). The Standards and Guidelines accept the use of commercial thinning as a silvicultural tool to reduce the risk of stand-replacing fires, but also recognize that this practice may reduce the quality of habitat for some organisms, including soil and litter arthropods and CWC. A retrospective assessment is essential in determining both the short- and long-term effects of thinning as a management tool on the abundance, diversity and function of these arthropods within the time limitations of the Record of Decision for general regional surveys. Such an approach will assess changes over a broad temporal scale, examining immediate effects as well as longer term recovery from thinning.

Background

Commercial thinning of overstocked stands has been recognized as being an effective tool for reducing the hazard of wildfire, increasing stand productivity, improving wildlife habitat (and increasing biodiversity), and as a means for hastening the transition to old-growth conditions (Smith 1986). One management goal of thinning densely stocked stands is to open the forest canopy, thereby increasing the structural complexity of the vegetation, and ultimately enhancing microhabitat diversity for arthropods and other wildlife. However, opening the forest canopy often increases exposure of the forest floor to solar radiation and wind, generally increasing temperatures, decreasing relative humidity and accelerating the drying of litter, soil, and woody debris. For forest floor organisms sensitive to fluctuations in microclimate, this change could be profound. Although little is known about the physical requirements of most soil, litter, and coarse wood chewing arthropods, many species are known to be highly specific to particular site conditions, and would be expected to be affected by such microclimatic changes.

Numerous studies investigating the effects of timber harvesting on arthropod communities have been performed since the 1960s. However, nearly all of this work has been concerned with conventional clear-cutting, or modifications of this practice (e.g. cable logging) (Huhta et al 1967, 1969; Huhta 1976; Vlug and Borden 1973; Seastedt and Crossley, Jr. 1981; Bird and Chatarpaul 1986, McIver et al. 1992; Niemela et al. 1993) . In contrast, very few studies have investigated how thinning influences arthropods. In one landscape scale study in Douglas-fir forests in western Oregon, Madson (1998) found no statistical differences in macroarthropods collected in pitfall traps or in microarthropods extracted from soil and litter samples among late-successional, pole-sized (80 yrs old) and thinned (9-23 yrs in age) stands. However, within sites a trend toward treatment differences was often seen. To better understand the influence of thinning on these arthropod communities, it is clear that further research needs to be performed.

Objectives

Objective 1: Measure the short and longer term effects of timber thinning on the abundance, diversity, and function of soil, litter, and CWC arthropods.

Objective 2: Determine the ability of soil, litter and CWC arthropods and their functions to recover after thinning.

Objective 3: Identify species, or groups of species, that can act as indicators of thinning as a disturbance, or of recovery.

Methods and Materials

Location

This retrospective study will take place on BLM land within the Ashland Resource Area of the Medford District. The study area, located between 5,300-5,400 feet elevation, is largely comprised of a white fir-Douglas-fir (ABCO-PSME) plant association. The structure of the forest has been heavily influenced by large scale stand-replacement wildfires occurring in 1910 and 1917; this resulted in relatively dense stands dominated by even-aged white fir over much of the landscape. However, small pockets of forest, dominated by ponderosa pine, sugar pine and red fir are also found in the area, depending upon elevation, aspect and proximity to riparian zones. To minimize sampling heterogeneity, we will restrict sampling to portions of the study areas that have an ABCO-PSME overstory.

Experimental design and plot selection

The primary variable that will be evaluated will be time since thinning. Therefore, sites will be comparable in terms of extent of thinning (approximately 15%), stand structure (i.e., tree species composition, age and density), elevation, slope and aspect.

Depending upon the availability of sites meeting our selection criteria, we will attempt to classify sites into the following age class categories:

1. 1 yr since thinning
2. 2 yrs since thinning
3. 10-15 yrs since thinning

If land treatment data shows thinned stands older than 15 yr., samples in such stands could be substituted for the 1 yr. thinning sample.

Two to four replicate sites for each age class will be chosen. For each age class, an equal number of unthinned sites (acting as controls) will be used.

Sampling

Soil and litter arthropods

Soil and litter arthropods will be collected using two standard methods: microarthropods will be sampled by directly collecting soil and litter followed by extraction in the laboratory and macroarthropods will be collected using pitfall traps. Within each site, sampling points will be placed along transects. Transects will run along terrain contours and will be placed no closer than 30 m from a site boundary. No sample point will be closer than 0.5 m to a live tree with DBH >10 cm. Soil and litter samples will be taken 2 times over the course of the study: late early summer (early-mid June), and fall (October). Samples from successive dates will be taken adjacent to earlier samples. Pitfall traps will be opened for four to six 2-week intervals over the course of the study.

1. *Microarthropods* - Litter collection will be guided using a plastic panel containing a 10 x 10 cm opening in the center. Litter within this opening will be collected by carefully scooping it from the soil using a putty knife and placing it into zip-lock plastic bags and labeled. Soil beneath the litter layer will be collected using a stainless steel corer (8 cm diameter by 10 cm deep), lined with two 5-cm long thin-walled PVC plastic sheaths. The soil will be fractioned into layers 0-5 cm and 5-10 cm below the surface. Each plastic sheath will be sealed tightly in a zip-lock plastic bag, bound with a rubber band and labeled. Both litter and soil samples will be immediately placed into chilled coolers and stored for transport to the laboratory where they will be maintained at 5 deg C until microarthropod extraction takes place. Litter and soil samples for each depth at each site will be composited into groups of 4 for extraction (4 samples consecutive along the transect), but compositing will take place in the lab as cores are placed into extractors rather than in the field at the time of collection. Microarthropods from both litter and soil samples will be extracted using Berlese funnels that create a heat and humidity gradient. Timers attached to powerstrips controlling 40 watt incandescent lights will create a gradual increase in soil and litter temperatures driving the arthropods from the substrate into collection jars. Lights will alternate being on and off for 2 hr intervals for the first 24 hrs, and then left on continuously until litter or soil has desiccated (dry to touch).

2. *Macroarthropods* - Pitfall traps will consist of a 1 qt plastic bucket (14 cm diameter opening) fitted with a metal funnel and covered with a 25 cm x 25 cm plastic rain cover, suspended with nails, 5 cm above the trap. Trap buckets will be buried in the ground with their tops placed flush with the level of the forest floor. An 8 oz canning jar partially filled with ethylene glycol (50% solution) will be placed beneath each funnel to catch and preserve arthropods caught in traps.

Coarse wood chewers

The quantity and quality of downed woody debris within the thinned and unthinned areas will be measured using line transects as described in Bull et al. (1997). Measurements will be taken on all logs down to 6 inches diameter at the large end. Data to be collected will include:

1. diameter at the large and small end of the log
2. length
3. species
4. log decomposition class (BLM 1965)
5. wood condition (sound, moderate decay, advanced decay)

In addition, all logs will be assessed for ant activity. Logs will be chopped into with hatchets and a representative sample of the ants present will be placed into alcohol for later identification in the laboratory. A densiometer will be used to estimate canopy closure in the thinned and control plots.

Taxonomic Identification

All arthropods collected in this study will be identified to the lowest taxonomic level that expertise and resources allow. Particular effort will be made to identify Oribatid mites and Collembola in soil (due to their abundance and well documented function and taxonomy); spiders and carabid beetles in litter; and ants in coarse woody debris to the genus or species level. Voucher material for all taxa will be established and maintained as part of USFS Western Forest Insect Collection housed at Oregon State University, Corvallis, OR.

Nutrient Analysis

If funding allows, we will incorporate a litterbag study to assess functional changes due to arthropods. Litter decomposition and mineralization would be measured using litterbags which are designed to include the effects of either : a) microbes only; or b) microbes and microarthropods. Weight loss, total carbon and total nitrogen levels in the two different types of litterbags would be analyzed to determine changes in decomposition rates due to arthropod function. If funding allows, soil nutrient analysis will include:

1. Soil pH
2. Total carbon
3. Total nitrogen
4. Available nitrogen

Analytical Process

An analysis of variance test will be used to determine whether differences exist in the abundance of arthropods (at the species or guild level) found within the three thinning age classes. If differences are found, then *a priori* orthogonal contrasts will be made to determine which thinning age classes differ significantly from each other. Multivariant clustering analyses will be used to determine if species, or assemblages of species, can be used to define thinning age classes. Data will be transformed as necessary to meet the assumptions of each statistical test.

C. Historic Fire Frequence in Old-growth Forests

Introduction

An understanding of the type, frequency and influence on stand development by historic disturbances can assists ecologist in evaluating potential ecosystem effects and response to various silvicultural treatments. It also provides a basis for developing management options, as well as the ability to recognize when stands are developing on an undesirable trajectory. Therefore the frequency of fire during stand development may influence the size and number of surviving trees. In the absence of fire, species like white fir that are relatively susceptible to fire, become established and steadily displace the more fire adapted species such as Douglas-fir and ponderosa pine. During extended periods without fire the abundance of fire dependent species may decline and eventually disappear altogether, therefore the lack of fire may result in a shift in relative abundance of both overstory and understory trees, shrubs and herbs, influencing the dynamics of forest succession and stand development. Thus, the lack of fire may result in a shift in stand development thereby altering, species composition, density and structure. Presently, the lack of fire may well replace the occurrence of fire as the most significant ecological disturbance factor influencing the development of southwestern Oregon forests. This is a regional study involving sites throughout southwest Oregon; however several of the study locations are near and within the CSNM.

Objectives

Objective 1: Quantify fire occurrence in old-growth forest stands from 1700-1900, through the detections of fire scars in three forested ranges, Cascade, Siskiyou and mid-Coast forests in Southwestern Oregon.

Objective 2: Compare the frequency of fire occurrence among stands and among these forest types.

Objective 3: Determine the length of fire free periods from 1700 -1900 in these three forest types.

Objective 4: Compare the frequency of fire with the recruitment of trees during stand development among sites and forest types.

Objective 5: Determine the developmental tree and stand characteristics including, tree establishment, growth and density of old-growth stands in relation to their fire environment.

Methods and Materials

All stumps within each 8 ha sample units were cleared of debris, cleaned and wire brushed if necessary and then examined for fire scars. When a fire scar was detected the growth rings after the fire were counted. A pin was inserted into the stump to mark each tenth annual ring grown subsequent to the fire to facilitate counting. A hand lens was used where growth rings were small or difficult to delineate. The number of years since harvesting was added to the years of growth subsequent to the fire event and the fire dates calculated. Where stumps recorded multiple fires, each fire was individually dated and a record of the fire interval in that tree was recorded. Where scars occurred on two sides of the same stump (cat-face) which resulted from the same fire, both scars were dated for comparison. The stump height diameter at the time each tree survived its first fire was measured in cm for each tree recording multiple fires.

Analytical Process

The dates (yr) of all fire scars were calculated and compiled for each 8 ha plot in all forest types. Each date became a fire record and when compiled formed a composite sample fire history for that stand. The intervals between each fire record were calculated and averaged to establish a <u>composite fire frequency</u>. Composite fire frequencies were compared among stands and between forest types using ANOVA (analysis of variance).

The dates (yr) of all fire scars on individual trees recording multiple fires were calculated and compiled for each 8ha plot in all forest types. Each date became a fire record and when compiled formed a point sample fire history for that stand. The intervals between fire scars on individual trees recording multiple fires from 1700 - 1900 were compiled to establish a <u>point sample fire frequency</u>. Point sample fire frequency intervals were compared among stands and between forest types using ANOVA.

D. The effect of thinning on the decomposition food web: a key to understanding the function of the soil and litter arthropod community

Introduction

Forest health and productivity are strongly influenced by rates at which dead organic matter is decomposed and nutrients are recycled. The decomposition food web, which is comprised of soil and litter organisms, is largely responsible for controlling the rates at which these processes take place. The diversity of organisms within this food web is large, both in terms of form and function, but is dominated by decomposers (fungi and bacteria), fungivores (microarthropods), and predators (micro- and macroarthropods). The decomposer guild, which is primarily composed of bacteria and fungi, is directly responsible for transforming organic molecules into inorganic forms (nutrients) that are available to plants for growth.

In forest ecosystems, fungi are the dominant microbial decomposer. The primary role of fungivorous microarthropds in this food web is to regulate the abundance and growth rates of fungi through grazing. However, fungivorous microarathropods also contribute significantly to rates of decomposition through comminution of organic particles, effectively increasing the surface area available to microbes, and by facilitating microbial innoculation of new organic substrates by transporting fungal spores during their movement (Anderson et al. 1984). Predatory arthropods dominate the highest trophic level of the food web. They feed on a variety of organisms, with their preference for prey associated with their body size. Studies have shown that fungivorous microarthropods are common components to the diet of both micro-and macroarthropod predators (Yeargan 1975, Nentwig 1987). Because food webs are inherently linked, when one organism within the web changes in abundance, organisms within other trophic levels may be affected as well (Paine 1966, Pimm 1982). For example, a decrease in predator abundance could ultimately decrease decomposition rates because as fungivore abundance increased with reduced predator abundance, the abundance of fungi would be expected to decrease. If management actions such as prescribed fire or thinning alter the composition and structure of this food web, then it would be expected that decomposition rates would also be affected. In fact, recent studies in grasslands have suggested that changes in arthropod predator abundance do cascade down through the decomposition food web, resulting in changes in the rate of plant decomposition (Kajak et al. 1991, Kajak 1997). However, it is not known whether a similar response would be found in forest ecosystems. Clearly, understanding how disturbance effects the functional relationship among members of the decomposition food web is important to understanding the consequences of management activities on ecosystem health and productivity.

Problem

Under the Record of Decision (ROD) for the Northwest Forest Plan, it was determined that additional information needed to be gathered for the four arthropod guilds considered to be at risk for losing their key ecological functions on federal lands (Holthausen et al. 1994). The survey and manage arthropod core team considered retrospective studies to be an important element of a plan to assess short- and long-term effects of ecosystem disturbance (human-induced or natural) on the abundance, diversity and function of these guilds. During FY 1998, the influence of prescribed fire on the abundance and diversity of arthropods within the soil and litter and those inhabiting coarse wood debris was investigated, while in FY 1999 the impact of thinning was studied on these same arthropod groups. Wildfire is the third form of disturbance considered to present a risk to these arthropod groups. Unfortunately, a retrospective study investigating the effect of wildfire on these arthropod communities, similar in approach to the previous two studies, does not appear feasible, and would likely lead to inconclusive results. This conclusion is based on the following reasons: 1) a GIS analysis performed during FY 1998, associating wildfire to elevation, forest type and land ownership, revealed that many wildfires have taken place outside of the forest types considered most important under the NWFP; 2) replicate sites within forest type or within appropriate age-of-burn classes are poorly represented, weakening statistical rigor and inference abilities of the research; 3) burn intensity within and among sites are extremely variable; and it is difficult to accurately quantify the intensity and extent of each burn, and; 4) burned sites are often difficult to access or are on terrain too steep to study effectively. Therefore, the focus of research proposed for FY 2000 is to address questions that will link data gathered during FY 1998 and FY 1999 to the critical question of whether the observed response of arthropods to disturbance leads to loss of ecosystem function. Within the continued context of the 1999 retrospective study, direct examination of the relationship between changes in the decomposition food web after disturbance will help bridge the gap between data gathered in the previous two years to the key ecological functions of the soil and litter arthropod guild.

Background

It is not entirely clear how disturbance to forest ecosystems affects arthropod communities, but a mounting body of evidence suggests that the structure and species composition of soil and litter communities are altered, at least initially after disturbance (e.g., Niemela et al. 1993, Seastedt and Crossley 1981, Holliday 1984, Michaels and McQuillan 1995). Results from the first two years of Northwest Forest Plan retrospective studies support this conclusion. In FY 1998, prescribed fire in the Ashland watershed (Rogue River NF) was found to significantly decrease the overall abundance of microarthropods (fungivores and predators) found in the litter. Prescribed fire also affected predatory spider and carabid beetle abundances, but the direction of the response varied among taxa; abundances of some species decreased after fire while some increased. For example, the abundance of relatively sedentary spiders (e.g. web-builders and lay-and-wait predators) was lower in burned sites, possibly due to a simplification of habitat after fire (reduction in the availability of web attachment points or foraging sites). In contrast, active hunting spiders were more abundant in burned sites than unburned sites. For these species, a structurally more simple habitat may have enabled them to hunt more effectively. Although as yet inconclusive, preliminary results from the FY 1999 study in the Jenny Creek LSR (now the CSNM)(Medford District, BLM) comparing arthropod abundance between unthinned, late-successional old-growth (LSOG) stands to sites thinned 10-20 years prior also suggest that changes in habitat structure have influenced arthropod community structure. Although it appears that disturbance does affect individual arthropod taxa (species, families, or functional groups), it is not clear how changes in the abundance of one taxa effects other members of the food web, or how such changes effect ecosystem processes. That is, does a change in spider abundance influence rates of decomposition? Understanding this relationship is fundamental to understanding the influence of management activities to concerns outlined in the ROD.

Within the southern range of the Northern Spotted Owl (NSO), spiders are the dominant invertebrate predator within the decomposition food web. Many species of spiders are considered to be opportunistic predators, capturing a wide range of prey, but most are thought to feed extensively on *Collembola* (Hallander 1970, Yeargan 1975, Nentwig 1987). *Collembola* are a common and ubiquitous fungivore in the soil and litter of forest communities (Peterson, H.1971). Due to their abundance, these tiny insects are considered to be important regulators of fungal colonization and growth (Swift et al. 1979). In studies where *Collembola* abundance is high, fungal growth has been shown to be low, and where Collembola abundance was low, fungal growth has been high (Coleman et al. 1983). Interestingly, at intermediate levels of grazing intensity, fungal growth has been shown to be enhanced due to a stimulating effect of grazing on senescent fungal hyphae (Hanlon 1981, Warnock et al. 1982). Although understanding the relationship among spiders, collembola, fungi and decomposition rates is clearly important, no study in forest ecosystems has shown that changes in the predator community effects either fungi abundance or rates of decomposition. Before changes in arthropod abundance associated with disturbance can be linked to this important ecosystem process, a better understanding of the dynamics within this food web need to be determined.

Objectives

Objective 1: The primary objective of the proposed research is to understand how thinning affects the decomposition food web. More specifically, the work is designed to determine how changes in predatory arthropod abundance influence rates of decomposition and nutrient cycling. This objective will be obtained by manipulating spider abundance within forest litter in thinned and unthinned LSOG stands, followed by measuring the response of *Collembola* abundance, fungal growth, and the rates at which conifer foliage decomposes and nutrients within the foliage tissues are mineralized. These results will allow, for the first time, a direct assessment of how forest thinning influences one of the key ecological functions of the soil and litter arthropod community.

Methods and Materials

<u>Location</u>
The proposed study will take place within the former Jenny Creek LSR, located in the CSNM. This area was also used during 1999 to determine the effect of thinning on the abundance and community structure of soil and litter inhabiting and coarse wood chewing arthropods. For the 1999 study, arthropod abundance was compared between eight LSOG (Type 1 habitat; habitat suitable for supporting nesting NSO) and eight adjacent sites thinned 10-20 years earlier (Type 5 habitat; considered dispersal habitat for NSO); the thinned sites were similar in overall structure to LSOG sites prior to thinning. This study area represents an ideal location to perform the proposed work because the relationship between stand condition and arthropod abundance will already be known. Furthermore, work at this location will allow comparison of this ecosystem process between forest conditions considered ideal (NSO nesting habitat) to those representing stand conditions currently unsuitable for nesting NSO but which is being intensively managed to be converted to the future desired condition of NSO nesting habitat.

<u>Study Design</u>
The effect of spider abundance on the decomposition food web will be performed in thinned and LSOG sites. A subset of four of the eight paired sites used in 1999 will be chosen for use in the proposed research. Each pair of sites will be similar in elevation, aspect, slope and in the structure of the forest prior to thinning. Site choice will be based upon differences in spider abundance between thinned and LSOG sites found in 1999; choosing sites with known differences will ensure the greatest applicability to management considerations.

Spider density will be influenced in two ways: natural and manipulated. Natural differences in spider abundance among sites will have been identified during 1999 and will be associated with thinning. Manipulated differences will result from a process of removing spiders from manipulated plots. These differences in spider density will provide the basis for which the response of the rest of spiders on the rest of the decomposition food web will be made.

Within each site, four types of plots will be established: 1) sift/removal plot - plots in which barriers will prevent movement of spiders and *Collembola* into and out of the plot and in which spiders have been removed by sifting the litter; 2) sift/no-removal plot - plots in which barriers exist and sifting took place but spiders were left in the plot; 3) no-sift/no-removal plots – plots with barriers but in which litter was not sifted and spiders not removed, and; 4) non-exclusion/undisturbed plots – plots without exclusion barriers and in which no sifting of the litter took place. This combination of plots will allow the effect of spiders on the rest of the food web to be separated from effects of the exclusion barrier and disturbance of the litter during sifting.

Within each site, four 2 m x 2 m plot locations will be identified. Plots will be 5-10 m apart and will be similar in terms of surrounding forest and litter structure. Each of the four plot types will be assigned randomly within each site. The perimeter of exclusion plots will consist of sheet metal driven into the ground to prevent movement of spiders and *Collembola*. Within the three plots receiving sorting treatment, spiders will be collected by hand sorting all litter within a plot. Spiders from the exclusion/removal plot will be preserved for identification while spiders collected from the two non-removal plots will be counted and returned to their respective plots. All litter will be returned to their respective plot after spiders are sorted. Spider density will be determined again at the end of the study by resorting litter and removing all spiders from each plot.

Collembola abundance will be determined by extraction from litter that has been collected within each plot. Within each plot, two 10 cm x 10 cm samples of litter will be collected. Sample locations will be determined by randomly choosing points within each plot. Collections will be taken on four occasions: just prior to sorting the litter (pre-treatment), and at 4, 8 and 16 weeks after litter had been sorted. Extraction will take place in the laboratory using Berlese-type funnels. A light bulb at the top of each Berlese funnel generates a heat and humidity gradient that forces organisms from the litter into collecting vials below. All *Collembola* collected will be identified to the morpho-species level and counted.

Litterbags containing conifer needles will be used to determine fungal growth and rates of decomposition and mineralization. Eight litterbags, each 10 cm x 10 cm, and containing 4 grams of conifer needles, will be placed between the soil and the litter that has been sorted for spiders within each plot. Four litterbags will be used to analyze fungi and 4 litterbags will be used to measure decomposition and mineralization rates. Litterbags will be collected at 5 and 12 months after placement in the field. Each litterbag sample will be replicated once within each plot; these paired bags will be combined for each analysis.

Analytical Process

An analysis of variance test will be used to determine whether differences exist in the abundance of *Collembola* and fungi, and rates of decomposition and mineralization between thinned and unthinned sites and between treatments of different spider density. Data will be transformed as necessary to meet the assumption of the test.

E. Habitat Type "1" & "2" vs. "5" Effectiveness Monitoring

Introduction

Plots were established and forest stand data collected in 1998-99 in these habitat types to assist with writing the assessment for what was originally the Jenny Creek LSR and to characterize forest stand components for the Microarthropod studies (see preceeding --study proposals). The existing information will be the baseline data for monitoring treatments and trends in CSNM. Various pre- and post-treatment stand density, growth and fuels data, etc., will help determine effectiveness in meeting goals and objectives during management activities. Current Vegetative Survey plots in the Monument will also be used to those ends.

Methods and Materials

Establish plots in the habitat types in order to monitor post treatment effects. Baseline data has been collected previously. Use BLM stand exam to collect data and maintain database. This is the Atterbury stand exam format.

Objectives

Objective 1: Monitor stand structural characteristics, stocking levels, canopy, fuels, CWD and snags over time.

Objective 2: Determine effectiveness in meeting protection and maintenance goals after treatments.

Objective 3: Use information to further assist decision making and planning future activities.

Analytical Process

Compare pre- and post-treatment stand tables and other information using existing Atterbury, Farsite and Organon data systems. Use analysis of variance when applicable.

F. Root Rot Incidence and Insect Activity in CSNM

Introduction

Root rots and insects, especially bark beetles are common agents of disturbance in CSNM. See Chapter 2 disturbance agents. This will be a project aimed at developing baseline data in determining the location of and the extent to which root rots and beetles are affecting forest stands in the Monument.

Objectives

Objective 1: The insect and root rot baseline data would be linked to global fiducial data and other aerial flights to assist in tracking trends and aiding in decision making in the Monument.

Materials and Methods

Annual flights will continue map out insect occurrence in CSNM. Locations will be field checked. Root rot occurrence and severity has been and will continue to be added to the database as inventory work is accomplished.

Analytical Process

Develop maps, determine severity, link to effectiveness monitoring involving established plots and input into the decision making process for prioritizing treatments in forest stands. Specifically, protection of LSOG habitat types is desired.

G. Aerial and Satellite Imagery

Introduction

Satellite and aerial imagery can be obtained on a regular basis to be used during analysis of plant community changes and trends over time. Currently aerial photos are flown every 5 years. Satellite imagery can be flown annually and used in a variety of way to observe changes in vegetation and condition of plant communities over time. With designation of the CSNM baseline data becomes important for tracking long term changes within that designation. The Global Fiducial (NIIR) program seeks nominations for sites in order to track ecologically significant events over time. The Monument fits that need and has been designated a Global Fiducial site which is to represent major elements or critical processes that can be monitored remotely as indicators of long-term environmental variability or change.

Objectives

Objective 1: Develop baseline data for tracking plant communities over time on the Monument that will assist in meeting stated goals and objectives while managing the CSNM.

Methods and Materials

Obtain satellite imagery annually for this Global Fiducial Site. Analyze the data, compare with existing data and photos. The project, dependent on funding, is expected to last 20 years.

Analytical Process

Review and compare annual data to track plant community trends and changes. Track forest disturbance agents. Use data and observations to assist in making management decisions.

III. INDIVIDUAL MONITORING PROJECTS CONTRIBUTING TO UNDERSTANDING THE CSNM LANDSCAPE: AQUATIC (PHYSICAL AND BIOLOGICAL)

A. Landscape Hydrologic/Riparian Surveys

Introduction

Management, protection, and monitoring of aquatic/riparian resources can only be accomplished if the location of those resources is known. Detection of change in many of those resources, especially due the site-specific nature of many aquatic/riparian features, can only be accomplished through the collection of existing condition data, and then monitoring change over time.

Objectives

Objective 1: Provide general hydrologic/riparian spatial information, morphologic description, flow regime, and ecological condition, as context for other studies, input to transportation planning, and protection of aquatic/riparian objects identified. Will serve as baseline for long-term monitoring.

Objective 2: Provide data to assist in assessment of all ACS objectives.

Methods and Materials

Location, flow duration, channel classification/morphology data for streams, wetlands, and other hydrologic features; instream large wood; impact descriptions and restoration opportunities, especially related to livestock, transportation, and vegetation throughout the Monument. Assessment of functioning condition. Surveys conducted using the Ashland Resource Area Stream Survey Protocol. On BLM lands within the Monument, initial data collection in the Keene Creek and a portion of the Middle Jenny Creek subwatersheds was completed in 1999; portions in the Upper Emigrant Creek Subwatershed were completed in 2000. Portions in Fall, Camp, Scotch, Upper Cottonwood, Lower Cottonwood, Upper Jenny, Lower Jenny, and the remainder of Middle Jenny Creek subwatersheds are proposed for initial data collection. Surveys would be repeated at 10-25 year intervals.

B. Baseline Stream Temperature Monitoring

Introduction

Changes in vegetative cover, channel dimensions, and bank/floodplain water storage are known to influence stream temperatures. Changes in riparian management, upland management to increasingly protect riparian resources, and cooperative restoration activities targeted at meeting MACS objectives and state water quality standards should lead to detectable changes in summer stream temperature at locations throughout and adjacent to the CSNM as stream and riparian function improves.

Objectives

Objective 1: Monitor for long term changes in stream temperatures, as context for judging success of riparian/aquatic management, restoration, and protection.

Objective 2: Provide data to assist in assessment of MACS objectives 2, 4, and 9, for assessment of compliance with state water quality standards, and to assist in development of State of Oregon/EPA-required Water Quality Management Plans for this area.

Methods and Materials

Seasonal 30-minute interval stream temperature data collected using USGS and ODEQ-established methodologies. Data collection at 13 existing and 10 proposed sites in addition to the 9 project-specific sites listed above.

C. Gaging station and Staff Gages: Flow and Water Quality Assessment

Introduction

Calculation and assessment of peak, high, and low flows is extremely difficult without actual field measurement and reference over time. Flow data is also required for the meaningful analysis of water quality parameters. Because of rapid fluctuation in stream levels, continuous records are required at a key location to interpret data collected in non-continuous sampling from other locations.

Objectives

Objective 1: Provide flow and water quality information at key locations as context for other types of aquatic condition assessment.

Objective 2: Provide data to assist in the assessment of ACS objectives 1, 2, 4, 5, 6, 7, and 8, and to monitor compliance with state water quality standards.

Methods and Materials

Monthly grab sample collection of turbidity, air temperature, H2O temperature, pH, flow, fecal coliform, dissolved oxygen at 11 existing and 5 proposed locations. Continuous record (15-minute interval) of stream stage, water and air temperature at one location. Standard methods using USGS, Oregon DEQ and EPA approved protocols.

D. Stream Channel Cross Sections Throughout the CSNM

Introduction

Calculation and assessment of peak, high, and low flows is extremely difficult without actual field measurement and reference over time. Flow data is also required for the meaningful analysis of water quality parameters. Cross-sections provide a reference point from which to document changes in channel morphology, conduct flow measurements, and estimate flood flows. Documentation of changes in channel morphology provides an indication of stability and functioning of the upstream surface hydrologic system.

Objectives

Objective 1: Provide site-specific trend of width/depth ratios, entrenchment, and other indicators of channel form, and provide reference points for assessment of large flood flows.

Objective 2: Provide data to assist in the assessment of MACS objectives 1, 2, 3, 5, 6, 7, and 8.

Methods and Materials

Cross-section measurement to calculate entrenchment, width/depth ratio; bankfull channel length to calculate slope and sinuosity. Measurement methodologies including standard cadastral survey techniques and those outlined in Rosgen (1996). 12 existing and 5 proposed Monumented sites measured at ~5-year intervals and after major flood events.

E. Lower Jenny Creek Rain Gage

Introduction

Assessment of hydrologic response and water quality parameters, as well as many other aspects of ecosystem function, can only be accurately analyzed in the context of recent precipitation. Although year-to-year trends in precipitation tend to be uniform over an area of this size, there is substantial variability in precipitation between locations based on terrain, elevation, etc. Precipitation data from a number of sites at varying elevations and locations in and around the Monument is needed for interpretation of related data including hydrologic, vegetation conditions, etc.

Objectives

Objective 1: Provide rainfall data as context for flow assessment and other types of monitoring.

Objective 2: Provide data to assist in assessment of ACS objectives 4, 5, 6, and 7.

Methods and Materials

Fifteen minute interval rainfall data collected at 1 site in Lower Jenny Creek using tipping bucket rain gauge. Daily precipitation collected at Howard Prairie Dam (NOAA), Parker Mountain (RAWS), and Buckhorn Springs (RAWS). Daily snowfall and snow-on-the-ground collected at Howard Prairie Dam (NOAA).

F. Jenny Creek Riparian Restoration Aerial Photo Monitoring

Introduction

Past practices in vegetation management and utilization, stream channelization, and flood control have dramatically changed riparian condition and morphologic character of portions of Jenny Creek. Changes in management, riparian vegetation restoration activities, and removal of flood control structures should allow the stream channel of Jenny Creek to recover from a straightened and constrained state to an increasingly sinuous, non entrenched condition as described by Rosgen (1996) and others. The extent and size of woody riparian vegetation should likewise increase. Aerial photo monitoring of this change over time is a relatively inexpensive technique that can dramatically demonstrate the magnitude of change occurring.

Objectives

Objective 1: Aerial Photo monitoring of change in riparian and morphologic condition in a portion of Jenny Creek undergoing restoration activities.

Objective 2: Provide data to assist in assessment of ACS objectives 1, 2, 3, 5, 7, 8, and 9.

Methods and Materials

Digitally-orthocorrected GIS layer photo mosaics of Jenny Creek and tributaries in 40s 4e sections 22,27, and 28 using photos from 1939, 1953, 1962, 1966, 1975, 1980, 1985, 1991, 1996, ~2001, and ~5 year intervals after that.

G. Jenny Creek Riparian Restoration Stream Temperature Monitoring

Introduction

Changes in riparian vegetative cover, channel dimensions, and bank/floodplain water storage are known to influence stream temperature. Restoration activities and management strategies targeted at meeting ACS objectives should lead to detectable changes in summer stream temperature over the next few decades on this portion of Jenny Creek as the stream channel and adjacent riparian/floodplain areas regain functionality.

Objectives

Objective 1: Document long-term change in water temperatures resulting from passive and active restoration activities attempting to reverse past management impacts.

Objective 2: Provide data to assist in assessment of ACS objectives 2, 4, and 9.

Methods and Materials

Seasonal 30-minute interval stream temperature data collected according to USGS and Oregon DEQ-established methodologies. Data collection at 9 Monumented sites along 2.5 miles of Jenny Creek, repeated annually. Two sites monitored since 1991, seven additional sites monitored since 1997.

H. Jenny Creek Riparian Restoration Channel Morphology Monitoring

Introduction

Recovery of riparian vegetation and removal of flood control structures should allow the stream channel to recover from a straightened and constrained state to an increasingly sinuous, non entrenched condition as described by Rosgen (1996), Leopold (1992) and others.

Objectives

Objective 1: Document long-term change in stream dimension, pattern, and profile resulting from passive and active restoration activities attempting to reverse past management impacts.

Objective 2: Provide context for other aquatic monitoring activities.

Objective 3: Provide data to assist in assessment of ACS objectives 1, 2, 3, 5, 7, and 8.

Methods and Materials

Cross-section measurement to calculate entrenchment, width/depth ratio; bankfull channel length to calculate slope and sinuosity. Measurements methodologies including standard cadastral survey techniques and those outlined in Rosgen (1996). Data collection at 8 cross-sections along 2.5 miles of Jenny Creek, measured at ~ 5-year intervals or after major flood events.

I. Aquatic Macroinvertebrate Monitoring

Introduction

When monitored over the long term, composition of macroinvertebrate communities can serve as a sensitive indicator of condition and change in aquatic habitat/water quality conditions.

Objectives

Objective 1: Long term monitoring of aquatic macroinvertebrate community change as indicator of habitat/water quality.

Objective 2: Provide data to assist in assessment of ACS objectives 4, 6, and 9, and compliance with state water quality standards.

Methods and Materials

Monitor taxa abundance, taxa richness, other metrics measured at 12 existing and 10 proposed sites using methods which meet or exceed state or EPA protocols for the sampling of benthic macroinvertebrates. Revisit sites at 5-6 year intervals.

J. Fish Distribution Surveys

Introduction

Throughout southern Oregon, BLM, the USFS, and ODFW constantly update fish distribution maps. All agencies share information with each other. Although these agencies have a good idea of which fish use larger streams and rivers, fish use in small streams varies throughout the year and from year to year. Some fish use intermittent streams to spawn in the spring; summer surveys would not find any fish in those streams. Similarly, in years with high spring flows, more streams are accessible to spawning fish. The fish distribution information in the CSNM is twenty years old.

Objectives

Objective 1: To determine the upstream limit of any fish species throughout the CSNM.

Methods and Materials

BLM follows a protocol designed by ODFW. Two people use an electroshocker to slightly charge the water and stun fish. The stunned fish can be scooped up in nets and identified quickly before being returned to the water. If four pools in a row do not contain fish, the last pool with fish is considered the upstream limit. Repetitions depend on the presence of fish barriers like waterfalls, time since last survey, and water year.

K. Fish Habitat Use Monitoring: Watershed Scale, Responses to Watershed Change

Introduction

Habitat relationships of western suckers are poorly understood. Most studies on sucker habitat relationships have been conducted at the microhabitat scale (Moyle and Nichols 1973; Alley 1977; Baltz and Moyle 1984; Moyle and Baltz 1985; Decker 1989): how suckers use habitat within a pool, for example. This is important information, but without understanding habitat use at more than one spatial scale, serious misinterpretations could lead to inaccurate conclusions about JCS habitat needs (Dunham and Vineyard 1997). In addition, little is known about the habitat use of suckers at different ages (i.e. young-of-the-year, juvenile, adult). Examining the habitat requirements of different age classes is important in identifying potentially limiting or sensitive physical habitat requirements (Imhof et al. 1996). Finally, the paucity of studies describing habitat relationships of western suckers at different spatial scales is exacerbated by the almost complete lack of studies examining habitat use for longer than one year. Only Rossa (1999) studied sucker habitat use for two concurrent years. This monitoring study continues the work begun in Rossa (1999). It is an effort to further understand sucker habitat use in Jenny Creek in order to ensure that the isolated population remains healthy and viable.

Rossa (1999) did find that sucker habitat use differed in the two years of that study. To understand why, other projects will have to be conducted in conjunction with this study. Some projects are being discussed, or are in the preliminary stages. None are developed enough to include in this monitoring section. Topics include: food availability and possible competition from other grazers, the influence of reduced stream flows due to the Talent Irrigation District system and Howard Prairie Reservoir, and impacts of small irrigation dams.

Objectives

Objective 1: To quantify JCS habitat use within study reaches and throughout the watershed for all JCS age classes.

Objective 2: To further explore the relationship between JCS habitat use and various environmental variables (e.g. cover, substrate, etc.).

Objective 3: To further understand how the patterns of habitat use vary between years, in order to provide a basis for the other projects aimed at understanding "why."

Methods and Materials

Study locations are distributed throughout the entire watershed, to sample a wide variety of reach types. Five monitoring sites are located within the CSNM. A habitat-type based stream survey is used to quantify habitat. Randomly selected habitat units are snorkeled to collect fish numbers and estimated fish lengths.

This project's stream survey methods are a somewhat truncated version of that described in Rossa (1999). Statistical analysis requires that some environmental variables, specifically the numerous cover categories, be lumped into two basic cover categories. Details can be obtained by contacting the Project Lead at Medford BLM: (541) 618-2351.

Analytical Process

Related to Objective 1: Chi-square goodness-of-fit tests. See Rossa (1999) for details.
Related to Objective 2: Multiple stepwise regression and/or discriminant functions analysis. See Rossa (1999) for details.

L. Fish Population Monitoring

Introduction

Only two research projects have been conducted on Jenny Creek suckers (JCS) (Hohler 1981, Rossa 1999). Both projects found that the JCS population separated into somewhat distinct size classes; Rossa (1999) found that there appears to be a pronounced year-to-year variation in young-of-the-year survival. Unpublished data collected with that used in Rossa (1999) indicate that both JCS and redband trout densities are low relative to other streams in the west (Platts and McHenry 1988). Related suckers in other parts of the west are threatened, endangered, or at risk. It is important to monitor the population levels of all fishes in Jenny Creek, to make sure that their populations remain stable and healthy in this isolated watershed.

Objectives

Objective 1: To estimate population levels within Jenny Creek for the three native fish species: Jenny Creek suckers, redband trout, and speckled dace.

Objective 2: To estimate whether the populations are stable, increasing, or declining.

Methods and Materials

The information gathered for this survey is also used for fish habitat use monitoring. Stream habitat areas will be measured as described below. Randomly selected habitat units will be snorkeled to collect fish numbers and estimated fish lengths. Sampling will be conducted at sampling locations throughout the watershed, to ensure that all age classes are represented (Rossa 1999). Sampling will be repeated in two concurrent years every five years, because population levels may fluctuate with water year and habitat condition.

Analytical Process

Simple density models and length-frequency histograms (a standard fisheries method for estimating age classes) will be used.

M. Fish Habitat Use Monitoring: Reach Scale Responses to Riparian and Channel Restoration on the former Box-O Ranch

Introduction

Stream channelization, riparian vegetation removal, pasture management, and construction of flood control structures have dramatically altered Jenny Creek's channel through the former Box-O ranch. Changes in management, riparian vegetation restoration, and removal of flood control structures should allow the stream channel to recover to an increasingly sinuous, non-entrenched condition as described by Rosgen (1996) and others. Aerial photo monitoring and monumented cross sections completed by the Hydrology shop track the physical changes; this additional survey work monitors the response of the aquatic community.

Objectives

Objective 1: To track changes in the fish community to physical changes in the channel through the former Box-O Ranch, as restoration projects restore floodplain connectivity.

Methods and Materials

See "Fish Habitat Monitoring" above.

Analytical Process

See "Fish Habitat Monitoring" above.

N. Jenny Creek, Keene Creek Channel Restoration Monitoring

Introduction

In 1991 and 1992, three large, complicated channel restoration projects were constructed as part of the Jenny Creek Work Day (now part of Public Lands Day). Two projects cabled logs to bankside trees to protect eroding banks, allow the return of riparian vegetation, and reduce fine sediment input into stream. The third project embedded logs across an eroding meadow channel to trap sediment and stop downcutting. Normally, when these kinds of projects are undertaken, effectiveness monitoring is not included, so it becomes difficult to celebrate successes or to learn from mistakes. Fortunately, BLM made sure to take "pre-project" data on these three projects in order to monitor their effectiveness.

Objectives

Objective 1: To see if original project objectives were met.

Objective 2: To determine if any unforseen impacts (girdling of streamside trees with cable, worse erosion) happened.

Objective 3: To determine how (or if) fish habitat responds to channel changes as a consequence of these projects.

Methods and Materials

Methods used at the three sites vary, but include some or all of the following: marked photo points, contour channel mapping, channel cross sections, Wolman pebble counts, habitat type survey (Rossa 1999). Two of the three sites are also snorkeled to observe fish use of the project area; however, because fish use of a site varies so greatly (Rossa 1999), this information is of qualitative use only.

O. Identifying Jenny Creek Sucker Spawning Areas

Introduction

Two scientific studies have been completed on the Jenny Creek suckers (JCS) (*Catostomus rimiculus*): Hohler (1981) and Rossa (1999). While both researchers observed fish in spawning colors, neither pinpointed the exact spawning areas of JCS. All closely-related sucker species migrate upstream to spawn in the spring (Moyle 1976, Bond and Coombs 1985, Villa 1985). Until now, it has been assumed that the suckers spawn in Corrall, Beaver and Johnson Creeks (Hohler 1981). This information needs to be collected so that the spawning areas can be protected or restored. In the future, sucker spawning should be tracked in different water years to determine if sucker spawning areas are influenced by water flows (i.e. low water years or high water years) (Barton 1980, White et al. 1990).

Objectives

Objective 1: Identify important spawning areas so JCS can be protected and/or restored.

Methods and Materials

Other related suckers drift downstream at night after hatching (Villa 1985, White et al. 1990). Therefore, netting stream drift at night with a specially-designed net should collect drifting fish. Once a week, nets will be set up in several streams at dusk. Nets will be checked after 2 hours, and again at dawn. A few alevins will be collected and preserved for positive identification. Sampling season is short: April 15 - June 15.

P. CSNM Visitor Use Monitoring

Purpose and Scope:

The purpose of this plan is to outline a procedure to gather visitor use data for lands within the CSNM.

The scope of this plan is focused on public lands within the Monument, but it is not limited to public lands. Private lands and businesses which are within the boundary of the Monument also receive visitors who might be there because of the Monument, and if not, they will still view the Monument while passing through, so in this sense, all lands within the Monument will be included if at all possible.

Goals and Objectives

Goals

The goal of this plan is to gather visitor use data or in the absence of accurate data, make estimates, of visitation to the Monument. Accurate data can be obtained from the Hyatt

Lake Recreation Complex, the only developed BLM recreation facility within the Monument. Data will also be gathered from the Pacific Crest Trail and the Pilot Rock areas using traffic or trail counters, but these types of counters require some corrections for number of occupants or animals which might be counted. In areas where no public vehicle access is allowed, gathering accurate use data will be difficult at best. In these areas, estimates will be made based on best available data.

Businesses within the Monument boundary, should have some estimates of visitors associated with the Monument. These businesses will be asked to provide estimates of such use. The Oregon Department of Forestry lookout tower on Soda Mountain receives many visitors and these visitor totals will also be useful.

A third type of visitation occurs on the State and Federal highways which traverse the Monument. Traffic data from Oregon Department of Transportation (ODOT), when available, can show the number of visitors passing through the Monument, regardless of their purpose for travel.

The goal will be achieved by accomplishing the following objectives:

Collect accurate visitor use data at the Hyatt Lake Recreation Complex. This data is already required for the Recreation Management Information System yearly submission so the mechanism is already in place to gather this data.

Install trail counters along the Pacific Crest Trail. A relatively small number of people hike the entire PCT during a season. Most use of the PCT within the Monument comes in the form of day use on stretches of the trail. Popular segments of the PCNST within the Monument include Soda Mountain to the Greensprings summit and Pilot Rock to Soda Mountain. The segment near the Hyatt Lake Recreation Complex also receives a lot of use with hikers going from Hyatt Lake to Howard Prairie Reservoir, or from Hyatt Lake to Little Hyatt Reservoir. Trail counters installed along these segments should provide acceptable use figures. The exact locations will to be determined from field studies, but the objective is to count people who hike these four segments.

A number of people go to the Pilot Rock area to hike up to or climb Pilot Rock. A trail counter placed on the path to the base of the rock would provide visitor use data.

The Soda Mountain WSA needs to be monitored at least once per month during the time it is accessible to the public. Since all the boundary roads except portions of the Pilot Rock jeep road have been closed, the WSA will be monitored from the air. This monthly overflight would be an opportunity to gather visitor use data for the Monument area south of Keene Ridge.

The area within the Monument north of Keene Ridge receives a large portion of its use during big game hunting season. To gather use data , hunter patrols should be conducted during the first two weekends at the beginning of big game rifle season. Major access roads to the Monument should be staffed from the afternoon of the Friday before rifle season begins and both weekend days thereafter; then again on the following weekend, at the same times.

Businesses which are located within the boundary of the Monument or adjacent to the boundary should be contacted for visitor use data or at the least visitor trend data, including the Box-R Ranch, the Greensprings Inn, Hyatt Lake Resort, Camper's Cove, Buckhorn Springs, and Callahan's Restaurant. These establishments should be contacted at the beginning of each year and asked to participate in this visitor use data gathering effort. They should be told of the purpose of the data gathering effort, how the data will be used, how they can help gather and supply data, and when to report the data to BLM. At the end of the year these establishments should be contacted to acknowledge receipt of the data or to remind them to submit data, and they should be thanked for their cooperation.

The Oregon Department of Forestry lookout tower on Soda Mountain receives many sightseers yearly, and the lookout maintains a log for visitor registration. The lookout should be contacted yearly and asked to supply this visitor data to BLM.

Another source of sightseer data is highway traffic data gathered by ODOT for both Interstate 5 and Highway 66. Both of these highways traverse the Monument so every person who travels over these routes visits and views the Monument. Data for the segments within the Monument will be requested yearly and used in compiling a visitor use report.

The data from all the objectives will then be totaled for a yearly report.

Implementation:

The purchasing and installation of trail counters will be accomplished by the Monument maintenance staff. Data from the counters needs to be gathered weekly to ensure accurate operation, and this should be done by seasonal staff assigned to the Monument. Campground data for the Hyatt Lake Recreation Complex will be gathered by the campground staff throughout the season.

Contacting the businesses and the Lookout can take place initially by the Monument Manager in an introductory letter or meeting if desired. Monument staff can contact the businesses at the end of the year to collect the data.

Hunter patrol should be conducted on major access roads or entry points and should be done by Monument personnel who are familiar with the area and issues concerning the Monument.

Overflights of the WSA will need to be started once the area is accessible to the public, probably April, and continue through November. The WSA will not need to have an overflight every month because the northwest portion of the WSA can be monitored from the Pilot Rock jeep road, but this only allows viewing about a third of the WSA so the remainder must be monitored from the air.

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Appendix MM-Summary of Meetings held regarding the CSNM

March 28, 2001

Pre-Monument Designation Forums:

1990 to 1995 - Worked with the local community prior and subsequent to the area's designation as the Cascade-Siskiyou Ecological Emphasis Area (CSEEA), as part of the 1995 Medford District Resource Management Plan.

Federal Register Notices required as a part of Resource Management Plan (RMP)

1. Notice Announcing Intent to being the Draft EIS
2. Notice Announcing Availability of the Draft EIS
3. Notice Announcing Availability of the Final EIS
4. Notice Announcing Availability of the Record of Decision

Spring 1999 - Field Tour with Associate Secretary in charge of Natural Resources.

Summer 1999 - Flyers mailed to interested public and included in five local newspapers announcing the management plan process for the CSEEA.

August 1999 - Federal Register Notice announcing scoping.

September 1999 - Four public field trips to the CSEEA planning area to scope for issues and concerns *(9-28-1999, 10-2-1999, 10-6-1999. 10-18-1999).*

October 1999 - Public meeting held at Southern Oregon University.

Fall 1999 - Interior Secretary tours area with local and federal government officials, representatives from interested local groups and the media.

Fall 1999 - Met with Siskiyou County, California officials and Redding BLM.

Fall 1999 - Open field trip with interested citizens from Siskiyou County citizens.

Winter 2000 - Briefed Jackson County Commissioners.

Winter 2000 - Congressman Walden arranges panel discussion with Secretary of Interior, local government, and interest group representatives.

CSEEA Draft Environmental Impact Statement (DEIS) Plan published March 2000

April 2000 - Met and discussed draft plan with the Jackson County Commissioners in a public forum.

April 2000 - Met and discussed draft plan with the Siskiyou County Commissioners.

April 2000 - Tele-conference with Secretary of Interior, local government, interested local groups and media.

April 2000 - Field trip and briefing for the Provincial Advisory Council to discuss draft plan.

Spring 2000 - Field Tour with Aides of Congressman Walden, Senator Wyden, Senator Smith, Solicitor Department of Interior, and Assistant Secretary of the Interior.

Spring 2000 - Public forum at Southern Oregon University to present EIS/draft plan.

Cascade Siskiyou National Monument (CSNM) Designation - June 9, 2000

July 2000 - Advertisements in five local newspapers explaining Monument designation and inviting public comment for upcoming Monument planning effort.

July 2000 - Federal Register notice of scoping for CSNM EIS/plan.

July 2000 - Letters to CSEEA public mailing list soliciting input on Monument Plan.

July 2000 - Letters to grazing lessees explaining Monument implications and enclosures.

Area planners from the Medford BLM met with Don Rowlett, Box R Ranch.

Met with grazing lessees three times concerning grazing impacts study plan and administrative assess. County Commissioner Sue Kupillas attended several meetings.

Fall 2000 - Met with the Talent Irrigation District and representatives from the Bureau of Reclamation.

Fall 2000 - Met with Oregon Department of Fish and Wildlife to discuss wildlife/ Monument issues.

Fall 2000 - Met with Oregon Department of Forestry to discuss fire suppression access.

March 2001 - Met with a local group of citizens interested in CSNM issues.

Spring 2001 - Public Field Tour including Media of Californina/Oregon Trail.

Summer 2001 - Field Trip with Local News Media.

Fall 2001- Briefing and Field Tour with BLM Director and Media.

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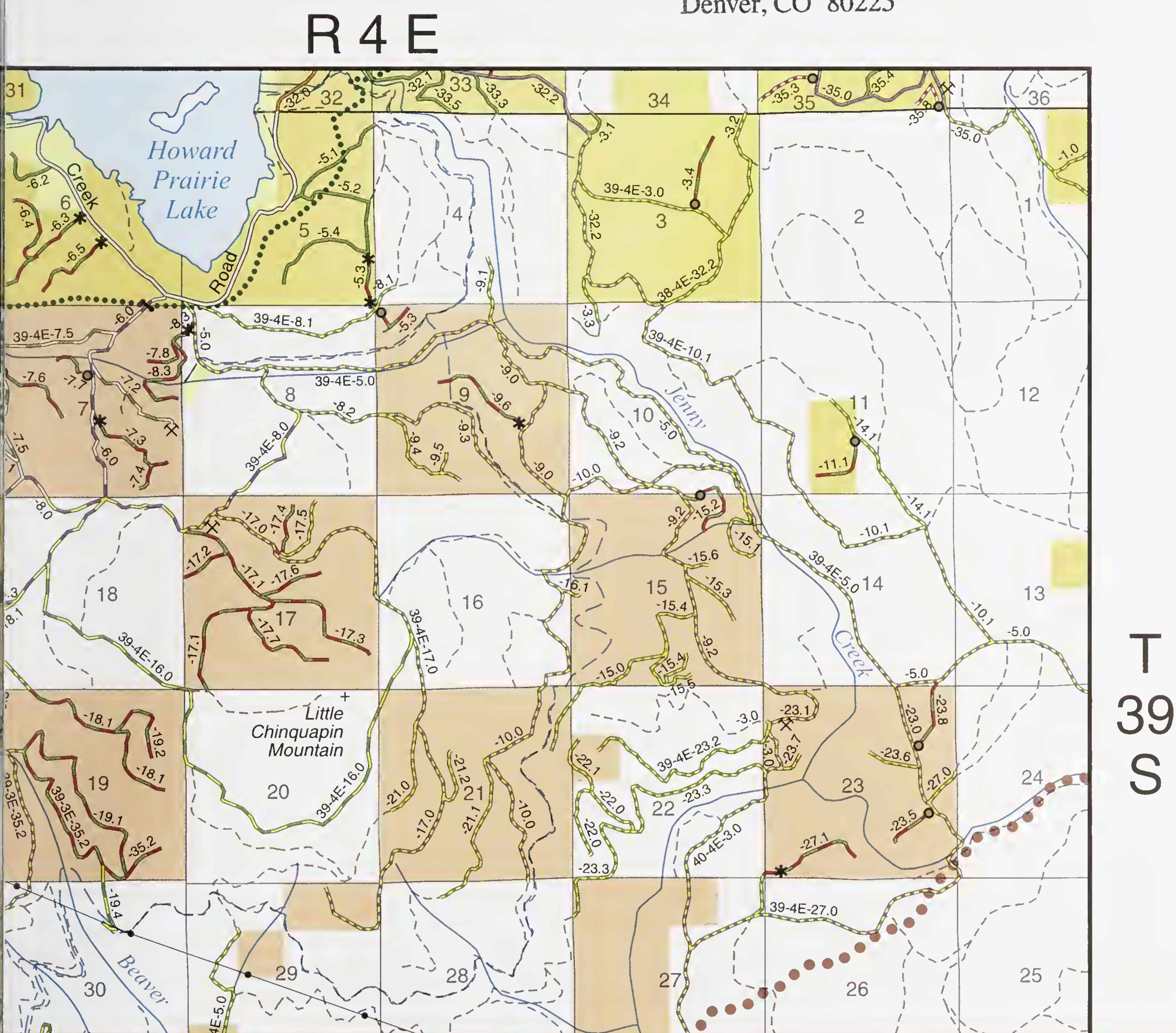
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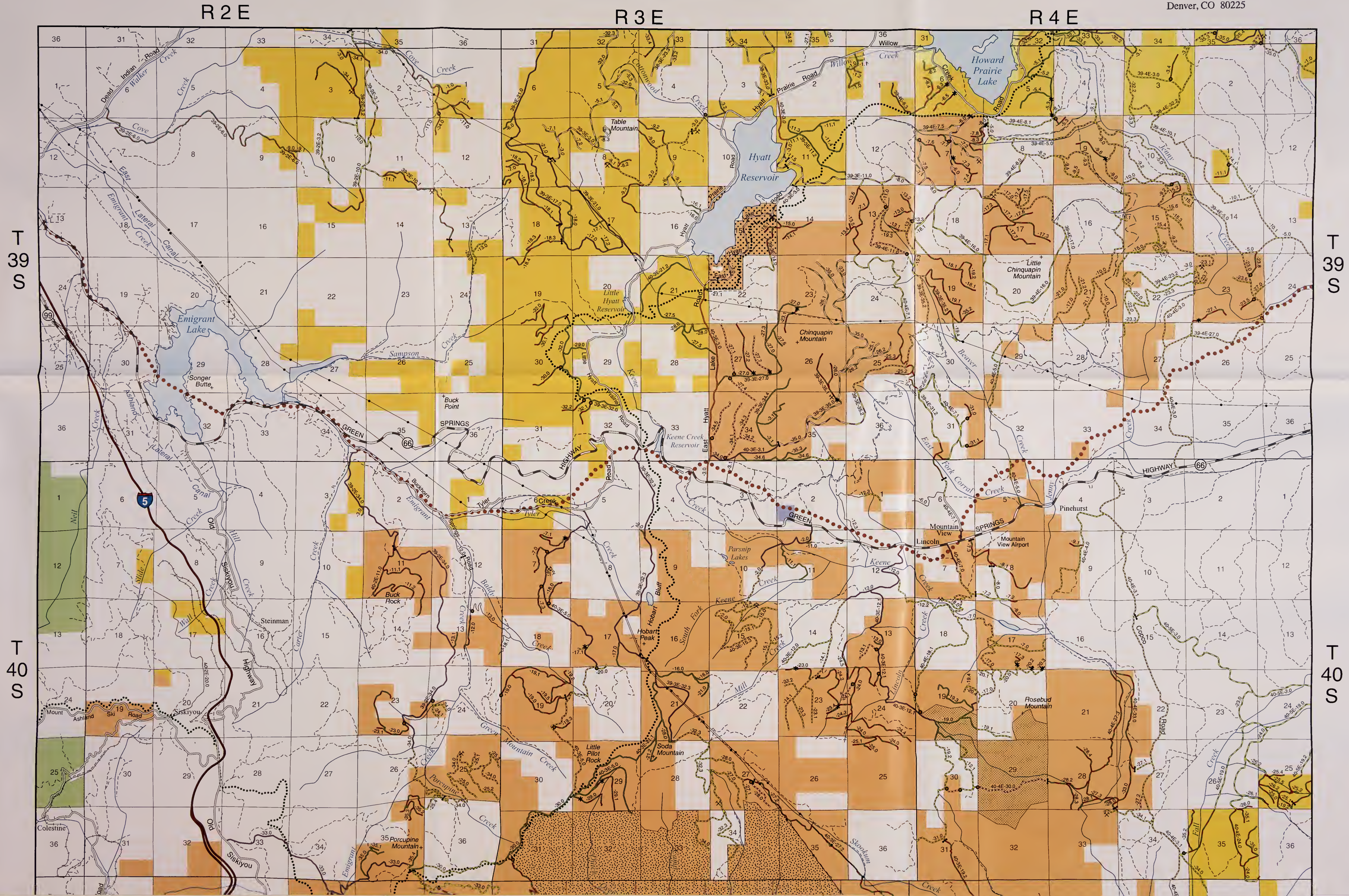
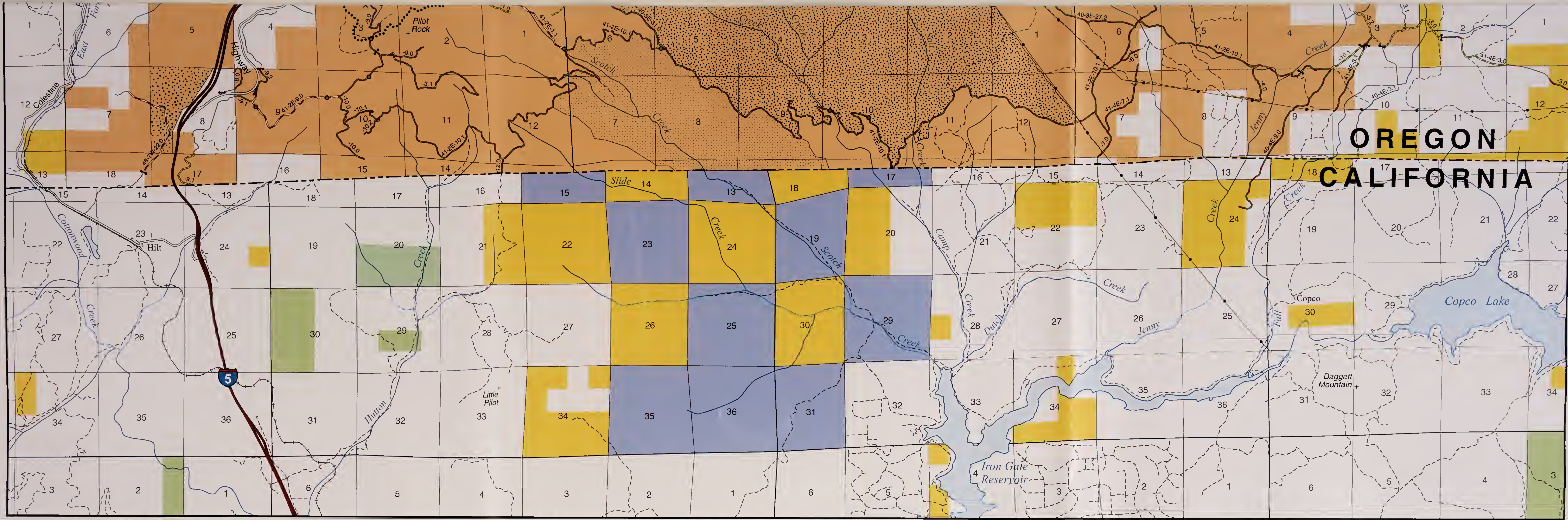
Cascade-Siskiyou National Monument

Existing Environment



T 41 S

T 48 N



T 41 S

T 48 N

R 7 W　R 6 W　R 5 W　R 4 W

2　0　2　4 Miles

2　0　2　4 Kilometers

LEGEND

- Cascade-Siskiyou National Monument
- Other BLM Administered Land
- U.S. Forest Service
- Bureau of Reclamation
- State
- Private
- Hyatt Lake Recreation Area
- Mariposa Botanical Area
- Oregon Gulch RNA
- Scotch Creek RNA
- Wilderness Study Area
- Gate
- Guard Rail Barricade
- Earth Berm
- Rock Quarry
- Pacific Crest Trail
- Applegate Trail (Historic)
- Powerline
- Railroad
- Interstate Highway
- *State Highway*
- State or County Road

Transportation Management Objective Road
(Refer to Appendix CC for definitions)

- TMO 4 Open BP-OP
- TMO 3 Open BP-OP
- TMO 3 Seasonal BP-SC
- TMO 3 Restricted (BA, BR-OP) or (BA-SC, ST)
- TMO 3 Restricted Seasonal BR-SC
- TMO 2 Open BP-OP
- TMO 2 Seasonal BP-SC
- TMO 2 Restricted BA, BR-OP
- TMO 2 Restricted Short Term BR-ST
- TMO 2 Restricted Seasonal BR-SC
- TMO 2 Temporary Closure BA-SC, ST
- TMO 1 Permanent Closure BA, BR-ST
- TMO 1 Decommissioned BA, BR, BP-DR, FD, OB
- TMO 0 Private Road
- TMO 0 Unnumbered Road

U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Medford District
2001

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PLATE 1

D11-05-2000:JR

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DEPARTMENT OF THE INTERIOR
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