final environmental impact statement
general management plan
january 1981

LASSEN VOLCANIC



NATIONAL PARK / CALIFORNIA

Digitized by the Internet Archive
in 2012 with funding from
LYRASIS Members and Sloan Foundation

http://archive.org/details/finalenvironment81lass

UNITED STATES DEPARTMENT OF THE INTERIOR

FINAL
ENVIRONMENTAL IMPACT STATEMENT
GENERAL MANAGEMENT PLAN

LASSEN VOLCANIC NATIONAL PARK
CALIFORNIA

Prepared by
Denver Service Center
National Park Service
U.S. Department of the Interior

Howard H. Chapman
Regional Director, Western Region

SUMMARY

( ) Draft (X) Final Environmental Impact Statement

Department of the Interior, National Park Service Western Region, San Francisco, California

1. Type of Action: (X) Administrative ( ) Legislative

2. Brief Description of Action: A general management plan for Lassen Volcanic National Park, California to guide development and visitor use in the park. Major actions of the plan include removal of developments in the Manzanita Lake area; construction of interpretive centers at the two main entrances to the park; retention of the present capacity of the ski area with improved facilities; and a replacement of inadequate sewage treatment facilities in the park.

3. Environmental Impact and Adverse Environmental Effects: Visitor health and safety conditions will be improved. Revegetation projects will produce a net gain of 44.7 acres of reclaimed habitat. Lodging and dining facilities will not be returned to the park. Interpretation and orientation services will be improved. Five historic sites will be lost to future generations. There will be no known impact on endangered or threatened species of plants or animals.

4. Alternatives Considered: a. No action; b. Relocate Lassen Park Road; c. Eliminate visitor use in Manzanita area; d. Reopen Manzanita Lake developments; e. Construct visitor facilities just outside the Manzanita Lake area; f. Eliminate Lassen ski area; g. Expand Lassen ski area; h. Minor variations at other developed areas; i. Develop hostels at wilderness thresholds.

5. Comments Have Been Requested From the Following: (See following page for listing)

6. Date Made Available to EPA and the Public:

   Draft Statement: June 9, 1977

   Final Statement:

5. Comments Were Requested From the Following: (Continued from preceding page)

a. Federal Government

*Advisory Council on Historic Preservation
Department of Agriculture
    *Forest Service
    *Soil Conservation Service
Department of the Interior
    *Bureau of Land Management
    *Bureau of Outdoor Recreation
    *Fish and Wildlife Service
    *Geological Survey
Department of Transportation
    *Federal Highway Administration
*Environmental Protection Agency
Federal Energy Administration
National Railroad Passenger Corporation (Amtrak)

b. State Government

*California State Clearinghouse
*California State Historic Preservation Officer

*Comments have been received and are attached.

TABLE OF CONTENTS

SUMMARY iii

I. DESCRIPTION OF THE PROPOSAL 1

A. LASSEN VOLCANIC NATIONAL PARK 1

B. GENERAL MANAGEMENT PLAN 1

C. GENERAL DEVELOPMENT PROPOSALS . . . 2
1. Lassen Park Road 2
2. Northwest Entrance (Manzanita Lake/Manzanita Meadows). 5
3. Lost Creek 14
4. Hat Creek. 14
5. Summit Lake 14
6. Southwest Entrance (Lassen Ski Area). . . 16
7. Headquarters 18
8. Warner Valley 20
9. Juniper Lake 22
10. Butte Lake 22

D. CAPACITY 22

E. IMPLEMENTATION 26

F. INTERRELATIONSHIPS WITH OTHER PLANS AND PROPOSALS 27

II. DESCRIPTION OF THE ENVIRONMENT 32

A. PHYSIOGRAPHY 32

B. CLIMATE 34

C. GEOLOGY 35
1. Geologic History 35
2. Hazards from Geologic Events . . . 36
3. Geophysical Monitoring 42
4. Paleontological Resources 43
5. Geothermal Potential 44

D. SOILS 45

E. HYDROLOGY 48
1. Surface Waters 48
2. Subsurface Waters 48
3. Water Quality 50

F. PLANTS 53
1. Life Zones 53
2. Vegetation Types 57

II. DESCRIPTION OF THE ENVIRONMENT (cont.)

3. Vegetation at Northwest Entrance . . . 65
4. Vegetation at Manzanita Lake 65
5. Vegetation at Summit Lake 66
6. Vegetation at Southwest Entrance . . . 66
7. Vegetation at Other Development Sites . . 66
8. The Role of Fire 67
9. Plants of Special Interest. 67

G. ANIMALS 69
1. Invertebrates 70
2. Vertebrates 70
3. Animals of Special Interest 75

H. ENVIRONMENTAL QUALITY 77
1. Aesthetic Quality 77
2. Air Quality 79
3. Noise Pollution 81

I. CULTURAL RESOURCES 82
1. Archeology 82
2. History 88
3. National Register Status of Historic Properties 90

J. SOCIOECONOMIC FACTORS 95
1. Regional Land-Use Patterns 95
2. Regional Socioeconomic Characteristics . . 97
3. Visitor Use 98
a. Access to the Park 98
b. Trends in Visitation 99
c. Visitor Characteristics 100
d. Overnight Use 103
e. Recreational Use 109

K. EXISTING PARK DEVELOPMENT 116
1. Lassen Park Road 116
2. Northwest Entrance 118
3. Lost Creek 126
4. Hat Creek. 127
5. Summit Lake 127
6. Southwest Entrance 127
7. Headquarters 132
8. Warner Valley 132
9. Juniper Lake 133
10. Butte Lake 133
11. Inholdings and Other Private Lands . . 134

L. PROBABLE FUTURE ENVIRONMENT WITHOUT THE PROPOSAL 134

III. ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION 137

A. IMPACTS ON THE NATURAL ENVIRONMENT . . 137
1. Geologic Features 137
2. Soils 137
3. Hydrology 142
4. Plants 147
5. Animals 154
6. Environmental Quality 156

B. IMPACTS ON CULTURAL RESOURCES . . . 160
1. Archeologic Resources 160
2. Historic Resources 160

C. IMPACTS ON SOCIOECONOMIC FACTORS . . 161
1. Impacts on Human Safety 161
2. Impacts on Visitor Use 166
3. Economic Impacts 167
4. Impacts on Park and Forest Management . . 168

IV. MITIGATING MEASURES INCLUDED IN THE PROPOSED ACTION 169

A. ACTIONS TO MINIMIZE IMPACTS ON NATURAL RESOURCES 169
1. General 169
2. Soils 169
3. Vegetation 170
4. Animals 170
5. Aesthetic Quality 171
6. Water Quality 171

B. ACTIONS TO MINIMIZE IMPACTS ON CULTURAL RESOURCES 171

C. ACTIONS TO MINIMIZE SOCIOECONOMIC IMPACTS 172

V. ADVERSE EFFECTS WHICH CANNOT BE AVOIDED SHOULD THE PROPOSAL BE IMPLEMENTED 174

A. UNAVOIDABLE ADVERSE IMPACTS ON THE NATURAL ENVIRONMENT 174

B. UNAVOIDABLE ADVERSE IMPACTS ON CULTURAL RESOURCES 175

C. UNAVOIDABLE ADVERSE SOCIOECONOMIC IMPACTS 176

VI. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY . . . 177

VII. ANY IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES THAT WOULD BE INVOLVED IN THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED 178

VIII. ALTERNATIVES TO THE PROPOSED ACTION . . 179

A. NO ACTION 179

B. LASSEN PARK ROAD 180
1. Close Lassen Park Road Across Chaos Jumbles and Relocate 180
2. Relocate the Lassen Park Road to Avoid Anklin Meadows 186

C. MANZANITA MEADOWS - MANZANITA LAKE . . 187
1. No Action 187
2. Develop Lodging and Concession Services in Manzanita Meadows (Section 13) . . . 188
3. Reopen Manzanita Lake Developments . . 190
4. Alternative Relocation Sites 192

D. THE LASSEN SKI AREA 195
1. No Action 195
2. Remove Downhill Skiing Facilities . . . 196
3. Expand Ski Area Facilities 198
4. Alternative to Commercial Power . . . 212
5. Alternatives for Sewage Treatment . . . 212

E. WARNER VALLEY 215
1. Convert Drakesbad Guest Ranch to a Hostel . 215
2. Eliminate Drakesbad and Relocate Other Facilities to Kelly Camp 215

F. MINOR DEVELOPED AREAS 219
1. Lost Creek - Remove Campground When Manzanita Lake is Restored to Full Capacity . . . 219
2. Summit Lake - Construct Sewage Treatment Plant and Remove 10 Campsites to Provide Trailhead Parking 219
3. Juniper Lake - Relocate Campground . . 220
4. Butte Lake - Replace Fire Cache Structure on Present Site 220
5. Hat Creek - Retain Road and Trailhead . . 220
6. Develop Hostels at Wilderness Thresholds . 220

IX. CONSULTATION AND COORDINATION WITH OTHERS . 222

A. CONSULTATION AND COORDINATION IN THE DEVELOPMENT OF THE PROPOSAL AND IN THE PREPARATION OF THE DRAFT ENVIRONMENTAL STATEMENT . . . 222

B. COORDINATION IN THE REVIEW OF THE DRAFT ENVIRONMENTAL STATEMENT 226

C. SUMMARY OF COMMENTS 228
1. Tabulation of Public Comments Regarding the Draft Plan and Draft Environmental Statement 228
2. Summary of Public Hearings 230

D. CONSIDERATION OF COMMENTS AND FORMULATION OF THE FINAL PLAN 239

E. WRITTEN COMMENTS AND RESPONSES . . . 241

Federal Agencies 242

State Agencies 263

Organizations And Local Government Agencies . . 279

Individuals 348

X. SELECTED REFERENCES 414

APPENDIXES 419

A: MANAGEMENT OBJECTIVES FOR LASSEN VOLCANIC NATIONAL PARK 420

B: EXPOSURE TO ROCKFALL-AVALANCHE HAZARD . . 423

C: ACREAGES IN AND ADJACENT TO PARK THAT WILL BE AFFECTED BY THE PROPOSAL 428

D: MEMORANDUM OF AGREEMENT WITH ADVISORY COUNCIL ON HISTORIC PRESERVATION 433

E: PLANNING TEAM AND CONSULTANTS 444

LIST OF TABLES

Table Number		
I-1.	Summary of Proposals for Northwest Entrance	12
II-1.	Coliform Bacteria Concentrations in Lake Waters, 1973	52
II-2.	Water Quality Data for Summit Lake, 1976-80	52
II-3.	Annual Discharge of Park Sewage Systems	53
II-4.	Plants and Animals Most Abundant in Lassen's Life Zones	56
II-5.	Projected 1980 Emissions from Internal Combustion Engines at Lassen Volcanic National Park	80
II-6.	Four-County Area Population	97
II-7.	Annual Travel Summary for Lassen Volcanic National Park, 1950-1977	100
II-8.	Recreational Activities Preferred by Lassen Visitors	102
II-9.	Facility Preference	103
II-10.	Campground Use Within Lassen Volcanic National Park	104
II-11.	Use of Forest Service Campgrounds Near the Park (Visitor Days)	106
II-12.	Winter Recreation Use at Lassen Ski Area	111
II-13.	Winter Recreation Use at Manzanita Lake.	112
II-14.	Hikers on Lassen Peak and Bumpass Hell Trails, 1971-77	114
II-15.	Surfaced Parking Areas at Manzanita Lake	125
III-1.	Acreages of Impacted Soil	138
III-2.	Projected Wastewater Loads by Watershed	147
III-3.	Acreages by Vegetation Type Impacted by Proposal	148
III-4.	Net Changes in Air Pollution	159

LIST OF FIGURES

The Region 3
Vicinity 4
Development Concept - Northwest Entrance 9
Proposed Trail System - Northwestern Part of Park . . 11
Development Concept - Summit Lake 15
Development Concept - Southwest Entrance 17
Development Concept - Headquarters 19
Development Concept - Warner Valley 21
Development Concept - Juniper Lake 23
Development Concept - Butte Lake 24
Wilderness 29
Land Planning Units - Lassen National Forest . . . 31
Topography 33
Recent Geologic Events 37
Soil Limitations 47
Watersheds 49
Life Zones 55
Vegetative Types 59
Deer Herds 73
Archeological Surveys 85
Cultural Resources 87
Historic Resources - Manzanita Lake 91
Commercial Campground Concentrations 105
Ski Areas - Northern California 113
Existing Development - Lassen Volcanic National Park . . 117
Existing Conditions - Northwest Entrance 121
Existing Conditions - Southwest Entrance 129
Landownership 135
Possible Road Realignments - Northern End of the Lassen Park Road and the Manzanita Lake Campground Access Road 181
Roads and Trails on Table Mountin with Alignment "C" . 182
Alternate Road Alignments to Avoid Anklin Meadows . . 185
Alternative Development Concept - Northwest Entrance . 189
Potential Relocation Sites and Geological Hazards . . . 193
Examples of Alternatives for Lift Improvements - Southwest Entrance 201-207
Alternatives for Chalet Expansion or New Interpretive Center - Southwest Entrance 209
Parking Expansion Alternative - Southwest Entrance . . 211
Alternative - Warner Valley 217

I. Description of the Proposal

A. Lassen Volcanic National Park

Lassen Volcanic National Park is situated in northeastern California at the southern edge of the Cascade Range, about 30 miles north of the Sierra Nevada. The Region map shows the relationship of the park to major cities, highways, and units of the national forest and national park systems. About three-quarters of the half million visitors to the park each year reside in the Sacramento Valley and San Francisco Bay Area to the west and south of the park.

The Cascade Range in California is visually dominated on the north by Mount Shasta at 14,162 feet, and on the south by Lassen Peak at 10,475 feet. The range of mountains between these two peaks is famous for its scenic mountain terrain and numerous lakes. Accordingly, timber, water, and outdoor recreation are the greatest resources of this mountainous area. Eight national forests, three California state parks, and four national parks are readily accessible, and they provide both developed and primitive areas where regional visitors may enjoy such activities as fishing, hunting, camping, hiking, cross-country and downhill skiing, snowmobiling, snowshoeing, swimming, picnicking, and scenic viewing.

In 1907, two presidential proclamations established Cinder Cone and Lassen Peak national monuments to illustrate features of "special importance in tracing the history of the volcanic phenomena of the vicinity." Lassen Volcanic National Park incorporated these two national monuments in 1916 when an act of Congress (39 Stat. 442) authorized the park and set it apart as "a public park or pleasuring ground for the benefit and enjoyment of the people of the United States."

The master deed list shows the total park acreage to be 106,297.88, including the detached headquarters unit and the private lands within the boundary. A boundary survey was completed in 1978 and resulted in minor changes to the park acreage.

B. General Management Plan

The National Park Service has developed a general management plan to provide a rational basis for developing the best future for Lassen Volcanic National Park. The plan is in keeping with the intent of the enabling act for the park, post-establishment legislation, and the congressional mandate of the service, as they are reflected in a set of management objectives for the park (see appendix A). The general management plan contains a conceptual and long-range strategy for resource management, visitor use, and development that will achieve these objectives and comply with a wide variety of executive and legislative requirements, management policies and procedures, and environmental constraints.

The strategies proposed in the general management plan will be continually subject to reevaluation and revision to reflect changes in management objectives or in ecological, social, and economic conditions. They will be implemented through a series of progressively more specific and detailed plans. The implementation plans will not always be prepared concurrently, but they will be consistent with each other and with the

management objectives. As these plans are completed and approved, they will become a part of the general management plan for the park. These implementation plans will require environmental analysis and may require the preparation of environmental impact statements.

The general development/visitor use component of the general management plan is the primary concern of this final environmental impact statement. A separate environmental assessment has been completed for the natural resources management plan.

A detailed, parkwide cultural resources study will be conducted to determine the locations of historical and archeological features, to evaluate their significance, and to recommend strategies for preserving these resources.

C. General Development Proposals

The general development strategy for Lassen Volcanic National Park is primarily concerned with the existing developed areas, shown on the Existing Development map (see section II.K). The main concepts of the plan are to remove the Manzanita Lake development; to provide permanent interpretive and administrative facilities at the northwest entrance; to upgrade the quality and efficiency of the facilities at the park headquarters, southwest entrance, and Summit, Juniper, and Butte lakes, and to acquire private lands within the park. In addition, wastewater treatment systems and potable water systems will continue to be upgraded to meet current and future standards.

The plan for Lassen Volcanic National Park recognizes that visitor use and development will continue in areas of potential volcanic hazard. It was recognized during the development of the plan that if all risks to human life were to be avoided, the park would virtually be closed to all visitor use, and the wonders of the park could only be observed from a distance. Thus, the plan recommends that visitors be warned of the potential dangers but does not propose to prohibit visitor use in areas of high risk. To reduce visitor exposure to known hazards, development will be removed from high risk areas. Seismic monitoring equipment has been installed, and an emergency operations plan is in effect. In all probability, advance warning will allow evacuation of visitors prior to major volcanic or seismic activity. However, the possiblity of a sudden, catastrophic event remains. Much as San Franciscans live with the knowledge that a major earthquake will occur, the visitor to Lassen must accept the fact that natural events of a violent nature could occur at any time.

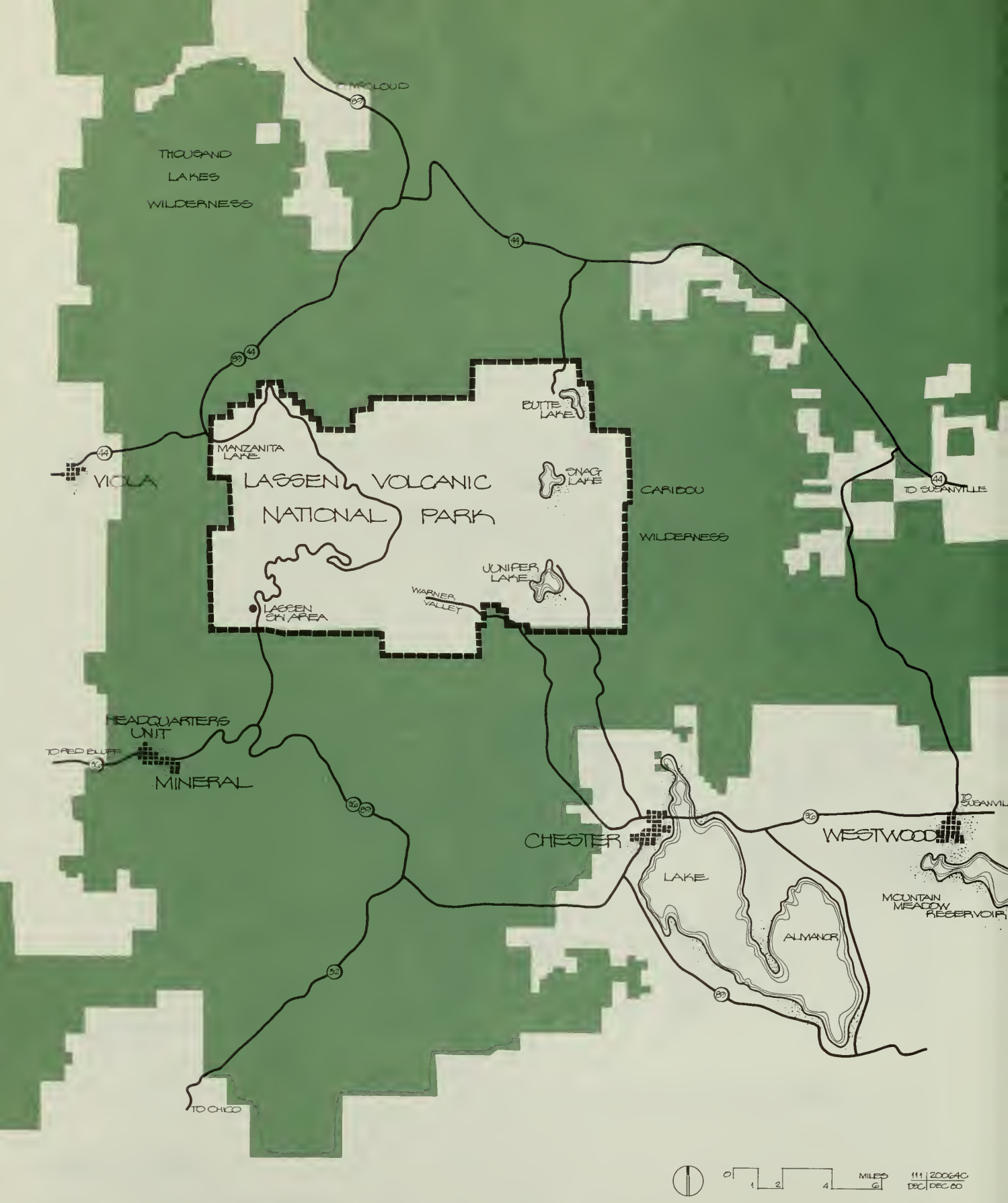
1. Lassen Park Road

The 30-mile transpark road intersects an array of volcanic features, crosses several distinct life zones, and offers access to a variety of hikes ranging from short nature walks to lengthy wilderness treks. For most park visitors, the scenic road corridor is the foundation of the Lassen experience. Little could be gained by altering the existing circulation patterns. Most of the major stops along the park road serve visitors well. Consequently, the diversity of visitor activities along the road will be maintained, and modifications will be made only where necessary to rectify unsafe conditions or to improve wayside exhibits.



REGION

LASSEN VOLCANIC NATIONAL PARK



VICINITY

LASSEN VOLCANIC NATIONAL PARK

The Devastated Area wayside is poorly designed; visitors now cross the road to take pictures, and the exhibits are not attractively sited. The area will be redesigned to provide a more attractive and safer viewing situation and improved access for disabled persons. A specific design has not been prepared, but it appears that any redevelopment will take place in currently disturbed areas.

Kings Creek Meadows (a popular picnic area), Lake Helen and Emerald Lake, Bumpass Hell, and the Sulphur Works will remain popular day use areas, and there will be little change other than routine maintenance, safety improvements, upgraded exhibits and signing, and provision for access by disabled persons where feasible. Although the parking areas fill up at some of the more popular attractions, it is not proposed to increase the parking capacity at these places unless future studies indicate that higher visitation levels would not significantly impact the resources.

2. Northwest Entrance

Until its closure in 1974, the developed area at Manzanita Lake, near the northwest entrance to the park, formed a traditional part of the Lassen experience for the majority of park visitors. The cool, forested setting, with its streams, reflecting lakes, and scenic views of Lassen Peak, provided an almost ideal locale for the development of the park's major interpretive center and the major concentration of day use and overnight visitor accommodations and facilities.

In 1968, the Geological Survey began studies to identify hazards in the park from possible future geologic events. One such hazard was the potential for a rockfall-avalanche to fall from Chaos Crags and sweep catastrophically across the Chaos Jumbles and into the Manzanita Lake/Manzanita Chutes area.

In 1974, the concessioner at Manzanita Lake requested that the National Park Service accept liability for loss of life and property in the face of the rockfall-avalanche hazard. Since this could not be done, National Park Service management concluded that the closing and complete elimination of facilities on and adjacent to the Chaos Jumbles was the only suitable action consistent with the responsibility to protect the lives and safety of park visitors.

In the aftermath of closing the Manzanita Lake area, a number of actions were taken to accommodate park visitors until a permanent relocation site could be found. A visitor contact facility, maintenance area, and residences for personnel were developed on a temporary basis at the eastern edge of Manzanita Meadows, which lies in the eastern portion of Manzanita Chutes outside the high risk area.

Day use of the Manzanita Lake and Reflection Lake area has continued and consists primarily of fishing, boating, swimming, picnicking, hiking, and scenic viewing of the lakes, Chaos Crags, and Lassen Peak. Parking or stopping has not been permitted on the park road or the campground access roads where they cross the Chaos Jumbles.

As they are not in the direct path of a potential rockfall-avalanche, ±180 sites* in the campground south of Manzanita Lake were temporarily reopened in 1976. A temporary gas station and hot food facility have been developed in the camper service building; its shower and laundry functions have been suspended because of inadequate wastewater treatment facilities. A little more than half of the 800 seats in the Manzanita Lake amphitheater were temporarily relocated to the Lost Creek campground; the original seating capacity has now been restored, but the amphitheater is in need of extensive rehabilitation.

A permanent system of geophysical instruments has been installed within the park to detect those events which might indicate a renewal of volcanic activity or rock movement. An alert from this system would activate the park's emergency operations plan, providing an early warning so that park visitors could be moved away from hazardous areas.

The National Park Service does not intend to replace the stores, lodging units, and restaurants that are already closed and will be removed from the Manzanita Lake area. If there is a demand for these facilities, they should be developed in nonhazardous areas outside the park. Replacement facilities were previously proposed to be built west of the park in Manzanita Meadows (section 13), which is rated as a moderate to low risk area, but with the eruption of Mount Saint Helens it became obvious that a major capital expenditure for these kinds of facilities should not be undertaken by the National Park Service even though the potential for loss of life was relatively low. It is hoped that this decision will lead to private capital development of overnight facilities on both the northwest and south sides of the park. The National Park Service will cooperate in any manner possible with the Forest Service, local governments, and the private sector to encourage development of these facilities outside the park.

a. Visitor Facilities

A new interpretive center will be developed in Manzanita Meadows adjacent to the park entrance. This will be a joint operation of the National Park Service and the Forest Service where visitors may receive information about the features of the park and the forest. The National Park Service will build the facility on Lassen National Forest land. Temporary information facilities and the district office now located at the park entrance will then be removed.

The interpretive center will have approximately 13,000 square feet of floor space. It will be sited to take advantage of views of Lassen Peak and will include--in addition to the information/orientation facility--an auditorium, exhibit space, outdoor amphitheater, and offices for National Park Service and Forest Service employees. A parking area large enough to accommodate 75 visitor and 10 employee vehicles will be constructed at the interpretive center. The new center will remain open

---

*The number of sites in use varies from year to year as some sites are temporarily closed for restoration.

for winter interpretive activities, but on a modest scale compared to the summer operations.

The need for and feasibility of providing commercial visitor services such as food, camping supplies, gas, and equipment rental will be addressed during Forest Service land use planning efforts scheduled for completion in 1983. If there is a proven need and these services are not likely to be provided on private land, Forest Service policies could permit their development in Manzanita Meadows or other areas adjacent to the northwest portion of the park. These facilities would serve summer visitors to the park and forest as well as winter visitors who primarily would be using recreation facilities on Forest Service lands.

Approximately 5-10 acres predominantly covered by manzanita growth and windrowed material will be cleared and graded for the new development. A low-growth firebreak probably will be required to protect the development from wildfires in the surrounding manzanita shrub. If needed, an irrigation and firebreak sprinkling system will be installed, and the area will be landscaped with native vegetation.

b. Park Entrance Station

A new entrance station will be constructed near the park entrance; the historic station and residence will be removed.

c. Employee Housing

Permanent housing for Park Service and Forest Service personnel will be located northwest of Chaos Jumbles on the western edge of the park. It will consist of 3 three-bedoom residences for permanent employees and, if feasible, 15 Pine Cottages relocated from Manzanita Lake to be used by seasonal employees, with some cabins upgraded for winter use. If these cottages cannot be relocated, they will be razed or salvaged, and new buildings will provide the quarters. Housing requirements for Forest Service personnel have not been determined.

d. Maintenance Facilities

National Park Service and Forest Service maintenance facilities will be located near the new residential area. This site has been used for various functions in the past and will require little clearing. The NPS maintenance building, storage sheds, and gas station now in Manzanita Meadows will be moved to the new site. The maintenance and residential areas will occupy a maximum of 20 acres, of which 8 acres are currently in use.

e. Utility Systems

A sewage treatment facility will be constructed west of the park in Manzanita Meadows to serve the proposed visitor facilities in Manzanita Meadows, the residential/maintenance area at the western edge of the park, and the Manzanita Lake campground. The design criteria for this facility should consider the utilization of reclaimed water for irrigation and fire protection purposes and expansion potential to handle commercial facilities should they be developed on Forest Service land. The feasibility of these features should be reexamined during the preliminary design process, after the site is chosen and the availability of

water is quantified. Commercial power and telephone service are available in close proximity to serve the proposed sites. The facility will be constructed on the low valley floor west of the proposed interpretive center and be screened from view with native vegetation. It will require approximately 1.75 miles of water lines, 0.75 to 2 miles of sewer lines, 1 mile of underground power and telephone lines, 0.5 mile of treated water lines, and a storage tank for irrigation and fire protection purposes.

f. Access and Circulation Roads

Approximately 1.5 to 2 miles of paved roadways will be required for access and circulation within the new development area. These roadways will be constructed concurrently with utility lines so that utility lines may be laid prior to the application of a bituminous surface.

g. Manzanita Lake Area

The Loomis Museum and seismograph building (both on the National Register of Historic Places) and the Loomis residence will be retained (but not be reopened) until the new interpretive center is developed, then they will be removed. Some of the fine exhibits in the museum, while somewhat outdated, will be restored to their original appearance and relocated to the new interpretive center. Other closed structures in the Manzanita Lake area that can be relocated and reused in the future, such as the Pine Cottages, will be maintained until they can be moved to the new housing area. (These buildings will not be relocated if moving them will extensively damage native growth surrounding them.) Structures that cannot be relocated will be removed. These include the park naturalist's residence, the original entrance station and residence, and the stone comfort station near the lodge, all of which have been determined to be eligible for listing on the National Register. These historic buildings have been recorded for the Historic American Buildings Survey in accordance with section 2(c) of Executive Order 11593.

Excess paving will be removed and an extensive grounds rehabilitation program will be undertaken to restore the vegetation and encourage new growth in the overmature forest. Underground utility lines will be abandoned in place and surface utility lines will be removed, except where these utilities are necessary for the continued operation of the campground and its related facilities.

Manzanita Lake and Reflection Lake will be left in their present conditions. Water will continue to be diverted from Manzanita Creek into Reflection Lake. This diversion channel was temporarily obstructed between 1974 and 1978. During that period, because of drought, the lake level dropped several feet below normal; in 1978, at the end of the drought, the lake level returned to normal. The diversion channel has since been reopened in response to public concern about maintaining the water level in Reflection Lake, but no cause-effect relationship has been established between the lake level and diversion of water from Manzanita Creek.

The boat-launching ramp at Manzanita Lake will be removed and the parking area closed, scarified, and revegetated with native plants. The picnic area at Manzanita Lake will be closed, all

NPS/FS HOUSING AND MAINTENANCE AREA

NEW ENTRANCE STATION

INTERPRETIVE CENTER

SEWAGE TREATMENT (SPECIFIC SITE REQUIRES FURTHER STUDY)

REFLECTION LAKE

MANZANITA LAKE

SERVICE ROAD

TRAIL TO CHAOS JUMBLES OVERLOOK

WATER INTAKE

AMPHITHEATER (RENOVATE)

CAMPGROUND ENTRANCE STATION

CAMPER SERVICES EXPAND STORE, RESTORE SHOWERS AND LAUNDRY

TRAIL TO OVERLOOK AND CAMPGROUND

5800

6000

6200

6400

MIXED CONIFEROUS FOREST

BRUSH AND MEADOW

CUT WINDROWED BRUSH SEEDLING

CHAOS JUMBLES

NOTE: LONG RANGE - CAMPGROUND AND RELATED FACILITIES TO BE REMOVED WHEN ALTERNATE FACILITIES ARE DEVELOPED OUTSIDE OF PARK

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

0 200 400 800 1200 FEET

DSC | 40010C
NOV 80

NORTHWEST ENTRANCE
DEVELOPMENT CONCEPT

LASSEN VOLCANIC NATIONAL PARK

facilities removed, and the area revegetated with native plants. The Reflection Lake picnic area is already closed; the comfort stations will be removed. All well-defined trails within the Chaos Jumbles will be scarified and revegetated or otherwise obliterated as pathways. The Lily Pond environmental study area and nature trail will remain permanently closed. Removal of facilities from the Chaos Jumbles area around Manzanita Lake will allow restoration of approximately 53 acres.

The 50-acre campground will remain in use for the foreseeable future. Loops A and B will be reopened for camping in addition to others currently in use, and the amphitheater will be renovated. A small addition to the camper service building will allow the reopening of the shower and laundry facilities (when adequate wastewater treatment facilities are available), while also retaining the general store and gas station in that building.

The National Park Service and the Forest Service will cooperatively plan for the location of campgrounds in less hazardous areas adjacent to the park. When adequate camping and visitor service facilities have been developed in the vicinity, the Manzanita Lake campground, camper service building, and amphitheater will be removed, and the 50-acre area restored to native vegetation. At this time a new amphitheater will be developed at the interpretive center unless adequate facilities are available elsewhere. Roads and parking areas will be removed except for the service road to the water intake. Portions of the campground road system will be converted to trails to provide connections between existing trails outside the campground.

Upon completion of this phase all visitor use facilities other than the Lassen Park Road will have been removed from the Chaos Jumbles/Manzanita Lake area. No parking will be provided in the Chaos Jumbles area.

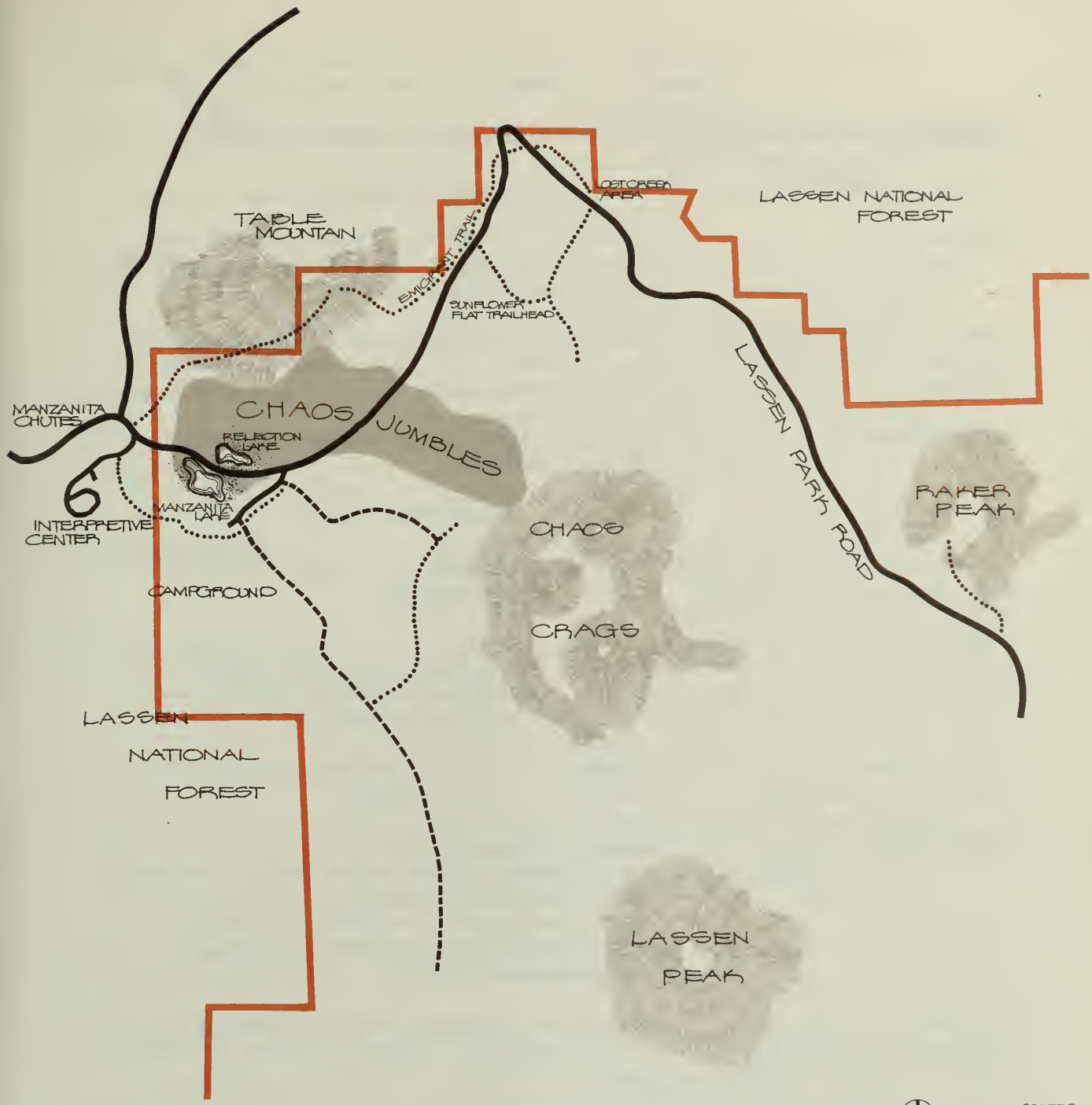
h. Trail System

A new trail system (approximately 12 miles) will be developed in the northwest area of the park, primarily to relocate trails from areas of high risk. New trails will connect the interpretive center with the campground and to an overlook above the campground; other trails will be developed for day hiking outside of Chaos Jumbles. One mile of the trail west of Sunflower Flat will coincide with the Nobles Emigrant Trail. Interpretive waysides will be provided at several scenic points with views of Chaos Jumbles, Manazanita Lake, and Lassen Peak. Parking areas, wayside exhibits, and possibly picnic areas will be developed at trail access points.

In addition to new trails in the areas around Chaos Jumbles, a trail with overlooks will be built on Raker Peak to provide vantage points for interpretation of the mudflow and cloud of fire that created the Devastated Area in 1915.

i. Summary

Table I-1 summarizes the major proposals and places them in order of priority. These priorities may change as further studies are completed, and they are subject to the availability of funding.



111 | 20070G
DEC | DEC 80

0 1/2 1 2 3 MILES

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERIVCE

PROPOSED TRAIL SYSTEM

NORTHWESTERN PART OF PARK

LASSEN VOLCANIC NATIONAL PARK

Table I-1. Summary of Proposals for Northwest Entrance

Phase One--Restoration of campground and removal of facilities

Facility	Proposed Action
Campground	Retain 181 sites and reopen loop A (42 sites) and loop B (54 sites) for a total of 277 sites, 8 comfort stations
Camper service building (former shower/laundry facility)	Expand building; retain food, store, and gas service, and reopen shower/laundry when feasible
Amphitheater	Retain 800-seat capacity and restore to former quality
Lassen Park Road	Retain on present alignment
Reflection Lake picnic area, Lily Pond environmental study area and nature trail	Remove all facilities, scarify sites, and plant native vegetation
Manzanita Lake	Remove trails, parking, boat ramp, and picnic areas from shoreline; scarify sites and plant native vegetation
Loomis Museum, seismograph building	Retain until new interpretive center is completed, then remove
Lodge area	Remove lodge, comfort station, stores, gas station, and all other facilities except those determined capable of being moved for employee housing or other purposes; scarify sites and implement intensive revegetation program
Summertown and other residential and mainten- areas on Chaos Jumbles	Retain only those facilities essential for daily operation; remove all other facilities, including roads and trails
Entrance station and residence	Retain until replacement facility has been constructed
Utility systems	Retain essential systems; disconnect unessential systems, abandon underground lines in place, and remove overhead lines

Note: Facilities to be removed will be offered for salvage prior to demolition.

Phase Two--Development of new visitor and administrative facilities

Facility	Proposed Action
Sewage treatment facility	Construct sewage treatment/reclaimed water facility in Manzanita Meadows to serve campground, residential/maintenance area, and interpretive center
Road/utility systems	Construct basic road system to serve new residential/maintenance area, interpretive center, and sewage plant; install utility lines in road corridor where feasible
Residential/maintenance area	Relocate facilities from temporary site in Manzanita Meadows and from lodge area to a 20-acre site northwest of Chaos Jumbles; construct new housing and maintenance facilities as required
Entrance station	Construct new entrance station outside Chaos Jumbles and remove old entrance station and residence
Interpretive center	Construct interpretive center/offices (13,000 square feet) on a 5-10 acre site in Manzanita Meadows; construct employee and visitor parking; remove temporary facilities at park entrance, scarify site, and plant with native vegetation
Trails	Construct pedestrian/bicycle trail between interpretive center and campground; construct trail to Chaos Jumbles/Manzanita Lake overlook

Note: Actions in phase two will be preceded by a comprehensive design, and phasing of projects will be determined at that time.

Phase Three--Removal of campground and related facilities

Facility	Proposed Action
Manzanita Lake campground	Obliterate structures, roads, and other facilities; scarify sites and plant with native vegetation
Amphitheater	Construct amphitheater at interpretive center utilizing salvageable parts from campground amphitheater; obliterate campground amphitheater and restore site
Trails	Utilize portions of campground roads to connect existing trails

Note: Phase three will occur when adequate replacement facilities have been developed in the region. These actions are probably beyond the life of this plan.

3. Lost Creek

The 8-acre Lost Creek (Crags) campground was reorganized and expanded following the temporary closing of the Manzanita Lake campground in 1974--the former group campsites were converted to 45 individual sites, and 10 new group sites were developed a short distance away. An amphitheater, using equipment from the Manzanita Lake amphitheater, was also constructed to serve the enlarged campground. While originally intended as a temporary improvement to replace some of the closed campsites of Manzanita Lake, the Lost Creek campground as now developed will be retained until replacement facilities are provided in less hazardous locations. The two employee trailers will be replaced with permanent but moveable structures located on the same site.

4. Hat Creek

Privately owned property at Hat Creek consists of five small unimproved lots. These lands will be purchased on a willing seller-willing buyer basis. The National Park Service now owns all of the cabins in this area. The former owner of one of these cabins has retained a 25-year right of occupancy. When all of the properties are under NPS management, the remaining cabins will be removed and the area scarified and replanted with native vegetation. The access road will be closed at its juncture with the Lassen Park Road, and a small trailhead parking area will be developed. The Hat Creek road will then be allowed to revert to a trail. Approximately 3.1 acres will be restored to natural conditions.

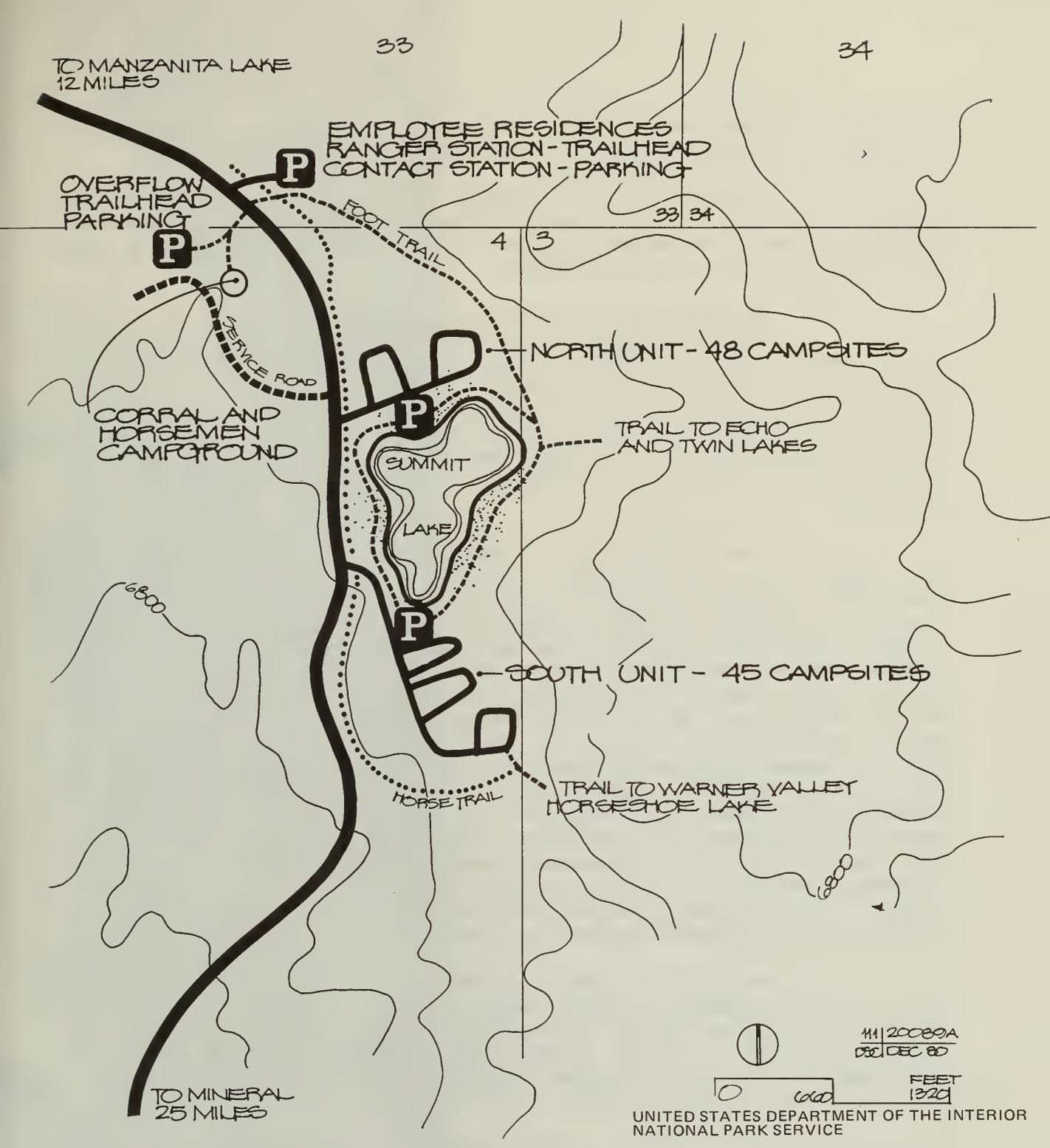
5. Summit Lake

This area receives heavy use by day visitors, overnight campers, and backcountry users beginning trips at the trailhead. The 93-unit campground and day parking areas will remain. Overall, development will occupy 26.9 acres, most of which is currently disturbed.

Previous studies of Summit Lake indicated counts of coliform bacteria that might be unfavorable for pursuing such activities as fishing and swimming. Existing sewage treatment facilities in the campground were suspected as a source of this pollution. To correct this situation, the leach fields for the north unit were upgraded, and the leach fields for the south unit were abandoned. Subsequent counts of coliform bacteria indicated a marked decrease in bacteria levels. Sewage from the south unit is now collected in vaults and transported to treatment facilities outside the park. The portable toilets that were installed in the south unit at the same time the vaults were installed will be replaced with permanent structures.

The corral and small campsite with pit toilet will remain in use, serving as a starting point for backcountry trail riders. The present trailhead parking area is frequently full, and cars are left along the park road and in day parking areas. An overflow parking area for approximately 25 cars will be developed in the area of a former borrow pit. Access will be along an existing service road.

The historic ranger station/residence near the trailhead parking area will be retained, and an additional residence for a seasonal



SUMMIT LAKE DEVELOPMENT CONCEPT

LASSEN VOLCANIC NATIONAL PARK

employee will be constructed. A contact station for backcountry information and permits will be constructed near the trailhead.

Monitoring of water quality will continue to ensure that the changes in sewage treatment methods have corrected the lake pollution problem. It may prove necessary to modify other land use activities in the area if the pollution problem continues.

6. Southwest Entrance (Lassen Ski Area)

The long-range objective of the National Park Service will be the removal of the downhill ski facilities when comparable or better facilities are developed in the vicinity. Recognizing that this could take 15 to 20 years, the facilities at Lassen will be renovated to meet current standards to provide a safe and less congested experience. The cost of the lift improvements will be amortized over a 20-year period, allowing removal of the downhill ski facilities when alternate facilities have been developed.

The present Poma lift will be removed and the scars from this facility will be revegetated. A chair lift will be constructed from an area north and east of the ski lodge to the top of the present Poma hill. Towers and loading/unloading stations will require approximately 0.3 acre of land. An exact alignment has not been determined, but preliminary studies indicate that it will be necessary to remove up to 186 mature trees, many of which are diseased and hazardous, to provide clearance and a safety zone for the lift. Design and construction criteria will ensure that the chair lift is sited to avoid damage to archeological sites and to minimize impact on the land. The upper and lower terminals will be located to reduce their visibility from the park road, and the number of towers will be kept to a minimum. Installation of a chair lift will not increase slope capacity but will allow longer and more frequent runs with less skier fatigue. The intermediate rope tow will be realigned to reduce congestion and allow easier crossing of the slopes by cross-country skiers. The beginner rope tow may also be realigned, but in the same general area, to provide more efficient use of the beginner slope.

As part of a continuing maintenance program, the two rope tows will be upgraded to provide safer and more reliable operation. The present direct drive will be replaced by equipment driven by commercial electrical power, a better height adjustment will be developed to compensate for the range of snow depths encountered during the season, and sight lines for lift operators will be improved.

The present 5,500 square-foot ski lodge (Chalet) is one-third to one-half the size needed to provide adequate year-round management and visitor facilities. A feasibility study by private consultants indicated that renovation of the Chalet is not feasible and that it would be most cost-effective to replace it with a new structure. The new facility will feature a year-round interpretive center, food service and gift shop, and the equipment rental, first-aid, ski patrol, storage, and maintenance areas needed for winter operation. The existing Chalet will be removed when the new structure is completed. The new facility will be fully accessible to the disabled.

RIDGE "R"

UPPER BASIN

PARK ROAD

PRELIMINARY CHAIR LIFT ALIGNMENT

UNLOADING

EXISTING POMA LIFT (TO BE REMOVED)

INTERMEDIATE ROPE TOW RELOCATION

INTERMEDIATE ROPE TOW (RELOCATE)

PRIMARY CROSS-COUNTRY SKI TRAIL

EXISTING ROPE TOW (TO REMAIN WITH MINOR CHANGES)

EXISTING CHALET (REMOVED)

PROPOSED NEW INTERPRETIVE CENTER LOCATION

SULPHUR WORKS CAMPGROUND - 24 SITES (TO REMAIN)

EXISTING PARKING 50 CARS BUSSES

40000 GALLON WATER STORAGE TANK

GASOLINE STATION

SUGGESTED PARKING AREA EXPANSION TO RECOVER SPACES LOST TO LODGE CONSTRUCTION

EXISTING GENERATOR BUILDING

VEHICLE/MAINTENANCE FACILITY

ENTRANCE STATION

EMPLOYEES TRAILER

AREA OF MUDFLOW

0 200 400 600 FEET

400 11 D
DEC NOV 80

SOUTHWEST ENTRANCE
DEVELOPMENT CONCEPT

LASSEN VOLCANIC NATIONAL PARK

The parking area capacity will not be increased; additional spaces will be provided at the south end to compensate for those lost to the interpretive center construction. Attendant parking will be utilized on heavy use days to increase the usable capacity of the area by 10 to 30 percent. Consideration will be given to further limiting lift ticket sales and to instituting a shuttle bus system as methods of reducing crowding and ensuring that the capacities of the parking area, ski slopes, and lifts are not exceeded.

The existing southwest campground adjacent to the parking area will be retained at its present size of 24 sites.

The sewage treatment system is inadequate to serve normal summer loads and peak winter loads, and the leach field is ineffective because impermeable soil causes ponding; as a result, inadequately treated effluent has drained into West Sulphur Creek. This system is being replaced by a modern system located a short distance outside the park. This will bring the facility into conformance with current codes and eliminate the pollution problems that have occurred in the past. The system will consist of a 20,000-gallon septic tank installed in the median strip of the parking area, 1,200 feet of collector lines installed in roadways and parking areas, 6,500 feet of gravity sewer and 1,900 feet of force main located in the California 89 road corridor and a Forest Service access road corridor, a wet pit type pump station, and a subsurface disposal system in the Bluff Falls area of Lassen National Forest. An environmental assessment has been prepared for this project.

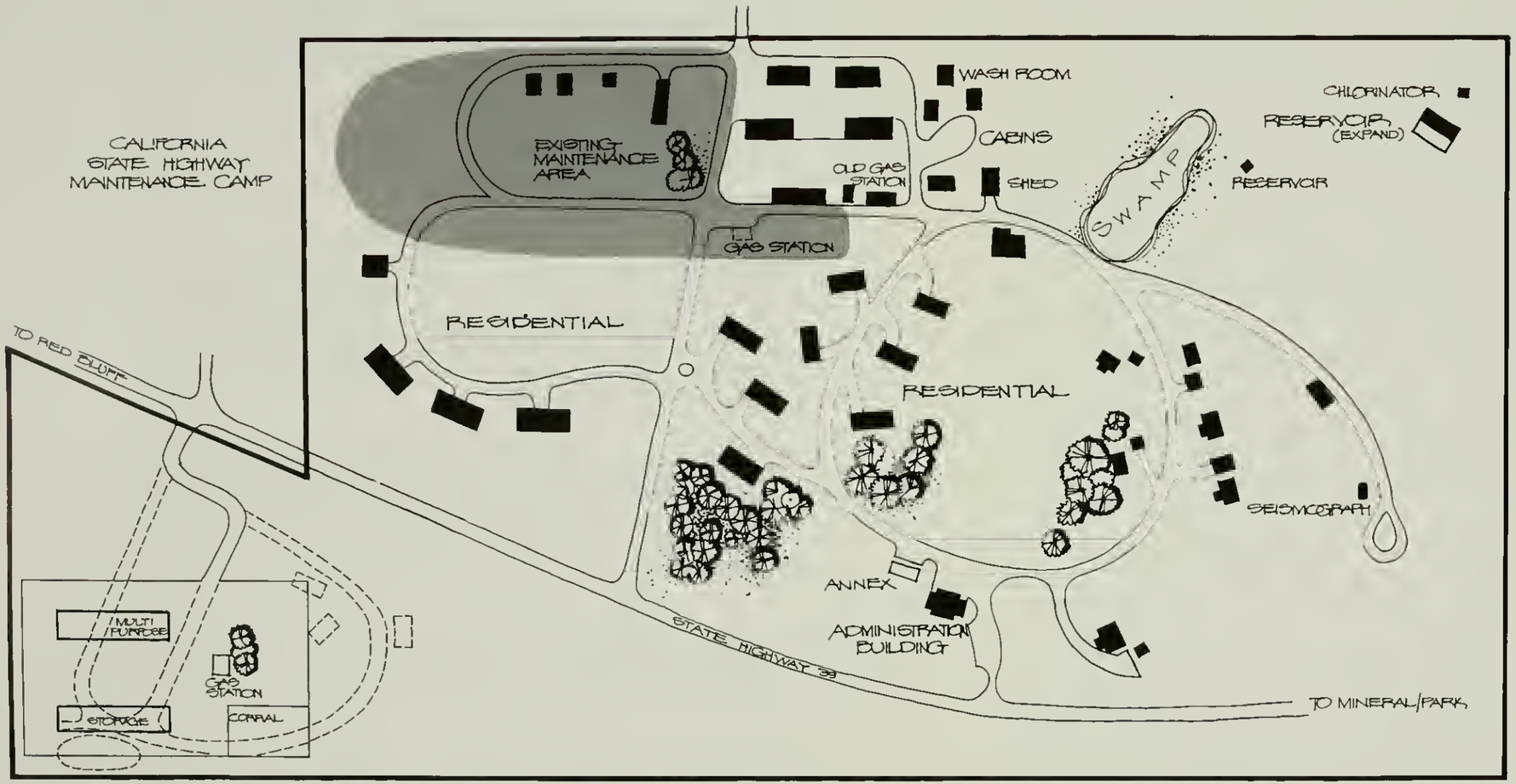
About 7 miles of underground electrical cable will be placed at a depth of 36 to 48 inches alongside California 89 and in existing utility corridors to connect the southwest entrance area with commercial power at Mineral, California. Underground power will be distributed to the various park facilities and to the ski lifts. The generator at the ski area will be converted to auxiliary use; it will be upgraded so that it can serve all facilities, including the proposed sewage treatment facility, during periods when commercial power is interrupted.

The water system is adequate to meet projected needs.

The southwest entrance development currently occupies 93.4 acres; 91.1 acres will continue to be occupied for the foreseeable future, and 2.4 additional acres will be committed to new uses. All improvements will be in currently disturbed areas except for the sewage disposal facility (which will affect approximately 2.1 acres outside the park) and the chair lift (which will affect approximately 0.3 acre).

7. Headquarters

The park headquarters is located on a detached site of 75 acres near the town of Mineral. The administration building, maintenance facilities, and housing area are fine examples of early park architecture and site planning. Even the newer housing blends well with the older structures and the attractive setting. However, the staff has outgrown the 1929 administration building, and some of the older residences and maintenance buildings provide substandard working and living conditions and are expensive to operate and maintain.



POTENTIAL RESIDENTIAL EXPANSION
EXISTING
PROPOSED
REMOVE

NO SCALE

411 | 40013
DSC | NOV 80

HEADQUARTERS
DEVELOPMENT CONCEPT

LASSEN VOLCANIC NATIONAL PARK

The conflicts between maintenance facilities and a residential area have been increasing as the park staff has expanded and additional housing has been constructed. To separate the maintenance and housing areas and to provide efficient facilities, new maintenance buildings--an equipment storage building, a gas station, a fire cache, and a multipurpose shop building--will be developed on a 4.7-acre site across California 36 from the present housing/maintenance area. Standby power will be provided, and the entire facility, including corrals and outdoor storage areas, will be fenced.

It appears that future housing needs can be met through renovation of the older residences. Space for additional housing, if needed, is available.

An annex close to, but not attached to, the present administration building, is proposed to provide adequate office space for the park staff and to free space in the main building for necessary visitor information/orientation services. Further study may indicate that some of the old maintenance structures could be renovated to provide needed office space rather than constructing an annex to the headquarters building.

The entire headquarters complex will be evaluated for historical/architectural significance prior to implementing proposals which would affect existing structures. The administration building at Mineral is listed on the National Register; the old gas station has been determined eligible for the National Register; other structures may prove eligible when further evaluation is completed.

An expanded reservoir and improved filtration system will provide adequate water reserves and improved water quality for the headquarters area. The area is served by commercial power and sewage service through the town of Mineral.

The Development Concept map is conceptual and is not intended to show specific locations for proposed structures. A comprehensive design will be prepared following future site and cultural resource studies. New construction will generally be confined to previously prepared and/or disturbed sites. Following the removal of excess structures, the unneeded roads, paving, and related development will be removed, and the area scarified and replanted with native vegetation.

8. Warner Valley

Drakesbad Guest Ranch will be retained as a concession operation with no increase in its present capability to serve 38 overnight guests. The campground and ranger station will be retained in their present locations.

The Warner Valley ranger station has been nominated to the National Register of Historic Places as having local significance in historic architecture. Two other buildings at Drakesbad that were determined eligible for nomination to the National Register--the hay barn, built in 1914, and the cook's cabin, built in 1920, both dating from the middle period of the Sifford resort--have been recorded and removed.

INDIAN LAKE

JUNIPER LAKE

KINGS CREEK

PACIFIC CREST TRAIL

DREAM LAKE

FORMER RANGER STATION

HOT SPRINGS

BOILING SPRINGS LAKE

GUEST RANCH

RANGER STATION AND CAMPGROUND

ALTERNATE PACIFIC CREST TRAIL

EXTENDED BOUNDARY

TERMINAL GEYSER

LEE RANCH

LITTLE WILLOW LAKE

5600

6400

5200

6919

Kelly Mou

WILDERNESS

PRIVATE LAND

111|20061D
DSC DEC 80

0 1/4 1/2 1 MILES

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

WARNER VALLEY DEVELOPMENT CONCEPT

LASSEN VOLCANIC NATIONAL PARK

Both buildings were clearly unpreservable in the sense of maintaining their historic fabric; they could not be restored or preserved without radically altering what little remained of their integrity.

The Warner Valley road will be maintained as an unpaved, low-speed, light-duty access road. Three to five culverts will be placed beneath the road to facilitate drainage, and a few trees at roadside will be removed or pruned to improve sight distances. Approximately 0.3 acre could be affected by these actions.

The National Park Service has recently purchased the 566-acre tract of land 2 miles southeast of Drakesbad (section 36 of T. 30 N., R. 5 E.). This was formerly the largest tract of privately owned land within Lassen Volcanic National Park.

9. Juniper Lake

Eleven privately owned lots improved with eight summer cabins on the northeastern shore of Juniper Lake will be acquired on a willing seller-willing buyer basis. When acquired, the eight summer cabins will be removed and the sites restored to a natural condition. Previously acquired NPS-owned cabins are in the process of being removed.

When all the private lands are acquired and the buildings removed, the unpaved access road will be closed at the southeast corner of the lake and converted to a hiking trail beyond that point. A trailhead information facility, a residence for seasonal employees, and a 40-car parking area will be provided at the road terminus; these will replace the present trailhead and ranger station, which will be removed from the north end of the lake. The campground will be relocated toward the southeast; a carrying capacity study will be conducted as part of the comprehensive design project to determine the appropriate size and specific location.

These proposals will allow the restoration of approximately 6.6 acres to natural conditions. Approximately 6 acres of currently undisturbed land will be utilized for the relocated facilities.

10. Butte Lake

The 98-site campground, comfort stations, ranger station/residence, and corral will be retained at Butte Lake. Two new employee residences for seasonal personnel will be constructed on a previously prepared site, replacing trailers that are hauled into the area each summer. A deteriorated structure that serves as a fire cache/storage building will be replaced by a new structure in a more central location. The access and campground roads paving project (±3.50 miles), halted due to insufficient funds, will be completed. These proposals will not increase land use in the area. Relocation of the fire cache will allow restoration of approximately 0.2 acre in a scenic area while disturbing the same acreage at the residential area.

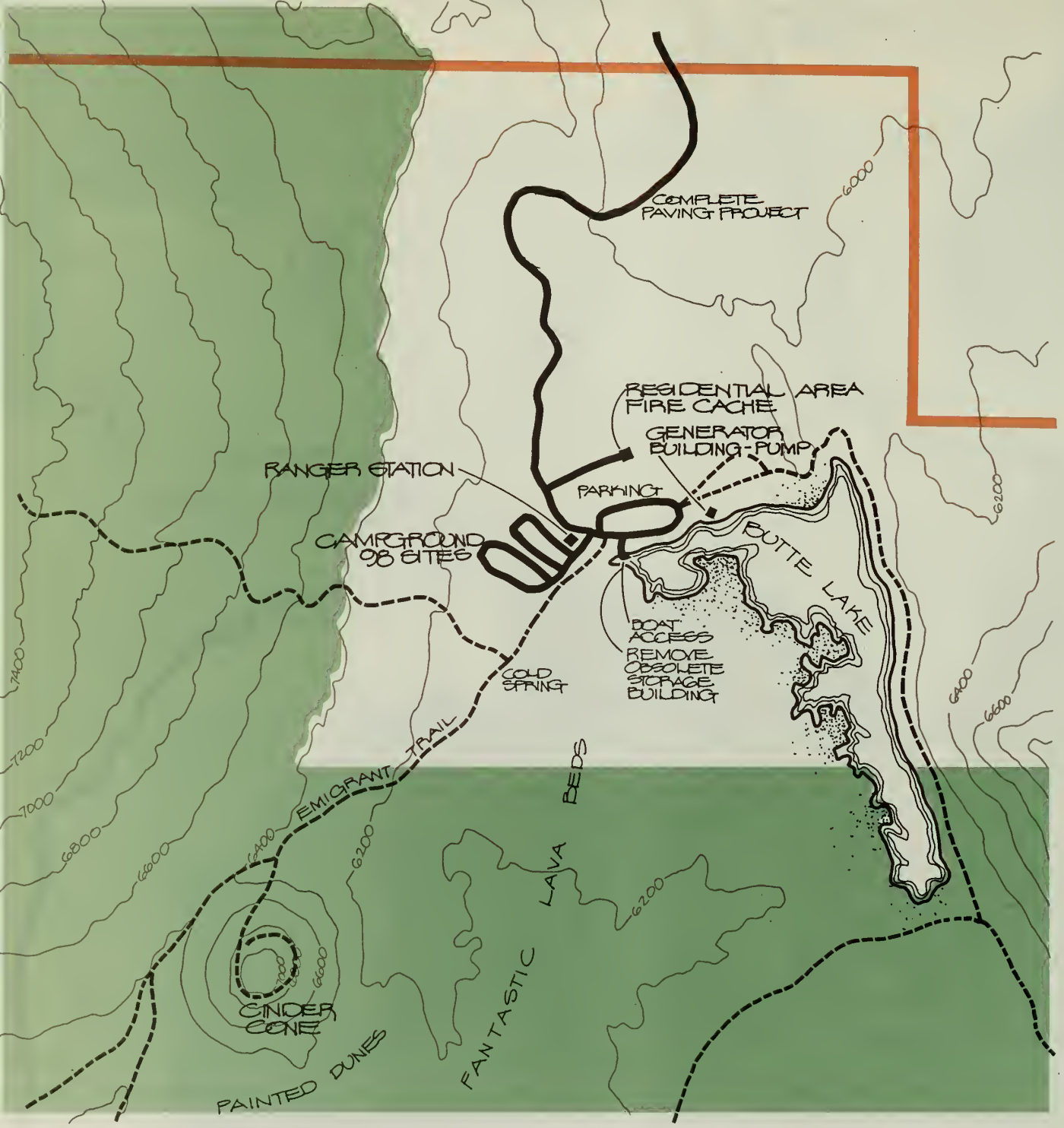
D. Capacity

Visitation to Lassen Volcanic National Park is relatively low when compared to other major national parks in the western United



JUNIPER LAKE DEVELOPMENT CONCEPT

LASSEN VOLCANIC NATIONAL PARK



WILDERNESS

111 | 20009A
DSC | DEC 80

0 1/8 1/4 1/2 MILES

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

BUTTE LAKE DEVELOPMENT CONCEPT

LASSEN VOLCANIC NATIONAL PARK

States. Some of the more popular areas in the park do become crowded, but on the whole the park is relatively free of this problem. Visitation forecasts do not indicate any significant increase in visitation for the foreseeable future. Therefore, no overall capacity for the park will be set by the general management plan, nor will it make any major changes in the existing capacity.

At the present time, the capacities of certain areas or facilities are set by physical limitations (primarily the capacity of parking areas) and do not necessarily relate to the visitor experience or to the natural resources in the vicinity. For example, the Bumpass Hell parking area limits the number of visitors to an area that could probably handle higher use levels, whereas the Sulphur Works parking area acts as a constraint in an area that probably cannot withstand higher use levels. Continuing resource management studies will monitor the impacts of visitor use on specific sites so that capacity levels may be established where necessary. An overall capacity for the park will evolve from the total of these specific area studies and the limitations imposed by the capacity of the Lassen Park Road. Future decisions to develop or expand facilities in specific areas will be based upon an analysis of the potential impacts on the natural resources and upon the visitor experience.

Most visitors to Lassen Park use the park road at one time or another. No studies have been made regarding the actual capacity on the road. (See further discussion of road capacity in section II.K.1.) Based on studies of similar roads in other national parks, the Lassen road has an estimated capacity of 200 to 400 cars per hour. The scenic qualities, narrow shoulders, and tight curbs in some areas make the lower figure more realistic for recreational use. Approximately 54 percent of park visitation occurs over the 90-day summer season. Eighty percent of visitation occurs between 8 a.m. and 4 p.m. Using these figures the park road has a capacity of approximately 1,600 cars per 8-hour day and 2,000 cars per 12-hour day. Peak day travel records have not been kept, but the peak day probably occurred in August 1972, when an average of 1,200 to 1,300 cars per day entered the park. Of these, 1,100 to 1,200 used the park road.

Utilizing park visitation data from 1960 to 1980 there appears to be no observable trend of either increase or decrease. Instead, such events as gas crises, road closures due to snow, and fire hazards have affected annual visitation dramatically in the past. If, for the sake of putting capacity levels into understandable terms, we assume visitation increases at an annual rate of 5 percent (which appears unrealistically high), the number of cars would exceed the capacity of the park road by the turn of the century.

The park road does not appear to be a constraint on increasing visitation over the next 20 years. However, the popular attractions, with their limited parking areas, will become more difficult to visit as overall visitation increases. Busing visitors to the more popular attractions has been considered, but this would not fit the normal drive-through visitor use patterns. Also, the capability of the resources to withstand additional use is not known. Until these capabilities are better understood, parking at these areas will not be expanded and NPS operated busing will not be implemented.

The optimum capacity of the ski area is 500 persons on the slopes at one time, plus 30 percent who are not downhill skiing at any one time, for a total of 650 persons at one time. On peak days, ticket sales are limited to 800, but at this capacity the area may be overcrowded. In 1977-78, ticket sales exceeded 500 on 28 percent of the operating days. Depending on skier patterns, weather, and other variables, there were some days with long lift lines and excessive crowding on the slopes, particularly in the congested area between the top of the intermediate tow and the base of the Poma lift. Besides the slope, the other limiting factor is the parking area, which will hold approximately 250 automobiles and about four buses. Although some turnover in use occurs on a normal day, the majority of visitors spend most of the day at the ski area. When weather is poor, the Chalet becomes extremely crowded and cannot accommodate a majority of the visitors.

Including the ski area parking facility, there are approximately 836 parking spaces currently available, in either designated surfaced areas or in surfaced turnouts along the park road. In addition, about 629 spaces are available at picnic and camp sites throughout the park. This latter estimate does not take into consideration multiple-car parking sites within the campgrounds, or parking in campgrounds and picnic areas by large recreation vehicles.

As a result of the proposal, minor changes in parking capacities will occur. Approximately 150 parking sites will be added in the Manzanita Meadows area and at the Sunflower Flats trailhead. With the removal of the day use area adjacent to Manzanita Lake, approximately 60 spaces will be obliterated. The total number of surfaced spaces available in the park will be approximately 986, excluding those in campgrounds and picnic areas. These spaces will accommodate approximately 15,000 cars per day if the average stay is 30 minutes. As tour bus use increases, some existing parking spaces may be converted to bus parking.

Fifty-four picnic sites are currently available in the park. Additional picnic sites may be installed at trailhead parking areas if there is an indicated need.

Overnight front-country campsites will total 575 throughout the park; this total includes 91 sites that will be available with the reopening of loops A and B of the Manzanita Lake campground. On a peak day in the summer there could be approximately 2,500 to 3,000 overnight visitors in the campgrounds, Drakesbad Guest Ranch, and the backcountry.

The present and proposed facilities appear adequate to serve the visitors for the life of this plan. There is no indication of a need to set overall capacities and restrict visitation. Monitoring of visitor use patterns and resource impacts will alert the park to changing conditions that may require such actions as advance campground and backcountry reservations or restrictions on vehicle entrance in the future.

E. Implementation

The general management plan contains the long-range strategy for management of Lassen Volcanic National Park and ensures compliance with a wide variety of legislative and executive requirements, management policies, and procedures. For the most part the plan is conceptual and must be used with other implementation documents that detail elements of the plan.

Field surveys will have to be made to site structures and facilities, and physical tests made for sewage treatment facilities. Environmental analysis will proceed apace with these studies to evaluate their specific impacts upon the environment, and to develop further actions to mitigate those impacts that are adverse.

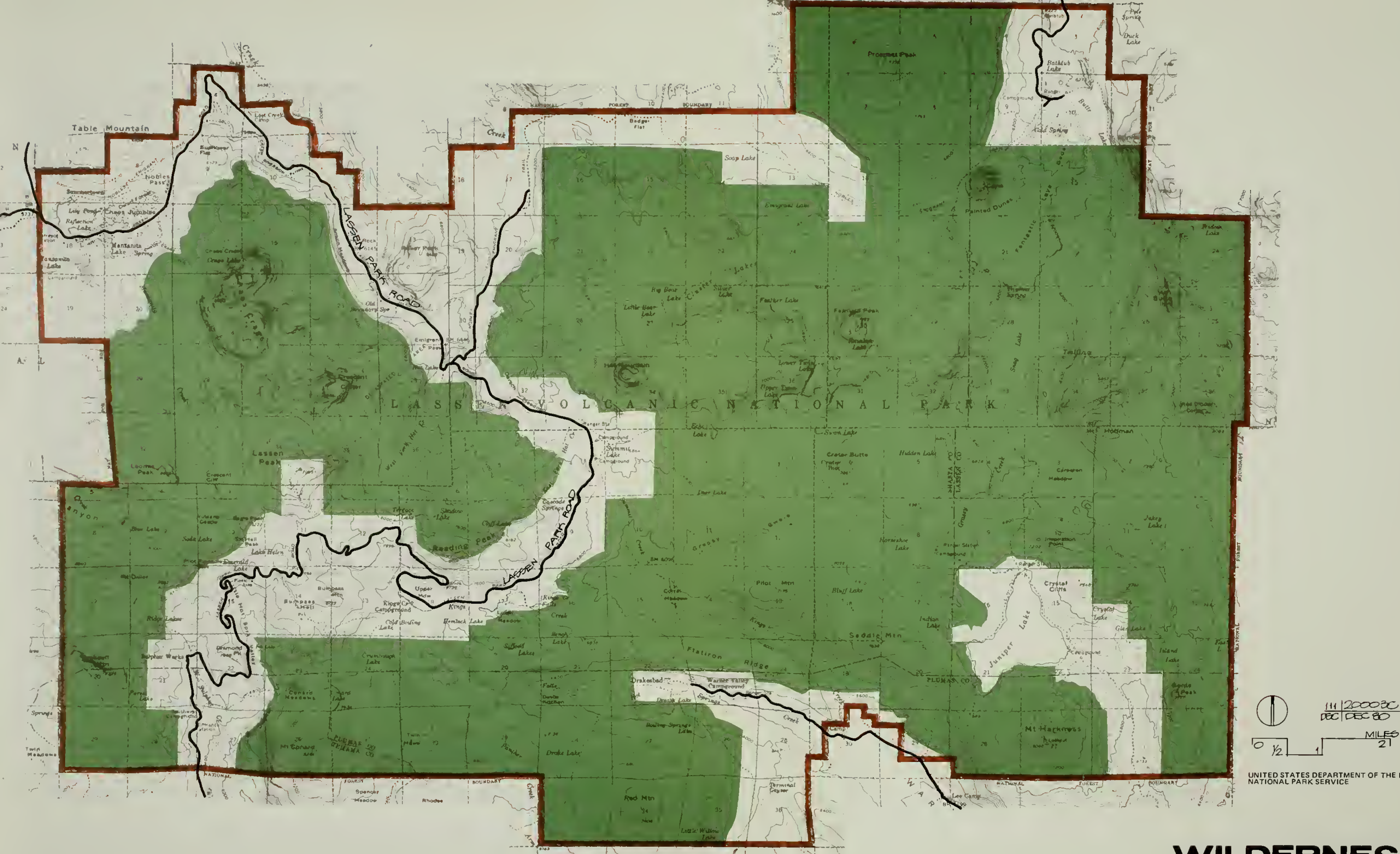
Implementation of the major proposals in the general management plan will not occur immediately upon approval of the plan. Following detailed planning and environmental analysis, each proposal must compete with funding requests from other units of the National Park Service, and some of the proposed actions could take several years to implement.

F. Interrelationships with Other Plans and Proposals

In 1972, 78,982 acres of the park were designated as wilderness by Congress (see Wilderness map). These wilderness lands share a common boundary with the 18,080-acre Caribou Wilderness in Lassen National Forest east of the park. A number of wilderness additions and new wilderness areas within Lassen National Forest are under consideration in Congress and some of these are also contiguous with Lassen Volcanic National Park. The extent to which the shared wilderness resource will be interconnected for public use, if at all, and the commonality of management, will continue to be subjects of mutual concern and will require future bi-agency planning. The general management plan proposes no actions that will adversely affect the continued use of these lands as wilderness.

The wilderness lands within the park and other roadless areas are being managed under the concepts of the park's revised backcountry management plan which was approved in 1973. The backcountry management plan establishes guidelines and sets limits to provide protection for the resource from overuse and to provide a quality experience for the backcountry and wilderness visitor. The plan is an outgrowth of concepts formulated early in the development of the park's natural resources management plan and is consistent with the principles of the general management plan. The trail system proposed in the general management plan will facilitate access and use of the park's nonwilderness backcountry. When acquisition of inholdings is completed, a study will be made to determine if wilderness boundaries should be revised.

In 1975, studies were conducted on selected cultural resources in the park to evaluate archeological and historic resources that could be affected by actions proposed in the general management plan. It was found that proposed actions will significantly affect cultural resources. Therefore, the compliance procedures listed in the section on mitigating measures (section IV) are to be considered as proposed actions of the general management plan.



UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

WILDERNESS

LASSEN VOLCANIC NATIONAL PARK

A natural resources management plan was approved in July 1979 following public comment. That plan and its accompanying environmental document have been drawn from in the preparation of this environmental impact statement and the general management plan. The resources management plan details the direction for managing natural resources, and monitoring the effects of visitor use, and sets the use capacities for natural areas within the park.

In 1976, the National Park Service and the California Department of Fish and Game entered a 2-year study of national park areas in California to determine the suitability of fish stocking in natural areas. The results and decisions stemming from this study are discussed in the park's natural resources management plan.

The park is completely surrounded by Lassen National Forest. Actions within one administrative unit that might affect the resources of the other require that the two agencies maintain a constant liaison and high degree of cooperation. The proposal of the general management plan to develop joint Forest Service and Park Service visitor facilities in Manzanita Meadows and to develop sewage treatment facilities at Bluff Falls outside the southwest entrance, has required, and will continue to require, close cooperation and coordination in planning. Also, all of the facilities and roadways to support public use of the park cannot be contained within the park's boundaries. Thus the park is dependent upon continued Forest Service actions outside of the park to support in-park levels of use.

The California Region Land Use Planning Program of the Forest Service previously identified for further study the Mill-Deer Creek, Almanor, and Hat Creek planning units surrounding Lassen Volcanic National Park. Current scheduling calls for completion of a land use/resource management plan for all of Lassen National Forest in 1983. It will be during this planning phase that the National Park Service will participate with the Forest Service in formulating many details of planning which will affect both the park and adjacent forest lands.

For at least 30 years the National Forest Service has recognized the potential for a winter sports area at Carter Bowl on Butte Mountain in the Almanor planning unit, 18 airline miles southeast of the Lassen ski area. The Forest Service does not view the development of Carter Bowl as feasible at this time, and their only activity in this area is the collection of snow-depth data.

Planning at Lassen Volcanic National Park has taken place concurrently with planning at Lava Beds National Monument and nearby national forests with volcanic features, such as the Medicine Lake area of Modoc National Forest. Regional planning efforts extend from Lassen Volcanic National Park northward to Newberry Crater in central Oregon.

The general management plan proposes continued monitoring of volcanic and seismic activity within the park and continued studies of geologic hazards. The results of such studies are essential in the evaluation of the relative safety of proposed actions in the general management plan.

HAT CREEK LAND-USE
PLANNING UNIT
START 1978
FINISH 1980

LASSEN VOLCANIC
NATIONAL PARK

ALMANOR LAND-USE
PLANNING UNIT
FINISH 1977

MILL-DEER CREEK LAND-USE
PLANNING UNIT
START 1977
FINISH 1979

* BUTT MOUNTAIN
POTENTIAL SITE FOR
DOWNHILL SKI AREA

MILES
0 1 2 3 4 5

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

LAND PLANNING UNITS

LASSEN NATIONAL FOREST

LASSEN VOLCANIC NATIONAL PARK

II. Description of the Environment

A. Physiography

The southern Cascade Range is characterized by a series of isolated volcanic peaks situated on a great lava plateau. This geographic unit includes not only Lassen, but its sister parks of Lava Beds National Monument in California and Crater Lake National Park in Oregon.

West of Lassen a great mass of lava slopes gradually toward the Sacramento Valley. This sloping area is notched by westward-trending stream-cut canyons. The lower reaches of this incline present a striking appearance: a rock-strewn plain with countless lava boulders--the resistant remnants of volcanic mudflows.

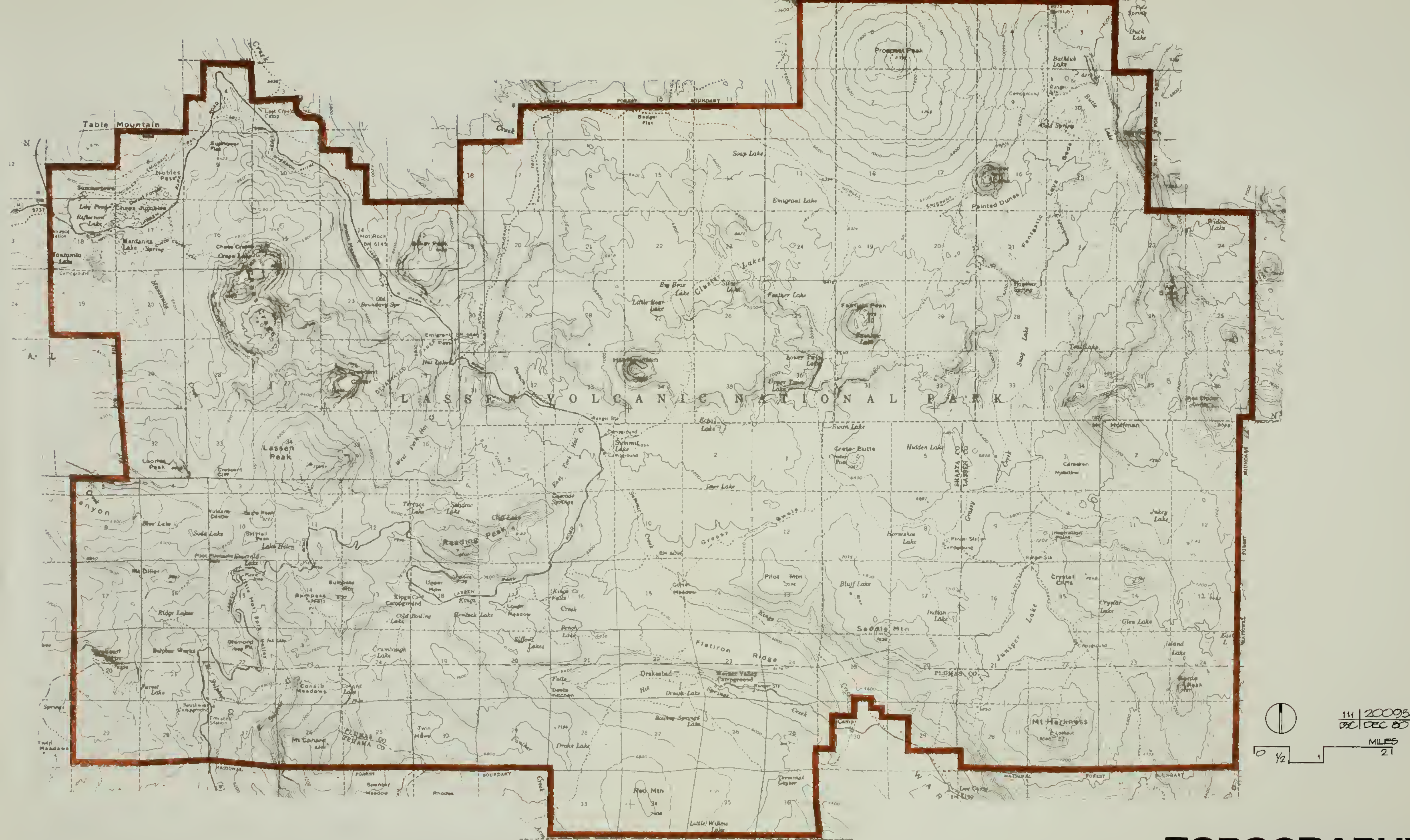
In the western portion of the park is a rugged, high mountain zone. It is made up of a north-south group of volcanic peaks ranging from 7,000 feet in elevation up to Lassen Peak, towering nearly 2 miles above sea level. The landscape here is characterized by great lava pinnacles, cliffs, huge mountains made of lava flows, jagged craters, and steaming sulphur vents--Sulphur Works, Bumpass Hell, and others. This high mountain zone is cut by spectacular canyons bearing marks of the work of glacial ice and containing many beautiful blue lakes, clear rushing streams, persistent snowbanks, and lush green meadows that exhibit colorful wildflower displays in late summer.

The eastern portion of the park is a lava plateau lying at about 6,500 feet above sea level that comprises more than half of the land area of the park. It is forested with pine and fir and studded with small lakes. There are several grassy flats on the plateau, but streams are few in number and small in size. Small cinder cones, such as Fairfield Peak, Hat Mountain, and Crater Butte, are among the most distinctive physiographic features in the eastern part of the park.

The southern edge of the Lassen plateau is cut deeply by Warner Valley, elevation 5,300 feet. This valley exhibits steep glaciated walls and is marked by several steaming or hot spring areas--Boiling Springs Lake, Devils Kitchen, and Terminal Geyser. The valley is forested and contains large and beautiful meadows.

Along the northern and eastern boundaries of the park are peaks and ridges of lava, for the most part modified by erosion. Far to the east in the park, a north-south depression holds the three largest lakes: Juniper, Snag, and Butte. Juniper is the largest of these, about one square mile in area.

Complementing these physiographic features are several sites of recent volcanic activity: the Devastated Area on the northeast flank of Lassen Peak, where virtually all life was destroyed by eruptions in 1915; and desolate Fantastic Lava Beds near Butte Lake with stark, symmetrical Cinder Cone, active in the 1850's. Prior to the eruption of Mount Saint Helens in 1980, these sites represented the most recent volcanic activity in the contiguous United States. Spectacular Chaos Jumbles, a rockfall-avalanche with an unusual dwarf forest, is only 300 to 1,200 years old. It is here on Chaos Jumbles at Manzanita Lake that the major visitor facilities in the park were developed by the National Park Service and the Lassen Volcanic National Park Company.



TOPOGRAPHY

LASSEN VOLCANIC NATIONAL PARK

B. Climate

The park region has relatively cool summers and cold winters typical of high mountain country in temperate regions. This contrasts dramatically with the nearby Central Valley lowlands of California, where summers are often oppressively hot and winters are cool. The comfortable summer temperatures in the southern Cascades is a strong attraction to residents in the Central Valley lowlands.

The climate differs within the park with changes in elevation (from 5,500 feet to over 10,400 feet) as well as with changes in season. Summers are generally dry with clear skies, but late summer brings occasional thunderstorms. Mean summer temperatures range from 48°F in May to 68°F in July, and about 9.5 inches of rainfall can be expected from May through October.

Most of the annual precipitation falls as snow during the winter. The average annual snowfall is about 13 feet, but some areas of the park may receive more than 30 feet of snow per year. The average mean temperature from November through April is approximately 33°F.

Detailed weather data is available for the park headquarters at Mineral, California, at an elevation of 4,900 feet and 9 miles southeast of the Lassen ski area. Here the average annual precipitation is about 52.5 inches and most of it comes from the average annual snowfall of about 158 inches. Mean monthly temperatures range from 31°F in January to 63°F in July. The average minimum temperature is 21°F in January and 44°F in July, while the average maximum temperature is 40°F in January and 81°F in July.

The Lassen ski area generally experiences slightly cooler temperatures than the headquarters at Mineral as a result of a slight gain in elevation (approximately 1,500 feet). The area probably receives more than one-tenth of an inch of precipitation on at least 100 days of the year, and on 70 of those days it receives half an inch or more. The base of the Lassen ski area is at an elevation of 6,800 feet and receives approximately 370 inches of snow each year. Between snowmelt and rain, the ski area receives an estimated 60 to 65 inches of precipitation each year.

The heavy snowfall requires continual snow removal from the park road during the winter to provide access to the ski area. Spring opening of the transpark road normally requires two months of snow clearing activity due to the heavy snowpack. On May 1, 1978, some 235 inches of snow containing 95 inches of water was measured on the Lake Helen snow course. This is the fourth deepest snowpack since the survey was established in 1928. As a consequence, the transpark road was not fully opened to park visitors until mid-June.

Periods of high velocity winds have been experienced in the past. The last damaging windstorm was on October 12, 1962, when a regional storm uprooted thousands of trees in the park. Much of this storm damage can be seen from the transpark road in a red fir forest on the eastern side of Reading Peak. Small windfalls also occurred at the Lassen ski area. The park staff at the ski area report that wind speeds

are normally moderate, with 60 mile per hour winds being occasional and 80 to 100 mile per hour winds being rare. Additional data on wind direction and velocity is presented in the subsection devoted to air quality.

C. Geology

1. Geologic History

At an elevation of 10,457 feet, Lassen Peak is the highest point in the park, and it dominates the scene as the central natural attraction for most park visitors. It is a relatively recent volcano, and although presently quiescent on the surface, it is still considered active.

The oldest rocks exposed in the park are the andesitic and basaltic lavas that flooded the eastern part of the Lassen region and form the low, broad plateau underlying the Cascade Range. About 50,000 years ago, the southern end of this plateau was the site for the growth of a great stratovolcano, Mount Tehama, a major peak of the Pacific Ring of Fire volcanic and seismic zone.

The growth of Mount Tehama was followed by a change to dacitic plug volcanic acitivity throughout the park, which has continued into the present century. By about 33,000 years ago, Mount Tehama had collapsed, perhaps explosively as its great sister Mount Mazama did 6,600 years ago in what is now Crater Lake National Park. Tehama's caldera was breached, and no great central lake was ever formed. The main vent, or throat, of Mount Tehama is at the Sulphur Works and the remnants of its flanks are preserved as the encircling peaks of Brokeoff Mountain, Mount Diller, Pilot Pinnacle, and Mount Conrad.

Before Mount Tehama collapsed, new vents opened on its northeastern flank, and dacitic plug volcanoes began to be formed. This dacitic volcanism typically began with highly explosive expulsions of tephra and pyroclastic flows. Dacitic eruptions are not very fluid and can be compared on a grand scale to toothpaste squeezed from a tube. Shortly before Lassen Peak began to be formed, violent explosions and eruptions to the north of it resulted in pumice cones and dacite domes as far north as Sunflower Flat. At the same time, fiery clouds of ash erupted into the Manzanita Creek, Lost Creek, and Kings Creek drainages. The extrusion of the Lassen dome of dacite began about 11,000 years ago. As the Lassen lava dome grew in height, its crust fractured and crumbled onto the lower flanks of the volcano to form long slopes of talus.

Major volcanism began again in the area north of Lassen Peak between 1,000 and 1,200 years ago where the Chaos Crags now stand. Pyroclastic flows swept down Manzanita Creek as far as 5 miles. This pyroclastic eruptive phase was followed by the eruption of four or more dacite domes with an estimated volume of about 0.25 cubic miles (or 1,307 million cubic yards) to form the Chaos Crags. More than 300 years ago, the steep northwestern side of Chaos Crags collapsed, and a rockfall-avalanche containing about 200 million cubic yards swept into the Manzanita Creek drainage. It struck the base of Table Mountain at a speed in excess of 100 miles per hour, and rose 400 feet up the side of Table Mountain before expending its energy and slurging back into Manzanita Creek to form what is now the Chaos Jumbles.

During the last thousand years, the northeastern part of the park (Butte Lake Area) has had at least three periods of eruptions, the latest in 1851. The eruptions were violent on a local scale and formed the Cinder Cone and the Fantastic Lava Flows. The eruptions were not as far-reaching and devastating in effect as the more explosive dacite dome eruptions.

The most recent volcanic activity in the western part of the park began in 1914 on Lassen Peak. Some 150 separate ash falls were ejected from vents on the summit before May 19, 1915, when there was an actual eruption of dark, dacite lava. Flows poured over the northeast and southwest edges of the summit. Their high viscosity prevented them from flowing very far, but the northeast flow spilled onto snow and loose debris from previous eruptions, and the resulting meltwater and loose debris became an immense, hot mudflow that plunged down the mountain toward Raker Peak. The Great Mudflow was divided by Raker Peak, and the drainages of Lost Creek and Hat Creek were inundated by this high velocity slurry which was cutting a quarter-mile-wide swath through the forest. The Great Mudflow rushed down Lost Creek for about 8 miles, leaving deposits of mud 20 feet deep in many places and almost completely destroying the environments of the stream and meadows along its path.

The most highly explosive historic climax eruption of Lassen Peak occurred on May 22, 1915. Known as the Great Hot Blast, it was a hot gaseous cloud that spewed down the northeastern slope of the crater. It followed the same course as the Great Mudflow, but its path was broader and it only traveled 3 miles. The Great Hot Blast uprooted and sheared off nearly all of the trees in its path. The Great Hot Blast and the Great Mudflow destroyed more than 5 million board-feet of timber between them.

Lassen Peak and the Chaos Crags are quiescent now, but spasms of microquakes and the geothermal areas at Sulphur Works, Bumpass Hell, Little Hot Spring Valley, Boiling Springs Lake, Devils Kitchen, and Terminal Geyser are all evidence that the area should be considered far from dormant.

2. Hazards from Geologic Events

An administrative report was submitted to the National Park Service by scientists of the Geological Survey concerning the areas that could be threatened by potential future geologic events (Crandall, et. al., 1970). The report singles out the perched boulders above the roadway at Diamond Peak and the thermal waters of the park as two serious hazards that could be significantly reduced by remedial actions, which have subsequently been undertaken by the park staff. Protection from other potential geologic events of a catastrophic nature can only be gained by being absent when they occur. In 1974 the same scientists published a report on their studies in the Manzanita Lake/Chaos Crags area (Crandall, et. al., 1974). Much of what follows has been gleaned from these two reports and oral statements by these and other geologists. The Recent Geologic Events map locates those areas which have been visited by catastrophic geologic events in the last 32,000 years.



1 DEVASTATED AREA - GREAT HOT BLAST OF 1915

2 MUDFLOWS – 1915

3 ROCKFALL-AVALANCHE DEPOSITS (300-1200 YEARS AGO AT CHAOS JUMBLES)

4 DACITE DOMES (1100 YEARS AGO - CHAOS CRAGS)

5 YOUNGER PYROCLASTIC FLOW DEPOSITS (1000 TO 1200 YEARS AGO)

6 OLDER PYROCLASTIC FLOW DEPOSITS (12000 TO 32000 YEARS AGO)

7 NOTABLE ACCUMMULATIONS OF PYROCLASTIC EJECTA THROWN OUT OF THE VOLCANOES DURING SEVERAL PERIODS OF ERUPTION

DEPTH OF TEPHRA (AIRFALL MATERIAL) OF 1000 - 1200 YEARS AGO, SHOWING BOTH THE OUTER LIMIT OF ACCUMULATION AND THE 10 CENTIMETER ISOPATCH

111 | 120290
DEC | DEC 80

0 ½ 1 2 MILES

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

RECENT GEOLOGIC EVENTS

LASSEN VOLCANIC NATIONAL PARK

a. Characteristics of Volcanic Events

Although renewed volcanic activity could take place anywhere in the park, the administrative report identified the area stretching northward from Lassen Peak to Sunflower Flat as the most likely area of future activity. Such activity would probably consist of explosive ejection of material as tephra or pyroclastic flows followed by or concurrent with the extrusion of dacitic lavas. Mudflows, landslides, floods, and earthquakes might be expected to accompany such volcanic action.

(1) Explosive Activity

The most catastrophic event a plug volcano has the potential for is exploding from gas or steam pressures with such violence that it destroys the entire central portion of the volcano, leaving a great central depression known as a caldera. Examples of such phenomena are Mount Mazama, Mount Tamboro, Krakatoa, Mount Pelee, Katmai, and Mount Somma at Pompeii and Valles Caldera north of Santa Fe, New Mexico. During the last few million years, such cataclysmic eruptions have occurred repeatedly in California, Oregon, Washington, Nevada, and New Mexico. Such a violent event is usually preceded by some minor volcanic activities that may provide a warning and sufficient time for evacuation of threatened areas. However, apparent dormancy is no guarantee of safety, for Mount Tamboro had been dormant for 200 years and Mount Somma at Pompeii was not even known as a volcano. Mount Tehama at Lassen may also have exploded suddenly, forming a caldera.

The development of a caldera by explosive collapse is of such magnitude that many cubic miles of material are blown into the air and consumed by the collapsing caldera. If such an event occurred without warning beneath the Chaos Crags there would be little chance to escape this violence anywhere in the northwestern portion of the park and surrounding national forest.

(a) Pyroclastic Explosions and Flows

Pyroclastic flows are hot dry flows of volcanic rock debris that is propelled chiefly or wholly by gravity and lubricated by air trapped and heated within the debris, or by hot gases emitted by the rock debris, or both. A pyroclastic flow commonly consists of basal flow of hot rock debris and a nuee ardente, or glowing cloud, which moves downslope over, and often ahead of, the basal flow. The nuee ardente may rise thousands of feet into the air and usually covers more area than the basal flow, and can easily sweep over low ridges that will contain the basal flow.

The basal flow buries and incinerates all things in its path. The principal dangers to humans from a nuee ardente are its great speed (35 to 75 miles per hour) and hot gas and ash burns to the skin and lungs, which asphyxiates the victim. Dacite nuee ardentes erupted from Mount Mazama at Crater Lake traveled more than 25 miles and in some areas are up to 300 feet thick. In 1902, a great nuee ardente from Mount Pelee on Martinique killed 28,000 people in a span of three minutes in the city of Saint Pierre. A pyroclastic outburst at Chaos Crags or Lassen Peak could reach the Manzanita Lake/Manzanita Meadows area in a similar amount of time.

Shortly before Lassen Peak was formed, several pyroclastic flows streamed down the valleys of the park from a number of vents. Flows originating near Sunflower Flat moved northward through Lost Creek and beyond the present boundary of the park. The southern part of Sunflower Flat is underlain by pumice from a pyroclastic flow that is older than the major glaciation of the park. Many of the pyroclastic flows in the Lost Creek drainage at Anklin Meadows are between 1,000 and 1,300 years old (Crandall, et. al., 1974).

The Manzanita Lake/Manzanita Meadows area has been extensively covered by pyroclastic flows that are more than 32,000 years old and may relate to the oldest flows in the southern part of the Sunflower Flat area. During the Chaos Crags eruptive phase, but before the Chaos Jumbles avalanche, pyroclastic flows repeatedly moved from the vent areas downslope into the valleys of Manzanita and Lost creeks, one reaching into the area now occupied by the Manzanita Lake campground, and one pyroclastic flow is reported (Macdonald 1966) to be as recent as 200 years and to overlie Chaos Jumbles material. The paths taken by these flows are shown on the Recent Geologic Events map.

(b) Tephra

Tephra is the name given to rock debris that is thrown into the air by a volcanic eruption. This debris may range in size from huge blocks, which fall near the vent, to fine ash, which can be carried many miles by the wind currents. The map shows part of the tephra fallout area that is linked to the Chaos Crags eruption about 1,200 years ago. Because of westerly winds during the eruptive period, most of the finer material was deposited to the east of the Crags area.

The hazards from a tephra fall come from being struck by large fragments, breathing fine ash and accompanying gases, and reduced visibility on highways. Roofs can become overloaded with tephra and collapse on those who have taken shelter beneath them. There is also corrosion of metals by acids carried in the tephra fall, and turbidity and acidity from the fall will affect lakes and streams used as a water supply.

(c) Steam Explosions

Steam explosions are similar to pyroclastic explosions except that water, as steam, is the propelling gas. As these explosions do not always depend upon a renewal of volcanic activity in the area, they can occur without warning. The Great Hot Blast may have been such an explosion. If it had occured at Chaos Crags and been directed down the Chaos Jumbles, it would have reached well into the Manzanita Meadows area. Direct hazards from steam explosions include scalding burns, being struck by flying debris, or being thrown against large unyielding objects.

(2) Lava Flows

Basaltic lava flows normally move so slowly that a person can walk or run from their path. Dacitic lava flows are even less fluid, and areas threatened by them can be evacuated. Because of their high viscosity, dacite flows travel only short distances, and their area of destruction is quite limited.

(3) Mudflows

Mudflows occur when eruptions melt snow and ice and the water produced mixes with large amounts of ejected volcanic debris. Mudflows can move at speeds as high as 55 miles per hour and they can flow for great distances, as evidenced by the 8-mile length of the Great Mudflow from Lassen Peak in 1915.

Mudflows move down valley floors, and those of large volume can overtop stream banks and spread onto adjacent low-lying surfaces. Because of their massive force, mudflows crush and carry away everything in their path. They may contain hot material but the chief danger to humans is from crushing and smothering.

(4) Floods

Eruptions can cause floods in several ways. Steam and many of the gases from an eruption condense and fall as rain, and the normal moisture in the air will nucleate about the finer particles of tephra which are blown into the air. The increase in precipitation can combine with melting of snow and ice from the heat of the eruption and produce abnormal amounts of runoff and consequent flooding of lowland areas. Landslides, avalanches, or flows caused by the eruption can also block drainages and impound flooding lakes behind them, which eventually overtop the dam and cause flashflooding downstream. Flows or landslides that suddenly enter lakes cause a displacement of water, which may surge into nearby areas of low relief. Drowning and the loss of property are the obvious hazards from floods.

b. Characteristics of Nonvolcanic Events

(1) Earthquakes

The area of the park is not known to be in a zone of major earthquake activity from nonvolcanic movements in the earth's crust, but this does not rule out the potential for a major earthquake to occur. Aside from the normal expected hazards to humans from fires and the collapse of structures, a major magnitude quake centered at Lassen Volcanic National Park could generate other geologic events of a more catastrophic nature, such as renewed volcanic activity.

Boulders perched on steep slopes above the Lassen park road could tumble onto the roadway and crush motorists, as could landslides from steep cliffs adjacent to the road.

A major earthquake could reactivate the large prehistoric earthflow at the Lassen ski area. The parking area and the lodge are built on the earth flow (see Recent Geologic Events map) and would be destroyed if it began to move again. There is no evidence today of surface creep, and geologists believe that the mass is now stable. The mass is sufficiently drained so that water saturation is not high enough to allow movement. The critical threshold level for water content that would cause renewed movement in parts of the earthflow is not known. Changes in water saturation caused by such activities as adding water from septic tanks or leach fields, trenching, or changing the vegetative cover could cause renewed movement within the earthflow. There may be sufficient moisture normally in the earthflow that it could begin to move again if shaken by a major earthquake.

(2) Rockfall-Avalanche

A rockfall-avalanche differs from a normal debris avalanche in that it travels in part on entrapped and compressed air. Rockfall-avalanches characteristically involve a tremendous mass of rock debris that falls as a nearly coherent unit down a vertical or near vertical drop of great extent. The volume of these rockfall-avalanches is measured in thousands of millions of cubic yards, and the vertical drop is usually a thousand feet or more. It is this nearly vertical fall, the coherency of the debris, and great mass that enable the debris to entrap the air necessary to lubricate and cushion the avalanche. A slow or turbulent breaking away of the rock mass, insufficient vertical drop, or an insufficient volume of involved rock will convert a potential rockfall-avalanche into a normal avalanche of limited lateral extent.

Rockfall-avalanches attain velocities greater than 100 mph and can travel several miles over relatively gentle terrain. With their great velocity and mass, these avalanches are constrained and channeled only by major topographic features. Aside from their obvious capacity to crush everything before them, there is a marginal air-blast created by the avalanche that can destroy buildings and trees within 500 feet of the slide.

As described by the Geological Survey (Crandell, et. al., 1974, p. 59) the dacite domes of Chaos Crags retain sufficient height and rock mass to hold the potential for future rockfall-avalanches. These avalanches could equal or exceed the size of the Chaos Jumbles event, and the USGS scientists thus "regard as hazardous the areas within a distance of about 5 km (3.1 miles) downslope from Chaos Crags to the east and to the west." This would include the lowland areas down Chaos Jumbles into Manzanita Meadows, the drainage leading to the Manaznita Lake campground, and the Lost Creek drainage at Anklin Meadows.

The park road through Anklin Meadows along Lost Creek is about 1,500 feet east of a relatively small rockfall-avalanche deposit. The debris from the rockfall-avalanche covers an area about 3,500 feet long and 1,700 feet wide, as shown on the Recent Geologic Events map. The exact age of this avalanche is not known; however, the lack of an obvious reentrant or scar in the face of Chaos Crags above the slide indicates that the rockfall-avalanche probably occured about 1,200 years ago during the formation of Chaos Crags. The likelihood of additional rockfalls occurring along Lost Creek appears to be about the same as that in other areas along the park road that are immediately beneath steep slopes, such as Bumpass Mountain or Diamond Peak.

The Chaos Jumbles is a broad band of angular rock debris from a rockfall-avalanche. It extends from the northwest base of the Chaos Crags northwestward and westward for a distance of about 2.7 miles and covers an area of 3.1 square miles. The volume of the debris is estimated at close to 200 million cubic yards, and its weight at 300 million tons. The avalanche struck the base of Table Mountain 1.5 miles from Chaos Crags with a velocity greater than 100 mph; it rose 400 feet up the side of the mountain before losing its momentum and tumbling

back into the Manzanita Lake area. This event occurred between 300 and 1,200 years ago.

If a similar Chaos Jumbles event occurs in the future, the potential exists for it to extend into section 13 of the Manzanita Meadows area. The Chaos Jumbles rockfall-avalanche resulted from the collapse of the Chaos Crags just north of the highest dome; one which was reported as issuing steam in the 1850s. If this area of the Crags were to collapse, it could generate a rockfall-avalanche that could channel itself down the drainage containing the Manzanita Lake campground. The likelihood of these and other catastrophic geologic events is explored in section III, Environmental Impacts of the Proposed Action.

3. Geophysical Monitoring

The present seismograph at the park headquarters in Mineral does not provide adequate coverage and sensitivity for a volcanic early warning system. In 1972, the Geological Survey Volcanoes Research Program under Dr. Peter Ward installed an experimental seismic system in the park. The system relayed its data via satellite for more than a year until it was removed in 1974 because of a lack of funds. This single instrument package was able to record swarms of microearthquakes but was not able to plot their source because the quakes were too small to be recorded by more distant seismographs.

In 1976, the National Park Service made funds available to the Geological Survey for installation of a geophysical monitoring system within the park, and the system has become operational. Two tiltmeters were placed on Lassen Peak to measure any swelling or deflation of the peak that might indicate volcanic activity. Two inclinometers were installed on Chaos Crags to attempt to measure movements between the surface rocks. There is usually some minor slippage prior to an avalanche getting fully underway. These instruments will provide data for future planning, but may not be able to provide sufficient advance warning of a rockfall-avalanche.

Four seismometers have been installed in addition to the one in operation at park headquarters in Mineral. They are located at the southwest entrance, at Manzanita Lake, and on Lassen and Reading peaks. Data from the seismometers will be combined to locate the position of any subsurface movement within the park and to provide specific information about subsurface features such as faults and fluid magma chambers.

Eight instruments are connected by radio and open telephone line to both the Geological Survey Earthquake Laboratory in Menlo Park, California, and to the earthquake lab at the University of California at Berkeley. Activity is monitored 24 hours a day. The information gathered from this system will add greatly to the understanding of earthquake and volcanic phenomena. The tilt anomalies and records of microearthquakes will be periodically interpreted by specialists of the Geological Survey to develop a data base background from which significant changes can be plotted.

This seismic system will provide the first long-term continuous monitoring of a volcano in the Cascade Range. Eventually the system will provide the park staff with the means for executing the most effective warning and evacuation plan should renewed volcanic activity begin in the park area.

Epicentral data for the region of northern California surrounding Lassen Volcanic National Park has been compiled (Bolt and Miller 1975). The most prominant feature in the area is a northwest trending seismic zone passing through Truckee, Lassen Peak, and Redding. The largest recorded earthquake along this zone was in March 1950. It had a local magnitude of 5.5, and was not part of an earthquake swarm (a series of earthquakes closely related in space and time, but without a dominant main shock).

The first 14 months of recording by the seismic system within the park has revealed that clusters of earthquakes, including swarms, are associated with the three major areas of active hot springs within the park. The Morgan Hot Springs and springs of the Mount Tehama caldera are located directly above two of the earthquake clusters, and the Warner Valley thermal area is within 1¼ miles of a third major cluster.

Virtually no earthquakes have been recorded beneath any recent dacite domes such as Lassen Peak or Chaos Crags. Seismic quiescence does not guarantee volcanic inactivity, but the lack of earthquakes suggests that faults or fractures beneath these dacite domes are either cold, have healed, or are not now being stressed, even though they are within the broader northwest trending seismic zone. Significant earthquake activity beneath either Lassen Peak or Chaos Crags should be taken as a warning of potential eruption or avalanche hazard.

In a separate study, Dr. Jules Friedman of the Geological Survey is monitoring temperatures of hot springs and fumaroles in the park by using thermistors. The data is trasmitted via satellite to Goddard Space Center, where it is monitored. It is theorized that renewed volcanic activity may be preceded by increases in water temperature.

4. Paleontological Resources

The paleontological resources of the park have not been studied. No consolidated sedimentary rocks outcrop within the park, and the temperature and violence of most volcanic events preclude the preservation of material as recognizable fossils. Some charred trees have been found in some of the pyroclastic flows, and it is possible that some of the mudflows may still contain the scrambled remains of past life in some recognizable form. The glacial deposits of the park have not been investigated for Pleistocene remains. All of the sediments in the park's older lakes may contain significant pollen and microfossils combined with ash layers which could be valuable in determining the sequence and age of past events as well as the climate in which they occurred.

5. Geothermal Potential

This section describes the geothermal energy potential of the Warner Valley area and compares this area with similar reserves that are successfully producing power from geothermal sources. Some of the information is from a Geological Survey pamphlet, Natural Steam for Power (1966), and from specific data on Lassen geothermal features provided by Donald E. Whate of the Geological Survey's Branch of Field Geochemistry and Petrology, Menlo Park, California.

Most known geothermal reservoirs contain hot water rather than steam. When this water is tapped by drilled wells and rises to the surface, the pressure falls. If the temperature of the water is above boiling temperature as the pressure decreases with upward flow, part of the water boils to steam. At the wellhead the steam is separated from the remaining liquid water and is fed to a power plant. Because the well itself acts as a continuously erupting geyser, the expanding steam propels liquid water to the surface and pumping costs are nil.

Successful commercial fields have large porous subsurface reservoirs with channels penetrating down to the heat source, near which water can circulate. The heated water rises and is stored in the porous permeable reservoirs. The best reservoirs frequently have capping rocks of low permeability that inhibit the flow of water and heat to the surface. A deep and well-insulated reservoir is likely to have much more stored energy than an otherwise similar but shallow and uninsulated reservoir.

Geothermal energy sources are not perpetual, and tapping them is, in effect, a process of "mining" heat and fluid. One significant limiting factor is the amount of water in the system. As the available water is withdrawn, the effectiveness of the system for generating power diminishes. Withdrawing water through steam wells also can be expected to disrupt the supply of hot water that reaches natural geothermal features on the surface.

In a few explored systems the heat supply is so high and the rate of discharge so low that steam forms deep in the system. Larderello in Italy and the Geysers in Sonoma County, California, are examples of less common reservoirs of natural steam. The geothermal reservoir at Lassen is believed to be of this type.

The first commercial geothermal power plant in the United States was built by the Pacific Gas and Electric Company in 1960 at the Geysers. Recent investigation at the Geysers strongly suggests the existence of a single reservoir at least 8 miles long and averaging more than 2 miles wide. Present capacity at the Geysers is 502,000 kilowatts, and there are applications for developing an additional 402,000 kilowatts. This field is now the largest in the world, having exceeded the Larderello field in Italy in 1974. The main production zone at the Geysers ranges in depth from about 1,000 to about 9,000 feet, with initial reservoir temperatures close to 465°F (240°C).

The Warner Valley area of Lassen contains a 4-mile-long, crudely linear series of thermal features. From northwest to southeast these features are Devils Kitchen, Drakesbad, Boiling Springs Lake, and

Terminal Geyser. Terminal Geyser is located in section 36, which until recently was a privately owned inholding within the park. Based on chemical tests and field investigations, Devils Kitchen strongly indicates the existence of a vapor-dominated geothermal system similar in type to the world's most economically attractive systems, Laraderello in Italy and the Geysers in California. Drakesbad, Boiling Springs Lake, and Terminal Geyser individually do not prove a high potential for developing geothermal energy. In combination with the nearly certain potential of Devils Kitchen, however, the probability is strong for a continuous subsurface vapor-dominated reservoir in the park at least 4 miles long and at least 3/4 mile wide. Surface and chemical evidence suports this assumption, which could be confirmed or disproved only by deep exploratory drilling. Also it is possible that the vapor-dominated reservoir at Warner Valley extends father northwest and west to Bumpass Hell and Sulphur Works, making it about 10 miles long. The Geological Survey estimates the area of the Lassen reservoir to be between 4 and 27 square miles, with 18 square miles the most likely size. This compares to an estimated reservoir area of about 27 square miles at the Geysers field in Sonoma County. The indicated vapor-dominated field at Lassen is believed by the Geological Survey to be the only other one in the United States that may have magnitude as large as the Geysers.

D. Soils

In anticipation of proposals in the general management plan, the soils in areas of existing and potential development were mapped in 1974. Soil series designations in use for the region were Seventh Approximation of the Soil Conservation Service. The Soil Limitations map shows the characteristics of the soils in the park that limit the types of development and use proposed by the general management plan.

Soils within the park are generally stony, shallow, readily drained, and moderately to strongly acidic. The volcanic bedrock weathers slowly into colluvium, which becomes increasingly enriched in organic material as it moves downslope.

The erosion hazard is a measure of the resistance of the soil surface to erosion by water once it has been stripped of its protective vegetation. Soils with low to moderate erodibility can be cleared for roads and trails with the expectation that nonintensive mitigating measures, such as routine rounding of cut-and-fill slopes and ordinary reseeding efforts, will prevent accelerated erosion.

Permeability is a measure of the ability of a soil to transmit water, and is used here to indicate the suitability of a soil for use as a sewage filter field. Soils with moderate permeabilities are the most suitable for such purposes because they allow for sufficient infiltration yet retain the effluent long enough for bacteria decomposition to take place. Soils with high or low permeabilities are generally not suitable for this purpose.

The depth of soil is the distance from its surface to bedrock or cemented horizons. Shallow soils and barren rocky areas are constraints on construction of roads and trails, utility lines, and other facilities because of the costs in avoiding or excavating the bedrock.

Some soils contain large percentages of uncohesive fine materials and are highly susceptible to disturbance by the wind and construction activities. Silt and clay particles blown into the atmosphere are an annoyance and irritant, and at certain exposure levels are a health hazard.

Other soil limitations that may be constraints on development in specific areas are susceptibility to mass movement, poor drainage, and rapid runoff. These particular constraints are explained in the following site descriptions.

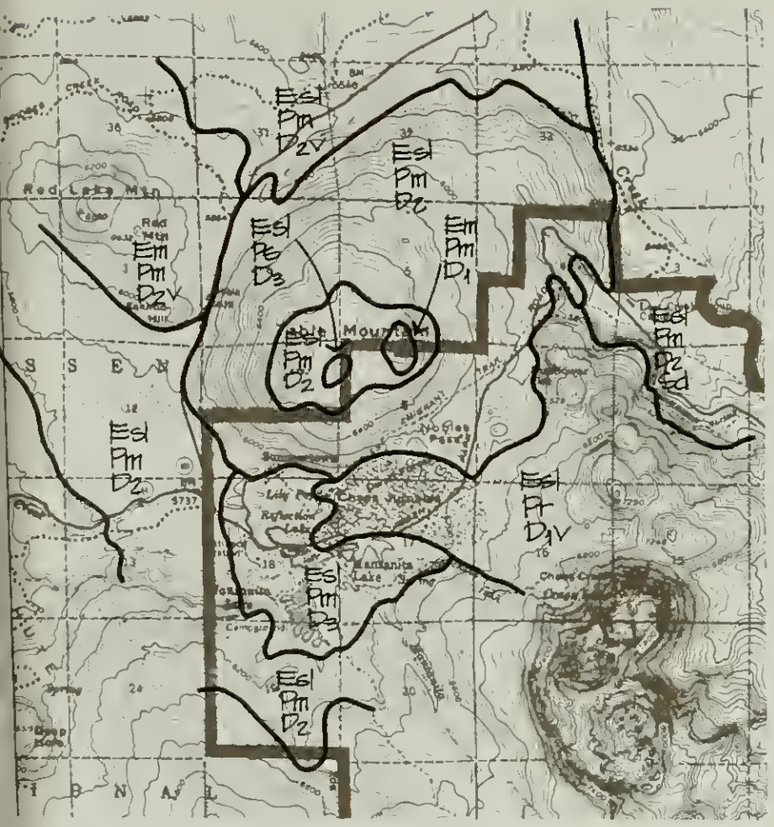
Soils across the northern portion of the park are similar to each other and are placed in the Cohasset, Lyonsville-Cohasset, and Jibbs series. These soils occur in the Manzanita Lake/Manzanita Meadows areas away from the Chaos Jumbles and in other areas of rock debris. The soils are a sandy loam, which absorbs water rapidly and permits acceptable percolation rates for sewage filter fields. These soils are generally about 5 feet deep to bedrock. The rather limited summer rainfall and the permeable soils result in a low potential for erosion in most areas, even on slopes with grades approaching 50 percent. These soils expand or contract very little from moisture content; however, when dry they readily form dust if impacted by foot or vehicular traffic.

At the Lost Creek campground a mantle of fine volcanic ash overlies the original redish-brown soil in depths of an inch to several feet. The ash generally contains enough fine material to cause moderate to severe dust conditions when trampled by a concentration of people in the campground. The ash is quite unsuitable for the surface of a filter field and would have to be stripped from an area before it could be put to this purpose. Between Lost Creek campground and Sunflower Flat there are several small hills of dacite covered by shallow soils. The presence of bedrock so close to the surface could limit trail building in the area.

Summit Lake occupies a low divide between the Kings Creek and Hat Creek watersheds. Impermeable layers in the subsurface sustain a perched water table causing soils to be saturated in many areas surrounding the lake. Drainage in the area is therefore poor and the soils are unsuitable for filter fields.

Soils in the southern portion of the park have been mapped in the Chummy, Lyonsville-Jiggs, and Windy series. At the Lassen ski area the soils have been mapped in the Lytton and the Donner series. The soils on the Poma lift hill have a moderate to severe erosion hazard. The steep fill slope beneath the Poma lift is a barren and eroded area resistant to revegetation efforts. The bulldozed service road leading to the top of the Poma lift hill is an eroding, bulldozed track with gullies cut up to 3 feet deep.

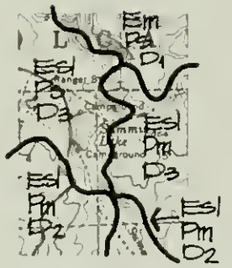
The leach field for the ski area has failed because of impermeable layers in the soil at shallow depths. The earthflow on which the parking area and the entrance station are built has moderate permeability in many places. However, the introduction of additional water into the earthflow could cause it to become unstable again,



MANZANITA LAKE

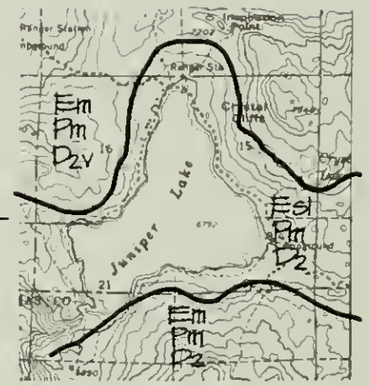


BUTTE LAKE

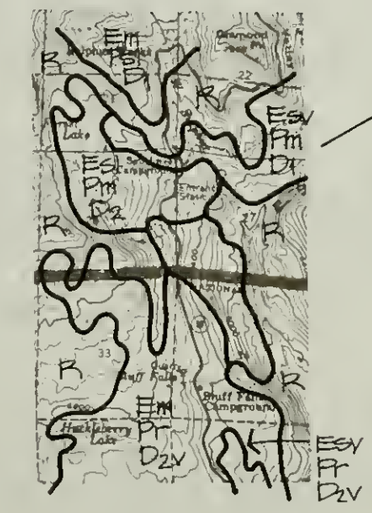


SUMMITT LAKE

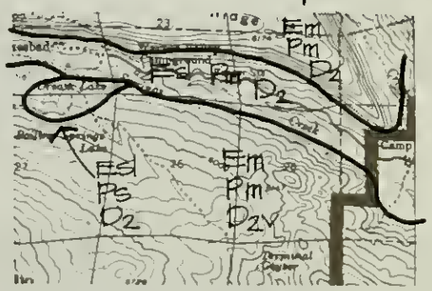
LASSEN VOLCANIC NATIONAL PARK



JUNIPER LAKE



LASSEN SKI AREA



WARNER VALLEY

111 40002A
DEC DEC 80

SCALE FOR INSETS
0 ½ 1 1½ MILES

SCALE FOR PARK
0 1 2 3 4 MILES

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

SOIL LIMITATIONS

LASSEN VOLCANIC NATIONAL PARK

destroying the parking area, entrance station, and ski lodge. Therefore, it is quite unsuitable as a site for the disposal of sewage waters.

Recent basaltic volcanism at Butte Lake included eruption of cinders and fine ash, which covers the area between Cinder Cone and the campground and residential area. This material is not cohesive, easily creates dusty conditions, and is readily beaten into deep trails by foot and vehicular traffic.

There are no known limiting soil characteristics at the park headquarters in Mineral or at Warner Valley, Juniper Lake, or Hat Creek.

E. Hydrology

1. Surface Waters

More than a dozen perennial streams of significant size, and several hundred lakes ranging from small intermittant snowmelt ponds to the 573-acre Juniper Lake, provide an adequate water base for the park. Those watersheds in the park that will be affected by proposals in the general management plan are shown on the Watersheds map. Surface waters in the park have undergone varying degrees of study in the past. All permanent lakes and all permanent streams that have fisheries potential have been characterized through general biological and physical surveys. Intermittent streams, springs, and groundwater resources have not been surveyed.

All of the drainageways within the park have been significantly altered by glacial, volcanic, or landslide activity, and some have been altered by man in historic times. The natural drainage in Warner Valley was altered to more evenly distribute water in a meadow used for livestock grazing. A dam was constructed on Manzanita Creek in the mid-1800s for the purpose of power production and to improve fish production.

Manzanita Creek rises from seeps and snowmelt in the canyon between Loomis and Lassen peaks, flows 4 miles to Manzanita Lake, and then becomes intermittent with no significant flow until a series of springs is reached 5 miles west of the park boundary. The streams in this area seem to be unusual in this way--they flow perennially from the volcanics to the south and east but to the west and north of Manzanita Lake they become intermittent.

All developed areas within the park draw their water supplies from lakes or perennial streams. However, the future needs of each area for a consistent and adequate supply of uncontaminated water may require that groundwater supplies be tapped by wells. The park headquarters at Mineral draws its supply from Martin Creek. A water well drilled in 1977 will supplement the headquarters water supply in the future.

2. Subsurface Waters

The flow of groundwater beneath the park is not known in any great detail. Volcanic rocks include materials having a wide range of hydrologic properties. Some recent basalt aquifers have close to the highest transmissivities known. In contrast, tuffs generally have high

BUTTE CREEK

LOST CREEK

MANZANITA CREEK

HAT CREEK

KINGS CREEK

SULPHER CREEK

HOT SPRINGS CREEK

JUNIPER LAKE

LASSEN VOLCANIC NATIONAL PARK

111 | 400060
DSC | DEC 80

MILES
0 1/2 1 2

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERIVCE

WATERSHEDS

LASSEN VOLCANIC NATIONAL PARK

porosities but very low permeabilities, and dike rocks have low porosites as well as low permeabilities. Although transmissivities of recent basalt and andesite are high, groundwater may be very difficult to develop because it has drained to prohibitively expensive depths, or it may even be locally absent.

Silica-rich lavas such as rhyolite and dacite, which are commonly erupted as pyroclastics, have porosites and permeabilities directly related to fragment size, sorting, and degree of cementation. Poor sorting and abundance of fine material cause most widespread pyroclastic deposits to have low permeabilities but moderate to high porosities. Mudflows and ash layers act as impermeable layers.

The Table Mountain andesite at Manzanita Lake is composed of numerous flows that are intensely fractured and cavernous and have a high transmissivity. However, the overlying pyroclastic flows are poorly permeable and combine with silt and organic deposition to maintain a perched water table near the lakes. A similar condition may exist in the Summit Lake area and in the Lassen ski area, where sewage effluent from leach fields has failed to percolate to sufficient depth and has risen to the surface.

3. Water Quality

The Water Quality Control Plan Report, Volume I, of the California Water Resources Control Board was consulted. The park is located in subdivision 5A of the Sacramento River Basin of the Central California Region.

The water quality of Battle and Mill creeks, to which Manzanita and Sulphur Creeks are tributary, is described in the report as excellent. The water downstream is suitable for all beneficial uses year around, although during low summer flows, boron (possibly from natural sources such as geothermal springs in the park) exceeds the recommended limits for class 1 agricultural waters in Mill Creek. The mineral quality of the Pit River and Feather River systems is described as generally excellent.

No tests for surface water sediment load have been performed in or close to the park, but it is presumed that the sediment load is minimal, since neither forest fires (over 4 acres) nor timber cutting have taken place and the vegetation cover has been little disturbed by human activities.

Two watersheds may have higher sediment loads than the others. Mudflows in the Lost Creek and Hat Creek watersheds in 1915 contributed to short-term increases in sediment load, and because the devastated areas are not completely revegetated, sediment loads there probably are still above average for the park. Streambed gradients in the Sulphur Creek and Manzanita Creek watersheds are steep and run through areas where altered and poorly consolidated volcanic sediment is exposed in quantity; therefore, sediment loads there also may be above the average.

Water quality data based on analysis of samples is limited. Periodic analyses of water from the drinking water systems at the developed areas show no abnormalities in mineral constituents or pH that would prohibit human use. Untreated water at the ski area and other developed sites has a relatively low bacteria content, which is typical of most waters at these high altitudes.

Selected lakes were sampled for coliform bacteria concentrations in 1973. Such bacteria are common to the intestinal tract of man and other mammals and thus are commonly found in soils and natural bodies of untreated water. Human wastes are 4 to 5 times as high in this bacteria as those from native animals, and a high coliform count is usually evidence of contamination from human wastes. Coliform counts are expressed as the most probable number of organisms per 100 milliliters of water sampled (MPN/100 ml). The Environmental Protection Agency has set the following standards for the average count of fecal coliform bacteria in recreation waters:

Drinking water, no more than 1.0 MPN/100 ml
Swimming, no more than 200.0 MPN/100 ml
Fishing, no more than 1,000.0 MPN/100 ml
Boating, no more than 2,000.0 MPN/100 ml

The coliform counts from the lakes were expectably variable because of the random localities of collection and the differing levels of visitor use density and wildlife populations. The intent of the testing program was to see if overuse of certain backcountry areas was occurring and resulting in contamination of water being used by hikers and campers for a number of purposes. Table II-1 lists the results from the 1973 tests.

Table II-1. Coliform Bacteria Concentration in Lake Waters, 1973

Lake	Sample 1	Sample 2
Jakey Lake	23 MPN/100 ML	-------
Horseshoe Lake	62 "	-------
Swan Lake	62 "	-------
Snag Lake	130 "	-------
Rainbow Lake	13 "	716
Lower Twin Lake	230 "	716
Upper Twin Lake	16 "	2,300
Pond North of Summit Lake	1,230 "	-------
Summit Lake	2,300 "	-------

The high count at Summit Lake was caused by drainage of imperfectly treated sewage effluent from one or more of the three campground leach fields. The failure was caused by a perched water table supported on an impervious hardpan about 3 feet below the surface. The two southernmost leach fields were abandoned because of these tests. Fecal coliform and and fecal streptococcus counts made at Summit Lake in 1976, 1977, and 1980 show marked reductions in coliform bacteria (see table II-2).

Table II-2. Water Quality Data for Summit Lake, 1976-80

Test Date	Coliform*	Fecal Streptacocci*	E Coli*
8/16/76	376 MPN/100 ml	32 MPN/100 ml	14 MPN/100 ml
9/7/76	22 MPN/100 ml	2 MPN/100 ml	5 MPN/100 ml
8/21/77	2.2 MPN/100 ml	not tested	not tested
10/22/80	2 MPN/100 ml	not tested	not tested

*Average of three samples taken from different areas of the lake

Results from October 1980 coliform tests in Manzanita and Reflection lakes indicate that the quality of those surface waters is high. Samples taken 100 feet from the shoreline documented 17 MPN/100 ml for Reflection Lake and 4 MPN/100 ml for Manzanita Lake.

Estimated annual discharge into the park sewage systems is listed in table II-3. All park-operated systems are septic tank/leach fields except Manzanita Lake, which is a septic tank/spray field. Some areas are served by chemical or vault toilets, and these are wastes hauled to disposal facilities outside the park. The park headquarters is connected to the Mineral sewage treatment facilities.

Table II-3. Annual Discharge of Park Sewage Systems
(Millions of Gallons)

Site	June-Aug	Sept-May	Total	Watershed
Manzanita Lake (1)	13.20	2.00	15.20	Manzanita Creek
Manzanita Lake (2)	3.90	.30	4.20	Manzanita Creek
Lost Creek	.05	.01	.06	Lost Creek
Ski Area	1.60	.90	.50	Sulphur Creek
Drakesbad	1.9	.00	1.90	Hot Spring Creek
Butte Lake	.90	.10	1.00	Butte Creek
Summit Lake	1.0	.10	1.10	Hat Creek

(1) Pre-1974 for septic tank/leach field system north of entrance station (160,000 gpd in July and August)

(2) 1976 for old septic tank/leach field system north of entrance station (after reopening of campground)

F. Plants

Lassen Volcanic National Park is near the junction of the Cascades and the Sierra Nevada. These two great ranges create changes in climate and vegetation because of their elevation, and the park has species of plants which are common to both ranges. Gillett, Howell, and Leschke (1961) list 715 plant species from 74 families within Lassen Volcanic National Park, compared to only 485 species from 60 families at Mount Shasta and 570 species in 60 families at Crater Lake National Park. About 24 Sierran species are at the north limit of their range at Lassen, and about 15 Cascadian species are at the southern limit.

1. Life Zones

The elevations in the park range from 5,200 feet to 10,457 feet and can be divided to correspond with four of Merriam's life zones.

The Transition life zone reaches elevations of 6,500 feet in the park, experiences the greatest annual precipitation (both rain and snow), and is under snow 4-5 months of the year. Average minimum temperatures are in the low 20s (degrees Fahrenheit) while average highs are in the 70s or 80s. Temperatures as low as -13°F and as high as 100°F have been recorded. This zone is characterized by the yellow pine forest with its associated sugar pine, white fir, incense cedar, and squawcarpet ceanothus. Some wildflowers normally found here are fat

solomonplume, whiskerbrush linanthus, Kellogia, hyacinth brodia, Bigelow sneezeweed, dwarf larkspur, blue-eyed grass, Washington lily, and the magnificent snowplant.

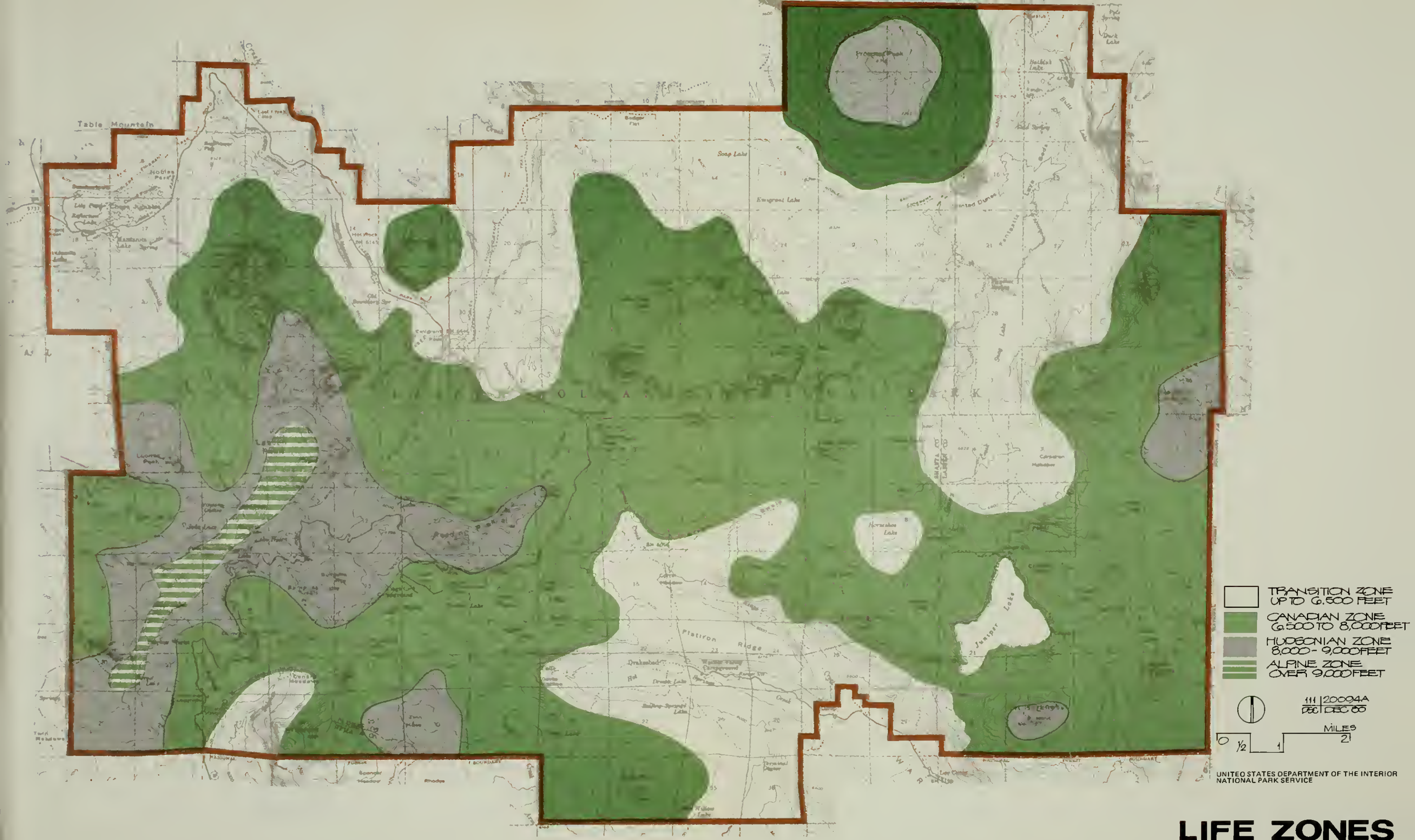
The Canadian life zone reaches elevations of 8,000 feet, and with average maximum snow depths of 12 to 20 feet or greater, is under snow 6-7 months of the year. Temperatures average from 6-8 degrees lower than in the Transition zone. This zone is characterized by red fir with its associated lodgepole, Jeffrey, and western white pine, bush chinquapin, and Labrador tea. Some wildflowers that occur here are Lewis monkeyflower, bog kalmia, subalpine spirea, elephants snouts, western pasqueflower, Brewer goldaster, and the unique Lassen paintbrush.

The Hudsonian zone reaches timberline at 9,000 feet and is under snow 8-9 months of the year. Here maximum snow depths average 16 feet but in some years they exceed 27 feet. Temperatures are not known for the higher elevations of the park but they combine with high winds to greatly increase the chill factor. This zone is characterized by mountain hemlock at its lower elevations and dwarf forests of whitebark pine at its upper limit. Brewer mountainheath, Mertens cassiope, and pinemat manzanita are shrubs that are commonly found in this zone as well as in lower life zones. Some flowers associated with this zone are rose willowweed, tolmie saxifrage, silver raillardella, phacelia, and Shasta knotweed.

Above 9,000 feet lies the treeless Alpine life zone, much of which may be buried under snow 9 or 10 months of the year. Indeed, patches of snow last all year. Winds are intense, and wide daily fluctuation in temperatures are common. As a result, plants in this zone generally have hairy leaves and low or creeping growth forms, such as skimkleaf polemonium, golden draba, and dwarf hulsea.

Much of Lassen's flora is found in more than one of these zones; for example, a brush association consisting of tobacco brush, greenleaf manzanita, and chinquapin forms extensive stands in both the Transition and Canadian life zones where crown fires have destroyed the forest. The insect-eating plant, sundew, lives in both the Transition and Canadian zones, as do monkshood and skyrocket gilia. Silverleaf lupine lives in the Canadian and Hudsonian, while oarleaf eriogonum lives in both the Hudsonian and Alpine zones. Pennyroyal and penstemon are found in all life zones.

The boundaries of these zones are not fixed and tend to intergrade according to local conditions of weather, exposure (i.e., north vs. south-facing slopes), and soil conditions. For example, four types of lava are found in Lassen and there is evidence to indicate that the plants growing in them vary from the life zones in which they would normally be expected. Specifically, a comparison between flora of comparable elevations on Brokeoff Mountain and Lassen Peak reveals that each mountain holds several species not found on the other. The differences become more striking when one compares the areas surrounding Emerald and Helen lakes. These lakes are located within one-quarter mile of each other at approximately the same elevation. Emerald Lake is located in a



TRANSITION ZONE
UP TO 6,500 FEET

CANADIAN ZONE
6,500 TO 8,000 FEET

HUDSONIAN ZONE
8,000 - 9,000 FEET

ALPINE ZONE
OVER 9,000 FEET

111 | 20004A
DSC | DEC 80

0 ½ 1 2 MILES

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

LIFE ZONES

LASSEN VOLCANIC NATIONAL PARK

Table II-4. Plants and Animals Most Abundant in Lassen's Life Zones

Zone	Trees and Shrubs	Flowers	Animals
Transition (to 6,500 feet)	yellow pine; white fir; incense cedar; sugar pine; Douglas-fir; squawcarpet ceanothus; deer-brush	snowplant; Brown's peony; whiskerbrush linanthus; kellogia; Washington lily; fat solomonplume; thinleaf euphorbia; Bigelow sneezeweed; dwarf lark-spur; American speedwell; hyacinth brodiacea; blue-eyed grass	sagebrush lizard; Northern alligator lizard; Western skink; red-legged frog; bald eagle; purple finch; pygmy nuthatch; Lewis woodpecker; Swainson thrush; Nashville warbler; pied-billed grebe; sharpshinned hawk; silverhaired bat; cougar
Canadian (to 8,000 feet)	red fir; lodgepole pine; Jeffrey pine; aspen; huckleberry oak; bush chinquapin; Labrador tea	Lassen paint-brush; smokey mariposa; sub-alpine spirea; bog kalmia; Lewis monkey-flower; ele-phants snouts; western pasque-flower; Brewer goldaster; furry hawkweed; swollenstalk	Cascades frog; goshawk; Williamson's sapsucker; Hammond's flycatcher; greentailed towhee; fox sparrow; Lincoln sparrow snowshoe hare
Hudsonian (to 9,000 feet)	mountain hemlock; whitebark pine; Brewer mountain; pinemat manzanita	rose willow-weed; tolmie saxifrage; silver raillar-della; timber-line phacelia	three-toed woodpecker
Alpine (above 9,000 feet)	none	golden draba; skunkleaf polemonium; dwarf hulsea	none

basin of Brokeoff andesite and has a well-developed marginal vegetation including sedges, epilobium, wood-rushes, Lassen paintbrush, shooting stars, and several other species which do not occur at Helen Lake.

Studies of the flora on Crescent Crater, the Chaos Jumbles, and Table Mountain provide further examples of the relationship between flora and geological information. Hot springs panic grass is an example of a plant which is restricted to Lassen's thermal areas.

Much of Lassen's biota is in an early stage of succession brought about by the geological events for which Lassen is so famous. For example, the catastrophic events which caused the Devastated Area and the Chaos Jumbles also created Hat and Manzanita lakes. Then slower processes which still continue came into play. Both areas are in the process of being reforested with a young forest that is more varied than the climax forest that once stood there. Lack of biological competition has permitted species of plants not normally found there to invade both areas. This is graphically shown in the Chaos Jumbles, where eight species of conifers grow. With the passage of time, western whitebark pine, mountain hemlock, and red fir, which have invaded the Jumbles from higher elevations, and Douglas-fir and incense cedar, normally from lower elevations, will be eliminated through biological competition. The ability of conifers to invade newly disturbed areas without the benefit of preparation by herbaceous plants is clearly demonstrated in both areas.

A classic example of lake succession is occurring at Hat Lake at a much speeded-up rate. Now only a remnant of its former self, Hat Lake has been rapidly filled in with debris from higher elevations brought by the forces of erosion. It is bordered by grasses and willow, which were the first to invade the soggy soils. More distant from its borders, where more erosional debris and dead materials from grasses and willows have accumulated, the soil has built up, and lodgepole pines have become established. Soon Hat Lake will completely disappear, leaving a transitory meadow in its place. Eventually a red fir forest will displace the lodgepole pines that are now paving the way. The same story with modification is told at each of Lassen's lakes and meadows. However, classical patterns of succession do not prevail in the park, and one cannot be certain from the pattern of succession observed in one meadow or lake what to expect in the next.

2. Vegetation Types

The vegetation within the park can be grouped into five classes based upon the predominant species and four classes based upon the type of environment. If an area is predominantly covered by a transitional species, the area has been classified as the nearest climax species. The Vegetation Types map shows the predominant species types within the park and also indicates those areas with very little or no vegetation.

a. Jeffrey Pine

The Jeffrey pine forest covers approximately 13,174 acres (12%) of the park and occurs primarily in the Transition zone up to elevations of 6,500 feet. Jeffrey pine (Pinus jeffreyi) is predominant with white fir (Abies concolor) being locally present in significant numbers.

RED FIR

LODGEPOLE PINE

ROCKS, LAND

MANZANITA

JEFFREY PINE

MOUNTAIN HEMLOCK

111 400058
DSC PSC 80

0 ½ 1 MILES 2?

VEGETATIVE TYPES

LASSEN VOLCANIC NATIONAL PARK

Other species of trees such as Shasta red fir (Abies magnifica), sugar pine (Pinus lmabertiana), ponderosa pine (Pinus ponderosa), lodgepole pine (Pinus lambertiana), Douglas-fir (Pseudotsuga menziesii), and incense cedar (Libocedrus decurrens), are also found in the Jeffrey pine forest.

Fire acts as an important factor in maintaining Jeffrey pine. This species is usually found at higher elevations than Ponderosa, and hence experiences a greater frequency of lightning fires. Shade-tolerant species, such as white fir, develop as an understory beneath the pine, but cannot withstand the periodic fires. The Jeffrey seedlings are fire resistant and survive, thereby perpetuating the stand. Fire then acts as a check on succession so that the Jeffrey pine can replace itself.

Pines require mineral soil seedbeds for natural regeneration. Pine seedlings often fail unless site preparation has eliminated vegetation that competes for soil moisture, but if given an even start with brush, pines generally grow well. The Jeffrey pine will reach cone-bearing age in about 20 years and reach maturity in 200 to 300 years.

b. Manzanita

Chaparral brushlands cover approximately 19,876 acres (19%) of the park and are most common at the lower and middle elevations of the park. However, these brushlands can form important stands at elevations up to 8,000 feet. The principal dominant plants are manzanita (Arctostaphylos sp.), snowbrush (Ceanothus sp.), and Chinquapin (Castanopsis sp.). Common shrubs often found in the more open brushlands include currant (Ribes sp.), Sierra gooseberry (Ribes roezlii), serviceberry (Amelanchier sp.), and bitter cherry (Prunus emarginata). On some sites, white fir or other trees may occur in significant numbers. Species density varies considerably from site to site with some sites having widely scattered clumps of brush and others being impenetrable to man, deer, and other large mammals.

Chaparral vegetation is adapted to frequent fires. A chaparral stand from which fire is excluded for more than 25 years gradually becomes decadent. Production declines and the proportion of dead material to live increases with age. Any new shade-tolerant sprouts, seedlings, or other groundcover is choked out. In some areas conifers may take over portions of the chapparral stand after long periods without fire. The wildlife population in the stand declines because even deer cannot penetrate thick stands of chaparral. Rodents eventually abandon the stand due to a lack of readily available food.

Fire, however, changes all this and in a sense rejuvenates the stand. Many species, including manzanita, are fire sprouters. After the crowns are destroyed in a fire, new growth starts from large burls located a few inches beneath the soil. The soil serves as insulation so that burls are seldom fire damaged. Other species, snowbrush for example, produce seeds which will germinate only after being fire-heated. Snowbrush is an important browse species for deer, has a relatively short lifespan, and dies after an average of 25 years;

hence, fire is requisite for its perpetuation. Production, health, and vigor of the chaparral is high during the early years after a fire in contrast to the poor condition of the old stands.

Opening of chaparral by fire results in a large increase of annual and short-lived perennials, the seeds of which have been dormant in the soil beneath the chaparral for many years. Deer again utilize the area for browse; rodent, bird and insect populations increase. Annuals and perennials persist 3 to 7 years following a fire. About 10 years after a fire, the stand is again primarily chaparral.

c. Red Fir

Red fir forests cover approximately 50,096 acres (47%) of the park and occur at elevations ranging from 6,500 to 8,500 feet in the Canadian zone. Shasta red fir dominates this forest type, either as pure stands or mixed with other trees, including Jeffrey pine, lodgepole pine, western white pine (Pinus monticola), and mountain hemlock (Tsuga metensiana). Except for the reproduction of these trees there is effectively no intermediate canopy of trees in a mature red fir forest. A few shrubs, such as pine mat manzanita (Arctostaphylos nevadensis), chinquapin (Castanopsis sempervirens), Sierra gooseberry (Ribes roezlii), and snowbrush (Ceanothus cordulatus), may be found in the understory of this forest. Herbaceous species are even less prominent and are perhaps strays from adjacent vegetation types. Occasional grasses, sedges, and some geophytes may be found on the floor of this forest; however, more apt to be part of the forest community is what Oosting and Billings (1943) called the "Pyrola-Colrallarrhiza union". This is an aggregation of curious plants including herbaceous plants and saprophytes and includes the white-veined shinleaf (Pyrola picta).

The red fir forest is considered a true climax association (Oosting and Billings 1943). The abundance of red fir, from seedlings to mature trees, ensures continued dominance of the species. Even brush areas are reclaimed eventually by red fir. Red fir grows in areas that have long winters with heavy snowpack and short, dry summers. Ground vegetation is often completely lacking in mature stands; this, combined with cool, moist, high-altitude conditions, makes the fire hazard low.

For reestablishment, red fir reproduction requires seedbeds of loose mineral soil. Fir seedlings begin to grow rapidly within 3 to 4 years, produce cones within 20 years, and reach full maturity in 250 to 400 years.

d. Lodgepole Pine

This forest type covers approximately 8,639 acres (9%) of the park, especially in the middle and eastern portions east of the Cascades crest and between elevations of 6,000 to 7,200 feet. Lodgepole forests are often nearly pure stands; however, minor numbers of other pine species may be present.

Lodgepole pine is a pioneer species and most stands are due to catastrophic fires. It is a very light-demanding tree, and associated species, which are more shade-tolerant, replace it in

succession. But where lodgepole is in pure stands, there is no seed source of associated species, and replacement of the lodgepole by other trees is very slow. Normal recovery of an area to trees of cone-bearing stage is 15 years, and the forest stand reaches maturity in 80 to 250 years.

e. Mountain Hemlock

This forest type occupies roughly the Hudsonian zone of 8,000 to 9,000 feet and covers approximately 8,180 acres (8%) of the park. Mountain hemlock (Tsuga mertensiana) may be in nearly pure stands or in association with red fir and lodgepole pine. As this forest type approaches higher elevations, the hemlock is gradually replaced in dominance by whitebark pine (Pinus albicaulus).

Whitebark pine has limited distribution in the park and is not common enough to be considered a major forest type. Stands of whitebark near the upper edge of the closed continuous forests of mountain hemlock are relatively low in productivity, and the harsh environmental conditions make regeneration very difficult and slow. Mountain hemlock will reach cone-bearing age in about 30 years and is considered mature at an age of 300 to 500 years.

f. Special Environments

A number of other areas in the park are dominated by a particular plant species, such as the western juniper (Juniperus occidentalis spp. occidentalis) along the shores of Juniper Lake. Most of these areas are relatively small, however, and the remaining 6 percent of the park's area is most easily classified by the readily recognizable environments that produce particular assemblages of plants. Many of these plant assemblages are very sensitive to changes in their environments, and many of the special environments are very easily altered.

(1) Rocklands

As the name implies, these areas consist of bedrock or areas covered by fragmented bedrock, and are nearly devoid of soil and vegetation. In the western portion of the park above 9,000 feet nearly all of the Alpine zone falls into this category. Alpine vegetation is not well developed, and there is little evidence of tundra. These higher areas of the park are precipitous and dominated by active talus and scree slopes formed from the disintegration of volcanic bedrock.

At lower elevations in the park, areas classed as rocklands are the result of recent volcanic activity, rockfalls so recent that vegetation has not been reestablished to any significant extent. Rockland areas include Cinder Cone and Fantastic Lava Beds in the northwestern part of the park, where eruptions occurred as recently as 1851, and the Devastated Area on the northeastern slope of Lassen Peak, where eruptions occurred in 1915. The 1915 eruptions stripped more than 12 square miles of vegetation from the area, and a succesional process of revegetation is now taking place, with herbs, grass, shrubs, and finally trees retaking the land. The first tree to recolonize this area has been the lodgepole pine, and it will eventually give way to other pines and firs.

Rocky cliffs and talus slopes contain small pockets of soil that harbour many interesting plants. Disturbance of any kind to these rocky habitats will take many years to heal because of the slow process of soil development, the instability of the scree, the low water-holding capacity of the soil, and the paucity of plant materials suited to such a habitat. Because of the downhill movement of soil, plants which persist on the loose gravelly soils of these slopes may often be rooted a foot or more uphill from where the plant now surfaces.

Gankin (1973) reported an onion (Allium platycaule) and a member of the sunflower family (Haplopappus whitneyi) on rocky scree and talus in the Lassen ski area, and also reported the southernmost locality for the volcanic daisy (Erigeron elegantulus). The cliff brake fern (Pellaea) has also been reported but not confirmed in this area. Other less rare plants which one might expect to see among the cliffs and boulders are such plants as

chinquapin	Castanopsis sempervirens
pine mat manzanita	Arctostaphylos nevadensis
cliff-spray	Holodiscus microphyllus
brickellia	Brickellia greenei
wild buckwheats	Eriogonum spp.
better cherry	Prunis emarginata
mountain pride penstemon	Penstemon newberryi
pussy paws	Calyptridium umbellatum
snow bush	Ceanothus cordulatus
bedstraws	Galium spp.
pincushion	Chaenactis nevadensis

(2) Dry Meadows

Dry meadows can be characterized as open, generally treeless, and often shrubless herblands. Dry meadows are generally underlain by clayey soils which seem relatively stable even when somewhat disturbed by man's activities. The vegetation is made up of western pennyroyal (Monardella odoratissima), mule ears (Wyethia mollis), balsam-root (Balsamorhiza sagittata), western rye grass (Elymus glaucus), and mountain squirrel tail (Sitanion hystrix). Other plants which may be seen in these meadows are Mariposa lily (Calochortus leichtlinii), wild onion (Allium campanulatum), and the satin lupine (Lupinus obtusilobus).

(3) Damp Meadows

Fed by intermittent springs, the high water table from an impermeable layer near the surface, or the late melting of shaded snowbanks, damp meadows are sensitive to any disturbance which affects the moisture regime. Some plants common to both the dry and wet meadows occur here. Erigeron peregrinus is one of the most common. Corn lily (Veratrum californicum) and a variety of aster (Aster sp.), blue joint (Calamagrostis canadensis), clover (Trifolium sp.), groundsel (Seneco triangularis), and tinker's penny (Hypericum anagaloides) are common associates, but other associates may also be numerous, depending upon moisture, shade, soil acidity, and other environmental factors.

(4) Wet Meadows

The wet meadows are permanently wet. Thus, much of their vegetation is common to lake and stream banks. As wet meadows are supplied by perennial streams or springs, they are true bog-like alpine marshes. Wet meadows are dominated by various species of rushes (Juncus) and sedges (Carex). Common plants are Juncus nevadensis, various buttercups (Ranunculus), the marsh lupine (Tofieldia glutinosa sp. superbus), various Polyganum species, Pedicularis groenlandicus, and Lupinus polyphyllus sp. Wet meadows are fragile and can be easily damaged, especially by changes in the water regime, and any diversion of water out of such a meadow would alter its plant species composition dramatically.

(5) Aquatic

Aquatic vegetation within the park's waters is not abundant. Four moss genera, Sphagnum, Fontinalis, Chiloscyphus, and Drepanocladus, have been found in the park's permanent waters. Duckweek (Lemma sp.), water milfoil (Myriophyllum sp.), yellow pond-lily (Nuphar sp.), pond weed (Potamogeton sp.), and filamentous green algae are common plants in the water.

(6) Riparian and Shoreline.

This vegetation type occurs along all perennial and some intermittant stream courses and immediately adjacent to lakes and ponds, where plants often occur in transition rings around the water. As in the wet meadows, which is often what these are, shorelines are dominated by sedges (Carex sp.) and rushes (Juncus sp.) including the bulrush (Scirpus sp.). Three members of the heath family, mountain laural (Kalmia polifolia var. microphylla), labrador tea (Ledum glandulosum var. californicum) and pink heather (Phyllodoce breweri) are relatively abundant around lakes and ponds in the Lassen ski area.

On a wet bank next to a stream issuing from a wet meadow, a plant new to the flora of the park, Gaultheria humifusa, was discovered by Gankin in 1973. So many different species of plants are capable of flourishing in this fruitful environment that further field studies will undoubtably unearth additional species new to the park.

The relatively shallow depth to water and the scrub and herbaceous layer of plants combine to support a relatively uniform vegetation growth along steamsides, and variations in plant association can often only be explained by changes in elevation along the streamcourse. Alder (Alnus tenuifolia) is found along many of the park's streams, with several scrub willows as associates (Salix lemmonii, Salix Masiandra, and Salix scouleriana). Mountain Maple (Acer glabrum var. torreyi) and aspen (Populus tremuloides), occupy moister areas at lower elevations in the park, which are often near streamcourses. The herbaceous plants along the riparian areas are predominantly grasses, sedges, and rushes such as spike rush (Eleocharis sp.), and scouring rush (Equisetum arvense). Winter Cress (Barbara orthoceras) and monkey flower (Mimulus guttatus) are often observed on rocky, wet stream banks.

Because of their stump-sprouting nature, healthy young stands of willow can be topped or cut back and not be destroyed. However, cutting back or topping old or decadent stands of alder will kill them. Willows are an important deer browse and are generally fawning cover. Both plants help stabilize and retain the soil along streamside. Alders make an important contribution to both the chemical and physical improvement of the soil where they grow. Their litter decomposes rapidly to form a basic humus layer that to some degree neutralizes the normally acidic soils in the park. Alders share with legumes the ability to fix nitrogen, which is important in the nitrogen-poor soils found within the park.

3. Vegetation at Manzanita Meadows

Manzanita Meadows is contiguous with the park boundary and the Manzanita Lake area. Most of the land within section 13 has a gentle slope of 3 to 6 percent in the valley bottom, but the land rises sharply to the north and to the south. The majority of Manzanita Meadows is covered by a dense manzanita brushland that may have established itself following forest fires in the earlier part of the century.

In 1966 brush was mechanically removed from most of the area and bulldozed into parallel windrows about 50 feet apart. The National Forest Service planted the areas between the windrows with economically important tree species, pondersosa, sugar, and Jeffrey pine. In 1978 there was little sign of these seedlings, and the entire area had been covered by an almost impenetrable growth of manzanita. A few large pines occur along drainages, the steeper slopes, and along the road corridor of California 44, but they are not the result of the Forest Service planting efforts.

4. Vegetation at the Northwest Entrance

The vegetation west of Chaos Jumbles, southwest and southeast of the Manzanita Lake campground, is primarily manzanita brushland or chaparral. The area south of Chaos Jumbles and within the campground is a mixture of manzanita brush and Jeffrey pine. The rest of the area, including that of Chaos Jumbles and the old Manzanita Lake Lodge and cabin area, is dominated by Jeffrey pine.

Many of the Jeffrey pine trees in the former concession development, especially around the cabins, are reaching maturity. There has been virtually no reproduction of trees in those areas of dense human occupancy. Much of the lack of replacement is due to asphalted surfaces, heavy foot traffic, and the larger than normal population of pine-seed-eating rodents encouraged here by human occupancy.

In the fall of 1973, 60 problem trees were removed from the Manzanita Lake concession and campground areas. Some of these trees were removed because they were infested by mountain pine beetle and others because they were decadent and large limbs were dangerously overhanging many of the cabins. Under conditions of the former dense visitor occupancy, the long-range prospect for this comparatively even-aged mature-stand forest would have been the death of the trees at an artificially accelerated rate. The overstory trees would have died in

perhaps a century, or less, from disease, but because of heavy visitor traffic many of the trees would have become hazardous and removed before their time was up. Some tree regeneration is now taking place in areas away from the areas of heavy use prior to 1974; however, there has been virtually no replacement in the developed area.

5. Vegetation at Summit Lake

The vegetation at Summit Lake is more diverse than at other developed sites within the park. The forest surrounding the lake is a mixed-age group of western white pine, red fir, and mountain hemlock. Lodgepole pine appears to be encroaching into the open and grassy Dersch Meadow. Concentrations of nuhly grass, velvet grass, and annual hairgrass indicate past and present disturbance by grazing. Pocket gophers are numerous and active in the drier grassy areas. Dense stands of willow are present in some areas and are heavily browsed by deer.

6. Vegetation at the Southwest Entrance

The Lassen ski area is located at an elevation of 6,800 feet, and it is comprised of numerous habitats, ranging from dry to aquatic. The cool, sometimes harsh, climate that provides a short growing season, and the shallow, erodible soils combine to make the Lassen ski area a fragile environment for plant life.

Most of the slopes face east of southeast and drain to West Sulphur Creek. The two predominant types of landscape are red fir forest and large, barren rocky areas called screes. The barren areas are caused in part by fire and in part by soils that are nearly devoid of organic matter and are very low in productivity. Also present are small groves of mountain alder, found where the water table is closest to the surface.

The Vegetation Types map shows most of the ski site as red fir. However, eight vegetative types have been described and mapped in detail at the ski area (Gankin 1973). The ski area is located primarily in a red fir climax forest. Associated tree species are mountain hemlock, western white pine, and alder. One of the principal herbaceous species at the site is pennyroyal, found at the edges of the red fir stands where light levels are adequate for its survival.

Three plants not previously found in the park were recorded in Gankin's study: Allium platycaule (onion family), Haplopappus whitneyi (sunflower family), and Gaultheria humifusa (heather family). The latter is unique this far north in California. A fern appearing to be a cliffbrake (Pellaea sp.) was noticed among the rocks near the park road above the ski lodge. There has been only one collection of cliffbrake in Lassen, and the credibility of this collection has been questioned. The particular area where the fern grows is amid the most impacted part of the ski area, and its identity has not been verified.

7. Vegetation at Other Development Sites

The forest at Lost Creek is a continuous stand of white fir, sugar pine, and Jeffrey pine. The park headquarters at Mineral

covers less than 10 of the 75 acres of mixed conifer forest at the site. Warner Valley is a long, flat, grassy mountain valley. Red fir and lodgepole are predominant forest trees at Juniper Lake, along with the western juniper from which it draws its name. The forest at Butte Lake is largely Jeffrey pine with fewer white fir, red fir, and lodgepole pine.

8. The Role of Fire

Some of the preceding descriptions of vegetative types have included information on the role of fire. In general, past forest fires have been effectively suppressed at Lassen. In the 10-year period from 1964 to 1974 there were 26 man-caused fires, the largest burning only 1 acre. In the same period there were 55 natural fires, the largest burning only 3 acres. The largest man-caused fire on record (1.8 acres) was in 1948. The largest natural fire on record (3.9 acres) was in 1951. Most man-caused fires have been in developments and along roadways in chaparral and Jeffrey pine. Most natural fires are distributed throughout the chaparral, Jeffrey pine and red fir vegetation, where lightning sets fires in trees.

To adequately restore and maintain the park's natural terrestrial ecosystems requires that all elements of those systems be allowed to function in their normal manner. Fire is one dynamic element that has not been permitted to function naturally within the park, since all fires have been totally supressed for at least the past 70 years. As a result, some plant communities are disappearing, and in others the fuel accumulations are becoming dangerously high. In still other areas, such as in the subalpine forest, the fire supression activities themselves often result in more devastation than the fires.

The park's natural resources management plan envisions employing a mixture of three fire management practices--natural fires, prescribed burning, and fire supression--to restore the natural role of fire within the ecosystems of Lassen Volcanic National Park. Natural fire units are defined in the plan, and fire in these areas will be monitored but normally not supressed unless it threatens to reach uncontrollable dimensions or escape the boundaries of the unit. Prescribed burning will be used to reduce fuel load in hazardous fire areas to prevent future holocaust fires. All fires occurring outside of the natural fire units will be supressed immediately. The details and environmental implications of this fire management plan are addressed in the environmental assessment document for the resources management plan.

9. Plants of Special Interest

a. Candidate Endangered and Threatened Species

Two plant species within Lassen Volcanic National Park were listed on the U.S. Fish and Wildlife Service's Draft Notice of Review as "candidate threatened" species. One species within the park is listed under "insufficient information" to determine status at present. It is expected that the status of these plants will remain unchanged when the final list of candidate species is published in the Federal Register in the near future.

Three plant species that were formerly listed as "proposed threatened" ("Endangered and Threatened Wildlife and Plants," Federal Register, April 26, 1978) have been deleted as candidate species.

Candidate Threatened

Silene invisa (Campanulcere family): A sierran species found in partial shade at the edges of meadows in red fir forest at Hat Creek and near Summit Lake at elevations of 6,500 to 6,700 feet.

Trifolium lemmonii (Fabaceae family): Collected from Lassen Peak in 1875 by J. G. Lemmon and not found since.

Insufficient Data

Smelouskia ovalis ssp. congesta (Brassicaceae family): A rare localized endemic, known only from the loose rocky slopes near the summit of Lassen Peak. The closest typical form is found at Three Sisters in Oregon, 250 miles north of Lassen Peak.

Deleted From Proposed Threatened List

Agastache parvifolia (Lamiaecae family): Found on the east side of Butte Lake in open places on the broken lava flows.

Castilleja lassenensis (Scrophulariaceae family): Found in the moist or wet soil of open or brushy meadows and in red fir and subalpine forests at elevations of 6,600 to 8,000 feet; found at Prospect Peak, Dersch Meadows, Summit Lake, Grassy Swale, Kings Creek Meadows, Emerald Lake, Bumpass Hell trail, and in the meadows at the foot of Lassen Peak.

Penstemon cinicola (Scrophulariaceae family): The only known occurrence in the park is from pumice at the edge of the lava beds on the trail from Butte Lake to Cinder Cone.

Of these six plants species, all but one, Agastache parvifolia, are listed as candidate threatened species on the California Fish and Game listing, pending further analysis. Agastache parvifolia has been withdrawn as a candidate species, because the existing population in the state was found to be too large to meet "rare" criteria.

Species of the following plants occur within Lassen Volcanic National Park, but the subspecific form that was considered threatened or endangered on the original Smithsonian listing and appeared on the Fish and Wildlife Service's Draft Notice of Review on April 26, 1978, has not been identified in the park because of a lack of taxonomic studies. The "candidate" status of these plants is expected to remain unchanged when the final list of condidate species is published in the Federal Register in the near future.

Threatened

Dicentra formosa ssp. nevadensis (Fumariaceae family): Grows in wet meadows and on wet banks in ponderosa and subalpine forests at elevations between 5,500 and 8,000 feet; found at Emerald Lake, Cold Boiling Lake, Bluff Falls, Morgan Springs, Warner Valley, and along the Bumpass Hell trail.

Arabis breweri var. austinae (Brassicaceae family): Found growing in rock crevices along the park road south of Diamond Peak at an elevation of 7,200 feet.

Castilleja minata var. elata (Scrophulariaceae family): Grows in wet meadows and along streams in ponderosa and red fir forests at elevations between 5,800 and 8,000 feet. Found at Hat Lake, Summit Lake, Morgan Springs, and Drakesbad.

Endangered

Dicentra formosa ssp. oregana (Fumariaceae family): Same as for nevadensis, above.

Arabis breweri var. percuniaria (Brassicaceae family): Same as for austinae, above.

Stipa lemmonii var. pubescens (Poaceae family): Found on open, dry rocky slopes in ponderosa forest at Drakesbad at an elevation of 5,700 feet.

Brodiaea coronaria var. rosea (Liliaceae family): Grows on dry open flats and slopes at an elevation of approximately 5,500 feet.

Corydalis caseana: This species is not on the national listing of threatened and endangered plants; however, it is specified by the California Native Plant Society as rare. It occurs in the park at the Lassen ski area.

Only one species that may occur within Lassen Volcanic National Park is listed as endangered in the April 26, 1978, Federal Register. Although the species has been identified in the park, the subspecific form that is endangered has not been identified because of a lack of taxonomic studies.

Erysimum capitatum var. angustatum (Brassicaecae family): Grows on warm open slopes, often in rocky soil, in ponderosa to subalpine forest at elevations of 5,500 to 8,800 feet; found at Manzanita Lake, near the summit of the park road, at Sulphur Works, and along the Brokeoff Mountain trail.

b. Exotic Plants

There are from 20 to 25 exotic plant species in the park which are sufficiently widespread to be readily located. Some species are undoubtedly competing with native vegetation on some sites, and others have occupied disturbed areas and are delaying the natural recovery of the area by native species.

G. Animals

The diversity of terrain features, range in elevation, and variety and abundance of vegetation in the park combine to provide a corresponding diversity of animal habitats. The forests, lakes, streams, bushlands, meadows, cliffs, and open rocky areas all support different but overlapping and dependent faunas. An accounting of invertebrates

has not been made, but at least 240 vertebrate animals are known to exist within the park's boundaries.

1. Invertebrates

The importance of invertebrates in the natural environment of Lassen Volcanic National Park has received little study, and except for swarms of mosquitos or flies, they pass unnoticed by most park visitors. However, invertebrates form a crucial element of the life chains within the park. Almost all of the animals in the park include insects as part of their diet, and insects are vital for the reproduction of many plants. Insects, bacteria, and fungi perform the ultimate reduction of plant material and return vital elements to the soil.

Studies of aquatic habitats within the park have shown a rich assemblage of invertebrates which spend some, if not all, of their life cycle in water. A few of the invertebrates that have been observed in the park's waters are backswimmers, water boatmen, water striders, midges and other true flies, dragonflies, mayflies, mosquito larvae, whirlygig beetles, predaceous diving beetles, water scavenger beetles, damselflies, copepods, freshwater snails, fairy shrimp, and the larvae of a number of other insects.

On land and above it, various invertebrates such as butterflies, moths, crickets, grasshoppers, cicadas, spiders, ants, fleas, bees, worms, June bugs, beetles, gnats, ticks, flies, and mosquitos perform their functions in the complex ecological chains of the park's natural environment. Bark beetles, mountain pine beetles, and carpenter ants infest many of the trees in the park. Of particular concern among the invertebrates is Pasteurella pestis, the source of sylvatic plague. It is endemic and occurs at varying levels in rodent populations in and around the park.

2. Vertebrates

Lassen's animal life, especially the vertebrates, are far less tied to the life zones of Meriam than the plants. However, despite their obvious mobility there is still a correlation between many species of vertebrates and life zones within the park.

a. Reptiles and Amphibians

Reptiles or amphibians can be found in all of the park's life zones except the Alpine. The Pacific treefrog, for instance, may be found in the Transition, Canadian, and Hudsonian life zones. However, Cascade frogs prefer the higher elevations of the Canadian zone, while the red-legged frog remains below in the Transition zone. The sagebrush lizard, northern alligator lizard, and western skink are also found in the lower elevations of the park, as are most of the park's snakes.

Garter snakes, gopher snakes, California kingsnakes, and western yellow-bellied racers are common within the Transition zone, and two species of rattlesnakes are found at lower elevations. Toads and salamanders round out the park's diversity of reptiles and amphibians.

b. Birds

More than 150 species of birds have been sighted over the park. The many permanent lakes in the park provide nesting areas for waterfowl such as Canadian geese, coots, grebe, teal, and sandpipers. Raptor and fish predators include golden and bald eagles, sharp-shinned hawks, goshawks belted kingfishers, ospreys, great blue herons, common mergansers, California gulls, and peregrine falcons. Water ouzels are commonly seen dipping into the park's streams for food.

The Lewis woodpecker is found in the Transition zone, while Williamson's sapsucker, Clark's nutcrackers, and three-toed woodpeckers prefer the higher elevations of the Canadian and Hudsonian zones. Other birds commonly sighted in the park include Steller's jays, gray jays, Oregon juncos, ravens, pigmy nuthatches, mountain chickadees, purple Swainson thrushes, Nashville warblers, Hammond's flycatchers, green-tailed towhees, hummingbirds, and fox and Lincoln sparrows.

c. Fish

Most of the lakes within the park are isolated from major river drainages and are naturally barren of fish. In the mid and late 19th century, it became popular in California to introduce coldwater game fish into the state's lakes and rivers. Throughout the latter part of that century, residents, travelers, stockmen, and sports groups planted nonnative trout in many high-altitude lakes of California. This practice was still in vogue in 1909 when the Fish and Game Commission took over the job of fish stocking in the state. Rainbow trout are the only fish native to Lassen, but brown trout, Eastern brook trout, and squaretail catfish were introduced before Lassen became a park. At the present time, the California Department of Fish and Game continues to stock trout in many of the backcountry lakes of the Lassen region, including the park.

Trout were not the only species of fish introduced into the California mountain lakes. Species of chubs, suckers, and dace were used as live bait and accidently escaped or were deliberately released as trout food. In many parts of the state, including some lakes within the park, these introduced species of game and nongame fish have caused extensive environmental changes to occur.

In a fisheries study, West (1976) studied lake conditions, visitor use, watershed conditions, and fish populations within the park to identify those lakes in which native trout species could survive and reproduce in a self-sustaining population. He found that under natural conditions the park's lakes are not an extremely valuable trout fishery. At most, only 10 percent of the park's lakes are capable of supporting reproductive salmonid populations. Only 17 of the park's lakes contain fish, and of these only 7 have the spawning conditions requisite for a self-replenishing trout population.

The eight species of fish identified in the 17 lakes are rainbow trout (Salmo gairdneri), Eastern brook trout (Salvelinus fontinalis), brown trout (Salmo trutta), coarseraker tui chub (Siphateles bicolor obesus), modoc sucker (Catostomus microps), tahoe sucker

(Catostomus tahoensis), golden shiner (Notemigonus crysoleucas), and lahontan redside (Richardsonius egregius). The rough sculpin (Cottus asperrimus) has not been identified in waters of the park. However, populations of this fish species do occur in Hat Creek near its junction with the Pit River north of the park. This fish is a protected species under the California Fish and Game code and depends upon high water quality in Hat Creek, which has its headwaters in Lassen Volcanic National Park.

d. Mammals

(1) Deer

The park is summer range for two subspecies of mule deer, Rocky Mountain mule deer (Odocoileus hemionus hemionus) and black-tailed deer (Odocoileus hemionus columbianus). The exact distribution of the two subspecies is not known, but mule deer seem to be concentrated in the eastern third of the park, while black-tailed deer seem to be distributed throughout suitable range in the park.

The park constitutes an important fawning region and summer range for two herds of these migratory deer (Donart 1968). An arbitrary line along the main east-west watershed is used as a hypothetical division between the northern Cow Creek herd and the southern Tehama herd. These two groups undoubtedly mingle, and membership in the herds is geographic rather than exclusive.

The Tehama herd consists of approximately 20,000 to 30,000 deer and occupies some 225,000 acres of winter range below 3,500 feet elevation in the foothills southwest of the park. The majority of this herd uses the area south of the park for summer range; however, perhaps 20 percent (about 5,000 deer) enter the park and range as high as 8,000 to 9,000 feet. The deer move into the park in May and June and return to their winter range in October and November. Their migration corridors conform with drainage patterns. Sulphur Creek east of the Lassen ski area is a main migration route for the Lassen portion of the Tehama herd. Deer from the Tehama herd are also common in the Kings Creek and Summit Lake areas, and probably are among the deer at Warner Valley and Juniper Lake during the summer months.

The Cow Creek herd consists of approximately 20,000 deer and occupies about 120,000 acres of winter range northwest of the park. Possibly 20 percent of the herd (about 4,000 deer) migrate into the northern part of the park for summer range, and the remainder occupy areas 10 to 20 miles north of the park. The Manzanita Creek and Table Mountain areas are heavily used by deer of the Cow Creek herd, while others move on into the drainages of Hat and Lost creeks. Some of these deer may range as far east as Butte Lake, where they mix with deer who migrate north to the Hat Creek rim area for the winter.

East Tehama deer herd composition data for the years 1975 through 1977, provided by the California Department of Fish and Game, indicate 8 bucks, 32 fawns, and 60 does per 100 animals in the fall, with a winter mortality rate of about 20 percent in the fawn population. A similar composition is to be expected in the Cow Creek herd, although thorough composition counts have not been made. Deer

WHITMORE HERD

TEHAMA HERD

LASSEN VOLCANIC NATIONAL PARK

LASSEN NATIONAL FOREST

LASSEN NATIONAL FOREST

LASSEN VOLCANIC NATIONAL PARK

CRITICAL FAWNING AREA

111|40008A
DSC/DEC 80

Miles
0 1 2 3 4 5

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

DEER HERDS

LASSEN VOLCANIC NATIONAL PARK

census transects have not been done within the park or within Manzanita Meadows.

In very rough terms, deer density for the park averages one animal per 10 acres, however, deer distribution within the park is constrained by the availability of habitat for food, shelter, and fawning. The park's resources management plan proposes to conduct deer herd composition counts to determine fawn production and survival rates within the park. In addition, the extent and distribution of fawning areas will be determined, and more exact migration routes will be mapped. Further, permanent transects will be established in key areas to obtain census data, annual forage production, degree of deer pressure, and condition and trend of the preferred and staple browse species.

Although there is not adequate data at present to precisely estimate deer numbers in the park or in selected areas, it is possible to say with confidence that deer are abundant and in some areas are apparently exceeding the carrying capacity of their habitat. Areas of particularly heavy browse utilization are east and south of the ski area in the Mill and Sulphur Creek drainages and in the Manzanita Creek drainage, where snowbush, bittercherry, and other palatable plants in the chaparral are browsed to excess. Willow clumps at Summit Lake have been high-lined from heavy browsing by deer.

Areas known to be critical to successful deer fawning within the park are shown on the Deer Areas map. Areas of particular significance are in the Sulphur Creek and Manzanita Lake/Manazanita Meadows areas and along the riparian willow/alder thickets and associated stringer meadows throughout the park. The chaparral growth and windrows in section 13 of Manzanita Meadows has developed into one of the finest fawning areas in the state of California because of Forest Service manipulations to produce economic tree species. The intent was to replace chaparral growth with conifers; however, conifer growth is slow and the brush recovered rapidly and with vigor to provide forage and cover for deer and habitat for ground birds and rodents. The extent of the deer population in the Manzanita Meadows area can be grasped from data gathered on highway roadkills by the Department of Fish and Game. Between 1973 and 1976, there were an average of 3.3 deer killed per mile of highway between Manzanita Lake and Viola. This is 2.5 times higher than for all of California 44 in Shasta County. The number of fawns killed in this area (29) formed a high percentage of the total number of deer killed, and indicate the intensity of use of Manzanita Meadows for fawning.

Concentrations of deer occur within the park at major public use areas, particularly at the campgrounds at Manzanita, Butte, and Summit lakes. Deer are attracted to these areas because of the availability of food in garbage cans, and once they become accustomed to the presence of humans, from being fed by some park visitors. Such concentrations of deer cause a rapid deterioration of natural browse in the immediate area as well as pose physical hazards to themselves and to humans.

(2) Bear

The park has an estimated 20 to 30 black bears (Ursus americanus), whose range is primarily within the park. The bears are rarely seen, and the contact between bears and humans has not been very frequent or serious. There have been no reported human injuries since annual summary reporting of bear incidents was begun in 1969. During the same period, 61 bear incidents were reported which resulted in an estimated $770 in property damage. Two repeat offenders were live-trapped and released outside of the park in the national forest.

(3) Beaver

Because of the near extinction of beaver in California owing to excessive trapping during the last century, it is unknown if they were ever endemic, or native, to what is now Lassen Volcanic National Park. The existing population of beaver on Hot Springs Creek may be immigrants from imported species released outside of the park. The ecological changes along streams and lakesides that are attributable to beaver are acceptable if this subspecies was once native to the Lassen area.

(4) Other Mammals

Red foxes, coyotes, mountain lions, bobcats, weasels, martens, and fishers form the primary predator base within the park. Some of the more commonly observed mammals include chipmunks, goldenmantled ground squirrels, chickarees, rabbits, skunks, and porcupines. Bats, pikas, marmots, and flying squirrels are also present but are seldom observed because of their habits.

3. Animals of Special Interest

a. Endangered and Threatened Species

Only two animals within the park are listed as endangered on the list of Endangered and Threatened Wildlife and Plants as published in the Federal Register for May 20, 1980.

The American peregrine falcon (Falco peregrinus anatum) has been observed at Forest Lake, Bumpass Hell, and Lassen Peak. The normal habitat of this bird is open country, and therefore it is believed to be a nonresident and infrequent visitor within the park. However, recent sighting of two adults and one young bird may indicate that they do nest in the park.

The bald eagle (Haliaetus leucocephalus) has been sighted at Warner Valley and Snag, Butte, Jakey, Juniper, and Upper Twin lakes. The habitat of this bird is usually in high trees and cliffs near lakes and streams. No nests have been found in the park; however, the recurring and widespread sightings may indicate that the bird is less than transient in the park. The production of native fish in the park's waters is low, and it may be that the presence of this bird in the park is being sustained by fish-stocking in the lakes.

Three species of animals found within the park were listed in the Department of the Interior's "Redbook" (Threatened Wildlife of the United States, 1973) but are not on the current list of endangered and threatened wildlife.

The spotted owl (Strix occidentallis) has not been definitely reported within the park but probably occurs there. Sightings have been made within a few miles of the southwestern corner of the park, and there is suitable habitat in lower forested canyons in that section of the park that have not been significantly disturbed by humans. This possible resident was listed as threatened in the "Redbook."

The fisher (Martes pennanti) has been sighted at Snag, Horseshoe, and Manzanita lakes, and at the summit of the park road. It is a seldom seen resident, and its habitat is normally mixed hardwood forests and cutover areas, where it forages on the ground and in the trees for small mammals, birds, and fruits. This resident was listed as status undetermined in the "Redbook."

The pine martin (Martes americana) was also given an undetermined status in the "Redbook." It is a relatively common resident of the park in fir and hemlock forests, where it spends much time in trees foraging for squirrels and on the ground for other small mammals. It has been sighted at Kings Creek, Diamond Peak, Summit Lake, ski area, Horseshoe Lake, and the Sulphur Works.

The rough sculpin (Cottus asperrimus), a protected species under state law, is not present in the park, but it is dependent upon the continued high water quality of streams originating in the park.

b. Exotic and Extripated Species

The natural resources management plan proposes research to determine the biotic composition of the park prior to the effects of non-original man. Species of plants and animals and processes that have been lost or altered will be considered for reintroduction to restore these primitive systems.

Bighorn sheep previously lived in the higher elevations of the park. Deep accumulations of snow and a lack of windswept feeding areas probably forced this large mammal to migrate to lower elevations in the park and national forest during the winter. The possible reintroduction of these animals to the park will require close cooperation with the Forest Service and the California Department of Fish and Game.

The wolverine, or carcajou (Gulo luscus), is native to the Lassen region and is classified as rare by the California Department of Fish and Game. Suitable habitat for the wolverine is present within the park and wolverines may be present, although they have never been reported as seen in the park.

Trespass livestock are the primary exotic animals within the park. These animals enter the park in varying numbers from adjacent lands during the summer months. The park's resources management plan identifies this problem and proposes drift fences, patrols by park rangers, and legal action to achieve control and elimination of these exotic animals from the park.

Stock use (which has included horses, llamas, and mules) is permitted in the backcountry on a day-use basis. Numbers of day users with stock requesting wilderness permits were 42 in 1979. For the same year, 16 parties with stock utilized corral facilities within the park for a total of 56 animal nights.

H. Environmental Quality

1. Aesthetic Quality

Maintenance of a landscape that appears natural even in developed areas, as well as nonobtrusive structures and roadways that blend with the terrain and natural setting, is essential to visitor enjoyment of Lassen Volcanic National Park.

The visual experience begins outside the park, on the approaches to the northwest and southwest entrances. The Forest Service has defined these highway corridors as travel influence zones, and large trees are maintained there for visual quality. The state of California maintains Highways 44 and 89 close to the park within 132-foot-wide rights-of-way. Highway 44 both west and north of the park has been designated in the California Master Plan for Scenic Highways for possible inclusion in the state Scenic Route System.

Upon entering the park at Manzanita, the visitor notices the concession facilities abandoned in 1974. The Manzanita area used to be popular as a base for enjoying the rest of the park. The older timber and stone structures blended with the forest setting; the newer structures, close to the main road, intruded on the natural setting. The reflections of mountains in the lakes and the proximity of water for walking, picture taking, and enjoying nature made Manzanita particularly attractive for spending leisure time close to one's cabin. Many cabin guests were strollers or hikers. The forest was an attraction too. The cabins were shaded even at midday, a welcome relief from the summer heat of lowland California. These benefits of visiting and enjoying the environment of Manzanita Lake are no longer available, as they were part of the cabin-oriented stay which has been eliminated.

Visitors drive through the old concession development and across 3.5 miles of the Chaos Jumbles and are advised by signs not to stop along the roadway because of the potential hazard of a rockfall-avalanche. Chaos Jumbles is visually impressive, and the thought of a repeat performance is awesome to the mind. Because stopping along the road is prohibited, there is no opportunity for a leisurely interpretive and viewing experience of this important facet of the park's geologic past.

The remainder of the park road in the northern half of the park is in deep coniferous forests, with relatively few views of the volcanic skyline, except at the Devastated Area where excellent views of Lassen Peak and Chaos Crags are made all the more exciting by realization of the awesome forces that produced this open terrain. Further on, beginning at Summit Lake, the midpoint of the park road, the visitor begins seeing more diverse landscapes characterized by streams, meadows with wildlife, and frequent views not only of Lassen Peak but also of forested expanses to the southwest with large lakes

distant from the park. In ascending beyond the headwaters of Kings Creek, and approaching the highpoint of the park road at 8,500 feet, rock fields are common in the scene, and as snow melts in midsummer, the subalpine meadows fill with colorful wildflowers.

The trip through the southwest entrance is different because of relatively open, precipitous terrain most of the way, and because there are more outstanding natural features to draw visitors out of their vehicles. On the approach, however, the scene northward into the park from Mineral is one of dense forests close to the roadside with two or three fleeting glimpes of Lassen Peak. Once past the entrance station, the visitor notices the large ski area parking lot. Then, alongside the ski lodge, the forest suddenly opens to view, and the summer visitor's attention is drawn to the open meadows with colorful flowers and rugged mountains towering over all. This important visual transition takes place exactly at the point where the ski lodge, Poma lift towers and housing for the intermediate tow exert the most impact on the scene. A mile north of the ski area, the road passes through Sulphur Works, where visitors are intrigued by foul-smelling steam vents amid brilliantly colored gulches. The road is built upon this geothermal area and is virtually on top of the largest steam vent (the alignment probably is inherited from the location of the original wagon road into the Supan resort).

Beyond Sulphur Works the roadway ascends with increasing grades and tight curves. At two interpretive parking areas the visitor can stop and look back down the road toward the ski area and see the lodge and ski slopes. The building and lifts are not as obvious as the light-colored fill-slope scar beneath the Poma lift, which is so steep that it has never revegetated. Farther up the park road, visitors drive past beautiful green Emerald Lake and Lake Helen, which are in glaciated basins surrounded by rugged peaks and spectacular talus fields. In the last mile of the ascent to the high point of the road, the visitor has two opportunities to park and walk to outstanding scenic features. The first is the 1.5-mile trail to Bumpass Hell, the largest geothermal area in the park. The second is the steep 2.5-mile trail to the summit of Lassen Peak, where spectacular distant views and picturesque, gnarled clumps of whitebark pine add to the excitement of the climb. The large parking areas at the Bumpass Hell and Lassen Peak trailheads, often filled to capacity on weekends, are considered by some to be serious intrusions on the natural scene.

Chief aesthetic attractions at Warner Valley are three geothermal areas--Terminal Geyser, Boiling Springs Lake, and Devils Kitchen--the three quite different in appearance and individual appeal.

Butte Lake, a cold lake of crystal blue clarity, is surrounded partly by jagged edges of black lava flows. The strikingly symmetrical Cinder Cone is a favorite destination of hikers. Over the years its slopes and the fragile cinderfields around it have become marred by numerous random trails worn by visitors not remaining on designated routes.

2. Air Quality

Dust particles picked up by the wind, water vapor, pollen, and chemicals given off by growing plants are natural contaminants in the lower atmosphere and combine with light refraction to form a normal haze above the land. Steam, carbon dioxide, hydrogen sulfide, and minor amounts of other gases are emitted from hot springs and steaming fumaroles to add to the natural contamination of the air.

The primary sources of air pollution in the park are internal combustion engines and pollutants from outside sources, which are blown into the park by the prevailing winds. Lassen Volcanic National Park is a mandatory federal class I area under the "Prevention of Significant Deterioration" provisions of the 1977 Clean Air Act Amendments. However, air quality monitoring is not done within the park or in any comparable area within the Lassen region, so ambient air quality is not known. Air quality monitoring stations do exist in nearby cities, such as Redding and Chico, but they obviously cannot be used to provide data on natural air conditions against which air quality in the park can be measured.

The prevailing wind direction over the park during the summer months is from the southwest, with average wind velocities increasing from less than 10 miles per hour at elevations below 5,000 feet to 20 miles per hour at elevations of about 7,000 feet. At higher elevations in the park the average wind velocity exceeds 20 miles per hour. These southwest winds blow across the lower Sacramento Valley and bring an unknown amount of pollution into the park from this area. Therefore, existing and future levels of pollutants in the Sacramento Valley can reach the park and adversely effect its air quality.

In recent years photochemical oxidant (ozone) damage in the Sierra Nevada to the south of the park has become increasingly evident. At Sequoia National Park numerous ponderosa and Jeffrey pine are showing the symptoms of chlorotic mottling disease: yellow spots on needles, with older needles dying and dropping off the trees. This type of air pollution damage has long been known further south in the forests near Los Angeles, where trees are dying from it and it appears that the major part of the forest overstory is being eliminated. Damage to vegetation from this cause occurs when ozone concentrations reach 0.6 to 0.8 parts per million for prolonged periods of time.

Oxidants at damaging levels of concentration have been detected in the Sacramento Valley as well as at the California Air Resources Board monitoring stations at Chico and Redding. The ozone produced in areas of heavy pollution exerts most of its severe vegetation damage alongside the mountainsides where it is held by inversion layers in the atmosphere. Therefore, damage occurs in a distinct elevational pattern. Chlorotic mottling in pine trees occurs at Placerville, due east of Sacramento and about 150 miles south of the park. About 30 miles north of the park at Fall River Mills, oxidants have been recorded at sufficient concentrations for extended periods of time to produce minor damage to pine trees, although none has been observed.

Table II-5: Projected 1980 Emissions from Internal Combustion Engines at Lassen Volcanic National Park

Source	Vehicle Miles	Carbon Monoxide	Hydrocarbons	Nitrogen Oxides	Particulates	Sulphur Dioxide
Summer Visitors	3,900,000	312.00	23.400	8.755	2.2600	0.780
Winter Visitors	20,000	1.60	.120	.045	.0126	.004
Campground Driving	52,000	4.160	.312	.117	.0302	.010
NPS Vehicles	28,000	2.24	.168	.063	.0162	.006
Subtotal Vehicles	4,000,000	320.000	24.000	9.00	2.320	.800
Heavy Equipment		.410	.160	1.91	.160	.150
Chalet Generator		.830	.310	3.86	.170	.260
Ski Tow Engines		16.150	.740	1.72	.113	.113
Subtotal Non-Vehicle		17.390	1.21	7.49	.543	.523
Total from all sources in metric tons or millions of grams per year		337.390	25.210	16.49	2.863	1.323
Total from all sources in pounds per year		743,734	55,572	36,350	6,311	2,916

Without ambient background data and a continuous monitoring of all internal combustion engines within the park it is impossible to place exact values on the amount of contaminants entering the park's atmosphere from these sources. The variable nature of the factors involved in emission estimates are fraught with assumptions and averaged values which make all evaluations true for only the general case and the approximate magnitude of air pollution.

For the purposes of this analysis, 1980 has been chosen as a base year and projections within the park are based upon current patterns and levels of use. The values given in the table II-5 are based upon EPA estimates of exhaust emission factors for light-duty vehicles driven in high-altitude regions and adjusted for the type of mountainous driving done within the park. Diesel engines used for power generation at the ski area and to power heavy equipment used for park maintenance and snowplowing have been estimated on the basis of hours of operation rather than miles driven. The following factors will be assumed to hold statistical value for each vehicle mile driven within the park: 80.0 grams of carbon monoxide, 6.0 grams of hydrocarbons, 2.25 grams of nitrogen oxide, 0.58 grams of particulate matter, and 0.2 grams of sulphur dioxide.

As can be seen from the preceding table, approximately 95 percent of vehicle emissions are released during the summer season, June through mid-September, along the park road and adjacent development. Most of the pollutants are released between 10:00 a.m. and 6:00 p.m., when park visitors are the most active on the roadways.

The air pollutants generated in the park are relatively low on a daily basis even during the summer months and are dispersed rapidly by the stronger winds at higher elevations. Nearby forest fires can degrade the air quality during the summer months of highest fire danger far more than the limited amount of vehicular emissions generated within the park. Cooking fires and campfires at established campgrounds and in the backcountry add pollutants to the atmosphere in unquantifiable amounts during the summer season.

3. Noise Pollution

Lassen is a relatively quiet park. Noise generated by vehicular traffic on the roadways and by human activities in campgrounds and developed areas is noticeable primarily to those individuals actively engaged in such activities and, therefore, at an acceptable level. The primary distractive and annoying noise in the Lassen ski area is from the continuously operating diesel-powered electric generator, and in the winter season, from the internal combustion engines of the ski tows.

I. Cultural Resources

1. Archeology

a. Ethnographic Setting

The following information is derived from "Archaeological Investigations in and around Lassen Volcanic National Park in 1975" (Johnson). Lassen Peak was important to Native Americans because it was the point where three different cultures met. The Yahi-Yana lived to the west, the Northeastern Maidu to the southeast, and the Atsugewi to the northeast.

The only information about the Yana perspective of Lassen came from Ishi, the last survivor of the culture. Ishi was unfamiliar with white culture until he made contact with Oroville residents in 1911. Studies and interviews with Ishi provided knowledge of aboriginal lifeways. After his emergence at Oroville, he spent 5 years at the University of California Museum of Anthropology in San Franciso. He indicated that the Yahi-Yana left the southern Cascade foothills in the summer and spent three to four months in the Lassen region with the journey to Lassen taking about four days. It is not clear from Ishi's account why the Yana left the foothills, but recently it has been determined that virtually no plant food resources are available in the foothills from late May until late September and that deer abandon the area from April to October. The blue oaks are very inconsistent producers. Thus the Yahi-Yana would often be on the verge of starvation by late April. The relatively abundant deer, pine nuts, berries, seeds, and other resources below 7,000 feet in the Lassen region, therefore, probably constituted a primary reason for the annual migration.

The Manzanita Lake, Table Mountain, and Lost Creek areas of the park are completely within the territory formerly occupied by the Atsugewi Indians. A few Atsugewi, including Mrs. Salina LaMarr, were interviewed by various investigators and have provided information about the Atsugewi's use of the Lassen region. Mrs. LaMarr spent her childhood with her people and migrated each year into the Lassen Peak area. Until her death in 1972, Mrs. LaMarr demonstrated basketry and other crafts at the Loomis Museum.

At Atsuge, or Hat Creek, Indians lived for most of the year along the creek, between elevations of 2,500 and 4,000 feet. After the snow melted, they journeyed up Hat Creek valley to the lower slopes of Lassen Peak. The Atsugewi could obtain almost everything they found at Lassen elsewhere in their territory and were not dependent on resources found within the park's boundaries. For obsidian they had to trade with the Achumawi to the north or travel to Glass Mountain.

The nearest permanent Northeastern Maidu village was in Big Meadows, at an elevation of just over 4,000 feet. This area is now under Lake Almanor. A substantial amount of information was collected by McMillin from other Maidu areas similar in elevation and plant cover to the Warner Valley and Willow Lake localities. McMillin's description of the human ecology of the Northeastern Maidu also probably applies to their utilization of the southeastern part of the park, and the numerous archeological sites in Warner Valley and near Willow Lake may relate to

use by the Northeast Maidu and their ancestors. The obsidian quarries on Kelly Mountain were probably an important resource for both the Maidu and the Yahi-Yana. The Maidu could obtain all of the resources found in Lassen Park from elsewhere in their territory, except for obsidian and perhaps some of the minerals associated with the hot springs in upper Warner Valley. The use of this part of the park for food gathering by some Maidu would lessen the pressure on other areas, providing a better subsistence base for the population as a whole.

All three groups were hunters/gatherers rather than agriculturalists. They followed the flora and fauna through an annual cycle; they sought higher elevations during summer and lower elevations during winter. In spring they hunted deer and gathered early-ripening berries, and in fall they collected nuts and acorns. The hunters/gatherers tended to have simple, easily carried, easily replaced tools that included projectile points, grinding stones, knives, scrapers, baskets, and food-processing equipment.

The abundant evidence of Indian utilization of the southern half of the park is not matched in the northern half. This can, for the most part, be attributed to the 1914-1917 eruptions of Lassen Peak and associated mudflows and ash falls rather than the Atsugewi's absence from the park. Some Forest Service areas that were discounted during archeological investigations by Treganza (1963) because they were obliterated by volcanic ash contained trees that displayed over 250 rings when logged. Most of the Atsugewi's campsites were probably on portions of Hat Creek and Lost Creek that were completely devastated by the mudflow of May 1915, and little evidence of the use of the Lassen region by the Atsugewi remains.

The Yahi-Yana and Northeastern Maidu apparently ventured into the park region to exploit the food resources and to collect obsidian and other relatively scarce minerals, while the Atsugewi may have simply enjoyed spending their summers at higher altitudes, where cooler temperatures prevailed.

The Yahi-Yana, Atsugewi, and Northeastern Maidu undoubtedly continued to visit the Lassen region even after they lost control of the bulk of their territory. Euro-American settlement was slow in northeastern California, and few people visited Lassen until after the 1920s. For this reason, Ishi and the other surviving Yahi-Yana were able to continue to visit the high country until 1908, and some Atsugewi and the Northeastern Maidu may have continued to visit and collect resources after that date.

b. Archeological Research

Prior to the middle 1960s, the archeology of northeastern California was little known. Before 1972, only 49 sites had been test excavated and 1,351 recorded (Johnson 1975). Since then, over 1,000 new sites have been noted, and excavations have been completed at several others.

Since 1954, 46 prehistoric sites have been located in Lassen Volcanic National Park, and more than 30 archeological sites have been recorded within 6 miles of the southern park boundary. The finding of an Indian site at the Bluff Falls campground and of two isolated projectile point fragments farther south suggests that additional Native American materials will be found both within the park and in its immediate vicinity. The Forest Service currently is conducting an archeological inventory of Kelly Mountain, and California State University, Chico, has test excavated two sites on the North Fork of the Feather River, 4 miles south of the park boundary.

Adam Treganza directed the first professional archeological investigations in 1962. Much of his work was done late in the year and most of the sites recorded were outside the park (Treganza 1962). In 1965, 12 sites were recorded in the Warner Valley/Willow Lake localities. Nine new sites were recorded in the southwest corner near the ski area in 1971 to facilitate the realignment of the highway from the Sulphur Works to the south entrance of the park (Journey 1972). In 1973, five of the sites previously recorded on West Sulphur Creek were reinvestigated during planning for the possible expansion of the ski facilities (Johnson 1973). These included Teh-583, Teh-584, Teh-585, Teh-586, and Teh-596. Surveys in the park were continued in the summers of 1972 and 1973 as part of a master's thesis project by Alfred E. Journey. He recorded an additional 15 archeological sites. In his thesis he attempted to cover all the places that might have been suitable for Indian utilization (Journey 1974).

In 1975, sites at the Lassen ski area were intensively mapped by Jerald J. Johnson. He also conducted reconnaissance surveys of the Bluff Creek area south of the ski area, in the Table Mountain area north of Manzanita Lake at Lost Creek Camp, and in Warner Valley. He found no sites in the area surveyed at Bluff Creek, and no sites were discovered on the top and slopes of Table Mountain. An intense examination of surface concentrations of sites Teh-583 and Teh-596 at the ski area led to the following conclusions:

These sites constitute the most important sites thus far located in the park.

The midden found at Teh-583 is unique for a site at 6,700 feet, and it should be protected.

The cultural materials from the sites clearly suggest their use from at least as early as A.D. 700 to within the last 150 years.

These sites represent a seasonal camp of the Yahi Indians and their ancestors, who were attracted to the locaility because of the dense growth of Wyethia; the availability of opal, chalcedony, and other resources; and the excellent position of the area in regard to available water, sunlight, and protection from the wind.

The sites functioned as food-processing stations and also as manufacturing areas for chipped stone tools.

MANZANITA LAKE

BUTTE LAKE

JUNIPER LAKE

SKI AREA

WARNER VALLEY

MINERAL

89

44

13

36

MOFFIT, K., 1977
ARCHEOLOGICAL SURVEY
PROPOSED NPS/FS HOUSING AREA
AND SECTION 13
DEVELOPMENT AREA

JOURNEY, A.E., 1972
AN ARCHEOLOGICAL SURVEY
OF ROUTE 1 AND VICINITY OF THE
PARK ROAD, IN LASSEN VOLCANIC
NATIONAL PARK, CA.

JOHNSON, J.J. 1973
ARCHEOLOGICAL RECONNAISANCE
OF THE SOUTH ENTRANCE AND
SKI AREA OF LASSEN VOLCANIC
NATIONAL PARK, CA.

TREGANZA, A.E., 1963
AN ARCHEOLOGICAL SURVEY OF
THE ABORIGINAL AND EARLY
HISTORY SITES OF LASSEN
VOLCANIC NATIONAL PARK, CA.

OTHER TREGANZA SITES

JOHNSON, J.J., 1975
ARCHEOLOGICAL INVESTIGATIONS
IN AND AROUND LASSEN VOLCANIC
NATIONAL PARK

111|20018C
DSC DRC 80

0 ½ 1 2 MILES

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

ARCHEOLOGICAL SURVEYS

LASSEN VOLCANIC NATIONAL PARK

Teh-583 and Teh-596, along with Teh-584, Teh-585, Teh-586, Teh-587, Teh-588, Teh-589, Teh-590, and Sha-456, should be nominated to the National Register of Historic Places as a small archeological district because of the variety and unique characteristics they possess. (See following section on National Register status.)

Sites Teh-583 and Teh-596 have been seriously damaged by previous construction and use associated with the ski area. This damage, which has caused significant loss of information and cultural deposits, has resulted from:

bulldozing roads through some of the most concentrated deposits, including the center of Teh-596 and the midden at Teh-583, to facilitate construction and maintenance of the sewerline, septic tanks, and leach field

installing a buried sewerline through the center of Teh-583

installing the lower tower for the beginning ski tow in Teh-583

continuous illegal collection of stone projectile points and other artifacts from the surface

continuous depositing of modern trash during ski tow use

No archeological remains were found on the surface during the reconnaissance surveys at Lost Creek Camp or along Lost Creek. Cultural material may be covered by recent deposits of volcanic ash and mudflows, although it is possible that the steep, narrow, heavily wooded canyon of Lost Creek was not used in preference to the many excellent camping spots along Hat Creek before Lassen Peak erupted from 1914 to 1917.

At least 25 archeological sites are known from earlier surveys in the Warner Valley area. Two of these are in the Kelly Camp area ouside of the park and seven are in recently acquired section 36. Site Plu-146 is near the Warner Valley campground and has been heavily damaged by human activity in the area. Sites Plu-136 and Plu-147 are in the vicinity of the ranger station and are among the least disturbed sites in the park. They are close enough to the road that road improvements will have to be carefully planned to avoid disturbing them.

In June 1977, the proposed housing and maintenance area northwest of the toe of Chaos Jumbles was surveyed by Kathleen Moffitt. She found that the area had been heavily impacted over the years by borrow pit, fill, and trash disposal activities. The surface survey and subsurface spot checks revealed no cultural materials in the area. She also evaluated the proposed development site in Manzanita Meadows. The entire area has been windrowed and is densely covered with manzanita. Windrowing causes such extensive surface and subsurface disturbance that any archeological sites located here have been destroyed. Clearance (270-LAVO) has been made for any proposed

LOST CREEK DIVERSION
FLUME AND DITCH

PROSPECT PEAK
FIRE LOOKOUT

MANZANITA LAKE

NOBLES EMIGRANT TRAIL (ON NATIONAL REGISTER)
DOTTED LINE INDICATES KNOWN LOCATION
DASHED LINE INDICATES LOCATION NOT YET DETERMINED

LOWER TWIN LAKE
PATROL CABIN

L A S S E N V O L C A N I C N A T I O N A L P A R K

SUMMIT LAKE
RANGER STATION

HORSESHOE LAKE
RANGER STATION

SULPHUR CREEK
ARCHEOLOGICAL
DISTRICT

SUPAN
WAGON ROAD

SIFFORD HAY BARN
AND COOKS HOUSE

WARNER VALLEY
RANGER STATION

MT. HARKNESS
FIRE LOOKOUT

PARK HEADQUARTERS,
ADMINISTRATION BUILDING,
AND SERVICE STATION LOCATED
AT TOWN OF MINERAL

NOTE: INDICATED FEATURES POSESS,
OR ARE LIKELY TO POSESS,
HISTORICAL OR ARCHITECTUAL
SIGNIFICANCE

111 | 400038
DSC | DEC 80

0 1/2 1 MILES 2

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

CULTURAL RESOURCES

LASSEN VOLCANIC NATIONAL PARK

actions at these two sites, providing an archeologist is present to salvage and record any cultural remains encountered during construction activities.

2. History

Since the earliest exploration of the Lassen region by western man, Lassen Peak has been given many names. In 1821, Don Luis Arguello lead an exploration party into northern California and passed close enough to Lassen Peak for priests in his party to name the peak San Jose. In 1827, Peter S. Odgen passed north of the area and named Mount Shasta. In the same year, Jedediah Smith also passed through the area and anglicized San Jose to Mount Joseph and applied it to a whole range of mountains from 39 degrees to 41 degrees north latitude.

Peter Lassen entered the region in 1841. He subsequently became a Mexican citizen, obtained a land grant of 22,000 acres south of Vina, and attempted to establish Benton City on his ranch. He applied the name Sister Buttes to Lassen Peak and Brokeoff Mountain. Captain John C. Fremont and some of his men visited Lassen's ranch in the spring of 1846, the same year that the Applegate brothers founded the southern Oregon Trail. The following summer, Lassen and Commodore Robert F. Stockton backtracked the Oregon Trail from Goose Lake to Missouri in hopes of encouraging emigrants to settle at Lassen's Benton City. Lassen returned in the fall of 1848, leading a wagon train and using much of the Applegate Trail route.

In 1848, John Marshall discovered gold at Sutter's Sawmill at Coloma, John Bidwell discovered gold in the Feather River, Major Person B. Reading discovered gold on Clear Creek, and the famed California gold rush was launched. William Nobles was with a party of men who came to Honey Lake seeking gold. The party disbanded, and Nobles continued eastward, searching for the rumored "Gold Lake." When he intersected the Oregon Trail at Black Rock, Nevada, he realized that his route to California was easier and shorter than the Oregon Trail and that this could mean wealth to him. He obtained a $2,000 subscription from the citizens of Shasta in return for his promise to reveal his new route. A portion of what was to be known as the Nobles Emigrant Trail crossed the full width of the north end of today's park.

Peter Lassen was killed by an unknown party near what is now Clapper Creek in 1859. This was also the year in which local Indians were rounded up by militia and taken to the Round Valley Indian Reservation. Conditions were poor on the reservation, and most of the Indians had fled from it by 1863. In August 1866, a band of Yahi-Yana Indians raided the Dersch place on Bear Creek and killed Mrs. Anna Maria Dersch, wife of George Dersch who had settled there in 1861. In 1868 many of the Indians who had fled the reservation were again captured and returned to it, and in 1871, what was believed to be the last Yahi Indians were killed at Kingley Cave. In 1884, Fred Dersch established a sheep ranch on Hat Creek near Raker Peak and built a cabin and corral in Dersch Meadows. He was killed by Indians at his ranch on Bear Creek, just outside of what is now Lassen Volcanic National Park.

In 1860, Edward R. Drake settled in Warner Valley, and it was during the 1860s that James M. King began living and running horses and mules in the Kings Creek Meadows. In 1863, the C. Brewster/Clarence King party climbed Lassen Peak, and in their later writings confirmed the earlier (1854-1857) observations of steam issuing from the Chaos Crags. In the following year, 1864, Major Reading led the third party of record to the summit of Lassen Peak. This party included Mrs. Helen Tanner Brodt, the first woman to climb the mountain.

The Tom Malgin family bought a 400-acre sheep ranch in the Drakesbad area in 1874, and by 1881 had developed open log conduits and a log bathhouse. In 1900, Alex Sifford bought property from Edward R. Drake in Warner Valley and named it Drakesbad. As the unusual beauty of the Lassen area with its unique volcanic geology and hot springs became known throughout the state, tourists began to arrive to enjoy the natural beauty and the hot baths at Sulphur Works and Drakesbad.

As mining became increasingly important in the Lassen region, it spurred the depletion of the forests for supplies of lumber and mine timbers. The demands for timber gave rise to communities until Lassen National Forest was established in 1905. The numerous small but growing communities, the lumber mills, and the mining industry required increasing amounts of energy, and soon man's ingenuity was turned to harnessing the local waterways to provide a sufficient source of electrical power.

As early as 1883, a claim to water rights on Little Manzanita (Reflection) Lake was posted by William H. Coffey and John E. Stockton. In 1887, William Bartels filed claims to water rights from Manzanita Lake, and in 1902, Joseph A. Rossi filed claims to water rights from Lost Creek. The Lost Creek diversion flume and ditch (Sunflower flume) was constructed by the Shasta Power Company between 1904 and 1907. It was an ambitious project to divert water from Lost Creek to a powerplant on Bear Creek about 5 miles beyond the present park boundary. The flume was a continuous series of ditches and wooden aquaducts that followed land contours and allowed for gravity flow. The flume was in operation for 7 years until the 1915 eruptions of Lassen Peak destroyed the entire intake system. About 2½ miles of this now deteriorated flume system are within the present park.

The Northern California Power Company dammed the outflow of Manzanita Lake in 1911, in the hopes of developing a reservoir to supply its Volta Power Plant. The earthern dam was 10 feet high, 8 feet wide at the top, and 500 feet long. The inner face of the dam was covered with timber sheeting, and a projected 275-foot-long tunnel was begun 20 feet below the expected surface of the reservoir. The fractured rock of the Chaos Jumbles had not been sealed by organic material and silt above the normal level of the lake, and after the reservoir had risen about 2 feet the water began to leak from the lake as fast as it entered it. A subsequent mudflow from the 1915 eruptions partially filled the lake, reduced its capacity even further, and caused the project to be abandoned.

The turn of the century movement to preserve the natural wonders in the area of the present national park culminated in President Roosevelt issuing two presidential proclamations in 1907. These documents established Cinder Cone National Monument, and Lassen Peak National Monument from lands within Lassen National Forest. The name Lassen Peak became officially adopted in 1915, and on August 9, 1916, an act of Congress established Lassen Volcanic National Park.

3. National Register Status of Historic Properties

a. Properties on the National Register

Seven historic properties and one archeological district in the park are on the National Register of Historic Places. These features and their historic scene must be treated in accordance with section 106 of the National Historic Preservation Act of 1966.

(1) Sulphur Creek Archeological District

The Western Archeological Center of the National Park Service developed and completed the inventory and nomination forms for a 1,210-acre archeological district along the Sulphur Creek drainage. This nomination was forwarded to the state historic preservation officer and the National Register. This district was subsequently added to the National Register of Historic Places in April 1980 as the Sulphur Creek archeological district.

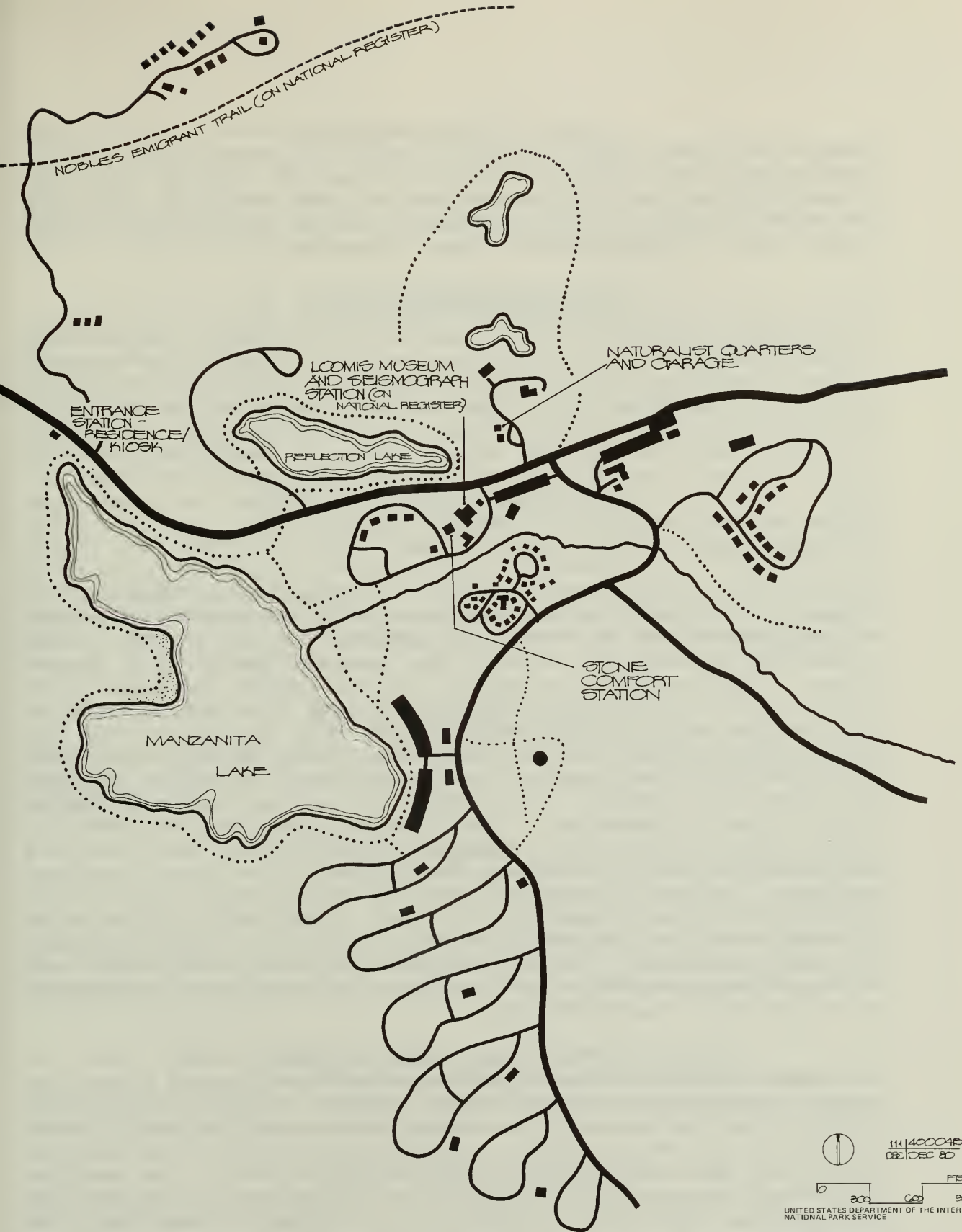
(2) Loomis Museum

Benjamin F. Loomis was 18 years old in 1874, when he moved to the small town of Viola, 6 miles west of Manzanita Lake. A shingle-maker and lumberman by training, and a naturalist and photographer by learning, he built and operated a store and a hotel at Viola. He and his wife, Estella, were to play important roles in the eventual establishment of Lassen Volcanic National Park. When Lassen Peak began to erupt in 1914, Loomis photographed the volcanic activity and achieved national fame through his photographs.

Loomis purchased 40 acres of land near Manzanita Lake from W.B. Armstrong in 1926. By July of 1927 he had erected the May Loomis Museum, named for his only daughter, who died of influenza in 1920. The museum is a one-story building, constructed with massive walls of native volcanic gray rock. It is topped with fortress-like parapets and trimmed with imitation Spanish tile canopies. A rustic T-shaped building, it measures 25 feet across the front and extends 60 feet to the rear. A short, solid wall surrounds the front and sides of the building. Over the years, changes and additions to the exhibits in the museum resulted in a rearrangement of the interior, but the structure remains essentially in its original condition.

Because of the museum, Manzanita Lake became the educational center and chief focal point for park visitors. Loomis used the building to display his famous photographs of the Lassen Peak eruptions, and as a wildlife and natural history museum.

About 15 yards northeast of the building is a seismograph station (10 feet square by 12 feet high) built of the same materials and having the same design as the Loomis Museum. It is included with the museum on the National Register, along with 1 acre of land beneath and surrounding the building.



111 | 400041B
DSC | DEC 80

FEET
0 300 600 900

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

MANZANITA LAKE

HISTORIC RESOURCES

LASSEN VOLCANIC NATIONAL PARK

With the expansion of the park in 1929, Loomis donated the museum and 40 acres of land to the National Park Service. The National Park Service continued to use the building until 1974. Throughout this time, the museum became significant as the focal point for visitor information and interpretation, and as the depository for the famous Loomis photographs of the Lassen eruptions.

(3) Nobles Emigrant Trail

William H. Nobles, a gold seeker from Minnesota, discovered the route of the Nobles Emigrant Trail in 1851, while returning to California from a trip into northwestern Nevada. For entering northern California, this trail was a great improvement over the longer, more circuitous Lassen Trail, which swung north nearly to the Oregon boundary. Hoping to further the development of their area, the citizens of Shasta, California, financed Nobles's efforts to promote the use of the trail. Although used by several thousand emigrants in the 1850s and 1860s, the trail did not attract people to the extent that the better-known routes to the south did. Despite Nobles's effort, the trail never developed beyond a primitive wagon road.

The complex of emigrant routes known as the Oregon and California trails carried the bulk of westward migration prior to the completion of the first transcontinental railroad in 1869. These routes are an important part of the American frontier and western history. Geographically, the Nobles Trail lies between the major trunks of the western parts of the Oregon Trail to the north and the California Trail to the south. Those emigrants who used the Nobles Trail had earlier traveled west along the Platte River route, through South Pass, and beyond Fort Hall, where they turned southwest to the Humboldt River and on to California. The Nobles Trail was the best route into the northern part of California. Today it winds across the wild terrain of Lassen Volcanic National Park, through a landscape that looks much as it did in frontier days. As an extensive reminder of the story of westward migration, the Nobles Emigrant Trail deserves preservation. In its association with the Oregon/California trails system and in its use of an important route into northern California, this trail has national, regional, and local significance. The trail contributed to the founding of the towns of Susanville and Redding, and it played an important role in development of the gold fields west of Redding.

No other national park, historic site, or monument has within its boundary such an extensive segment of this trail system. Eighteen miles of the Nobles Emigrant Trail traverse the park. Originally the trail wound 24 miles across the northern portions of Lassen Volcanic National Park; however, a 6-mile section between Hat Creek and Lost Creek park was buried by the mudflow of 1915. The remaining portion of the trail is generally visible as a narrow, overgrown path through trees and brush. It crosses the park road at several points and follows the road for about 2 miles northwest of the Devastated Area. Although parts of the Nobles Trail are suitable for hiking, such a use is not promoted by the park. The trail and 200 feet of land on either side are on the National Register of Historic Places.

(4) Prospect Peak Fire Lookout

The fire lookout on Prospect Peak has regional significance because it was built in 1914 and is one of the oldest surviving U.S. Forest Service fire lookouts in the nation. The lookout and 0.9 acre of land have been accepted on the National Register as a sample of early 20th century conservation architecture.

(5) Warner Valley Ranger Station

The original ranger station built here in 1926 was the first structure erected in the park by the National Park Service. It was severely damaged by heavy snow and had to be rebuilt in 1927. The present structure is of solid wood construction composed of 2-inch by 6-inch planks laid in log cabin fashion. This building was accepted to the National Register because its rustic style is locally significant in historical architecture.

(6) Summit Lake Ranger Station

This one-story log cabin was built by the National Park Service at Summit Lake in 1927. Because it was completed before the Warner Valley ranger station was rebuilt, it is considered the oldest structure in the park. It is an excellent example of the type of housing provided to personnel of the National Park Service in the early days of the park. This building was accepted to the National Register because of its rustic style and its historic architectural significance.

(7) Horseshoe Lake Ranger Station

The log residence, 33 by 23 feet, is of local architectural significance and is also of historical significance through its association with the Civilian Conservation Corps, who constructed the building in 1934.

(8) Park Headquarters

The two-story headquarters building, located at Mineral, was constructed in 1929 and is considered to be a significant local example of the rustic style. The building is wood frame with a stone-faced concrete foundation and a shingled gable roof. In addition to its architectural value, the National Register form cites that the headquarters' association with early Park Service management efforts gives it local significance with regard to conservation.

b. Properties Eligible for the National Register

The following properties have been determined to be eligible for the National Register. Although they are not on the National Register, they will be treated as if they were.

(1) Park Naturalist's Residence The park naturalist's residence and adjacent garage are eligible for the National Register for their architectural significance. The two-story naturalist's quarters was built by the National Park Service in 1933. Its exterior is made of large native stone up to the first story ceiling level, with the upper story made of wood. The garage is a frame construciton that was built by the Civilian Conservation Corps in 1935.

(2) Entrance Station

This site contains the entrance station kiosk and entrance station residence at Manzanita Lake. The entrance station kiosk is a small building and the only remaining stone entrance station in the parks of the Western Region of the National Park Service. The entrance station residence is a one-story stone and frame structure built by the National Park Service in 1931. The structures do not appear to be historically significant but do possess architectural qualities that establish their eligibility for nomination to the National Register.

(3) Comfort Station

This architecturally distinctive stone comfort station lies about 100 feet southwest of the Manzanita Lake Lodge. The site also consists of 1 acre of land surrounding the comfort station.

(4) NPS Service Station

Located in the maintenance area adjacent to the Mineral headquarters complex, this 1932 structure is considered to be a signficant local example of the rustic style as it relates to a service facility. The 12-foot by 18-foot rectangular frame building has a steeply pitched gable roof with rough cut shakes that harmonize with the surrounding forest.

(5) Sifford Buildings at Drakesbad

In 1900, Alexander Sifford, a schoolteacher who had enjoyed the mineral baths at Warner Valley for many years, managed to persuade Edward Drake to sell. Sifford named the property "Drakesbad" after the first owner and the German word "bad", meaning "baths", and soon developed a rustic resort catering to California's tourists. Sifford and his children were pioneers in the resort business in this area, and they offered the first lodging in the park. Alexander Sifford was instrumental in the establishment of the park. His role in this respect was perhaps equal to if not more than that of Benjamin F. Loomis. During the eruptions of 1914-15, Drakesbad was used frequently as a "command post" for visiting dignitaries and scientists. The records are filled with messages of appreciation to Sifford for the role he played in reporting the activities of the volcano.

Until their removal in 1978, two log structures that dated back to the early Sifford years stood amidst the more modern development at Drakesbad. The hay barn, 1914, was built of logs with saddle-notched corner joints and a gable roof made of shakes. The cookhouse, 1919, had an interesting hipped roof, which is not as common as gable roofs in log structures. The buildings were in fair to poor condition; estimates of restoration costs were $30,000 for the cook's house and $2,160 for the hay barn. Based upon their significance to the historic development of commerce, both of the structures were determined eligible for inclusion on the National Register; yet, because of their delapidated condition, they were subsequently razed. Prior to this action, the buildings were recorded for the National American Buildings Survey as stipulated in the compliance agreement between the National Park Service, the California state historic preservation officer, and the Advisory Council on Historic Preservation.

c. Ineligible Historic Sites

The Manzanita Lake dam and the Sunflower flume and canal have been formally determined to be ineligible for the National Register. No expenditure of historic preservation funds will be made on these structures, and they will be left undisturbed and allowed to deteriorate naturally.

d. Properties Requiring Further Study

A number of other historic sites and structures within the park and at the park headquarters have not received sufficient study for a determination of their historic and architectural significance. Some of these sites may have National Register significance, while others will undoubtedly be found ineligible.

The maintenance area structures and other buildings in the headquarters complex at Mineral are believed to represent relatively unaltered examples of the rustic style as interpreted by NPS architects in the late 1920s. Further evaluation and research is needed before the requisite National Register forms can be completed for a potential Mineral historic district.

In 1865, T.M. Boardman made arrangements for developing the sulphur and clay potential for the Sulphur Works under the supervision of Dr. Supan, a well known chemist. The Supan family pioneered in the southwestern part of the park and commercialized the hot springs at Sulphur Works. Their access road connected Sulphur Works with the town of Mineral, 10 miles to the south. Most of the old road lies outside of the park, but about 2.5 miles of it is within the boundary, and a portion of it passes within a quarter mile to the east of the ski area parking lot. Ruins of old log cabins can be found along the old road, and at one place there are the ruins of an old log bridge over a creek. The trail has lost much of its physical integrity within the park, and further studies need to be made of it and of the Supan Sulphur Works themselves.

The fire lookout on Mount Harkness, a three-story, stone-faced building, is one of two architecturally distinct fire lookouts in the Western Region of the National Park Service.

J. Socioeconomic Factors

1. Regional Land-Use Patterns

A thorough study of uses of land adjacent to the park was made in 1974, relative to options for relocating visitor facilities in areas outside the park boundary. The following information is a summary of the principal uses adjacent to the park.

a. Lumbering

Virtually all of Lassen National Forest contiguous with the park boundary between section 32 north of Table Mountain and section 36 at West Prospect have undergone selective harvesting of timber since 1970. Timber sales also have taken place along most of the west park boundary south of Manzanita Chutes (about 6 miles). As a result, numerous rough timber roads penetrate up to the park boundary and formerly little-disturbed stands of ponderosa, Jeffrey, and lodgepole

pine, and white fir have been selectively thinned. Visual impact from within the park is low. There has been no harvesting of timber immediately outside the park south of the ski area in recent years because these sites are steep and reserved as travel and water influence zones parallel to Mill Creek and California 89. Chapparal brushfields adjacent to the northwestern part of the park--about 450 acres on the north slope of Table Mountain and 500 acres in sections 12 and 13 of Manzanita Chutes--have been cleared for pine plantations, as described in the preceding subsection on vegetation. The Forest Service has no further plans for harvesting timber or clearing brushfields on Table Mountain.

b. Grazing

Grazing by concessioner livestock was formerly permitted in Warner Valley. This nonconforming use of park lands has been discontinued. However, trespass grazing occurs along the park boundaries at varying levels during the summer season.

The Hat Creek, North Battle Creek, and Manzanita Lake cattle allotments lie immediately outside the boundary of the northwestern portion of the park. Use of these allotments is generally from May or July through September. However, there is no suitable range, and therefore little or no actual grazing, adjacent to the park. The Martin-Digger cattle allotment, in the area immediately south of the park boundary near the ski area, is not under obligation and is receiving no use at present.

c. Wilderness and Scenic Areas

The park is completely surrounded by Lassen National Forest (about 66 miles of common boundary). The national forest contains two wilderness areas, the Caribou Wilderness, which is contiguous with 9 miles of the park along its eastern boundary, and the Thousand Lakes Wilderness, which lies only 6 miles northwest of the park. As at Lassen Volcanic Wilderness, permits are required for use of the Forest Service wilderness areas. In 1972, all 811 permits were issued for 3,431 people using the Caribou Wilderness. Use was heaviest in July and August, with 342 visitors present on the maximum use day. Although the Caribou and Lassen Volcanic wilderness areas are contiguous, there are no designated interconnecting trails between the two; however, there is a well used trail between Triangle Lake in the Caribou Wilderness and Window Lake in the park.

The 5,000-acre Heart Lake/Glassburner Meadows area adjacent to the southwestern corner of the park is identified by the Forest Service as a potential candidate for scenic area classification. Management decisions governing its future use and development include (1) avoidance of uses, such as logging by road, which would detract from the natural beauty or aesthetic value; (2) a trail system that would tie together Bluff Falls, Huckleberry Lake, Glassburner Meadow, and all points of interest; and (3) minimum-facility camps and provision of policing during periods of heavy use. The area includes forested glacial moraines and glacial cut-wash areas dotted with bogs and small lakes. It is overshadowed on the north by Brokeoff Mountain, which is within the park.

2. Regional Socioeconomic Characteristics

Lassen Volcanic National Park occupies portions of four California counties: Lassen, Plumas, Shasta, and Tehama. It is a relatively rural region, with logging, wood products manufacturing, agriculture, and tourism serving as the economic mainstays. Outdoor recreation is an important aspect in the future economic growth and well-being of this relatively undeveloped part of the state.

a. Population Trends

Between 1970 and 1980, the four counties grew in population from 133,824 to 192,694, an increase of 44 percent. This rate of increase is well above the rate of increase for the entire United States (13.3 percent).

Table II-6. Four-County Area Population

	4-County Total	Lassen	Plumas	Shasta	Tehama
1970 Population	133,824	14,960	11,707	77,640	28,517
1980 Population	192,694	21,674	17,365	114,779	38,876
Growth Rate 1960-1980	+44%	+45%	+48%	+48%	+36%

The counties' median educational level of persons 25 years and older equals the state's median of 12 years of school completed. However, the median income level, $9,147, is approximately $4,500 less than the state figure, reflecting the region's generally poor job market. Nine percent of the populace live below the poverty line (compared to 8.4 percent statewide), and 16 percent earn more than $15,000 (26.7 percent statewide).

Racial composition of the area is predominantly white. Indians represent the largest nonwhite category, but still make up only 1.6 percent of the total.

The age structure of the local population changed significantly between 1960 and 1970. The only decline (13 percent) occurred among that segment of the population under 5 years of age. The greatest increase (32 percent) occurred in the 15-25 age group because of the post World War II "baby boom". However, this growth rate is not as large as the state increase for this age category (71 percent), probably because of outmigration of the region's young people in search of jobs.

b. Economic Base

The region's economy is based on timber and the manufacture of wood products, agriculture (including livestock production), and tourism. Recreational attractions include the Sacramento River; Shasta, Lassen, Plumas, and Tahoe national forests; Whiskeytown-

Trinity-Shasta National Recreation Area; and Lassen Volcanic National Park.

In Shasta County, the leading agricultural activity is raising livestock. Large acreages are maintained in hay and pasture. The leading manufacturing activity is lumber and wood products.

Government, followed by trade, is the largest nonmanufacturing employer. Historically, Shasta County has had high unemployment; however, developments in Redding that may brighten the economic picture include an industrial park formed to attract business, a downtown shopping mall, and a regional shopping center. Tourism is a $41 million business in Redding, making it nearly as important as lumber. Redding, the largest city (population 40,692) and the county seat of Shasta County, is the transportation, recreaton, and economic focal point for northern California.

The largest industries in Tehama County are manufacturing, government, and agriculture. The largest manufacturing activity, lumber and wood products, has shown some decline in employment in recent years. Nearly three-fourths of Plumas County is in the Lassen, Plumas, and Tahoe national forests--popular refuges for recreational enthusiasts. In the 1960s the number of people at work in Plumas County increased slightly because of new jobs in manufacturing, mining, and trade. This compared to small decreases in transportation, communication, and utilities.

Lumber and wood products dominate manufacturing in Lassen County and provide seasonal employment for 300 to 450 workers. Government at all levels is the largest nonmanufacturing sector, providing half of the county's total jobs; the federal government accounts for over half of government employment. Employment in lumber manufacturing is increasing because of demand for lumber and wood products, although shipping costs and declining old-growth timber stands limit growth in this sector.

3. Visitor Use

a. Access to the Park

Interstate 5 is the main north-south transportation artery for inland California, as well as the primary vehicular route for the entire West Coast. This freeway extends some 1,400 miles from San Diego and the Mexican border to Vancouver, British Columbia, and serves as a major access for tourism and recreation, both regionally and nationally.

Gateway towns west of the park are Red Bluff (population 8,550, 1977 estimate) and Redding (population 40,692, 1977 estimate) located on Interstate 5. These towns provide the nearest year-round accommodations and visitor facilities to the west. The park is about 50 miles from both communities, being reached from Red Bluff on California 36 and from Redding on California 44.

To the southeast and east are the smaller towns of Chester and Susanville, respectively 30 and 60 miles from the park,

accessible on California 36/89. The small towns of Fall River Mills and Burney are about 50 miles north of the park, reached by California 44/89.

The road through the park is a connecting link between California Highways 36 and 44; and in function, although not in official designation, it is a segment of California 89. The park road provides a route through the park from its northwest corner to the southwest corner. This road partially encircles Lassen Peak and provides access to many of the trailheads, campgrounds, and picnic areas available for public use. Other roads, none of them paved, enter the northeast corner of the park at Butte Lake, and the southern portion of the park at Warner Valley and Juniper Lake.

b. Trends in Visitation

Table II-7 is a 29-year tabulation of travel to Lassen Volcanic National Park. During the post-war travel boom in the United States, the visitation to the park increased rather uniformly each year. From 1950 through 1961 the average annual increase in visitation was nearly 9 percent. However, the travel to the park since 1961 has been a seesaw affair, with 8 years of increasing visitation and 11 years of decreasing visitation, and only 4 years where visitation reached the 1961 level.

Perhaps 200,000 of the park's visitors are repeat visitors, with the remainder visiting the park for the first, and perhaps only, time. The repeat visitors usually live within a reasonable driving distance of the park and can change their travel plans if conditions warrant. The first-time visitors are usually on an extended trip, and if the park has a late spring opening or an early closing in the fall, or if there is high fire danger or danger of plague, or if there is a rumor that the park is closed, it will severely affect the number of these visitors coming to the park.

It is expected that over the long term, travel will show an increase and stabilize near half a million visitors annually. However, large fluctuations in the number of visitors reaching the park can be expected on a year-to-year basis because of the variable length of season, regional factors of forest fires and sylvatic plague, weather conditions, changing vacation patterns, and the expenses of private vehicular transportation.

Use at present is largely seasonal, with 55 percent of the visits in July and August. About 90 percent of the visits occur from June through September. The ski area near the southwest entrance accounts for most winter use, although about a quarter of the winter visitation occurs at Manzanita Lake. Skiers make up 50 percent of the winter visitors. The present proportions of use by season are expected to continue well into the future.

Table II-7. Annual Travel Summary for Lassen Volcanic National Park, 1950-1979

Year	Automobiles*	Visitors*	Percent of increase or decrease from previous year
1979	124,263	380,014	-14.1
1978	147,397	442,192	+16.0
1977	126,574	381,157	-17.4
1976	132,407	461,419	+ 3.5
1975	123,681	445,659	+ 9.0
1974	113,222	408,676	-17.7
1973	136,494	496,590	- 1.8
1972	148,178	505,851	+13.1
1971	124,942	447,421	- 4.1
1970	130,278	466,551	+ 7.1
1969	123,105	435,710	- 1.6
1968	124,048	442,755	+23.6
1967	114,371	358,286	-22.5
1966	130,428	462,508	+15.5
1967	114,371	358,286	-22.5
1965	106,741	400,282	- 1.8
1964	108,721	407,705	+10.4
1963	99,551	369,335	- 7.4
1962	107,553	399,006	-13.3
1961	130,244	460,008	+14.5
1960	113,364	401,845	+ 5.8
1959	107,713	379,937	+ 9.6
1958	96,654	346,659	+ 5.9
1957	97,844	327,282	+ 7.7
1956	85,094	303,767	- 0.2
1955	85,686	304,371	+ 7.8
1954	82,803	282,443	+25.3
1952	66,497	212,550	+ 4.4
1951	62,607	203,609	+10.8
1950	56,952	183,815	+ 6.6

*Figures are parkwide.

c. Visitor Characteristics

Visitors from all over the world have visited Lassen Volcanic National Park. However, Lassen is a relatively obscure national park with a short summer season and a close proximity to California population centers, and thus draws the preponderance of its visitors from local or regional residents.

The following information on visitor characteristics is drawn from North Pacific Border Studies (USDI, Field 1971), from three

visitor surveys conducted during the summer of 1976 and 1977 and the winter of 1977-1978 (Gallagher 1977, Becker 1977, Gallagher & Gallagher 1978), and from visitor use statistics maintained by the park.

The visitor surveys and Dr. Field's work show that Lassen visitors live in large or middle-sized urban areas; 70 percent of the summer visitors and 30 percent of the winter visitors come from cities with populations of more than 20,000 people. This agrees well with the distribution of people in California, where 60 percent live in large urban areas, 30 percent in middle-sized urban areas, and only 10 percent in small towns or rural areas. Seventy-five percent of the summer visitors and 99 percent of the winter visitors reside in California. Twenty-two percent of the summer visitors come from the San Francisco area, 19 percent from the Los Angeles area, and 19 percent from the northern part of California in the Lassen region. The winter use survey indicated that 60 percent or more of the ski area visitors come from within the Lassen region and only 10 percent come from the San Francisco area. Twenty-three percent of the winter visitors responding to the survey did not answer this question. Forty to fifty percent of the summer visitors and 75 percent of the winter visitors are repeat visitors.

The typical Lassen visitor is young. Sixty percent of the Lassen visitors are under the age of 40, and the largest age group is between 20 and 30 years old. This is especially true of winter users; 38 percent of them are between the ages of 20 and 30. Persons older than 60 accounted for only 7 to 10 percent of the summer visitors and less than 2 percent of the winter visitors.

Lassen visitors have more children than the average for the general populace and they usually bring their children with them to the park. Seventy percent of the park visitors travel in family groups, and 20 percent travel with friends. A very few individuals traveling singly and people in tour groups make up the remaining visitation. Three-quarters of the visitors arrive in groups of more than 2, and one-third in groups of more than 5.

Lassen visitors on the whole appear to belong to a higher socioeconomic level than California residents or the average visitor to national parks in the Pacific Border States. However, education and income rates were not as high at Lassen as for the typical visitor to Yosemite National Park or to Point Reyes National Seashore, both of which are closer to the San Francisco Bay Area. The typical winter users at Lassen have a high level of education, with 85 percent reporting some college education and 27 percent a bachelor's degree or higher. Their income levels are split into two groups, with 36 percent earning less than $5,000 a year and 30 percent earning more than $15,000 per year. This is to be expected in an area with a large number of college students.

Visitors to the park generally have visited other national parks as well. Dr. Field's study showed that 60 percent of Lassen visitors had visited Redwood National Park, 50 percent had visited Whiskeytown-Shasta-Trinity National Recreation Area, and 44 percent had visited Point Reyes National Seashore. Over a third had seen John Muir National Historic Site, Muir Woods National Monument, or Yosemite National

Park. They had relatively less association with national parks in Oregon and Washington, although approximately 25 percent of Lassen visitors had visited Crater Lake.

Two of the surveys inquired into the park visitor's preferences for activities and facilities. Hiking and camping ranked highest in both surveys, as shown in the following tables, and other activities and preferences were biased by the season of the survey, as would be expected. Visitors interviewed in the 1976 survey expected to experience natural beauty (23%), to explore (15%), to be a part of nature (13%), and to be with family and friends (11%). Nearly 95 percent of both winter and summer visitors feel that Lassen is a low-density or a wilderness type park.

Some additional information specifically related to winter users was available from the winter 1977-1978 survey. Sixty-four percent of the visitors interviewed were downhill skiers, 14 percent were cross-country skiers, 3 percent were snowshoers, and 18 percent were listed as other. Eighty-four percent of the people questioned skied, and two-thirds of the rest would like to learn. Thirty-seven percent of the skiers indicated they were intermediate in ability, 26 percent were beginners, and the rest were advanced. The question of the type of slopes available has been mentioned throughout the planning process. Fifty-three percent of the people responding indicated the slopes were challenging enough, 20 percent indicated they were not, and 23 percent indicated the question was not applicable.

Table II-8. Recreational Activities Preferred by Lassen Visitors

	Persons Indicating Preference	
Activity	Summer 1977	Winter 1977-78
Camping	87.6%	71.3%
Hiking	85.1%	81.7%
Picnicking	71.4%	56.4%
Fishing	61.5%	47.4%
Swimming	57.8%	37.0%
Boating (nonmotorized)	46.6%	30.1%
Cross-country skiing	42.0%	66.4%
Bicycling	40.8%	40.8%
Rock climbing	40.0%	47.1%
Snowshoeing	36.0%	52.6%
Horse riding	32.3%	41.5%
Downhill skiing	15.9%	71.3%
Snowmobiling	5.0%	18.7%

Table II-9. Facility Preference

Facility	Persons Preferring Facility	
	Summer 1977	Winter 1977-78
Restrooms	72.9%	56.7%
Visitor center	69.6%	31.8%
Trails	69.1%	56.4%
Campgrounds with services	64.8%	45.7%
Showers	63.1%	24.6%
Small grocery store	62.9%	39.8%
Museum	57.4%	21.5%
Gas station	47.4%	26.3%
Roads	40.6%	29.1%
Campgrounds without services	32.3%	40.5%
Restaurant	26.3%	39.1%
Ski area	16.1%	77.2%

d. Overnight Use

Under this subheading, the pattern of public overnight use is considered, both for the park and the surrounding region, with emphasis on capacities of facilities and their utilization before the closing of facilities at Manzanita in 1974, and after its reopening in 1976.

(1) Camping

Before the 277-site campground at Manzanita Lake was closed in 1974, the average number of camping sites occupied each night was about 180 in July and about 250 in August. In August of 1973 all of the sites in the campground were filled on 21 out of the 31 days, indicating that the demand for camping was approaching the capacity of the campground. The number of visitor nights spent in the campground at Manzanita Lake accounted for approximately 60 percent of all campground camping in the park during 1973. After the 181 sites were reopened to campers in 1976 (a reduction of 35 percent of the camping sites) the number of visitor-nights at the campground at Manzanita Lake accounted for 36 percent of the camping in the park during 1976 and 37 percent in 1977. The new campground at Lost Creek and the campground at Summit Lake were apparently accommodating the proportion of campers missing at Manzanita Lake because campgrounds in the national forest northwest of the park showed no dramatic increases over this time period.

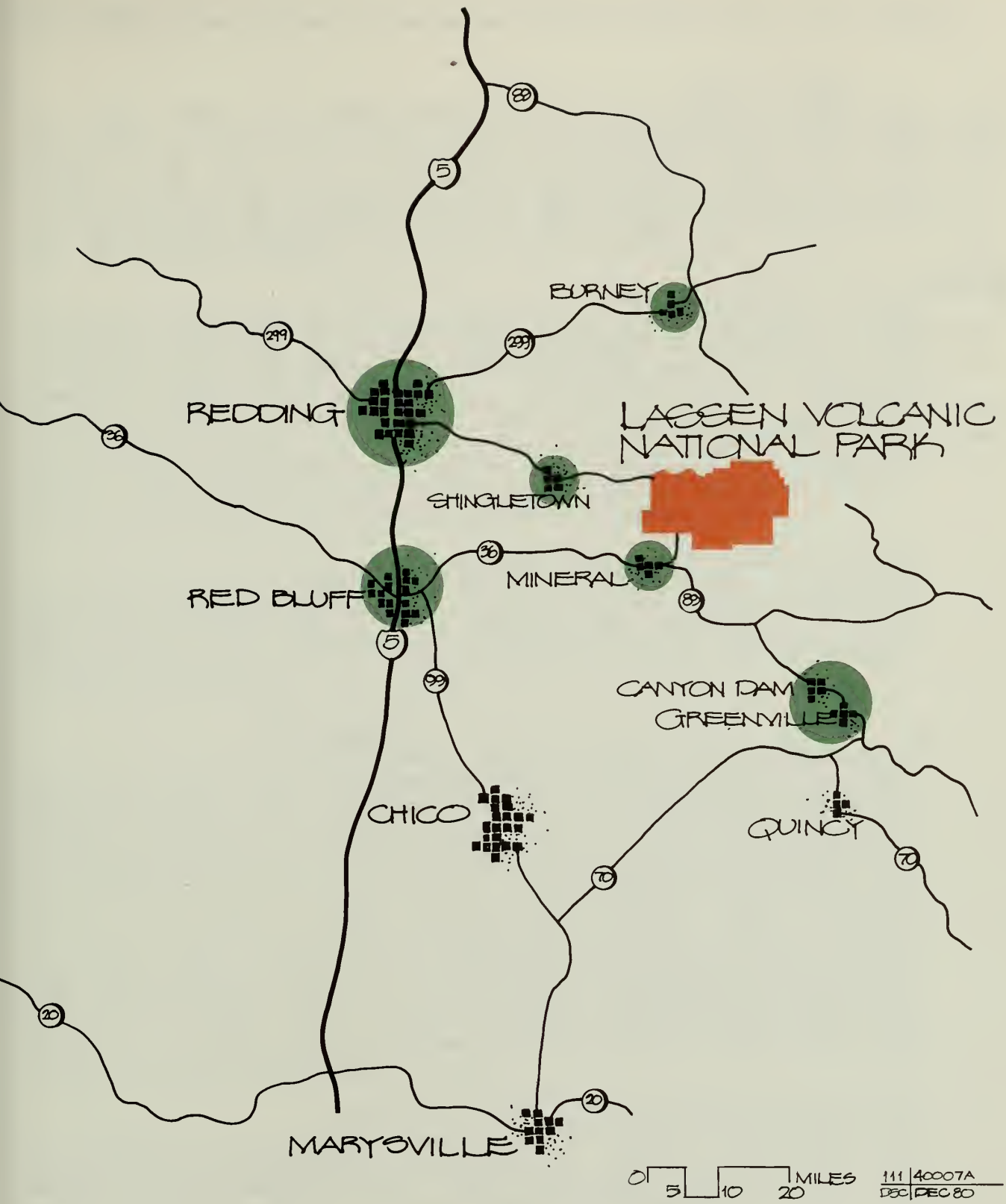
Total campground use increased 9.9 percent from 1975 to 1979, from 64,363 to 71,427 visitor-nights. The 1979 total is comprised of 39,225 tents and 32,202 recreational vehicles. For the same period backcountry camping amounted to 11,462 parties.

In addition to Manzanita Lake, there are three other campgrounds along the park road: 10 group camping sites and 45 individual sites at Lost Creek, 93 individual sites at Summit Lake, and 24 sites at Sulphur Works. During August most of the camping facilities in the park are filled each night, and they are are 80 to 90 percent filled during the rest of the summer months. The use of all designated campgrounds within the park between 1973 and 1977 is given in table II-10.

Most commercial campgrounds are clustered around Red Bluff and Redding (50 to 60 miles west of the park), around Burney and McArthur (50 to 60 miles north of the park), and in the Chester-Almandor-Greenville area (35 to 60 miles southeast of the park). Concentrations of commercial campgrounds and trailer parks in the Lassen region are shown on the Commercial Campground Concentrations map. Forest Service campgrounds and use figures for 1972 through 1977 are listed in table II-11.

Table II-10. Campground Use Within Lassen Volcanic National Park (visitor-nights)

Ccampground	1973	1974	1975	1976	1977	1978	1979
Manzanita Lake	74,397	Closed	Closed	31,767	27,933	42,181	30,27
Butte Lake	9,098	11,106	16,361	9,793	5,455	7,772	8,21
Warner Valley	1,211	1,814	1,291	1,176	1,530	1,746	1,18
Juniper Lake	4,425	3,443	2,784	3,203	3,999	3,315	2,97
Summit Lake	22,377	20,466	22,307	27,971	19,635	11,543	17,16
Sulphur Works	4,536	6,258	6,332	5,192	5,322	4,841	4,45
Crags		4,908	15,098	5,568	5,940	6,409	4,10
Lost Creek	7,219	5,240	3,600	4,734	4,157	2,691	3,06
TOTAL	123,263	53,236	68,629	89,404	73,971	80,498	71,42



COMMERCIAL CAMPGROUND CONCENTRATIONS

LASSEN VOLCANIC NATIONAL PARK

Table II-11: Use of Forest Service Campgrounds Near the Park (visitor-nights)

Site	Miles from Park Entrance	Number of Units	1972	1973	1974	1975	1976	1977	1978	1979
North of Park on California 44-89:										
Big Pine	10	18	7,400	6,900	8,100	1,700	5,600	2,600	7,200	6,000
Hat Creek	13	89	31,400	26,500	25,700	32,300	23,500	31,300	28,300	36,500
Cave	15	50	31,700	30,500	31,800	19,800	31,300	32,200	24,800	31,000
South of Park on California 36:										
Battle Creek*	10	50	3,600	15,200	23,000	24,100	15,400	11,300	16,200	14,900
Gurnsey Creek	14	52	11,600	11,700	24,200	19,700	13,300	14,600	22,300	18,900

*Expanded from 17 to 50 units in 1972.

The popular McArthur-Burney Falls Memorial State Park, 47 miles north of Manzanita Lake, has the largest campground in the region (other than Manzanita). Its 118 sites, open May 24 to September 15, are run by a computerized reservation system. Of the 14,396 campsite-nights available there in 1972, 11,308 (77 percent) were utilized. Thus, the average number of unused campsites there is less than 30 percent per night.

There are few government campgrounds along California 36 and 44, which approach the park from the west. Along California 36, 89, and 32, on the south, and California 44 and 89, on the north, there are 18 Forest Service campgrounds and one state park campground within 50 miles of the park. Fourteen of these are developed campgrounds with 611 units, 474 of which are described as "destination vacation" in character, and 145 as "overflow" or "peak." Before the closing of facilities at Manzanita Lake in 1974, Forest Service "destination vacation" and "weekend" sites in the Lassen region averaged 75 percent utilization on weekday nights and 90 percent on weekend nights.

In summary, the pattern of camping in this southern Cascades region has evolved toward federal and state government providing this service. The park--with a total of 386 sites along the main road compared to 611 federal and state campsites at other places on highways within 50 miles--obviously has been a major provider of public campgrounds.

(2) Lodging

The Lassen Volcanic National Park Company, a subsidiary of U.S. Natural Resources, Inc., was the concessioner in the park from 1970 to 1974. Preceding companies provided lodging and other services at Manzanita Lake beginning in 1932. Under the conditions of exclusive operation and other encouragements granted to the company by the National Park Service, Lassen Park Lodge established a reputation for quality service that was well suited to the overnight visitor who was disposed to staying in cabins rather than camping. Other company operations in the park served the requirements of other visitors. These operations, which are still open under a new concessioner, include the sales and quick-food operation at the Lassen ski area near the southwest entrance, a similar but smaller operation at the Manzanita Lake campground, and the Drakesbad Guest Ranch in Warner Valley, which was closed in 1974 but was reopened in 1975.

Occupancy of Manzanita Lake Lodge through 1973 was heaviest on weekend nights during July and August; from about July 15 through early September the occupancy rate was essentially 100 percent. The capacity of the lodge was about 440, but full room occupancy usually occurred with about 350 to 375 visitors.

The socioeconomic characteristics, the areas of residence, and the motivations of the clientele who used the lodge are not well known, although many probably were Californians from the Sacramento Valley and San Francisco Bay Area. Qualities of the Manzanita lodging environment that may have been important to these people were the lake, the view of Lassen Peak, and the idea that this was

"the" place to stay within the park. Other important qualities may have been low-density development (that is, cabins rather than a motel) and the immediate surroundings (big pines; shady, cool places to relax; pleasant dining).

West of the park in the direction of Redding on California 44, there are five restaurants and two lodges. Between the park and the Burney-McArthur region 50 miles north, there are only half a dozen small businesses of this type. At one time there was a lodge in Viola (owned by B.F. Loomis), but it went out of business years ago.

On California 36 between Red Bluff and Mineral there are three small stores. Mineral is the closest concentration of commercial services to the park. These include the Mineral Lodge with cabins (about 20 units), restaurant, grocery store, and gas station. Continuing 9 miles east on California 36, the next lodging establishment is Childs Meadows Resort. Mill Creek Resort is located 6 miles south of Mineral on California 172. Farther east on California 36, other resorts offering services similar to those already mentioned are the Fire Mountain, Deer Creek, Black Forest, and Cedar lodges. All these businesses are open in summer and early fall. In the winter of 1973-74, two were closed completely, and the others were most active on weekends. Thirty miles east of Mineral in the Chester/Lake Almanor area there are dozens of motels, resorts, guest ranches, and water-recreation-oriented businesses.

Accommodations in more distant communities such as Red Bluff and Redding also are important to the park. Expansion of sleeping units has been occurring in Redding, where there were 30 motels and hotels with 1,776 rooms and 2,358 beds available in 1976.

Travelers who support the lodging industry in the larger Lassen region are difficult to categorize. Interstate traffic is quite important at Red Bluff and Redding and includes a variety of commercial travelers, people en route to Reno, and tourists who are passing through. A second group of travelers are bound for local attractions such as Lassen Volcanic National Park and recreational lands in Lassen National Forest. These people predominate as clientele in the lodges between Mineral and Chester. During summer weekends the group of seven resorts along California 36 typically runs at capacity, and local residents are hired temporarily to assist in the operations. There is not likely to be significant growth in these lodge operations under present patterns of use. The effects of fuel shortages and/or high prices for fuel on these businesses are not clearly known.

In March 1975, National Park Service employees conducted interviews at stores, restaurants, lodges, bars, and service stations on the north and south sides of the park to find out how business had fared in 1974 compared to 1973 before the closures at Manzanita Lake. In each case, the owner, manager, or knowledgeable person was asked for a percentage increase or decrease between 1973 and 1974; they were told their businesses would not be identified individually; and they were told the infomation was being used for park planning.

Of 13 businesses contacted in the Manzanita/ Shingletown/Hat Creek area northwest of the park, 10 reported 1974 business had increased between 10 and 25 percent over 1973; one reported no change; and two reported their business was down 12 to 20 percent. One of the businesses that reported an increase and one that reported a decrease indicated they would have done better if park and concession employees who had formerly traded with them had been at Manzanita in 1974.

Of businesses contacted along California 36, six responded with figures. Five of them reported that business in 1974 compared to 1973 had increased between 5 and 20 percent; one reported business was down 1 percent. Many indicated that the closure at Manzanita had little or no effect on business, and that the late road opening in the park and the gas shortage were more significant influences on 1974 travel.

It would probably not be accurate to attribute overall increases in business to the closing of facilities at Manzanita. Other factors prejudiced the situation in 1974. The fuel problem may have discouraged park vacationers, yet in other cases it may have caused others to stay longer in local resort areas. Late opening of the park road, and possibly widespread announcement of the closing, may have decreased travel. Additional statistics would be needed in order to assess long-range effects of the closures on local businesses.

e. Recreational Use

A 1971 doctoral dissertation by Virginia B. Gillespie of New York University was based on questionaires and interviews in 15 western national parks. The study sought to determine guidelines for family-camping programs. Many visitor preferences were sampled as to the character of camping and associated recreational opportunities that are and should be offered. The Lassen sample was based on 219 respondents. The investigator found that hiking, relaxing, and sight-seeing ranked high in the importance that visitors attached to Lassen and that many family campers came several times a year to see the outstanding nature programs and exhibits, to hear talks, and to take trails and tours. In summary, she states, "This appears to be one of the parks which more completely meets the needs of the participant than most of the others....good use of facilities and....opportunities for the development of new interests." This indicates that camping in the past at Lassen, particularly that in the Manzanita Lake area, was a very successful public service.

(1) Skiing

The ski area now operates as a day-use facility open Wednesday through Sunday. The ski season normally runs for 21 weeks beginning in mid-November, though adverse weather conditions usually limit the actual number of operating days to between 50 and 60 each season. The optimum capacity is 500 downhill skiers plus 30 percent who are not downhill skiing at any one time, for a total of 650 people at one time. On peak-use days, ticket sales are limited to 800, but at this capacity, the area may be overcrowded.

Downhill skiing within Lassen Volcanic National Park has evolved as a popular family activity since the late 1930s when a rope tow and warming house were constructed in the vicinity of Sulphur Works. In 1956, the ski area was relocated to its present site, and a Poma lift and two rope tows were installed. In 1965, a lodge and parking area were constructed, but the capacity of the ski slopes was not increased. There was an average 22 percent increase in the number of skiers each year over the five ski seasons from 1968 to 1973. The total number of downhill skiers during the 1978-79 season was 24,015.

An attempt was made to determine how much more people would be willing to pay for lift tickets if the ski area was expanded and a chair lift installed. Nineteen percent indicated they would not be willing to pay any more for tickets; 6 percent said $1; 25 percent said $2; 31 percent said $3-4; and 11 percent $5-6 more. Although "willingness to pay" is not necessarily a valid measure of how people will actually react, it does given an idea of the number of people who would continue to use the ski area if the prices were raised.

Winter activities other than downhill skiing have also increased in popularity at the Lassen ski area--approximately 25-30 percent of the winter visitors are participants in those other activities. The number of cross-country skiers keeps increasing, and there is a great potential for this sport along the unplowed park road. Because of the steep terrain, the park road is best for more advanced cross-country skiers; avalanche danger can be high and the area is sometimes closed to visitors. Snow play such as plattering or tobogganing takes place adjacent to the parking lot, though no supervision is provided. A very successful winter-ecology interpretive program featuring guided snowshoe walks to Sulphur Works has grown in popularity, and the National Park Service plans to expand this activity in the future.

The ski area is mainly used by local people who travel between 1½ and 3 hours to the ski site. The ski area is known for its family atmosphere; 50 to 60 percent of the skiers are regular or return visitors. Approximately 70 percent of the skiers come just for the day and are from Butte, Tehama, and Shasta Counties, which have higher skier ratios per population than other nearby counties. An increasing number of skiers are coming from the Bay Area and staying with friends or in nearby lodging. There are approximately 210 motel rooms and 40 housekeeping cabins that could accommodate 500 people within 30 miles of the ski area; however, relatively few of these facilities operate during the winter.

Winter use at the northwest entrance has increased in recent years. Most activity occurs on Forest Service land where snowmobile use is permitted and at Eskimo Hill where a snowplay area has been developed. Cross-country skiing in the Manzanita Lake area has increased in popularity. The terrain is gentle and suitable for beginners as well as the more advanced skiers.

Table II-12. Winter Recreation Use At Lassen Ski Area

Season	Snowshoers and Cross-Country Skiers	Total Downhill Skiers	Average No. Downhill Skiers Per Day	No. of Days More Than 500 Skiers/ No. Days of Operation	Percent Days Over 500 Tickets Sold
1968-69	--	11,255	268	--/42	--
1969-70	200	14,614	291	--/50	--
1970-71	450	18,804	372	--/50	--
1971-72	884	21,836	399	--/54	--
1972-73	2,459	25,099	417	17/61	(28%)
1973-74	2,400	18,579	265	4/70	(6%)
1974-75	3,055	16,429	278	9/59	(15%)
1975-76*	3,497	17,316	275	6/63	(9.5%)
1976-77	2,051	8,754	292	7/30	(23%)
1977-78	4,406	23,974	369	18/65	(28%)
1978-79	4,556	24,015	255	--/94	--

*April figures estimated.

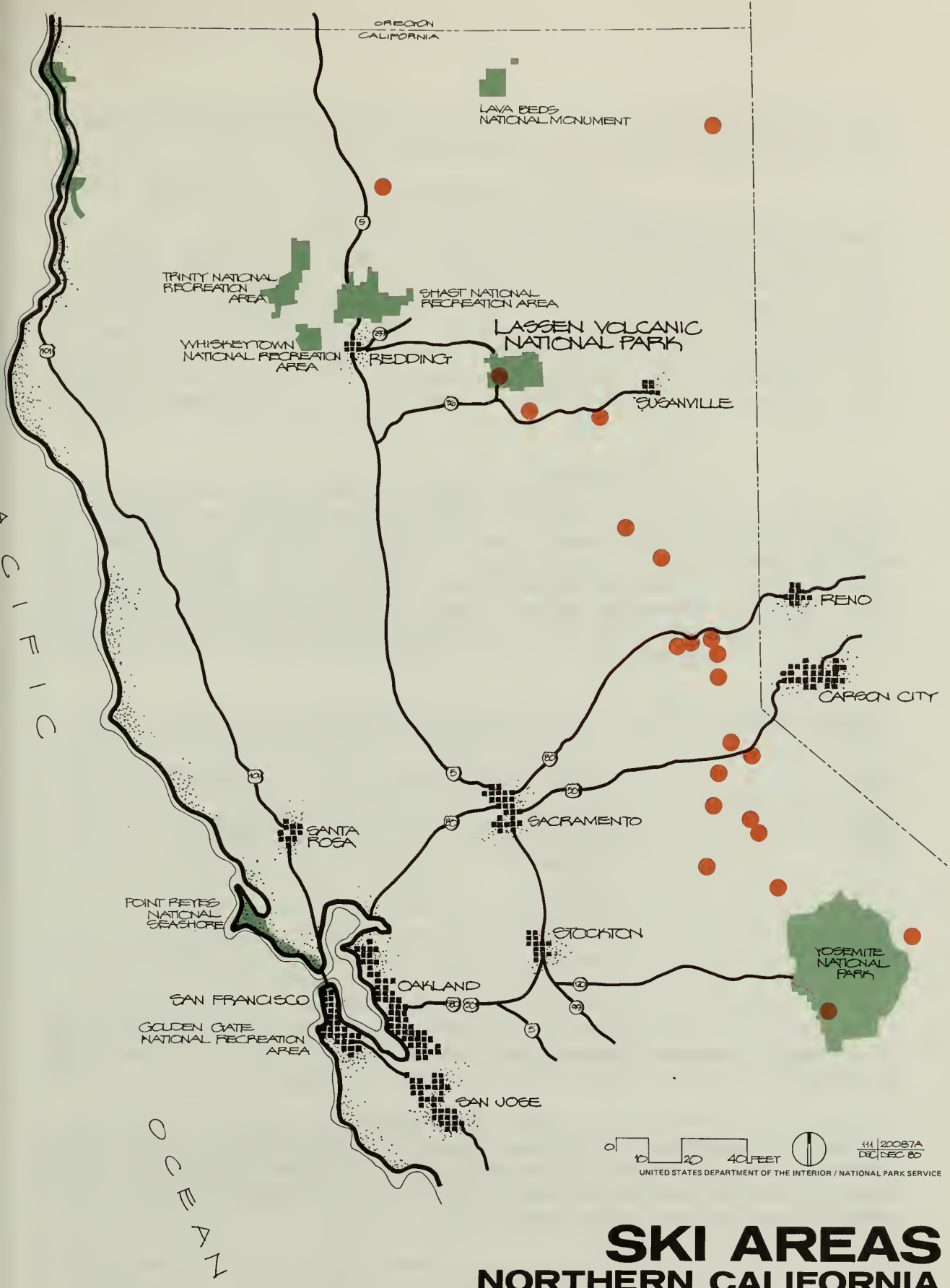
Table II-13. Winter Recreation Use at Manzanita Lake

Winter	Visitors	Snowshoers and Cross-Country Skiers Entering At Manzanita	Snowmobilers
1969-70	13,648	31	65
1970-71	7,676	81*	3*
1971-72	11,676	375	5*
1972-73	16,645	1,373	117
1973-74	16,376	1,646	24
1974-75	17,715	1,765	105
1975-76	19,320	1,816	0
1976-77	18,226	1,936	(Closed to snowmobilers)
1977-78	21,684	4,871	(Closed to snowmobilers)

*Figures incomplete.

There are several competing ski sites in the Lassen region. Stover Mountain, located near Chester, 28 miles from Lassen, has relatively constant use, with 3,000 visitor days per season; this site seems to satisfy the needs of residents of northern Plumas County and some of Lassen County. Plumas/Eureka State Park in Plumas County and Coppervale in Lassen County are marginal, local ski operations. The Donner/North Tahoe area serves the San Francisco Bay Area and Sacramento skiers; the annual capacity is estimated at 1,067,000 skiers and is adequate to satisfy growing demand for several years. The Lassen skiers apparently return to the area. Sixty-three percent ski two or more times a year at Lassen, but it is apparent that people divide their skiing time between Lassen and other ski areas. Eighty percent of the people interviewed ski two or more times in a normal winter.

Deercreek (also known as Carter Bowl on Butt Mountain), located 18 miles southeast of Lassen (see Ski Areas map), is a possible site of development for year-round recreational use. With a 2,800-foot vertical drop, the Butt Mountain and Deercreek drainage offers potentially excellent skiing. Fairly level meadow and forest lands at the base, which are privately owned, would provide an ideal support facility area. The Deercreek area may be considered for winter sports development by the Forest Service, but it is probable that decisions about



SKI AREAS
NORTHERN CALIFORNIA
LASSEN VOLCANIC NATIONAL PARK

the future of this area will not be forthcoming within the expected 10-year life of the Lassen general management plan.

Recent estimates indicate that skiing in the United States is increasing by about 8 percent annually, and skiers represent 1.5 percent of total population. The United States Ski Association claims that 3.6 percent of the total California/Nevada population ski up to 2 days annually and 1.5 percent ski 10 days or more. There are five times as many skiers in the 20-year to 35-year age bracket as in the 35-year to 50-year age bracket. The former age bracket is the largest group of Californians, and the greatest increases are projected for that group. Consequently, a growing ski population seems assured for any ski facility in the region, assuming that projections of population, economics, and leisure-time trends are correct.

(2) Hiking

Hiking at Lassen is classed into two types: day hiking and overnight hiking (backpacking). Most day hiking is concentrated along trails made accessible by the park road. By far, the most popular hikes are to Bumpass Hell and to the summit of Lassen Peak. Use of the two trails has remained high in this decade, with the effect that the trailhead parking areas have been used to capacity on virtually all summer weekends. The numbers of hikers on the two trails are as listed in table II-14.

Table II-14. Hikers on Lassen Peak and Bumpass Hell Trails, 1971-77

Year	Lassen Peak Trail	Bumpass Hell Trail
1971	22,440	46,800
1972	28,780	37,600
1973	27,750	24,500
1974	23,750	19,250
1975	30,000	20,000
1976	30,600	20,400
1977	34,700	22,600

Other interesting day-hike trails lead to the top of Brokeoff Mountain, Terrace and Shadow lakes, and Kings Creek Falls. No statistics on use of these trails have been collected.

Two other outstanding natural areas used heavily by day hikers are at Warner Valley (Boiling Springs Lake/Devils Kitchen/Terminal Geyser) and at Butte Lake (Cinder Cone/Fantastic Lava Beds). Interpretive guide leaflets to these places add much to visitor understanding of the natural features.

Despite the former major visitor development at Manzanita Lake and the immense popularity of hiking as a pastime at Lassen, opportunities for hiking on trails in that area were limited to short walks around Manzanita Lake, and Lily Pond and two trails south of the development. Major natural features such as Chaos Jumbles and the

Devastated Area, and other areas in the northwestern part of the park, were never made accessible to a significant extent by trails, whereas a multitude of trails in other parts of the park have made these areas readily accessible and they receive heavy use.

Most of the backpacking at Lassen takes place in the eastern unit of the Lassen Volcanic Wilderness, which lies east of the park road. This area is encircled by readily accessible trailheads. The eastern unit is distinctly different from many other such areas in the western United States because of its relatively small size, ease of access, and gentle terrain. These characteristics are favorable to use by family groups, who can learn the ethics and techniques of backcountry living and later may go elsewhere for a more demanding primitive area experience.

The backcountry has been used for wilderness hiking and camping by about 13,000 persons per year since 1973, when the Backcountry Management Plan, which sets carrying capacities on this use, was put into effect. Half the backpackers depart or exit at Summit Lake; 25 percent at Butte Lake; 10 percent at Juniper Lake; and the remaining 15 percent principally at Kings Creek, Sulphur Works, Warner Valley, and Bumpass Hell. The most popular backcountry campsites are Snag Lake (27% of use); Twin Lakes (18 %); Horseshoe Lake (8%), and Chester Lake, Rainbow Lake, and Corral Meadow (each 6%).

The Pacific Crest Trail bisects the park from north to south. It enters from a point on the north boundary at Badger Flat and exits on the south boundary below Little Willow Lake, for a total of 17.4 miles through the park. Both entrances to the trail are signed as trailheads. Through the park the trail is marked with the official trail tree markers. Pacific Crest Trail users who camp overnight in the wilderness are required to have a wilderness permit. Use of the trail as a through-park route is light, about 200 to 250 hikers each year.

The vast majority (98 percent) of the persons receiving wilderness permits are from California. About 60 percent of these California users are from the Bay Area. Twenty-one percent are from the Sacramento/Marysville/Fresno area, and 7 percent are from the Los Angeles area. Ten percent are local residents from Redding, Red Bluff, and other nearby towns. June, July, and August accounted for 83 percent of the wilderness permits issued from May through December of 1977.

In accordance with the backcountry management plan, campers in the backcountry are assigned either to a specific campsite or to a general area (undesignated campsite) for overnight stays. Wilderness permits are required for this use. A maximum number of six individuals are allowed at any designated or nondesignated site, and hiking groups are limited to 20 persons. The camping limit is 7 days.

Use of pack or riding animals at Lassen is very limited. No visitors using pack or riding animals can stay overnight in the park backcountry. For day trips, group size is limited to 15 animals, with no more than three such groups allowed in the park at one time.

Animal use in the backcountry during May through December 1977 consisted of 12 groups and 39 animals.

K. Existing Park Development

1. Lassen Park Road

The 30-mile-long Lassen Park Road has a 20-foot-wide bituminous running surface, with numerous paved and unpaved pulloffs. It links the former developments at Manzanita Lake at the northwest entrance with the Lassen ski area and the Sulphur Works at the southwest entrance, and forms the backbone of the park experience for most visitors.

The road is a scenic corridor through a variety of volcanic terrain and life zones, which provide a diverse, interesting park experience. Visitors can drive through Sulphur Works with little effort, or they can walk 1½ miles to the largest thermal area in the park--Bumpass Hell. Another popular day-hike starting from the road is Lassen Peak. Other trails leading to Brokeoff Mountain, Cold Boiling Lake, and other features add to the enjoyment of this colorful landscape. Important overnight hiking thresholds along the road are at Kings Creek Meadows and Summit Lake. Much visitor interest focuses on the southern portion of the park between Summit Lake and the southwest entrance, and the trails there are popular destination points for California visitors seeking recreation and climatic relief in the summer.

The road is open June through October. The speed limit between Manzanita Lake and Upper Kings Creek Crossing (15.5 miles) is 45 mph; in the winding section between Kings Creek and the southwest entrance (12 miles) it is 35 mph. In three or four areas that tend to be congested the posted speed limit is 15 to 25 mph.

About 50 percent of the visitors to the park enter at Manzanita Lake and about 50 percent enter from the south, although these percentages vary slightly from year-to-year. It is estimated that about 85 percent of the traffic entering both entrances eventually passes on through the park; however, no records have been kept, and the described pattern of use is based on observations and judgment of employees. It is believed that about 15 percent of the visitors entering from the south drive to the Sulphur Works or Lassen Peak parking area, then turn around and return to the highway. About 10 to 20 percent of the traffic entering at Manzanita Lake is believed to stay at that area, thereby not becoming part of the general flow on the park road. About 80 percent of the vehicles pass through both main entrances, and about 85 percent travel over all or portions of the park road between Sulphur Works and the east side of the Manzanita Lake development.

Actual traffic counts show that the park road carries 100 to 150 cars per hour during the periods of peak travel in the summer. According to standards suggested by the American Association of State Highway Officials (AASHO) rural roads with a 20-foot paved running surface should be able to carry volumes of 200 to 400 vehicles per hour. Thus, it would seem that the park road is far from its vehicle carrying capacity. However, because of narrow shoulders, short-radius curves, limited sight distances, and main use of the roadway for scenic touring,

CLOSED IN 1974
MANZANITA LAKE
- LASSEN PARK LODGE, CABINS, DINING ROOM, STORE, GAS STATION
- EMPLOYEE RESIDENCES
- LOOMIS MUSEUM
- TRAILS

LOST CREEK
- 10 UNIT GROUP CAMP / 45 UNIT CAMPGROUND
- EMPLOYEE TRAILERS

BUTTE LAKE
- 98 UNIT CAMPGROUND
- RANGER STATION
- EMPLOYEE RESIDENCE AND TRAILERS
- TRAILS

MANZANITA CAMPGROUND
- AMPHITHEATER,
- 190 UNIT CAMPGROUND REOPENED 1976
- TRAILS

HAT CREEK
- TRAIL
- PRIVATE LAND AND DEVELOPMENT

MANZANITA CHUTES
- TEMPORARY DEVELOPMENT
- RANGER STATION
- INTERPRETIVE FACILITY
- EMPLOYEE RESIDENCES
- MAINTENANCE FACILITIES

DEVASTATED AREA
- PARKING AREA

SUMMIT LAKE
- 98 UNIT CAMPGROUND
- RANGER STATION
- TRAILS

LASSEN PEAK
PARKING AREA
TRAILS

JUNIPER LAKE
- 18 UNIT CAMPGROUND
- RANGER STATION
- EMPLOYEE RESIDENCE
- TRAILS
- PRIVATE LAND AND DEVELOPMENT

SULPHUR WORKS
- PARKING AREA
- TRAILS

BUMPASS HELL
- PARKING AREA
- TRAILS

WARNER VALLEY
- 15 UNIT CAMPGROUND
- RANGER STATION
- TRAILS

DRAKESBAD
- GUEST LODGE
- TRAILS

LASSEN SKI AREA
- SKI LIFT AND SLOPES
- SKI LODGE
- PARKING AREA
- 24 UNIT CAMPGROUND
- TRAILS

PARK HEADQUARTERS AT MINERAL
- ADMINISTRATION, MAINTENANCE
- RESIDENCE FACILITIES

LASSEN VOLCANIC NATIONAL PARK

111 | 20077D
DSC | DEC 80

0 ½ 1 MILES 2

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

EXISTING DEVELOPMENT

LASSEN VOLCANIC NATIONAL PARK

the lower value of 200 cars per hour is closer to the true carrying capacity for the road. If visitation were to increase at an annual rate of 5 percent over 1979 levels, this volume of traffic would be reached by the turn of the century.

Despite the basic adequacy of the roadway in most areas, the southernmost 7 or 8 miles of the road passes through very scenic terrain including at least one unusual feature that prompts a slowdown in traffic. Sulphur Works presents a visual novelty because the road passes over colorfully altered rocks next to spectacular steam vents. At times during the summer, the heavily used parking areas along the southern part of the road at Sulphur Works, Bumpass Hell, and Lassen Peak cause hesitation and slowing in the flow of traffic. The Bumpass Hell parking area has a capacity of 60 vehicles and is at this capacity during 2 to 4 hours on 60 percent of the days in July and August. The Sulphur Works parking area has a capacity of 41 vehicles and is at this capacity during 1 to 2 hours on 20 percent of the days in July and August. The Lassen Peak parking area has a capacity of 135 cars and is seldom at capacity except on weekends.

In 1973, the 8.34-mile-long road between the southwest entrance and a point just east of the Lassen Peak parking area was resurfaced and short segments were improved. The road surface was paved at a 20-foot standard with variable width surfaced shoulders, which in some places are very narrow. Surface-width standards of 24 to 25 feet were maintained for about 600 feet at the Jones Cut parking area, 1,200 feet at the Bumpass Hell parking area, and 2,100 feet at the Lassen Peak parking area. Curves with small radii were bypassed at the Sulphur Works, Bumpass Hell, and Lassen Peak parking areas in order to eliminate tight turns as well as to enlarge those sites for parking. There are six curves with radii of 100 feet still remaining on other portions of the road; five of them are within a 2-mile segment between Diamond Peak and Jones Cut. The winding southern portion of the road is of a standard well below many state highways with this volume of traffic. It is a park road designed for slow, scenic touring. Commercial truck traffic is denied access to the park road, although to some extent large recreational vehicles cause slowdowns of a similar nature.

In Anklin Meadows along Lost Creek the park road is about a quarter of a mile east of rockfall-avalanche debris from Chaos Crags. At Chaos Jumbles the park road passes over the debris of the Chaos Jumbles rockfall-avalanche for more than 2 miles.

2. Northwest Entrance (Manzanita Lake/Manzanita Meadows)

Until its closure in 1974, the developed area at Manzanita Lake formed a traditional part of the Lassen experience for the majority of park visitors. The cool, forested setting, with its streams, reflecting lakes, and scenic views of Mount Lassen, provided an almost ideal locale for the development of the park's major interpretive center, and the major concentration of day use and overnight visitor accommodations and facilities.

In 1968, the Geological Survey began studies to identify potential hazards in the park from possible future geologic events. One such potential was for a rockfall-avalanche to fall from Chaos Crags and sweep catastrophically across the Chaos Jumbles and into the Manzanita Lake/Manzanita Meadows area. The potential exists for this slide to be as great, or greater, than the estimated 200 million cubic yards contained in the prehistoric Chaos Jumbles avalanche. Such an event could be triggered by a severe earthquake or major steam explosion beneath Chaos Crags. Therefore, a major rockfall-avalanche could occur unpredictably, without warning, and equally at any given moment. A rockfall-avalanche of Chaos Jumbles magnitude would travel in excess of 100 miles per hour, reach the park boundary at Manzanita Meadows in 2 minutes, and totally devastate everything within its path and that of its marginal air blast.

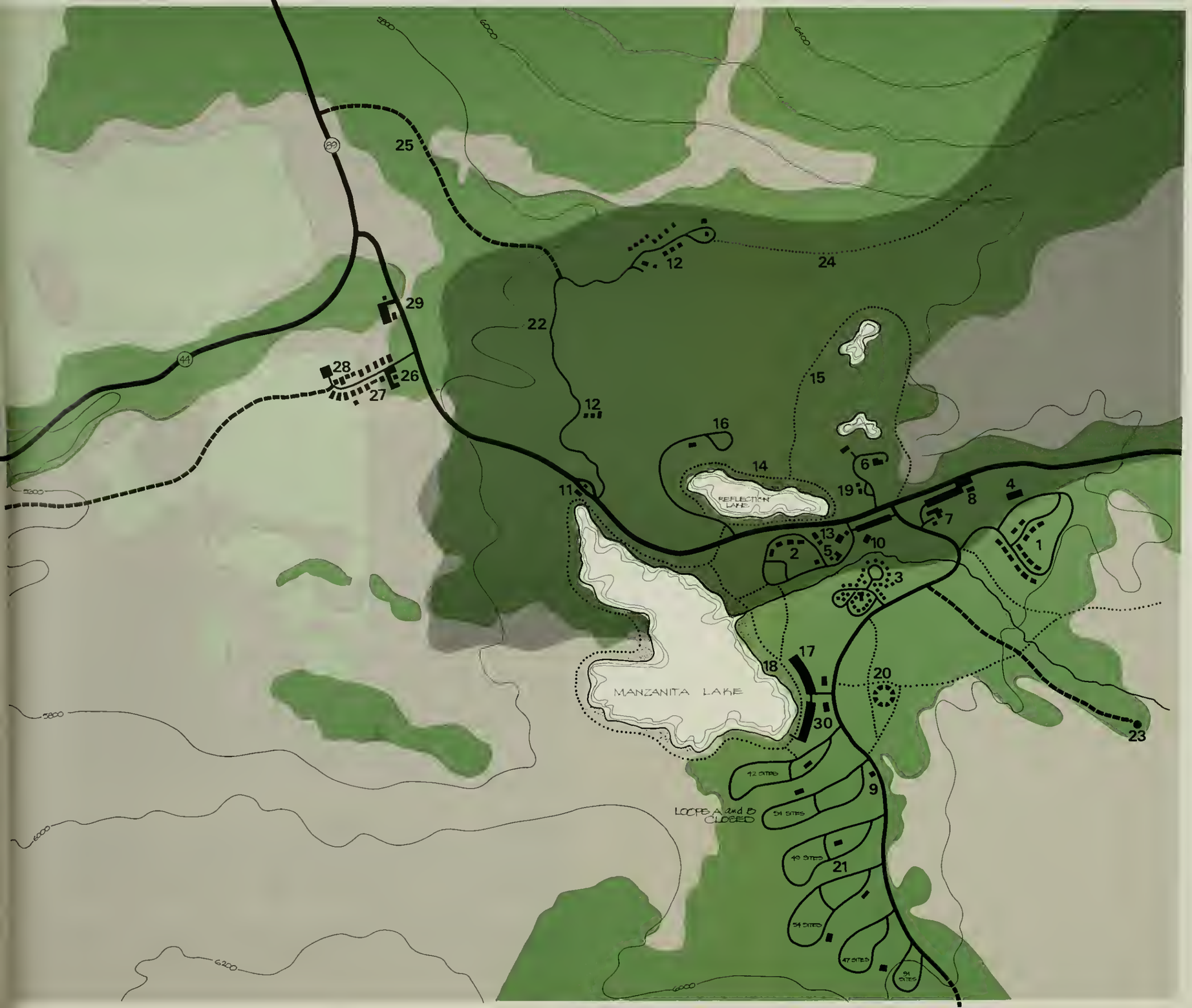
As identified by the Geological Survey, the area in hazard from such an event extends along the valley floor of Manzanita Creek for 3 miles from the base of Chaos Crags. The prehistoric avalanche of Chaos Jumbles traveled more than 2.5 miles before coming to rest. A major portion of the existing Manzanita Lake development lies on the Chaos Jumbles, and the proposed Manzanita Meadows development occupies the valley floor less than a quarter mile from the toe of Chaos Jumbles.

Other potential hazards will be realized within the Manzanita Lake/Manzanita Meadows area if surface volcanic activity is resumed along a line connecting Lassen Peak, Chaos Crags, and Sunflower Flat. These events, however, would probably be preceded by seismic and minor volcanic activity, which would serve as a warning for humans to vacate the area. Although humans could be evacuated from hazardous areas, structures and facilities occupying the valley floor could be destroyed by pyroclastic flows, glowing avalanches, and mudflows. On the basis of their studies and evaluations of all geologic hazards in the area, the Geological Survey scientists recommend that visitor use of the area be restricted, and that future facilities be sited in areas that are less subject to destruction from potential geologic events of the future.

In the aftermath of closing the Manzanita Lake area, a number of actions were taken to accommodate park visitors until a permanent relocation site could be found. A visitor-contact facility, maintenance area, and residences for personnel were developed on a temporary basis at the eastern edge of Manzanita Meadows, as shown on the Northwest Entrance Existing Conditions map.

Day use of the Manzanita Lake and Reflection Lake area, though not encouraged, has continued, and consists primarily of fishing, boating, swimming, picnicking, hiking, and scenic viewing of the lakes, Chaos Crags, and Lassen Peak. Parking or stopping has not been permitted on roads where they cross the Chaos Jumbles.

As they are not in the direct path of a potential rockfall-avalanche, 181 sites in the campground south of Manzanita Lake were temporarily reopened in 1976. A temporary gas station and hot food facility have been developed at the camper supply store and its shower and laundry functions suspended. A number of the seats in the



1 PINE CABINS
2 CEDAR CABINS
3 BUDGET CABINS
4 DORMITORY
5 LODGE/DINING ROOM
6 MANAGER'S RESIDENCE
7 STORE/SNACK COUNTER
8 GAS STATION
9 CAMPER SERVICE STORE/COMFORT STATION
10 RANGER OFFICE (LOOMIS RESIDENCE)
11 ENTRANCE RESIDENCE/STATION
12 SUMMERTOWN RESIDENTIAL/MAINTENANCE AREA
13 LOOMIS MUSEUM
14 REFLECTION LAKE NATURE TRAIL
15 LILY POND NATURE TRAIL
16 REFLECTION LAKE PICNIC AREA
17 MANZANITA LAKE PICNIC AREA
18 SWIMMING AREA
19 RANGER RESIDENCE
20 AMPHITHEATER
21 CAMPGROUND
22 SEWAGE TREATMENT
23 WATER INTAKE
24 HISTORIC TRAIL
25 CORRALS
26 TEMPORARY MAINTENANCE
27 TEMPORARY RESIDENCES
28 HELIPAD
29 TEMPORARY INFO STATION/DISTRICT RANGER STATION
30 CAMPGROUND ENTRANCE STATION AND RANGER STATION

MIXED CONIFEROUS FOREST
BRUSH AND MEADOW
CUT WINDROWED BRUSH SEEDLING
CHAOS JUMBLES

NOTE: FACILITIES ON OR IMMEDIATELY ADJACENT TO CHAOS JUMBLES HAVE BEEN CLOSED EXCEPT FOR THE ENTRANCE STATION AND THE LASSEN PARK ROAD

0 200 400 800 1200 FEET

REV. NOV 80

NORTHWEST ENTRANCE
EXISTING CONDITIONS
LASSEN VOLCANIC NATIONAL PARK

amphitheater were temporarily relocated to the Lost Creek campground, but the amphitheater has since been restored to its 800-seat capacity.

A permanent system of geophysical instruments has been installed within the park to detect those events that might indicate a renewal of volcanic activity or rock movement. An alert from this system would activate the park's emergency operations plan, providing an early warning so that park visitors could be moved away from hazardous areas.

The following list of features is keyed to the Existing Conditions map for Manzanita Lake. Those features marked with an asterisk (*) will be removed under the proposals of the general management plan.

(1)* Pine Cabins: The Pine Cabins are 15 buildings, each consisting of two units with a bedroom, full bathroom, kitchenette, and sofa bed in the living/kitchen area. All are frame structures built on a concrete slab and have approximately 184 square feet per unit. These are the newest of the former lodging units.

(2)* Cedar Cabins: The Cedar Cabins consist of 6 buildings with 4 units in each building. Each unit contains a full bath and a single living/sleeping room. The buildings were designed so that the end units could be linked by connecting doors with the center units to form a larger two-bedroom unit. The structures are frame with wooden floors on concrete foundations. The average floor space for each building (excluding the outside porch) is about 950 square feet.

(3)* Budget and housekeeping cabins: These oldest lodging units of the former overnight facilities are small compared to the more recent Cedar and Pine cabins, and unlike the more recent cabins they do not have porches. There are 24 duplex units, all with baths and some with kitchens, and 9 housekeeping units with baths, kitchens, and separate bedrooms. In the duplexes, two units can be combined by a connecting door to form a larger two-bedroom unit. All of these cabins are of frame construction and set on concrete piers. The average floor space of each building is approximately 280 square feet. A central linen, laundry, and general storage building is located among the budget cabins. It is of frame construction, set on concrete piers, and has had a number of additions over the years.

(4)* Dormitory: This two-story dormitory for concession employees is located near the Pine Cabins. The building is relatively new and is of frame construction set on concrete piers. There is a central lounge and an apartment for a housemother. The total floor space of both floors is approximately 9,300 square feet.

(5)* Manzanita Lake Lodge: Prior to their closing in 1974, the rustic lodge facilities were being gradually upgraded. The main

lodge building contained a dining room, kitchen, gift shop, employee dining room, offices, cocktail lounge, small lobby for registration, small storage rooms, and two quarters upstairs for cooks. The total floor space of both floors is approximately 15,000 square feet. The lodge is architecturally of 1930 vintage, and is substantial, attractive, and visually compatible with its setting. An enclosed service area with storage sheds at the rear of the structure detracts from the basic quality of the structure.

(6)* Managers residences: These two buildings located north of the park road provided residences for the concession manager and assistant manager.

(7)* Store and snack counter: Just east of the Loomis Museum and adjacent to the park road, the concessioner operated a large general store, gift shop, and fast-food service. A small post office was also housed in the structure. The building is a complex frame structure of contemporary design on a concrete slab. The snack bar is separated from it by a sheltered walkway.

(8)* Gas station: Adjacent to the general store, a gas station of similar contemporary design provided gasoline and minor repairs for vehicles. The four gasoline pumps, including two self-service ones, were installed in 1973. The station has no service lift. The exterior of the building encloses approximately 9,000 feet of floor space.

(9) Camper service store: This building covers approximately 1,800 square feet and provided groceries and other camping supplies. Shower and laundry facilities in an attached wing were temporarily closed until sewage treatment facilities could be improved.

(10)* Ranger Office: The ranger office and adjoining residence cover about 1,650 square feet.

(11)* Entrance station and residence: This stone building with adjoining garage was occupied by a ranger. The small entrance station on a traffic island is still in use.

(12)* Summertown: The Summertown residential and maintenance area contains five small two-bedroom cabins, two small one-bedroom cabins, storage buildings, a utility shop, six trailers on concrete pads, and several scattered utility buildings.

(13)* Loomis Museum: This building was built in 1927 by the Loomis family and donated to the National Park Service in 1929, as described in the history section of this document. Its total interior floor space is about 3,450 square feet; the walls are three feet thick, made of rock and plaster, and the building is 16.5 feet high. A small stone building in front of the museum houses a seismograph used as a public exhibit.

(14)* Reflection Lake nature trail: Trail, no self-guiding devices.

(15)* Lily Pond nature trail: Self-guiding trail; numbered stakes and leaflet.

(16)* Reflection Lake picnic area: Twenty tables, comfort station.

(17)* Manzanita Lake picnic area: Six tables, comfort station.

(18)* Swimming area: No structures.

(19)* Naturalist's residence and garage: Small two-story wood and stone structure with a wooden garage.

(20) Amphitheater: Seating capacity of 800.

(21) Campground: The 181 campsites are open from early May to October 15. Amenities include fireplaces, tables, flush toilets, piped water, and garbage collection, and there are accommodations for house trailers. Loops A and B are currently closed. (30) Campground entrance station and ranger station.

(22)* Sewage treatment facility: Sewage is treated with a 35,000-gallon septic tank and spray field north of the entrance station. Designed in 1938, this system was inadequate for the Manzanita Lake development, and plans for improvements had been prepared prior to the closing of the area in 1974.

(23) Water System: The water system consists of an intake, chlorinator, and 100,000-gallon storage tank.

(24) Historic Nobles Emigrant Trail: Described in history section of this document.

(25) Corrals: Corrals are infrequently used at the present time for livestock; the primary use is as a storage area.

Surfaced parking areas at Manzanita Lake are not numbered on the Existing Conditions map. They are listed in table II-15.

Table II-15. Surfaced Parking Areas at Manzanita Lake

Location	Dimensions (in feet)	Automobile Capacity
Entrance station*	20 by 60	6
Lodge (rear)*	18 by 50	5
Loomis Museum*	18 by 106	11
Ranger office*	20 by 70 20 by 70	14
East of ranger office*	20 by 140 20 by 150	14
General store*	20 by 310	62
Dormitory*	20 by 200	20
Amphitheater	18 by 100	20
Camper service store	18 by 100	10
Beach (obliterated)	20 by 115 20 by 110	23
North picnic area	20 by 130	13
South picnic area	20 by 230	23

*Closed for visitor use.

Contiguous acreages covered by the preceding developments, including associated roads and parking areas, are as follows: concession cabins, 24 acres; Manzanita Lake and Reflection Lake picnic areas, 6 acres; ranger station, store, and service station south of road, 9 acres; residences north of road, 3 acres; entrance station and residence, 1 acre; sewage treatment facility, 1 acre; Summertown, 6 acres; campground, including amphitheater and swimming beach, 50 acres.

The Manzanita Meadows area is Forest Service land contiguous with the park boundary west of Manzanita Lake in section 13; it is divided by California 44 into a northern part of 650 acres and a southern part of 450 acres considered suitable for development. Most of the land is gentle in slope--only 3 to 6 percent--but it rises sharply on the north and south. The majority of the meadow is manzanita brushland. It is managed by the Forest Service for growth of economically important tree species, and in 1966 most brush was mechanically

removed and bulldozed into long parallel windrows about 50 feet apart, and areas between the windrows were planted with ponderosa, sugar, and Jeffrey pine seedlings. Today, these trees are just beginning to show above an almost impenetrable growth of manzanita. The only large trees occur along drainages, the highway corridor, and on the steeper slopes.

Temporary structures in the Manzanita Meadows area keyed to the Existing Conditions map are as follows:

(26 & 27) Temporary maintenance/residential area: A temporary maintenance/residential area is located a quarter of a mile west of the visitor-contact facility. This 2.5-acre site is out of public view on a preexisting secondary road. Structures include 16 National Park Service and Forest Service trailers with parking spurs, an A-frame residence, laundry room, small storage sheds, a concrete block gas station and a maintenance/fire cache building (30 feet by 100 feet). Water is provided through a buried main connected to the preexisting Manzanita Lake water system at the entrance station inside the park. About 2,700 feet of new water main with 6-foot ditches, and 1,500 feet of new supply lines and ditches were required to serve the temporary visitor-contact and management areas. A septic tank and leach field 300 feet southwest of the residential trailers required ditching; altogether, 3,000 feet of trunk line and laterals with ditches were required to install the sewage system. Clearing of about 2 acres of sparse chapparral brushland was required to accommodate the temporary management area.

(28) Helipad: Cleared area in manzanita shrub for the landing of Forest Service helicopters during fire season.

(29) Temporary Visitor Contact Station: A temporary visitor contact facility at the eastern edge of Manzanita Meadows. This building is an A-frame structure belonging to the Forest Service; it was moved from the Subway Lava Tube area late in 1974, and it is staffed and operated cooperatively by park and forest personnel. In addition to this structure, there is a mobile ranger office, a visitor comfort station (with chemical toilets), and a paved 54-car parking area at the site. This visitor development occupies an area of 1 acre along the south side of the park entrance road. The site is built up to the level of the main road, a job that required importation of 10,000 cubic yards of fill.

3. Lost Creek

This area west of Lost Creek was used in the days of the Civilian Conservation Corps as a construction camp, and prior to 1974 it was used to accommodate camping by groups too large for the Manzanita Lake campground. Group camping still is provided at Lost Creek, but at a new site. The old group site has been converted into 45 individual family units with parking spurs, tables, and firegrates. The new group campsites are similarly equipped and capable of holding 25 people each. A 125-seat amphitheater and access trails are situated between the two camping areas.

The 1,500 feet of paved circulatory roads and the water system from the old group camp were retained. The new group campground west of this area is in a formerly undisturbed forested area and required grading of new roads; these roads are oiled to reduce dust. Water is supplied to the new group campground by 1,500 feet of buried pipe connected to the preexisting Lost Creek water system. The waste from 22 chemical toilets in the two camping areas is hauled to Redding for disposal. There are two seasonal employee trailers (12 feet by 60 feet), which are served by a septic tank and gravity leach field that required 1,500 feet of ditching. There is no electrical power at the Lost Creek area.

4. Hat Creek

Hat Creek is located in the north-central part of the park. An unpaved road leads down Hat Creek from the park road and provides access to a trail and unimproved private inholdings about 2.5 miles north of Hat Lake. The cabins in this area are owned by the National Park Service, but one previous owner has a 25-year right of occupancy. A septic tank and leach field provide sewage treatment in this area.

5. Summit Lake

Summit Lake is roughly midway on the park road between the two main park entrances. At 6,800 feet, Summit Lake is snowbound well into June. The environs include the lake and small ponds, portions of upper Dersch Meadow, and a variety of marsh, meadow, and forest habitats. Much of the land is irregular and rocky.

The campground at Summit Lake is split into two sections, one north of the lake with 49 units, and the other south of the lake with 45 units. The north section comfort station is served by a sewage leach field; sewage from the south section vault toilets is hauled outside the park for disposal. Other structures at Summit Lake include a historic seasonal ranger station, a primitive water system (intake pipe in stream and a storage tank), and a trailhead. Heavily used trails lead east to Echo Lake, south to Summit Creek, and west to Shadow Lake.

The popular Summit Lake campground is used heavily from mid-June or early July through Labor Day. Summer occupancy at the campground is high--more than 90 percent of capacity. The campground and day-use activities contribute to vehicular congestion.

6. Southwest Entrance (Lassen Ski Area)

Development at this entrance includes a ski lodge (the Chalet) which provides concessioner services to visitors, a small campground, the ski area, and an entrance station.

The ski area is located in the southwest corner of park, approximately 1 mile inside the southwest entrance. The ski site is in Tehama County, just south of the Tehama/Shasta county line. The park road is plowed in winter to provide access to the ski area. The site lies 52 miles from Red Bluff via California 89, 70 miles from Chico via California 32, and 25 miles from the Chester/Lake Alamanor area via California 89/36.

The present development associated with the ski area includes a Poma lift, two rope tows, the Chalet, utilities, a parking area, an interpretive kiosk, and a 24-site campground.

The existing ski area facilities were erected by both the National Park Service and the concessioner in 1946, 1950, and 1956. The present lifts are of 1940 vintage and are operated by internal combustion engines (one diesel, two gasoline); the ski runs are maintained with Thiokol snow-grooming and compacting machines.

The main attraction of the ski area is the Poma lift, serving both advanced and intermediate skiers. Its permanently installed towers, terminals, and sheds are located on an open slope above the highway. The capacity of the Poma lift is approximately 600 skiers per hour. The steep slope, short runs, long waiting lines, varying snow depths, and inadequate level unloading area with a steep climb to the runs, all contribute to skier fatigue which leads to increased accident rates late in the day. The old Poma lift, which required $40,000 worth of repairs in 1979, passes all safety inspections. However, when snow levels are low, the cable is too high off the ground, and children and light-weight skiers may be pulled off the ground and fall on an advanced slope, making it difficult to return to the base of the hill. At the top of the Poma is a small level unloading area. Advanced skiers cut across the return cable, risking injury. Other skiers must climb as much as 100 vertical feet to reach intermediate slopes.

The intermediate rope tow crosses the highway, and the towers are immediately adjacent to the highway. The tow capacity averages 1,200 skiers per hour. This tow provides access to the Poma lift as well as to a relatively small area, parallel to the tow, that is used by all levels of skiers other than the true beginner. This area can become quite congested and, because of this mix of skiers, the potential for accidents is high.

The beginner rope tow is located in the meadow east of the Chalet. Its metal poles and wires secured around two trees are considered fixed equipment and its capacity and the usable ski terrain handles up to 50 skiers at one time.

There are 67.5 acres of developed skiable terrain at Lassen ski area; approximately 7 percent of the area is beginner terrain (4.5 acres), 53 percent intermediate terrain (36 acres), and 40 percent advanced terrain (27 acres). The area available for beginner skiing is considered inadequate, particularly for a family oriented area.

Scarred surface tracks under the Poma lift, bulldozer tracks along the rope towline, a worn service road curving up to the Poma lift hill, and the intermediate rope tow and Poma lift structures are visible from the park road (especially at viewpoints 7 and 8 up the road beyond Sulphur Works) and from the Chalet deck and interior eating areas.

Use of the Lassen ski area by cross-country skiers and snowshoers has increased substantially. Most of this activity takes place

RIDGE "R"

UPPER BASIN

EXISTING ROPE TOW

EXISTING INTERMEDIATE ROPE TOW

EXISTING BEGINNER ROPE TOW

CHALET

SULPHUR WORKS CAMPGROUND - 24 SITES

PARKING 20 CARS

40,000 GALLON WATER STORAGE TANK

CONTACT STATION

GENERATOR

ENTRANCE STATION

EMPLOYEE TRAILER

AREA OF MUDFLOW

0 200 400 600 FEET

111 | 20047C
DSC | DEC 80

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

SOUTHWEST ENTRANCE
EXISTING CONDITIONS

LASSEN VOLCANIC NATIONAL PARK

north of the main ski area towards the Sulphur Works. The intermediate tow blocks the direct route (along the unplowed park road) to the Sulphur Works, requiring a detour below or above the tow. There are occasional problems caused by visitors cutting across the tow line.

The Chalet serves as a support facility for the ski area and as a restaurant and tourist shop in the summer. It is located adjacent to the park road, southeast of the Poma lift hill and south of the intermediate slope. Designed by the National Park Service, this A-frame building with an outside deck was constructed in 1965, at half of its originally designed size. Currently the upper level of this day lodge is devoted to a short-order restaurant with a dining and viewing area; in the summer, a small gift shop is also provided in the dining area.

The lower level of the Chalet contains the restrooms, the ski patrol first-aid room, and the ski rental and accessory shop. The building was initially planned as a visitor center for the reception, orientation, and comfort of 200 to 300 visitors. The use patterns have changed its function, and now 85 percent of the total floor area is used for concessioner activities. Minimal consideration was given to the servicing of winter sports clientele, and the 5,500-square-foot building, which has a seating capacity of 100 people, is inadequate for serving the 800-1,000 winter visitors on a peak day. The heating system is poorly designed, and the inside registers and outside vents are improperly placed. Single glazing, high ceiling, poor insulation, and the need to melt snow on the roofs and decks make the structure energy inefficient. The kitchen is poorly arranged, with difficult access to storage and an undesirable service flow pattern. Traffic patterns resulting in congestion are problems on the lower levels, and the first-aid room is much too small for current needs at the ski area. The outside deck is not suited to viewing the skiing activities, is partly shaded, and is exposed to winds. The slope of the roof produces snowslides hazardous to pedestrians, and causes snow accumulation on the walkways. Space for maintenance of snow-grooming equipment and lifts is completely inadequate.

Because of the conflict of functions and lack of space, the day lodge does not currently serve as an interpretive center for the National Park Service, as was originally intended. Instead, a small, portable A-frame kiosk, moved in next to the Chalet during the summer months, is used for National Park Service information. This facility is only large enough for a display of Lassen park literature and for shelter for the seasonal ranger who is available to answer questions.

At the present time, the only commercial utility available in the ski area is telephone service. Electric power is supplied by two 25-kilovolt-ampere diesel generators that are linked in alternating series and provide single-phase power to the lodge and the campground comfort station. They are housed in a masonry building at the south end of the parking lot. The lodge is heated with oil and the concessioner's cooking needs and emergency lighting are supplied by propane gas.

There are two existing sewer systems within the ski area; one serves the Chalet and the other the campground. The lodge system consists of a 5,000-gallon septic tank and a leach line that extends along

the slope below the beginner rope tow; it operates beyond capacity during most of the year, and it cannot withstand increased development.

The water supply is provided by a 2-foot-wide spring-fed watercourse emanating from the lower slope of Brokeoff Mountain and flowing in a southeasterly direction toward Mill Creek. The stream crosses the ski area development approximately 1,500 feet south of the Chalet. The water collection and distribution system consists of a concrete impounding structure at the stream with an infiltration gallery and a sand/gravel filter bed. The water is gravity fed from the intake by a 3-inch galvanized steel pipe to a hypochlorinator located within the generator housing south of the parking area. From here it is pumped back to a 40,000-gallon storage tank and distributed by a 6-inch cast-iron pipe to the lodge and the comfort station in the campground. This supply source has been used since the Chalet and comfort station were constructed in 1965. Observations and study of the adequacy of the supply were made several years prior to construction and have continued periodically since. All data available indicate that the supply is reliable and fluctuates only slightly during the dry summer periods. The sustained flow exceeds the current needs and would be adequate to accommodate any expansions of the ski area described in the alternatives section of this document.

The parking area is directly south of the chalet adjacent to the park road. The area is divided into two sections by large islands, which are used for snow storage during the winter. In the summer it serves the nearby campground as well as the Chalet and the National Park Service interpretive facility. (The southwest campground, located on the east edge of the parking area, consists of 24 walk-in campsites.) The capacity of the parking area is 250 cars, with a designated area for 4 buses. During the winter the parking area serves 750 people at one time, which is adequate for the current average day but is inadequate on peak days or when there are significant numbers of visitors participating in other winter sports or snowplay activities. Approximately 100 yards below the parking area is the southwest entrance station, which is unmanned during winter operations.

South of the parking area a short road leads to a site prepared for a duplex residence. The residence was not constructed and a trailer is used for summer employees. On some occasions an employee uses the Chalet first-aid room as quarters. Because of heavy snow loads the trailer must be removed in the winter and employees must live in the Mineral area. The lack of winter quarters presents problems in protection and maintenance of the area, which can be particularly critical when the generator shuts down.

The ski lift facilities, the base support facilities, including the parking lot, and the utilities are all federal property, and they are maintained by the National Park Service. An estimated $133,000 has been invested in rope tows, the Poma lift, snow-grooming machines, kitchen equipment, tables and chairs, and ski rentals. The lodge is a $500,000 federal government investment, and approximately $33,000 a year is spent on lodge maintenance, utilities, parking lot upkeep, and snow removal.

7. Headquarters

The park administrative site west of Mineral was acquired in 1928 to provide a location below the heavy snow line for administrative, maintenance, and housing facilities. The 75-acre site straddles California 36 and adjoins a California highway maintenance camp.

Most of the facilities were constructed in the late 1920s and early 1930s; some additional employee housing was constructed in the 1960s. Many of the maintenance structures and older residences are expensive to maintain. Of the 19 residences, 7 are considered substandard. Additional living quarters are located in two former storage buildings, a dormitory, two small cabins, a washhouse, and four trailers.

Ten structures of varying size and condition serve as maintenance shops, storage sheds, vehicle maintenance shops, warehouses, garages, and maintenance offices. A fire cache is located in part of one of the storage buildings converted to a residence. A small corral is located across the highway from the main building complex.

The park administration building is a three-story structure (including the basement) located near the entrance to the site. There is a small visitor information desk and the remainder of the building is used for administrative offices. A former maintenance building serves as a temporary district ranger office; other offices are located in maintenance buildings.

A seismograph building is located near the eastern edge of the site. Data is transmitted to the seismograph in the administration building.

An informal softball field and play area has been developed across the highway near the corrals, and a small recreation hall is located on the second floor of a vehicle storage building.

Water comes from a nearby creek, passes through a chlorinator, and is stored in two reservoirs with a total capacity of 114,000 gallons. The storage capacity needs to be increased and the treatment system needs to be upgraded. The sewage collection system is connected to the Mineral Sanitation District disposal system.

Located in a mixed coniferous forest with meadows and marshes, the site is an attractive setting for the residential community, marred only by the intrusion of maintenance buildings and outside storage areas. Weather is less severe at Mineral than at the higher elevations, reducing the cost of year-round operations. The town of Mineral supplies basic necessities and a grammar school. The cities of Red Bluff and Redding have major shopping and medical facilities.

8. Warner Valley

Warner Valley is a flat, grassy mountain valley 16 miles north of Chester; it lies between Flatiron Ridge and Red Mountain at an elevation of 5,400 feet. Three of the unusual geothermal features of the park--Devils Kitchen, Boiling Springs Lake, and Terminal Geyser--are located in forested areas south and west of the main valley floor.

A 12 to 16-foot-wide graded road is maintained up Warner Valley and ends at Drakesbad Guest Ranch about 3 miles inside the park boundary. About one accident a year occurs on the narrow, winding road. In the first 2 miles west of the park boundary, the road cuts through a forested portion of the valley where there are generally moderate to steep slopes and little developable land. Development along this portion of the road consists of a historic ranger station and the Warner Valley campground, three-fourths of a mile apart. Facilities at the campground include 15 campsites (suitable for small house trailers), fireplaces, pit toilets, and picnic tables. There is little or no potential for further expansion of the campground because the area is very rocky, with steep slopes up to 10 percent.

Where Warner Valley begins to widen to the west there is a picnic area and a trailhead. A leaflet is provided for a self-guiding walk to Boiling Springs Lake. Farther west at the end of the road is Drakesbad Guest Ranch.

The guest ranch is a small rustic facility frequented by a long-established clientele who highly value their repeated visits to an area that offers fishing, horseback riding, and hiking. Use is at capacity--38 visitors per night--during the 67-day operating season of late June to Labor Day. Assuming many visitors stay about one week, it is estimated that 400 to 600 individuals stay at Drakesbad each year. Buildings at Drakesbad consist of a lodge, kitchen/dining facility, and seven cabins and bungalows. Normal annual costs for maintaining utilities are about $500. However, $55,000 was spent by the National Park Service in 1975 for major rehabilitation of the Drakesbad facilities. The water and sewage systems at Drakesbad are functioning adequately.

9. Juniper Lake

Juniper Lake, the largest lake in the park, is located in the southeastern corner at an altitude of about 7,000 feet. Visitors approach the lake over an 11-mile road north from Chester. In the final few miles before reaching the lake, the road is unsurfaced and rough.

A seasonal ranger station on the north shore is staffed in the summer to serve visitors at the lake and to patrol trails leading north to more secluded lakes within the wilderness. A primitive campground at the southeastern end of Juniper Lake contains 18 sites, which are filled to about 90 percent capacity during most of the summer. There is no developed water system, though some campers do use lake water. The campground has vault toilets.

10. Butte Lake

Butte Lake is a beautiful, irregularly shaped lake bounded on its southwestern side by lava flows of Fantastic Lava Beds. The lake is situated at an altitude of 6,000 feet in the northeastern corner of the park, about 6 miles south of California 44. Fantastic Lava Beds, Painted Dunes, and Cinder Cone, all outstanding natural features of recent volcanic origin, are area attractions. The latest eruptions in this vicinity were noted by pioneers in 1851 when lava extended into Butte Lake.

Facilities at Butte Lake include a ranger station/contact facility and a 98-site campground that is used at about 35 percent capacity. Two or three trailers are brought in at the beginning of the summer to house seasonal employees, and they are hauled out at the end of the season. All facilities are served by a water system (using lake water) and septic tank and leach field system that are adequate. The development is reached from the north on an unsurfaced access road.

11. Inholdings and Other Private Lands

Privately owned land within the legislated boundary of the park consists of cabin sites at Juniper Lake and Hat Creek. Section 36 south of Warner Valley has been acquired since the Draft Environmental Statement was written.

a. Juniper Lake

Eleven small lots of private land in seven contiguous tracts on the northwestern shore are served by a continuation of the road around the northern point of the lake. Eight privately owned cabins are concealed fairly well by red fir and stands of lodgepole along the shore. One other cabin now owned by the National Park Service is still occupied by the former owner, who has a 25-year right of occupancy. Individual septic tanks and leach fields handle sewage and wastewater disposal on the private lands. Several inholders have pumps and tanks for water supply from the lake.

b. Hat Creek

There are 5 small unimproved parcels of private land north of Hat Creek, near the end of the access road. Also, a former cabin owner has reserved a 25-year right of occupancy.

L. Probable Future Environment Without the Proposal

Projected trends into the future of Lassen Volcanic National Park are speculative, with or without the actions proposed in the general management plan. There are a number of potential activities which may occur, and trends which may continue, regardless of what actions are taken within the park.

Travel to the park would probably increase and reach half a million near the end of the century. Plague scares, forest fire conditions, heavy snowpack, and weather conditions in the Sacramento and San Francisco areas would continue to cause yearly fluctuations in visitation. Use of the Lassen ski area already exceeds slope and tow capacities; therefore, increases in winter use would be in snow play activities, snowshoeing, and cross-country skiing. Travel on the park road is not expected to reach capacity until the end of the century, but traffic congestion would continue to occur at popular parking areas and at the Lassen ski area during the winter.

Most of the existing structures and facilities throughout the park would be retained, and minor upgrading and modification would occur as part of normal maintenance activities. Without the proposals in the general management plan the existing temporary structures would not be expanded or relocated. However, they could be replaced by more permanent facilities, such as modular structures, and through continued use, become established as permanent facilities.

HAT CREEK INHOLDINGS

JUNIPER LAKE INHOLDINGS

LASSEN PARK ROAD

HAT CREEK

JUNIPER LAKE

L A S S E N V O L C A N I C N A T I O N A L P A R K

111 | 300028
DSC | DEC 80

0 1/2 1 2 MILES

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

LANDOWNERSHIP

LASSEN VOLCANIC NATIONAL PARK

If the proposed actions in the general management plan are not taken the park will not continue into the future without plans or actions. Plans such as the backcountry use plan, the resources management plan, the cultural resources management plan, the visitor use/interpretation plan, and the wilderness plan, all would contribute to the direction of the park.

The facilities and structures that were closed at Manzanita Lake in 1974 would remain closed and would deteriorate in place without upkeep or use. The dormant structures would continue to lure curious visitors into a high risk area; and vandalism would be a problem. The park has an existing program for removal of unused and deteriorated buildings, and eventually all but those structures on or nominated to the National Register of Historic Places would be removed. Those structures on or nominated to the National Register could be removed and relocated or maintained in place. In either case, all necessary steps would be taken to record the structures and comply with the legal requirements pertaining to such properties.

If camping demand continued to be high in the park, loops A and B in the Manzanita Lake campground would probably be reopened (same action as contained in the proposal). The campground amphitheater would continue in use, and an increasing number of "temporary" structures could creep into the area to meet visitor demands for desired services. Sewage treatment facilities would become overtaxed and a new treatment facility would have to be constructed.

The proposal indicates that lodging facilities displaced in the Manzanita Lake complex will not be redeveloped in the future. In the absence of such a proposal there would remain a degree of uncertainty in the business sector as to the intention of the National Park Service to build concession lodging at the northwest entrance of the park. Under such circumstances it is doubtful that private enterprise would invest in a competitive venture of this nature.

The continued use of the inefficient facilities at the Lassen ski area, with consequent long waiting lines and potential skier fatigue and injury, would encourage increasing numbers of ski enthusiasts to seek their experience elsewhere in the region. The Donner/North Tahoe area, which has capacity beyond its current use, could serve these skiers. Also, the local skier population near Lassen would probably exert pressures to accelerate the development of other winter sports areas within the region. Carter Bowl in the Butt Mountain area of Lassen National Forest is a likely area for such a development catering to downhill skiers. The Mount Shasta ski area, closed because of unpredictable weather and hazardous high winds, may reopen in the future at a lower elevation.

III. ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

A. Impacts on the Natural Environment

1. Geologic Features

The proposal maintains the park road on its present alignment. At Sulphur Works the road passes over portions of an active fumarole and changes its natural character. The fumarole has slowly shifted location during recent years and has undercut a minor portion of the embankment and the roadway. A preliminary study has identified the use of sunken piers as one possible means of stabilizing the road in the future.

The general management plan contains no proposed actions that will affect outstanding geologic features in the park. The continued monitoring of subsurface movements through geophysical instrumentation will have the effect of increasing the body of geologic information on tectonics and volcanism.

2. Soils

Table III-1 and appendix C identify and quantify the locations and extent of soil disturbance created by existing and proposed development and use. Areas to be restored cannot practically be returned to their original condition, but they will be returned to a condition where plants, animals, frost heave, and climate will re-create normal soil-moisture and permeability in 10-20 years. There are two current and proposed types of uses that have similar impacts upon the natural soil regime: covering the soil with a structure or fill, and using an area for foot traffic. These are listed as "developed" and "adjacent" acreages in table III-1.

Roadways, parking areas, constructed trails, buildings, service areas, septic leaching fields, aeration ponds, and similar man-made constructions are partly to totally impermeable. Water and nutrients from decaying organic material no longer enter these covered soils, and nitrogen-fixing soil bacteria die. The natural vegetation and the humus layer of the soil profile are normally disturbed or removed completely prior to construction.

When precipitation falls on impermeable surfaces, it develops new drainage patterns. To the extent that runoff from precipitation is not efficiently collected or diverted into natural drainageways, it develops new channels, and erosion is increased until these new channels reach a stable depth and gradient. Also, larger than normal discharge of water into existing drainage courses can, in sufficient volume, cause inordinate erosion along established channels. Any construction site where soil is disturbed undergoes accelerated erosion, at least temporarily, until drainage structures are fully operable and vegetation recovers in cleared areas.

Roads and trails, whether surfaced or graded, either eliminate direct inflow of water to soil, or differentially alter the inflow, so that the soil moisture is altered for the term of maintenance and use of the structure. Precipitation and sediment concentrate in low spots of paved roads and trails; once the water evaporates, repeated use

Table III-1. Acreages of Impacted Soil

	EXISTING USE			PROPOSED FOR RESTORATION			CONTINUED USE		
	Developed	Adjacent	Total	Developed	Adjacent	Total	Developed	Adjacent	Total
Lassen Park Road	89.5	0	89.5	0	0	0	89.5	0	89.5
Manzanita Lake/Manzanita Meadows	40.8	87.0	127.8	27.5	34.0	61.5	18.3	48.0	66.3
Trail System/Backcountry	100.5	0	100.5	0	0	0	100.5	0	100.5
Lost Creek	2.0	6.0	8.0	0	0	0	2.0	6.0	8.0
Hat Creek	4.9	0	4.9	3.4	0	3.4	1.5	0	1.5
Summit Lake	8.4	19.0	27.4	0.6	0	0.6	7.8	19.0	26.8
Southwest Area	21.2	72.2	93.4	0.6	2.1	2.7	20.8	70.3	91.1
Headquarters	8.6	0.6	9.2	2.1	0	2.1	5.5	0.6	6.1
Warner Valley	10.0	14.6	24.6	0	0	0	10.0	14.6	24.6
Juniper Lake	9.6	1.6	11.2	5.0	1.6	6.6	4.6	0	4.6
Butte Lake	6.6	22.4	29.0	0	0	0	6.6	22.4	29.0
TOTALS	302.1	223.4	525.5	39.2	37.7	76.9*	267.1	180.9	448.0

	PROPOSED NEW USE			PROPOSED TOTAL USE			CHANGE IN TOTAL IMPACT		
	Developed	Adjacent	Total	Developed	Adjacent	Total	Exist.	Prop.	Net C
Lassen Park Road	0	0	0	89.5	0	89.5	89.5	89.5	0
Manzanita Lake/Manzanita Meadows	10	2	12	31.3	47.0	78.3	127.8	78.3	-49.5
Trail System/Backcountry	6.3	0.6	6.9	106.8	0.6	107.4	100.5	107.4	+6.9
Lost Creek	0	0	0	2.0	6.0	8.0	8.0	8.0	0
Hat Creek	0	0	0	1.5	0	1.5	4.9	1.5	-3.4
Summit Lake	0.1	0	0.1	7.9	19.0	26.9	27.4	26.9	-0.5
Southwest Area	2.4	0	2.4	23.2	70.3	93.5	93.4	93.5	+0.1
Headquarters	4.9	0.2	5.1	10.4	0.8	11.2	9.2	11.2	+2.0
Warner Valley	0.3	0	0.3	10.3	14.6	24.9	24.6	24.9	+0.3
Juniper Lake	3.5	2.5	6.0	8.1	2.5	10.6	11.2	10.6	-0.6
Butte Lake	0	0	0	6.6	22.4	29.0	29.0	29.0	0
TOTALS	27.5	5.3	32.8	297.6	183.2	480.8	525.5	480.8	-44.7

*Includes land not presently in use that will be restored to a more natural condition.

Developed--Land where vegetation is eliminated completely or kept deliberately in a highly modified condition.

Adjacent--Land generally adjacent to developed areas where vegetation disturbance is due to uses other than development.

pulverizes the surface and generates dust, which lowers the quality of recreation and coats nearby vegetation, interfering with plant growth processes.

The stabilization of roadbeds during construction is a deliberate effort to compact soils and to decrease their permeability. Site preparation (leveling) for buildings and landscaped grounds, trails, roads, and parking areas results in removal of earth in some places (cuts) and addition of soil in others (fills), thereby destroying the local soil structure.

Septic/leach field systems depend in part on evaporation or infiltration of wastewater on or in the soil. Where wastewater is placed on or under the ground, nutrient values increase. Where evaporation or transpiration is high, substances in the wastewater may build up (salt up) in the soil. Local buildups of soil moisture, the result of using filter fields, causes water to occupy more intraparticulate space, impacting plant growth on the site and increasing the possibility of earthslides in areas prone to this type of mass movement.

Areas near campgrounds, lodges, trailheads, and interpretive facilities, particularly where there are attractions that encourage walking, are impacted by foot traffic. The primary impact on soil is compaction, which decreases permeability and locally alters the soil moisture regime for the term of heavy use. The acreage affected becomes less effective in retaining moisture, thereby diminishing the storage capability of soils in the watershed. This results in slower rates of water transmission within soils and increased runoff on the surface, which increases soil erosion. Gradual decreases in vegetation and forest litter resulting from prolonged trampling lead to increasing exposure of bare ground to the direct erosive impact of rainfall. Erosion takes the form of channelization on barren areas of even slight slope.

a. Northwest Entrance

The development of new visitor use facilities in the Manzanita Meadows area will have varying effects on approximately 5-10 acres of previously disturbed soil. Soils throughout this area will be further disturbed by the removal of manzanita chaparral and windrows, and by the construction of an interpretive center, sewage treatment plant, roads, trails, and parking areas, and by the emplacement of underground utilities.

Until a comprehensive design is completed, the exact acreage affected cannot be determined. The above figures are based on a conceptual design. Further studies will determine the need for and extent of a firebreak around the developed area. If the 5-10 acres to be cleared of chaparral do not provide an adequate firebreak, sufficient additional acreage will have to be cleared.

Development of the new housing and maintenance facilities will affect approximately 20 acres of land, of which 8 acres are presently being used. Extensive clearing will not be required in this area--only the immediate construction sites will be affected. However, foot traffic adjacent to the new facilities will have a long-term effect on soils.

Approximately 27.5 acres of land currently occupied by development in the Manzanita Lake area and 34.0 acres of adjacent land that has been compacted by foot traffic will be scarified, graded, and allowed to return to a natural state.

The areas where major construction activities are proposed are generally in stony and loamy soils of moderate to great depth to limiting horizons; they present no unusual limitation to construction and impose no impacts beyond those previously described for developed and adjacent areas. The soil permeability in these areas is moderate and is satisfactory for sewage treatment facilities that use evaporative and filtration procedures.

b. Trail System, Northwest Part of Park

The construction of approximately 12 miles of new trail and trailhead facilities in the northwest section of the park will affect approximately 6.9 acres of presently undisturbed soils. Where these trails are located on shallow stony soils or on bedrock, such as exists south of Sunflower Flat, there will be little or no effect on native soils. Where the trail passes along the trace of the Nobles Emigrant Trail it will not be surfaced, and the major impact will be compaction from foot traffic. Where the trails require fill material or surfacing with rock materials, they will affect drainage and infiltration of precipitation in the immediate area. There are no instances where drainage structures beneath sections of the trails would significantly change the natural drainage patterns or increase soil erosion.

c. Southwest Entrance

The few changes proposed for the Lassen ski area will have little effect on native soils. Support towers, piers, and housing for mechanical equipment and personnel will be required to relocate the ski tows, but because of their small size (total 0.3 acre) and distribution these structures are not expected to impact the soil moisture regime or to promote soil erosion in the area. Minimal grading will be required for the placement of structures, and trenching will be required to extend power to the lift. Installing a chair lift would require the construction of 17 to 35 support towers, depending upon the recommended spacing between towers. Each of the towers, depending upon the type used, could cover up to 150 square feet of land area, and the drive engine equipment and housing of the upper and lower terminals could cover up to 350 square feet. Construction activities will cause some temporary erosion and perhaps increased sedimentation in the local watershed. Soils in this area are rated as having only slight erosion potential, so erosion and sedimentation will likely be minor. Helicopters will be used during construction to reduce the need for heavy vehicles in the area. Removal of piers used by existing tows will have no significant impact on the soil moisture regime, drainage, or erosion characteristics.

The snow beneath the tows is severely compacted by skiers during the winter. This results in only a minor compaction of the underlying soils; however, the compacted snow melts slowly and prevents vegetation from growing until mid-summer. The soils have a moderate to high erosion potential, and the lack of vegetation beneath the ski tows allows gullying and soil erosion. This effect is most noticeable beneath

the Poma lift and to a lesser degree beneath the intermediate rope tow. Efforts to reestablish vegetation on the barren areas have been unsuccessful to date, and the scars will remain as long as the tows are in use. Removal of the Poma lift, combined with extensive restoration efforts, should allow this area to return to a more natural appearance, improving soil permeability. Relocation of the beginner and intermediate rope tows will have similar rehabilitative effects on these areas, but the soils under the new rope tow alignments will begin to experience compaction during the winter season. Severe snow compaction does not occur on the rest of the ski slopes because the skiers are spread out over a larger area. Foot traffic on the ski slopes during the summer is very light and has little impact on soils.

Replacement of the ski lodge (Chalet) will require construction on approximately 0.4 acre. Most of this construction will occur on land disturbed by previous construction. The soil moisture regime will be altered in the area of the new structure. Little if any change is anticipated in the present drainage pattern. Removal of the existing Chalet will be followed by scarification and grading, and the gradual return of 0.9 acre to a natural state.

To bring an underground commercial power line into the Lassen ski area will require ditching and filling along the existing road corridor, existing Forest Service logging access roads, and utility rights-of-way. This temporary disturbance will affect a maximum of 12 acres of previously altered soils at a maximum trench width of 20 inches.

Abandonment of the existing sewage leach field will result in cessation of the injection of wastewater into potentially unstable soil along the margin of the earthslide mass and in restoration of a natural soil moisture regime within 1.5 acres, with no further accumulation of nutrients. Replacement facilities will impact approximately 2.1 acres outside the park. Trenches for collector and sewer lines in the new sewage system will follow the same alignment and be laid concurrently with the commercial power line as far south as the proposed subsurface disposal unit at Bluff Falls.

d. Other Development Sites

No actions proposed for the Lost Creek campground will cause additional impacts upon soils. Visitors will continue to pulverize the volcanic ash that covers the soils in this area, create dust, and cause local areas of soil compaction.

At Summit Lake 0.1 acre of native soils will be disturbed by the construction of a trailhead contact station. The addition of 25 parking spaces will occur on 0.3 acre of a former borrow pit. Upgrading the roadway in Warner Valley is expected to affect less than 0.3 acre of native soils.

At Juniper Lake, the relocation of the ranger station, construction of a new residence, development of trailhead parking, and relocation of portions of the campground is expected to affect 1.5 acres by development use and 2.5 acres by adjacent use. Additionally, the water and sewage treatment system is expected to affect approximately 2

acres of native soils. Approximately 6.6 acres of presently disturbed soils will be restored to more natural conditions. Based upon the present knowledge of the soils in the area there appear to be no soil constraints on the new developments, either from the standpoint of permeability for a new sewage leach field or from increased erosion.

The proposed actions at Butte Lake will occur on soils that are presently impacted by use, and little additional impact upon the native soils is expected. However, the susceptibility of the soils in this area to dust formation will continue to be a problem. The volcanic cinders in this area are unconsolidated and will continue to give way under foot traffic. This leads to networks of tracks in the numerous unvegetated areas and on the fragile slopes of Cinder Cone.

At the park headquarters area in Mineral, the construction of an administrative annex and new maintenance facilities will result in the disturbance of 4.9 acres for development and 0.2 acre for adjacent use, for a total of 5.1 acres. A total of 2.1 acres of presently disturbed land may be restored to more natural conditions if some obsolete maintenance buildings are removed.

e. Cumulative Impacts on Soils

As a consequence of the proposed actions, approximately 27.5 acres of undisturbed native soils will be covered by structures, roadways, and other similar features, and approximately 5.3 acres of adjacent native soils will be impacted by intensive human use, for a total of 32.8 acres of new disturbance. Approximately 448.0 acres of soils which are presently affected by developments or adjacent use will continue to be so affected, and 76.9 acres will be restored to a more natural state, with recovery expected near the end of the century. The net change between existing impacts on soils and impacts anticipated from the proposals in the general management plan will be a decrease of 44.7 acres after soil recovery is complete in restored areas.

3. Hydrology

a. Surface Waters

. Only minor changes in drainage patterns are expected to occur from actions proposed in the general management plan. These changes will occur from the blocking of natural drainages by structures and the channelization of surface runoff through culverts beneath roadways and trails. The natural stream pattern in the Manzanita Meadows area has been altered by the construction of Manzanita Lake Dam, and the spring runoff is normally channeled into the southern intermittent stream cutting through this area. This drainage pattern will be retained under the actions in the general management plan. The park's natural resources management plan calls for the return of a natural drainage pattern in Warner Valley, where the stream has been used for pasture irrigation.

b. Subsurface Waters

The proposed actions will affect only the near-surface portions of groundwater flow. This will occur where structures, roadways, parking areas, trails and other such features block the downward infiltration of water. This blocking effect is localized and will not

affect the direction or volume of phreatic flow at depth. In the future, upgrading the water systems at Butte and Juniper lakes may require that wells be drilled to tap the groundwater resources of the park. The small supply of water required by these areas is not expected to cause significant drawdowns of the local water table or to have effects outside of the park. Future changes in potable water quality standards may require changes in water sources for other areas in the park. Essentially, where continued or increasing recreational use of surface waters degrade quality to where it requires extensive treatment, groundwater sources may become a viable alternative source of drinking water. Further analysis of environmental effects would be required if well sources of potable water were to be considered for the major development in Manzanita Meadows, the southwest entrance, or the park headquarters.

c. Water Quality

(1) Lassen Park Road

Approximately 266 tons of hydrocarbons and 2.6 tons of particulates from vehicle emissions will be deposited on or adjacent to the park road at its estimated 1980 use. Some of this material will ultimately reach streams and lakes and diminish water quality. The proposals in the general management plan will have no direct effect upon the rate or amount of this water pollution.

(2) Northwest Entrance

Currently, sewage from the Manzanita Lake area is treated in a 35,000-gallon gravity-fed septic tank some 500 feet north of California 89 and 500 feet west of Reflection Lake. The septic tank proved to be of inadequate size to meet past loading. The system utilizes a sprayfield west of the tank which, because of limited sprinkler coverage, has caused the affected area to become organically overloaded in the past. Although minor improvements have been made, only a new treatment system will be sufficient to handle proposed future facilities and consequent loading. There exists no economical method to enlarge and/or repair the present system. The proposal of the general management plan is to replace the old septic tank and sprayfield with a more effective sewage treatment facility that can handle expected loads of up to 9.5 million gallons of wastewater per season. This volume of treatment will not be required until all proposed facilities in the Manzanita Meadows, the new residential/maintenance area, and the Manzanita Lake campground are fully operational.

Detailed studies and environmental evaluations will be required before the type of treatment facility and its exact location in Manzanita Meadows can be determined. The environmental assessment will ensure that site parameters for disposal and treatment methodology are adequate to meet state and federal laws and regulations pertaining to liquid waste disposal, public health, water quality, and environmental protection.

The most logical location for a sewage treatment facility in Manzanita Meadows is down valley and west of the proposed interpretive center site. This location would allow for gravity feed to the plant and not require the expense of a pumping station. In this area the

soils are moderately permeable and cover pyroclastic flows having moderate to low permeability.

The most likely treatment system to replace the present plant at a new location in Manzanita Meadows is aeration lagoons with injection or percolation of effluent into the subsurface. As described in the September 1971 "Sewage Treatment and Collection Plan for Manzanita Lake," this system represents the best compromise of size, capital cost, operational costs, and control of fluctuating loading. Such a system would be designed to handle approximately 10 million gallons of domestic sewage a year. The liquid wastes not removed by evaporation during the aeration phase would be absorbed or injected directly into the subsurface and have an expected BOD load of approximately 16 pounds per acre.

The effect of this system would be to raise the quality of effluent entering the soil and groundwater above that of the present system. The effluent would have fewer solids and coliform bacteria and contain a greater amount of oxygen, resulting in less demand being placed upon the purifying action of soil bacteria in the upper 3 feet of soil. The presence of such nutrients as phosphates, nitrates, and sulphates would not be affected by the change in treatment systems. Bacteria from the wastewater effluent are not expected to be detectable at distances greater than 100 feet from the point of injection into the soil. Phosphates, nitrates, and sulphates, however, could move into the groundwater regime and move westward toward Viola; and they could eventually return to the surface flow of Manzanita Creek and lower the water quality downstream in Battle Creek and potentially the Sacramento River. The total lowering of water quality from this source of nutrients in the streams west of the park cannot be established at this time, but it is not expected to be high enough to discern from natural chemical fluctuations in the streams of the area.

Construction of visitor use and management facilities on 25-30 acres and razing of the existing facilities in the Manzanita Lake area will cause a local increase in the rate of soil erosion by exposing soils and loosening them for transportation by air and precipitation runoff. This effect should last no longer than 3 years from the end of each particular construction or razing activity, as natural and induced revegetation should stabilize the soil in that time. Most of the soils carried by wind and water will be immediately redeposited on similar soils adjacent to the disturbed site. Perennial streams are distant enough from the activity sites that they will not gain appreciably in their sediment load from this source. The sediment load of Manzanita Creek may increase slightly and feed the development of its delta in Manzanita Lake. However, this should be more than balanced over the long term by the elimination of foot and vehicular traffic in the area of the lake and the revegetation of disturbed sites. The establishment of visitor use in Manzanita Meadows will result in a small, but unknown, amount of increase in the sediment load to intermittent surface waters in the Manzanita Creek drainage. A small, but unknown, amount of contaminants will be washed from bituminous surfaced roads, trails, and parking areas in the Manzanita Meadows area and enter the surface and subsurface waters, affecting the water quality in the area.

(3) Hat Creek

When the septic tank and leach field serving the cabin at Hat Creek are abandoned, the potential for a small amount of nutrients entering the Hat Creek watershed will be eliminated.

(4) Summit Lake

As a result of the upgrading of the leach lines for the comfort stations in the north campground unit and the abandonment of the septic tank/leach field system in the south campground unit, coliform levels in Summit Lake have decreased markedly. These actions have reduced the discharge of sewage from 1.2 million gallons to approximately 0.4 million gallons per year, and have consequently improved the water quality in Summit Lake and Hat Creek. An August 1976 coliform count for Summit Lake recorded 376 MPN/100 ml, and a subsequent count in October 1980 recorded 2.0 MPN/100 ml.

(5) Southwest Entrance

The existing sewage treatment system at the Lassen ski area has proven ineffective in providing adequate wastewater treatment and disposal of the Chalet's annual 2.5-million-gallon discharge. A new system has been designed that will utilize a 20,000-gallon multicompartment septic tank, which will be located within the median strip of the Chalet parking area, and a subsurface effluent disposal site, which will be located in the area of Bluff Falls in Lassen National Forest. The new system is expected to eliminate the seepage of effluent into surface waters and to considerably improve the quality of effluent entering soils within the Sulphur Creek watershed. Specifically, the treated effluent will be lower in solids and coliform bacteria.

The existing secondary-treatment system that serves the small trailer facility and comfort station at the campground adjacent to the Chalet parking area will be utilized as a backup emergency system, if the new system malfunctions, to further protect surface water quality.

The proposed sewage disposal site is within ½ mile of surface streams, including Mill Creek and its tributary from Bluff Falls. Soils disturbed by construction will remain vulnerable to erosion for 1 to 3 years, resulting in an unknown quantity of sediment being lost to surface drainage and temporarily diminishing water quality.

Commercial power brought to the area will eliminate the emission of approximately 1.4 tons of hydrocarbons and 0.6 tons of particulates from the generator and the internal combustion engines used to run the ski tows. These contaminants will no longer be added to surface runoff and nearby streams.

(6) Juniper Lake

The operation of a new sewage treatment system near the southeastern side of the lake will result in an unknown quantity of nutrients entering the lake. Any pollution occurring at the present time from privately owned septic tanks will be eliminated as these properties are acquired. An unquantifiable amount of sediment from construction sites (not more than 6 acres) will diminish the quality of

surface water for up to 3 years following construction activities. However, most of this sediment will remain in soils of heavily vegetated areas adjacent to construction sites. About 6.6 acres of soil that formerly was vulnerable to minor erosion and causing siltation in Juniper Lake will be revegetated, and siltation will be reduced by an as yet unquantifiable amount.

(7) Cumulative Impacts on Water Quality

Accelerated erosion can be expected from construction sites for a period of 1 to 3 years, until natural and cultivated vegetation restores a resistance to surface erosion. Most of the eroded soil will restabilize in the soils of adjacent vegetated areas and will not reach local streams. The cummulative impact on water quality will be a minor temporary increase in stream turbidity and sedimentation. A total of 32.8 acres of previously undisturbed soils will be covered with partially or wholly impermeable surfaces. To the extent that runoff is not effectively diverted and contained in drainage structures, this will increase soil erosion over the long term with a subsequent decrease in water quality from turbidity and sedimentation. Overall, however, there will be a net decrease in land influenced by development and adjacent uses.

Approximately 266 tons of hydrocarbons and 2.6 tons of particulates from vehicle emissions will be deposited in the park adjacent to roadways and parking areas at the 1980 estimated level of use. Eliminating the internal combustion engines at the Lassen ski area will reduce the airborne pollutants by 1.4 tons of hydrocarbons and 0.6 ton of particulates. An unquantifiable amount of material from vehicle emissions and washed from bituminous roadways and parking areas will reach the park's streams and lakes, diminishing their water quality.

Proposed sewage treatment systems will treat approximately 17 million gallons of wastewater per year. Much of this water will be evaporated into the atmosphere and the rest will be discharged into the soils of the individual watersheds shown in table III-2. Because of upgraded treatment of domestic sewage, the effluent will have a higher quality than in the past. This will significantly improve water quality near the treatment sites but will create no overall change in water quality throughout the park.

Table III-2. Projected Wastewater Loads by Watershed

Watershed	Annual Wastwater Loads		
	Existing	With Proposal	Net Change
Manzanita Creek (8,303 acres)	15.2 (prior to 1974)	9.5	-5.7
Hat Creek (11,633 acres)	1.2	0.1	-0.8
Butte Creek (30,465 acres)	1.0	1.0	0.0
Juniper Lake (5,605 acres)	0.0	1.0	+1.0
Hot Springs Creek (6,402 acres)	1.9	2.9	+1.0
Sulphur Creek (6,090 acres)	2.5	2.5	0.0
Totals	21.8	17.0	-4.8

4. Plants

a. General Impacts

Table III-3 and appendix C identify and quantify those areas in the park and at Manzanita Meadows in which vegetation is now impacted by human use, and those areas where effects on vegetation are to be expected from proposals in the general management plan.

Removing vegetation from an area alters the normal biogeochemical cycles of carbon, nitrogen, nutrients, oxygen, and water. It liberates carbon lost in the litter layer and soil horizon, releases nitrogen stored in the soil, alters normal patterns of water percolation and surface runoff, and allows leaching of nutrients in the disturbed humus layer.

Clearing vegetation and altering the texture of soils leads to reestablishment of plant species, either indigenous or exotic, that tolerate or are benefited by the changes. These early successional stages of plant recovery are different in appearance than the mature vegetation that may have been removed. Roots of trees and other plants which are in or close to sewage filtration fields or become established there after construction probably will be submerged in wastewater. This decreases aeration, contributes to root fungal disease, and leads to death of plants in the area.

Table III-3. Acreages by Vegetation Type Impacted by Proposal

	Existing Use	Proposed for Restoration	Continued Use	Proposed New Use	Proposed Total Use	Net Change In Total Impact
Chaparral	93.5	9.2	84.3	4.7	89.0	-4.5
Jeffrey Pine	151.7	53.0	98.7	15.4	114.1	-37.6
Lodgepole Pine	43.2	3.9	39.6	1.2	40.8	-2.4
Red Fir	190.1	8.7	181.5	6.4	187.9	-2.2
Mountain Hemlock	19.5	0	19.5	0	19.5	0
Mixed Coniferous	9.2	2.1	6.1	5.1	11.2	+2.0
Barren Rock	18.3	0	18.3	0	18.3	0
TOTALS	525.5	76.9	448.0	32.8	480.8	-44.7

Increased nutrient values in soil beneath filter fields differ in effect, depending on the concentration of nutrients and the plant species present. Lower levels of nutrient enrichment generally promote plant growth, but increasing concentrations progressively retard growth, or largely eliminate it, as the tolerance of each species to these chemicals is exceeded.

Roadways, parking areas, trails, buildings, sewage treatment facilities, and supports for ski towers completely exclude vegetation. Their installation and maintenance result in direct removal of all plants. Precipitation normally falling there is no longer absorbed by soil and vegetation, and to the extent that runoff is not efficiently collected and diverted to natural drainage systems, it pours out into vegetated areas adjacent to the impervious structures. Plants in these adjacent areas are impacted by this added runoff: Species that cannot tolerate extra water decrease on the sites, and species that benefit from extra water increase in number and/or size. Trees next to new roads or parking areas, with root systems partly covered by impervious portions of structures, are deprived of normal capability to collect water, and may die.

Areas adjacent to developments are impacted by foot traffic. Most soil compaction occurs in the top few inches of the soil, and since most nutrient-gathering rootlets of trees are within the surface 2 inches of the soil, such compaction is detrimental to the trees.

Those areas in and near campgrounds, lodges, trailheads, and interpretive facilities, and areas where there are scenic attractions that encourage off-trail foot traffic, are especially subject to soil compaction and plant destruction. The primary impact of trampling is death of tree seedlings and other small plants and disintegration of forest litter. This results in changes in species composition. Secondary impacts of foot traffic also contribute to vegetation change: Compaction of soil results in denser texture and decreased permeability and oxygen content, which increases probability of fungal diseases in plant roots, decreases germination potential, and retards growth of young plants.

Some trees are severely affected by a change in soil moisture conditions, especially those causing changes in the level of the water table. Lowering the grade in an area of construction can cause a lowering of the water table and result in excessive root drying. Conversely, filling in an area may raise the water table and drown plant roots with too much moisture.

Increased intermittent surface flow as a result of decreased permeability in soil also decreases the probability of plant germination and survival. Use of campgrounds and other public areas is accompanied by practices harmful to plant life such as throwing detergent-laden wastewater on the ground, carving on and cutting down trees and shrubs, picking wildflowers, and the accidental setting of wildfires.

Vegetation along roadsides is impacted as a result of maintenance and use following construction. Vehicular emissions result in abnormal concentrations of substances, such as sulphur dioxide, that are

toxic to plants; however, the relatively low concentrations generated at Lassen, and their high dispersion rate, probably do little or no damage (none has been observed). Throwing cigarettes from vehicles causes fires that have the potential to spread into adjacent areas; the effects, although unplanned, may be beneficial in maintaining vigor to fire-dependent types such as chaparral. Road maintenance includes removal of trees which appear unstable or which block the view of drivers on curves.

b. Revegetation

Approximately 76.9 acres of severely to moderately impacted land under current use will be revegetated. This reestablishment of vegetation will be a very slow process at best, because of the climatic and soil constraints. Grasses and forbs will be planted by direct seeding and shrubs and trees by transplanting.

In the Lassen region grasses are important in stabilizing the soil and preventing erosion. Mixtures of grass species will be used in revegetation projects because the more rapidly growing species will provide temporary cover until the slower developing species can develop into a turf. Grasses which will probably be used include bentgrass, brome, tufted hairgrass, alpine timothy, sedges, and some wheatgrasses. These species are desirable because they have a low spreading form, are tolerant to drought, grow well in poor shallow soils, are resistant to invasion by exotic species, and have deep, soil-stabilizing root systems.

Forbs also help protect the soil from erosion and provide food and cover for wildlife. Forbs in the legume family are especially desirable in any revegetation project because their roots help fix nitrogen in the soil and increase soil fertility. Some of the forbs available that are native to the area are asters, columbine, lupins, evening primrose, wild geraniums, clovers, larkspur, gillia, wild strawberry, and wild iris.

Shrubs and trees have varied usefulness in revegetation projects but are difficult to transplant. Both are important in forming visual barriers, stabilizing soil, and providing food, cover, and shade. Native shrubs to be used in revegetation projects would probably include manzanita, ceanotha, chinquapin, huckleberry oak, pine mat manzanita, willow, and alder. Only native trees that are similar to the surrounding forest type will be transplanted in revegetation projects.

Revegetation projects will restore a more natural appearance to an area. However, such projects may also introduce exotic plant species into an area or introduce insect and disease infestations. The extensive use of growth-stimulation chemicals or artificial fertilizers to hasten plant growth may alter or supplant the normal flow of carbon, nitrogen, phosphorous, and other nutrients. Plant loads may begin to exceed the normal soil capacity of a revegetated area and reduce the effectiveness of the normal biological network of the soil. Runoff and soil leaching may also transfer artificial fertilizers to adjacent natural areas and stimulate unnatural and unwanted rates of growth.

c. Impacts by Area

(1) Lassen Park Road

Maintaining the park road at its present length and on its present alignment will continue the impacts to roadside vegetation occurring from normal maintenance activities. Brush and trees which cause unsafe sight distances will be pruned or removed. Salt and carbon particles which are added to the road surface to facilitate ice melting will continue to be added to the roadside environment. In the wintertime rotary snowplows keep the road to the Lassen ski area clear. Ice particles and undissolved crystals of salt are hurled against the crowns of trees with a sandblast effect and damage the roadside vegetation. As the snow melts in the spring, the contained salt may concentrate around the base of these roadside trees and cause further damage.

(2) Northwest Entrance

All of the vegetation within the Manzanita Meadows area that will be affected by proposals of the general management plan has been manipulated by the Forest Service in an effort to grow a plantation of economic tree species. Native vegetation and soils were windrowed and pine seedlings planted. The recovery of the area by manzanita has been rapid, and it now forms a nearly impenetrable growth in the area. Many of the pines that were planted in the area are just beginning to show above the dense stand of manzanita, and the success or failure of the plantation remains to be seen. Between 13 and 18 acres of vegetation in the Manzanita Meadows/Manzanita Lake area will have light to moderate impact from the proposed development, and vegetation will be severely affected or removed on approximately 12 acres.

Approximately 61.5 acres of land in the Manzanita Lake area will be revegetated as structures and facilities are removed.

No unusually fragile vegetation is known in areas proposed for development. No endangered or threatened plant species are known specifically in areas to be affected by construction or proposed subsequent use either in or adjacent to the northwestern part of the park.

(3) Trail System

The 12 miles of new trail and trailhead facilities in the northern portion of the park will eliminate approximately 6.3 acres of vegetation and impact an adjacent 0.6 acre of vegetation with occasional and random foot traffic.

(4) Hat Creek

Acquisition of 3.6 acres at Hat Creek, removal of structures, and eventual closing of the road will result in vegetation on about 3.4 acres no longer being impacted by use and being returned to a natural condition within the time expressed for lodgepole pine.

(5) Summit Lake

The construction of a new visitor contact station will eliminate vegetation on approximately 0.1 acre. The abandonment of the two southernmost leach fields will result in the slow return of forest vegetation to approximately 0.6 acre. All other impacts from development in area will occur on previously disturbed sites and will result from campground use, parking, corrals, and a residence built on a former trailer site. The total area of impacted vegetation under the proposal is 26.9 acres, a reduction of 0.5 acre from the prior impacted area.

(6) Southwest Entrance

Bringing in commercial power by buried cable along roadsides will result in the removal of vegetation from along the roadside and vegetative disturbance of about 12.0 acres. About 2.1 acres of vegetation could be removed or altered in composition by the installation of the proposed sewage leaching field. Sewer trench lines will be installed in the same corridor as the commercial power cable. The abandonment of the existing sewage leach field will allow the return of natural soil moisture conditions over 1.5 acres, the natural leaching of excessive nutrients from the soil, and the gradual recovery of the red fir forest. Removal of the Poma lift will reduce localized compaction and allow the area beneath the former tow to return to more natural conditions.

Recreational use will continue on the 67.2 acres of ski slopes but will contribute no direct impact on vegetation. The snow compaction by skiers and snow grooming machines may slightly delay the spring melting of snow in localized areas and result in a slightly later beginning for new plant growth. This could encourage the growth of certain native plants at the expense of others, and such plants as pussytoes (Calyptridium umbellatum) could make inroads into dry meadow environments. Severe compaction of snow occurs beneath the tows, causing late melting, compaction of soils, erosion, a shortened growing season, and the general elimination of plants.

Installing a chair lift through the forest will require clearing a linear path to accommodate the lift. The forest type at the ski area is mature red fir. Characteristically this forest type is susceptible to windfall. A single storm in 1962 toppled over 50 trees in a 4-acre area just west of the upper basin. As many as 186 trees, out of a total of some 600 to 800, may have to be removed in the groves along the upper 700-800 feet of the lift line corridor. The majority of these trees are tall and decadent red fir that will have to be removed for lift safety; these fir trees have had severe bole damage from dwarf mistletoe and crown damage from fir engraver bark beetles and several twig insects, and they could fall across the lift line, although out of the actual lift corridor. The actual number of trees to be removed will, of course, depend upon the final lift alignment. It is anticipated that most of the required removal or thinning can be accomplished within the tree groves, leaving intact the wind-strengthened trees on the edges. The end result will be a healthier stand of trees that will provide similar visual quality and lift concealment potential to what exists there now.

It is anticipated that tree removal will be accomplished by helicopter, coordinated with installation of lift towers as may be practicable.

Continued use of the campground and foot traffic surrounding the lodge will perpetuate the relative barrenness created by soil compaction and trampling of plants over approximately 3.7 acres. At the present time this barren area is dominated by pioneer exotic weeds such as knotweed, sand spurrey, and Klamath weed.

A possible cliff brake fern (Pellaea) was identified by Gankin (1973) in the Holodiscus-Brickellia-rocky cliffs and rubble slopes at the ski area. Although Pellaea is not rare, its occurrence in the park would be unusual. Impact on this species is not expected as a result of the proposal because the vegetative type in which it was identified lies outside new or existing ski terrain. The Gankin study, although conducted during the growing season, did not find three rare plants--Corydalis caseana, Silene invisa, and Smelouskia ovalis, var. congesta--that could exist at the ski area according to the California Native Plant Society and are candidate threatened or threatened species on the California list. Impact on these species is not expected because of their apparent absence.

(7) Warner Valley

The minor improvements in the access road will result in the removal of vegetation from less than 0.3 acre of land. Three species of plants which are known to grow in the Warner Valley have subspecies which are considered candidate threatened species by the U.S. Fish and Wildlife Service. These include Dicentra formosa (ssp. nevadensis and oregana), Castilleja minata (var. elata), and Stipa lemmonii (var. pubescens). Due to a lack of taxonomic studies, the existence and distribution of the subspecific form is not known for Warner Valley. Such investigation will be conducted prior to improvement of the access road.

(8) Juniper Lake

At Juniper Lake, relocation of the campground, trailhead, contact facility, and related utilities will result in removal of vegetation and construction of buildings on 3.5 acres, and in vegetation being impacted by foot traffic on an additional 2.5 acres. Acquisition of private land (2.3 acres), removal of private cabins, relocation of the ranger station and campground, and closure of the road at the southeastern shore of the lake will result in vegetation on 6.6 acres no longer being impacted by use and being returned to a more natural condition by vegetation projects. No threatened or endangered plant species are known in the Juniper Lake area.

(9) Butte Lake

At Butte Lake, replacement of two employee residences and the fire cache will not affect vegetation. The 29 acres of Jeffrey pine forest affected by development and use in this area will continue to be affected. The effect that this use is having on the threatened plant species Penstemon cinicola, which was recorded from a trailside between Butte Lake and Cinder Cone, is not known.

Management actions such as trail relocation or protective rock placement will be used to protect these species.

d. Cumulative Impacts on Vegetation

Table III-3 shows the changes in acreages of vegetation that will be impacted by the proposal. The cumulative effect of the proposal after it is fully implemented is that significant impacts on areas of vegetation, caused by development and use, will decrease 8.5 percent from 525.5 acres to 480.8 acres.

Acreages of each vegetative type proposed for restoration in table III-3 should be compared with data in section II in order to establish time frames for aesthetic and full vegetative recovery.

The total land area within the park's boundaries is 106,297.88 acres, including private lands proposed for acquisition and the detached headquarters unit. The 480.8 acres where vegetation will be considerably affected by development and use is thus some 0.45 percent of the park. The remaining 105,817.08 acres will be managed to perpetuate natural vegetative conditions.

5. Animals

a. Invertebrates

Impacts on invertebrates cannot be quantified. Construction activities will destroy both habitat and individuals with low mobility; invertebrates with higher mobility will easily relocate to adjacent habitats. Construction activities will also create new habitat situations for invertebrates. Trees that are accidently injured by construction or razing equipment will be more susceptible to insect infestation. Unless treated, aeration ponds and other areas of standing water caused by construction will provide breeding areas for insects such as mosquitoes. Although such effects are not quantifiable, they do not appear to be significant except on a very local scale.

b. Vertebrates

Changes in water quality from the temporary increase in siltation during the construction period is not expected to have a significant adverse effect upon native fish or their aquatic habitat. Because of the short duration, small increase in siltation, and distance involved, there should be negligible impact upon the rough sculpin or its habitat in Hat Creek, about 25 miles north of the park.

There will be no significant impact upon the habitats of reptiles or amphibians. Populations will be dislocated in construction areas and for the most part move into adjacent habitat. Some of these animals will return to restored areas where suitable habitats develop.

No waterfowl habitats are expected to be affected by the proposal; however, clearing of manzanita brushland will eliminate approximately 4.6 acres of habitat and cover for ground-nesting birds and food for others. Considering the large extent of manzanita in and surrounding the park, this would not appear to be a major impact upon birdlife in the park.

Two endangered species of birds, the American peregrine falcon and the bald eagle, have been sighted in the park, but no nesting sites are known. The spotted owl, listed in the Department of the Interior's "Redbook" of Threatened Wildlife of the United States has been sighted near the southwestern corner of the park but not in the park. Proposals of the general management plan will not affect known habitats of these three bird species. However, if any individuals are nesting in the park, they may abandon their nests if disturbed by increases in nearby activities.

Construction and razing activities will eliminate minor amounts of wildlife habitat, which will cause insignificant displacement of small mammal and bird populations. The overall proposal calls for the net restoration (scarification and revegetation) of 44.7 acres of land, which will effectively offset habitat loss in the long term. More importantly, the reduction of human disturbance in areas proposed for restoration may increase the use of these areas by wildlife.

The removal of 186 mature diseased trees during the chair lift construction at Lassen ski area will prematurely reduce habitat, particularly for some species of nesting birds. The longer range impact will be a healthier forest with increased habitat for a variety of wildlife.

For the most part, the proposals of the general management plan will have little or no effect on the estimated 9,000 deer which use the park during the summer months. In the long run, habitat lost to construction and razing activities will be more than offset by revegetation projects and natural recovery of presently occupied land.

The proposed development at Manzanita Meadows will effectively eliminate 5 to 10 acres of presently good habitat for fawning purposes, 10 to 15 years before it would happen naturally. The density of deer in the Manzanita Chutes has not been determined because the manzanita is already too thick to conduct adequate pellet transect surveys. If the density of deer is roughly 2.5 times the average for the general region, as is indicated by roadkills, and the regional average is 1 deer per 10 acres, then the development will affect the habitat for a maximum of 2 deer.

The closing of the Manzanita Lake development in 1974 resulted in a reduction in the number of deer in the park, which indicated they had depended upon garbage or intentional feeding by park visitors as part of their summer diet. The reopening of the campground in 1976 has reintroduced this source of food from garbage cans and handouts. An unquantifiable number of deer will be more susceptible to disease because this food is not natural to their normal diet and digestive systems. Deer attracted to the area by this source of food may become aggressive problem animals and have to be removed, or they may be hit by vehicles and cause the number of roadkills in the area to increase.

There is an estimated density of one black bear for every 2 square miles of park land. As recreational use and development increase, the natural habitat for bears is intruded upon or lost. Occasionally an individual will become unruly and dangerous to humans. Two such bears have had to be trapped and relocated since 1970. The

proposals of the general management plan will not result in a significant loss of bear habitat and should have no measurable effect on black bears.

The pine marten and fisher are residents in the park and the wolverine may be present. Little is known about these animals in the park. Their tolerance to human presence varies, and the impacts of the proposed actions on these species of animals is not predictable at this time.

In general, any increase in visitation and subsequent disturbance of wildlife will occur as ongoing trends and not as a result of specific proposals in the plan.

6. Environmental Quality

a. Aesthetic Quality

The 78.5-acre Lassen Park Road, which winds circuitously for 30 miles through Lassen landscapes, has more visual impact on park resources than any other man-made element. Its linearity and use by moving vehicles will continue to exert adverse aesthetic impacts in the minds of visitors who are disturbed by congestion and reminded of the intrusions of a mechanized society on natural terrain. Conversely, the access provided by the road contributes to the enjoyment and understanding of the many natural features within the park for many visitors unable to explore the park on foot.

When the developments at Manzanita Lake were closed in 1974, the park visitor was denied the aesthetic amenities that had made this area such a popular overnight destination and base for exploring the rest of the park. The view of the alpine skyline and the reflected images of the mountains in the lakes of the area have been photographed and painted as the symbolic expression of the park since its beginning. The outstanding geologic feature of the Chaos Jumbles rockfall-avalanche was interpreted from a roadside interpretive area on the Jumbles. Many visitors will now miss the opportunity to understand and visualize the magnitude of this event, as another interpretive site cannot be placed on or near the Jumbles.

The development site in Manzanita Meadows is devoid of attractive vegetation, shade, and water. The removal of 5 to 10 acres of chaparral, and the scars from road construction, parking areas, interpretive facilities, and other structures will be visible from California 89 and from Table Mountain and Lassen Peak. A disturbance of this small magnitude will be a minor visual intrusion, if it is found to be intrusive at all.

Manzanita Meadows is aesthetically inferior to the Manzanita Lake area and will be hot and windy in the summer and cold and windy in the winter. Repeat visitors arriving at the new development at Manzanita Meadows will miss the forest and lakes of the former development. Many years of intensive landscaping, along with proper architectural design, can make the new facilities attractive, but it cannot re-create the cool summer shade of the forest and the lakes of the Manzanita Lake area.

Twelve miles of new trails around Chaos Jumbles will provide visual perspectives of this and other geologic features along a scenic skyline that is not now visible from trails in the northwestern part of the park. Removal of lodging, camping, and administrative facilities at Manzanita Lake will improve the natural scene in that area.

At Hat Creek, acquisition of private inholdings and removal of structures will result in minor aesthetic improvement in a forested area now little visited except by occasional hikers.

At Summit Lake, a residence will be built on a site now occupied by a trailer, a parking area will be built in a former borrow pit, and a small contact station will be built on a presently unoccupied site. The presence of up to 25 automobiles in the parking area and the new contact station will be the primary visual intrusions beyond what is already there. It is doubtful if these facilities will be visible to those on Lassen Peak some 4 miles to the west.

For the most part there will be little change in the appearance of the Lassen ski area as a result of the actions in the general management plan. Facilities will continue to intrude upon the natural scene. Removal of the Poma lift and revegetation of the scar will improve the visual quality of the area. The new interpretive center will be designed to blend more naturally into its setting. Removal of the Chalet will reduce the visual intrusion of development adjacent to the Lassen Park Road and permanently remove this eyesore from the park.

Continued use of about 2,400 feet of service road up the ski slopes to maintain facilities at the top of the hill will result in local erosion and imperfect reestablishment of grasses, herbs, and forbs. This disturbance will be visible to visitors at vista points 7 and 8, 1.0 to 1.5 miles to the east on the Lassen Park Road. About 1,100 feet of the existing service road in three segments is highly visible.

Realignment and improvement of the rope tows will require higher towers, and the chairlift will require several large towers. Depending upon the actual location of the towers and whether or not they are silhouetted against the skyline, a portion of the lift might be visible for 2 miles along the park road north of the ski area. At the ski area itself, the major intrusion is from the equipment, structures, and scars below the tows, and the presence of additional or higher towers will not significantly increase the visual impact.

The new sewage treatment facility near the southwest entrance will have a minor visual impact. The 2.1 acre mounded subsurface disposal system in the Bluff Falls area of Lassen National Forest will be visible to visitors at the Bumpass Hell parking area, Lassen Peak, and Brokeoff Mountain. The disposal area will be partially shielded from view by vegetation, but it will be perceptible because of its unnatural linear shape. The wet pit pump station and service road will be located approximately 50 feet from the road shoulder and will be largely screened from view by existing vegetation, thus providing only an occasional and minor visual intrusion to passers-by on the park road.

Installation of commercial power by cable in a roadside ditch and along existing disturbed corridors will cause a temporary visual intrusion for 1 or 2 years. Where the cable follows existing Forest Service roads and telephone cable rights-of-way, the disturbance will not be visible from either the park road or California 89 and 36.

At Juniper Lake, scenic integrity of the lakeshore will be improved by converting about 2.5 miles of the roadway to trail, thereby eliminating intrusion of vehicles, and the dust of their operation, along the scenic edge of the largest lake in the park. Acquisition of private land on the northeast shore of the lake and removal of about 12 buildings there and at the ranger station will result in additional scenic restoration at Juniper Lake, as will relocation of the campground to an area more distant from the shore. A new ranger station and parking facility located on the main road will impose a new intrusion on the natural scene to the extent these structures are not concealed by vegetation.

At Butte Lake no change in aesthetic quality will take place as a result of the proposal. Continued use of cinder field areas for foot travel, both on established and unofficial trails, will result in gradual intensification of the visually obtrusive, random network of paths over a 1,000-acre area between Cinder Cone and the campground trailhead.

b. Air Quality

The primary changes in air quality will be from automobile travel in the new development area in Manzanita Meadows, travel from the campground at Manzanita Lake to Manzanita Meadows by campers, the elimination of the internal combustion engines at the Lassen ski area, and the use of heavy equipment during construction and razing activities. To facilitate a comparison of effects, the same factors used in the description of air quality at a 1980 level of use found in section II are used below.

The developed area at the northwest entrance will have approximately 1.75 total miles of new roads and parking areas, and a round-trip from the campground to the new development will be approximately 3.2 miles. If the developed area at Manzanita Meadows is traveled through by 100,000 vehicles per year, and if 20,000 vehicles from the campground drive to the interpretive center and back only once, there will be an addition of 239,000 vehicle miles driven in the park, or roughly a 6 percent increase over the estimated vehicle miles for 1980. The amount of air contaminants eliminated at the Lassen ski area is brought forward from table II-5.

Table III-4. Net Changes in Air Pollution
(millions of grams per year)

Pollutant	Northwest Entrance	Southwest Entrance	Net Change
Carbon Monoxide	+19.12	-16.98	+2.14
Hydrocarbons	+ 1.43	- 1.05	+0.38
Nitrogen Oxides	+ 0.54	- 5.58	-5.04
Particulates	+ 0.14	- 0.38	-0.24
Sulphur Dioxide	+ 0.05	- 0.37	-0.32

The northwest entrance and southwest entrance areas are at opposite ends of the park and have different peak pollution periods. Therefore, an improvement or degradation of air quality in one area will not offset a degradation or improvement in the other.

Dust and smoke abatement activities are never 100 percent effective, and localized air pollution will certainly occur from the removal, alteration, and construction of facilities. Spent fuel emissions from construction equipment will add contaminants to air and cause a reduction in visibility. These impacts will be short-term or temporary in any one location. However, the short snow-free construction season forces such impacts to be most intense during the primary visitation period for the park. The short construction season also causes projects to be lengthened through several summer seasons, and it is likely that some form of environmental quality degradation will be going on from these activities during any summer for the next 10 to 15 years.

There are no known topographic low areas where air pollution would become concentrated, and the relatively high velocity of the average summer winds ensures a rapid dispersal of air contaminants.

c. Noise Pollution

The noise generated from construction, obliteration, or restoration activities will be localized, but it will still be quite disturbing and out of place in a natural setting for those in the vicinity. As with air pollution related to these activities, the noise will be short-term or temporary but occur during the periods of greatest park visitation. Noise generated at Manzanita Meadows from clearing and construction activities, and noise from obliteration and restoration activities at Manzanita Lake, will be quite audible in the Manzanita Lake campground throughout the life of the projects. Similarly, noise from construction activities at the ski area will be audible in the campground and will disturb day visitors for at least one full visitor season.

B. Impacts on Cultural Resources

1. Archeologic Resources

Archeological investigations indicate that no archeological sites in the Manzanita Lake/Manzanita Meadows area will be affected by new actions proposed in the general management plan. The continuing use of the Manzanita Lake campground will, however, result in further disturbance of what little remains of a large Indian summer camp (Sha-464) on the southeastern shore of Manzanita Lake.

At the Lassen ski area, sites Teh-583 and Teh-596 constitute the most important sites thus far located within the park. The sites have been severely damaged by sewer facility construction, surface collecting by park visitors, littering during ski tow operation, and use of the beginner ski terrain. The impacts of littering in the winter and souvenir collecting in the summer will not increase or decrease as a result of the proposal.

Until a new sewage treatment facility is constructed, the continued use of the existing sewage collection, septic tank, and leach field system will require maintenance when the system needs cleaning, repair, or partial replacement, leading to driving of trucks, and possibly backhoes, bulldozers, and other heavy digging equipment to the points of failure. Use of this equipment on the existing service roads or alongside the sewage lines and septic tanks, even without widening or improving these service routes in any way, will result in renewed irreversible disturbance of concentrated cultural material, caused by tires compacting soil. Digging to correct failures in the sewage lines and septic tanks will have high potential for further irreversible disturbance of important spatial relationships between archeological objects, which are essential to interpreting the significance of the sites. As long as the existing system remains in use, the maintenance practices described above will continue to impact concentrations of archeological material.

The proposals in the general management plan will not impact any known archeological resources at Butte Lake, Hat Creek, or the park headquarters in Mineral. So little is known of the archeological resources at Summit and Juniper lakes that no assessment of effect can be made on the proposed actions; however, the amount of new land disturbed at these areas will be small (6.1 acres) and will be surveyed prior to construction.

2. Historic Resources

There will be a severe impact on the park's historic resources from the proposed actions in the general management plan. The Loomis Museum and seismograph building are on the National Register of Historic Places. Both will be recorded and razed under the proposal. The Mae Loomis Museum was built in 1927 as a memorial to Loomis's only daughter, who died in 1920. Because of the museum, Manzanita Lake became the educational center and chief focal point for park visitors. Loomis used the building to display his famous photographs of the Lassen Peak eruptions, and as a wildlife and natural history museum. He donated the museum to the National Park Service in 1929, and the building continued as the focal point for visitor information and interpretation and as the depository for the Loomis photographs until its

closure in 1974. The original purpose for the museum, and its local historic significance, will be lost when it is removed. The structures associated with the Loomis family will remain in place until the new interpretive center is completed, ensuring continuity of a memorial to the Loomis family.

The naturalist's residence and garage, the entrance station kiosk and residence, and a stone comfort station at Manzanita Lake have been determined to be eligible for the National Register of Historic Places. All will be recorded and razed and lost permanently as examples of historic architecture not found elsewhere in the park. It may be possible to relocate the entrance station kiosk to another area, but its historic context would be lost.

One mile of new trail northwest of the Sunflower Flat trailhead will coincide with the Nobles Emigrant Trail, which is on the National Register of Historic Places. This is approximately 5.5 percent of the 18-mile-long alignment of this trail in the park. Use of the old trail will reinforce the trace by retarding the natural trend toward vegetative and erosional obliteration, but it will also result in compaction of soil and possibly in deepening of the trail profile by resultant erosion, thereby imposing the marks of contemporary use upon a historically integral feature. Possible future development in Manzanita Chutes could occupy parts of yet unlocated portions of the Nobles Emigrant Trail in that area. Impacts cannot be stated until the location of the resource is pinpointed and future planning results in siting of new facilities.

The Sifford cookhouse and hay barn were determined eligible for the National Register, yet because of their delapidated condition and hazard to safety, they were recorded and removed in 1978. The loss of these two buildings will be permanent and mark the passing of the last buildings representative of the Sifford era at Drakesbad.

C. Impacts on Socioeconomic Factors

1. Impacts on Human Safety

As detailed in section II-C, certain areas in Lassen Volcanic National Park have been identified as holding the potential for sudden and catastrophic geologic events. All of those types of events have happened at least once in the past 12,000 years, and some have happened as recently as 1915. The majority of these events are volcanic and are usually preceded by less violent activity, which may provide some warning that events of a more serious nature can occur. However, a major earthquake or steam explosion can occur without an observable prelude and trigger a nuee ardente ("glowing cloud") or a rockfall-avalanche.

The general management plan for Lassen recognizes that visitor use and development will continue in areas of potential volcanic hazard. It was recognized during the development of the plan that if all risks to human life were to be avoided, the park would virtually be closed to all visitor use. The wonders of the park could only be observed from a distance. Thus, the plan recommends that visitors be warned of the potential dangers but does not prohibit visitor use in areas of high risk. To reduce visitor exposure to known hazards, development

will be relocated to areas of less risk. Seismic monitoring equipment has been installed and an emergency operations plan is in effect. In all probability, advance warning will allow evacuation of visitors prior to major volcanic or seismic activity. However, the possibility of a sudden, catastrophic event remains. Much as San Franciscans live with the knowledge that a major earthquake will occur, the visitor to Lassen must accept the fact that natural events of a violent nature could occur at any moment.

There are several major events which could occur with so little prelude that people would be unable to evacuate a hazardous area in time to save their lives. A major earthquake could cause loss of life throughout the park from slides, fires, collapsing structures, and falling trees. Such an earthquake could trigger rockfall-avalanches. A major steam explosion near the base of Chaos Crags could also trigger a rockfall-avalanche or generate a nuee ardente. Nuee ardentes could also sweep into major developed areas from the flanks of Lassen Peak.

Either a nuee ardente or rockfall-avalanche could reach the park boundary between Manzanita Meadows and Manzanita Lake in less than 2 minutes. During these 2 minutes the events would destroy all life within their paths. A rockfall-avalanche is more limited in extent and more directed by topography into valleys than is a nuee ardente. The deadly effects along the margins of a nuee ardente depend upon the size of the glowing avalanche. The deadly effects from a marginal air-blast generated by a rockfall-avalanche extends 300 to 500 feet beyond its mass and can destroy structures, vehicles, trees, and life within that distance.

Geologists can identify those areas in the park that have the highest potential as sites for any renewed volcanic activity or rockfall-avalanches. All of the events are controlled to a great degree by gravity, and thus a study of the modern topography indicates the probable paths for any future catastrophic events similar to those of the past. The magnitude and extent of the potential events can be estimated from similar events in the park's history and from such events in other parts of the world. Thus, it can be determined with a great degree of professional certainty that one or more of these catastrophic geologic events can occur, where they can occur, and what paths they can extend along. However, the critical factor, which cannot be evaluated or quantified, is the likelihood or probability that an event will, in fact, occur.

These catastrophic events are not random, but by their nature they are rare in time, noncylic, and show no trend in frequency that can be projected into the future. All that can be said with certainty is that these events can happen at any moment, at some time in the life of the park, or never. This situation makes any evaluation of hazard to human safety speculative. Because of this highly speculative aspect, professional geologists are unwilling to even provide subjective comparisons with more predictable degrees of hazard found in the human sphere of experience. Nonetheless, because of the potentially disastrous loss of human life from such events, some attempt at evaluation must be made for this environmental statement.

One approach in evaluating exposure to a hazard is to determine the number of hours per individual in a potential hazard area. This was done in the Draft Environmental Statement (appendix B) to analyze the effects of the closure of the Manzanita Lake area to public use in 1974. This type of a computation is very useful when comparing changes in kinds of use. However, it does not represent the true threat to human life. This is easily seen by comparing the use of an area by 1,000 people for one hour with the use of the same area by one person for 1,000 hours. The number of exposure hours is the same for both cases. As the potential for a catastrophic geologic event to occur is equal for any given segment of time, both of these cases have the same chance of being struck by a rockfall-avalanche or a nuee ardente. However, the potential loss of human life is far greater in one case than the other. Therefore, the maximum number of people in a potential hazard area at any given time is a truer measure of threat to human safety than the amount of time they spend there.

The proposed action to retain the Lassen Park Road in its present alignment across the Chaos Jumbles and through Anklin Meadows will allow 100 to 150 visitors to be in a potential geologic hazard zone during periods of heavy road use. A rockfall-avalanche across the road in Anklin Meadows would probably strike two to three vehicles at most. However, a rockfall-avalanche, steam explosion, or nuee ardente from the northern Chaos Crags could destroy all life along 2.5 miles of the highway and account for the fatalities of perhaps 100 to 150 park visitors. If the prohibition against stopping along this section of roadway were to be lifted, the number of visitors in the area at a given time could be greater and increase the potential loss of human life. The hazard is most severe near the base of Chaos Crags and decreases toward the park exit at Manzanita Meadows.

The proposed actions to remove all structures, roads, trails, and aboveground utilities in the potential hazard zone at Manzanita Lake, and to restore the area to a more natural appearance by scarification and planting of native vegetation, will eliminate the temptation for visitors to enter the area because of interest in the rustic structures and historic buildings. The revegetation projects will also dissuade entry to the area by obscuring obvious points of entry and pathways. A program of visitor contact and interpretation will further dissuade visitors from entering the area, as will the removal of facilities such as the boat-launching ramp, picnic tables, comfort stations, and parking areas around the lake.

Service and contract employees will be in the hazard zone to remove structures and carry out revegetation work. Perhaps as many as 20-25 persons might be involved in such work at the height of the natural restoration actions.

However, despite these actions, there will still be a small, but unknown, number of park visitors who will enter the hazard zone for the attractions which are there. Some of these will be repeat visitors who doubt that there is a hazard because nothing catastrophic seems to have happened since their last visit. Others will simply be lured by the natural beauty of the cool forest, lakes, and scenic views. Revegetation

projects will enhance this feeling and appearance of naturalness and thus encourage use of the area by some visitors who otherwise might not have been attracted.

The proposed development at the Manzanita Meadows site and retention of the Manzanita Lake campground will place the attraction of the lakes and forests in the potential hazard zone between the park's chief interpretive area and the park's largest campground. Visitor interaction between these two areas of heavy use will increase the number of people on the park road across Chaos Jumbles, and hikers between the two areas can also be expected to take shortcuts across the toe of the Jumbles. Park and concession employees must cross the Chaos Jumbles to reach the campground at Manzanita Lake, as must all park visitors who wish to camp, picnic, get gasoline or camper supplies, or just see the area. The maximum number of people in the potential geologic hazard zone for one or more of the above reasons would probably not exceed 25-50, including those in vehicles.

When the proposed action is taken to open the 96 campsites in loops A and B to camping, it will have the effect of exposing visitors using these sites to the marginal airblast from a potential rockfall-avalanche. Should such an event occur when all of the sites were occupied, there would be immediate death and serious injury to many of the 300 or so campers from airblast and flying debris. Those campers who had chosen the desirable sites nearest the lake could be drowned in the seiche created by the rockfall entering the lake. The loss of vehicles and other personal property around loop A would be nearly total if such an event were to occur.

The other campground loops, camper service building, comfort station, campground entrance station, and amphitheater are within the zone of marginal airblast from a potential rockfall-avalanche. Should a rockfall-avalanche take place during the evening program, as many as 800 visitors could be exposed to airblast and flying debris. The roar of the approaching avalanche would give a few seconds for some visitors to take cover and gain relative safety; however, many others would stand stunned into immobility or be panicked into flight into the path of the oncoming avalanche.

Dead and injured visitors would undoubtedly be evacuated by helicopter, and uninjured visitors could make their way over or around the avalanche material on foot. However, all vehicles and most personal property would have to remain under guard in the campground until a new roadway could be established. If the cause of the rockfall-avalanche was the beginning of volcanic activity in the Chaos Crags or Lassen Peak area, the abandoned property in the campground could fall prey to mudflows, nuee ardentes, or pyroclastic flows.

If a large steam explosion wracked the base of the Crags, it would be channeled down the Chaos Jumbles. If it came without prelude, and of sufficient magnitude to launch a major rockfall-avalanche, it could do more extensive damage in the form of a nuee ardente than the avalanche itself and eliminate all life within the valley, including the residence/maintenance area and campground.

The most unlikely event in the Manzanita Lake/Manzanita Meadows area would be another rockfall-avalanche identical in size and shape to Chaos Jumbles. As defined by the Geological Survey (Crandell, et al. 1974) the area of highest hazard from a potential rockfall-avalanche extends along the surface of Chaos Jumbles and the bottom of the valley for a distance of slightly more than 3 miles from Chaos Crags. The toe of the Chaos Jumbles lies approximately 2,300 feet short of this distance, and about 500 feet from the park boundary between Manzanita Lake and section 13. Therefore, the easternmost 1,800 feet of section 13 lie within the same hazard zone as the closed developments at Manzanita Lake.

The residence/maintenance area lies outside of this hazard zone at the southwest base of Table Mountain. The probable location of the sewage treatment facility lies beyond this 3-mile hazard zone, but it is in the valley bottom along the path that a slightly larger rockfall-avalanche would take. All of the other proposed developments are within the defined hazard zone.

Because they commonly travel such great distances, there is no increase in safety from nuee ardentes to be gained in the Manzanita Meadows site over Manzanita Lake. However, the Manzanita Meadows area does have an unquantifiable reduction in risk from rockfall-avalanches because of its additional distance from Chaos Crags.

The potential exists for a rockfall-avalanche of equal or greater magnitude than the Chaos Jumbles event. The valley floor has been smoothed and filled in by debris from this avalanche, and a future slide of equal magnitude would overrun the margins of Chaos Jumbles and could enter well into the proposed development site in Manzanita Meadows. Should this potential be realized, the effect could be a catastrophic loss of life and property to park visitors and the National Park Service. The cost could be as high as $6 to 10 million and 500 to 1,000 lives.

If a catastrophic geologic event does not materialize and strike the Manzanita Lake area in the next few hundred years, several important elements will have been traded for an unquantifiable reduction in the risk to human safety. The aesthetic amenities of Manzanita Lake will have been lost as a traditional part of the Lassen experience and replaced by new structures and contrived landscaping patterns. Historic structures that were an important part of the cultural fabric of the park and region will have been lost. The park visitor will have lost the awesome interpretive experience of walking among the debris of a catastrophic geologic event and understanding the forces which created it.

A renewal of minor volcanic and seismic events could occur at any time. If the proposed actions are taken and minor volcanic activity begins, the entire Manzanita Lake/Manzanita Meadows area will have to be evacuated and abandoned until such activity ceases. This could be a period of tens of years, and "temporary" facilities might again be constructed in a safer location. All structures and facilities in the Manzanita Lake/Manzanita Meadows area, including the campground, must be considered expendable in the face of mudflows or pyroclastic flows generated from Lassen Peak or the Sunflower Flat/Chaos Crags area.

The Lassen ski area lodge and parking lot are on a prehistoric earthflow. This flow is now stable, and the proposal calls for retaining these functions in place. In the event a rockfall-avalanche occurs in the Crags area, generated by the shaking effects of a major earthquake, the quake would have to be of a major intensity to affect the earthflow. Such an intense earthquake might be sufficient to regenerate movement in the prehistoric earthflow and destroy both the new lodge and parking area. The earthflow would move slowly and not endanger visitor safety, so the main effect of bringing the ski area up to standard is to hazard the investment to destruction by the earthflow.

2. Impacts on Visitor Use

Approximately 6 to 8 percent of the park visitors prior to 1974 stayed overnight at the Manzanita Lake lodging facilities. By not reestablishing lodging, that proportion of park visitors who are not inclined or equipped for camping but who desire to remain overnight will continue to be inconvenienced.

A permanent campground has been established at Lost Creek since the closing of the Manzanita Lake campground, and all but loops A and B of the Manzanita Lake campground have been reopened on a permanent basis. The reopening of loops A and B to camping will raise the number of available campsites in the park to above 1974 levels. This will reduce competition for campsites within the park and relieve some camping pressures at Butte and Summit lakes.

Prior to its closure in 1974, the Loomis Museum was the center for park interpretation and orientation and the sale of educational material by the Loomis Museum Association. The proposed interpretive centers at Manzanita Meadows and the southwest entrance will again make these services available to the park visitors desiring them.

The 12 new miles of hiking trails, with trailheads at Manzanita Meadows and Sunflower Flat, will provide entirely new opportunities for visitor recreation in highly scenic terrain.

At Hat Creek, purchase of inholdings will make 3.6 acres available for visitor use without conflicts with private interests or use. Closure of the road and trailhead will increase walking distance for a few backcountry users.

At Summit Lake, development of additional parking sites will reduce illegal parking on road shoulders but will not significantly increase the capacity of the area. There has been a sharp reduction in coliform bacteria as a result of abandoning two leach fields, and Summit Lake is again available for fishing. The potential for disease or illness from wading in or drinking lake water has been reduced. The emplacement of vault toilets has eliminated the need to dispose of human waste through new leach fields which potentially could recontaminate the lake.

Upgraded and remodeled base facilities at the southwest entrance will improve service and provide a less crowded experience for winter recreationists and sightseers and summer visitors. Installation of

a chair lift will reduce skier fatigue, a primary cause of accidents. Replacement of the base lodge may require construction over more than one visitor season. During the construction period, visitors will continue to be served from the Chalet. If construction activities continue into the ski season, the number of available parking spaces will be reduced and visitors will be generally inconvenienced because of construction activities. A new sewage treatment system will improve sanitation and reduce the potential for the spread of disease or other illnesses, especially among summer visitors to the area.

At Juniper Lake, hikers and fishermen will be inconvenienced by walking a longer distance (up to 3 miles round trip) to gain access to the north end of the lake. Visitors who are not disposed or who are physically unable to walk will no longer see the lake from this perspective. Visitors who enjoy walking and who value natural terrain will be benefited. Moving the campground away from the lake will probably result in a less enjoyable experience for some campers. Upgrading utilities for campers and all other visitors by building a water system and sewage treatment facility in a centralized location will improve public sanitation by eliminating dependency on lakewater and pit toilets. Potential pollution of the lake from privately owned septic tanks and leach fields will no longer be a concern. Purchase of inholdings will make 2.25 acres available to all people without conflicts with private interests or use.

3. Economic Impacts

The estimated total cost of carrying out the proposals of the general management plan is approximately $20 million. Of this, some $6.5 million would be required for the development at the northwest entrance and $7.2 million for improvements at the southwest entrance. The majority of this federal money will be used to pay for goods and services from the region and local communities. During the course of the proposed actions this money will act as a stimulus to the local and regional economies as well as add jobs and increase county and state tax revenues.

Closing the lodge and other concession services at Manzanita Lake resulted in a comparatively small loss in possessory interest and property tax revenue to Shasta County ($12,400 out of $41 million collected in 1973). In addition, a 1 percent sales tax on concession receipts was lost to the county. In 1973, the concession provided jobs for 2 permanent employees and 117 summer employees who were mainly students supplementing their income for college and seeking a summer experience in a national park.

There has been a lack of private development near the northwestern approach to the park in the 6-year interim since Manzanita Lake was closed. The decision not to replace the commercial facilities at Manzanita Lake may stimulate development in the area outside the park.

The proposals in the general management plan will not change the current level of operations at the Lassen ski area and are therefore not expected to have any significant economic impact upon the ski area concession.

4. Impacts on Park and Forest Management

The developments at Manzanita Meadows will require continued bi-agency planning and budgetary expenditures by the National Park Service and the Forest Service. A savings will be realized through shared use of structures and utilities by both agencies.

There will be a total loss to the Forest Service of timber growing potential on the portion of the pine plantation that the Manzanita Meadows developments will occupy.

Park management is faced with the inconvenience and cost of operating temporary facilities and housing in the northwestern part of the park until permanent facilities are reestablished. The additional personnel to control and explain limited access in the hazard area and to monitor the volcanoes will be permanent. Park employees carrying out duties on Chaos Jumbles will be exposed to the geologic hazard for about 500 hours each year. Costs of maintaining the ski area with additional needs for interpretation will require more staffing.

Depending on the type, size, and complexity of the new sewage treatment systems in the park (particularly at Manzanita Lake), a staff specialist in wastewater plant operation may be required.

Depending upon the time of construction, there is the potential for conflict between proposed timber cutting activity and the NPS trenching activity proposed on Forest Service logging roads in sections 21 and 16 (related to the development of commercial power at the southwest entrance). Delays of either of these activities during the summer months may produce additional costs to the respective agencies.

Maintaining the Lassen ski area at its present size may place increased public pressure upon the Forest Service to develop downhill skiing facilities at Carter Bowl.

IV. Mitigating Measures Included in the Proposed Action

A. Actions to Minimize Impacts on Natural Resources

1. General

All activities that affect the natural environment will be done in strict compliance with contract specifications. These specifications will require that such activities be conducted in as small an area as is necessary to perform the action to minimize the amount of environmental damage to soils and ecosystems within the park. Contract supervision will be done by onsite service personnel to ensure that all impacts on the natural environment are kept as small as possible.

All construction and obliteration activities will be conducted under environmental standards to minimize the degradation of the park's environmental quality from noise, air pollution, and litter. All contract equipment used within the park will meet or exceed federal and state standards for emission and noise control. All unnatural materials remaining as waste following proposed actions will be removed from the site and, if they cannot be salvaged, from the park.

All sites where vegetation and soil disturbance has occurred as a result of proposed actions will be returned to a natural contour and revegetated or landscaped immediately following the completion of the land-disturbing project. Only plants native to the park and occurring naturally within the ecosystem of the disturbed area will be used for revegetation or landscaping.

Planning for the park is consistent with the provisions of the National Environmental Policy Act of 1969 (83 Stat. 852). Environmental assessments or statements will be prepared in conjunction with all proposed actions that presently lack site-specific analysis (for example, the developments at park headquarters and in Manzanita Meadows) and may have a significant impact upon the human environment or be controversial.

2. Soils

In general, at all development sites erosion of soils will be partly averted by installation of drainage structures (normally designed as parts of roadways, parking areas, and buildings) that will contain runoff and channel it with minimal sediment load to natural drainages. Construction zones will be confined to the smallest area possible to avoid disturbance of soil. At sites for new trails and facilities where foot traffic could compact soils or create dusty conditions, walks and trails and directional signing will discourage random walking.

In constructing 12 miles of new trail in the northern part of the park, the routes generally will be built up with stone siding and fill in areas of shallow soil where bedrock otherwise would be intersected and destroyed. The surfaces of trails in areas of fine volcanic ash will be stabilized where needed to minimize pulverization and consequent dust.

Soil limitation survey data, which is now low in reliability, will be improved and verified for proposed construction sites at Juniper and Summit lakes and Warner Valley. Soil characteristics data specific to sites selected for wastewater treatment and road construction will be collected and analyzed during the design phases of individual projects.

3. Vegetation

At all sites selected for public use where foot traffic could result in trampling of vegetation and retarding its recovery, walks and trails and directional signing will discourage random walking. Where rare and endangered species occur, trail rerouting or other protective means will be used to eliminate disturbance to these plants.

Construction zones will be confined to the smallest areas possible in order to minimize volumes of vegetation removed.

Intensive vegetative management will be conducted on all sites with unacceptable rates of natural revegetation because of high erodibility of soil or adverse aesthetic impact.

Normal techniques for revegetating disturbed areas, including mulching and seeding or planting of native species, will take place in denuded construction zones bordering new development where visual impacts are high.

Removal and transport of usable and relocatable federal buildings at Manzanita Lake, and selected relocation of structures acquired from private interests at Juniper Lake and Hat Creek, will be conducted with the least possible damage to trees and other vegetation.

Prior to implementing elements of the proposal inside or outside the park, specific botanical surveys will be conducted to determine site-specific inventories of threatened and endangered plants. If any such species or subspecies are identified, siting of the facilities will be planned to avoid impact on the critical environment.

At Lassen ski area, additional studies will be conducted before construction of the sewage treatment facility, lodge, and chair lift to determine the presence or absence of three plants that are candidate threatened or threatened species on the California list: Corydalis caseana, Silene invisa, and Smelouskia ovalis, var. congesta.

As proposed in the Natural Resources Management Plan, taxonomic studies should be conducted to determine if candidate endangered or threatened subspecies or varieties of the plant species listed in section II are present in the park and, if so, their distribution and habitat requirements.

4. Animals

Management of known foraging habitat of the endangered southern bald eagle at Warner Valley and Juniper and Butte lakes will be considered in studies outlined in the resources management plan. More needs to be known about population dynamics, nesting territory, and food sources of these species. As critical habitats are identified there may be seasonal restrictions on visitor use in the area and/or trails may be relocated to avoid these areas.

All plans for the park will be implemented in compliance with section 7 of the Endangered Species Act of 1973.

5. Aesthetic Quality

Views of wastewater storage and subsurface disposal systems and aeration ponds from scenic areas in the park will be mitigated by using vegetative screening where possible. Chair lift terminals will be located to reduce visibility from higher scenic areas.

6. Water Quality

Construction zones will be held to minimum size to avoid temporarily accelerated erosion and increased sediment load in streams. Management of vegetative recovery in areas disturbed by construction will hold temporary erosion to a minimum. Use of drainage collection and dispersion devices at sites of impermeable structures also will prevent most erosion by channelization.

Sewage treatment and disposal systems will be designed in accordance with the latest federal, state, and local requirements to ensure that water quality in the park and the region is not threatened.

B. Actions to Minimize Impacts on Cultural Resources

All actions proposed in the plan will comply with the regulations of the Advisory Council on Historic Preservation (36 CFR 800), National Park Service management policies, historic preservation policies, director's memoranda, and section 106 of the National Historic Preservation Act of 1966. A memorandum of agreement with the Advisory Council on Historic Preservation has been included in appendix D.

All project areas not yet adequately surveyed will be surveyed for archeological and historic remains by appropriate professionals, in accordance with Executive Order 11593. A historic studies plan and a historic resources study will be prepared in compliance with National Park Service management policies. A historic assessment for compliance with Executive Order 11593 has been prepared by a professional historian of the Denver Service Center, National Park Service. The California historic preservation officer has been contacted to determine if he has any data regarding historic or archeological resources within the area or on lands that may be added to or used by the park. As cultural resources are located in the future, they will be evaluated by the appropriate professionals in terms of the criteria for nomination to the National Register of Historic Places. If they meet or may meet the criteria, they will be nominated to the National Register. Where additional significant cultural resources are identified within an area already on the National Register, the National Register forms will be revised and forwarded to the National Register.

In complying with the provisions of the Advisory Council regulations (36 CFR 800), the regional director is the responsible federal agency official. He will consult with the California historic preservation officer concerning the National Register eligibility of any historic or archeological remains discovered, as well as the effect or potential effect of any undertaking.

All activities or developments proposed will be in accordance with established National Park Service historic preservation policies.

The demolition of any structures, whether historic or not, will be made in accordance with the procedures outlined in Special Directive 78-3 of May 10, 1978.

National Park Service procedures for obtaining archeological clearances for project areas will be followed, and a professional archeologist will be on site during construction to prevent damage to known cultural resources near project locations. The contracting officer and/or archeologist will have the responsibility and authority to halt any construction activities if historic, archeological, or paleontological resources are exposed. Construction activities will remain halted pending evaluation of the remains and completion of the steps required by the regulations of the Advisory Council on Historic Preservation.

In addition, the contractor will be made responsible to halt construction activities immediately and to notify the contracting officer or archeologist in the event that historic, archeological, or paleontological resources are discovered during construction. The contractor will be briefed specifically on these provisions, and the types of cultural material he may observe, by the contracting officer prior to the start of construction. All contracts will reflect these provisions.

Before the historic structures in the Manzanita Lake area are razed, they will have been recorded for the Historic American Buildings Survey as mitigation for their removal in accordance with section 2(c) of Executive Order 11593. Executive order consultation will be completed prior to removal of these structures.

The 1-mile segment of the Nobles Emigrant Trail (on the National Register of Historic Places) to be used as part of the new trail system will be studied by a professional historian in order to determine the impact of foot traffic on its trace and to recommend measures to avoid effects. The alignment of the trail will be surveyed in Manzanita Chutes in advance of development of a trailhead facility, access road, and other possible development which could occur there as a result of future planning with the Forest Service.

Archeological reconnaissance surveys will be conducted at Juniper and Summit lakes prior to site-specific planning for proposed development and for other development areas lacking archeological surveys.

C. Actions to Minimize Socioeconomic Impacts

One of the goals of the proposed actions is to discourage visitor presence on the Chaos Jumbles. To the extent that this is successful, a large number of park visitors will miss the experience of walking among the remains of this outstanding geologic feature and gaining insight into its creation. To some degree this will be alleviated by the 12 miles of new trails which will be built parallel to the flanks of Chaos Jumbles and will have good views of the Jumbles.

The closing and ultimate razing of the Mae Loomis Museum creates a major void in park interpretation and orientation. This will be rectified by the construction of an interpretive center in the new development area of Manzanita Meadows.

The new developments in Manzanita Meadows will be more distant from Chaos Crags than the Manzanita Lake developments and will thus provide an area of less risk to human life from rockfall-avalanches. However, the new developments will be in the demonstrated paths of nuee ardentes, pyroclastic flows, mudflows, and falls of tephra. The National Park Service accepts the long-term hazard to the development investment from these events and will mitigate the potential hazard to human life by providing an evacuation plan and a volcanic activity monitoring system to provide warning and response time to renewed volcanic activity.

In planning with the Forest Service for the Manzanita Meadows development, as little of the pine plantation will be used as possible to minimize the potential loss of timber revenue. Park Service planning will be phased with forthcoming unit management plans scheduled for the Hat Creek and Mill Creek/Deer Creek areas of Lassen National Forest. This will coincide efficiently and economically with comprehensive planning for development and use of Lassen National Forest.

V. Adverse Effects Which Cannot Be Avoided Should the Proposal Be Implemented

A. Unavoidable Adverse Impacts on the Natural Environment

1. Soil

Unavoidable adverse impacts on soil will occur on both development sites and areas adjacent to these sites. Acreages of park land to be affected are listed in table III-1 and in appendix C.

a. Developed Areas

Precipitation will be diverted from impermeable surfaces, resulting in erosion of adjacent areas where the force of added running water is not effectively channeled. Ponding of water on unsurfaced roads and trails, in conjunction with pressure exerted by vehicles and pedestrians, will result in compaction of soils. Building site and roadbed preparation will result in deliberate compaction of soil with a decrease in its permeability and air content. Also, site preparation will entail differential cutting (removal) and filling (importing) of soil, thereby destroying local soil structure. Injecting wastewater into soil will decrease its permeability and air content and increase its nutrient content.

b. Adjacent Areas

Soil gradually will become compacted to a varying extent in areas impacted by foot traffic, decreasing its permeability and altering the soil moisture regime. This will reduce storage capability of the watersheds and increase runoff on the surface. Soil erosion will be accelerated.

2. Water Quality

New sewage treatment systems in the park will treat approximately 17 million gallons of wastewater each year. This is a decrease of 4.8 million gallons below pre-1974 levels. The quality of the effluent being discharged into the environment will be higher than at present but it cannot be quantified because all of the new systems have not been site located nor have the exact methods of treatment been decided upon. Some of the nutrients in the wastewater will eventually reach surface streams and decrease their quality. Minor amounts of sediment produced from erosion at construction sites will adversely affect water quality throughout the duration of the projects.

3. Vegetation

Unavoidable adverse impacts on vegetation will occur on development sites and adjacent areas. Acreages to be affected are listed by vegetation type in table III-3 and appendix C.

a. Developed Areas

The installation and maintenance of roadways, parking areas, trails, buildings, and sewage treatment facilities will result in removal of all plants. Precipitation will be diverted away from these impermeable structures to adjacent areas where native and exotic species that benefit from disturbance and/or added water increase in number and/or size. Early successional stages of plant life will dominate construction zones managed by vegetative recovery, which will have a different appearance than the mature vegetation that may have been

removed. Roots of plants submerged in wastewater at sewage filtration fields will be subject to root fungal disease. Vegetation in and near filter fields will either increase or decrease, depending on tolerance of individual species to higher levels of nutrients.

b. Adjacent Areas

The primary impact on plants as a result of trampling in or near campgrounds, lodges, trailheads, and other facilities will be death of tree seedlings and other small plants. Secondary effects, such as compaction of soil, will lead to decreases in germination potential, retardation of plant growth, and ultimately in a change in species composition. Other adverse effects of use, especially around campgrounds, roads, and trails will include carving on trees, cutting trees and shrubs for firewood, and picking wildflowers. As they are identified as hazards, trees will be removed, accelerating the change in species composition.

4. Animals

None of the adverse effects on animals have counterbalancing mitigations. As described in section III, these impacts are for the most part unknown or minor. Approximately 44.7 acres of habitat will be gained within the park over a period of 10 to 25 years. However, until new growth has become established, these lands will remain unsuitable for wildlife. The construction activities in Manzanita Meadows will eliminate fawning, bedding, and feeding habitat for approximately two deer.

Possible increased use of backcountry areas, resulting from improved facilities at Summit Lake and Juniper Lake, may have unknown adverse effects on endangered species such as the bald eagle or species of undetermined status such as the pine marten. Increased visitor use in backcountry areas may result in increased conflicts between humans and black bears.

5. Environmental Quality

The unavoidable adverse effects of construction activities will be smoke, dust, noise, the sight of construction activity, and the presence of construction equipment on park roadways. These impacts can only be partially mitigated by regulation.

The aesthetic attributes of the former Manzanita Lake development and its scenic backgrounds will no longer benefit visitors in the relocated facilities at Manzanita Meadows. The Manzanita Meadows development site will be visible from the northern summit of Lassen Peak and will have an adverse visual impact on some park visitors.

B. Unavoidable Adverse Impacts on Cultural Resources

Two historic structures on the National Register of Historic Places and four structures on three sites that have been determined eligible for the National Register will be removed. Except for structural records, these buildings will be lost as architecturally significant buildings. Marks of contemporary use will affect approximately 1 mile of the Nobles Emigrant Trail.

In the Sulphur Creek archeological district at the Lassen ski area, concentrations of archeological material in midden deposits will be disturbed permanently by use of beginner ski terrain. Archeological deposits will be disturbed temporarily by maintenance of the septic tank and leach field system. Continued infrequent access by maintenance vehicles along the sewer lines, along the commercial power line corridor, and on the service road leading to the the leach field, and possible digging in these areas, will result in renewed disturbances of spatial relationships between cultural objects. This data will be unrecoverable. Continued use of the ski lodge and campground in summer will result in illegal but unavoidable collection of projectile points from these highly significant archeological sites.

C. Unavoidable Adverse Socioeconomic Impacts

1. Visitor Safety

The general management plan for Lassen Volcanic National Park recognizes that visitor use and development will continue in areas of potential geologic hazard. The likelihood that such an event will happen, and endanger life and property, is not quantifiable. Placing developments and allowing use in areas that are not safe from such events is an unavoidable potential adverse effect on human safety. The development at Manzanita Meadows, the Manzanita Lake campground, the Chaos Jumbles, portions of the park road, and the Lost Creek area are all within zones where this potential adverse effect can be realized.

If volcanic activity is resumed in the Lassen Peak to Sunflower Flat area, the concern for human safety will dictate evacuation and abandonment of the downslope roadway and facilities. Although a catastrophic volcanic event might not destroy any abandoned park developments, use of these areas could not be resumed until volcanic activity ceased. Some individuals might ignore warnings of hazard and enter the endangered area for vandalism or a better view of the volcanic activity. Roadways and developments in the Manzanita Meadows/ Manzanita Lake area would make it very attractive for these purposes.

2. Park and Forest Management

The increased costs to the National Park Service for support of concession development, increased manpower needs, and increased maintenance activities are unavoidable impacts of the proposed actions.

Maintaining the Lassen ski area at its present size may place increased public pressure upon the Forest Service to develop downhill skiing facilities at Carter Bowl.

VI. The Relationship Between Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

In the context of the proposal, local short-term uses of man's environment will be related closely to impacts caused by development and visitor use. Long-term productivity will be related closely to maintenance and enhancement of the natural environment. For example, new facilities in the Manzanita Meadows area will have great short-term benefits to the visitor experience at the expense of potential long-term degradation of the natural and scenic resources.

The net change caused by the proposal will be an overall increase in the amount of land dedicated to long-term maintenance and enhancement of the natural environment.

As a result of the proposal, 448 acres affected in the past by development and use will continue to be used with similar types and intensities of impact. A total of 76.9 acres of disturbed land will be restored to a more natural condition, and 32.8 acres of land not now in use or disturbed will receive significant impact. The total land to be occupied by future development and use is 480.8 acres. This is 44.7 acres, or 8.5 percent, less than the 525.5 acres currently affected.

The proposal also will result in 5.87 acres being acquired and added to federal ownership within the park, and this acreage will be dedicated to maintenance and enhancement of the natural environment rather than maintained for short-term commercial and private uses.

The net result will be a national park of 106,297.88 acres, of which 99.5 percent will be dedicated to preserving the scenic and natural environment and conveying long-term benefit to future park visitors, and 0.5 percent will be developed and used by visitors for enjoyment of the park environment.

VII. Any Irreversible or Irretrievable Commitments of Resources That Would Be Involved in the Proposed Action Should It Be Implemented

The changes in the natural, historic, and archeological resources of the park that will occur as the result of implementing the proposal are classified as irreversible or irretrievable on the basis of possible future restoration of altered conditions. Changes classified as irreversible are ones that alter the environment to the extent it cannot be restored to the state that existed prior to resource alteration. Changes classified as irretrievable are resource uses that preclude any other uses as long as these uses remain in effect, but the resource can be restored to its original state, either through man's efforts or natural regenerative processes, at any future time.

A. Irreversible Commitments of Resources

With the razing or relocation of historic structures located at Manzanita Lake, these structures will be permanently lost.

B. Irretrievable Commitments of Resources

Development of approximately 12 miles of new trails and associated trailheads and parking areas outside the Chaos Jumbles will channel visitor use into selected areas of the park that have not previously been subjected to high levels of visitors.

Construction of permanent interpretive, management, and maintenance facilities, and utility systems, will in some cases establish man-made structures on lands that now are naturally vegetated and populated by native faunal species. Buildings and utilities will replace these biotic components of the environment and alter the natural scene. In most cases, construction will occur on previously disturbed sites that may now contain natural vegetation and native faunal species to a limited degree.

VIII. ALTERNATIVES TO THE PROPOSED ACTION

A. No Action

1. Description

The alternative of no action would consist of a conscious decision to continue the present management policies, trends, and conditions within Lassen Volcanic National Park. This alternative would not place the park in a quasi status quo, where no changes would occur. The park would continue to evolve in the foreseeable future, much as it has in recent years. Many of the minor proposed actions in the general management plan are, indeed, simply continuations of trends created in past years of park operation.

Elements of the present plan that would probably also occur under a no action alternative would be installation of a new sewage treatment facility at the Lassen ski area and an upgrading of other sewage and water facilities within the park. Unneeded access roadways would be closed and minor improvements would be made to unpaved roads and trails. Both the park road and the Lassen ski area would remain, as proposed in the general management plan.

Under no action, loops A and B of the Manzanita Lake campground might be reopened to camping if demand was sufficient. One or two trailers would be replaced with permanent residences for full-time personnel, but trailers and other temporary structures would remain for seasonal personnel. Public interpretive services and National Park Service administration would remain in "temporary" structures, which would eventually become permanent features of the landscape. Historic and concession structures on and near Chaos Jumbles would remain closed to the public. Replacement lodging would not be constructed by the National Park Service, nor would its development be encouraged in the private sector.

2. Impacts

Impacts of no action that would also occur under the proposals of the general management plan are described in section III of this document.

There would be no direct impacts on the pine plantation occupying Manzanita Meadows under the no action alternative. As temporary facilities proliferated in the present temporary management site northwest of the toe of the Chaos Jumbles, there would be an increasing disturbance of soils and vegetation (primarily manzanita shrub brushland). The siting of temporary facilities would continue to be piecemeal and uncoordinated with the placement of other facilities. This would cause duplications, and structures and facilities might be moved two and three times, creating more habitat destruction and soil disturbance than if construction efforts were part of a total plan for the park.

The historic structures on and adjacent to Chaos Jumbles would be retained and not lost as part of the historic scene. Other structures in the closed area would probably be torn down as they deteriorated. Ultimately, historic structures would also be removed.

The potential human safety hazards would remain the same as under the proposals in the general management plan. The cost of structures that would potentially be lost to a catastrophic geologic event would be reduced by approximately $4 million (the cost of structures and facilities at the proposed Manzanita Meadows development.)

Under the no action alternative, there would be no impetus for park management to engage in revegetation projects in disturbed areas, and the progress of these programs would probably lag behind the natural regeneration processes.

As in the proposal, concession lodging would not be be replaced by the National Park Service in or adjacent to the park. Existing lodging businesses in the Lassen region would benefit by growth and possibly by the addition of new sleeping units, and other enterprises might also provide new accommodations. Because of the short three-month travel season, investments in entirely new lodging businesses close to the park might be retarded, and preclosure levels might never be reached. To visitors not inclined or equipped to camp, limited lodging within the park would diminish the quality of a total park experience.

B. Lassen Park Road

1. Close Lassen Park Road Across Chaos Jumbles and Relocate

a. Description

Three alignments for a new road into the northern part of Lassen Volcanic National Park were considered to provide safety from potential rockfall-avalanches and to provide access to alternative development sites (see the map of possible realignments). All three alignments cross lands managed by the Forest Service, and cooperative planning would be required to select a route to satisfy the requirements of both the Forest Service and the National Park Service. To this date, detailed joint studies by the two agencies have not been conducted. Information on the three alignments is based on preliminary studies by the National Park Service. The National Park Service has not rejected the relocation of the park road, but it recognizes such a possibility is beyond the time frame of the proposed plan. If the Forest Service indicates that further study is desirable, these and other alternatives will be given consideration.

(1) Alignment C

This new surfaced road (26-foot-wide roadway) would begin on California 44/89 near Eskimo Summit and would extend eastward 3.8 miles to an intersection with the existing park road at a point about 1 mile northwest of the Lost Creek area. About 1.5 miles east of Eskimo Summit, a spur would depart alignment C and would lead southward 1.0 mile to a parking area on Table Mountain only 0.1 mile from a scenic overview of Chaos Crags and Chaos Jumbles.

In its first 2.7 miles, this relocated northern segment of the park road would ascend the north slopes of Table Mountain over grades that would not exceed 6 or 7 percent. In this area, it would traverse brushland and white fir stands that are seldom visited or little disturbed by man. The next 0.8 mile of alignment C would be in a windrowed pine plantation developed in 1972. The

ALIGNMENT "C"

ALIGNMENT "D"

ALIGNMENT "E"

ESKIMO SUMMIT

SUNFLOWER FLAT TRAILHEAD

ALIGNMENT "B"

ALIGNMENT "A"

LASSEN PARK ROAD

44

89

EXISTING ROAD - TO BE RETAINED

ALTERNATIVE ALIGNMENT

1:200 SCALE

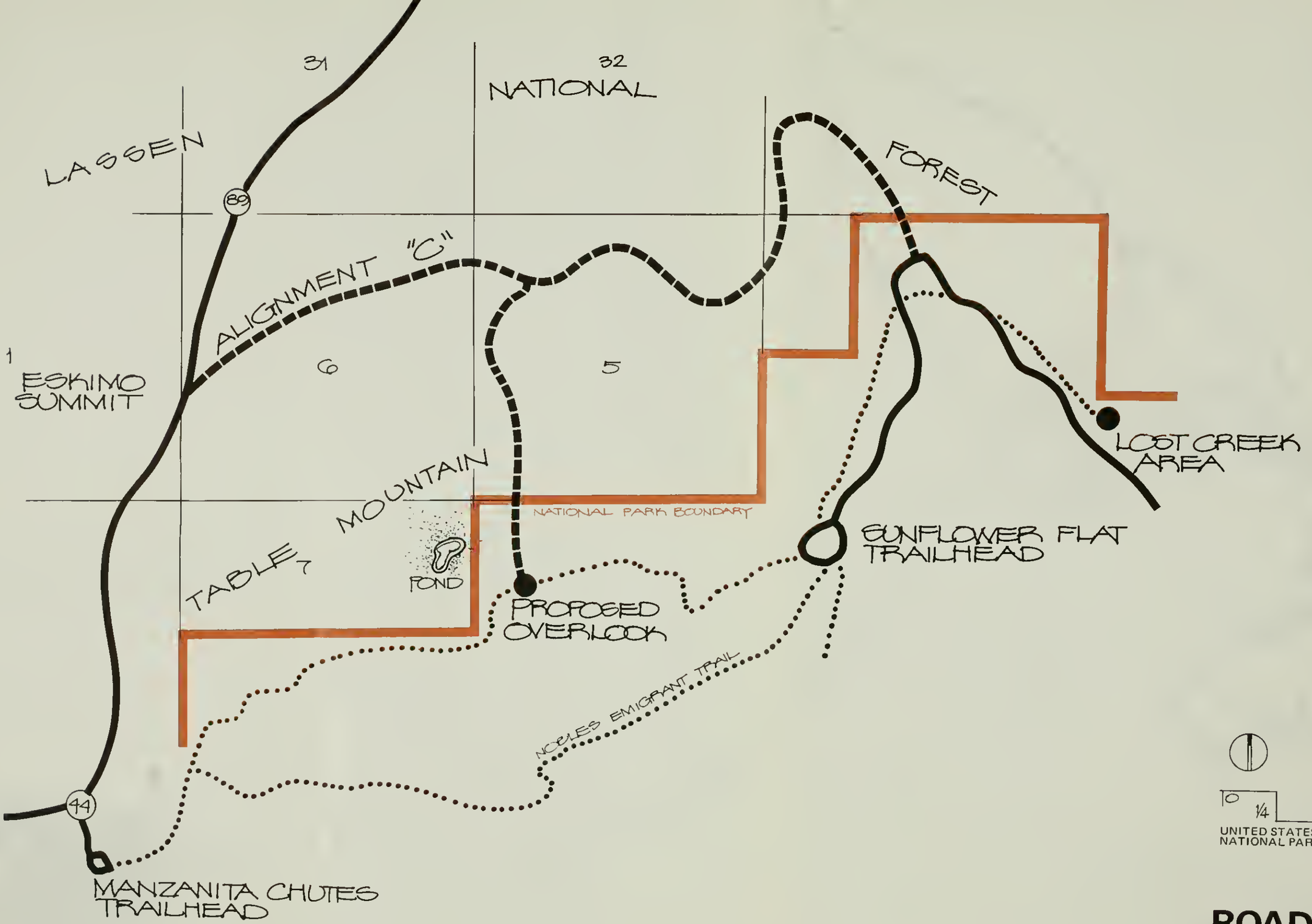
DEC. 80

MILES

0 ½ 1 2

POSSIBLE ROAD ALIGNMENTS NORTHERN END OF THE LASSEN PARK ROAD AND MANZANITA LAKE CAMPGROUND ACCESS ROAD

LASSEN VOLCANIC NATIONAL PARK



111 | 20071C
DEC | DEC 80

0 1/4 1/2 1 MILES

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

ROADS AND TRAILS ON TABLE MOUNTAIN WITH ALIGNMENT C

LASSEN VOLCANIC NATIONAL PARK

remaining 0.3 mile would be in a forested valley (white fir and sugar pine) within the park, where it would intersect the present park road.

The 1.0-mile spur road between alignment C and a point west of the top of Table Mountain would enable visitors in cars to drive to a short trail 0.1 mile long, or less, leading to an overview of Lassen Peak, Chaos Crags, and Chaos Jumbles. Here Chaos Jumbles would be interpreted as a natural feature that has influenced the course of human history. Trails might lead to other parts of Table Mountain, including a lily pond in the summit basin. Other trails would connect with the park trail system, providing access to trailheads at Manzanita Chutes and Sunflower Flat.

About 0.3 mile of the 1.0-mile-long spur road would be in brush close to the forest margin, and the other 0.7 mile would be in a Jeffrey pine/white fir forest with dense overstory. Road construction would require clearing of a 30-foot-wide strip. Trees would have to be removed for a 22- to 24-foot-wide roadway with maximum grade of 10 percent. A surfaced parking area would occupy about 1 acre.

(2) Alignment D

This new surfaced road (26-foot-wide roadway) would begin about 2 miles north of Eskimo Summit on California 44/89 and would extend southwestward approximately 2.2 miles, intersecting the present park road about 1 mile northwest of the Lost Creek area.

South of California 44/89, alignment D would ascend the lower north slopes of Table Mountain, with grades not exceeding 10 percent and averaging considerably less. Along the first 0.4 mile the road would be in the pine forest in the Forest Service travel influence zone along California 44/89. For the next 1.5 miles, it would traverse a pine plantation established in 1972. The final 0.3 mile segment would be in the valley forested with white fir and sugar pine that is also traversed by the final segment of alignment C.

Most of alignment D (1.5 miles out of 2.2) would be within a highly disturbed area that was windrowed in 1972 and planted for future timber production. The 1,000-acre plantation is the maximum planned for reforestation north of Table Mountain because of the marginal potential of other sites. Since 1974, the plantation has received spray treatments to release the tree seedlings from compaction by brush. The establishment of the pine plantation in 1972 may have improved deer habitat, but until recently most of this area on the north side of Table Mountain has been relatively inaccessible because of dense brush.

(3) Alignment E

This new surfaced road (26-foot-wide roadway) would begin on California 44/89 at the Forest Service vista point near the junction of Lost and Hat creeks. It would proceed southward from the vista point through general forest use zones dominated by selective cutting on both federal and private land; however, the alignment would be located entirely on federal land. Some of the forest is interspersed with checkerboard-like plots of land owned by Fruit Grower Supply Company that appear to have been cut more heavily than the plots

administered by the Forest Service. Alignment E is on land vegetated with conifers and brush, and in some places it is windrowed and planted with pine. Alignment E would join the present park road north of the Lost Creek area.

Alignment E would require two bridges over Lost Creek and would follow low to moderate grades, nowhere exceeding 10 percent. In all, the new road would be about 5.2 miles long.

b. Impacts

(1) Alignment C

Alignment C would require cuts and fills with limited blasting along most of its length. Most of the road would be shielded from view and would not be seen from surrounding public use areas such as California 44/89.

The soil on the north side of Table Mountain is comparatively stable, and alignment C would cause no unusual problems for road construction.

One to 2 miles of California 44/89 might have to be realigned near its intersection with alignment C to provide effective circulation for a visitor facility and park-bound traffic. This would result in disturbance of about 10 acres in the Eskimo Summit area--mostly brushland with scattered white fir and Jeffrey pine in soils high in cinder.

All but the easternmost 1.0 mile of alignment C would be in areas inaccessible to deer hunters because of dense brush. A 1972 spotkill map for the national forest shows only one kill in the Table Mountain area. Even though the map is not precise and is based on incomplete hunter return data, it indicates a low level of hunting on the north side of Table Mountain.

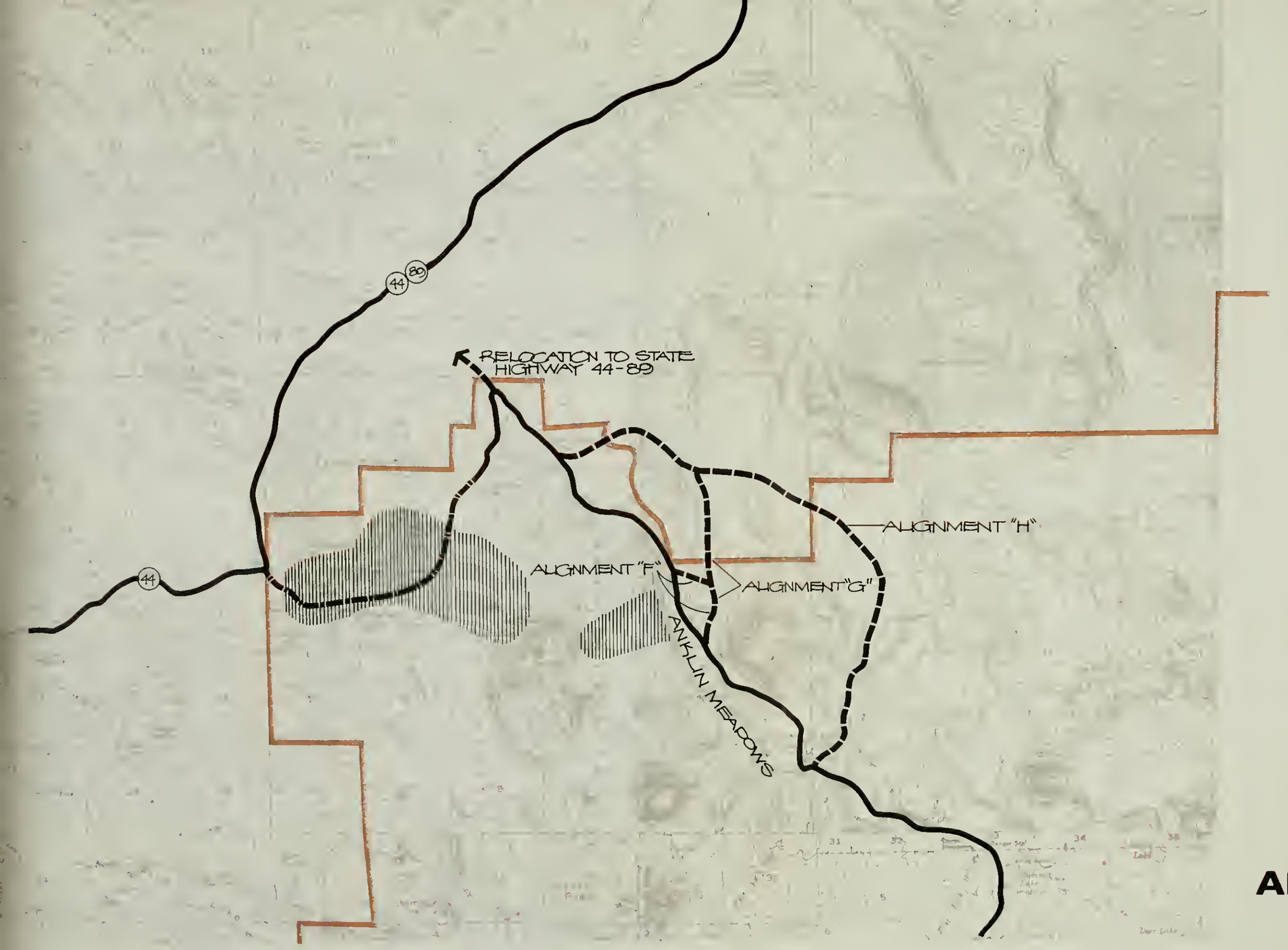
For the many visitors driving toward the park from Redding, alignment C would require an additional 0.5 mile of driving, compared to the present road over Chaos Jumbles. Visitors coming from the north would be advantaged in that their driving distance would be 2.0 miles less.

(2) Alignment D

Alignment D would require cuts and fills and limited blasting along most of its length. Except for its first half mile near the highway intersection, the new road would not be noticeable from surrounding public use areas.

The soil on the north side of Table Mountain is comparatively stable and would cause no problems for road construction.

Because there would be no road to the top of Table Mountain, no vehicular access would be provided to points overlooking Chaos Jumbles. The rockfall-avalanches and Chaos Crags would have to be interpreted by means of exhibits in other places, and they would be a firsthand experience only for hikers. Thus, the majority



EXISTING ROAD - TO BE RETAINED

ROAD TO BE ABANDONED/CLOSED

NEW ROAD - ALTERNATE

ROCKFALL / AVALANCHE

1:1 | 200,000
PRC | DEC. 80

MILES
0 1/2 1 2

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERIVCE

ALTERNATE ROAD ALIGNMENTS TO AVOID ANKLIN MEADOWS

LASSEN VOLCANIC NATIONAL PARK

of visitors, who stay close to their vehicles, would not be able to see Chaos Jumbles.

The beginning of alignment D coincides with the first quarter mile of forest road 32N13. Because this graded route provides most access to the forest in the Lost Creek and Hat Creek drainages, conflicts could arise between logging traffic and park visitors. Consequently, it would be most feasible to begin alignment D slightly south of the forest road to avoid such conflicts.

The many eastbound visitors coming from Redding would have to drive an additional 2.8 miles, compared to following the existing road over Chaos Jumbles. Visitors coming from the north would have to drive 4.4 miles less through the park.

2. Relocate the Lassen Park Road to Avoid Anklin Meadows

a. Description

In Anklin Meadows along Lost Creek, the park road is about a quarter of a mile east of a relatively small rockfall-avalanche deposit. The rockfall-avalanche mass is about 3,500 feet long and 1,700 feet wide. This debris originated on the volcanic domes in that area and did not travel as far east as Anklin Meadows. Its nearest point to the park road is 1,500 feet.

The age of this rockfall debris is not known. However, there is no identifiable "reentrant" or "backscarp" in the face of Chaos Crags at the head of this rockfall mass, so it is probable that the mass fell before the intrusion of the dome, which forms the northeastern side of Chaos Crags in this area. Possibly the mass fell from an older dome no longer evident, either before or about the time that Chaos Crags was formed about 1,200 years ago.

The likelihood of additional rockfalls occurring along Lost Creek appears to be no greater than in other areas along the park road that are immediately beneath steep slopes For example, an earthquake could cause a rockfall above the road on the slopes of Bumpass Mountain or Diamond Peak. Although the possibility of another rockfall occurring above Anklin Meadows cannot be discounted totally, the probability of such an event is less here than at Chaos Jumbles on the northeast side of the Crags, where there has been a higher degree of unstability. At Chaos Jumbles, the park road passes over more than 2 miles of actual rockfall debris, whereas at Anklin Meadows the road is 1,500 feet from a much smaller mass of rockfall debris.

b. Impacts

The principal impacts of relocating the road in Anklin Meadows to reduce exposure to potential rockfalls would be the monetary cost of road construction and disurption of the park environment over a linear area at least 1.5 miles long. There are three feasible realignments (see the map showing the routes around Anklin Meadows).

Alignments F and G would result in relocating the road about 0.5 mile east of Anklin Meadows, thereby reducing the probability that rockfall-avalanches originating on the northeast side of

Chaos Crags would reach the route of visitor travel. The possibility of a such a large rockfall-avalanche reaching alignments F and G cannot be entirely discounted. Alignment F would be 1.5 miles long, compared to the 1.2 miles of existing road it would replace, and it would retain the basic route through this part of the park between Emigrant Pass and the Lost Creek area. Alignment G would be about 1.2 miles long, up to the point where it would leave the park in the lava levee area north of Raker Peak. Alignment H, which would be more than 4.0 miles long up to the same lava levee area, would follow Hat Creek, thus avoiding completely the potential rockfall-avalanche area along Lost Creek. None of the three alignments avoids passing through or alongside the areas devastated by volcanic eruptions in 1915. All three of these realignments would be along grades of 10 percent or less and probably would be technically feasible. Limitations from the standpoint of soils and cultural resources are not known. The alignments would be in densely forested areas, dominated by lodgepole pine along the Lost Creek and Hat Creek drainages, and by mixed conifer forest north of Raker Peak, where selective logging has occurred recently north of the park boundary.

C. Manzanita Meadows/Manzanita Lake

1. No Action

a. Description

Under a no action alternative, future development of overnight lodging facilities in or adjacent to the northwest portion of the park would not be undertaken by the National Park Service. The facilities closed in 1974 would remain closed, and public use of the Chaos Jumbles would continue to be discouraged. The historic structures, and perhaps the Manzanita Lake Lodge, would be retained, but all structures would be allowed to deteriorate and would eventually be removed. Trails surrounding Manzanita and Reflection lakes would remain in place. Loops A and B of the campground might be reopened for use if demand was sufficient. Management, interpretation, maintenance, and living quarters would continue on a "temporary" basis. The sewage treatment facility would be upgraded and probably relocated to the base of Table Mountain.

b. Impacts

As under the proposal, visitors desiring to stay overnight, dine, and purchase remembrances of the park, and who were not equipped or disposed to camp, would be denied these opportunities inside the park. Private enterprise near the park might increase these services slightly because of demand; however, the pre-1974 level of services at Manzanita Lake might not be reached.

The "temporary" management facilities northwest of the toe of Chaos Jumbles would continue to grow in a piecemeal fashion. These facilities would become accepted as permanent structures. Seasonal residence trailers would be retained, but probably at least two permanent residences would be constructed for full-time park personnel. Moveable structures would continue to be emplaced as the demand for various services increased, both in the management area and in the campground. As these management and service facilities proliferated, many of them would be placed within the zone of potential geologic hazard because of space limitations within the park boundary. The primary impact of the growing "temporary" management facilities would be on Manzanita brushland and soils derived from pyroclastic flows.

The historic buildings would be retained so that they would not be lost to future generations. However, the buildings would not be used and access to them would be discouraged. They would continue to draw visitors into the geologic hazard zone and increase the potential for loss of human life in the area. The trails retained around the two lakes would provide easy access to the hazard zone.

With only temporary and makeshift interpretive and orientation facilities provided, there would be little for park visitors and campers to do with their time except enter the Chaos Jumbles hazard zone.

This alternative would relieve the National Park Service of expending the majority of the $4 million for the Manzanita Meadows development.

2. Develop Lodging and Concessioner Services in Manzanita Meadows (Section 13)

a. Description

Under this alternative, the National Park Service would develop new facilities on Forest Service land just outside the western boundary of the park. Approximately 112 lodging units, restaurants, stores, and a gas station would be provided to replace the facilities formerly available at Manzanita Lake. These facilities would be designed for year-round use, providing a base for winter sports activities in the immediate area.

This level of development would require an investment by the National Park Service of $12 million to $15 million. The National Park Service would accept the fact that the area may be devastated if volcanic activity resumes, with a subsequent loss of the capital investment.

The structures, facilities, and utilities in the former developed area would be removed as discussed under the proposal. Because of the proximity of the new development, Manzanita Lake would continue to be a day-use area. Under a version of this alternative, the historic Loomis Museum and seismograph building would be reopened to visitor use, and the old entrance station would continue to be used.

b. Impacts

This alternative would continue many aspects of the traditional Lassen experience in the northwestern part of the park. Visitors desiring overnight lodging, dining, or other services would not be denied this experience. Some historic structures could be saved rather than demolished.

The Manzanita Meadows site was studied to determine its feasibility for development and its economic viability for concessions operations. This study was documented in the report Economic and Development Feasibility for Visitor Services, completed in May 1977. This report stated that the eastern portion of the site could be developed at high cost for grounds development, which would be somewhat offset by the reduced cost of access roads and utilities. The report concluded that

NPS/FS HOUSING AND MAINTENANCE AREA

TRAIL TO TABLE MOUNTAIN

HELIPAD

NEW ENTRANCE STATION

GENERAL STORE/ GAS/ POSTOFFICE FAST FOOD

INTERPRETIVE CENTER AND AMPHITHEATER

SEWAGE TREATMENT (SPECIFIC SITE REQUIRES FURTHER STUDY)

CABINS

LODGE

LANDSCAPE RESTORATION

DORMITORY

CABINS

EXPANSION

LANDSCAPE RESTORATION

TRAIL TO OVERLOOK AND CAMPGROUND

REFLECTION LAKE

OBLITERATE AND RESTORE PREVIOUSLY DEVELOPED AREA

MANZANITA LAKE

SERVICE ROAD

TRAIL TO CHAOS JUMBLES OVERLOOK

WATER INTAKE

CAMPGROUND ENTRANCE STATION

CAMPER SERVICES STORE

NOTE: HISTORIC STRUCTURES ARE NOT SHOWN ON DRAWING - DECISION TO RETAIN OR REMOVE HAS NOT BEEN CONSIDERED IN THIS STUDY

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

0 200 400 800 1200 FEET

111/40014
DSC JAN 81

NORTHWEST ENTRANCE
ALTERNATIVE DEVELOPMENT CONCEPT

LASSEN VOLCANIC NATIONAL PARK

any development would have to be subsidized for a number of years, since a concessioner would not be able to operate at a profit until the resort regained a regular patronage and the site could offer an attractive setting. In the interim, patronage of the lodging facilities would be far below the pre-1974 levels.

Manzanita Meadows is aesthetically inferior to Manzanita Lake. Repeat visitors would likely miss the forest and lakes of the former development. Intensive landscaping efforts and good design could, in time, make the area attractive, and aggressive concession management could increase patronage by promoting package tours, but local/regional repeat visitation would be slow to develop.

Approximately 100 to 120 acres of Manzanita brushland and pine plantation would be extensively altered by the construction of new facilities. Approximately 96 acres of previously developed land would be restored to more natural conditions, as discussed under the proposal. Sewage treatment would have essentially the same impacts as the proposal, although volumes would be higher. Construction activities would undoubtedly result in increased erosion of soils, sedimentation of streams, and reduction in air quality for a short time. Approximately 100 to 120 acres of presently good habitat for deer fawning would be removed prematurely.

Visitors using the new facilities would be exposed to potential geologic hazards rated as low to moderate. Monitoring systems should give adequate warning to evacuate the area; however, there would be a potential for the loss of 500 to 1,000 lives and $12 million to $15 million invested in facilities.

The development would provide significant income to the county and local communities during construction and subsequent operation. The concession would generate jobs for 120 employees, a payroll of approximately $350,000, a California state sales tax of $80,000, and a federal income tax of $87,000 during the first three years of operation.

3. Reopen Manzanita Lake Developments

a. Description

This alternative would require that the National Park Service accept the opinion that Chaos Crags no longer presents a significant threat to life and property in the Manzanita Lake area.

Under this alternative, the National Park Service would return the Manzanita Lake facilities to their pre-1974 level of service and use. The Manzanita Lake Lodge, and all dining and overnight lodging facilities, would be refurbished, remodeled, and reopened for public use. Historic structures would be retained and returned to functional use. Hazard trees and diseased trees throughout the area would be removed. The Loomis Museum and seismograph building would be reopened for interpretive functions to supplement a new interpretive center in Manzanita Meadows.

The Chaos Jumbles would be reopened for full day use. Hiking, fishing, boating, swimming, interpretive hikes, and other such uses would be encouraged. The Lily Pond nature trail and environmental study area would be reopened. Picnic areas around Manzanita Lake and Reflection Lake would be reestablished, and comfort stations would be reopened. The level of water in Manzanita and Reflection lakes would be maintained, if necessary, to provide a suitable fish population for sportfishing. Fish stocking of the two lakes could be resumed under this alternative.

Park housing would probably be relocated to the same site as proposed in the general management plan. A new sewage treatment facility would serve both the Manzanita Lake development and the housing and maintenance areas. This facility would be near the base of Table Mountain where discharges could be made into the highly fractured Table Mountain basalt or, as in the proposal, it could be developed in Manzanita Meadows.

b. Impacts

The primary difference between hazards associated with development at Manzanita Lake or Manzanita Meadows would be the maximum number of people who could be expected to be in a potential hazard area at any given time. Under this alternative, with the development at Manzanita Lake, perhaps 300 to 500 additional visitors would be on and around the Chaos Jumbles on a day of heavy visitation. If a catastrophic geologic event such as a rockfall-avalanche should occur and reach this area, these visitors would be killed. These figures should be added to those discussed under the previous alternative for the full effect on human safety.

The alternative would cost between $7.5 million and $10 million and approximately 7 percent to 42 percent more than the cost of the proposal for Manzanita Lake/Manzanita Meadows. The development could lie entirely within the park, which would not require joint planning and management with the Forest Service.

This alternative has the support of many local and return visitors, and it would provide all of the aesthetic amenities of the traditional Lassen experience. Because of the publicity surrounding the closure of the area for public safety in 1974, many park visitors might hesitate to take overnight lodging in an area "officially" declared as hazardous. A shadow of doubt would cling to the Manzanita Lake area, and for some park visitors, this could be undesirable.

Reopening the Manzanita Lake developments could be accomplished more rapidly than any of the other alternative actions. Many of the buildings and utilities could be reopened for use with only minor remodeling and refurbishment. Some structures have, however, become badly deteriorated from six years without maintenance and would have to be replaced. Utility systems would require almost total replacement, and almost all structures would have to be brought into compliance with current codes.

No undisturbed land area would be impacted by this alternative. The park housing and maintenance area would be relocated as proposed in the general management plan to an area already impacted by use. A new sewage treatment facility would provide a higher quality effluent than the present overtaxed system, and would discharge the effluent into a rock formation that would ensure deep disposal. Any development in Manzanita Meadows would be on previously disturbed land.

As under the proposal, reopening the campground at full capacity would bring the number of available campsites in the park above the pre-1974 level. This would reduce overuse at other campgrounds within the park and the national forest. Campers would again be able to find lakeside campsites on loop A of the campground.

All of the historic structures at Manzanita Lake would be maintained and used for functional purposes, thus preserving the historic fabric and historic architecture of the area for present and future generations. The Loomis Museum would continue to stand as a memorial to the Loomis family and house the Loomis photographic collection of the historic eruptions of Lassen Peak. The museum would also continue to function as an interpretive and orientation center if funds were not available to construct a building more suited to this function.

Interpretive activities would resume on the Chaos Jumbles, where the story of this awesome geologic event can best be told and understood. The Lily Pond nature trail and environmental study area would be reopened under this alternative and could be used by both visitors and school groups. Those visitors desiring to hike, swim, photograph, paint, picnic, boat, and fish in the area of potential geologic hazard on the Jumbles could do so without the feeling of impending doom created by the abandonment of the area.

Because the Manzanita Lake area is closer to the Chaos Crags than Manzanita Meadows, it is more exposed to the potential hazard of a rockfall-avalanche. Therefore, one of the effects of this alternative would be continual refinement of geophysical monitoring equipment and greater observation and interpretation of the records being produced. Also, before this alternative could be initiated, the National Park Service would request of the Geological Survey a report containing the following: an estimate of the volume of rock material which is high enough on Chaos Crags to fall and produce a rockfall-avalanche; a map showing the path and maximum extent of such a slide; the significance to human safety of the increased distance of Manzanita Meadows over the Manzanita Lake area; and a consensus of professional geologic opinion on the likelihood of such an event occurring, couched in subjective terms which compare it to other hazards in human life. Such a report would require the expenditure of Park Service and Geological Survey funds.

4. Alternative Relocation Sites

a. Description

In July 1974, the National Park Service released an Environmental Assessment of Master Plan Options for Lassen Volcanic National Park. The document presented 12 potential sites (5 within the park, 6 in Lassen National Forest, and 1 straddling the boundary) for

ASHPAN BUTTE 5922
RED LAKE
SITE 5
SITE 4
RED LAKE MOUNTAIN 6680
RED MOUNTAIN
ESKIMO HILL
TABLE MOUNTAIN
SITE 7
SITE 8
SITE 9
SITE 10
SITE 11
SITE 3
SITE 1
SITE 2
SITE 12 OFF MAP
MANZANITA LAKE
DEEP HOLE
ONION SPRINGS 7263
6924
CHUTES
CREEK
10 CM.
0
OUTER LIMIT
LASSEN NATIONAL FOREST
LASSEN VOLCANIC NATIONAL
NORTH FORK
HOT ROCK
RAKER PEAK
BADGER MOUNTAIN 7127
WEST PR PEAK
EMIGRANT TRAIL
LASSEN NATIONAL FORE
LASSEN-VOLCANIC NATION

DEVASTATED AREA (GREAT HOT BLAST OF 1915)

MUD FLOWS (1915)

ROCKFALL-AVALANCHE DEPOSITS (300 YEARS AGO AT CHAOS JUMBLES)

DACITE DOMES (1100 YEARS AGO AT CHAOS CRAGS)

YOUNGER PYROCLASTIC FLOW DEPOSITS (1,000 - 1,200 YEARS AGO)

OLDER PYROCLASTIC FLOW DEPOSITS (12,000 - 32,000 YEARS AGO)

NOTABLE ACCUMULATIONS OF PYROCLASTIC EJECTA THROWN OUT OF THE VOLCANOES DURING SEVERAL PERIODS OF ERUPTIONS

DEPTH OF TEPHRA (AIRFALL MATERIAL) OF 1,000 - 1,200 YEARS AGO, SHOWING BOTH THE OUTER LIMIT OF ACCUMULATION AND THE 10 CENTIMETER ISOPATCH

111|20029C
DRDEC 80

POTENTIAL RELOCATION SITES & GEOLOGICAL HAZARDS

LASSEN VOLCANIC NATIONAL PARK

the relocation of the facilities at Manzanita Lake (see the Potential Relocation Sites map).

Public comment (including local organizations and government agencies) on these options gave some direction to further planning. The majority of comments favored reopening the existing facilities. If that were not possible, the replacement of existing facilities with similar facilities (rustic cabins, varied price range, attractive setting) was the second choice. Reopening the facilities or replacing them as soon as possible was emphasized in many comments. There was a strong sentiment that replacement facilities should not be developed within the park if the existing facilities could not be reopened.

National Park Service and Forest Service planning efforts were not on the same schedule, so while the National Park Service had funds for cooperative studies, the Forest Service was several years from funding for studies of these development sites. Based on public comment, the National Park Service determined that the sites within the park should not be further considered. Discussions with the Forest Service further emphasized that a joint planning effort could not be undertaken within a reasonable time frame. However, the Forest Service agreed to allow the National Park Service planning team to conduct further studies at site 3 (sections 12-13, Manzanita Meadows), since that area had the least immediate potential for timber harvest and would not require the additional impact associated with the realignment of the park road. Site 3 also offered the potential for the earliest development; utilities were available adjacent to the site, there would be no immediate loss of commercial timber, and the park road and Manzanita Lake campground would not require relocation. This site is the Manzanita Meadows site described in alternative 2.

b. Impacts

The impacts of the Manzanita Meadows site are discussed under alternative 2. Most of the 11 other sites would provide greater safety from potential geologic hazards for both human life and physical developments than would the site in Manzanita Meadows. These sites would not be as readily available through cooperative agreements and thus could not be developed as rapidly; also, they would require the extension of utility lines, the cutting or loss of some commercial timber, the relocation of portions of the park road, and more money to develop. Consequently, these alternative sites were given no additional environmental, economic, or feasibility studies beyond the preliminary assessment of options. None of the eleven sites was considered as an alternative to Manzanita Meadows in the Draft Environmental Statement for the general management plan. An adequate comparative analysis of effect cannot be made because of a lack of information at the same level of detail as that for Manzanita Meadows.

Development at any of the 11 other sites would eliminate the hazard to human life from a potential rockfall-avalanche, and 6 of the sites would be relatively safe from renewed volcanic activity in the area from Lassen Peak to Sunflower Flat.

The amount of soil and vegetation impacted at the 11 sites would be similar to the 100 to 120 acres to be impacted at Manzanita Meadows (site 3) and the administrative site in the northwestern part of the park. If the Manzanita Lake campground was also relocated to the alternative site, it would require an additional disturbance of 50 to 60 acres. Access roads, utility corridors, and the development of a water system would affect additional acreage, the amount depending upon the particular site selected.

D. The Lassen Ski Area

1. No Action

a. Description

The Lassen ski area would continue to operate with the present facilities, although some upgrading would occur as part of routine maintenance programs. The downhill skier capacity would be limited to present numbers, and the capacity for other winter activities would continue to be limited by the available parking. Additional temporary structures and remodeling of existing facilities would likely occur as management responded to pressures to improve facilities, relieve congestion, and increase operating efficiency. Further limiting the sale of lift tickets and/or implementing a reservation system could be initiated to reduce crowding on peak weekends.

The existing sewage treatment system would continue in use. Failure of the system could require limiting use or closing the area until corrective actions could be taken. The 24-unit campground would remain in use, and power would continue to be supplied by the existing generators and individual drive units at the tows.

b. Impacts

There would be little additional environmental impact except for continued deterioration of existing impacted areas.

The Lassen ski area probably would still cater to a crowded maximum number of skiers (up to 800 skiers at one time on peak days). The ski area would not contribute to serving the increasing skiing demands of the region. Facilities elsewhere in northern California, such as the Donner/North Tahoe area (with potential capacities beyond its current use), would benefit economically from the decision not to expand the Lassen ski area. (The Mount Shasta ski area has been closed and its future is uncertain. Poor weather conditions and avalanches have made it a marginal operation.)

Lassen could assuredly retain its valued family atmosphere, for it would attract mostly regular, local visitors. Lift ticket prices could remain comparatively low.

Because of the limited downhill skiing facilities, there would be an increased emphasis on cross-country skiing and other snow play activities. The unplowed park highway offers an excellent route for such activities, although there would be limited parking space and avalanche danger is, at times, quite high.

The existing ski facilities and, in particular, the scar beneath the Poma lift, would continue to be a visual intrusion, obvious to summer visitors from the park road within the ski area, from viewpoints 7 and 8, and from several points along the Brokeoff Mountain trail.

Generally, crowded conditions are evident when more than 500 skiers are present at one time. In 1977-78, this was occurring on 28 percent of the operating days. With continued overcrowding, skiers would become more dissatisfied with conditions at Lassen ski area, and visitation might level off to a number consistent with the capacity of the existing facilities. The local skier population might exert demands and pressures to accelerate the development of other winter sports areas within the region. Carter Bowl in the Butt Mountain area of Lassen National Forest would be more likely to be developed for winter sports.

On peak days, the existing parking area is filled to capacity, with 235 to 250 cars carrying about 750 to 1000 people. This problem would have to be corrected to handle the existing peak crowds, even without expanded ski facilities. The cross-country skiers who are increasing in number probably would compete all the more with downhill skiers for available parking space.

The Chalet, as the support facility for the ski area, would continue to provide inadequate service for winter visitors until remodeled and supplemented by portable structures. The Chalet was constructed at half of its originally designed capacity. In winter, it is used by 800 to 1,000 visitors a day. It suffers from overcrowding, poor traffic patterns, and inefficient heating. A new supportive facility, even without expansion of the ski area, might be required.

The septic tank and leach field system in use at the ski area, which has been inefficient in recent years and is susceptible to failure, would be replaced when funds were available. Archeological sites would continue to be disturbed by maintenance of this sewage system over the next few years.

2. Remove Downhill Skiing Facilities

a. Description

The existing ski operation facilities, including the Poma lift and rope tows, along with their towers, terminals, and operating sheds, would be removed. The Poma lift, rope tow, and access road scars would be stabilized and revegetated. The Chalet would be converted for use as a visitor center, allowing minimal expansion of both the winter and summer interpretive programs by utilizing the space occupied by the ski rental shop. Food services would remain. (The removal of the Chalet and the construction of a more suitable interpretive center on another site would be a long-range possibility.)

The parking area would be reduced in size to accommodate summer capacities and reduced winter capacities. The 24-unit campground would remain. Underground commercial power could replace the existing generators as a power source, although further analysis would be needed to determine if this would be economically feasible without the power demand of the ski tows. Reliable power is

needed to operate the Chalet and proposed sewage treatment system; duplicate generators would be another option.

Reduced winter use might permit the continued use of the present septic tank and leach field. However, this system could eventually be replaced with new treatment facilities, since summer visitation to the information/interpretive facility now equals or exceeds the winter use levels.

The removal of the ski area facility would shift emphasis from winter recreation to a year-round southern entrance information and interpretive center, with use directed toward a more resource-oriented experience. Activities such as cross-country skiing and snowshoe hiking on the unplowed road would be developed to a much greater extent than is now possible, and both winter and summer interpretive programs could be expanded. However, without the downhill ski facilities, the area could be closed in the winter.

b. Impacts

A small amount of environmental disturbance would result from removing the downhill skiing facilities. Any activity in the area would likely affect the vegetation and soil, but effects would be minor and temporary. There would be no additional adverse impact from future use. After the initial disturbance, the ski slopes would be allowed to return to a natural state, with intensive management to stop soil erosion and promote revegetation below the ski lifts and on the maintenance road.

The visual intrusion from the existing ski tow facilities would be reduced and eventually eliminated. The terminals, sheds, towers, and support poles adjacent to the highway would no longer be present. The Chalet would remain for the foreseeable future, presenting a visual intrusion because it is near the park road.

Other winter activities oriented to a resource-related experience would be encouraged. Cross-country skiing, which increased almost 500 percent (884 to 4,406 participants) between 1972 and 1978, might continue its growing popularity. The winter interpretive programs could be expanded concurrently to better serve this increasing interest. A winter interpretive program, cross-country skiing, and snowshoeing at Lassen would complement activities at other winter sports developments in the region.

The existing parking area would be more than adequate to serve winter and summer visitors. Currently, it is never filled to capacity in the summer. Even with the establishment of a southern entrance visitor center, a portion could be obliterated and the site could either be used for a new visitor center or be restored to a natural state.

The removal of the ski facilities would dissatisfy the local downhill-skiing population, which would have to travel farther to a ski area because there is no other local site with development comparable to Lassen's. Other ski areas in the vicinity offer more marginal skiing.

Lassen's family atmosphere might not be matched elsewhere, and lift ticket prices might be higher at other sites. There were 23,974 downhill skiers at Lassen during the 1977-78 season; this number of skiers would have to be accommodated elsewhere in the vicinity.

The Chalet would be better suited to handle the reduced visitor loads, and with major modifications, it could be converted into an interpretive facility to be used by the National Park Service, although it would remain a substandard facility.

Visitation could decrease to such levels that winter operations might not be necessary. Without the downhill skiing operation, it might be unprofitable for the concessioner to continue winter operations in the southern portion of the park. The winter interpretive programs at Lassen would neither have the advantage of advertising by the concessioner nor the incidental participation of skiers. The removal of downhill skiing would have a definite adverse effect upon the commercial enterprises within the immediate vicinity (Mineral), and it could affect businesses as far away as Red Bluff and Chester.

The park's outlay for the maintenance of the lodge, utilities, and parking area is estimated to be $33,000 to $40,000 a year, not including ranger time at the ski site in administrative work and first-aid. If downhill skiing was discontinued, this outlay would be for the benefit of a smaller group of winter visitors, approximately 13,000 instead of 37,000.

Continued use of the 24-unit campground would have the same impacts as those described under the proposal. Retaining the existing generator as a power source would result in continued emissions of pollutants, and the visitors, particularly campers, would continue to be disturbed by the noise and smell. Because of these impacts, commercial power would probably be extended to the area, even though the economic feasibility may prove marginal or duplicate generators could be constructed to provide more reliable power.

Constructing new sewage treatment facilities would have impacts similar to the proposal.

3. Expand Ski Area Facilities

a. Description

The Environmental Assessment of Master Plan Options, the Draft General Management Plan, the plan Supplement, and the Draft Environmental Statement addressed numerous alternatives for the expansion of the ski area facilities. Additional alternatives were discussed at public meetings, and specific proposals by individuals and organizations were considered. The various components of ski area expansion (lift improvements, expanded base lodge and parking facilities, location of an interpretive center, and utility system improvements) can be combined into innumerable alternatives. The above mentioned documents give more detailed descriptions of specific alternatives and their impacts. The following sections summarize alternatives considered for the various components of ski area expansion.

(1) Slope and Lift Improvements

Alternatives for slope and lift improvements were designed to relieve slope congestion, increase beginner ski terrain, and increase overall capacity of the area. Expanding ski runs onto open terrain in the upper basin would require the construction of one or more chair lifts and, under some alternatives, the relocation or redesign of the Poma lift, intermediate tow, and beginner tow. These changes would open additional advanced and intermediate slopes and allow expansion of the beginner area. The alternatives considered would have increased the capacity of the ski area by anywhere from 100 to 1,200 additional skiers. Proposals ranged from replacing the Poma lift with a similar length chair lift to construction of two chair lifts and relocating the Poma lift to open major areas of additional terrain for skiing.

(2) Base Facility Improvements

Under any of the alternatives considered, the inadequate base facilities would have to be expanded or additional facilities constructed. Up to 16,000 square feet of additional space would be required to accommodate the increased levels of use. Alternative sites for an interpretive facility at the southwest entrance to the park included several sites in the vicinity of the present parking area and a site at Bluff Creek on Forest Service land south of the park. The alternate sites at the ski area could utilize existing parking facilities and utility systems. The Bluff Creek site would require the construction of an access road, parking area, and utility system. Parking would also be expanded to serve the increased levels of use. Alternatives considered the expansion of parking through the removal of all landscaped islands, expansion to the south, the construction of a multistory parking structure, and the development of remote parking areas with shuttle bus service to the ski area. Up to 440 additional parking spaces requiring up to 7 acres of land would be required.

b. Impacts

The impacts of the various expansion proposals would vary in degree with the selected location of facilities and the capacity levels for which facilities were designed. Visual impacts could be reduced under some of the alternatives by relocating the Poma lift to the upper basin, shortening the intermediate tow so that all equipment was below the park road, and placing the chair lift so the forest would provide a screen and the skylining effect would be minimized. The lower terminal, chair lift towers, and the clearing through the forest would be visible from some areas within the ski area base complex and possibly from the entrance station. The most visible intrusion, the scar on the Poma lift hill, could be eliminated. Depending upon the actual location of the chair lift towers and whether or not they were silhouetted against the skyline, a portion of the lift might be visible for approximately 2 miles along the park road north of the ski area, from vista points 7 and 8, and possibly from as far away as the Bumpass Hell trailhead.

Clearing for lift construction and the development of runs would affect 15 to 18 acres, although a much larger area would be available for skiing because of the rather sparse forest cover, large openings, and wide tree spacing. With careful planning it would not be necessary to clear large areas for runs, and there would be little visible evidence of the ski area from the park road or nearby trails.

Installing a chair lift would require the construction of 17 to 35 support towers, depending upon the recommended spacing between towers. Each of the towers, depending upon the type used, could cover up to 150 square feet of land area, and the drive engine equipment and housing of the upper and lower terminals could cover up to 350 square feet. Construction activities associated with installing the lift would cause some erosion and increased sedimentation in the local watershed. Soils encountered along this alignment are rated as having only slight erosion potential, so the erosion and sedimentation would likely be minor and temporary.

Installing a chair lift through the forest would require clearing a linear path to accommodate the lift. The forest type at the ski area is mature red fir (Abies monticola), which is considered the steady state or climax species. Characteristically, this forest type is susceptible to windfall erosion. A single storm in 1962 toppled over 50 trees in a 4-acre area just west of the upper basin. To provide maximum safety for skiers and to minimize shutdown time and damage to the lift from falling trees and debris, it might be necessary to cut a 200-foot-wide swath along the entire length of the chair lift. This would require clearing approximately 19 acres of forest. The removal of this many trees in a linear pattern could, in turn, alter local wind patterns in the area and increase the probability of windfall erosion in the forest. Selective clearing of hazard trees, rather than total removal of all trees, would be utilized if feasible.

The southwest half of the ski area, including the lodge and parking area, rests upon an ancient earthflow or landslide mass, which extends from the base of Brokeoff Mountain to the west bank of Sulphur Creek. There is concern about the water saturation levels and stability of this mass. Although the earthflow appears to be stable, just what level of soil saturation would be required for the mass to become unstable is not known. The removal of the forest cover under some of the alternatives could, in the long run, increase soil moisture levels and decrease the stability of the mass.

Installing and maintaining the chair lift might require the construction of a new 1.2-mile service road, running from the top of the Poma lift hill, across the upper basin, and switching back along the forested ridge to the upper terminal of the lift. Constructing and using the road would result in visual scarring, increased erosion, and the deposition of unknown quantities of sediment in local watersheds. Skiing from the upper terminal would be primarily limited to intermediate classes, although a service road to the upper terminal could serve as a ski trail for beginner skiers and substantially increase use of the lift.

Congestion in the lower meadow could be substantially reduced by the development of new lift facilities which separate different classes of skiers. The present intermediate tow, shortened so that it would not cross the park road, would serve advanced beginners, while intermediate and expert skiers would tend to ski the upper areas. Some congestion could occur during lunch time and late afternoon as skiers converged on the base facilities. Under some of the alternatives, access to the chair lift would require a long uphill climb or the use of the

RIDGE "R"

UPPER BASIN

PROPOSED POMA TOW

MINIMUM TREE CLEARING

PROPOSED CHAIR LIFT

MINIMUM TREE CLEARING

EXISTING INTERMEDIATE ROPE TOW (SHORTEN)

BEGINNER ROPE TOW RELOCATE AND EXTEND

UNLOAD STATION

GENERATOR

ENTRANCE STATION

EXAMPLES OF ALTERNATIVES FOR LIFT IMPROVEMENTS

0 200 400 600 FEET

1" = 200'

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERIVCE

SOUTHWEST ENTRANCE
ALTERNATIVE A

LASSEN VOLCANIC NATIONAL PARK

RIDGE "R"

UPPER BASIN

PROPOSED CHAIR LIFT

EXISTING INTERMEDIATE ROPE TOW

EXISTING POMA TOW

BEGINNER ROPE TOW

CHALET

MINIMUM TREE CLEARING

COMFORT STATION

GENERATOR

ENTRANCE STATION

0 100 200 400 600 FEET

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

SOUTHWEST ENTRANCE
ALTERNATIVE 2A

LASSEN VOLCANIC NATIONAL PARK

RIDGE "R"

UPPER BASIN

PROPOSED CHAIR LIFT

RELOCATED AND EXTENDED POMA TOW

EXISTING INTERMEDIATE ROPE TOW

BEGINNER ROPE TOW (RELOCATE AND EXTEND)

0 200 400 600 FEET

11 | 20097A
DSC | DRC 80

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

SOUTHWEST ENTRANCE
ALTERNATIVE B

LASSEN VOLCANIC NATIONAL PARK

RIDGE

UPPER BASIN

NEW POMA TOW

CHAIR LIFT

EXISTING INTERMEDIATE ROPE TOW

EXISTING POMA TOW

BEGINNER ROPE TOW (RELOCATED AND [illegible]THENED)

0 200 400 600 FEET

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

SOUTHWEST ENTRANCE
ALTERNATIVE C

LASSEN VOLCANIC NATIONAL PARK

RIDGE "R"

UPPER BASIN

PROPOSED CHAIR LIFT

RELOCATED PUMA TOW

INTERMEDIATE DROP-OFF POINT

EXISTING INTERMEDIATE ROPE TOW (SHORTENED)

BEGINNER ROPE TOW (RELOCATED AND EXTENDED)

CHALET

COMFORT STATION

GENERATOR

ENTRANCE STATION

0 200 400 600 FEET

111 | 20056
DSC | NOV 80

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

SOUTHWEST ENTRANCE
ALTERNATIVE D

LASSEN VOLCANIC NATIONAL PARK

RIDGE "A"

MINIMUM TREE CLEARING

PROPOSED CHAIR LIFT
"J.P. PETERSON'S"

UPPER BASIN

MINIMUM TREE CLEARING

EXISTING INTERMEDIATE ROPE TOW

EXISTING ROPE TOW

BEGINNER ROPE TOW

CAMPGROUND

RESORT STATION

GENERATOR

ENTRANCE STATION

FEET

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

SOUTHWEST ENTRANCE
ALTERNATIVE E

LASSEN VOLCANIC NATIONAL PARK

MINIMUM TREE CLEARING

RIDGE 'R'

UPPER BASIN

PROPOSED CHAIR LIFT

RELOCATED POMA TOW

MINIMUM TREE CLEARING

NEW ROPE TOW

EXISTING INTERMEDIATE ROPE TOW

CHAIR LIFT

BEGINNER ROPE TOW (RELOCATE AND EXTEND)

CHALET

CAMPGROUND

COMFORT STATION

GENERATOR

ENTRANCE STATION

7900 7800 7700 7600 7500 7400 7300 7200 7100 7000 6900 6800 6750 6600 6500 6400

200 400 600 FEET

111/20037C
DSC/DSC-80

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

SOUTHWEST ENTRANCE
ALTERNATIVE F
LASSEN VOLCANIC NATIONAL PARK

intermediate tow, which would cause congestion on the lower slopes in the morning and after lunch. Relocating and extending the beginner tow would require the construction of from two to eight support towers, depending upon the design of the tow. These towers could be designed to be removable, but during the summer the tower bases and drive housing would still be minor visual intrusions. The new towers would be located out of the archeological sites, and the actual area of disturbance would be minimal, because each tower would not carry a significant load. Beginner tow capacity would triple, and usable terrain would more than double, providing a more desirable balance of terrain for the various classes of skiers. These impacts are essentially the same as those discussed under the proposal.

The alternatives considered various locations for additional and/or relocated lift facilities. No single alternative stood out as a perfect solution to the problem at the Lassen ski area. If the decision had been made to expand the Lassen ski area, the proposal would have been some combination of parts from the various alternatives and the resulting impacts could have been less or more than those discussed above.

Recreational use of a larger area for ski slopes (up to a 100 percent increase) would contribute no clear direct impact because use would be seasonal and on temporary surfaces of snow. However, Gankin (1973) points out that snow compaction caused by grooming and use can delay spring thaw in local areas, thereby resulting in a slightly shorter growing season. The use of surface tows increases compaction in local areas and those areas where ground surfaces have been disturbed by grading and filling for these tows tend to be more severely impacted, as evidenced by the failure of native vegetation to recover on the existing Poma lift alignment.

Expanding base facilities to accommodate an expanded ski area would have a more substantial impact than constructing lifts and opening new ski terrain. The present base lodge is inadequate to serve the present level of use and would have to be expanded by three or four times. Several alternatives for expansion were considered, including additions to the present structure or additional structures at other locations, depending upon the location of lifts and the redesign of the parking area. The impacts of these alternatives would be similar to those of the proposal.

The sites considered for new lodge facilities were in areas disturbed by the construction of existing facilities. These areas are sparsely vegetated, and soils are rated as having only a slight erosion potential. Up to 16,000 square feet of land could be covered by structures, with additional adjacent areas covered by walkways and service roads. Although there would be little disturbance to vegetation, drainage patterns could be substantially altered by this construction. The major impact would be visual. If the present Chalet was expanded, it would encroach upon the park road and be even more visible from the road north of the ski area.



ALTERNATE INTERPRETIVE CENTER SITE

ALTERNATE CHALET SITE

25 75 0 50 100 FEET 200

111 | 20025B DSC | NOV 80

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

SOUTHWEST ENTRANCE

ALTERNATIVES FOR CHALET EXPANSION OR NEW INTERPRETIVE CENTER

LASSEN VOLCANIC NATIONAL PARK

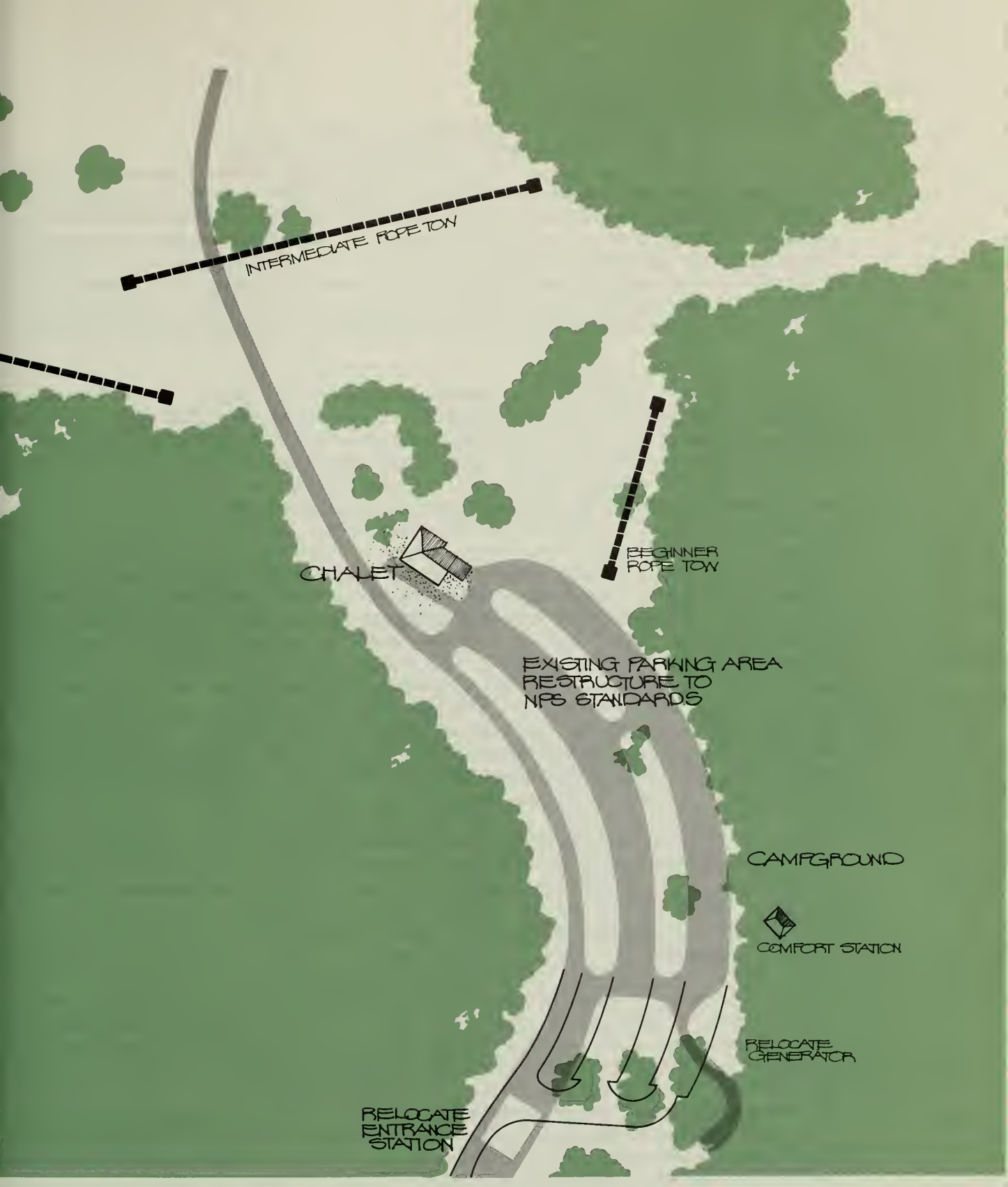
Constructing a separate interpretive center within the existing ski area would have impacts similar to the construction of additional lodge facilities. Constructing an interpretive center on Forest Service land would impact a currently undeveloped area. Approximately 3 acres of vegetation would be completely removed for the construction of a building, parking area, and access roads. An additional acre around the interpretive center would be affected by foot traffic. Additional land could be affected if sewage treatment facilities and a water supply system were required.

Locating the interpretive center south of the park entrance would provide information and orientation in a more attractive setting than the ski area, but it could result in duplicate operations during the winter if both the ski area and interpretive center remained open. Concessioner operations during the summer would probably remain at the ski area, so summer visitor would still be subjected to the visual intrusion of the ski area development.

Expanding parking facilities to accommodate winter use levels could require the construction of a multilevel parking structure because adequate terrain is unavailable for extensive surface parking at the ski area. An alternative would be the development of remote parking areas with a shuttle bus system to the ski area, but no specific sites were studied. With a modest expansion of the ski area, the present parking area could be redesigned and expanded to provide parking for approximately 530 cars. This would impact an additional 1.7 acres of land to the south of the present parking area. Most of this land was disturbed during construction of the present facilities, there is minimal vegetative cover, and soils are rated as having only a slight erosion potential. The major impact would be visual. The existing planted parking islands would be removed, and a total of 6.3 acres of continuous paving would be visible to the summer visitor.

A parking structure could substantially reduce the amount of land impacted. If feasible, the structure could be placed almost entirely below the surface, with parking on the top designed to handle the summer requirements. A parking structure would occupy 2 to 2.5 acres, allowing approximately half of the present parking area to be restored to a more natural appearance.

Costs of a parking structure normally run three to four times the cost of surface parking, although locating the structure in an earthflow area could substantially increase construction costs. Snow removal costs would be significantly reduced, snow removal vehicles could be stored in the structure, and needed maintenance facilities could be located in the structure, reducing the need for additional buildings on the surface. A large parking structure could disturb summer visitors not accustomed to such a structure in a park setting. Some winter users, expecting a more natural experience, would be disturbed by the structure, but the majority of skiers would probably accept it since they are becoming common in other ski areas.



NATIONAL PARK SERVICE STANDARDS
INCREASE - 90 TO 120 AUTOS
TOTAL - 340 TO 370 AUTOS

LARGER NUMBER RESULTS WHEN SOUTHWARD EXPANSION COMBINES WITH RESTRUCTURING OF EXISTING PARKING AREA

0 25 50 75 100 FEET 200

111 | 20028D
DSC | NOV 80

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

SOUTHWEST ENTRANCE
PARKING EXPANSION ALTERNATIVE
LASSEN VOLCANIC NATIONAL PARK

4. Alternative to Commercial Power

a. Description

A power source other than from commercial lines would require the expansion of the onsite power-generating capability. Power capability would vary from that needed for minimal expansion to serve the proposed ski area improvements to that needed for a major expansion as discussed under the various alternatives. Under all proposals and alternatives, electrical power to the lifts, tows, and additional base facilities would be required. Converting the existing oil and liquid propane gas systems in the Chalet might also be considered.

b. Impacts

Providing adequate power to support the maximum level of improvements would require three or four additional 150- to 200-kva generators to be installed at a cost of $35,000 to $45,000 each. The generator housing would need to be more than twice as large as the existing structure and, assuming that the character of the new structure would be similar to the existing one, would cost approximately $35,000 to $40,000.

Noise levels and air pollutants produced by the new generators during winter operation would be three to four times greater than what are produced by the existing generators. To reduce these obtrusive noise levels within the ski area, generators might have to be located 0.25 to 0.5 mile away. The result would be increased costs for extending the power line, and probably disturbance of a previously undisturbed site. During the summer months, power requirements would be reduced and would be approximate to the levels of the existing generators; consequently, noise levels and impacts upon summer visitors would not be increased and could, in fact, be reduced if a new site farther from the ski area was used for the power plant.

Initial costs for developing an alternate power source would be approximately one-third the cost of a commercial power installation, but would cost about 0.4 cent more per kilowatt hour to operate. Over a period of years, once the original investments were amortized, the comparative costs would be greater than bringing in commercial power.

With an onsite power system, no backup power would be available to adequately operate a chair lift (if one were installed) in case of a failure of the system. This would increase the danger to skiers stranded on the chair lifts and could result in a loss of revenue to the concessioner if repairs could not be made immediately. Constructing a backup capability to provide maximum safety for the skiers and eliminate shutdown time and revenue losses would double the costs of onsite power. In terms of cost this would practically eliminate the only advantage over commercial power.

5. Alternatives for Sewage Treatment

Alternative sewage treatment methods, alternative treatment locations, and the option of pumping effluent to Mineral were explored. None of these alternatives, however, proved environmentally and/or economically feasible.

a. Alternative Treatment Methods

(1) Description

The two alternative sewage treatment methods considered included a package treatment plant and a system with septic tank and spray irrigation. The package treatment plant would involve treatment of sewage such that effluent discharge to nearby streams would be within existing standards of the California Regional Water Quality Control Board. The possibility of disposing effluent at sites inside and outside the park by spray irrigation was also considered.

(2) Impacts

The option of using a package treatment plant would be undesirable in that it would be both energy intensive and expensive to operate. Additionally, large fluctuations in flow volume throughout the year would make it difficult to operate.

Climate, topography, soils, and vegetation of this area would preclude the effective use of a spray irrigation system. The short summer irrigation season and cool climate with limited evapotranspiration would require extensive land areas. The result would be altered vegetation, habitat, and visual qualities. In addition, spray irrigation would be relatively energy intensive, with high operating and maintenance costs.

b. Alternative Treatment Locations

(1) Description

Two alternative treatment locations were considered, including the Chalet parking area and a hillside site 0.9 mile south of the Bluff Falls site within Lassen National Forest.

(2) Impacts

Soils in the parking area are composed of clay and silt and are shallow and impermeable, making this area unsuitable for subsurface disposal.

The hillside site south of Bluff Falls has acceptable percolation rates. However, the hillside is extremely rocky, with a soil mantle of unadequate thickness for subsurface dispoal. For these reasons, as well as difficult access, this site was considered unacceptable.

c. Pump Effluent to Mineral

(1) Description

The Mineral sewage system was designed with future expansion in mind and is currently operating at about 40 to 50 percent of its capacity. Preliminary studies indicate that the projected volumes of effluent under the proposed development of the southwest entrance could be accommodated in this system and still leave ample room for anticipated future loading. The National Park Service has discussed this idea with representatives of Mineral, and it appears that the additional loading would be welcomed because it would help to defray the operating and maintenance costs of this facility.

(2) Impacts

By tying into an established system, the National Park Service would be actively pursuing the federal mandate of establishing or promoting regional sewage treatment facilities whenever possible. Future National Park Service or Forest Service developments, such as a visitor center, campgrounds, or lodging, could be connected to the system with a minimum of additional impacts.

The distance from the ski area to the Mineral treatment facility is approximately 10 road miles. Installing a sewer line along the road, if deemed acceptable by the California State Department of Transportation, would cost approximately $1.6 million, depending upon soil conditions along the route (1980 NPS estimate). The sewage collection system in the ski area, the sewage pumps, and modifications to the Mineral treatment facility to handle the ski area loading could add another $390,000 to $500,000. The total expenditures would range between $1.6 million and $2.1 million. A monthly charge would also be incurred, based on the number of gallons of treated effluent. This charge would have to be calculated for a given period of time and would be considered as part of the total project cost.

The Mineral system was constructed prior to the enactment of the new state codes, and it might not be acceptable by today's standards. A party desiring to increase loading at the facility might be obligated to share in or be solely responsible for the costs of upgrading the system to current acceptable standards. This additional factor would increase the total project cost.

The impacts of installing the sewer line could be held to a minimum by following the existing road alignment and placing the line within the road. Construction of the line would cause temporary interruption of the traffic flow and inconvenience along the park entrance road for approximately 5 miles and along California 36 through Mineral for an additional 5 miles. These disturbances, although considered temporary, could span two full summers.

Since following the road alignment would increase the distance and the costs and might cause undue side effects on local businesses, it might be considered impractical. As a result, it might be decided to go cross-country with the sewer line, following a fairly straight alignment to Mineral, utilizing unimproved Forest Service roads and existing disturbed telephone line corridors, if possible. An alignment through the forest would involve removing an unknown number of trees, over a distance of approximately 6 to 7 miles, and the probable disturbance and possible destruction of some wildlife habitats in the area. Disturbing the soils along the alignment would increase the erosion potential and would probably result in increased sedimentation in local watersheds, although this would likely be minor and temporary. By going cross-country, the overall length of the sewerline could be shortened by as much as 2.5 miles; consequently, costs for the installation could be reduced by approximately $210,000 to $285,000.

E. Warner Valley

1. Convert Drakesbad Guest Ranch to a Hostel

a. Description

With Drakesbad converted to a hostel, twice the number of people--perhaps 60 per night--could be accommodated in existing buildings. Some buildings could be converted for multiple occupancy by single visitors, and others could be partitioned for families. Rustic bunk space would be provided, and some of the toilet accommodations would be shared. Cooking facilities would be in a central location--possibly outdoors. The nightly fee per person might be $3 to $5, depending on the character of the bathroom facilities and other amenities. The facility might be operated by a private organization, with a manager in residence to provide maintenance and other services. The hostel could be operated on a trial basis until its success was determined. In general, the hostel would offer rustic space to individuals who would stay no more than two or three nights and would use the facility as a base for day hiking in the southern part of the park.

b. Impacts

The conversion of Drakesbad to a hostel would result in a loss of appeal to many visitors who return year after year, and it would no longer be the same place socially and traditionally. However, a new clientele interested in low-cost accommodations would be served. A hostel would provide a place for the few hikers on the Pacific Crest Trail to lay over for a day, bathe, rest, and buy simple provisions. There might be conflicts between young single adults and families who would share facilities in the same limited space. Social conflicts could be mitigated by strong management who would enforce the rules of conduct, such as cleanup and sanitation. Limited time of stay would eliminate a tendency for long-term occupancy that might otherwise be encouraged by the inexpensive accommodations. Cost of operation might be partly defrayed by simplifying maintenance (removal of plumbing and electricity except where provided for central use) and selling simple foods and trail provisions.

2. Eliminate Drakesbad Guest Ranch and Relocate Other Facilities to Kelly Camp

a. Description

Drakesbad Guest Ranch, the picnic area, campground, ranger station, and road from the Warner Valley portion of the park would be removed. Kelly Camp would become the base for both overnight camping and day use. A trailhead, picnic facility, ranger station, and campground would be built there; water, sewer, and power would be provided. The road would be closed at Kelly Camp, and beyond this area it would be converted to a hiking route.

If use of the Pacific Crest Trail increased, it could be rerouted through Kelly Camp to provide more control of its use and to route it to an area where limited services could be provided.

Under a similar alternative Drakesbad Guest Ranch would be retained, but the ranger station, campground, and picnic area would be relocated to a new site at Kelly Camp. Another variation would relocate all facilities to the Kelly Camp area.

The Kelly Camp area in the western half of section 30, is private land owned by members of the Lee family, who utilize this area as part of the Lee Ranch, with headquarters about 2 miles to the southeast along the Warner Valley road. The principal use of the land is for grazing--mostly cattle and a few horses. About 200 cattle are grazed in the general area of the ranch, including section 30, in summer and early fall when the ground is free of snow. The forest in section 30 is being harvested.

About four cabins at Kelly Camp date from early in the century, when ranching and tourist facilities were established here.

In the northeast corner of section 30 (T. 30 N., R. 6 E.), another part of the Lee Ranch contains about 20 private summer cabins which are on lots leased from the landowner. All of the cabins are on a side road east of the main channel at Kings Creek. There is a large rock diversion structure along the creek north of this development that channels the runoff and protects private investments near the creek.

b. Impacts

Structures, such as pasture fences, water and fuel tanks, the swimming pool, the sewage lift station, and all other buildings would be eliminated. Minor existing impact from horse grazing would cease.

Locating a trailhead at Kelly Camp, rather than in the upper portion of Warner Valley, would require that visitors walk 2 miles farther to view the meadows and thermal features. However, the narrow, dusty road would be eliminated from the scenic valley, and the abandoned road would become a rewarding hike for some visitors. With no road, fewer people would visit the upper valley, further decreasing use and lessening impact on the interior of the park. A trail between Kelly Camp, Terminal Geyser, and Boiling Springs Lake, in combination with the trail along the road, would provide a loop route beginning at Kelly Camp.

Should the existing segment of the Pacific Crest Trail between Terminal Geyser and Corral Meadows be rerouted through Kelly Camp and Kings Creek, the resulting trail distance would be 5.3 miles rather than 4.2 miles, as it is now. The trail through Kelly Camp might be less interesting to hikers because it would not pass close to geothermal features other than Terminal Geyser. Kelly Camp would have shower facilities for hikers and be a point for purchasing food and other simple provisions.

If the ranch at Drakesbad was eliminated and lodging was not replaced at Kelly Camp, visitors desiring this type of experience in upper Warner Valley would be disadvantaged. Drakesbad is a small operation, and its elimination might not be an incentive for the development of new private guest ranches outside the park. Even if another ranch replaced it, many of the present clientele, who are attached sentimentally to Drakesbad, probably would not use it. Possessory interest and personal property tax of the concessioner at Drakesbad would no longer be paid to Plumas County if the ranch was eliminated altogether; this loss would amount to about $1,253 each year.

INDIAN LAKE

JUNIPER LAKE

KINGS CREEK

PACIFIC CREST TRAIL

DREAM LAKE

FORMER RANGER STATION

HOT SPRINGS

BOILING SPRINGS LAKE

GUEST RANCH

RANGER STATION AND CAMPGROUND

EXTENDED BOUNDARY

ALTERNATE PACIFIC CREST TRAIL

TERMINAL GEYSER

LEE RANCH

LITTLE WILLOW LAKE

Flatiron Ridge

Kelly Mou

6000

5600

6400

5200

6919

5135

WILDERNESS

PRIVATE LAND

111|20061D
PSC DEC 80

MILES
0 1/4 1/2 1

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

WARNER VALLEY ALTERNATIVE

LASSEN VOLCANIC NATIONAL PARK

A new campground, ranger station, trail, and utilities at Kelly Camp would result in soils on 3.7 acres being covered by new structures and soils on 3.0 acres being impacted by foot traffic. Restoration of the present campground would result in soils on 3.0 acres no longer being compacted by vehicles and foot traffic, and they would return to a natural condition within 10 years of abandonment. Based on present knowledge of soils at Warner Valley, new development would be suited to the proposed sites, with no constraints from the standpoint of either permeability for a new sewage leach field (0.5 acre) or general erodibility of soil.

Acquiring and adding private land in section 30 (Kelly Camp) to the park would ensure long-term preservation of natural vegetation, in contrast to present grazing of 64 acres of chaparral and timber exploitation on 125 acres of Jeffrey pine forest.

Constructing a new campground, ranger station, utilities, and trail at Kelly Camp would result in removing vegetation and building structures on 3.7 acres; in addition vegetation would be impacted by foot traffic on an additional 3 acres. Restorating the present campground and eliminating use would allow vegetation on 3 acres to return to a natural condition. Removing structures at Kelly Camp would allow 1 acre in the Jeffrey pine habitat type to return to natural conditions.

An estimated net loss of 1.7 acres of vegetation would cause a loss of habitat to 0.2 deer. Loss of potential hunting range in the 190 acres of private land that would be acquired would be about 0.5 deer each year. Sightings were made in Warner Valley in 1974 of the southern bald eagle, an endangered species, but no impact as a result of implementing this alternative is expected.

Treatment of sewage in a new system at Kelly Camp, probably by means of a septic tank and leach field, would result in nutrients of unknown proportion, in up to 1 million gallons of wastewater each year, eventually reaching Hot Springs and Warner creeks. Construction at the Kelly Camp development and along local improved sections of the Warner Valley access road would not exceed 3 acres in the Hot Springs Creek watershed; most of the disturbance would be within 0.25 mile of the stream, resulting in unquantifiable sedimentation and diminished water quality for 1 to 3 years. Most of the disturbed soil would be reestablished in soils of heavily vegetated areas adjacent to construction sites, and it would not enter the stream.

A ranch house and other old structures, including summer cabins at Kelly Camp, probably would be razed to make room for a new ranger station and campground. However, this would not occur until the findings and recommendations of a future parkwide historic resource study were evaluated. Likewise, possible future removal of the existing Warner Valley ranger station, which is poorly sited for management purposes but is listed on the National Register of Historic Places for its architectural merit, could be an indirect consequence of the proposal.

Acquiring 190 acres in section 30 and including Kelly Camp in the park would provide long-term protection for two additional archeological sites, provided one of these sites (Plu-90), which is close to the proposed campground/ranger station, remained undisturbed by development and use. Closing the present Warner Valley campground would lessen impacts of vehicular access and illegal artifact collecting at site Plu-146. Local improvements in the Warner Valley access road would not affect nearby sites Plu-136 and Plu-147.

F. Minor Developed Areas

The limited problems associated with minor developed areas did not call for an extensive study of alternatives. The following alternatives were considered during the formulation of the proposal.

1. Lost Creek - Remove Campground When Manzanita Lake Is Restored To Full Capacity

a. Description

The Lost Creek (Crags) campground was expanded to provide individual sites as a "temporary" measure to provide some relief following the closure of the Manzanita Lake campground in 1974. Under this alternative, the individual sites would be closed and the area restored when the Manzanita Lake campground is restored to full capacity. Under the present proposal, the Manzanita Lake campground will remain in use and the 45 sites at Lost Creek will also remain, raising the camping capacity to a higher level than what existed prior to 1974. However, when adequate camping facilities develop in the vicinity of the park, the Lost Creek campground would be closed.

b. Impacts

This alternative would allow the restoration of approximately 4 acres to a more natural condition in the immediate future.

2. Summit Lake - Construct Sewage Treatment Plant, Remove 10 Campsites to Provide Trailhead Parking

a. Description

A sewage treatment plant was considered as a means of reducing the pollution problems at Summit Lake. The plant would have required extensive construction of sewer lines, a power plant, possibly a residence for the plant operator, and an extensive disposal field. The methods of sewage treatment that have been implemented in the meantime have been determined to be far less disruptive to the environment, although long-term operational costs will probably be higher.

To provide additional trailhead parking, the conversion of part of the campground to a parking area/contact station was considered. Public objection to this proposal led to a reevaluation, and it was determined that an auxiliary parking area could be developed in an already disturbed area and that the contact station could be located at the present trailhead parking area.

b. Impacts

A detailed analysis of the requirements for a sewage treatment plant was not made. It is probable that the facility would have required 3 to 5 acres for the plant and disposal field plus additional land

for access and an employee residence. The present system has reduced, rather than increased, the area affected by development.

The use of an existing disturbed area and access road for additional trailhead parking would not increase the area disturbed by development, although the use would change. If 10 campsites were removed, 750 days of camping opportunities annually at this popular campground would be lost.

3. Juniper Lake - Relocate Campground to the North End of the Lake

a. Description

Under this alternative, the present primitive campground would be replaced with a new campground with full facilities near the ranger station at the north end of the lake.

b. Impacts

Impacts would be essentially the same as those described under the proposal for a new campground on the southeast side of the lake. This alternative would preclude closing the lakeshore road, converting it to a trail, and returning the road and developed area at the north end of the lake to a more natural environment.

4. Butte Lake - Replace Fire Cache Structure on Present Site

a. Description

The present structure serving as a storage building for fire fighting equipment is located close to the lakeshore and south of the campground. A new structure on the same site was considered as an alternative to construction on a new site.

b. Impacts

A new structure on the same site would preclude restoring this area to a more natural condition. The isolated location of the structure invites vandalism and continued maintenance costs.

5. Hat Creek - Retain Hat Creek Road and Trailhead

a. Description

Approximately 2.5 miles of low standard dirt road and a small trailhead parking area would be retained for backcountry access.

b. Impacts

Retaining of the road and trailhead would reduce hiking distances approximately 5 miles (round trip) for those wishing to hike into this area of the park. It would also preclude returning the road corridor and trailhead to a more natural condition. Since the number of hikers using this road and trailhead is relatively small, the expense of maintaining the road for such limited use cannot be justified by park management.

6. Develop a System of Hostels at Principal Wilderness Thresholds

a. Description

Hostels would be built at Warner Valley, Juniper Lake, Butte Lake, and possibly Summit Lake. Hostelers would move from

hostel to hostel by reservation, selecting their trail routes according to their individual interests and endurance. For a nominal fee their baggage could be transported daily from point to point so that, upon arrival at the next hostel, their bedding and personal effects would be waiting. Hostels would be clean and inexpensive--simple wooden bunks, minimum plumbing, and central cooking. The facilities probably would be run by an established hostelry organization.

b. Impacts

Impacts in wilderness threshold areas would be "contained" in the sense that the primitive lodging would be in relatively small areas, perhaps spatially apart from campgrounds. The facilities would tie into existing or upgraded sewage treatment facilities. The hostels would be situated away from outstanding natural features so that this new overnight use would not conflict with existing visitor use and enjoyment of the threshold areas.

This option would not result in additional overnight impact within the wilderness. Hostelers would stay overnight only in the threshold areas. As in the past, backpacking by other visitors would continue but would not exceed the varying capacity of the wilderness to sustain overnight use.

Within the wilderness, the principal impacts of hostelers would be (1) additional use of trails--compaction of soil, walking on fragile cinder fields, disturbing wildlife; (2) increased demand on sanitary facilities, which might be handled with chemical toilets at trail intersections, as in the case of backpacking use, which would be removed and replaced by helicopters; and (3) increased number of people--hostelers as well as backpackers--who would be passing one another during the day. If a hostel was built at Summit Lake, impacts of use in a fragile area, which already are serious, would be compounded. Other impacts of hostels, some of them sociological, are discussed under alternative uses of Drakesbad Guest Ranch in Warner Valley.

IX. Consultation and Coordination With Others

A. Consultation and Coordination in the Development of the Proposal and in the Preparation of the Draft Environmental Statement

General management planning for Lassen Volcanic National Park began late in 1971, when the Denver Service Center and Western Regional Office of the National Park Service began gathering information and analyzing planning needs.

In August 1972, the planning team conducted a field study at the park that included observations at Manzanita Lake, Lassen ski area, Summit Lake, Warner Valley, Juniper Lake, Butte Lake, and areas along the Lassen Park Road. Backcountry trails were studied too.

In October 1972, preplanning public meetings were held in communities around the park. At these meetings employees of other agencies and citizens expressed their concerns about Lassen Volcanic National Park. The meetings were held at Mineral on October 25, at Red Bluff on October 26, at Susanville on October 27, and in Redding on October 28.

In July 1973, the California state historic preservation officer was contacted about potential nominations to the National Register of Historic Places. Additional consultation between the NPS regional director and the California state historic preservation officer took place in April 1976 to discuss the disposition of structures eligible to the National Register.

In October 1973, NPS planners and park staff members participated in a study of the Lassen ski area. Denver Service Center personnel were Allen Hagood (geologist/planner), and Glenn Caldaro (landscape architect), Eric Janes (ecologist), and Charles Clapper (interpretive planner). Other individuals involved in the study included Gerald Smith (president of Lassen Volcanic National Park Company), Roman Gankin (a consultant on ecology from Ecolabs Associates), and Jerrald Johnson of California State University (who conducted an archeological survey of the ski area a few days later).

On October 15, 1973, and on June 28, 1974, NPS personnel consulted with officials of Lassen National Forest regarding aspects of planning at Lassen that would affect programs of the Forest Service.

March 25 through 27, 1974, economic consultations were held with businessmen, chamber of commerce officials, and county planners at Redding, Red Bluff, Mineral, and Chester on the economics of visitor use at Lassen.

On August 23, 1975, the Western Region Advisory Committee met in public session in Redding to hear individuals express their concern about the closing of facilities at Manzanita Lake. As a result of their subsequent recommendations, the regional director reopened part of Manzanita Lake campground on a temporary basis beginning in 1976.

Individuals who were contacted or consulted personally by letter or telephone during the course of the study, most of them between mid-1972 and 1977, are listed below. Most information gained through these consultations was of a technical or economic nature.

Forest Service, Lassen National Forest - James Berlin (forest supervisor); W.L. Bunnel, W.S. Swanson, Fred Alberico, and C.H. Jacobson (district rangers); Paul Reiling (administrative officer); Ken Estes (resources management); and others on the Forest Service staff who are stationed in Susanville.

California Department of Parks and Recreation - Jerry Johnson, Sacramento.

Soil Scientists - R.F. Reeves (district conservationist, Soil Conservation Service, Redding), and Royce Lambert and Paul Nishimatsu (California Polytechnic State University, San Luis Obispo).

Air Quality Specialist - Wilfred L. Freeman, Jr., James Byler, and Wayne T. Williams (Forest Pest Control Staff, Forest Service Region 5, San Francisco).

Water Quality Specialists - Bert Mitchell (Public Health Service, Denver), and William B. Baldwin (senior engineer, Sacramento Watershed, California Region Water Quality Control Board, Sacramento).

Ski Area Specialists - Peter J. Wyckoff (Sequoia National Forest), Gordon R. Linebaugh (regional tramway engineer, Forest Service Region 5, San Francisco), Charles Dwyer (aerial tramway specialist, Forest Service Region 2, Denver), and Bob Miller (recreation planning and administration, Forest Service Region 2, Denver). Contact was also made with Thiokol Company, Logan, Utah, and Colorado Ski Country, USA, Denver. Dana, Larson, Roubal and Associates of Omaha were contacted about shuttle-bus systems.

Biologists and Ecologists - J.A. Helms (University of California, Berkeley), Roman Gankin (Ecolabs Associates, Davis, California), James I. Mallory (Pacific Southwest Forest and Range Experiment Station, Redding), Tom E. Ramsey (California Department of Fish and Game, Red Bluff), and David Smith (California Department of Fish and Game, Redding).

Archeologists and Historians - Russell W. Porter acting for William Penn Mott, Jr. (California state historic preservation officer), Jerrald Johnson (Department of Anthropology, California State University, Sacramento).

Transportation, Roads, and Utilities Representatives - Lester Blue (Pacific Gas and Electric Company, Redding), Harry McMasters (editorial supervisor, Pacific Gas and Electric Company, San Francisco), Richard W. Curry (director of public works, Shasta County, Redding), Larry Coleman (Tehama County Road Department,

Red Bluff), Harry Harding (Transportation System Modelling Branch of the California Department of Transportation, Sacramento), H.W. Griffin (transportation planner, California Department of Transportation, Redding), Gerry Marquardt (Amtrak, Los Angeles).

Visitor Study Specialists - Virginia B. Gillespie (University of Oklahoma, Norman), and Richard L. Shew (Washington State University, Pullman).

Mining Specialists - Robert H. Merrill (Bureau of Mines, Denver), and Clifford Livingston (Grand Junction, Colorado).

Seismometry Specialists - Bruce Bolt (head of the University of California Earthquake Center, Berkeley) and Walter C. Marion (senior engineer, Seismograph Station, University of California, Berkeley).

Geologists and Volcanologists - Dwight R. Crandell and Donal R. Mullineaux (Geological Survey, Denver), Howel Williams (Professor Emeritus, University of California, Berkeley), Gordon A. Macdonald (Department of Geology and Geophysics, University of Hawaii, Honolulu), Donald White and Robert Forneir (Branch of Field Geochemistry and Petrology, Geological Survey, Menlo Park), Jules D. Friedman (thermal sensing specialist, Geological Survey, Denver), and Peter Ward (head of volcanoes research program, Geological Survey, Menlo Park).

Chamber of Commerce Officials - Donald Moroskey (Chester, California), Kenneth Roby (Red Bluff), and Sidney Cowgill (Redding).

County Planners - Charles Furey (Plumas County Planning Department, Quincy, California), Gary Clark (Shasta County Planning Commission, Redding), and Robert McCullough (Tehama County Planning Commission, Red Bluff).

Landowners and Businessmen - George Perkins, John Dennis, and Mr. and Mrs. Charles Kindig, all of Mineral. The Discover Lassen Associates of Mineral submitted a written statement.

Conservation Organizations - The following members made statements at the Redding preplanning public meeting: Stephen H. Matteson (Sierra Club), and Wes Dempsey (National Parks and Conservation Association).

Ski Organizations - The following persons made statements at the Redding preplanning public meeting or submitted written statements: Jay Price (president, Sierra Ski Areas Association, Truckee), Vernita Burnadett (secretary, Lassen Volcanic National Ski Patrol, Chico), and Dave Garretson (executive director, Far West Ski Association, San Francisco).

Snowmobile Organizations - Robert Wagner (Sno-Rides, Inc.).

Lassen Volcanic National Park Company - The following officials participated in master planning: Terrace Cullinan (past president), John Del Favero, (president, U.S. Natural Resources), and John Koeberer (present manager of Lassen ski area and Drakesbad Guest Ranch). Don Hummel (past general manager, U.S. Natural Resources at Yosemite) submitted a written statement.

In August 1974, the document Environmental Assessment of Master Plan Options was distributed to the public in advance of the public meetings. The meetings were held in four communities in the Lassen region. The meetings were at Redding on August 26, at Red Bluff on August 27, at Susanville on August 28, and at Mineral on August 29. Because of the complexity of the planning issues, the period during which additional comments were to be received was extended to 60 days.

Beginning November 1, 1974, the superintendent of Lassen Volcanic National Park reviewed transcripts of tapes recorded at the four public meetings, and he reviewed the contents of letters received by that time. All of this data was tabulated in the form of pro and con expressions about the individual planning options. The tabulation, transcripts, and letters were used to guide formulation of the draft general management plan and the draft environmental statement.

At the Redding meeting, much public opposition was expressed to the closing of facilities at Manzanita Lake; the several options concerned with specific sites for reestablishing facilities received relatively little comment. General opposition to the closing was expressed at the other meetings, but did not predominate to the degree that it did at Redding. At the Red Bluff, Susanville, and Mineral meetings, the Lassen ski area and Drakesbad ranch in Warner Valley were discussed at length. The public that responded generally favored installation of chair lifts at the ski area rather than using surface lifts only, and they favored expansion of beginner skiing facilities. The public that was represented overwhelmingly favored retention of Drakesbad as a guest ranch and operation of this facility as in the past.

Further consultation with the Forest Service and with businesses in the Lassen region in February and March 1975 resulted in comparison of business and campground use in 1973 and 1974. Resource impact data for the several alternatives involving extensions of park boundaries was prepared at Lassen National Forest in July 1974, and this information was included in the draft environmental statement. In addition, in April 1975, park planners met with the staff of Lassen National Forest in Susanville about future planning needs.

On April 11, 1975, park representatives met with Sno-Riders, Incorporated, in Redding, to discuss the status of snowmobile policy at Lassen Volcanic. On October 17, Robert Wagner of Sno-Riders was notified of withdrawal of the proposed regulations that would have permitted the use of snowmobiles on certain park roads. The withdrawal was made because of negative public response to a special regulation proposed in the Federal Register in 1974, which would have allowed snowmobiling. Of 81 respondents to the 1974 Federal Register notice, 79 opposed snowmobiling. More recently, snowmobile users and the Lassen

County Chamber of Commerce have expressed opposition to the ban on snowmobiling in the park.

B. Coordination in the Review of the Draft Environmental Statement

The Draft General Management Plan, its accompanying Draft Environmental Statement, and a Supplement to the plan were made available for public review from June 14 to September 6, 1977. The Supplement, which was based on an Economic and Development Feasibility Study for Visitor Services prepared in January 1977, indicated the selection of Manzanita Meadows (section 13) as the area for redevelopment in the northwestern sector of the park and the decision to maintain the Lassen ski area at its present level of operation.

Formal public hearings were held in the first week of August 1977. In addition, several other consultations were held, usually to brief other government agencies on the contents of the draft plan and statement. These meetings and consultations are listed below:

June 14, 1976 - Brief Redding State Agencies Council on draft plan.

July 28, 1976 - Discuss draft plan with Jim Berlin (forest superivisor), Alan Lamb (deputy regional forester), and Vern Smith (recreational planner), U.S. Forest Service.

August 14, 1976 - Brief Sierra Club on draft plan.

April 26, 1977 - Meeting with Forest Service/Park Service personnel regarding the permanent use of section 13 under a memorandum of understanding for joint USFS/NPS operation. Forest Service agreed to this joint use. In attendance: Howard Chapman, John Adams, and Bill Stephenson of the Park Service; and Jim Berlin (forest supervisor), Doug Leitz (deputy forester), Bob Cermak (associate forester), and Vern Smith (recreational planner) of the Forest Service.

May 1977 - A special study, Economic and Development Feasibility for Visitor Services, which discussed the replacement of the Manzanita Lake facilities and the development at the Lassen ski area, was made available to the public.

July 11, 1977 - Brief Redding Chamber of Commerce and Lassen Park Committee.

July 18, 1977 - Brief Shasta County Board of Supervisors.

July 19, 1977 - Brief Tehama County Board of Supervisors.

July 19, 1977 - Brief Red Bluff Chamber of Commerce.

August 1, 2, 3, 4, 5, and 6, 1977 - Present draft plan in public hearings in Chico, Susanville, Mineral, Redding, Red Bluff, and San Francisco.

Copies of the Draft Environmental Statement were sent to the following for review:

Federal Government
- Advisory Council on Historic Preservation
- Department of Agriculture
  - Forest Service
  - Soil Conservation Service
- Department of the Interior
  - Bureau of Land Management
  - Bureau of Outdoor Recreation (now Heritage Conservation and Recreation Service
  - Fish and Wildlife Service
  - Geological Survey
- Department of Transportation
  - Federal Highway Administration
- Environmental Protection Agency
- Federal Energy Administration
- National Railroad Passenger Corporation (Amtrak)

State Government
- California State Clearinghouse
- California State Historic Preservation Officer

Informational copies were sent to the following:

Local Government
- Butte County Board of Supervisors
- Lassen County Board of Supervisors
- Plumas County Board of Supervisors
- Shasta County Board of Supervisors
- Tehama County Board of Supervisors
- Butte County Planning Commission
- Lassen County Planning Commission
- Plumas County Planning Commission
- Shasta County Planning Commission
- Tehama County Planning Commission

Organizations
- Active Conservation Tactics--
  University of California, Davis
- Alpine Outfitters
- American Land Conservation Council
- Chester-Lake Almanor Chamber of Commerce
- Chico Chamber of Commerce
- Discover Lassen Association
- Environmental Defense Fund
- Far West Ski Association
- Friends of the Earth
- Lassen Volcanic National Ski Patrol
- National Audubon Society
- National Geographic Society

National Parks and Conservation Association
National Parks Foundation
National Wildlife Federation
Pacific Gas and Electric Company
Red Bluff Chamber of Commerce
Redding Chamber of Commerce
Shasta-Cascade Wonderland Association
Shasta County Recreation Trails Council
Sierra Club
Sierra Ski Areas Association
Sno-Riders, Inc.
Susanville Chamber of Commerce
The Wilderness Society
University of California Earthquake Center, Berkeley
Wilderness Study

Individuals

Virginia E. Gillespie, University of Oklahoma, Norman
John Koeberer, Truckee, California
Donald Lee, Chico, California
Richard L. Shew, Washington State University, Pullman
Mr. and Mrs. Roy Sifford, San Francisco, California

Upon request, copies were sent to other individuals and organizations. Approximately 700 copies were distributed.

C. Summary of Comments

A total of 246 letters and 2,523 signatures on petitions were received in response to the review of the draft plan and statement (see section E, "Written Comments and Responses"). In addition, 102 people out of approximately 250 in attendance at the public meetings held August 1 through August 6, 1977, voiced their opinions.

The Draft Environmental Statement was circulated for review of the accuracy of the information it contained and the adequacy of the environmental analysis. Many respondents used the environmental statement review only as a means of registering support or opposition to proposals of the plan. Although not open to a voting process, these opinions and feelings have been of value to decision makers in the preparation of the final plan. A tabulation of these opinions is therefore included below, along with the summary of the August public meetings.

1. Tabulation of Public Comments Regarding the Draft Plan and Draft Environmental Statement

Ski Area	
Expand ski area	118
Do not expand ski area	99
Opposed to ski area but accept status quo	25
Remove ski area	47
Move parking area for ski area out of park	1
Opposed to ski areas in national parks	67
Private capital should develop ski area	2

Manzanita Lake	
Relocate Manzanita Lake facilities to section 13	68
Do not relocate Manzanita Lake facilities to section 13	6
Opposed to section 13 specifically	2
Putting too much money into Manzanita Lake	1
Private capital should relocate Manzanita Lake facilities	2
Use local committee to assist in planning for Manzanita Lake	1
Retain stone buildings at Manzanita Lake	2
Provide more trails in Manzanita Lake area	2
Retain road through Chaos Jumbles	5
Retain existing road into Manzanita Lake campground	12
Reopen Loomis Museum	10
Reopen all Manzanita Lake facilities	225
Reroute road around Chaos Jumbles	2
Support for USGS report	1
Disbelief in USGS report	3
Provide bike paths	1
Move Loomis Museum	1
Remove old Manzanita Lake facilities	2
Rest Manzanita Lake campground periodically	1
Provide ice skating on Reflection Lake	1
No ice skating on Reflection Lake	2
Put water back in Reflection Lake	6
New facilities at Manzanita Lake should be "showcases"	6
Recycle all waste	6
Provide solar heating and cooling for new facilities	6
Need another geological survey	5
Use explosives on Chaos Crags	2
Leave entrance station at present location	2
Snowmobiling	
Do not allow snowmobiles in the park	900
Allow snowmobiles in the park	1,425
Do not allow any noisy vehicles in the park	1
Warner Valley - Drakesbad	
Acquire 190 acres at Kelly Camp	6
Do not acquire 190 acres at Kelly Camp	1
Leave Drakesbad as it is now	2
Remove swimming pool at Drakesbad	2
Retain Warner Valley campground	1
Upgrade road into Drakesbad	1
Juniper Lake	
In favor of Juniper Lake proposal	4
Keep road into Juniper Lake as it is	2
Upgrade road into Juniper Lake	1
Leave road into Horseshoe Lake trailhead	1
Do not move campground at Juniper Lake	1
Inholdings	
Acquire all inholdings	14
Do not acquire inholdings	2

Wilderness Area	
In favor of more wilderness area	24
Expand park boundary	1
Fisheries Management	
Sportfishing should be secondary recreation activity	1
Native trout habitats should be restored and maintained	1
Fishing in campground lakes for children only	1
Continue stocking fish in park	2
Manage frontcountry and backcountry lakes differently	1
Miscellaneous	
Begin plans for shuttle-bus system - mass transportation	8
Close Badger Flat Road	1
Provide overnight concession facilities on south side of park	1
Equally fund north and south sides of park	3
No more development in park	8
No concession development in park	14
Develop Butt Mountain-Carter Bowl	1
Develop Viola Road as main north/south road outside park	6
Support tent camping over recreational vehicle camping	1
Provide overnight parking areas for winter travel	1

2. Summary of Public Hearings

The following is a summary of public hearings held in northern California during August 1977. It is not intended to be a reiteration of the transcripts of the meetings, but is intended to highlight the main feelings and issues that were discussed by the various speakers.

Much of the discussion centered around a few issues: the ski area, snowmobiling, Manzanita Lake, the concept of a national park, and additions of land. These issues were repeated throughout the meetings by a number of different speakers.

Perhaps the most frequently mentioned item was the ski area. Almost all facets of its existence and operation were discussed. Many speakers concluded that the National Park Service proposal did not solve the problems which exist now--it only continued a bad situation. Opinions ranged from total removal to maximum expansion, with a few individuals favoring the status quo. Persons representing the Friends of the Lassen Ski Area made presentations at each meeting in favor of upgrading the existing ski area. Their position is summarized by the following quote:

> The Friends of the Lassen Ski Area wish to introduce into the record an alternate comprehensive plan that analyzes the goals previously stated by the National Park Service planner. It combines the need of the area and the best of each alternative to give a strong, beneficial master plan of the Lassen ski area that will be a positive asset to Lassen Volcanic National Park while enhancing the alpine skiers' appreciation of the value of the area, fulfill regional needs, comply with the National Park Service mandate to protect the resources for the enjoyment of future generations, and provide an environment upgrade that is otherwise unfeasible due to economics.

Other persons described the advantages of the site for the ski area. Its proximity to such northern California cities as Red Bluff, Redding, and Chico was cited, along with the protected (from weather) slopes, which make for good ski conditions. Other areas, such as Tahoe and Shasta, were described as being too far away, and in the case of Shasta, often unusable due to poor weather conditions. (The Shasta ski area has since been closed.)

The existing conditions were commented on several times. The inadequacy of the facilities and long lift lines were mentioned and are illustrated in the following quote:

> The last few seasons I've found that a lot more people are coming up there and that facilities just weren't adequate. Most of the weekends when there is good weather, the skiing was really no longer enjoyable. The lift lines averaged 20 to 30 minutes for a run that was maybe 2-3 minutes long. And only on a really stormy weekend when people stayed at home was it good to ski again.

The impact (on the natural environment) of improving the ski area was described as minimal. The ski area represents a small area within the park and expansion of it would not affect the wilderness boundaries or the presently disturbed archeological sites, or force the cutting of a large number of trees. These points are illustrated by the following:

> In 1973, 5% or 1/20 of the total visitors of the park that year were downhill skiers using the Lassen ski area. They were uisng just 1/1400 of the total area of the park. That is what is encompassed by the area. This seems to represent a rather small area from which great recreational enjoyment is occurring with minimal destruction to the area. The ski area is not in, and if enhanced would still not be within, the wilderness area, which is 78,982 acres or approximately 75% of Lassen Park--an area which will remain without roads or further development forever.
>
> As for the archeological sites, they were being destroyed--arrowheads playfully being broken--long before the construction of the ski area in the first place, and the Friends of Lassen Ski Area proposal would protect these sites--or I should say what is left of them.
>
> On the back side, as one looks at the picture, there appears to be a lot of trees, but the trees are really widely separated and it provides for good sheltered skiing in storms--there would be no need to cut any at all because they are so widely spaced you can see as far as you want. It opens up a tremendous amount of terrain off the back side of the ridge. It would be great expert skiing . . . get the experts away from the beginning and intermediate area and kind of relieve some of the congestion problems that we have.

Perhaps the opinions of most people supporting the expansion of the ski area can be summarized by the following:

> I see no point in spending $14 million in three months or four months for people staying in lodging when there is plenty of lodging available in Red Bluff, Redding, Chico, Chester, Susanville, anywhere . . . and build a $1½ million gas station. That's a hell of a lot of money. . . . We are talking about $1½ million for a chair lift that's going to serve a tremendous number of local people. Yes, it's a national park but it also serves local people.

> I think its kind of disappointing to me that we are meeting three years after 1974, when the Park Service said that every consideration would be given to the input of the public hearings that were held at that time. I was of the opinion and discussed the input with Lew Albert, who was in the Park Service at that time, and I was informed that the input at that time was almost overwhelming in favor of bringing the Lassen ski area up from a substandard operation to what you could call a legitmate ski area. It's disappointing that we have to meet three years later to say the same things. I think that current proposal of the Park Service completely ignores the input which was received in the 1974 hearings.

Not all persons who spoke at the hearings were in favor of expanding or even retaining the ski area. Many of the opponents of the ski area argued that it is not compatible with a national park, and that Lassen is a relatively small park and land should not be devoted to a small single interest group. Some persons called for the development of a ski area outside the park. The following sums up many of these people's opinions:

> Lassen, because of its size, it's a small park, I think is very susceptible to development in the way of bad impact upon the environment and on the esthetic or cultural use in the way of different ways that people use it and on the environment. Of course, I'm referring to the way wildlife and plant life and rocks and soil and everything else uses it. I think it would be a very grim mistake to allow expansion. In fact, I think a mistake to allow the ski area to be put in. I spoke before of my concept . . . what is a national park. It's there because of what it is and I don't think the ski area improved it at all. Furthermore, because the ski area conflicts with the preservation of the natural beauty, I would propose at this time that it would be considered at least an alternative maybe just to enlighten some people as to what's the furtherest extent of public opinion, possibly, that the ski area be removed. I would like to point that there are alternatives. There is Chester and of course there are several proposals, some of which I don't go along with, on National Forest lands. But there are alternatives.

Some other specific comments regarding the ski area were that the sewage treatment proposals lacked detail and that adequate environmental factors had not been addressed. Some expressed the opinion that wastes should be stored and then trucked out of the park for treatment. Others wanted maximum recycling and conservation measures. The need for commercial power to eliminate the noisy and air-polluting generators, motors, etc., and to provide adequate power for sewage treatment, was expressed by some individuals. Some people expressed opinions that the ski area parking area should be completely removed and a shuttle system provided from remote staging areas. Some were against removal of the parking area islands to provide more parking--additional parking should be provided at remote staging areas. And some were for maximum expansion of parking within the limits of the present development (including the use of disturbed areas near the entrance station and generator building).

Finally, a number of people commented that the ski area should be retained at its present size and location. Moving the ski facilities would cause another area outside the park to be heavily impacted, and the character of the small, family-oriented facility would be changed completely:

> I can't see taking it out, personally, because for one thing that would allow other areas outside the park to be developed just like the ski area is now. So, it can be maintained as it is now, but expansion, I think, is against the grain of what the park really is. It's a wilderness experience for most people and skiing is a good experience--downhill skiing and cross-country. I think to leave it a small family area with the character that it has . . . is the best way that the park can go. It can satisfy the most people and you can go and use the ski area and if it expands prices are going to go up. I don't see how it can be otherwise, whether or not it stays, and it'll change character completely. Perhaps people who have had such a good experience there in the past won't get that again. Everyone will be disappointed.

Snowmobile use in the park also received a large amount of comment. Although a decision was made in 1975 to no longer allow snowmobile use in the park and the issue itself was not addressed in the draft plan, many people used the hearings to express their support of or opposition to reopening the park to snowmobile use.

Those people in favor of reopening the park to snowmobiling expressed the opinion that the sport was not damaging to the environment. For example:

> I have found in 10 years of snowmobiling, I have come across many animals in the field--deer, coyotes, badgers, porcupines, small squirrels, a variety of animals. I have never, ever observed any fear on the part of any animal and I've come in contact with many in the forest. I've never seen any situation where the snowmobile created a problem. Animals are not instinctly afraid of noise. They are not instinctly afraid of

automobiles. Anybody that drives the roads around here very much knows it. More deer are killed on the highway by automobiles by far than the hunters kill. They run right down in the middle of those roadways and get slaughtered by cars.

Regarding the issue of noise and snowmobile use, snowmobile proponents said the following:

> At the present time, any snowmobile that you want to choose, fire it up, take it off 50 feet, crank it up to full throttle and it will produce a maximum and no more than 78 decibels . . . wide open. I think that is quite remarkable. The blender that you use in your kitchen to prepare a breakfast omelet produces over 80 decibels of sound. Your vacuum cleaner and your electric dishwasher produce more sound than snowmobiles at full throttle. You have got to remember that snowmobiles are transitory . . . it goes on its way. That's important. It's not a devastating, roaring, spoiling, eye crossing sound. It's a soft sound. The length of a football field, you can't even hear the machine. It's important. It's not a terrible sound. 78 decibels.
>
> We feel that it is compatible, because there is no real problem on sound. I dôn't think the sound of the snowmobiles today, the modern snowmobiles, is any more disturbing than between a couple of people on cross-country skis shouting to each other on the trail. That is a foreign sound in the forest, is it not? So we would like people to reconsider maybe in their thinking, try to think of what I've said. Try to think of snowmobiling in a little different light than the killer it is currently represented as being. Maybe give us some consideration.

Finally, a person supporting snowmobile use summed it up with the following:

> All we are asking is to be able to go on the unplowed roads. We are not asking to just terrorize the country. We would just like to be able to go in there on Sunday afternoon and ride the area. This place gets snow, had snow, when most of our other areas had no snow. It would have had heavy use if we had been allowed in there. In normal years, it probably wouldn't have been used that much simply because there are so many areas, but I think if they are willing to spend all these millions of dollars--2 or 3 millions of dollars--to develop the ski area and everything else, we're not asking you to spend money, we are just asking you to allow us to go in there.

As might be expected, other persons presented the opposite side of the above arguments. Both noise and wildlife harrassment were stated as reasons why snowmobiles should not be allowed in the park:

> When I am in Lassen Park walking through the snow I can hear a snowmobile more than five miles away and it's closer and it gets closer and I don't think that snowmobile driver realizes as

he roars past me, how close he gets to having snow balls thrown at him. Because, it's just total intrusion and ruination of why I was there.

Studies in Idaho show that deer will break into a panic run while s snowmobile is still three-quarters of a mile away. That's at 75 DBA. With increased energy consumption due to the running, the deer needs more food, which in turn, is a two-fold problem because as the deer runs more and eats more, he uses more food; therefore, there is less amount of total winter food available. Studies show that a deer will require 25,000 calories per week . . . when harrassed by a snowmobile, it uses 32,000 calories.

It was also stated, by both proponents and opponents of snowmobile use, that removal or modification of mufflers is the major cause of excessive noise levels which many people, including snowmobilers, find objectionable.

The proposal to relocate the Manzanita Lake developments and facilities to Manzanita Meadows was addressed by a number of people. Many felt that the actual threat to human life at Manzanita Lake was low and that a rockfall-avalanche of Chaos Jumbles magnitude was unlikely. The following quote portrays the sentiments of those individauls who doubt the extent to hazard to human life in the area:

As far as the Chaos Crags are concerned, we hiked up the Chaos Crags . . . . We've gone up that thing several times. Our kids swim in that body of water at the foot of the Crags. So far, we've all survived it.

One person stated that an "air-cushioned" avalanche would be unlikely because of the lack of available material and its physical composition:

The first question that comes up is what about the volume? How far could it be carried? Finding the volume of the material on the Chaos Crags is a simple matter of solid geometry. Somebody surely has a pocket calculator and can figure it out. It's not very much. As for how it could occur . . . I would suggest, I didn't bring the references but I can get it for anyone, Dr. Shreve's paper on the mechanics of air cushion avalanches. One of the interesting points of that--that I am going to have to say something about--is if the Chaos Crags could avalanche, the rocks would fracture, it's very coarse rock. This would leak air, it cannot support an air cushion, it could not be supported on an air cushion for more than a few seconds. In order to make a seal so it could travel on air cushion, it would have to have some sort of finer material. The only possible finer material in the area of the Chaos Crags would be snow. If an air cushion avalanche could occur on the Chaos Crags, it would have to occur in mid-winter, when no one is using the Manzanita Lake area.

The use of Manzanita Meadows for future concession visitor services brought a number of comments. Speakers pointed out that the area would be hot and dry and relatively treeless for a number of years. The fire danger is extreme during the late summer months, and the proximity of the development would encourage use of the hazard area. "If there really is a hazard, how can we keep the road and campground open and expose people to even a 'limited' risk." Some cabins should be relocated to the campground area to provide interim lodging facilities until the new facilities could be developed. In addition, the Manzanita Meadows area is an unattractive area which would never be able to support an economically viable concessions development--other, more attractive locations should be studied to the same level of detail that was given the Manzanita Meadows location. Alternate road alignments should also be studied. The Manzanita Meadows proposal would not provide for the needs of the elderly, traditional users of the former facilities. Was there really a need for facilities at the northwest entrance--further consideration should be given to concentrating all facilities at the southwest entrance, where lodging facilities could also serve the ski area in the winter. Winter operation of the lodging facilities at Manzanita Meadows should be given more consideration--they could serve as a base for cross-country skiing in the park and snowmobiling outside the park on Forest Service lands. Finally, a number of speakers at each meeting questioned why the National Park Service was willing to spend $14-16 million to subsidize a concession operation at Manzanita Meadows but unwilling to spend $2-3 million to improve ski facilities when both would serve approximately the same number of visitors.

The Loomis Museum received some attention, as indicated by the following:

> It is a crime to have a building of that caliber which has national significance, it's a national historical landmark, just sitting there without any use. If the road through the park past Manzanita Lake, past Reflection Lake, and out through the Jumbles is usable by people during the day and during the night . . . any time of the day they want to come through, why cannot the museum at Manzanita Lake be maintained and used during the time, and in the same manner as the roads?

During August 1977, Reflection Lake was several feet below its normal level. This situation caused several people to comment on the condition of the lake and request that water be rediverted into the lake:

> I think if the National Park Service will go back in the records they will find that the Reflection Lake is a natural lake . . . maintained itself for years and years and years from the flow from Manzanita Creek which had to be diverted because of the putting in of the present loop highway through Manzanita Lake area. Prior to the building of the highway, Reflection Lake was well known for the many, many catfish that could be taken out and . . . if the Park Service would just go back and talk with some of these people who were in the Reflection Lake area prior to the building of the dam and after the dam was built,

> I think they would find that that lake was naturally supplied with waters from Manzanita Creek. It's a crime for that lake to be let go the way it is and those of you who have seen it in the last few weeks should realize that that lake is a natural lake, it's not an artificial lake, and one that should be maintained in its status so that people can have that beautiful reflection across it from the north side of the lake itself.

Wilderness and the desirability of expanding the existing wilderness boundaries was brought up at a number of hearings. Most speakers were concerned that no consideration had been given to modifying the boundaries:

> Last but not least . . . the management plan ignores possible additions to the Lassen wilderness . . . now about 79,000 acres. With the Carter Administration expanding older administration proposals, I would recommend a new look at the designated wilderness within the park. At least 25,000 additional acres of wildland in Lassen Park could and should be added to the wilderness. I believe that such areas as Juniper Lake and Butte Lake ought to be included in the wilderness and that no development should be allowed to take place, including such things as easy access by paved roads or parking areas. I feel that the only access should be by foot . . . to these lakes to minimize the impact. As time goes on, more people will use the backcountry of Lassen National Park and I think it behooves us to plan for this use and protect the ecosystems and wildlife.

The concept of upgrading the existing road from Mineral to Viola to state highway standards and then designating the new road as California 89 was brought up several times. The existing road through the park would be retained as a park road.

> But I would like to support the idea of there being a serious consideration of rerouting State Route 89. Because for many of us who live to the north and east, it is a direct way coming down south and yet it's closed for us during the winter. I do think it will be an assistance to the park because it would relieve a lot of the summer pressure. I look at the license plates that are coming down 89 and they are predominately from Washington and Oregon. I think they are people who have become cross-eyed on I-5 and have taken this for a moment of relief.

Additions to the park boundary were of concern to several people. The most often cited area for addition was the Huckleberry Lake roadless area adjacent to the southwest corner of the park in Lassen National Forest. Anywhere from 5,000 to 9,000 acres of land currently contiguous with the park boundary were mentioned for addition.

Warner Valley and Drakesbad received a number of comments. Several people questioned the need to relocate the present campground and ranger station to Kelly Camp. The Kelly Camp area is being logged

and could be quite unattractive by the time legislation was passed and the area could be purchased. Some others commented that the relocation of the Pacific Crest Trail would provide a less desirable hiking route and limit access to natural features in the Drakesbad area. The proposal did not provide for day use or trailhead parking in the Drakesbad area. Others said that relocation of the ranger station to Kelly Camp would require additional travel to provide services to the Drakesbad area. The present campground should remain, with Kelly Camp developed only when there was a need for additional campsites.

Although some people called for the removal of facilities in these areas, others called for their retention or improvement:

> I think the plan for Warner Valley is very good. I wish a little additional land could be acquired there--private land. I certainly hope the Terminal Geyser area can be protected. I think maintaining the simple lodge facilities at Drakesbad is a wise move for people who want to have a park experience, staying overnight in the park, but they aren't equipped to camp.
>
> Another thing that I think should be considered is the upgrading of roads that go into Juniper Lake and Drakesbad. Right now, they are pretty low standard and there is an incredible amount of dust that goes up into the air, getting soil and deterioration of air quality. I think that should be considered a little more in the draft environmental statement, or in the final statement.

In terms of the proposal for Summit Lake, there was objection to the removal of 10 campsites to provide additional trailhead parking.

Bluff Creek was mentioned as being potentially developable:

> The Bluff Creek area, which is south of the park just slightly south of the ski area, is a really high potential area. It's got a lot of really scenic value to it. It was considered slightly in the draft environmental statement. I imagine there was some problems with Forest Service lands management planning. Well, it is my understanding that the multiple use plans that are in effect on national forests are still valid, and they are valid until they are replaced by the land management plans which will be coming out soon.
>
> The Bluff Creek area is also a lot closer to park headquarters, so I think it is an alternative that should be considered a little more seriously, possibly even half and half, you know, seven million dollars on each side of the park. It's also close to the ski area and possibly could provide a parking lot, shuttle buses as some people suggested.

In regard to Hot Springs Creek:

> Another concern I have in that area is the natural environment of the meadow along Hot Springs Creek near the park boundary. It is really deteriorating and the draft environmental statement said those kinds of situations would be considered in their resource management plan. The problem I have with that is the fact that this is an immediate problem. Because beavers are altering the stream flow by damming up the creek and what's happening is in periods of high flows the creek is diverted and erodes out the meadow. There is also a problem of cattle drifting in from Warner Valley into this area.

Finally, the concept of a national park was mentioned throughout the hearings. People were concerned that the same kind of developments found in other large national parks might come to Lassen:

> The national park is simply there because of its natural beauty. It's there to preserve the natural beauty for the people to enjoy and for the generations to continue to enjoy over the years. To preserve for people to enjoy but not manipulate. And, I'm referring to manipulation for profit or for user groups or for whatever that at Yosemite Valley, large parts of Yellowstone, certain national park units in the southwest also, which I think personally is a very sad thing that has happened.
>
> I'd like to call your attention to the fact that national parks represent very unique areas. You can't just put a national park anywhere you want to. In order for an area to become a national park, it has to be proven to be something unique. No other places like it anywhere in the country. That means that out of about 150 acres only one acre in our nation has been made into a national park. One out of 150. We have precious areas left and my plea is that . . . let's leave alone what we have left alone so far.

D. Consideration of Comments and Formulation of the Final Plan

February 27, 1978 - Meeting in Susanville between the park superintendent and chief ranger and the forest supervisor, Bill Jones, to discuss extension of memorandum of understanding. Revision and extension to remain in effect through the planning stages for development of section 13. Forest Service in complete agreement.

March 3, 4, and 5, 1978 - Park planner, Doug Cornell, met with the concessioner, representatives of the Friends of Lassen Ski Area and the park staff to study the ski area, discuss the various expansion proposals and operational problems, and observe all the operations, including ski patrol, first-aid, rental and sales, maintenance, lift operation, parking, and snow grooming/removal. A report on ski area operations, problems, and deficiencies was presented to the regional director of the National Park Service on March 28, 1978.

April 25-26, 1978 - Following analysis of public comment and discussions with the director of the National Park Service, the regional director convened a meeting of the planning team in San Francisco. At this meeting the various alternatives and propsals were discussed and the regional director selected the components to be included in the final proposal.

August 7, 1978 - The director of the National Park Service visited development sites in the park and held discussions with the park staff, concessioner, and planning team representative. As a result of the on-site visit and discussions, the director made revisions to the proposals included in the draft plan.

December 1978 - The director of the National Park Service requested that the Secretary's Advisory Board review the proposals, that further information on the feasibility and costs of reopening the Manzanita Lake facilities be obtained, and that further discussions be held with conservation organizations to determine their reaction to the current proposals.

July 1979 - The superintendent met with members of the Sierra Club, Wilderness Society, and North State Wilderness Committee to discuss the proposals. Following this meeting, 76 letters were received opposing the improvements to the ski area facilities. Three letters favored status quo, 9 favored removal, and 39 were opposed to ski areas in national parks.

A study team from the Denver Service Center conducted an extensive survey of the facilities at Manzanita Lake and prepared a report on the problems and costs of reopening these facilities. A team from the Harpers Ferry Center prepared an interim interpretive plan that addressed the feasibility of reopening the Loomis Museum. Alternatives for a combination of new and reopened facilities were prepared. These were transmitted to the director and regional director.

August 24, 1979 - A subcommittee of the Secretary's Advisory Board visited the park to view the problem areas and discuss the proposals and alternatives. Their report was distributed to the full board in September.

October 4, 1979 - The Secretary's Advisory Board accepted the subcommittee report recommending reopening of the Manzanita Lake facilities and a phase-out of the downhill ski operations.

March 1980 - The director of the National Park Service requested an impartial professional opinion on the issues at Lassen.

June 9, 1980 - A special committee of National Park Service professionals spent four days in the park reviewing the geologic hazards and the various alternatives considered since the closure of facilities in 1974. The committee report emphasized that Lassen is a potentially hazardous park; that overnight facilities should not be provided in known hazardous areas; that day-use in hazardous areas was an acceptable risk; and that traditional winter use activities should continue until adequate replacement facilities were developed outside the park.

July 23, 1980 - The regional director presented his recommendations to the new director. Subsequent discussions were held in August.

September 19, 1980 - At a work session in the Denver Service Center the proposals presented in this document were outlined to the planning team by the regional director.

August 1977 to October 1980 - Since the public meetings in August 1977, the superintendent and his staff have conducted numerous briefings for agencies, organizations, the press, and individuals on an almost weekly basis. These included 38 presentations to county officials, chambers of commerce, service clubs, and other interest groups, and several TV and radio presentations on the current status of the planning effort. The Forest Service has been advised with each change in direction. The proposals in this document were discussed with a representative of the Forest Service on October 8, 1980, and minor revisions have been incorporated as a result of that meeting.

E. Written Comments and Responses

A total of 246 letters were received during the June-September 1977 review of the Draft Environmental Statement. Comments were received from 8 federal agencies, 1 state agency, 7 other government agencies, 20 organizations, 4 businesses, and 346 individuals. Some agencies, groups, or individuals submitted more than one letter, and some letters were signed by more than one individual. All letters were analyzed, and 66 representative letters are printed as part of this final statement.

All agency and organization letters received are printed in this comment and response section, along with letters from individuals which raised questions requiring a written response. Review comments indicating errors in information or providing additional data have been checked for validity and changes incorporated where appropriate in the text.

The comments and responses for each letter are numbered in consecutive order, and responses immediately follow each letter. Since similar questions were posed by several reviewers, the first time a question is posed it is fully answered. From then on, responses to similar questions are referred back to the first answer. To facilitate this referral system, the letters are organized by category and placed in alphabetical order within each category as follows:

Federal Agencies
State Agencies
Organizations and Local Government Agencies
Individuals

Federal Agencies

Comments were received from the following federal agencies:

- Advisory Council on Historic Preservation
- Department of Agriculture
  - Forest Service
  - Soil Conservation Service
- Department of the Interior
  - Bureau of Land Management
  - Bureau of Outdoor Recreation
  - Fish and Wildlife Service
  - Geological Survey
- Department of Transportation
- Environmental Protection Agency

Responses follow those letters with comments needing specific responses.

Advisory Council On Historic Preservation

1522 K Street NW.
Washington D.C.
20005

February 2, 1979

Mr. Howard H. Chapman
Regional Director, Western Region
National Park Service
450 Golden Gate Avenue, Box 36063
San Francisco, California 94102

Dear Mr. Chapman:

The Memorandum of Agreement for the General Management Plan for Lassen Volcanic National Park, California, has been approved by the Chairman of the Council. This document constitutes the comments of the Council as required by Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. Sec. 470f, as amended, 90 Stat. 1320) and completes the "Procedures for the Protection of Historic and Cultural Properties" (36 CFR Part 800). A copy of the Agreement is enclosed.

A copy of this Memorandum of Agreement should be included in any environmental assessment or statement prepared for this undertaking in compliance with the National Environmental Policy Act and should be retained in your records as evidence of compliance with Section 106 of the National Historic Preservation Act of 1966. The Council appreciates your cooperation in reaching a satisfactory solution to the issues raised in this matter.

Sincerely,

Jordan E. Tannenbaum

Jordan E. Tannenbaum
Chief, Eastern Office of
Review and Compliance

Enclosure

SEE APPENDIX D FOR MEMORANDUM OF AGREEMENT

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
630 Sansome Street
San Francisco, California 94111

1530(2300)
September 7, 1977

Mr. W. Stephenson, Superintendent
Lassen Volcanic National Park
Mineral, California 96063

Dear Mr. Stephenson:

We appreciate the opportunity to comment on the draft General Management Plan and the plan's Draft Environmental Statement, including the Supplement to the General Management Plan for Lassen Volcanic National Park. Our comments which follow include those of the Supervisor of the Lassen National Forest.

1. The plan recognizes that the management of the Caribou Wilderness will continue to be a subject of concern. We would like to see the final plan continue to emphasize close coordination in wilderness administration and the permit system. This should also include, specifically, administration of the Pacific Crest Trail.

2. Page 11 of the plan discusses the "Natural Areas" land classification. This has been the subject of some of our comments and discussions in the past. It is a classification involving substantial acreage that appears to preclude any level of recreational development even where lands may be highly usable. We believe that these lands should be reclassified for such development as campgrounds if additional use is within the capacity of the park and safe for public use. The classification speaks of scenic transition areas on the one hand, and private inholdings which cannot be managed for park purposes on the other. This is confusing, but our point is that we feel that additional land could be made available, when necessary for development, by reclassification. Classification of developable land within the park as Natural Area could have a distinct impact on National Forest lands in the future. 1

3. The amount of use the trans-park road is capable of sustaining at its present standard, without deterioration of the park experience, is a key limiting factor and could very well occur prior to other resource deterioration. Its capacity (without changing the standard,

which would cause an unacceptable impact) should be investigated further. The plan does not address this point with respect to the trans-park road, although we are aware that it has been considered in the Wilderness Management plan. We feel that such a capacity should be estimated and that this is a basis for future development on adjacent National Forest lands. 2

4. The plan provides for interpretation centers at both the north and south entrances. After reading the plan, it is clear that each would be directed toward a different interpretative premise, but we wonder to what degree a single center in the heart of the park was considered. We realize this would be less desirable for joint Forest Service-National Park Service interpretation at the north entrance, but it would be far more economical. Forest Service interpretive efforts are generally oriented toward sites in field rather than toward indoor situations. 3

5. We suggest that the plan set up criteria for determination of when the park and its resources have reached maximum capacity, followed by the alternatives for management that are then available. 4

6. Concerning the ski area, the supplement to the plan indicates sewage treatment will be accomplished on site (Page 7). However, the cost of the sewage treatment plant is the same for both the present level of use and the ski area expansion. We understand that Lassen Ski Area will not be expanded to the extent that National Forest land is needed for sewage disposal or parking. 5

7. The acquisition of Section 36 in the Warner Valley, including Terminal Geyser, may have some effect on future geothermal development in that area after this section is purchased for park purposes. The impacts of possible geothermal development outside the National Park may be noticeable from this section. 6

8. With respect to the ski area, its effect on the potential development of Carter Bowl could be important. Carter Bowl is treated within our Almanor Unit Plan for which the Draft Environmental Statement is now published. Carter Bowl is also within an inventoried roadless area which is not recommended as a wilderness study area in the plan. If Carter Bowl were to be developed, we believe it would have average potential for ski development by the private sector, depending upon market and capital investment opportunities at that time. The extent to which Lassen Ski area expands directly affects skiing opportunities in this market area. 7

9. The relocation plan for the Manzanita Lake complex shows the new VIS Center inside the fee areas. We believe National Forest information should be available to the public without having to pay a fee to enter the complex. 8

10. The sewage treatment disposal at Summit Lake is not definitive as stated on page 182. An adequate facility would have a definite effect on this alpine area. We believe treatment and disposal alternatives should be addressed in the draft environmental statement. 9

Robert W Cermak

for DOUGLAS R. LEISZ
Regional Forester

RESPONSE TO COMMENTS BY
DEPARTMENT OF AGRICULTURE, FOREST SERVICE

1. The general management plan does not propose to change the present land classification system for the park and thus will generate no new impacts upon adjacent Forest Service land. It is realized that if demand for outdoor recreation facilities such as campgrounds increases that it will place additional demands upon both Forest Service and National Park Service lands within the region. If this occurs, cooperative planning between the Forest Service and National Park Service will be necessary to provide both public service and resource protection under each agency's mandate. Specifically, cooperative planning for the northwest area of the park and adjacent forest lands is addressed in the plan.

2. The capacity of the transpark road is approximately 400 cars per hour in both directions and improvements and upgrading of park facilities will result in only small increases in the number of visitors that could be served. Visitation to Lassen is expected to increase slowly over the next few years, but is not expected to outstrip facilities through the life of this plan. However, as visitor use increases, it will be necessary to cooperatively plan with the Forest Service, both to control use and to plan for future developments on adjacent national forest lands. A discussion of the park's capacity has been added to Chapter I.D.

3. A central interpretation facility was considered in the preparation of the plan options; however, this concept was rejected because of heavy snow load at that elevation and the need for a

suitable orientation to the park for park visitors before they begin their Lassen experience. Subsequent discussion with Lassen National Forest personnel has indicated that they wish to participate in orientation services at both major entrances to the park as well as in interpretive efforts throughout the region. These interests are discussed in the proposal.

4. The plan does not propose a capacity for the park and existing and proposed levels of development and use in the plan are not considered final. However, the decision to develop or expand facilities in any area of the park beyond the levels established in the plan will be based upon an analysis of the potential impacts on the resources and the visitor experience. The capacities for various facilities within the park are included in Chapter I.

5. Subsequent studies have refined the sewage treatment proposals. Alternatives were explored in consultation with the Forest Service. Agreement on disposal at the Bluff Falls area was reached when there appeared to be no feasible alternatives for disposal within the park boundaries. The National Park Service appreciates the cooperative attitude of the Lassen National Forest staff in resolving this problem.

6. Geothermal development on lands adjacent to the park may create a visual impact on park resources and could disturb thermal features within the park. If and when such development occurs, the National Park Service will attempt to coordinate with the developers to lessen any impacts.

7. The lack of expansion at the Lassen ski area will bring more pressure to develop additional ski facilities in Northern California and this may provide an additional incentive to develop Carter Bowl. Should Carter Bowl develop into a major ski area, the National Park Service would discontinue operation of the Lassen ski area when the concession contract expires.

8. As shown on the current plan for the development in Manzanita Meadows, the interpretive center will be located outside the fee area. The new entrance station location will allow visitors access to the interpretive center without having to pay fees. This is not the case at the south entrance, where fees will be collected before visitors arrive at the proposed interpretive center.

9. Sewage treatment at Summit Lake will consist of the recently improved leach field in the north unit and vault toilets in the south unit. Sewage from the south unit will be hauled outside the park for disposal. These systems and water quality will be monitored to ensure that the problems have been corrected. Because of the critical nature of the problems, these improvements were completed prior to completion of this FES. A separate Environmental Assessment was prepared for this project.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

2828 Chiles Road, Davis, CA 95616

August 9, 1977

W. Stephenson
Superintendent
Lassen Volcanic National Park
Mineral, California 96063

Dear Mr. Stephenson:

We acknowledge receipt of the draft environmental statement for the General Management Plan, Lassen Volcanic National Park in Lassen, Shasta, Plumas, and Tehama Counties, California, that was addressed to the Soil Conservation Service on June 29, 1977, for review and comment.

We have reviewed the above draft environmental statement and find that there are no controversial items in the statement within the realm of the Soil Conservation Service's expertise and responsibilities. We find no conflict with any Soil Conservation Service on-going or planned programs or projects.

We appreciate the opportunity to review and comment on this proposed project.

Sincerely,

Francis C. H. Lum

FRANCIS C. H. LUM
State Conservationist

cc: R. M. Davis, Administrator, USDA, SCS, P.O. Box 2890, Washington, D. C. 20013
Fowden G. Maxwell, Coordinator of Environmental Quality Activities, Office of the Secretary, USDA, Washington, D. C. 20013
Council on Environmental Quality, 722 Jackson Place, N. W., Washington, D. C. 20006 - Attn: General Counsel (5 copies)

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

STATE OFFICE
Federal Office Building
2800 Cottage Way
Sacramento, California 95825

IN REPLY REFER TO
1792 (INT)
(C-911.4.2)

Memorandum

To: Superintendent, Lassen Volcanic Park, Mineral, California

From: State Director, Bureau of Land Management, Sacramento, California

Subject: Review of Draft Environmental Statement and General Management Plan, Lassen Volcanic National Park, California
DES 77-19

We have reviewed the subject management plan and environmental statement and have the following comments to offer.

While the proposed action relative to the Lassen Ski Area and the Manzanita Lake area was changed as reflected in the supplement to the management plan, no corresponding detailed environmental assessment was made of the changes. One has to read the original proposed action and environmental impact chapters in the DES, then read the revised proposal, and then make guesses as to the differences in anticipated impacts between the original and revised proposals. This is not only cumbersome but also fails to meet the basic criteria for an adequate ES, namely, including an analysis of the actual proposed action; when the proposal changes, the analysis must be changed too. This is not an unusual situation and has been a problem for all agencies in environmental impact assessment. 1

Thank you for the opportunity to comment on the draft environmental statement.

cc: W.O. (260)

ACTING STATE DIRECTOR

RESPONSE TO COMMENTS BY
DEPARTMENT OF THE INTERIOR, BUREAU OF LAND MANAGEMENT

1. The final environmental statement contains an analysis of the proposed actions.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
PACIFIC SOUTHWEST REGIONAL OFFICE
BOX 36062
450 GOLDEN GATE AVENUE
SAN FRANCISCO, CALIFORNIA 94102

IN REPLY REFER TO:

DES-77/19

AUG 24 1977

Memorandum

To: Superintendent, Lassen Volcanic National Park

From: Regional Director

Subject: Review of Draft Environmental Impact Statement for the General Management Plan, Lassen Volcanic National Park, California

In response to your letter of June 29, 1977 we have reviewed the subject document and have the following comments to offer.

We are favorably impressed with the overall content of the report and the thorough assessment of the proposal. The objectives which your agency has set forth are clearly defined and if implemented, should enable you to deal more effectively with the growing needs of visitor use and recreation demands. The relocation of existing facilities and the development of new facilities in environmentally compatible and less hazardous areas should greatly reduce any unnecessary safety risks to park users. We are also pleased by your efforts to coordinate planning with the Forest Service in order to minimize economic and environmental costs.

Thank you for the opportunity to review and comment on your plan.

Frank E. Sylvester

United States Department of the Interior

FISH AND WILDLIFE SERVICE
SACRAMENTO AREA OFFICE
2800 Cottage Way, Room E-2911
Sacramento, California 95825

SEP 9 - 1977

In reply refer to: ES

Memorandum

To : Superintendent, Lassen Volcanic National Park
Mineral, California 96063

From : Area Manager, Sacramento, California (ES)

Subject: DES 77/19--Review of Draft Environmental Statement and Draft General Management Plan, and Supplement to both, for Lassen Volcanic National Park, California (Your reference D18)

We have reviewed the subject documents and find that, in general, they adequately cover matters within our area of concern. We offer the following specific comments on the draft environmental statement for your consideration.

Page 88 - Threatened Species: The current U.S. list of endangered species is found in the Federal Register, Vol. 42, No. 135, Part IV, Title 50 - Thursday, July 14, 1977. The current California list of rare and endangered species appears in the publication At the Crossroads, California Department of Fish and Game, January 1976. 1

Page 167 - 1st paragraph: Protection of the threatened plant, Penstemon cinicola, might be accomplished by a minor rerouting of the trail if feasible or perhaps by the strategic placement of some protective rocks. 2

Ed Collins

cc: EC, Washington, D.C.
ES, Sacramento, CA

RESPONSE TO COMMENTS BY
DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

1. Both these lists and the May 20, 1980, Federal Register were reviewed, and the information contained was added to the lists previously consulted.

2. This mitigating measure was added to the text.

United States Department of the Interior

GEOLOGICAL SURVEY
RESTON, VIRGINIA 22092

OFFICE OF THE DIRECTOR

In Reply Refer To:
EGS-DES-77/19
Mail Stop 760

SEP 2 1977

Memorandum

To: Superintendent, Lassen Volcanic National Park,
National Park Service, Mineral, California

Through: DEPUTY Assistant Secretary--Energy and Minerals

Richard E. Dawes
SEP 7 - 1977

From: Acting Director, Geological Survey

Subject: Review of draft environmental statement for general management plan, Lassen Volcanic National Park, California

We have reviewed the subject draft environmental statement as requested in your letter of June 29.

It is stated in the Summary that an alternative considered at Manzanita Lake is to "pursue assessments of the geologic hazard that would not require closing of the lodge" (par. 4b). Later in the text in the detailed description of Alternatives Specific to the Manzanita Lake Area, about three pages have been devoted to a description of Alternatives to Closing Facilities in the Rockfall-Avalanche Area (p. 241-244). However, no mention has been made there of further study or assessment of the geologic hazards. Instead, the alternative has been characterized in the following ways: "Disregard the Geological Survey hazards report; reopen the facilities on Chaos Jumbles and build more as needed"; and "This alternative assumes that the potential for another rockfall-avalanche would be ignored" (p. 242, first two pars.). Because of the central importance of the geologic hazard evaluation to the proposed action, it would be advisable to clarify whether further assessment is considered to be part of any alternative and whether it is under consideration. 1

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

As pointed out in Mr. Schuster's letter of February 2, 1976, "The risk from rockfall avalanches is appreciably less in the campground area than in the area of the Chaos Jumbles; continued closure of the northernmost two campground loops would further lessen the risk".

The statement should at least briefly comment on the occurrence and significance, including any use, of ground-water resources in the park area. Inasmuch as infiltration rates locally appear to be very high (e.g., p. 135), the significance of seasonal recharge to ground water for rock stability and for the proposed project may merit consideration. The assessment of the potential for ground-water impacts should include consideration of the significance of effluent ground-water flow for the quality and quantity of streamflow. 2 3

(Sgd) M. H. Klepper

Acting Director

RESPONSE TO COMMENTS BY
DEPARTMENT OF THE INTERIOR, GEOLOGICAL SURVEY

L. Except for an on-going monitoring program being conducted by the U.S. Geological Survey (Chapter II.C. 3), no further evaluation or assessment of the geologic hazard is being contemplated.

2. and 3. These are now addressed in the text in Chapters II.E. and III.A.3.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION NINE
Two Embarcadero Center, Suite 530
San Francisco, California 94111

ARIZONA
CALIFORNIA
NEVADA
HAWAII
GUAM
AMERICAN SAMOA

August 18, 1977

IN REPLY REFER TO
HED-09

Mr. W. Stephenson
Superintendent
Lassen Volcanic National Park
Mineral, California 96063

Dear Mr. Stephenson:

We have reviewed the Draft Environmental Impact Statement for the General Management Plan, Lassen Volcanic National Park in Lassen, Plumas, Shasta, and Tehama Counties, California, and have no specific comments to offer.

We appreciate this opportunity to review the subject Draft Statement.

Sincerely yours,

R. G. S. Young, Director
Office of Environment and Design

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
100 CALIFORNIA STREET
SAN FRANCISCO, CALIFORNIA 94111

OCT 1. 1977

D-NPS-K61017-CA

Lyle Dowell, Acting Regional Director
Western Region
National Park Service
Denver Service Center
P.O. Box 25287
Denver, Colorado 80225

Dear Mr. Dowell:

The Environmental Protection Agency has received and reviewed the draft environmental statement for the Lassen Volcanic National Park, California.

EPA's comments on the draft environmental statement have been classified as Category 3. Definitions of the categories are provided on the enclosure. The classification and the date of EPA's comments will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions under Section 309 of the Clean Air Act. Our procedure is to categorize our comments on both the environmental consequences of the proposed action and the adequacy of the environmental statement.

EPA appreciates the opportunity to comment on this draft environmental statement and requests one copy of the final environmental statement when available.

Sincerely,

David L. Calkins

for Paul De Falco, Jr.
Regional Administrator

Enclosure

cc: Council on Environmental Quality

Lassen Volcanic Park

EPA has reviewed the DEIS of the draft General Management Plan for Lassen Volcanic National Park. We have determined that the document contains inadequate information with which to accurately assess the environmental impacts of the proposed actions. EPA's major concerns concentrate on I Planning relationships and II Discussion of the proposals, the natural environment and the associated project impacts.

A summary of EPA's concerns is included. Should your staff find it helpful, my staff has on file additional page by page comments. Should your staff wish to review and discuss this additional, more specific data, please contact Patricia Sanderson Port, EIS Coordinator, at 556-~~6266~~ 6295. Betty Jantus

EPA recognizes that several agencies including both the Park Service and Forest Service as well as various state entities are participating in planning for Lassen Park. Among the significant plans being developed are the Park Service's Natural Resources and General Management Plans, the Forest Service's Unit Plans and an EPA sanctioned Section 208 plan.

I. Planning Relationships

These plans discuss similar issues. Since the scope of each plan is different the level of detail addressed will be different for each document. A unique opportunity exists for efficient multi-agency coordinated areawide planning.

The DEIS recognizes that cooperative planning is essential. On page 24 of the DEIS it is stated that the formulation of many details in the General Management Plan rely on bi-agency planning between the Park and Forest Services. However, the various interrelationships, levels of commitment, scope, purpose and responsibilities of various planning agencies and associated plans are not clearly defined. 1

In particular the coordination of the Natural Resources and General Management Plans is not adequately delineated nor reflected in the latter plan. It is stated in the DEIS that the Natural Resources Plan will be completed in 1978, obviously after the completion of the General Management Plan. The development of General Management Plan proposals however, relies on environmental information which apparently will be provided in the Natural Resources Management Plan. 2

It is not clear if, how and when the resource information will be incorporated in or modify the General Management Plan and related EIS, nor how the resource information will be environmentally assessed. The inappropriate timing and division of the Management Plan into two components has made the assessment of proposal impacts difficult. Proposals should not be developed before an information base is established. More importantly, environmental impacts, especially on water quality, cannot be adequately analyzed without sufficient base information. EPA is concerned that the planning and plans should be efficiently interrelated and that all relevant information and issues are exposed in the EIS. The EIS should address and resolve these concerns. 2

II Discussion of the proposals, the natural environment and the associated project impacts

EPA recognizes that the DEIS represents a significant effort on behalf of the Park Service. This effort is reflected in the adequacy of the general information contained in the DEIS. However, the DEIS does not provide adequate background information from which to evaluate alternative proposals for sewage treatment, water supply and camping facilities; assess the related site specific and overall water quality and biota impacts.

The DEIS provides an extensive discussion of alternative actions, but the description of the proposals are inadequate. EPA's primary concern is that specific sites for and types of sewage treatment facilities and water supply sources have not been identified by the Park Service. This inaction constricts the analysis of site specific problems/impacts (e.g., their magnitude, location and extent) and development of mitigation measures. Specific sites and sewage treatment methods and water supply sources should be identified in the EIS as well as the resultant environmental impacts. 3

EPA notes that the purpose of the creation of the Lassen Park is to protect the volcanic site and its related biotic and cultural resources for the benefit and enjoyment of park visitors. It is in regard to biotic resources that EPA concludes that the DEIS is inadequate. Though the document provides an extensive discussion of the biotic resources, it is somewhat unbalanced and limited. The document provides insufficient site specific soil and water data. Additional quantitative and qualitative soil, water and biota information for project sites should be included. 4

With regard to water, the EIS should identify water supply, stream sources and all receiving waters; provide turbidity, TDS and all other relevant water quality parameters for each body of water; indicate stream flow rates, storm water runoff and overland flows, indicating rates, frequency, volume and quality. It should identify non-point source pollution; describe the lake eutrophication process and indicate the existing rate for each lake; delineate the 100 year flood plain and analyze ground water in terms of depth, quality flow characteristics and problems. 5

With regard to soil information, the EIS should provide percolation rates, erosion potential, chemical analysis and other relevant data for each specific proposal site.

With regard to biota data, specific flora and fauna of proposal sites need to be delineated. Biotic resources need to be assessed with regard to quantity, location and biological requirements as well as project impacts and mitigation measures. 6

This information should be presented in a concise form easily evaluated and a discussion should be included which illuminates the significance of the findings. More importantly, a discussion emphasizing the interrelationship among both organic and inorganic biotic elements should be included in the EIS. 7 In addition, EPA suggests that a water quality monitoring program be established for the park area in order to detect and mitigate water quality degradation arising from construction and operation of the proposed projects. Finally, the EIS should also address the issue of whether existing water quality problems will be eliminated if one or more plan elements are not implemented. 8

EIS CATEGORY CODES

Environmental Impact of the Action

LO--Lack of Objections

EPA has no objection to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER--Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to reassess these aspects.

EU--Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

Adequacy of the Impact Statement

Category 1--Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2--Insufficient Information

EPA believes that the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3--Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement.

If a draft impact statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make such a determination.

RESPONSE TO COMMENTS BY
ENVIRONMENTAL PROTECTION AGENCY

1. Specific details of cooperative planning between the National Park Service and Forest Service have not been worked out. However, a key part of planning for Lassen Park in the past has been consultation and coordination with Forest Service officials, both on a local and regional level. This has included meetings to solicit ideas and opinions, special studies regarding park resources by Forest Service personnel, and a cooperative agreement to jointly use lands outside, but adjacent to the park. Coordination on both a conceptual and detail level is encouraged in the future.

2. The environmental information available to prepare the two plans has been the same, even though the production of the two documents has not coincided. Therefore, the Natural Resources Management Plan will not provide additional information necessary for the adequate preparation of proposals or assessment of effects in the General Management Plan. The Natural Resource Management Plan will provide the strategy to obtain further environmental information and monitor environmental quality. Many of these strategies will require studies and observations over a number of years. As results of these studies become available, they will be applied directly to revisions of affected park plans, particularly those affecting water quality and sewage treatment facilities.

3. The descriptions of proposed actions in this final statement are more detailed than they were in the draft statement. This is possible because ongoing studies have resulted in more specific action plans. However, many of the action plans still remain conceptual at this level of planning. As described on page I-2, these subsidiary plans will receive environmental analysis and documentation when they become site and action specific. The sewage treatment facilities proposed for Manzanita Chutes and the Lassen ski area will require such environmental documentation. Specific site description, sewage treatment methods, water supply sources, alternatives, and mitigating actions to off-set adverse effects, will be detailed in these future documents.

   In this final statement, the general impacts to soils, vegetation, wildlife habitat, and water quality have been discussed using the maximum acreage anticipated for treatment plants and disposal fields. It is recognized that at this conceptual level of planning that adverse impacts will result from any method of sewage treatment. The California Water Quality Control Board and the Environmental Protection Agency will be consulted during the

development of the detailed, site-specific, action plans.

The limited land base at the Lassen Ski area precluded feasible on-site sewage treatment. The Forest Service has agreed to disposal at Bluff Falls south of the park entrance. Due to the critical nature of this problem, design of the treatment facilities has proceeded and is discussed in a separate Environmental Assessment as well as in this Final Environmental Statement.

The larger land base in the Manzanita Chutes area will probably allow the use of a spray field or lagoon disposal system. Specific sites have not been analyzed and further analysis may indicate the soil conditions, drainage patterns, or other factors will preclude the use of this type of treatment system.

The sewage treatment problems described at Summit Lake appear to have been corrected and the actions taken are described in the text. A monitoring program has been established to assure that the corrective measures have solved the problem.

4. The final environmental statement has had significant revisions made in the description of the environment section. Not only has more information become available, but the section is now more balanced, especially in the area of biota. For a response to the request to provide more site-specific data see the response to comment 3, above.

5. The plan does not propose the use of new water sources at this time except for Juniper Lake. The quality of this water has been monitored in the past following treatment. Water quality data will become available in the future from studies proposed in the resources management plan to determine aquatic conditions within the park's water resources. Surface water sources (lake water) at Juniper and Butte Lakes are adequate at the present time and have no deliterious qualities which cannot be removed by simple chlorination. When new facilities at Juniper Lake are developed they will probably require the consistent water quality of a well.

6. For the response to requesting detailed site information see response 3.

7. Generally, such relationships are adequately treated within the information base of appropriate scientific disciplines and need not be described at length for the park. Where such relationships are involved or affected by specifically sited actions in this proposal they have been addressed in Chapter III of this document. Where the proposed action is conceptual and has not been specifically sited, these relationships will be included in the environmental document for that specific action plan when it is developed.

8. A water quality monitoring program is included in the park's Natural Resources Management Plan. The water quality problem at Summit Lake has been resolved by the replacement of leach fields with vault toilets. Water monitoring will continue on this lake to detect water quality degradation occurring in the future.

   Any action in this proposal which results in a failure to meet water quality standards will be mitigated with adequate treatment facilities so that the standards are met. Further, the National Park Service will initiate early consultation with the EPA and the California Water Quality Control Board in the design and location planning phase of all sewage treatment facilities.

State Agencies

Comments were received from the following state agencies:

California State Clearing House - Comments were compiled by the Resources Agency of California for the following state agencies

Department of Conservation
Department of Fish and Game
Department of Parks and Recreation
Department of Water Resources
Department of Food and Agriculture
Department of Health
Department of Transportation
Air Resources Board
Solid Waste Management Board
State Water Resources Control Board
Energy Resources Conservation and Development Commission
Public Utility Commission
State Historic Preservation Officer

Responses follow those letters with comments needing specific responses.

OFFICE OF THE SECRETARY
RESOURCES BUILDING
1416 NINTH STREET
95814
(916) 445-5656

Department of Conservation
Department of Fish and Game
Department of Navigation and Ocean Development
Department of Parks and Recreation
Department of Water Resources
Department of Forestry

EDMUND G. BROWN JR.
GOVERNOR OF
CALIFORNIA

THE RESOURCES AGENCY OF CALIFORNIA
SACRAMENTO, CALIFORNIA

Air Resources Board
Colorado River Board
San Francisco Bay Conservation and Development Commission
Solid Waste Management Board
State Lands Commission
State Reclamation Board
State Water Resources Control Board
Regional Water Quality Control Board
Energy Resources Conservation and Development Commission
California Coastal Commission
State Coastal Conservancy
California Conservation Corps

SEP 30 1977

Mr. Bill Stephenson, Superintendent
Lassen Volcanic National Park
Mineral, CA 96063

Dear Mr. Stephenson:

The Draft Environmental Statement (June 1977) and the Draft General Management Plan (August 1976) and Supplement (May 1977) for Lassen Volcanic National Park, which you submitted to the Office of Planning and Research (State Clearinghouse), has been reviewed by the State agencies concerned. This review fulfills requirements under Part II of the U. S. Office of Management and Budget Circular A-95 and the National Environmental Policy Act of 1969.

The documents have been reviewed by the Departments of Conservation, Fish and Game, Parks and Recreation, Water Resources, Food and Agriculture, Health, and Transportation; the Air Resources, Solid Waste Management, and State Water Resources Control Boards; and the Energy Resources Conservation and Development, and Public Utilities Commissions.

Total park area includes 43,275 hectares (106,934 acres) located in Lassen, Plumas, Shasta, and Tehama Counties. The Environmental Statement and General Management Plan cover proposed improvements of inadequate facilities at Lassen ski area, Warner Valley, and Summit, Juniper, and Butte Lakes, and the relocation of facilities at Manzanita Lake, which were closed in 1974 because of a geologic hazard. A natural resources management plan is in preparation and will be subject to public review as a separate document.

Recommendations

Solid Waste Management

1. Section II, Description of the Environment, should include information regarding solid waste generation and collection within the park. The 1

plan presently lacks any current or future solid waste data. Policies governing litter collection, management, and reduction should also be included in the draft environmental statement.

2. Potential recycling efforts that could be initiated within the park should be investigated. While Lassen Volcanic National Park is located some distance from available secondary materials markets, this does not necessarily preclude the establishment of a buy-back/deposit system similar to the one utilized in Yosemite National Park for beverage containers. Large state and national parks offer a unique proving ground to demonstrate the feasibility of recycling. 1

Fish and Wildlife

1. The proposed natural resources management plan should be finalized prior to any further action on subject general management plan. We feel this is the only way of ensuring that adequate fish, wildlife, and other natural resource baseline information is available with which to base sound land management decisions. 2

2. The decision to relocate the existing facilities at Manzanita Lake should be deferred until additional study is undertaken to determine suitable alternative sites. The proposed site at Manzanita Chutes happens to be located in some of the best deer fawning habitat in the State, and we feel it should be completely protected.

3. Alternative "E" for realignment of the Lassen Park Road should be implemented. This alternative would be longer than the others but would cause the least amount of habitat loss because of the use of existing roads for a majority of the route. More importantly, this alternative would cause the least amount of damage to critical deer fawning habitat.

   Alternative "D" would be less desirable than "E" because more habitat loss would occur in spite of its shorter length (e.g. Alternative D does not utilize existing roads). Alternative "C" should not be considered because of its significant adverse impact on critical deer fawning habitat.

4. Any trails constructed under this plan should avoid critical wildlife habitats, especially deer fawning areas.

5. Any developments in Warner Valley, Juniper Lake, and Butte Lake should be deferred until questions regarding potential impacts on bald eagles and other specially classified (rare or endangered) species are answered. 3

6. Ski lift developments, campgrounds, and other recreation-oriented facilities should be looked at closely in terms of increases in human use relative to sewage disposal capability. The existing physical and geological limits on sewage disposal in and adjacent to the park should be thoroughly analyzed. Such analysis should then be used in establishing criteria for future levels of park development. 4

7. Section 36 (T30N, R5E) should be acquired irrespective of other development proposals in Warner Valley. Such action would ensure protection of this area from geothermal development activities and subsequent adverse impacts on fish and wildlife.

General Comments

Air Resources

The Air Resources Board is developing an Air Conservation Program (ACP) in response to the federal program for prevention of significant deterioration (PSD) which has the goal of preserving air quality in California. A primary objective of the ACP is to maintain high levels (or identify the need for restoration) of air quality in those areas where air quality better than the national ambient air quality standards is appropriate. Lassen Volcanic National Park, which has been proposed for classification as Class A under the Early Action Program, is now, as a result of the 1977 Clean Air Act Amendments, a mandatory Class I (federal equivalent of Class A) area.

One proposed policy of the ACP is to limit emissions of air pollutants from activities in Class A areas to current levels. It appears the most appropriate method of implementing this policy would be to plan development of the area in accordance with this policy. General development plans are invaluable for identifying the air quality impacts of proposed park development. It is from this perspective that the Air Resources Board has reviewed the draft general development plan for Lassen Volcanic National Park.

Fish and Wildlife

We believe the major shortcoming of the draft EIS as well as the management plan is that decisions on land use within the park, including facilities development and their relationship to levels of recreational use, will be made prior to the preparation of a park natural resources management plan. We feel that for fish and wildlife resources to receive adequate consideration during the decision-making process, adequate baseline information must be available during the early planning stages. Such information is essential for analyzing the degree of impact of various development proposals on fish and wildlife. However, subject management plan is proposing several developments without having sufficient baseline information such as would be provided in a natural resources management plan. 5

For example, the following proposed Phase II developments: relocation of facilities at Manzanita Lake to Manzanita Chutes, park access road realignment Alternative "C", increases in skier capacity, increase in backcountry access, increase in sewage disposal capability and others will result in adverse impact on fish and wildlife. Yet the decision will soon be made pursuant to subject plan on whether or not to implement these proposals. If we assume this decision

is affirmed, then fish and wildlife populations within the areas influenced by these proposals will be decreased. We understand that subsequent to this action, a natural resources management plan would then be prepared with the objective " ... to restore the terrestrial and aquatic ecosystems of the park that most probably existed prior to technological disturbance by man." (Page 42, Draft General Management Plan Summary.) We question how this objective could be achieved within those areas of the park that will have already been impacted by the various developments proposed in subject management plan. Thus it appears the timing of preparation of subject management plan and the natural resources management plan may be inappropriate and not in the best interest of fish and wildlife and other natural resources.

We therefore recommend the final EIS be modified to address this concern. Further, we urge the Park Service to defer their decision on implementing their proposed Phase II developments until a complete natural resources management plan for Lassen National Park is finalized. The Department of Fish and Game would be happy to assist the park staff in this effort in cooperation with the U. S. Forest Service. 6

Specific Comments

Air Quality

1. The discussion of air quality in the draft environmental statement indicates a potential 2 percent increase each year in vehicular emissions in Lassen Volcanic National Park as a result of proposed alterations. It is not clear, however, if this increase results solely from the proposed alterations, or if the projected emissions increases also reflect expected increased visitor use which would result with or without the alterations. 7
   While a reduction in pollutant emissions is anticipated with elimination of the on-site stationary engines at the ski area (page 188), emission increases anticipated in the summer months cannot be considered to be offset by the reduced emissions from generators in the winter. The reduction in the emissions in the winter do not reduce the absolute total increase that would be generated in the summer months. This projected emissions increase would not be consistent with the proposed ACP policy. Statements in the report recognize "the unknown effect on other park resources" from increased vehicular emissions. It is also recognized that reduction in pollutants from eliminating the ski lift generators (page 188) would only have effect "in the local area".

2. Discussion of visitor use of the park (pages 107-110) is brief and appears to anticipate a continued emphasis on travel by private automobiles. It is stated, " ... by the end of the century, more visitors will be reaching the park by bus, or by train and bus, than at present ...", yet there is no indication of the number of visitors arriving by bus or train presently or if there is even access by train now. Such quantification needs to be provided to assure that a reasonable analysis of air quality impacts can 8

be made. There is also no indication that consideration was given to modes of transportation other than the private automobile. Because motor vehicles appear to be the major source of locally generated pollutants, much more detailed information on current transportation modes needs to be included as well as a more detailed discussion of viable alternatives for the future. 8

3. Consideration of alternative designs of trailheads and campgrounds to limit increases in vehicular and other sources of emissions is not present in the draft environmental statement. It is recognized that in the Manzanita Lake area, " ... if camping is reestablished in one large campground and lodging reestablished in the vicinity, there will be greater potential for pollutants ... to damage vegetation, compared to a case in which development is in disjuncted areas where concentrations of pollutants would be lower" (page 185). All efforts to minimize air pollutant emissions need to be included in the planning process. 9

Geologic Hazards

In the section on Geologic Hazards, there is mention made, on page 63, of the possibility of a rock fall at Chaos Crags being triggered by an earthquake. The possibility of earthquake-caused slope and cliff failures elsewhere in the park should be considered and discussed. For example, in Section C, Other Geologic Constraints, mention is made of the fact that at Lassen ski area, the parking area and lodge are built upon a prehistoric mudflow now believed stable. No mention is made of the possibility of reactivation of this or other "dormant" or "stable" slides in the park by an earthquake. Multiple landslides nearly always accompany a major earthquake event in areas of steep terrain. The 1959 Madison Canyon slide and other lesser, but significant, rockfalls and slides that occurred throughout the Yellowstone area as a result of the August 17, 1959 magnitude 7.1 earthquake are good examples. 10

Fish and Wildlife

1. Page 73, Vegetative Types: This section should be expanded to include the applicable vegetative types as discussed by Roman Gankin in Appendix A. We are especially concerned with respect to meadow and riparian habitats because of their critical importance to deer and other wildlife. This section currently does not include these two habitat types and we feel it should. 11

2. Page 84, Fauna: The term "Whitmore herd" should be changed to Cow Creek herd to reflect the current official name of this black-tailed deer herd. 12

3. Page 87, second paragraph: According to our field studies, the Cow Creek herd does not migrate as far north as Fall River Mills. The northernmost point of their migration appears to be centered in the Hat Creek Rim area. 13

4. Page 87, fifth paragraph: This section should be expanded to point out the significance of other critical deer fawning habitat within the park. This should include the riparian (primarily willow) and alder thickets and their associated stringer meadows scattered throughout the park. In addition, emphasis should be placed on the comparatively high productivity of the Manzanita Chutes area for deer. Our field analysis of this area indicates the brushfields extant there can be considered as some of the best deer fawning habitat in the State. 14

5. Page 88, Threatened Species: A discussion of wolverine and their occurrence within and adjacent to the park should be included in this section. We feel there is suitable habitat available for wolverine within the park and that they do occur there even though no documented sightings have been made. This species is currently classified as rare by the California Fish and Game Commission. In addition, the occurrence of peregrine falcon in the park should be thoroughly discussed in light of recent observations of two adults and one juvenile in the Ski Heil area. 15

6. Page 169, Fauna, Manzanita Lake Area: This paragraph contains an erroneous assumption that roads, trails, and facility development will improve deer habitat. We strongly disagree and recommend this sentence be deleted. In our view, the habitat loss and human disturbance caused by such developments will result in decreases in wildlife populations, including deer. 16

The figure of 1.3 deer expected to be lost as a result of this project may be incorrect. This figure apparently was developed by using the parkwide average for deer densities and does not reflect the tremendous productivity of the brushfields in terms of deer use. This fact, coupled with the human disturbance factor, leads us to believe that the 1.3 deer figure is extremely low. We recommend this section be modified accordingly. 17

This section indicates road kills will be a significant mortality factor with the proposed developments. While deer road kills will occur, this loss is not considered a significant mortality factor compared to habitat losses and human disturbance. 18

7. Page 160, second paragraph: This section may be incorrect with respect to wolverine since we feel the species could occur in this area. 19

8. Page 171, first paragraph: The statements regarding low levels of project impact with respect to human disturbance factors are correct. However, this section fails to address the impacts of habitat loss caused by ski facility developments which would adversely impact resident and migratory species of wildlife. This section should be expanded accordingly. 20

9. Page 171, Minor Development Sites (Warner Valley): The statement that the proposal will not impact southern bald eagles appears to be premature and based on insufficient information. Bald eagles have been regularly sighted 21

in this area for several years, so we can assume some components of their habitat needs are present here. Consequently, any development activity in this area may cause adverse impact on bald eagles. Unfortunately, there is presently little information regarding bald eagle requirements in Warner Valley. However, given the special significance of this species because of its endangered status, we feel these unknowns should be answered prior to any further consideration of development proposals in this area. 21

10. Page 172, first paragraph: If development proposals under this plan can in fact " ... be interpreted as exerting unquantifiable adverse impact on bald eagles." then there may be serious consequences of such actions with respect to the Endangered Species Act. This is another example of the need to develop wildlife baseline data in conjunction with a park natural resources management plan prior to implementing various development proposals as per subject management plan. 22

11. Page 172, Cumulative Impacts on Fauna: Again, parkwide averages of deer densities were used in obtaining deer loss projections. Given the tremendous productivity of the brushfields in this area, project-induced losses of this habitat as well as human disturbance factors will impact many more deer than the deer loss projections in this section indicate. 23

12. Page 179, Water Quality: This entire section should be expanded to include an analysis of the sewage disposal problems associated with various development proposals in relation to adverse impacts on aquatic resources. There are several watercourses whose headwaters occur within the park that support a significant trout fishery either in the park or further downstream. The same is true for several lakes in the area. Several of the developments under this plan will increase human use within the park which will in turn generate demand for additional sewage disposal capability. We feel that, depending on the sites involved, there are several physical and geological factors within and adjacent to the park that will establish limits on sewage disposal. It is therefore extremely important to determine these limits with respect to sewage disposal design criteria prior to implementing developments that will increase human use and a concurrent demand for increased sewage disposal capability. If this is not done, we feel the potential for adverse project impacts on aquatic resources may become extreme. 24

13. Page 209, Fauna: This section implies that mitigation measures for adverse project impacts will be addressed in the upcoming natural resources management plan. We feel this is an improper and ineffectual method of mitigation because adverse impacts from developments proposed under subject plan will have already occurred. Such action will virtually preclude any acceptable mitigation measures that might be developed as per the natural resources management plan. We therefore feel that mitigation for this proposal must be addressed and implemented now. Things like avoidance of critical habitats (brushfields, meadows, riparian thickets), restrictions in levels of human disturbance in the backcountry and protection of water quality by limiting developments are all suitable mitigation measures that should be implemented 25

as integral parts of subject management plan. We would be happy to work with the Park Service and the U. S. Forest Service in designing such mitigation measures.

14. Page 222, first paragraph: Again, parkwide average deer densities were utilized in formulating deer loss projections. These averages do not reflect the tremendous productivity and importance of specific areas to deer and other wildlife. 26

15. Page 222, second paragraph: If the impacts discussed in this section will occur, and we believe they may under the present proposal, there may be serious consequences with respect to the Endangered Species Act.

16. Page 223, Water Quality: This section assumes that sewage disposal capability can be achieved to handle this plan's various development proposals. Given the physical and geological factors extant in and adjacent to the park, we wonder if such assumptions are too optimistic. We feel the opposite approach should be used in this instance, i.e., basing developments on the extant physical limiting factors with respect to sewage disposal. 27

17. Page 234, fourth paragraph: Habitat loss caused by this project will adversely impact deer feeding and routes of migration and will in no way improve them. We therefore recommend the last sentence in this paragraph be modified to reflect the facts. 28

18. Page 244 and 253, Alternates in Relocating Lassen Park Roads: It would be helpful in assessing the adverse impacts of various realignment alternatives if there were some indication of the type and amount of habitat that would be destroyed in each case. 29

The following comments relate to the supplement (20 pages) to the draft general management plan:

19. Page 6: We concur with the recommendation to retain the present character of the park ski area and that any improvements be limited to relieving congestion and solving major environmental problems. Such action would be helpful in keeping human disturbance within the park at current levels. This would tend to maintain rather than increase current levels of impact on fish and wildlife resources.

20. Page 11, first paragraph: The discussion regarding Manzanita Chutes should be modified to explain man's influence on the rapid plant succession taking place there. Due to many years of plantation management and herbicide application -- which have failed to produce the desired timber benefits -- this area has rapidly developed into very productive brushfields, representing some of the best deer fawning habitat in the State. 30

21. Page 17, Recommendation: We feel the implication that the Manzanita Chutes site is of little immediate value to the Forest Service is incorrect. Many thousands of dollars have been spent in this area in attempts to grow 31

conifers. For various reasons, these attempts have been unsuccessful in achieving the desired timber benefits. However, the end result of this expenditure of funds and effort has been a super-productive deer habitat area. We therefore feel such expenditure of funds in this area by the Forest Service should be looked at on its own merit, e.g., production of deer. Given the multiple-use objectives of Forest Service land management, this site should be -- and no doubt is -- of significant immediate value to the Forest Service because of its wildlife values. 31

All of the proposed developments outlined in the next three pages would result in significant adverse impact on wildlife resources, particularly deer. Consequently, the last sentence on page 20 is totally incorrect. 32

22. Page 55, Management Objectives: There appears to be a conflict in these objectives with respect to recreational fishing and continued fish stocking within the park. For example, the objective to "restore and maintain the terrestrial and aquatic ecosystems as they most probably existed prior to technological disturbance by man" appears to indicate no fish stocking would be allowed. Yet, item 4 indicates recreational fishing will be allowed to continue under certain circumstances. Because a fish stocking program is necessary to maintain an acceptable level of recreational fishing within the park, these two objectives are contradictory. We therefore recommend this section be modified to express the park's desired management objectives. We feel this is important because it was our understanding the Park Service was conducting studies to evaluate the effect of fish stocking and recreational fishing on the aquatic ecosystem of the park. Following the studies, the decision would then be made whether or not to permit both fish stocking and fishing in selected waters where these activities are compatible with the environment and other park uses. The objectives stated on page 55 appear to indicate the decision has already been made that fishing and fish stocking are undesirable within the park. We feel this matter should be clarified. 33

Thank you for the opportunity to review this material.

Sincerely,

HUEY D. JOHNSON
Secretary for Resources

By
L. Frank Goodson
Assistant to the Secretary
Projects Coordinator

cc: Director of Management Systems
State Clearinghouse
Office of Planning and Research
1400 Tenth Street
Sacramento, CA 95814
(SCH No. 77070549)

RESPONSE TO COMMENTS BY
THE RESOURCES AGENCY OF CALIFORNIA

1. Solid waste generation in the park is handled in a number of ways. Roadside cans from the Lassen Peak parking area and all garbage south of the parking area, including headquarters, is handled through a solid waste contract with Tehama County. About 70 tons per year are hauled out. All solid waste from Kings Creek north goes to the Shasta County Refuse Disposal station and estimated tonnage is 135 per year. It should be noted that the contract with Shasta County specifies 465 tons to be hauled each year. This estimate was based on the full operation of the Manzanita Lake facilities. Therefore, it is estimated that solid waste generated from existing facilities and the minor development proposals will not significantly increase above current levels.

2. Solid waste collected at Butte Lake is hauled to the park boundary and placed in a bin and then hauled by a private contractor. Approximately 300 cubic yards of loose pack is hauled per season. Solid waste collected from Drakesbad, Warner Valley, and Juniper Lake is handled by the U.S. Forest Service under a mutual agreement that the National Park Service pick up garbage from the Forest Service's Battle Creek Campground (near the administrative area).

   Another type of solid waste, effluent from vault and chemical toilets, is also hauled outside the park. Although the volume of waste is not known, it is assumed that the municipal facilities where the effluent is disposed meet all applicable standards.

   The park has an active recycling program; the container deposit system has been in use in the park for many years and is now mandatory in all areas of the National Park System.

2. See response to comment number 2, Environmental Protection Agency.

3. See discussion under Mitigating Measures, section IV A.4.

4. See response to comment number 3, Environmental Protection Agency.

5. See response to comment number 2, Environmental Protection Agency.

6. The Natural Resources Management Plan for Lassen Volcanic National Park has been completed. See response to comment number 2, Environmental Protection Agency and section I.F.

7. This is correct, the reduction in air pollution by eliminating the ski lift generators and the power generator at Lassen ski area will only be local in effect. The power generator operates throughout the summer as well as during the ski season. Therefore, its replacement by commercial power will cause a

reduction in air pollution throughout the year. The potential 2 percent increase each year in vehicular emissions projected in the draft statement was predicated upon a realignment and increased length of the Lassen park road. The final general management plan does not propose to realign the road, nor does it make any other proposal which would cause significant degradation of air quality in the park. See discussion in the Section III A. 6. b.

8. For the purposes of this plan, it will be assumed that the private automobile will be the chief mode of transportation to and from Lassen Park. At the moment only a small percentage of visitors arrive by bus. The nearest train service is available at Redding or Red Bluff. Alternate means of transportation within Lassen Park were studied during the formulation of the master plan options. Specifically Option R-8 outlined the use of mass transit to reduce vehicular congestion at Sulphur Works. However, because of the "drive-through" nature of the Lassen road, this option was not deemed feasible. The National Park Service will encourage bus service to the park but a National Park Service operated bus system and the related parking areas are not feasible at this time.

9. Reduction of air pollutant emissions was a goal addressed during the formulation of the master plan options. However, air pollution is not considered to be a major problem in Lassen Park for the foreseeable future. See discusssion in Section II, H. 2 and III A. 6. b.

10. These additional hazards are described in Chapter II.C.

11. Discussions of meadow and riparian vegetative types have been included in the text, Section II. F. 2.f.

12. This change has been included in the text, Section II. G. 2.d.

13. This change has been included in the text, Section II. G. 2.d.

14. The final environmental statement recognizes that the Manzanita Lake - Table Mountain - Manzanita Chutes area is considered to be some of the best deer fawning habitat in the state. It is also realized that the proposal will eliminate approximately five to ten acres of this habitat in the Manzanita Chutes area.

15. The wolverine may exist in the more remote areas of the park. As the comment indicates, there have been no sightings of the wolverine in the park. The Natural Resource Management Plan proposes to study the status of the wolverine in the park. The American Peregrine Falcon (Falco peregrinus anatum) is found in the park; however, the extent of the activity is not known. The Natural Resources Management Plan includes studies regarding population dynamics, nesting, and hunting territories of the falcon. Modification of backcountry use regulations could result from these studies.

16. This sentence has been deleted.

17. Estimates of the number of deer lost through habitat reduction is based on a figure of 2.5 deer per 10 acres in the Manzanita Meadows area. Based on the figure, the proposal will result in a habitat loss for up to two deer.

18. The text has been modified to indicate the significance of each, road kills and habitat loss, with their influence on deer numbers. See Section III.A. 5. b.

19. This section has been corrected with respect to the wolverine.

20. No major long-term disturbance to wildlife habitat will occur due to the ski area improvements. The discussion of impacts to wildlife (Section III.A. 5) has been expanded to reflect the current proposals for the ski area and sewage treatment facility.

21. The text has been modified to include a statement that the southern bald eagle has been sighted regularly in Warner Valley. The Natural Resource Management Plan calls for further studies regarding the population dynamics and nesting and hunting territories of the eagle.

22. These problems have been addressed. See section I. F. and IV. A. 4.

23. The text has been modified to indicate reduction in habitat for about two deer. See Response 13 and 17.

24. Information regarding physical and geological factors was limited during the formulation of the proposal. Therefore, the exact method of sewage disposal will not be determined until more detailed design work is accomplished. If traditional sewage treatment methods prove unfeasible, package or similar treatment facilities will be developed. See response to comment number 3, Environmental Protection Agency. See section I. C. 6.

25. During the design phase of the study, the National Park Service Resource personnel will work closely with State Department of Fish and Game personnel to help avoid, where possible, critical habitats, and mitigate other adverse effects on fauna of the proposal. The suggested actions will all be considered as a means of preventing or mitigating imapcts.

26. See Response 13 and 17.

27. See Response 24.

28. See Response 12.

29. The type and amount of habitat that would be destroyed is discussed in general terms in Section VIII B. However, detailed road alignment and habitat studies were not accomplished during the formulation of the alternatives.

30. The text, section II.F.2.b and III.A.4.c have been revised to reflect this comment. See the following response

31. The statement regarding the value of the Manzanita Chutes area was based on the timber resources of the site, and not on its wildlife habitat. The final environmental statement reflects the value of this area for wildlife. Section II.G.2.d and III.A.5.b.

32. As indicated in the final environmental statement, adverse impacts to wildlife will occur as a result of the proposal.

33. A research study is currently going on to determine whether or not fish stocking should continue.

.TE OF CALIFORNIA—THE RESOURCES AGENCY EDMUND G. BROWN JR., Governor
:PARTMENT OF PARKS AND RECREATION
. BOX 2390
:RAMENTO 95811
(916) 445-8006

OCT 3 1978

Mr. Howard H. Chapman, Regional Director
Western Region
National Park Service
P.O. Box 36063
San Francisco, CA 94102

Attention Mr. Tom Mulhern

Dear Mr. Chapman:

I have received your letter of August 30, 1978, regarding compliance with the National Historic Preservation Act of 1966 for the proposed implementation of the General Management Plan for Lassen Volcanic National Park in California.

Thank you for transmitting the Preliminary Case Report, the General Management Plan-August 1978, and the Draft Environmental Statement General Management Plan.

Implementation of the General Management Plan will have an adverse effect on properties eligible for or included on the National Register at Drakesbad and Manzanita Lake. Preservation of significant architectural features and hardware for possible reuse in the Lassen Volcanic National Park is consistent with conservation of resources for the maintenance and preservation of other historic structures under National Park Service jurisdiction. Photographic documentation and measured drawings represent a feasible mitigative measure for buildings scheduled for demolition. The Memorandum of Agreement should acknowledge the completed HABS study as a mitigative prerequisite and should specify the location and accessibility of the survey documents.

The Cook's Cabin and the Hay Barn represent a serious public safety hazard in the Drakesbad area. The extent of physical deterioration precludes the possibility of maintaining the original historic fabric of the two structures.

The Loomis Visitor Center and Seismograph Station, a property listed on the National Register, has special historical significance in association with the Loomis family and as a repository for a collection of historic photographs. The Park Naturalists Residence, the Comfort Station, and the Park Entrance Station and Residence are determined to be eligible for the National Register

as architecturally significant structures exemplary of the rustic architectural style employed by the National Park Service during the period 1920-1941. Current technological knowledge obviates the moving of massive stone structures in a feasible manner at a reasonable cost. However, the phased demolition of the structures provides an opportunity for future technological advancements to dictate the possibility of relocating structures in accordance with innovative technological improvements. The Memorandum of Agreement should include consideration of directing the National Park Service and the Office of Historic Preservation to examine enlightened technological advancements contributing to the preservation and reuse of historic buildings.

Consideration of archeological values should be initiated in accordance with the provisions of Section IV, I(1)(2) of the Preliminary Case Report. I acknowledge the desirability of the National Park Service and the Office of Historic Preservation maintaining close coordination in the implementation of the recommendations of the Case Report.

Please do not hesitate to contact Eugene Itogawa at (916) 322-8701 for further assistance.

Sincerely yours,

Knox Mellon

Dr. Knox Mellon
State Historic Preservation Officer
Office of Historic Preservation

B-0616C

cc: Louis Wall
Advisory Council on Historic Preservation
Box 25085
Denver, CO. 80225

Organizations and Local Government Agencies

Comments by the following organizations and local government agencies have been included:

Altacal Audubon Society, Inc.
Anderson, City of
Butte College, Physical Education Department
Butte County Board of Supervisors
California Native Plant Society
California State University, Chico (Business Development Center)
California State University, Chico (Department of Physical Education)
Chester and Lake Almanor Chamber of Commerce
Chico Area Recreation and Park District
Friends of Lassen Ski Area
Friends of the Earth (2 letters)
Hills & Trails
International Snowmobile Industry Association
Michigan Botanical Club
Motorland Magazine
National Parks & Conservation Association
National Ski Areas Association
Northern California County Supervisors Association
Northstate Wilderness Committee
Paradise Recreation District
Red Bluff-Tehama County Chamber of Commerce
Redding Chamber of Commerce
Redding School District
Regional Council of Rural Counties
Shasta-Cascade Wonderland Association
Shasta County Board of Supervisors
Shasta County Schools
Sierra Club (2 letters)
Sierra Ski Areas Association
Sierra West
Tehama County Board of Supervisors

Responses follow those letters with comments needing specific responses.

Numerous letters were received stating endorsement of the Friends of Lassen proposal for expansion of the ski area. The National Park Service has modified the proposal presented in the draft environmental statement to reflect the need for improvements as stated in the Friends of Lassen Ski Area proposal. However, the ski area will not be expanded. The improvements will solve many of the present problems, enhancing the quality of skiing and services while correcting the major environmental problems. The proposed actions and impacts are described in the text. A typical response to those endorsing the expansion proposal is used to answer the letter from the Friends of Lassen Ski Area.

Altacal Audubon Society, Inc.

Post Office Box 3671
CHICO, CALIFORNIA 95926



August 16, 1977

William Stephenson
Superintendent
Lassen Volcanic National Park
Mineral, Ca 96063

Dear Mr. Stephenson:

As president of Altacal Audubon Society and representing some 450 members, I want to make some comments regarding the draft environmental statement of the general management plan for Lassen Park. The work put into the statement is much appreciated by everyone who shares a concern for the future of Lassen.

A main area of concern is the ski area, and the pressures which are being applied, understandably, by skiers, to expand the existing facilities. We feel that a ski area, with its accompanying environmental degradation, doesn't belong in a national park. Any facility which requires a substantial alteration of the natural environment in order to serve a special segment of the population, in this case, ski enthusiasts, doesn't appear to fit into the national park scheme. Since the present ski area is an established one, and since the damage has already been done, we are not opposed to leaving it where it is, as it is. But expansion to include more lifts, a much larger parking facility, and the consequent much heavier use is not in the best interests of the park or the people as a whole. We hope that the Park Service's own recommendations, as outline in the May 1977 supplement, will be followed in this case. We also want to go on record as supporting the ban on the use of snowmobiles in Lassen Park.

Again, I want to express my appreciation for the amount of work and thought which has gone into the draft general management plan. It bodes well for the future of Lassen and our other great national parks. Thank you.

Sincerely,

Phyllis Laymon

Phyllis Laymon
President, Altacal Audubon Society

TELEPHONE AREA CODE 916
365-2521
365-2522

MARIAN A. "MICKIE" JAKEZ
MAYOR

COUNCILMEN:
MARVIN P. BENNETT
THOMAS A. DUTTON
JIM LOGAN
KAY McQUADE

CITY of ANDERSON

1887 HOWARD STREET
ANDERSON, CALIFORNIA
96007
RECREATION & PARKS DEPARTMENT PHONE 365-5447
JOINT SCHOOL - CITY RECREATION PROGRAM

MURL M. FRITSCHLE
CITY MANAGER
PHONE 365 9535

W. LEONARD WINGATE
CITY ATTORNEY
PHONE 246-1800

VIRGINIA D. NUSS
CITY CLERK

August 25, 1977

Mr. William Whalen
Director, National Park Service
U. S. Department of Interior
Washington, D. C. 20240

Dear Mr. Whalen:

I am writing to express our support of the proposed alternate ski area presented by the Friends of Lassen Ski Committee. We urge your adoption of this plan for the ski area at LASSEN VOLCANIC NATIONAL PARK.

Our department offers a variety of winter activities to all age groups. The proposed plan would be very beneficial to our programs as it provides for a well rounded use of winter facilities, as well as meeting the growing need for skiers in Northern California. The low-key family atmosphere of Lassen has been a very important drawing point for our department's winter activities. We can well testify to the great demand for winter sports in our area, as we must turn down potential skiers for our programs because of lack of the ability to accommodate skiers in Northern California.

The new plan emphasizes skier and operational safety through eliminating the present skiers congestion by disbursing skier traffic.

This growth would provide not only employment in our area, but would also keep skiers from making costly trips to Lake Tahoe and Bend. Thus saving energy and keeping our money in Northern California. My last trip to Bend I saw over 100 people from the Redding area alone.

We urge your attention to the enactment of this plan.

Very truly yours,

Debbie Dickison

Debbie Dickison
Recreation & Special Services Supervisor

dd/lh
cc: Superintendent, L.V.N.P.
Congressman Harold T. Johnson
Friends of Lassen Ski Committee

CHICO
MASTER PLAN MEETING
LASSEN VOLCANIC NATIONAL PARK
AUGUST 1, 1977

Subject: Lassen Ski Area
Viewpoint: Favor proposal of Friends of Lassen Ski Area
Representing: Physical Education Department, Butte College

One goal of natural areas within the United States National Park System is to protect such areas while allowing public use and enjoyment simultaneously. The teetering balance between these two opposing forces changes from park to park and with the passage of time. Wherein lies the balance? Although the closure of the Manzanita Lake area was unavoidable, we witnessed the drop in visitor attendance at naturalist activities and the genuine sadness expressed by the thousands who now could not find a place to lodge overnight in the park unless they could camp. There is a proposal to get rid of the ski area which has been in operation for years bringing enjoyment to thousands of families in the Lassen area. How far should we go? Should we also destroy the roads and trails leaving the park only accessible to the hardiest outdoorsman?

Butte College has at least 5 different classes which annually bring over 500 people to Lassen Volcanic National Park with several visits each. The classes fill recreational purposes (canoeing, cross country skiing, map and compass, and alpine skiing) and scientific purposes (natural history). In short, we are using this unique area and deriving educational and recreational enrichment from it. We estimate these numbers will continue to rise. We are interested in preservation of the area; many of our class activities are enhanced or only possible because of the pristine nature of Lassen's backcountry. The ski area, we believe, is a legitimate recreational activity in Lassen bringing enjoyment to thousands of people yearly including the Butte College alpine skiing classes.

In 1973, 5% or 1/20 of the total visitors to the park(25,099 or 500,000) were downhill skiers using the Lassen ski area, which represents .071% or 1/1400 of the park area. This represents a small area from which great recreational enjoyment occurs with minimal destruction to the area. The ski area is not in and if enlarged will still not infringe upon the wilderness area, 78,982 acres or almost 75% of the park, which will remain without roads or further development.

We feel the additional environmental impact of the Friends of Lassen proposal to modify the ski area is negligible in contrast to the increased enjoyment by thousands of people of the winter aspect of Lassen. As for the archeological sites, they were being destroyed (arrowheads playfully broken) long before construction of the ski area. The Friends of Lassen Ski Area proposal will protect these sites.

Ski Area

I am not an alpine skier. I've never been on downhill skis. I am a fervent cross country skier and snowshoer, but I do not feel it is appropriate to curtail the enjoyment of many thousands of people of alpine skiing because it isn't my "cup of tea". We feel it should be enlarged as proposed by the Friends of Lassen Ski Area because so many people enjoy this activity; doctors, teachers, students--not just "ski bums".

In the same breath, though, we feel snowmobiling is not compatible with the skiing and snowshoeing activities in Lassen because of the noise factor which destroys the aesthetic appeal of a quiet winter day and the deleterious effect of the snowmobiles on wildlife through noise pollution and on plants through squashing.

Thank you very much,

Respectively yours,

Lloyd S. Parratt

Lloyd S. Parratt



Butte County

LAND OF NATURAL WEALTH AND BEAUTY

ADMINISTRATIVE OFFICE
County Administration Building
Oroville, California 95965

August 23, 1977

Mr. William Whalen
Director, National Park Service
U.S. Department of Interior
Washington, D.C. 20240

Dear Mr. Whalen:

The Butte County Board of Supervisors on August 16, 1977, reviewed a draft comprehensive plan for the Lassen Park Ski area. The Board of Supervisors asked that I write to you indicating their support of the alternate ski area proposal presented by the Friends of Lassen Ski Committee. The Board of Supervisors believes this plan should be adopted for the ski area at Lassen Volcanic National Park.

In making this finding the Board believes that the plan will provide for a well rounded use of winter facilities at Lassen, as well as provide for the needed ski capacity for the northern California area while retaining the low key family atmosphere.

The Board of Supervisors believes that this plan will have a positive affect on the area's environment in the following areas: removal of the gas and diesel emission pollutants by converting to electric power; elimination of the poma scar; elimination of the archaeological area intrusion by lift and sewerage, as well as provide sewerage treatment; uses the existing terrain without slope degredation, and calls for only a very minimal amount of selective tree cutting. The Board of Supervisors has been advised that the area will be well removed from the wilderness portion of the park.

The Butte County Board of Supervisors has gone on record urging your attention to the enactment of this plan.

Very truly yours,

Mike Pyeatt
Deputy County Administrative Officer

cc: Congressman Harold T. (Bizz) Johnson
Superintendent of Lassen Volcanic National Park
Friends of Lassen Ski Committee
James E. Gregg, California State University Chico

THE CALIFORNIA NATIVE PLANT SOCIETY

DEDICATED TO THE PRESERVATION OF CALIFORNIA NATIVE FLORA

August 15, 1977

W. Stephenson, Superintendent
Lassen Volcanic National Park
Mineral, Ca. 96063

Superintendent Stephenson:

The following are the comments of the Northcoast Chapter of the Calif--ornia Native Plant Society in regards to the Draft General Management Plan and Environmental Statement for Lassen Park.

We support the removal of the Manzanita Lake facilities from the Park due to the geologic hazards from the Chaos Jumbles above the lake. We are concerned though that the Park Service is picking up the tab for this relocation to the tune of some six million dollars. While we would agree that the concesssioner should be partially compensated for the expense of having to move operations, we would also point out that the National Parks were not established for the purpose of allowing small business a guaranteed enterprise. At a time when the National Parks are clearly underfunded to maintain facilities for the general public, it seems absurd to spend six million dollars for the benefit of private business.

We are pleased that snowmobiling will continue to be prohibited within the Park. This activity is obnoxious to so many people that it is re--freshing to see the National Park Service protecting the right of citizens to enjoy the Park without having to contend with this public nuisance.

We do not favor the establishment of a ski resort within Lassen Volcanic National Park any more than we do the golf course in Yosemite Valley. The National Parks were enacted for the purpose of allowing the U.S. cit--izen to enjoy the most scenic places in the country. While we do not oppose ski developments per se, we feel that they should be established on National Forest Lands (as part of multiple-use management) or on private lands. The National Parks should not be degraded by such activ--ities. If a person wants to go ski, there are several places in North--ern California where they can be accomodated. The National parks should be retained in their natural condition free of commercial developments.

We would urge that the Final Management Plan consider the possibilities for expanding the Lassen Wilderness within the National Park. This in--formation should be presented to the public in one of the alternatives for Park management. 1

Please keep us on the mailing list for future developments.

Sincerely,

Stephen Adams
Conservation Chairman
Northcoast Chapter, CNPS
4257 Robin Road
McKinleyville, Ca. 95521

RESPONSE TO COMMENTS BY
THE CALIFORNIA NATIVE PLANT SOCIETY

1. Wilderness boundaries at Lassen Volcanic National Park were studied by the National Park Service and approved by Congress in 1972. These boundary studies were reviewed by the public prior to approval. Revision to the wilderness boundaries was not considered during the course of this planning effort. However, the plan does not preclude future changes to the wilderness boundaries. The plan does propose to reevaluate wilderness boundaries when private lands have been acquired.

University Business Development Center
Sutter Hall
California State University, Chico
Chico, California 95929

August 5, 1977

Superintendent
Lassen Volcanic National Park
Mineral, CA 96063

Dear Sir:

The University Business Development Center (U.B.D.C.) at California State University, Chico is an activity funded by the U.S. Small Business Administration (SBA), the Economic Development Administration (EDA), and the University system to provide management and technical assistance to small business men and women and to aid local communities in acheiving their goals of community and economic development.

This service is provided in the twelve northeastern counties of California.

The staff of the U.B.D.C. has reviewed a proposal by an organization entitled "Friends of Lassen Ski Area" relating to the development of a ski area in the park.

We were particularly interested in that portion dealing with the economic impact on the area.

The U.B.D.C. will undertake a comprehensive study of this proposal in order to more carefully identify the economic potential and economic impact of this project on the region served.

Dr. Richard Davis will head-up and coordinate this study.

Unfortunately, because of the time needed to accomplish a representative study of this nature we will be unsuccessful in meeting the September 6th concluding date of the current series of hearings.

Our efforts, however, will be as expiditious as possible and results of the study will be made available to all interested parties and overseeing authorities.

Thank you for your consideration of this letter.

Cordially,

Dave Schmidt

Dave Schmidt
Director

DS:vs

California State University, Chico
Chico, California 95929

Department of Physical Education
(916) 895-6373

July 18, 1977

Mr. Bill Stephenson
Park Superintendent
Lassen Volcanic National Park
Mineral, California 96063

Re: Lassen Park Ski Area
Hearings - August 1977

Dear Mr. Stephenson:

For many years the California State University, Chico Department of Physical Education, has offered Chico State students ski instruction. Over the past 20 years our department has introduced the sport of skiing to several thousand students through physical education classes. During the years that this university sponsored cross-country and downhill ski teams they often trained at the Lassen Park Ski area.

This department has long been supportive of having suitable ski facilities close to our campus rather than being forced to bus our students to the Tahoe basin for instruction. The long lift lines, congestion and safety factors at the present ski area have been well known for many years. Not only have we not utilized the area, but almost all of the students at this institution who ski have driven long hours to the Tahoe area or Mt. Shasta rather than ski at Lassen.

Two points are pertinent to our urging the National Park Service to upgrade its winter use facility at the Lassen Park Ski area:

1. The present lifts provide skiers little access to an enjoyable experience while at Lassen. We would seriously consider bringing our instructional program to Lassen if this were not the case, provided adequate housing could also be found to accommodate class numbers.

2. It is suggested that increased use of the ski area is necessary to make lift improvement economically feasible. Of our 13,000 students several thousand are active downhill and cross country skiers. These young people will return to Lassen if adequate ski area development takes place and provide an economic input not now coming to the area.

We think the possible physical education instructional program use and use of the general student population from this institution would be important factors both educationally and economically at an improved Lassen Park Ski Area.

We urge that the proposal of the "Friends of Lassen Park Ski Area" for one chair lift from the present Poma lift base to Ridge R and the movement of the Poma to an upper bowl and relocation of the beginners rope tow be accomplished as soon as possible. We also support the Park Service plans for improvement of base support facilities.

If our instructional staff can be of any further assistance, please feel free to call on us. We wish this statement read into the record of the August 1977 hearings by the Park Service on this matter.

Thank you.

Sincerely,

Charles D. Scott

CHARLES D. SCOTT, Department Chairman
Department of Physical Education

CDS:dd

cc: · Congressman Harold T. [Bizz] Johnson

CHESTER AND LAKE ALMANOR CHAMBER OF COMMERCE

BOX 295, CHESTER, CALIFORNIA

August 23, 1977

Mr. Bill Whalen
Director, National Park Service
U.S. Department of the Interior
Washington, D.C. 20240

Dear Mr. Whalen:

The Chester-Lake Almanor Chamber Of Commerce representing the Chester- Lake Almanor business community is concerned with the proposed Master Plan for Lassen Volcanic National Park. Economic impact on the area as well as the needs of the skier and Park Visitor are of concern to us. As immediate neighbors the decisions made on Lassen Park have a large impact on us. As you probably know this is an economically depressed area in the winter.

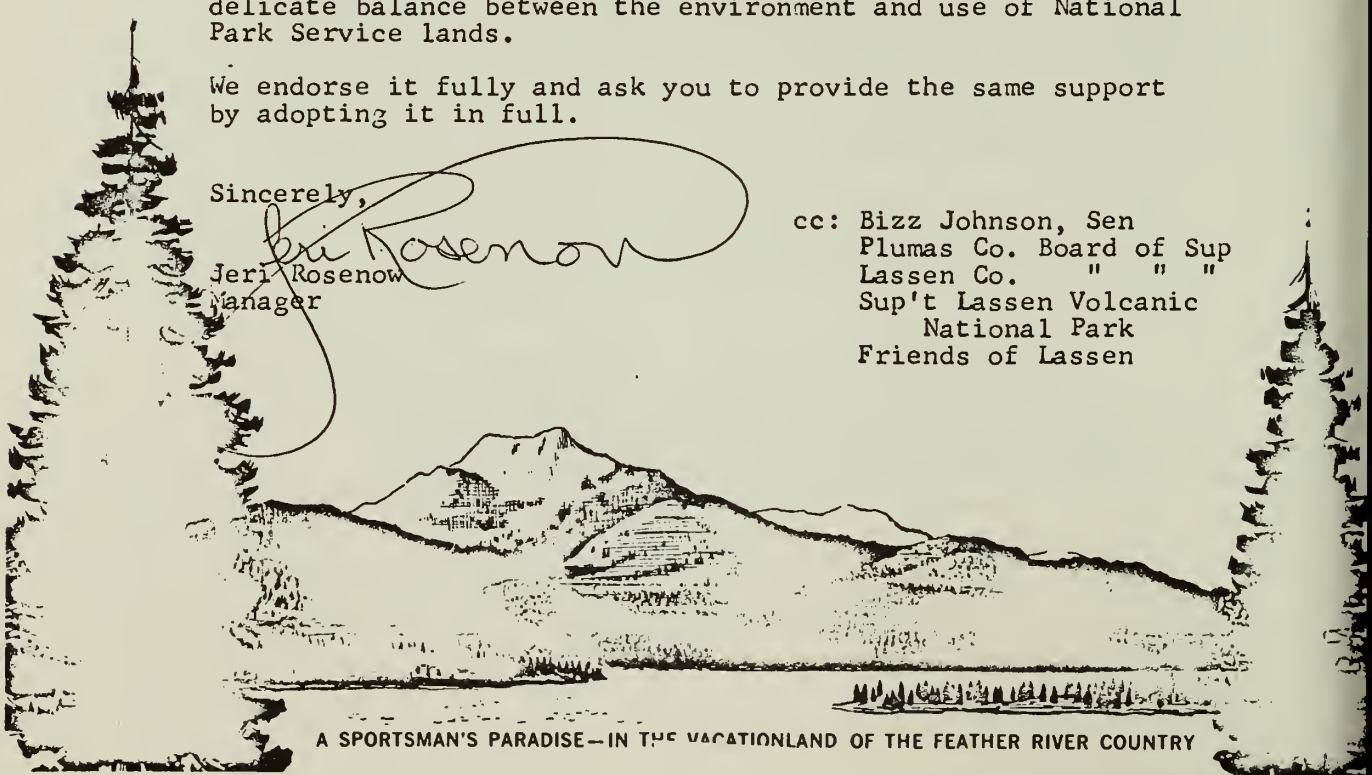
We have also studied the Friends of Lassen Ski Area Plan. This plan is well thought out and recognizes all the factors involved with the proposed changes. This is an exisiting area and as such has less impact than the creation of a new area. A need is satisfied and the plan is cognizant of the delicate balance between the environment and use of National Park Service lands.

We endorse it fully and ask you to provide the same support by adopting it in full.

Sincerely,

Jeri Rosenow
Manager

cc: Bizz Johnson, Sen
Plumas Co. Board of Sup
Lassen Co. " " "
Sup't Lassen Volcanic
National Park
Friends of Lassen



A SPORTSMAN'S PARADISE—IN THE VACATIONLAND OF THE FEATHER RIVER COUNTRY

Chico Area Recreation and Park District C.A.R.D.

545 VALLOMBROSA AVENUE
CHICO, CALIFORNIA 95926
TELEPHONE (916) 342-4281

July 29, 1977

National Park Service Representatives
Silver Dollar Fairgrounds
Fair Street
Chico, Ca 95926

Re: Public Hearing on Lassen National Park Ski Area

Gentlemen:

The Chico Area Recreation and Park District Board of Directors wishes to express their support of the "Friends of Lassen Ski Area" in their efforts to modify the existing ski area in Lassen National Park.

The Chico Area Recreation and Park District, for many years, has conducted ski lessons at the Lassen Ski Area for the residents of our community. Many of the individuals who received, possibly, their first exposure to the Lassen Ski Area through this program would look upon it as a very desirable area to ski with the advent of the proposal. The primary reason the District uses the Lassen Ski Area is because of its close proximity to the Chico area. Our other alternatives would be to drive to the Tahoe or Shasta areas. It would require additional driving in order to arrive at these more remote areas.

We feel that the proposal is of a minimal nature and will help to mitigate a great deal the increasing pressures on the existing facilities.

We are also supporting the relocation of the beginners' area away from the archaeological site.

Our Board looks forward to support of the proposal by the Park Service and would be most pleased to provide additional information if desired. We are quite confident that skiers from the Chico, Red Bluff, and Redding areas would receive with a great deal of pleasure the Park Services affirmative decision to proceed with the proposal presented by the "Friends of Lassen Ski Area".

Sincerely,

Jerry Hughes
General Manager

mb

cc: Jim Gregg, Friends of
Lassen Ski Area
Jim Lynch, Chamber of Commerce

August 1, 1977

Lassen National Park
Master Plan Hearing
Silver Dollar Fairground
Chico, California

Gentlemen

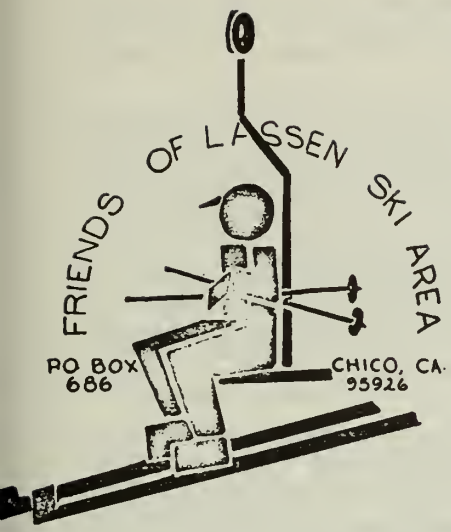
Approximately one year ago when we reviewed the various options to the proposed Master Plan for the Lassen Park Ski Area, we were encouraged that the Park Service was taking positive steps for marked improvement in the ski lift facilities. Last spring when we reviewed the recommendations of the local Regional Planning Office, we were still very optimistic that the Park Service was making progress to improve the ski area. However, approximately a month ago when we read the final report, we felt disillusioned and let down because there was very minimal modification to the existing ski area.

Over the last several years we, the "Friends of Lassen", consisting of local citizens, have spent much time and personal expense in working with Lassen Park personnel in arriving at a Master Plan for the ski area that was viable. When it appeared that our recommendations, advice and efforts were not being recognized, it became necessary for us to present a compromise plan that would take the best advantage of the previous plans. 1

The attached editorial that appeared in the Chico Enterprise-Record on Friday, July 29, 1977, explains clearly the existing position of a great many people who ski at the Lassen Park Ski Area.

It is hereby requested that this letter and this editorial be made a part of the official record of this hearing tonight.

Karl Wahl, Chairman
Master Plan Committee
"Friends of Lassen"
Route 1, Box 474H
Chico, California 95926



FOR THE NATIONAL PARK SERVICE

LASSEN VOLCANIC NATIONAL PARK HEARING

AUGUST 1ST, CHICO, CALIFORNIA

The Friends of Lassen Ski Area wishes to use this opportunity to comment on the National Park Service Master Plan for Lassen Volcanic National Park. We appreciate the tremendous amount of time and effort that have gone into the planning stages. We have much praise for the work and results forthcoming. However, there is one area that the committee feels the planning team has selected a course less than satisfactory. This area is the area dealing with the ski area and the one the Friends of Lassen Committee will confine its remarks to.

Until the May, 1977 supplement was released, we were led to believe that the National Park Service was planning to improve their facilities at the ski area. It seemed that the effect the Park has had on the region--how it served regional needs and the fact that actual physical improvements were needed--was recognized. The May, 1977 supplement fails to recognize and relate to these needs.

In response to this supplement, the Friends of Lassen Ski Area wishes to introduce into the record, an alternate comprehensive plan that analyses the goals previously stated by the National Park Service planners. It combines the need of the area and the best of each alternative to give a strong, beneficial Master Plan for the Lassen Ski Area that will be a positive asset to Lassen Volcanic National Park while enhancing the alpine skiers appreciation of the value of the area, fulfill regional needs, comply with the National Park Service's mandate to "protect the resourses for the enjoyment of future generations" and provide an environmental upgrade that is otherwise unfeasible due to economics. This is a rounding out of the existing facility.

Throughout the period of public hearings and comments this committee will submit additional information and economic figures to show the soundness of this plan. May this plan now be considered part of the record and we invite the National Park Service to adopt it in full.

CHICO ENTERPRISE-RECORD

1977 CALIFORNIA NEWSPAPER PUBLISHERS ASS'N., INC.

AN INDEPENDENT NEWSPAPER – Published every evening except Sunday at 700 Broadway, Chico, Calif. 95926 by The Enterprise Publishing Co
CHICO PHONE 891-1234
All Departments
Office in Paradise—Phone 877-4496

CIRCULATION DEPARTMENTS
Paradise 877-7210 Gridley 868-5285 Corning-Vina 824-4147
Willows-Arbois 934-4031 Orland 865-3400

A W Bramwell, Editor and Publisher
Garey Weibel, General Manager Bill Lee, Executive Editor

Local Input on Lassen Ski Plan

It sometimes happens that the people know more about certain public programs and problems than they are given credit for by government officials who administer public facilities and decide on solutions to public problems.

All too often, even when they are offered the help and advice of the people, government agencies and officials are inclined to ignore the people and proceed as if their area of operation were a private domain rather than a public responsibility.

Fortunately, however, this has not usually been the case insofar as the National Park Service is concerned. In many instances, this agency has sought out—and carefully considered—opinions from the people on national park matters. As a result, America has one of the world's best national park systems, a system which provides a maximum amount of public service and enjoyment while at the same time assuring the enhancement and preservation of the natural resources and scenic beauty of our park areas.

At the moment, the National Park Service is involved in such a "contact with the people" process concerning development of a new alternate master plan for the Lassen Park Ski Area.

Skiing used to be a sport available only to the very rich, or to people fortunate enough to live in a mountain area affording natural opportunities. Ski resorts were distant from population centers and the costs of the transportation, hotels, meals and equipment were quite beyond the average citizen.

In recent years, however, skiing has become popular with millions of average citizens, thanks in part to development of ski areas in national parks, the building of better roads, mass production of equipment, and so forth.

The Lassen Park Ski area is an excellent example. It has enabled people from our area to enjoy skiing when they couldn't afford the longer trips and higher expenses involved in skiing at some of the plush Tahoe resorts or other Sierra ski centers to the south. As such, what happens to the Lassen Ski Area is of great interest to the thousands of Mid-Valley families who look to it as their main source of participation in this wholesome sport.

For that reason, it is good news that the National Park Service is holding a series of six public hearings next week in Northern California on the proposed alternate plan for the Lassen Ski Area.

And it is also good news that a carefully researched report and suggested plan—designed by a Chico area committee—will be presented at the first of those public hearings scheduled for Monday evening right here in Chico (7:30 in the Art Center at the Silver Dollar Fairgrounds).

The local report and plan is the product chiefly of a group which has dubbed itself the "Friends of Lassen." It is headed by longtime local citizens who also happen to be family ski enthusiasts, such as Rock McClellan, Jim Gregg, Jack Windsor, Karl Wahl, Tom Vanella and others. (The five named participants in themselves account for over a century and a quarter of skiing at Lassen.)

The local committee was prompted to come up with its report and proposals after studying the initial park service plan and finding it deficient. They applaud the agency's recognition of the "genuine need for improvements at Lassen," but they believe their ideas to be superior from the standpoints of service to the people, enhancement of economic factors both for Lassen and for the counties of this area, and superior environmental considerations.

The local committee's report and proposals make so much good sense that they have already been accorded the support of Rep. Harold T. "Bizz" Johnson, who represents this area in Congress and by virtue of knowledge and seniority is one of the most potent voices in Washington on national parks and natural resources.

By necessity, the report and proposals of the local committee are laden with technical data and recommendations that will make more sense to Park Service officials and experienced ski operation experts than to the rest of us. But the goals of the proposal are clearly defined and embody unquestioned promise.

For example, in the realm of proposed facility changes, the local committee comes forth with potent suggestions on improved chair lift location and operation that will greatly enhance the ski area's ability to serve more Mid-Valley family skiers. In turn, the recommendations for expanded lodge facilities and additional parking are designed to help handle the additional patronage and avoid congestion.

In the bargain, the proposal's recommendations would result in the creation of additional employment as well as the attraction of additional ski-tourist dollars to the Lassen region and neighboring counties such as Butte.

Also of interest in this realm of "economic factors" is that the proposals could be accomplished chiefly via additional revenue generated by the skiing and other recreation features, rather than at the cold expense of the taxpayer. This is a point worth noting.

Needless to say, environmental considerations play a large role in the local committee's proposals. Such features as switching away from air-polluting gasoline and diesel generators to commercial electricity for ski-lift power are significant.

Monday night's meeting at the fairgrounds will be open to the public. Persons interested in learning more about the local committee's plan and having an impact on the National Park Service decision will find it worthwhile to attend.

RESPONSE TO COMMENTS BY
FRIENDS OF LASSEN SKI AREA

1. The proposals for the Lassen Ski Area have been revised and these changes are incorporated in the final environmental statement. These proposals are aimed at providing a higher quality experience for family oriented skiing. While the area will not be expanded and slope capacity remains unchanged, utilization of the slopes should be improved with more area available for the more advanced beginners. The proposals are a compromise between removal and expansion, but should provide a modest, well rounded ski area.

FRIENDS OF THE EARTH
124 SPEAR SAN FRANCISCO CALIFORNIA 94105
(415) 495-4770

August 24, 1977

Superintendent Wilbur Stephenson
Lassen Volcanic National Park
Mineral, California 96063

RE: Draft General Management Plan (August 1976), Draft Environmantal Statement (August 1976), and Supplement (May 1977)

Dear Sir:

The draft General Management Plan basically retains the pleasant status quo and we agree with most of it. We feel that the following recommendations would help protect the natural resource and would provide more meaningful experiences for visitors.

Friends of the Earth feels that mechanical ski lifts do not belong in national parks. The existing downhill facilities in Lassen should be removed and the Sulpher Works area used in winter for snowshoeing and cross-country skiing, two activities that are appropriate for NPS natural areas and are growing rapidly in popularity.

We view the location proposed for the concession facilities as an improvement over Manzanita Lake, but feel higher priorities exist for park funds. If built, these new facilities should be "showcases" of environmentally-sound construction including the recycling of all wastes and solar heating and cooling. We hope the proposed "jointly-operated" NPS-USFS interpretive center helps divert some visitors to the national forest lands surrounding the park, an area we feel should be designated a national recreation area to act as a buffer for the park and to provide more recreational opportunities. 1

We congratulate the NPS for continuing the ban on snowmobiles in the park. We are disappointed, however, that the plan made no mention of providing (or even studying) a shuttlebus system for the main park road although one could provide access for those unable to hike (without the congestion and pollution of private vehicles), interpretation and a hikers' shuttle. With the main road closed to private vehicles during the crowded periods, the road would make a good bicycle path, the huge parking lot at the Lassen Peak trailhead could be reduced considerably in size, and Summit Lake could be used for walk-in camping (with a reduction in the present adverse impacts outlined in the Environmental Statement). 2

We strongly support the proposed acquisitions of Section 36, Kelly Camp and the remaining private inholdings in Juniper Lake and Hat Creek. We support the closure of the Juniper Lake road beyond the campground when the inholdings have been purchased and we have no

objections to relocating the campground as long as the primitive character is retained. We see no reason why the Badger Flat road should not also be closed when the Hat Creek inholdings are acquired. 3

We doubted the wisdom of the recent $55,000 remodeling of Drakesbad while other parts of the park were being starved for funds. We are bothered by both the use of 67 acres of Drakesbad's meadows for stock grazing and the use of hot springs for a private swimming pool. In short, visitors not staying at the resort do not feel welcome around Drakesbad even though it is one of the most scenic areas in the park. 4

NPS policies regarding wilderness have changed considerably since 78,982 acres of Lassen were given protection under the Wilderness Act. At the time, FOE and other conservation groups wanted 101,000 acres designated. The conservationists' proposal is consistent with recent NPS policies, so we hope the NPS will recommend these additions. We continue to oppose the stocking of the park's lakes and streams. 5

Friends of the Earth appreciates this opportunity to comment on the planning for Lassen Volcanic and we will do what we can to help preserve this unique national park.

Yours truly,

Chuck

Chuck Williams
National Parks Representative

Mimi Abrams

Mimi Abrams
Conservation Assistant

RESPONSE TO COMMENTS BY FRIENDS OF THE EARTH

1. See responses to the Resources Agency of California. The National Park Service has an active recycling program including a mandatory container deposit in all areas. Lassen Volcanic National Park is a leader in the National Park System in efforts to recycle waste products. The National Park Service has an energy policy which directs that all new developments make use of the latest technology to reduce reliance on non-renewable fuels and that existing developments be renovated to reduce energy consumption. These policies are available for review at the park headquarters or the San Francisco Regional Office.

2. See response to comment 8, The Resources Agency of California.

3. The proposal has been revised to include the closing of this road.

4. The continued use of the meadows for grazing was addressed in the Resources Management Plan and has been discontinued. No adverse effects could be determined due to the use of the hot springs water for the swimming pool.

5. See response to the California Native Plant Society.

FRIENDS OF THE EARTH
124 SPEAR SAN FRANCISCO CALIFORNIA 94105
(415) 495-4770

Reply to:
State Capitol Office
717 "K" St., Suite 209
Sacramento, Calif. 95814
(916) 446-3109

September 3, 1977

National Park Service
Lassen Volcanic National Park
Mineral, Ca 96063

Dear Friends:

Friends of the Earth Sacramento has just completed its review of the Draft General Management Plan for Lassen Volcanic National Park, and in general we believe the Plan to be a satisfactory document. In particular Friends of the Earth Sacramento concurs with the Plan's assessment of the environmental impacts associated with the proposed developments outlined in the Plan. We, however, are not all together satisfied with all of the Park Service's analysis; as a result, we would like to address what we feel are the areas inadequately discussed in the Plan. In three areas Friends of the Earth Sacramento believes that the Park Service must re-evaluate its analysis and reconsider its conclusions: in the areas of water quality and sewage treatment, air quality and mass transportation to and from and within the Park, and the proposed parking lot expansion for the southern entrance of the Park.

Friends of the Earth Sacramento is disappointed that the proposed sewage treatment strategy of the Park presented in the Plan failed to include an analysis of the feasibility of treating sewage generated by Park vistors by on-site, contained, aerobic and an-aerobic bacterial or other so called "alternative" sewage systems. The Plan does address the need to adequately treat Park sewage in an urgent and straightforward manner for which the Park Service is to be commended. Friends of the Earth Sacramento, however, wonders why the Park Service failed to consider alternative sewage systems now available and why the Park Service continues to rely on centralized, capital intensive sewage systems instead? Friend of the Earth believes that these new, on-site treatment systems could meet the needs of the Park, particularly in the more remote areas of the Park, and still meet the most stringent of EPA standards. Furthermore, such sytems would have the added benefits of being cost effective and being alternative sources of energy if these systems are equipped to produce and store bacterial manufactured natural gas. Implementing these alternative sewage systems would provide the Park Service with a novel means to minimize the environmental impact and cost of the Park Service's operations and help to demonstrate to the country that such alternatives are environmentally safe, cost effective, and energy efficient. We, therefore, urge the Park Service to include an

FRIENDS OF THE EARTH
124 SPEAR SAN FRANCISCO CALIFORNIA 94105
(415) 495-4770

analysis of alternative sewage systems as a means of treating the Park's sewage in the Final Plan.

Friends of the Earth Sacramento is concerned that the Park Service is treating the issues of Park air quality and transportation to and from and within the Park too lightly. The Plan, we believe, unnecessarily stresses the need to continue to cater to the needs of the automobile. We acknowledge that the great majority of Park vistors continue and will continue in the near future to utilize their private autos in order to enjoy the natural resources of the Park. But by emphasizing this continued dependency on the private auto and failing to plan for alternative means of transportation, we believe the Park Service is contributing to the impaired air quality of the Park and is neglecting its responsibilities to plan for the future. Specifically, waiting for the Detroit automakers to cut auto emmissions is not, in our opinion, the answer to improving air quality in the Park as the Plan implies on page 98. Current experience in the U.S. Congress shows that the automakers are reluctant to comply with current EPA air quality standards, let alone comply with the stricter air quality standards proposed for the future. Similarly, fleeting references to train and bus lines that service the Park will not expand or improve mass transportion services to the Park or encourage Park vistors to utilize mass transportation systems. Lastly, as the Park Service mentioned on page 108 of the Plan, America's supply of fossile fuels are quickly running out, and the question of access to the Park in the future is in question. We believe that the Park Service has failed to vigorously pursue alternative transportation means that would improve air quality within the Park and transport vistors to and from and within the Park. Therefore, we feel that it is incumbent upon the Park Service to begin planning now to develop mass transportation services for the Park. Developing mass transportation services for the Park will mitigate the current environmental impact of auto use and enhance vistor appreciation of the Park. In this regard we urge the Park Service to include a feasiblity study for a Yosemite Park type tram service that would operate in the peak summer months. Such a tram service could transverse the popular trans-park road and have terminals at the southern entrance of the Park and the Lost Creek area (or new Manzanita Chutes area) and make stops at all the Park's most popular sites. The Park Service should also investigate the possibility of working with private bus and train firms so as to improve mass transportation service to the Park from near by towns. Perhaps the ski lodge and the new Manzanita Chutes vistor areas could serve as summer bus stops.

2

3

FRIENDS OF THE EARTH
124 SPEAR SAN FRANCISCO CALIFORNIA 94105
(415) 495-4770

Lastly, Friends of the Earth Sacramento questions whether the Parking Lot Expansion proposal for the southern entrance of the Park will prove to be adequate for the winter skiing crowds. From the figures provided in the Plan, it appears that the Planners are assuming that some 3.1 persons per car will be the average number of people who will actually drive up and utilize the parking. Are there any quantitiveable data that will support this assumption? In this regard we feel that the alternative describing the construction of a multi-storied parking structure (page 284 of the Plan) has strong merits and should be strongly considered. Furthermore, such a facility could also serve in the summer months as a convenient and natural terminal for the tram service along the trans-park road. Vistors to the Park could park their cars in the parking structure and ride the Park Tram to whatever sites they wish to visit. 4

Aside from these three major areas, the rest of the Plan represents a well written and well prepared document. In particular the use of the numerous maps made reading the Plan easy and simple and helped to explain the proposals and alternatives outlined in the Plan. The Plan for the most part showed a keen sensitivity and recognized the unique nature of the Park's environment and the needs of the Park's vistors. As a result, Friends of the Earth has no objections to the proposed developments outlined in the Plan.

To conclude, then, Friends of the Earth would like to briefly comment on some of the alternatives presented in the Plan we find of particular importance:

Friends of the Earth Sacramento is unequivically opposed to the use of snowmobiles in Lassen Volcanic National Park and all other National Parks and supports the Park Service's position of prohibting the use of snowmobiles in Lassen National Park for winter "recreation." purposes.

We support realignment "C" for the new northern Park entrance road and alignment "F" for the Ankiln Meadows road as the least environmentally disruptive proposals.

We would like the Park Service to examine more carefully the Hostle ideas brieflydiscussed on page 303 of the Plan. We feel that Hostles could prove to be an excellent means for vistors to utilize and enjoy the Park.

Friends of the Earth Sacramento wishes to thank the Park Service for the opportunity to review the Draft Gene al Management Plan, and is looking forward to reviewing the Final Plan. For Friends fo the Earth Sacramento,

Sincerely,

Michael Keesee

Michael Keesee, EIR/S Coordinator

RESPONSE TO COMMENTS BY
FRIENDS OF THE EARTH (STATE CAPITOL OFFICE)

1. See response to comment 3 under the Environmental Protection Agency and to comment 24 under the ResourcesAgency of California. During the detailed design of the sewage treatment facilities, contained or package systems will be considered.

2. See response to comment 8 under the Resources Agency of California.

3. Alternative means of transporting visitors to and from Lassen Park were considered during the formulation of the master plan options. These were deemed unfeasible at the moment because of the "drive-through" nature of the park road and lack of heavy use through much of the visitor season. See response to comment 8 under The Resources Agency of California.

4. The southwest entrance parking area capacity will not be expanded; however, the number of cars that may be parked could be increased through the use of attendant-directed parking. Increasing the size of the parking area could have overcrowded the ski area facilities and committed several acres of land to blacktop. If overuse of the parking area occurs, park management will determine whether to turn visitors away or find alternative parking sites (such as along the road). The plan does not preclude the use of a shuttle system from remote parking sites if there should be a future need for this service. However, where National Park Service transportation systems are in use, the major problem of long-term parking has been difficult to resolve.

TO .SUPERINTENDANT, B. STEVENSON
.LASSEN VOLCANIC NAT. PARK
.MINERAL, CALIF., 96063

FROM HILLS & TRAILS SKI-HIKE CLUB)
93 BRANT AV.
CLARK, N.J. 07066.

SUBJECT SNOWMOBILES. DATE 8/30/77

MESSAGE

SUBJECT SHOULD BE KEPT OUT OF OUR NATIONAL PARKS. PLENTY OF TRAILS EXIST FOR THE DANGEROUS GAS GUZZELING TOYS. WHEN USED SENSIBLY THEY HAVE A PLACE BUT NOT WHERE SKIERS USE THE SAME TRAILS. THEY RUIN TRAILS FOR SKIERS AND DESTROY THE PEACE. KEEP THEM OUT FOREVER!

Hills & Trails
SKI - HIKE - CLIMB
93 Brant Avenue, Clark, N.J. 07066

SIGNED Peter L. Steele, Pres.

Rediform® 4S 468 ☐ NO REPLY NECESSARY ☐ REPLY REQUESTED — USE REVERSE SIDE

International Snowmobile Industry Association

Suite 850 South
1800 M Street, N.W.
Washington, D.C. 20036
(202) 331-8484
Telex: ISIA WSH 89-534

August 1, 1977

Mr. W. Stephenson, Superintendent
Lassen Volcanic National Park
U.S. Department of the Interior
Mineral, California 96063

Dear Mr. Stephenson:

We have reviewed the Draft General Management Plan and EIS and Supplement for Lassen Volcanic National Park. We wish to indicate our disagreement with the decision to retain the ban on all snowmobile operation in the park.

National parks should provide opportunities for high quality, personal experiences for all individuals throughout the year. Man's need for recreation and spiritual refreshment does not go into hibernation with the advance of cold weather, ice and snow. The enclosed publication entitled "The Role of Recreation in the Life of Man" provides insight into the critical need for diverse recreational opportunities, and the role which snowmobiles can plan in ameliorating the impact of harsh winter conditions. Some nine million U.S. and Canadian citizens have already discovered this reality.

Today's snowmobile is markedly quieter than its predecessors of a few short years ago. Most new snowmobiles are subject to a double-faceted sound level requirement: 78 dBA under a full throttle acceleration test and 73 dBA under a constant speed pass-by test at typical trail speeds.

The result is that snowmobile sound normally becomes indistinguishable from background ambient levels at a distance of ¼ to ½ mile, depending upon terrain, wind and other factors. This means that snowmobile operation, properly controlled, is quite compatible with many other, non-motorized outdoors activities. We have included a document on snowmobile sound for your use in future planning activities.

We feel that the failure to permit any snowmobile operation in Lassen discriminates against the young, the old, the handicapped and families. Just as personal motor vehicles are used during warm weather months as a transportation mode, so can and should snowmobiles be utilized.

All traces of snowmobile operation over roads vanish with the melting snow, unlike alpine ski runs and other improvements in Lassen. Research has confirmed that controlled snowmobiling does not produce significant adverse environmental impact, as the position paper on the subject enclosed demonstrates.

Finally, we feel that park management should investigate the use of such techniques as "time zoning"--whereby use of snowmobiles would be permitted during particular time periods--as a way to insure high quality park experiences for all. In this way, park officials can avoid discouragment of winter visitation for a very large portion of the American public.

Sincerely,

Derrick A. Crandall
Director of Government Affairs

DAC/CF

Enclosures (3)

cc: Paul Carr
Susie Linzmeier

RESPONSE TO COMMENTS BY
INTERNATIONAL SNOWMOBILE INDUSTRY ASSOCIATION

The issue of snowmobile use within the park was addressed, both pro and con, at all of the public meetings. Since there are adequate areas adjacent to the park where snowmobile use is permitted, the National Park Service will continue to prohibit snowmobile use within the park.

WOLFGANG L. HAUER · 80 SEWARD APT. B2 DETROIT MICH. 48202

Michigan Botanical Club

Southeastern Chapter

Mr. W. Stephenson
Lassen Volcanic park
Mineral Calif.

Dear Mr. Stephenson

The 500 members of our organization would like to inform you that we are unanimously opposed to the establishment of further downhill skiing facilities as envisioned in the D E S of Lassen National Park. The obvious encroachments of roads and shelters are incompatible with scenic aesthetics, and wildlife habitat preservation, of flora and fauna. They would also greatly increase difficulties of visitor safety measures and park visitor surveillance by park personnel. For the same reasons we are also strongly in favor of banning snowmobiles in the confines of the park area. There are plenty of opportunities to pursue such sport activities in the ajecent national forest areas

Sincerely
Wolfgang L. Hauer

150 VAN NESS AVENUE
SAN FRANCISCO, CALIFORNIA 94101
TELEPHONE AREA CODE 415 • 565-2451

Newsland
TRAVEL AND NEWS MAGAZINE OF THE WESTERN MOTORIST

August 2, 1977

Superintendent
Lassen Volcanic National Park
Mineral, CA 96063

Dear Sir:

I wish to submit my recent article on Lassen as a written comment on the General Management Plan--i.e., this is an expression of how one person enjoyed and used the park, as a hiker's, backpacker's and camper's park.

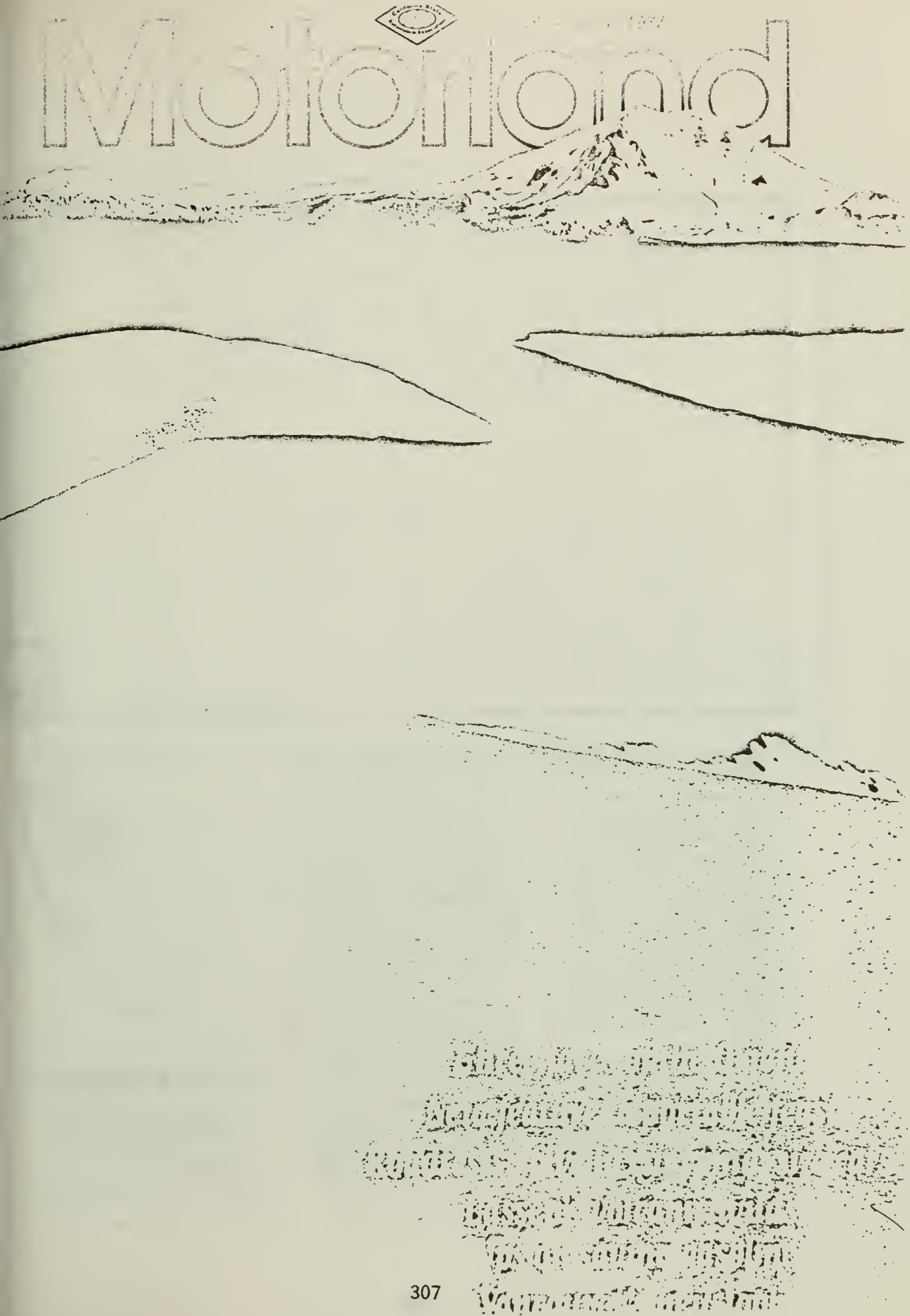
I feel that the park should remain as it is, largely wilderness with only minimal--or even no--commercial facilities. Although I must admit that Drakesbad greatly enhanced my experience of the park...it is a rare and unique hostelry for a national park.

I feel that the Manzanita Lake lodge complex should be torn down and that general area returned to a more natural state.

Sincerely,

Lynn Ferrin

Lynn Ferrin
Associate Editor


Motorland

Manzanita Lake is a tranquil place to camp and row your boat. Lassen Peak erupted in 1914, but it's cold and peaceful now.

DAVID MUENCH



Sometimes you feel like Bilbo Baggins, or some other traveler from the books of J.R.R. Tolkien, when you're wandering across that weird and marvelous country that surrounds Lassen Peak. It's a landscape made for fantasy tales: steaming fissures, snowy craters, cinder cones, waterfalls and soda springs.

The place names might have been given by Tolkien himself; within Lassen Volcanic National Park you'll find the Chaos Jumbles, the Fantastic Lava Beds, Devil's Kitchen, Cold Boiling Lake, the Grassy Swale, the Crystal Cliffs, and so on.

With all its variety of natural scene, Lassen is an intriguing park to explore. It has the usual mountain attributes of clear lakes, piney woods and snowfields. But it also has volcanic and thermal oddities like fumaroles, plug domes, mud pots and red cinder dunes.

Main feature of the park is 10,457-foot Lassen Peak, southernmost of the great fire mountains along the Cascade Range. It's the most recently active, too—in 1914 and 1915 it erupted several times, making a horrendous show and giving the United States its only living, performing volcano. The area was already a national monument, established in 1907 by that great friend of American wilderness, President Teddy Roosevelt. Publicity following the eruptions helped make it a national park in 1916. The crater is cold now—you can even walk around in it—and Lassen is considered dormant. But visual evidence of the hot fires of inner earth are found today throughout this untrammeled and beautiful park.

Lassen is for hikers and campers. More than 150 miles of trails crisscross the park. Except for areas around the roads and campgrounds, much of the park—almost 75 percent of it—is classified as wilderness. Most of the magnificent backcountry is accessible only to those who travel on foot, horseback or skis.

The main park road runs thirty miles from the southwest to the northwest entrances, traveling around three sides of Lassen Peak on the way. Unpaved roads penetrate the park at Warner Valley and Juniper Lake in the southeast and at Butte Lake in the northeast. And it's a very long drive between these areas on roads outside the park. (For example, from Juniper Lake to Butte Lake is only 10 miles by trail; by car it's 66 miles.)

Lassen is relatively uncrowded—it draws one sixth as many annual visitors



Lassen Volcanic National Park

Land of fire and ice

This mess is Chaos Jumbles, created three centuries ago during the eruptions of the Chaos Crags, four small volcanoes.



as Yosemite. Last summer the campgrounds at Manzanita Lake, Butte Lake and Crags were rarely full.

There are no hotels within park boundaries, except for Drakesbad Guest Ranch in the remote south-central part of the park. (The big resort complex at Manzanita Lake was closed a few years ago because of possible danger from rock avalanches.) If you want to enjoy the comforts of hotel and restaurant after spending your days on the trails, you can live it up at Child's Meadows Resort, nine miles from the park's southwest entrance.

About the drought: Of course, this summer Lassen Volcanic National Park will be dryer than usual; fire danger will be high and water supplies low. In April, water content of the snowpack was only 24 percent of normal. A few lakes, such as Butte and Snag, are much '. wer than normal. But others, like Manzanita and Summit lakes, haven't changed much. Thermal areas are not as spectacular as in a wet year, but they're still impressive.

Park personnel are conserving water, : almost everyone else in California. If water supplies become critical, some comfort stations may be closed and some campgrounds converted to dry camping. But conditions are not expected to be so bad that the entire park will be closed.

* * *

Exploring Lassen Volcanic National Park is easy—and educational, too. You'll learn a lot about volcanism, magma, plug domes and lava, and about how the land hereabouts was shaped by fire and ice. At the visitor centers at Manzanita Lake and Sulphur Works you can pick up several helpful publications on the park's natural and human history—its trees, wildflowers, birds, geology and early Indians.

Especially useful is *Road Guide to Lassen Volcanic National Park*, a $1 booklet with details about points of interest along the 30-mile park road. Indispensable to the hiker is 50-cent *Lassen Trails*, which describes the best hikes in the park, ranging from easy strolls of one-third mile to longer trips of eight miles and more. If you plan to do much hiking, you should pick up a copy of the park topographical map; the relief-shaded one provides an excellent perception of the terrain.

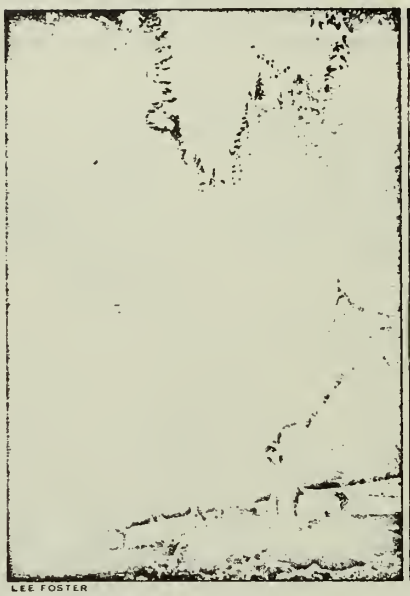
During the busy summer season, park naturalists offer a full schedule of interpretive programs: evening campfire talks, nature walks, and guided half-day and all-day hikes. Some of the best trails have self-guiding nature booklets.

* * *

Summon all your available energy and don a big sunhat for the climb of Lassen Peak. You'll also need water, suntan lotion, sunglasses and a windbreaker. The trail is steep and strenuous; it climbs 2000 feet in 2.2 miles, but it's often the most crowded trail in the park. And it's well worth doing, especially on your first day. There is the satisfaction of climbing a big mountain, and from the top you can get a good perspective of the park and look out over the places you'll be visiting later.

The trail switchbacks through mini-groves of gnarled whitebark pine, past clumps of silverleaf lupine and occasional snowbanks, and up the bare, windy flanks above timberline. At the top, you may find the actual summit so crowded there's no room to sit down. On the day of this writer's ascent, the climbers included: a woman who'd been up there eleven times, a baby who arrived on her mother's back, a man with one hand, and an electronic squadron of Japanese boy scouts with transistor radios blaring.

Gentle pursuits in the park include fishing in Hot Springs Creek near Drakesbad and watching blacktail deer.


LEE FOSTER


LEE FOSTER

Views from the top are far-reaching and splendid. Among several craters up there is the one that burst and burned in 1914-1915; now it's a jumble of lava and snow where kids squeal and throw snowballs. You can look down the route of the mudflow that swept the mountainside in 1915, devastating everything along its 18-mile rampage. In the parklands below are little jewel lakes in forest settings, and distant Cinder Cone. Further away are the smoggy Sacramento Valley, blanket-of-blue Lake Almanor, the snowy Trinity Alps, and that other ethereal, awesome volcano, Mt. Shasta, 75 miles north.

One of the most beautiful hikes in the park—and less crowded than the Lassen Peak trail—is up to the summit of nearby Brokeoff Mountain. The trail climbs 2600 feet in three miles, through sunny meadows, dark forests and the rugged country above timberline; views from the top are marvelous.

* * *

Boiling Mud Pot goes about its business night and day, spring, summer, fall, all those long months of winter when there's no one to see or care. Splat! Instant castles in the air! Pop! Sixteen cobras dancing! Splatter, gurgle, sigh. Drowning men sink out of sight, craters of the moon open and close, crabs raise their claws, fantastic pleasure domes rise and collapse. Everything you see lasts just an instant, then it's gone forever. One could lie on the wooden platform above Boiling Mud Pot and watch it for hours, watch all these subliminal landscapes that could have been designed by Hieronymus Bosch or Salvadore Dali.

And that's only one of the things that happen in Bumpass Hell, probably the most intriguing area in the park.

Wooden catwalks lattice the 16-acre hot springs basin so you can safely get up close to fumaroles, wildly boiling springs, pyrite pools, hissing steam vents and mud volcanoes. It all sounds like Spike Jones's band. The excellent self-guiding nature trail leaflet will explain what's been happening here; how glaciers polished the old lava, how the stupendous ancient volcano Mt. Tehama rose and fell, how a fault here penetrates down far enough to tap volcanic heat, etc. At the end of the nature leaflet is a thought to consider well: "The flow of energy in nature is continuous, and everything in nature, living or not, is tied to it."

Trekking into Bumpass Hell from the park road takes about three hours, round trip, and covers three miles. If you can arrange for a car shuttle somehow, a fine hike is to continue from Bumpass Hell down to Cold Boiling Lake and out to Kings Creek picnic area and rejoin the park road—a total of four miles one way, all downhill from Bumpass Hell.

As you descend the ridge, you'll pass through a vertical meadow fed by cold little springs, deep in green grasses, corn lilies, Indian paintbrush and penstemon. On the far shore, soda springs bubble up among the marshes, giving the lake its name.

* * *

Scrunch, scrunch go the cinders beneath your boots. Oh, the misery of climbing Cinder Cone! The trail climbs 700 feet in half a mile. Its deep powdery black cinders soak up the sun's heat and transfer it to you with vengeance. Every two steps you slide back one.

Don't be put off, though—the ascent of Cinder Cone is something every visitor to the park should try to do. The desolate moonscape that unfolds on the summit is weird, wonderful and unlike anything you've ever seen before. (Witness the cover of this issue.) While the lower slopes of Cinder Cone are black, the summit area is orange, red, yellow, black and white, relieved by brave little clumps of yellow sulphur flowers and shrubs of pale green willow. You can look out over the vast fields of ashes and cinders; below are the Painted Dunes, the Fantastic Lava Beds, distant cones, the sparkle-blue of Butte and Snag Lakes, and good old Lassen Peak.

Cinder Cone is in the far northeast corner of the park, an area blanketed with cinders from eruptions of various nearby volcanoes. If you must drive through the park from wherever you're staying, allow a long day—it's more than 50 miles each way, and you'll want to have several hours for exploring. If you're camping, it's more relaxing to stay in the Bu' Lake campground for a day or so a really explore this unique area.

If you're driving, take along the *Road Guide* and learn about the park features as you go. You'll drive below Lassen Peak, past Summit Lake and the Devastated Area, beneath Chaos Crags, across the Chaos Jumbles, and by the now-boarded-up Manzanita Lake resort complex. You might want to make short stops to hike the nature trail at Sulphur Works, to browse among the interpretive exhibits at the northwest entrance station. The Indian Ways nature trail is here, and displays on the tribes that inhabited the Lassen area, and samples of different kinds of local lava. On the return trip, it's nice to dip your angry toes in the icy swifts of Kings Creek, and lie around for a while in its juicy meadow, gazing at Lassen Peak, like a great ship sailing through the blue.

North of the park, the roads run through a region of tall pine and expansive views of neighborhood volcanoes. There is brief excitement along the banks of clear, rushing Hat Creek, where everyone in sight is carrying a fishing pole. Six miles of dirt road will bring you back into the park at Butte Lake.

The hike to the top of Cinder Cone and back will take you about three hours; sure to pack a water bottle. Pick u copy of the nature trail leaflet; it will tel you, among many other things, how pumice and basalt are formed and what

Stay on the catwalks. The man who named Bumpass Hell lost his leg after he stepped into a thermal pool.



LYNN FERRIN

the "angle of repose" is.

You can add a very interesting mile to your hike by following the trail down the ck side of Cinder Cone. It's a strange l lonely walk, with the dark lifeless one of ash looming above, past an "ice cave" in an 1851 lava flow, up and down over the Painted Dunes, where glassy volcanic bombs and a scraggly Jeffrey pine or two dot the cinder slopes.

A completely different face of the national park is revealed in the area around woodsy Summit Lake, popular with the camper-family crowd. If you like long day hikes, there's a pleasant 10-mile loop trip from Summit Lake to the Twin Lakes and back via the Cluster Lakes. After the fiery violence evident in the realms of Cinder Cone, this is a refreshing, mellow place of forest and water. The trail meanders among lodgepole, fir and hemlock and up green hillsides of manzanita. Along the way are such appeals as swimming in the lakes, watching a doe gently leading her fawns through the brush, listening to the hammering of woodpeckers (how *do* those tiny heads survive such treatment?) and general solitude.

* * *

The people who run Drakesbad Guest Ranch, and the people who stay there, know what the good things are: soaking in a natural hot springs pool after a long day on the trail, the tranquility of an old leather rocking chair on a wooden porch t looks on meadow and mountain, fine d, kerosene lanterns that don't interere with the burning stars, and good companions to enjoy it all with.

Drakesbad was a hot spring spa as far back as the 1860's; it's been a guest ranch since the turn of the century. It lies at the end of a 16-mile dirt road out of Chester, in the long green meadows of Warner Valley, within the park boundaries. It consists of a rustic main lodge built in 1938, a charming dining hall and a row of cabins without electricity.

Trails fan out from Drakesbad into the park wilderness, and the steaming thermal areas of Boiling Springs Lake and Devil's Kitchen are a short walk away. The Pacific Crest Trail enters the park nearby and runs north. Horses can be rented at the lodge stables; this writer especially enjoyed a ride up over Flatiron Ridge and down to Corral Meadow where Grassy Swale Creek tumbles into Kings Creek, and a cooling dip in the frothy pools above the waterfall.

A self-guiding nature walk goes out to Boiling Springs Lake, a place where *Macbeth's* witches would feel comfortable. Vapors rise from the opaque gray-green-pink waters of the lake and from its rainbow-colored shores, and you can hear soft pop-puffing and hissing all around. You may see a dipper working Warner Creek or a marmot waddling away, and it's very hard to get past the fascinations of the red ants who've built their mini-civilization beside the trail.

This year the thermal features of Boiling Springs Lake and nearby Devil's Kitchen are not as active as usual, but they're still well worth visiting.

* * *

Winter snows draw skiers and snowshoers to Lassen. The park road is kept open as far as the small ski area near the southwest entrance, popular with families from northeastern California. It has a poma-lift and two rope tows, which operate Fridays through Sundays and over holiday periods, and a cafeteria.

Cross-country skiing in Lassen is spectacular, varied and often adventurous. Lessons and guided tours are offered by Lassen Ski Touring Center. Beginners enjoy the one-mile tour from the ski area up to the fumaroles and hot springs at Sulphur Works. Otherwise, touring in the southwestern corner of the park is for good skiers—in good shape—who know something about winter survival. Slopes are steep and avalanche-prone. (Last winter two young skiers were hit by an avalanche on the park road; they survived because they knew how to take care of themselves.) Ski mountaineers tackle the summit of Lassen Peak, and more and more backpackers are traveling on skis to camp at the wilderness lakes. More gentle terrain around Manzanita Lake is ideal for cross-country skiing. —Lynn Ferrin

If you're going

Best CSAA map to use for a trip to Lassen is *Northeastern California.* It shows the surrounding area and contains a detailed inset map of the park itself.

Drakesbad Guest Ranch is open June to mid-September. Reservations are a must. For these write Drakesbad, Chester, CA 96020; or phone (916) 595-3306.

Only AAA-approved accommodation near the park is Child's Meadows Resort, about nine miles from the southwest entrance. It's open year-round. Write the resort, Mill Creek, CA 96061, or phone (916) 595-4411.

You'll find some small cabin-resorts and motels in Mineral, Mill Creek, Old Station and Hat Creek.

For information on the park contact Superintendent, Lassen Volcanic National Park, Mineral, CA 96063; phone (916) 595-4444.

Largest campgrounds in the park are at Manzanita Lake, Summit Lake and Butte Lake. The 470 campsites in the park are available on a first-come, first-served basis and there is a seven-day limit. Outside the park boundaries are several nice campgrounds operated by the U.S. Forest Service; largest is at Hat Creek, 14 miles north on State Route 89.

Backpackers must obtain a wilderness permit for all overnight stays in the back country of the park. They can be obtained at park headquarters and ranger stations, or you can get one in advance (allow two weeks) from the above address.

Anyone planning to camp or backpack in the park this summer should call in advance to find out about special regulations in effect because of the drought. For example, some campgrounds may be converted to dry camping, so you'll be required to bring your own water.

NPCA

August 12, 1977

William Stephenson
Superintendant
Lassen Volcanic National Park
Mineral, California 96063

Dear Superintendant Stephenson:

The following constitute the comments of the National Parks and Conservation Association on the Draft Environmental Statement for the Draft General Management Plan for Lassen Volcanic National Park. Since these views are submitted in behalf of NPCA's 45,000 members nationwide, we hope you will seriously consider our suggestions in the development of the Final General Management Plan for Lassen.

With the exception of the proposed expansion of Lassen ski area, the actions proposed for future management of Lassen Volcanic National Park appear to be highly desirable ones which merit our support. In particular, we find the expressed intention to work closely and cooperatively with the U.S. Forest Service in establishment of joint facilities and joint interpretive programs to be highly desirable and long overdue. The degree to which cooperation is anticipated in the Draft Environmental Statement should be given serious consideration in other units of the National Park System as well.

With regard to the proposed relocation of Manzanita Lake facilities, we fully concur in the necessity for permanently closing all facilities at Manzanita Lake because of the geologic hazard due to the potential rockfall avalanches in the Chaos Crags area. Realignment of a portion of the Lassen Park Road into an area outside the Park's northwest corner also provides an opportunity for location of a major park visitor and interpretation center as a joint venture with the Forest Service. We look forward to the results of cooperative planning between NPS and USFS for the location and design of this and other facilities which may be mutually beneficial and which offer the benefits of reducing costs and enhancing resource protection.

We fully support the proposal to acquire the 566 acres contained in section 36, which includes Terminal Geyser. Once included in the Park, this area would be accessible to visitors staying at facilities in the Warner Valley and would provide an opportunity for the relocation of the Pacific Crest Trail into a more scenic area. The lots (11) to be acquired on the northeast shore of Juniper Lake and those along Hat Creek (5) would essentially

National Parks & Conservation Association, 1701 Eighteenth Street, N.W., Washington, D.C. 20009
telephone (202) 265-2717
printed on recycled paper

eliminate private inholdings from within the boundaries of Lassen Volcanic National Park. This action has our full support. Preparation of the Park's natural resources management plan, which was discussed in the DES, should include a review of the status of endangered and threatened plants and animals within the boundaries of the Park, particularly those in locations where new construction or facility expansion is contemplated, such as in Warner Valley and at Summit and Butte Lakes. Special emphasis should be given to a determination of the status and a delineation of protective measures for the pine marten population within the Park. These studies must be completed prior to new construction. 1

The ban on use of snowmobiles within the boundaries of the Park should remain in effect. Since snowmobile users have alternative sites in Lassen National Forest and elsewhere in the region in which to enjoy their pursuit, and since snowmobile use in the Park would be likely to disrupt both other park users and native fauna, the exclusion of these machines should continue.

Prior to a final decision to retain the Drakesbad Dude Ranch in its present use, more serious consideration should be given to both Alternatives A and B as presented in the DES. The exclusive nature and small overnight capacity of the present Drakesbad Ranch readily identify it as a non-essential facility within the Park. Conversion to a hostel or complete elimination with increased emphasis on the Kelly camp area are alternatives that have merits which need to be more fully explored.

Despite our endorsement of other proposals contained in the Draft Environmental Statement and Draft General Management Plan, the proposal to expand the Lassen ski area facilities and capacity is one which we can neither comprehend nor condone. The Park Service's Management Policy Manual states that non-traditional recreational uses, such as ski areas, may be permitted when they do not "interfere with normal park usage; constitute a consumptive form of use; have an undesirable impact on park resources; compromise the historic or natural scene; or present a danger to the public welfare and safety, including the safety of the participants." It is apparent from the detailed discussion contained in the Draft Environmental Statement that the proposed expansion of Lassen ski area facilities and carrying capacity would seriously violate all five of the criteria set out in the Management Policies Manual. Other visitors to the park in the winter and virtually all visitors in the summer would find their experience degraded by the presence of downhill ski-related facilities including the terminals, sheds, towers, support poles, chair lift, parking lots, and denuded ski slopes. Expansion of ski facilities will consume an additional thirty-four acres of park lands for a total of 110 acres for the ski slopes and supporting development, lands which would otherwise be kept in a natural condition. The DES states that "installation and maintenance of the existing beginner ski tow and septic tank 2

and sewage line system have irreparably damaged two highly significant archaeological sites that clearly meet the criteria of the National Register of Historic Places." It is clear from this statement alone that the natural and cultural scene of the Park has been compromised. In addition, however, the DES also points out that the ski facilities and sewage treatment system have "caused ponding and flowing of inadequately treated effluent into West Sulphur Creek." Pollution of park streams is clearly an undesirable impact on park resources. In addition, in order to accommodate the proposed expansion of ski facilities, the water collection system, parking lot, and ski lodge will all have to be upgraded or expanded, and a seven mile underground commercial powerline brought into the park. As Alternative 1 (page 261) of the DES clearly indicates, if the ski facilities were removed from the park altogether, none of these additional facilities and concommitant expenditures would be necessary. At a time when the Park Service is coming under increasingly stringent budgetary and personnel restrictions, and when the overdevelopment of parks is being seriously questioned, it seems incongruous that the Service would propose such unnecessary and undesirable facility expansion. 2

The Service's conclusion (DES page 150) that "the aesthetic quality of winter recreation would decline as overcrowded conditions increased" fails to recognize that the National Park Service is charged with preventing overcrowded conditions through establishment of carrying capacity and use limitations. Overcrowding of facilities or areas of the park should not occur if NPS is performing its job properly. Of additional importance to the argument against expansion of ski facilities in Lassen Volcanic National Park is the fact that five other existing, competing ski sites in the Lassen region already offer an annual capacity estimated at 1,067,000 skiers and are adequate to satisfy the growing demand for some years into the future. In addition, an area within Lassen National Forest known as Carter Bowl is apparently being investigated as to its suitability for establishment of a ski facility at this site. It is likely that other potential sites exist as well. Consequently, since NPS has placed such heavy reliance on coordinated planning with the Forest Service in other aspects of the general management plan, it seems proper to insist that the Lassen ski area not be expanded until other potential ski area sites outside the park have been fully explored. 3

From NPCA's viewpoint, it is particularly important in small, wilderness parks like Lassen, subject to heavy use, that developments be placed outside park boundaries whenever possible. While it seems apparent that NPS and USFS's cooperative efforts will address this need in the proposed visitor contact and interpretive facilities near each end of the Lassen Park road, it would seem to be equally desirable for cooperative planning efforts to encompass

the full array of alternatives for ski facilities as well. If the National Park Service is to adhere to the letter and spirit of both the NPS Organic Act and its current management policies, the decision to expand ski facilities in Lassen Volcanic National Park must be reconsidered.

We look forward to a continuing opportunity to comment on the full range of planning decisions for Lassen in the future, and are hopeful that our comments in this instance will be seriously considered.

Sincerely,

T. Destry Jarvis

T. Destry Jarvis
Administrative Assistant
Parks and Conservation

TDJ:kn
cc: William J. Whalen
Howard Chapman

RESPONSE TO COMMENTS BY
NATIONAL PARKS AND CONSERVATION ASSOCIATION

1. See response to comment 1 by the U.S. Fish and Wildlife Service, and to comments by the Resources Agency of California.

2. National Park Service management policies allow the continued use of existing ski areas. The proposals have been revised to provide improved facilities with mitigation of adverse impacts. These measures are discussed in more detail in response to comments by the Environmental Protection Agency and the Resources Agency of California. Sewage treatment facilities would have to be improved even if the ski area operation were discontinued.

3. In the near future, winter use levels are not projected to create significant overcrowding in most areas of Lassen Park. A use capacity of 800 tickets per day has been set at the Lassen ski area. The monitoring and research components of the natural resource management plan will provide baseline information so that capacity and use limits can be established for all areas in the park. See the discussion of capacity, section I. D.

NATIONAL SKI AREAS ASSOCIATION

61 South Main St., P. O. Box 83, West Hartford, Conn. 06107
(203) 521-0206

CAL CONNIFF, *Executive Director*

August 31, 1977

BOARD OF DIRECTORS

PRESIDENT
Jay Price
Boreal
California

FIRST VICE PRESIDENT
Philip T. Gravink
Gore Mountain
New York

SECOND VICE PRESIDENT
Charles D. Lewis
Copper Mountain
Colorado

TREASURER
Preston L. Smith
Killington Ski Area
Vermont

SECRETARY
Robert B. Loughrey
Bogus Basin
Idaho

Richard D. Bass
Snowbird
Utah

D.R.C. Brown
Aspen Skiing Corporation
Colorado

David L. Carlo
Snow Trails
Ohio

Richard A. Coker
Cataloochee Ski Area
North Carolina

Thomas A. Corcoran
Waterville Valley
New Hampshire

James V. Ferrara
Thiokol Corporation
Utah

Raymond I. Johnson
Alpine Meadows
California

Channing B. Murdock
Buttermut Basin
Massachusetts

Roy Parker
Sierra Blanca
New Mexico

William J. Riley
Mt. Mansfield/Stowe
Vermont

Carl N. Reynolds
Multorpor
Oregon

Carl E. Schenck
Big Mountain
Montana

EX OFFICIO
William A. Norton
Cannon Mountain
New Hampshire

Peter Seibert
Vail
Colorado

Frank V. Snyder
Stratton
Vermont

Mr. Bill Whalen
Director, National Park Service
Department of the Interior
Washington, D.C. 20240

Dear Mr. Whalen,

The National Ski Area Association has very closely followed government policy towards ski facilities on public lands. We are especially concerned with the need to provide increased winter services at a time when increasing demand is far outstripping available supply. The Lassen area has experienced this high rate of growth with no improvements in facilities. We would therefore like to comment on your General Management Plan for Lassen Volcanic National Park and specifically the Lassen Park Ski Area.

Primary recognizance must be given to the fact this is an existing area on public lands. Each National Park's Master Plan should be considered separately and if possible allow for the regional role previously served by the park. For the past twenty years the Lassen Park Ski Area demand has grown without an improvement of facilities and the skiing experience. The Lassen Park Ski Area is and will remain the primary facility to serve the Tehama, Butte, Lassen and Southern Shasta Counties. Each year many thousands of people appreciate the experience of skiing in Lassen Volcanic National Park. However, many more are turned off by the lack of a quality skiing experience due to the inadequate facilities that exist at the present time. This fact was well supported at all of the public hearings.

As our Nation's energy demands and priorities change it will be increasingly important to have facilities close to home. With increasing leisure time throughout the year, greater numbers are turning to winter recreation through skiing. Existing facilities will have to be improved or new areas built in order to keep pace with the rapidly expanding demand. This is highly unlikely in the Lassen Area. Existing, local, close to home facilities will help reduce energy requirements while providing a low cost, quality winter experience to a greater spectrum of the populace.

A small well rounded area, as outlined in the Friends of Lassen Ski Plan is a definite asset to the surrounding communities. Proper planning and lift placement can make this facility environmentally sound in all aspects including construction and road access. The plan proposed by the Friends of Lassen has merit and has been well thought out. It takes into account the seriousness of the environmental question and addresses it head on, incorporating many improvements and upgrades.

We urge you to implement the Friends of Lassen Plan to protect the environment, round out an existing facility and provide needed additional access for the communities surrounding Lassen Volcanic National Park.

Very truly yours,

Jay Price, President
National Ski Areas Assoc.

JP:mb

cc: Superintendent, Lassen Volcanic National Park
Hon. Harold T. Johnson, Washington D.C.



Northern California County Supervisors Association

HEADQUARTERS OFFICE
19300 S. COW CREEK RD. PHONE (916) 547-4633
MILLVILLE, CALIFORNIA 96062

August 15, 1977

Mr. Bill Stephenson, Superintendent
Lassen National Park
Mineral, California 96063

Dear Mr. Stephenson:

The Northern California County Supervisors Association has gone on record generally supporting the Management Plan for Lassen Volcanic National Park as presented by Park Naturalist Richard Vance.

The association, in addition to the Park's proposal, supports the proposal of the Friends of Lassen Ski Area which would provide for enlargement of the present ski area and make facilities available for the more experienced skier.

The members of the association argue that full development of the ski area is necessary for the skiing interests of Northern California so that people do not have to travel long distances to enjoy this winter sport. This would conserve energy in the use of motor fuel.

Your favorable consideration of our position will be appreciated.

Sincerely,

Bessie L. Sanders

Bessie L. Sanders
President

September 18, 1977

Superintendent
Lassen Volcanic National Park
Mineral, CA

Northsate Wilderness Committee
708 Cherry St.
Chico, CA 95926

Dear Sir;

Please accept the enclosed comments for the official record. They are late for two reasons. First, we requested and were promised a copy of the expansion alternative proposed by the Friends of Lassen Ski Area from the Friends (etc.). We wished to comment on their proposal. We did not receive that document. We repeated our request, they repeated their promise to send one. We did not receive a copy. Second, heavy time demands on our members, all volunteers, have delayed our response.

Thank you,

Nancy Morton

Nancy Morton, Co-coordinator

Steve Evans, Co-coordinator
Northstate Wilderness Committee

Superintendent
Lassen Volcanic National Park
Mineral, CA 96063

Northstate Wilderness Committee
708 Cherry St.
Chico, CA 95926

Dear Superintendent;

The Northstate Wilderness Committee wishes to submit written comments on the Draft Management Plan of Lassen Volcanic National Park.

In reference to the Manzanita Chutes developement, we are concerned with the following points. Visitor services should not be increased above the previous level existing at Manzanita Lake. We are pleased with and support the emphasis on bicycle and foot trail access to Manzanita Lake. We feel that the landscape design and subsequent scenic restoration of Manzanita Chutes should reflect ecosystems native to the immediate area. 1

We urge the acquisition of Section 36, T 30 N, R 5 E, and protection of the resources therein (timber, geothermal features) in their natural state.

There should be an increased emphasis on protection of the archaelogical sites of the Yahi Indians. All efforts to preserve the remaining sites are important to the cultural resources of Lassen Volcanic National Park. Interpretive programs of the Yahi's use of the Park will promote understanding of this Park resource. 2

The Northstate Wilderness Committee supports the draft supplement's position of non-expansion of the ski area. The skier congestion should be relieved by the minimal realignment of the existing tows. The addition of a chair lift is opposed by the Northstate Wilderness Committee. The economic feasibility has been discussed in the draft. We do not feel that this federal agency should subsidize a private concessioner. Even with subsidies, the lift rates would still increase. The increased cost plus the economically necessary increased patronage would change the family atmosphere that is valued now. The increase in visitor use would strain the carrying capacity of the Park and lead to impairment of resource quality. Overcrowding would certainly result. Increased visitor population would increase impact on the resources of the Park during a time when Nature usually has a respite from Man.

The spirit of a national park is not an amusement center. A national park is a preserve of nature, managed for visitors to understand and appreciate its own resources, not for people to build and

construct their contraptions. By designating much of the Park as wilderness, the rest of the Park was not released from protective status. Non-wilderness Park lands are still to be managed for protection of Park resources and use regulated to assure that resource quality is not impaired.

Niether would the ski area be in the Park only for the 50 to 60 days it would be in use. The proponents of the expansion alternative speak of cutting only a few trees, putting up just a couple of lift towers and plowing only one road up Ridge R. This certainly doesn't agree with the management objective to "restore and maintain the terrestrial and aquatic ecosystems as they most probably existed prior to technological disturbance by Man." Certainly, there are other areas in the surrounding mountains that are not in protected lands and that have the potential for ski developement.

Finally, the Northstate Wilderness Committee commends the Park Service and strongly supports the alternative of no snowmobiles in the Park. There are hundreds of miles outside of the Park in the immediate vicinity that have no restrictions against snowmobiles. This one natural preserve can be free from motorized intrusion during the winter months.

Respectfully submitted,

Nancy Morton

Nancy Morton, Co-coordinator

Steve Evans, Co-coordinator
Northstate Wilderness Committee

RESPONSE TO COMMENTS BY
NORTHSTATE WILDERNESS COMITTEE

1. Proposals for development of major commercial facilities in Manzanita Chutes (Meadows) have been dropped. Further consideration of these needs will be addressed in future Forest Service planning efforts.

2. A parkwide cultural resources survey will be conducted as part of the cultural resources management plan. Among other items, this survey will identify sites of the Yahi Indians and evaluate their significance.

PARADISE RECREATION DISTRICT

TERRY W. ASHE
DISTRICT MANAGER

6626 SKYWAY - (916) 877-6211
PARADISE, CALIFORNIA 95969

PARADISE RECREATION AND PARK DISTRICT

August 11, 1977

Superintendent
Lassen Volcanic National Park
Mineral, California 96063

Dear Sir:

The Board of Directors of the Paradise Recreation and Park District recently discussed proposed plans for the Lassen Ski Area.

The plans call for installation of one chair lift, move the existing poma lift to the upper basin, relocate and lengthen the beginner rope tow out of the archaeological site area.

Our District family "Learn to Ski Program" is no longer held at Lassen due to the inadequate facilities. The Lassen Ski Area is much closer than the Tahoe area and we would certainly utilize the new facilities.

The Board unanimously approves of increasing the ski facilities at Lassen Park and encourages your support in this matter.

Sincerely,

Terry Ashe

Terry Ashe
District Manager

TA:er
cc: James E. Gregg
The Friends of Lassen Ski Area

Agriculture
Commerce
Industry
Recreation

Red Bluff - Tehama County
Chamber of Commerce

G. W. Hard, Jr.
Manager

P.O. Box 850
100 Main Street
Red Bluff, CA 96080
(916) 527-6220

RECEIVED

September 2, 1977

Mr. Bill Stephenson
Superintendent
Lassen Volcanic National Park
Mineral, California 96063

Dear Mr. Stephenson:

In light of the major interest of the Red Bluff-Tehama County Chamber of Commerce in Tourism and Recreation, and after significant investigation into the costs and benefits, the Chamber would like to be on record as in favor of the development of increasing the ski services and facilities as proposed by the Friends of Lassen, as well as the full development of the Manzanita Lake area as proposed by your office on August 5, 1977 in Red Bluff, California.

This was passed by the Chamber Board of Directors on September 2, 1977.

Thank you very much.

Sincerely,

G. W. Hard, Jr.
Executive Vice President

GWH/bmc

Greater REDDING Chamber of Commerce

"Where the bright waters meet"

August 3, 1977

Mr. Bill Stephenson, Sup't
National Park Service
Lassen National Park
Mineral, CA 96063

Dear Mr. Stephenson:

The 1977 Draft Management Plan and Environment Statement has been discussed at the July 25th meeting of the Board of Directors of the Greater Redding Chamber of Commerce. The Board wishes to go on record as favoring the proposal in the Management Plan to retain a major visitor service center in the Manzanita Lake area of Lassen National Park. The Board wishes to place this letter in the records of the August 4, 1977 hearing in Redding to confirm its approval of the general scope of this proposal. The use of the existing campground and the development of extensive new facilities on the west side of the lake should enhance opportunities for many visitors to enjoy this magnificent natural setting.

The Board would encourage a further look at the future of Loomis Museum either by moving the building outside the area labelled hazardous or by developing a plan for day use of the facility.]1

The Board will follow with interest the further development of the Master Management Plan for the Manzanita Lake area. We appreciate very much the cooperation of park officials in keeping us informed as planning has progressed. We would be willing to have representatives of the Chamber share in any visitation of specific site locations for new facilities as the plan is developed.

Sincerely,

John R. Mathena, president
GREATER REDDING CHAMBER OF COMMERCE

JRM:lm

1345 Liberty Street, Redding, CA 96001 / (916) 243-2541

RESPONSE TO COMMENTS BY
GREATER REDDING CHAMBER OF COMMERCE

1. The Loomis Museum is of such construction that moving it to another site would be virtually impossible. Continued day use of the facility would be contrary to the intent to minimize exposure in the hazardous area.

REDDING SCHOOL DISTRICT

BONNY VIEW • CYPRESS • JUNIPER • LIVE OAK • MANZANITA • SEQUOIA • SYCAMORE

ADMINISTRATIVE OFFICES: 1805 SEQUOIA STREET, REDDING, CALIFORNIA 96001
P. O. BOX 2418
TELEPHONE (916) 246-1050

July 27, 1977

Mr. Bill Stephenson, Superintendent
Lassen Volcanic National Park
Mineral, California 96063

Dear Bill:

As a member of the sub-committee of the Chamber of Commerce concerned with the Lassen Park development, I want to indicate my satisfaction with the decision of the Park Service to provide a Visitors Center at the west portion of the park near Manzanita Lake.

I also feel the decision to retain the existing highway instead of relocation is a very commendable move. I hope that strong consideration could also be given to retention of the fine museum at the lake to be used on a daily basis as an auxiliary building at the Visitors Center. I recognize the museum is in the hazard area but, with the additional monitoring service as well as only daily use, it is vital to retain the quality of the museum presently existing. I also concur with other members of the committee who feel that future expansion of the campsite should be planned subsequent to funding in future years. 1

I would like to commend you for your conscientious work in keeping our committee and all interested parties posted about the development of these plans. I feel the Park Service is most fortunate in having this kind of dedicated service you have provided.

I look forward to continued cooperative development of these resources.

Very truly yours,

John

John F. Clark
Superintendent

RESPONSE TO COMMENTS BY
REDDING SCHOOL DISTRICT

1. See response to comments by Greater Redding Chamber of Commerce

AN EQUAL OPPORTUNITY EMPLOYER

Regional Council of Rural Counties

11th & L Building
Room 512
Sacramento, California
95814
(916) 447-4806

PRESIDENT
ERIC W. ROOD
NEVADA COUNTY
FIRST VICE PRESIDENT
EUGENE HANSON
MONO COUNTY
TREASURER
HARRY "GLENN" SMITH
AMADOR COUNTY
EXECUTIVE COMMITTEE
WILLIAM FREEMAN
ALPINE COUNTY
LARRY LALAGUNA
TEHAMA COUNTY
TILIO CHIAPPELLI
TUOLUMNE COUNTY
GLENN SMEDLEY
DEL NORTE COUNTY
PAST PRESIDENT
B. ALONZO CORNWELL
MADERA COUNTY

August 30, 1977

William Stephenson
Superintendent, Lassen Volcano
National Park
Mineral, CA 96063

Dear Mr. Stephenson:

During the August 24, 1977 meeting of the Regional Council of Rural Counties, the Board of Directors unanimously voted to endorse the Lassen Park Ski Area Draft Comprehensive Plan as suggested by the Friends of Lassen Ski Area.

The Regional Council of Rural Counties believes the proposal as presented is a valid method of enhancing the park area and looks to the ecological concerns without threatening the existing environment.

Sincerely,

Eric W. Rood
President

EWR:cp
cc: Board of Supervisors
Tehama County

For the record, my name is John F. Reginato. I am the general manager of the Shasta-Cascade Wonderland Association, with headquarters at South Market and Parkview Streets, Redding, California. The primary purpose of our Association is to promote visitor travel to northern California.

Three of the six counties we represent are within the boundaries of Lassen Volcanic National Park, namely Lassen, Shasta and Tehama. We have addressed ourselves a number of times to the development and management of Lassen Park.

The last time was in regard to the National Park Service closure of the Manzanita Lake area. Tonight we will respond to two areas of development, which we feel are essential to provide well rounded services and needed facilities in the park.

The recommendations in the draft supplement, which pertains to the Lassen Park Ski area, we find most inadequate. We support strongly the Lassen Park Ski Area (draft) Comprehensive Plan, developed by the "Friends of Lassen Ski Area". We do not intend to review the plan, inasmuch as the plan will be and has been discussed at great length at previous sessions, and this evening, as well.

Before proceeding to the next subject, it should be brought to the Service's attention that inadequate ski areas are found in the northstate area. Mt. Shasta Ski Bowl development is currently understudy for expansion. That study has been ongoing, continuing with no date currently set as to when a decision may be rendered. Meamwhile, northern California skiiers have inadequate facilities for an expanding recreational activity. The National Park Service should move expeditiously forward on this project.

This Association vigorously opposed closure of Manzanita Lake Lodge and the adjacent campground. We supported the opening of the Manzanita Lake Campground with its minimal facilities.

Being fully aware that no entrance anywhere in Lassen National Forest or private lands adjacent to the park boundaries can equal the setting of Manazita Lake Lodge, we support the National Park Service plan to develop the Manzanita Chutes area.

We are fully aware of the lack of forested area, waterways, et al, but these features can be modified with proper landscaping. Lassen Peak and Chaos Crags are two main ingrediants, as the report points out, that are highly visible.

We do not favor phased development of the new park entrance facilities or the Association supported proposed ski development of the "Friends of Lassen Ski Area." It is our judgement that there be total funding, once the plans have been approved. We will urge our congressman and California senators to seek immediate and complete funding.

STATEMENT OF SHASTA COUNTY BOARD OF SUPERVISORS
ON LASSEN VOLCANIC NATIONAL PARK GENERAL MANAGEMENT PLAN

The Shasta County Board of Supervisors and Recreation Commission have spent a considerable amount of time reviewing the proposals your agency prepared on the future of Lassen Volcanic National Park. We certainly concur in the selection of the Manzanita Chutes site west of Manzanita Lake for construction of the new visitor facilities. Under the assumption that the visitor facilities at Manzanita Lake must be moved, this is the best alternative site. We would like to work with your agency as you select specific sites for development in this area. This development should be kept as near the lake as is possible for added enjoyment of the visitors and should include a lodge, museum and store as we think the need has been demonstrated for these facilities and their reconstruction should begin immediately. Your agency should accelerate the construction schedule to provide at least the level of service previously provided at Manzanita Lake at the earliest possible date. We may be of some assistance in seeking the necessary funding for reconstruction of these badly needed facilities. 1

We hope that you would also coordinate development with Shasta County on our proposed snowmobile parking area which will be located near the entrance to the park. Shasta County has been allocated funds to provide these facilities on Forest Service land and this development should be compatible with the needs within the Park. 2

Adopted by the Shasta County Board of Supervisors on August 1, 1977.

We would also like to see the development of a winter snow play area including ice skating on Reflection Lake. Ice skating is not now provided anywhere in Shasta County and this would be an excellent area for this activity. 3

Cross-country skiing development should be expanded in the Manzanita Lake area of the Park. This is an activity that is not detrimental to the environment and the sport is really catching on. 4

We also concur in the retention of the park road through Chaos Jumbles. The danger through this area is much less than driving to the Park on the adjoining State highway.

We support the concept of reorganizing and rounding-out the downhill skiing facilities in the ski area near Mineral, similar to that concept proposed by the Friends of Lassen as presented in their draft comprehensive report dated July 18, 1977. Considerable thought was put into that study to provide a facility that will be economically feasible, will provide a well-rounded type of skiing and will do little damage to the environment of Lassen Park. The snow conditions are much better at Lassen than the nearest alternative ski areas and with the improvement of the facilities, the number of visitors should increase to support those facilities. The plan deserves serious consideration by your agency.

We appreciate the efforts of Mr. Bill Stephenson, Superintendent of the Park, and his staff in reviewing with us the proposals by your agency and hope that we can be of assistance in obtaining a speedy reconstruction of park facilities to meet the public's needs.

Dated August 1, 1977

PGL:RWD:vn

RESPONSE TO COMMENTS BY
SHASTA COUNTY BOARD OF SUPERVISORS

1. Development of lodging, general store and other replacement facilities by the National Park Service is not now proposed. The Forest Service has agreed to consider the need for commercial facilities as part of their land use planning effort.

2. The new interpretive facilities in Manzanita Chutes will be designed for winter use and should be compatible with plans for the development of snowmobile facilities outside the park.

3. Development of a winter snowplay area including ice skating in the Reflection Lake area would result in the exposure of visitors to an unacceptable hazard. In effect, it would be an invitation for people to use a hazardous area.

4. Cross-country skiing is and will be permitted in the northwestern part of the park and is further addressed in the Backcountry Use Plan.

August 9, 1977

The Honorable Harold T. "Bizz" Johnson
First District, California
House of Representatives
Congress of the United States
2347 House Office Building
Washington, D. C. 20515

Dear Representative Johnson:

The Shasta County Schools Office has carefully reviewed the plans to improve the winter recreation facilities in Lassen National Park. In our judgment, the plans developed by "The Friends of Lassen" would most appropriately serve the students in public schools in Shasta County.

We are hopeful that you will review "The Friends of Lassen" proposal for the Lassen National Park and support this project.

Sincerely,

JACK S. SCHREDER
Superintendent

JS/blm

SIERRA CLUB

530 Bush Street, San Francisco, California 94108 (415) 981-8634
Northern California Regional Conservation Committee
1176 Emerson Street, Palo Alto, California 94301

September 4, 1977

W. Stephenson, Superintendent
Lassen Volcanic National Park
Mineral, California 96063

Dear Mr. Stephenson:

The following statement prepared by the Northern California Regional Conservation Committee sets forth the official views of the 175,000-member Sierra Club with regard to management plans for Lassen Volcanic National Park.

In general, the Sierra Club supports the National Park Service's draft general management plan of August 1976 (DGMP 76) as revised in a supplement dated May 1977 (Sup 77). Our comments on the various parts of the plan are arranged in the sequence of the topics in DGMP 76.

Interpretation (Goals and Facilities)

The Sierra Club endorses the National Park Service proposal (DGMP 76, pp. 13-14), assuming that it will not diminish the present naturalist program activities.

Lassen Park Road

The Sierra Club agrees with the views and intent expressed on pp. 14-15 of DGMP 76, but believes that the problem of congestion on the road and in parking areas should be addressed now by seeking a jurisdictional change and by planning for a new mode of transportation.

The Lassen Park Road should be removed from the State Highway System. The Mineral-Viola road could be upgraded to serve as part of State Sign Route 89, furnishing an all-year route outside the park, reducing through traffic on the Lassen Park Road, and permitting the National Park Service to regulate the use of the park road. 1

The NPS should prepare plans to institute some form of mass transit on the park road as a partial or complete substitute for private vehicular travel. The plans should be implemented if traffic exceeds the optimum capacity of the existing road or roadside parking facilities. 2

"When we try to pick out anything by itself, we find it hitched to everything else in the universe." *John Muir*

Manzanita Lake

With three reservations, the Sierra Club endorses the NPS proposal for the Manzanita Lake area (Sup 77, pp. 9-20).

The first reservation concerns Phase II (see p. 19). We believe that this undertaking should coincide with Phase I or perhaps precede it. Phase II is extremely important from esthetic and ecological standpoints; the buildings to be removed are eyesores, at least in their present state, and the pine forest in the lodge area needs to be rehabilitated or reestablished promptly as an important ecological feature of the park. 3

The second matter of concern has to do with the suggested new campground access road (see Sup 77, p. 18). It seems unlikely that such a road could fail to have a rather serious environmental impact. Careful study and an opportunity for public comment must precede any decision on the project. 4

The third question is in regard to the possible environmental impact of continued use of the Manzanita Lake Campground. A thorough, expert study of the extent and possible causes of the apparent deterioration of the forest (at least the overstory) in the campground area should be undertaken as soon as possible. If the campground is found to be a significant factor in the decline of the forest (if it is indeed declining), then all or some sections of the campground should be closed periodically or permanently, with compensating establishment or upgrading of campgrounds outside the park along Hat Creek and particularly Lost Creek in the Lassen National Forest. 5

In the press, mention has been made of a county proposal to encourage ice skating at Reflection Lake. The Sierra Club would oppose provision of substantial special facilities for ice skating, such as construction of a parking lot within the park or installation of electronic equipment to provide music in a commercial ice rink atmosphere. Encouragement of ice skating at Reflection Lake would, moreover, seem to indicate some degree of disregard for the rockfall hazard in the area. 6

Proposed Trail System in the Northwestern Part of the Park

The proposal outlined in DGMP (p. 27) and Sup 77 (p. 17) is supported by the Sierra Club so long as it does not require construction of new parking areas within the park. The trails should be so designed as to minimize their visual and environmental impact. Interpretive and sanitary facilities at the trailheads should be as inconspicuous as possible. 7

Lassen Ski Area

The Sierra Club endorses the NPS proposal presented in Sup 77 (pp. 2-7) on a temporary or provisional basis and with one exception.

National parks have been established to preserve and interpret natural and historical features of unusual significance. They should not be regarded merely as recreation areas, and certainly not as opportunities for commercial exploitation or even as stimuli for nearby economic activity.

The existence of a good site for a football stadium (perhaps a natural bowl) or for an automobile racetrack (perhaps a playa) would not be adequate reason to construct a football stadium or a racetrack in a national park.

Most Sierra Club members consider an extensive downhill ski development to be as inappropriate in a national park as a football stadium or a racetrack, because the construction and maintenance cause considerable environmental damage on the site, and the activity for which the development is provided is a sport that has little to do with the protection and enjoyment of unique natural or historical features. Moreover, the sport attracts large crowds that produce many problems -- large quantities of sewage, vehicle exhaust emissions, high-standard highway requirements, extensive parking facilities, high power requirements and need for new power transmission lines, and need for law enforcement services -- problems that cannot fail to distract the National Park Service to some degree from its primary purposes. Finally, the initial construction of the ski facilities and the necessary concomitant facilities requires a very large expenditure of park funds, funds that are never adequate even for the basic needs of the park.

In view of the foregoing statement, it might be expected that the Sierra Club would advocate immediate removal of the downhill ski facilities from Lassen Park. Instead, at least for the near future, the club endorses the NPS proposal to retain essentially the present level of development, with just the improvements needed to reduce environmental damage and to eliminate unnecessary minor annoyances to the users of the ski facilities. The Sierra Club does, however, take exception to the NPS plan in one respect: the club urges that the parking lot not be modified, but rather that it be replaced by a parking lot outside the park, probably in the logged area just south of Highway 36 at Morgan Summit, with shuttle bus service provided to the ski area. 8

In the case of the existing Lassen Park ski facility, the Sierra Club is recognizing the feeling of many local club members that the present small facility furnishes a unique "family-type" ski experience, as well as providing a base for low-impact cross-country ski and snowshoe trips. There is a reluctance to eliminate this development before the effects of the proposed environmental remedies have been assessed and before the possibility of an alternative site outside the park has been carefully studied. It has also been noted that the major cost in the proposed minimal improvement is for the sewage treatment plant, which could be used to serve a visitor center even if the ski facility were eventually removed.

It goes without saying that the Sierra Club opposes any expansion of the ski area, on grounds of inappropriateness in a national park, environmental damage, and excessive expenditure of park funds for a nonpark purpose. A further reason for opposition is that even the principal virtue of the present inexpensive, family-oriented ski facility would be destroyed by high prices and large crowds. It also seems unwise, at a time of uncertainty as to future energy supplies, to consider construction of a large ski development in an area which, unlike the Donner Pass area in the Sacramento-Reno corridor, has no possibility of railroad access and perhaps little possibility of adequate bus service because of the dispersion of the small population centers it would serve.

Summit Lake

The Sierra Club approves the NPS proposal as presented on pp. 33-34 of DGMP 76.

Warner Valley

The Sierra Club supports the NPS recommendations for Warner Valley (Drakesbad, Kelly Camp, and Terminal Geyser) as set forth on pp. 34-39 of DGMP 76.

The future of the existing campground in Warner Valley, small and primitive but dear to the hearts of some tent campers, is not clear. If there are no insoluble pollution problems or other environmental problems connected with this campground, its use could be continued even after the construction of the new campground at Kelly Camp. 9

The Sierra Club recommends that the problems caused by the location of the swimming pool at Drakesbad Guest Ranch be given continued attention.

Juniper Lake

The Sierra Club endorses the excellent NPS plans for the Juniper Lake area (DGMP 76, p. 39).

Butte Lake

The Sierra Club approves the NPS plan for Butte Lake (DGMP 76, pp. 39-42), but urges removal of the unsightly and noisy water supply facility on the shore of the lake. If the generator and pump cannot be located well back from the shoreline, a different water supply should be found (perhaps wells near the entrance road north of the lake). 10

Hat Creek

The Sierra Club supports the proposal to acquire the private inholdings (DGMP 76, p. 42). The future of the unsurfaced access road should be the subject of careful consideration, with an opportunity for public input. 11

Heart Lake-Huckleberry Lake Area

The Sierra Club believes that the 10,300-acre Heart Lake Roadless Area at the southwest corner of the park in the Lassen National Forest should be designated a national forest unit of the National Wilderness Preservation System or else be added to the park. This area is very scenic and contains extensions of ecosystems located partially within the present park boundary.

Snowmobiles

The Sierra Club believes that snowmobiles have no place in a national park, unless possibly for emergency administrative purposes. Snowmobiles are such a severe annoyance to many people who are not snowmobile enthusiasts that they must be considered an extraordinary phenomenon requiring special regulation. Furthermore, since the question of their possible long-term impact on various forms of wildlife above and below the snow in this region has not been definitively investigated, it would be wise not to run the risk of an adverse impact in the national park; experimentation should take place elsewhere.

Air Quality

The Sierra Club urges the National Park Service and the U.S. Forest Service to insist that the Environmental Protection Agency classify Lassen Volcanic National Park and Lassen National Forest as a Class I air quality zone. Such designation would provide protection for the exceptional scenic and timber values of the Lassen area. 12

Wilderness

The Sierra Club recommends that nonwilderness portions of the park be considered for designation as wilderness, particularly areas that will be affected by moves to acquire private inholdings and to restore natural conditions. 13

The Sierra Club thanks you for this opportunity to present its views on management proposals for Lassen Volcanic National Park.

Sincerely yours,

Luis G. Ireland

Luis G. Ireland
Lassen Park-Lava Beds Monument Task Force

RESPONSE TO COMMENTS BY
SIERRA CLUB

1. Conversion of the Lassen road from a state highway to a National Park Service road was considered during the formulation of the master plan options. However, this conversion was determined not to be necessary during the next ten to twenty years because of a lack of heavy traffic volume on the park road through much of the visitor season. If other agencies wish to plan for an improvement to the Mineral-Viola road, the National Park Service will cooperate in this planning effort.

2. See response to comment 8, The Resources Agency of California.

3. Since some of the existing structures in the Manzanita Lake area could be relocated to the new development sites, they must remain in place until they can be removed. Other structures will be removed as soon as it is determined they will not be relocated. The exact phasing will be determined during the comprehensive design study and those facilities which have no potential for relocation could be removed immediately. The phasing presented in the proposal is not rigid--Phase Three actions could occur simultaneously with Phase One actions.

4. The relocated campground access road has been dropped from the propsoal.

5. The impacts on vegetation will be monitored as part of the natural resources management program. Periodic closure of all or parts of campgrounds is a common practice in National Park Service Areas and is addressed in Resource Management Plans. Should it be determined that permanent closure of the campground is necessary for environmental reasons, the National Park Service will seek the cooperation of the Forest Service in planning for additional campsites in the area of the northwestern part of the park. The long-term plan calls for closure of this campground.

6. See response to comment 3, Shasta County Board of Supervisors.

7. Trailhead parking areas are proposed primarily to direct parking rather than have cars pull off on the shoulders of the road. Design of trails and facilities will be given careful consideration during future design phases.

8. Expansion of the parking area has been dropped from the proposal. The plan does not preclude the use of a shuttle-bus system in the future. There will be minor modifications to the parking area when the interpretive center is constructed.

9. The proposal to relocate facilities to Kelly Camp has been dropped. Basically, the plan for Warner Valley calls for retention of existing facilities at present levels of development. This includes retention of the small campground.

10. As part of a continuing effort to improve water quality, the feasibility of alternate water supply sources will be studied. The plan does not propose specific solutions to these problems.

11. The access road will be converted to a trail after inholdings have been acquired.

12. This had been done.

13. See response to comment 1, California Native Plant Society.

August 1, 1977

Motherlode Comments

1. No snowmobiles
2
2. No expansion of ski area
   -out of park parking
   -shuttlebus system

3. We have grave doubts about the continued use of Manzanita Lake because of:
   -Environmental considerations
   -Preservation of Aesthetics
   -Public safety
   -Also we need more information on the realignment of road to Manzanita Lake.

4. Support inclusion of the 9,000 acre Huckleberry/Heart Lakes roadless area in the SW corner of the Park.

5. Advise that the Park road be de-designated from State Highway standards.

   Good points:
   -reduces through traffic and associated environmental, aesthetic and cultural impacts.
   - makes 89 an all-season highway
   -improves north/south Sierra traffic

The above comments were made by Willie Hyman on behalf of the Motherlode Chapter of the Sierra Club before the hearing August 1, in Chico.

Sierra Ski Areas Association

EXECUTIVE DIRECTOR · 70 BROADWAY · SAN FRANCISCO · CALIFORNIA 94111 (415) 421 4384

August 6, 1977

Mr. William Whalen
Director, National Park Service
U.S. Department of Interior
Washington, D.C. 20240

Dear Mr. Whalen,

On behalf of the Directors and the thirty six member ski areas of our Association, I would like to strongly support the concept of expansion for the Lassen Park Ski Area.

As you may know, Senator Floyd Haskell (D-Colorado) recently held hearings before the Sub-Committee on Public Lands and Resources on the Senate Energy and Natural Resources Committee. His Bill, S.1338, addresses areas of concern in the development and operation of downhill skiing facilities on public lands. A key point in his considerations has been the assurance that facilities and services on public lands be made available to the widest possible public.

The Lassen Park Ski Area is an excellent example of the kind of facility the Senator would like to see more of. It is not a flashy destination resort, but rather a local, family oriented, recreational resource.

From my own experience as Manager of the skiing facilities on Mount Shasta, I know that the skier markets in the Northern counties are strong and growing. Equally as important is the fact that local skiers are generally loyal and long term supporters.

Unfortunately, the skiing public in Northern California is going to be hard put to find uncrowded slopes in the years ahead. Today's economic and environmental constraints virtually preclude the development of new ski areas. Prudent expansion of existing facilities offers the only real hope of keeping capacity in line with skier demand in the years ahead.

ALPINE MEADOWS · BADGER PASS · BOREAL · CHINA PEAK · DODGE RIDGE · DONNER SKI AREA · ECHO SUMMIT
HEAVENLY VALLEY · HOMEWOOD · HORSE MTN. · JUNE MTN. · KIRKWOOD · LASSEN NAT. PARK · MAMMOTH MTN.
MT. REBA · MT. ROSE · MT. SHASTA · NORTHSTAR · PAPOOSE · PEDDLER HILL · POWDER BOWL · SIERRA SKI
RANCH · SKI INCLINE · SLIDE MTN. · SNOW SUMMIT · SNOW VALLEY · SODA SPRINGS · STOVER MTN. · SUGAR
BOWL · TAHOE DONNER · TAHOE SKI BOWL · TANNENBAUM · YUBA

Sierra Ski Areas Association

EXECUTIVE DIRECTOR · 70 BROADWAY · SAN FRANCISCO · CALIFORNIA 94111 (415) 421 4384

If, in the course of your deliberations of the future of the Lassen Park Ski Area, I or any of the members of the Sierra Ski Areas Association can be of assistance, please don't hesitate to call upon us.

Yours truly,

Bob Roberts
Executive Director

BR:ma

ALPINE MEADOWS · BADGER PASS · BOREAL · CHINA PEAK · DODGE RIDGE · DONNER SKI AREA · ECHO SUMMIT
HEAVENLY VALLEY · HOMEWOOD · HORSE MTN. · JUNE MTN. · KIRKWOOD · LASSEN NAT. PARK · MAMMOTH MTN.
MT. REBA · MT. ROSE · MT. SHASTA · NORTHSTAR · PAPOOSE · PEDDLER HILL · POWDER BOWL · SIERRA SKI
RANCH · SKI INCLINE · SLIDE MTN. · SNOW SUMMIT · SNOW VALLEY · SODA SPRINGS · STOVER MTN. · SUGAR
· BOWL · TAHOE DONNER · TAHOE SKI BOWL · TANNENBAUM · YUBA

SierraWest

September 9, 1977

Bill Stevenson
Superintendant
Lassen Volcanic National Park
Mineral, CA 96063

Dear Mr. Stevenson:

We have recently become aware that Lassen Volcanic National Park is considering allowing the use of snow machines within the boundaries of the park. As participants in silent wilderness sports - X-C skiing, hiking and backpacking - we suggest that the few remaining wilderness areas in this beautiful state be retained as they are, without the addition of noisey gasoline engines and the potentially incompatible behavior of the drivers of snow machines and wilderness users. Even the built-up portions of National Parks return to a near wilderness state in the winter time and we feel that is good for the park and good for the visitors.

Sincerely yours,

Michael Chessler

Michael Chessler
Sales Manager

MC:kam

6 East Yanonali Street, Santa Barbara, California 93101 805-963-8727

SierraWest

BOARD OF SUPERVISORS
COUNTY OF TEHAMA
POST OFFICE BOX 250 AREA CODE 916 527-4655
RED BLUFF, CALIFORNIA 96080

Dist. 1—Gene Penne, P. O. Box 366, Red Bluff, California 96080
Dist. 2—Larry Lalaguna, Route 2, Box 2634, Red Bluff, California 96080
Dist. 3—Barbara V. Crowley, Rt. 1, Box 580, Red Bluff, California 96080
Dist. 4—Bill Flournoy, Star Route, Box 14, Corning, California 96021
Dist. 5—Shannon O. Patterson, P. O. Box 108, Gerber, California 96035

MEETINGS
10:00 A.M. TUESDAY OF EACH WEEK



COURTHOUSE

August 10, 1977

Bill Stephenson, Superintendent
Lassen Volcanic National Park
Mineral, California 96063

Dear Mr. Stephenson:

Thank you for the opportunity to comment on the Draft Management Plan for Lassen Volcanic National Park. The Tehama County Board of Supervisors is concerned about some of its conclusions.

The board has no quarrel with the plan to replace the Manzanita Lake facilities in the Manzanita Chutes area just outside the park boundaries, though the expense is substantial and it will be a number of years before landscaping makes that area aesthetically pleasing.

The board does disagree with the conclusion that it would not be economically feasible to develop and improve the Lassen Ski Area. The minimal improvements proposed for existing facilities will solve few of the problems and will probably result in continued declining use.

There has been a steady increase in the number of skiers in this area, as reflected in new ski shops in Redding and Chico and expansion of ski equipment sales throughout the area. The reason Lassen Ski Area has not kept pace with this increase is primarily the lack of facilities. Overcrowding and long waits at the tows have discouraged many skiers. Others have deserted Lassen because the short runs are not challenging enough for the more expert skiers.

Improvement of the facilities would recapture many of them, who would prefer to stay in the area. The drive to Mt. Shasta or the Tahoe area is long and, in the winter, sometimes hazardous. A side benefit of keeping Northern California skiers in the local area is added conservation of our limited resources of gasoline.

The board recognizes that local economic benefits must be weighed against the larger objectives of protecting and conserving an area whose natural features are unique. However, from the standpoint of the Board of Supervisors, the increased business and additional employment which would be generated in Tehama, Lassen and Plumas Counties, all economically depressed areas, is an important consideration. Development of the Lassen Ski Area would surely have a favorable impact on restaurants, motels and resorts, service stations and stores on the south side of Lassen Park.

The board would like to point out that the federal government spends billions of dollars for CETA programs, Anti-Recession programs and Youth Employment programs. It seems to us that maintaining and improving facilities already in existence which will automatically increase the number of workers in the surrounding counties has every bit as much, if not more merit.

The board supports the Friends of Lassen proposal for improving the Lassen Ski Area, feeling it to be well thought out and both economically and environmentally sound. It follows the Park Service's guidelines as to archeological, aesthetic, environmental and ecological concerns.

The Park Service seems willing to invest approximately $14 million to relocate the Manzanita Lake facilities. Tehama County feels that for a much smaller investment the Lassen Ski Area could be developed into an outstanding winter use area without destroying its existing "family oriented" character.

The board would be in favor of the maximum development (triple chair lift) recommended by Friends of Lassen, feeling that the Park Service would be saving money in the long run by making improvements now which will accommodate the growth needs of the next 20 years.

Tehama County urges you to give careful consideration to the recommendations of the Friends of Lassen report. The board feels they are realistic and workable. The report has the board's heartiest endorsement. We hope it will have a significant effect on the final form of the General Management Plan for Lassen Volcanic National Park. 1

Thank you for allowing us to make our views known.

Sincerely

GENE PENNE
Chairman, Board of Supervisors

cc:
Sen. Cranston
Sen. Hayakawa
Congressman Johnson
Sen. Ray Johnson
Assemblyman Statham

RESPONSE TO COMMENTS BY
BOARD OF SUPERVISORS, COUNTY OF TEHAMA

1. The proposals have been revised to include major improvements to the ski area which will improve the quality of the experience. The slope capacity will not be increased. See the response to comments by the Friends of Lassen Ski Area.

Individuals

Comments by the following individuals have been selected as representative of the letters received.

Rush M. Blodget, Jr.
Eric Burr
Elva Busher
James H. Cooney
Terrence Cullinan
Shawn Denkler
Leroy G. Fox
Ron Guenther
Howard Harrison
Lawrence E. Hazard
Judith and Jack Hermann
Honorable Ray Johnson
Clyde E. Kuhn
Stephen H. Matteson
Neil Moore
John Redd
Joseph C. Schott
Dr. Robert W. Schultz
John B. Sutherland
John R. Swanson
Susan Watson
Harold W. Wood, Jr.
Lea Wood
Jeri Zemon

Responses follow those letters with comments needing specific responses.

RUSH M. BLODGET, JR., M. D.
F. M. BRUNEMEIER, M. D.
DONALD K. LIDSTER, M. D.
DANIEL R. BRANNON, M. D.

REDDING OPHTHALMOLOGY GROUP
1950 COURT STREET
REDDING, CALIFORNIA 96001

TELEPHONE 243-1423
(AREA CODE 916)

July 28, 1977

Mr. Bill Stephenson, Superintendent
Lassen Volcanic National Park
Mineral, California 96063

Dear Superintendent Stephenson:

As the member of a chamber of commerce ad hoc subcommittee to study the closure of Lassen Park, I recently reviewed an updated copy of the Draft General Management Plan for the Park's reopening. My own views, and, I believe, those of the other committee members, are now similar to the objectives stated in this revised plan.

The retention of campsite areas within the park with ultimate relocation of the access road is to be commended. We also highly approve of the Park Service's decision to relandscape Manzanita Chutes and to construct a tourist destination point complex there for lease to a qualified concessionaire. Development of overnight tourist accomodations would have otherwise been haphazard at best.

The retention of Drakesbad in its present status pleases us greatly.

The plan, as now drawn, permits persons of all age groups, including those with some limitation of physical activity, to have equal access to the Park.

We greatly appreciate the efforts you have made to bring this about and hope that implementation will go forward as scheduled.

Sincerely,

Rush M Blodget Jr

Rush M. Blodget, Jr., M.D.

RMB/sh

cc: Congressman Harold T. (Bizz) Johnson

Eric Burr
Box ~~109~~ 122
Kirkwood Ski Resort
California 95646

31 August 1977

Superintendent
Lassen Volcanic National Park
Mineral California 96063

Dear Sir,

Thankyou for sending Lassen Park's latest draft management plan and environmental statement. It is the best such package I have yet seen, and I have been collecting ski area EIS's lately. Please include this letter in the record of written comments.

My views represent twenty years of education and experience in the forest recreation field, and I currently divide my employment between professional skiing and seasonal naturalist work in Olympic National Park. Olympic by chance has exactly the same degree of physical involvement with lift skiing as Lassen (one Poma and two ropes) except that Olympic's lifts are owned by a private corporation operating under a special use permit. I am curious how Lassen came to own the lift hardware. 1

Generaly I agree with your final plan, but not with analysis of the ski area and there are a few but important small omissions. The first of these omissions is the lack of shuttle bus consideration or feasibility study of a Highway 89 reroute around the park. I note that a firm was consulted about shuttle buses and can only guess that perhaps their report wasn't recieved on time. Ski area parking expansion should only be planned if shuttle buses prove unworkable. Oversnow shuttle buses should also be compared with snowplowing expense and vegetation damage. 2

Inadequate consideration is given to the explosive growth of cross country skiing and the implications this has for future public facilities at Lassen. Lodges, hostels, huts, and shelters all need to consider the implications of use by cross country skiers. Two of the most important are avalanche safety and sanitation, but deep snow access, wilderness management problems and seasonal use transitions also deserve more detailed analysis

in the tradition of Arnold Snyder's Wilderness Area Management by the U.S. Forest Service. As wilderness use restriction become more widespread there will be a steady increase in demand for day hiking opportunities out of an accessing system of huts and hostels in the European tradition. Seasonal integration of such facilities is essential for serving both nordic skiers and summer hikers.

I heartily commend your decision to ban private snowmobiles from the park! Our experience at Olympic confirms the wisdom of this decision.

Of all your ski lift proposals only the longest chairlift, useable for summer sightseeers, has any merit in my view. Aerial tramways can only be justified in natural areas of the National Parks as road substitutes. That lift proposal should stand or fall on its merits as an aid to the interpretation program of the park. Unfortunately I am not familiar enough with the site to say whether or not I would favor such a lift. Don't worry however about skiers returning to the lodge from its base. They can easily ski down from the top. I also seriously doubt that you would need the 100 foot plus width up the lift line, the EIS talks about. At Kirkwood we have very similar red fir forest growing on unstable volcanic soil, and we only have to fall the big hazard trees back that far. Many trees are so close that skiers can touch them with their poles and the lift line swaths are only visible by looking almost directly up the line. I notice that your ski lift analist was Wycoff who's name I recognize from Mineral King. I would tend to distrust any advice from the Mineral King crew because they are frankly leading Disney and the skiing public into an avalanche distaster area. Should you desire a lift consultant in the future I would suggest Dick Rueter from Kirkwood who is intimately familiar with Lassen.

Sincerely,

Ed Z Ben

cies to: Luis Ireland - Sierra Club
James Coleman Jr. - Superintendent Olympic Natnl Park
Dr. Ralph Slatyer - Australian National University, Canberra City

RESPONSE TO COMMENTS BY
ERIC BURR

1. In 1974, the National Park Service purchased all concession facilities, including the lift hardware, in Lassen Park.

2. See response to comment 3 by Friends of the Earth (State Capitol Office); comment 1 and 2 by the Sierra Club; and comment 8 by The Resources Agency of California. Use of oversnow vehicles to transport people to the ski area would require a large parking area some distance outside the park, a rather large number of vehicles in order to transport up to 800 persons in two or three hours to the ski area, a plowed or compacted path following the park road, and a compacted area available at the current ski parking area to provide for oversnow vehicle parking.

3. Management of cross-country ski use is being addressed in the backcountry management plan for Lassen Park. The general management plan considers the issue of this type of winter use through provisions of attended parking at the ski area. Specific problems such as avalanche safety and sanitation are addressed by park management as part of their day to day operations.

1922 Funston Avenue
San Francisco, CA 94116

August 30, 1977

Superintendent,
Lassen Volcanic National Park
Mineral, California 96063

Dear Sir:

Lassen Volcanic National Park is our home. Our family has been camping and living in the park since the 1920's. All of us have a deep love of nature, especially the Lassen region. Our love of nature has been enriched by Jim's historical knowledge of the American West, John's work with tree planting and parks for the city of San Francisco, and Peter's studies in Mammalian Ecology.

We also own a cabin and five lots at Juniper Lake. Our cabin was built as a family project in the 1950's.

As a consequence of our professional and personal knowledge and experience we have definite opinions and reactions to the proposed general management plan and environmental statement.

The Manzanita Lake area has been the traditional visitor center of the park. We feel the existing historical stone structures there should be preserved. They represent the best type of development under National Park Service auspices in the post-World War I era.

While we recognize the need for major relocation of visitor facilities in this age of liability and excess litigation, we disagree with the need for destruction of historic buildings. The Loomis Museum could be kept open with a large format exhibit on volcanism and the Loomis eruption photographs. The museum could serve its purpose, yet not unduly detain visitors in the danger area.

The campground, interpretive facility, and road alignment pose further problems. The Lost Creek area seems logical for camping. Complimentary camping facilities should also be developed in the National Forest near the northwest boundary. The interpretive facility should be located near the northwest entrance station. The best realignment of the road for the park would be alignment "C". However, this would be at the environmental expense of National Forest land.

The Lassen Ski Area has been a major topic at all the hearings on the plan. Despite strong public pressure further expansion of the area would only increase this contradiction to National Park Service goals and purposes. Money could best be spent to provid more cross-country

(Busher)

and snow hiking activities which are compatible with the environmental concerns of the park. On the related subject of snowmobiles, we are in agreement with the prohibition of recreational snowmobiling. However, the limited use of snowmobiles on developed roads for the use of private property owners exercising their rights to access to their property should be allowed. 2

Like the Ski Area, Summit Lake is popular. The greatest problem here is water pollution. It must be reduced. We agree with the continuation of overnight camping and the expansion of trailhead parking. We feel that some type of interpretive/educational exhibit should be developed at this and all major wilderness trailheads to enhance visitor appreciation and lessen environmental impact. 3

Warner Valley is another focal point of the plan. We support the plans to relocate the campground and ranger station and to maintain the "non-improvement" of the road. However, we disagree with the plans for acquisition of Section 36. The acquisition of this, or any other private land in the park, on a non-voluntary basis, would conflict directly with National Park Service policy and the Act which created the park (39 Statute 442 of August 9, 1916). This Act guaranteed land rights and the "full use and enjoyment of his land" to private land owners. Furthermore, Section 36, along with other private land in the park, is not the focus of any great visitor attention or interest. We feel needed camping improvements can be made without infringement of private property rights. 4

Naturally, our personal involvement is greatest with the proposals for Juniper Lake. Private land ownership at Juniper Lake predates the park by many years, going back to 1892. As noted in the Warner Valley comments such private land owners were guaranteed their rights by the Act creating the park in 1916. We do not oppose the voluntary acquisition policy of the Park Service, but feel strongly that it must be voluntary. Our cabin represents a lineal link to the best of America's pioneer heritage. We built it with our own hands of natural elements. It is well integrated into the visual and physical environment. Furthermore, we are very involved with the conservation and preservation of the environment in which we live. Our government was founded on the ideals of individual rights and government abrogation of such rights should never be undertaken without great deliberation and due cause.

There is no great public pressure for acquisition of our lands for public use. The land realized by full implementation of the plan that would be freed from environmental impact is only .6 of an acre. Compared to the present park size of 106,369 acres, the acquisition of 2.25 acres seems inconsequential and irrelevant.

(Busher)

August 30, 1977

Superintendent,
Lassen Volcanic National Park - Page 3.

Public usage or access will not be improved by this acquisition. The shoreline will not be enhanced by the closure of the road beyond the southeast corner of the lake because it does not touch the shoreline at any point. Further, private land owners represent a very small percentage of overall road users. In any event, the Juniper Lake road should be maintained on a "non-maintenance"basis.

Another environmental concern, water pollution, will be exacerbated under the plan. From 1892 to the present, Juniper Lake has had outstanding water purity. Increased visitor facilities, use and waste disposal, will far outweigh the planned gain from cessation of demonstrably safe private sewage systems.

Finally, private owners at Juniper Lake have rendered important public services over the years. These include: directions to visitors, fire control, trash collection, trail maintenance, and supply to Mt. Harkness Lookout Station, among others.

The plan for nearby Butte Lake is good, but increased effort should be made to educate and prepare wilderness visitors at this important trailhead.

Hat Creek is the last area selected for specific focus by the plan. Its private lands are in the same situation as others in the park. There is no demonstrable public need which justifies the abrogation of private rights.

In conclusion, let us restate our feelings and opinions. First, the northwest corner of the park should continue as a major visitor center. However, the old stone buildings should not be destroyed. Second, the Ski Area should be continued, but not expanded, and cross-country skiing emphasized. Third, Summit Lake should be developed as planned, but water quality improved. Fourth; Warner Valley, Juniper Lake and Hat Creek private lands should never be acquired by any but voluntary means. There are the additional factors of 1) lack of public need, 2) guarantee of rights in the original Lassen Park Act, 3) continued existence of private lands in other much more heavily used national parks. Fifth; increased effort should be made to improve the interpretive and educational facilities at major trailheads.

Sincerely,

Elva Busher

Elva Busher and Family
James Busher
John Busher
Peter Busher

RESPONSE TO COMMENTS BY
ELVA BUSHER AND FAMILY

1. Retention of the Loomis Museum and other historic structures is discussed under the alternatives in Chapter VIII. The Loomis eruption photographs and the role of the Loomis family will be interpreted in the new facility in Manzanita Chutes. Retention of public use of the Loomis Museum would encourage use of a potentially hazardous area and is contrary to the intent to minimize exposure to these risks.

2. Use of snowmobile for access to private property is a management rather than a planning decision and has not been addressed in the general management plan. The park superintendent should be contacted to determine current policy.

3. Improvements to sewage treatment systems at Summit Lake appear to have corrected the pollution problems. See the discussion in Section I.C.5. An interpretive plan for the park will be scheduled in the near future and will address the need for informative exhibits at trailheads.

4. The act which created Lassen Volcanic National Park guaranteed that any valid existing claims would not be affected by the establishment of the park and that the full use and enjoyment of his land by such claimant could continue. The intent of this provision was to insure that valid existing claims, when the park was established, would be honored; however, it does not prevent the National Park Service from acquiring the land at a later date, after providing just compensation to the landowner.

   The policy of the National Park Service is to acquire all lands and waters within authorized park boundaries, except in those cases where, consistent with provisions of law, zoning satisfactory to the Secretary of the Interior is in force, or in those cases where land uses satisfactory to the Secretary of the Interior and compatible with park purposes are being implemented. In inholding areas (pockets of privately owned lands in older parks), the National Park Service will not normally acquire lands until such time as the owners desire to dispose of them, unless the use of these lands is proposed for alteration that would make them incompatible with the purpose for which the area was established.

   The negotiations for the acquisition of inholdings shall be based on competent appraisals of fair market value, and the following will also generally be observed:

   a. The National Park Service will welcome offers from the owners to sell private properties to the United States, and it is hoped that the owners will give the Service first opportunity to purchase them. If an owner wishes to sell his property

outright, the Service would be glad to negotiate on that basis; or, in the alternative, on such other basis as may be authorized in the applicable legislation relating to the retention of use and occupancy rights by the owner for a given number of years or for the remainder of his life and that of his spouse.

b. The Service will not seek to acquire private lands without the consent of the owner, so long as the lands continue to be devoted to their present use. Substantial expansion of present uses will be considered an incompatible act. This also applies to any future owners of the property so long as the properties continue to be used for the same purposes.

c. If existing incompatible uses persist, or if present compatible uses of property are to be changed, and the properties are to be devoted to new and different uses not compatible with the primary purpose for which the area was established or if the present uses are materially expanded, the Service will attempt to negotiate with the owner for the acquisition of the property in order to eliminate a use or avoid development of a use adverse to the management of the area.

In the event all reasonable efforts at negotiation fail, and the owner persists in his efforts to devote the property to a use deemed by the Service to be adverse to the primary purpose for which the area was established, the United States may institute eminent domain proceedings to acquire the property.

JAMES H. COONEY

Aug. 17, 1977

Superintendent
Lassen Volcanic Nat. Park
Mineral, Ca. 96063

Dear Superintendent,

A newspaper article states you are accepting comments on the Lassen Park draft management plans.

My family has vacationed at Manzanita Lake lodge nearly every year for the past 30 years. We remember when the campground was located at the present "trailer dump" and the general store was under the Lodge in what is now called the "Crater" room.

We would like to voice our opposition to any radical changes in the Park until a more thorough study of the geological hazards is made. There seems to be more speculation on what could happen than if it might happen. The possibility of a rock fall avalanche is certainly a hazard but fom the facts I can gather the last avalanche 1

happened 300 years ago but there seems to be no information as to the height and slope of Chaos Craigs then compared to their height today. 1

We would not like to see Lassen Park change into another Yosemite Valley

Very truly yours,

James H Cooney
1831 Anza St
San Francisco
Calif 94118

RESPONSE TO COMMENT BY
JAMES H. COONEY

1. There is very little speculation involved in the determination of what catastrophic geologic events can happen within Lassen Volcanic National Park. As explained in Chapter II-C-2, it is the likelihood, or probability, of the event occurring which falls into the realm of speculation.

   The rockfall-avalanche of Chaos Jumbles fell between 300 and 1,200 years ago and covered an area of about 3.1 square miles with approximately 200 million cubic yards of rock debris. This is sufficient to cover 1 square mile to a depth of 200 feet; 1/2 square mile to 775 feet; and 1/4 square mile to 3,100 feet.

   Less than 20 million cubic yards of material on Chaos Crags appears to be steep enough to develop a rockfall-avalanche. However, the entirety of the Chaos Crags is highly fractured and there is no way to determine how much of it would become involved once an avalanche began. The total mass of the Crags is estimated at 2.2 billion cubic yards, eleven times the volume of the Chaos Jumbles.

LASSEN MASTER PLAN HEARINGS

WRITTEN STATEMENT OF

TERRENCE CULLINAN,

FORMER PRESIDENT (1970-73), LASSEN VOLCANIC NATIONAL PARK COMPANY (CONCESSIONER CO.)

I very much appreciate the opportunity to comment on the proposed Master Plan for Lassen Volcanic National Park, following up on my oral comments at hearings Saturday, August 6th, in San Francisco. My comments will be brief and in summary form; I will be pleased to elaborate further at any time.

For the record, my name is Terrence Cullinan, and I was from 1970-73 President of the Lassen Volcanic National Park Company, then the concessioner in the Park. I am currently director of Land Use, Recreation, and Tourism research and consulting for SRI International, of Menlo Park, California. This statement is a personal one, based on my own Lassen experiences and subsequent close contact maintained with the Park.

My family and I spent major portions of three years in Lassen, and watched it grow and develop its seasonal use in other than summer periods. We opened on Memorial Day rather than mid-June, and operated until October snows, rather than mid-September. We upgraded facilities and maintained prices. We greatly broadened winter use, approximately tripling use in the three years there, providing many people a new perspective on Lassen. We introduced formal cross-country ski programming to Lassen's winters. We originated a number of environmental and minority-hire programs in the Park. We went one entire summer without the Park Service receiving a single written complaint about our service. We worked long and hard in the Park, to serve visitors and enrich their experience. We had substantial and positive interrelationships with our colleagues in the National Park Service.

I have attached hereto, for entrance into the record as well, a statement of operating philosophy we published as concessioners, which also contains descriptions of some of our policies in environmental and minority-hire areas.

My comments here are restricted to three areas plus some minor comments on the draft master plan documents themseleves. These areas are:

- Ski area comments
- Drakesbad comments
- Manzanita Lake comments

Ski area comments

During my tenure as President of the Lassen concession, I commissioned an outside study of ski area potential. The conclusions were that (a) the ski area could better serve the public if a chairlift were installed; (b) operation with a chairlift would be economically feasible, whether the lift were built by the government or by the concessioner; and (c) the total skiing and winter

exposure of visitors to Lassen would be enhanced.

Lassen is a family ski area. It would remain so with a chairlift, except that the experience would be improved, and families who learn to ski at Lassen would most likely continue to ski there as their skills grew. At present, the area has limited capability for such ongoing skiing of an enjoyable nature. Lassen serves a geographic area which is not convenient to the Tahoe basin; Mt. Shasta, which serves some of the same area, is remote from areas like Chico, and does not have reliability of weather to the same degree that Lassen has. I have personally investigated the Carter Bowl alternative on several occasions, and have concluded that for various reasons, including political ones, and environmental pressure group ones, Carter Bowl will not be developed as a ski area. Lassen is there, it serves a purpose, it enables experiences to be had in winter that otherwise would not be possible, and an expanded ski area would provide broadened interpretive capabilities and support programs by the Park Service to interpret the Park during one of its most beautiful seasons.

The wilderness boundaries were carefully drawn in 1972 to permit single-chair intallation and preclude any massive further development. The various plans for single-chair installation presented by the NPS and by the new "Friends of Lassen Ski Area" appear to be physically workable and an improvement over the present situation.

In 1971 or thereabouts, the concessioner of which I served as President transferred then-existing building obligations from Manzanita Lake to the Ski Area because it seemed the most useful way of providing needed service, and a viable return. I see no reason that this rationale should be changed, because of intervening time periods.

I would support expansion of the ski area by adding of a single chair, making other modifications that have been suggested of a minor nature, and improving base facilities. The operating season would probably reach 100 or more days (not the 50 or 60 cited in some of the Master Plan documents). The operation when we looked at proved viable; detailed analysis would most likely prove the same feasibility at this time.

Drakesbad comments

Drakesbad is one of the loveliest unique spots anywhere. It has some historic import from the Sifford days. The present concessioner has broadened its visitor base considerably from what it was in my days as concession operator. I am in favor of its retention.

It has always confused me, however, that pressures have been brought to limit the ski area (or remove it), and to toss people out of the Manzanita Lake area, on the grounds of intrusion and unnecessary service. Drakesbad serves largely a fixed clientele that comes back year after year, it also serves, by virtue of its size, a very small clientele. It is hard to get to, and not centrally located to the Park's best and most unique natural features, in terms of access to them. If Drakesbad is to be retained (as

I have indicated I believe it should be), it seems hard to deny service at those areas where visitation is high, many different people come, and access to natural areas of great import is easy.

Manzanita Lake comments

Manzanita Lake, during my tenure as concessioner, became a fine physical facility as well as a beautiful location. We received AAA-ratings, the first time ever for the Park, because of a substantial and expensive interior upgrading program for facilities (without changing the exterior, except for repair and repainting which had been overdue). We opened inexpensive eating facilities (a cafeteria and "fast food" outlet) to complement a good dining room. We broadened the grocery store, introduced Native American art from the area on a free basis to local Pit River Indians, and also developed a local handicraft outlet.

Manzanita Lake served a steady stream of guests during the summer. There were many visitors -- older people, the infirm, and people who simply don't like backpacking or camping -- who received spiritual and physical comfort and experience in Lassen that they would not have without the Manzanita Lake facility existing.

Now it is proposed to close the facility permanently. On the surface, this seems to me absurd. The fact that there is some remote danger of a landslide -- and I believe the danger is so remote as to be ignorable -- has been used as a reason for denying people access to the Park, or reasonable services in it, at the Manzanita Lake area, on an extended time-period basis, including overnight facilitation. At great expense, relocation of facilities to another area is proposed. The area considered as an alternate, as will be discussed later, is totally unsuitable for the experience the Park should offer.

It makes no more sense to close Lassen's north end to extended visitation and overnighting that it would to require everyone to move out of the San Francisco Bay Area because there may be another earthquake someday. To be sure, the Government may be "inviting" people in -- even if warning signs are posted -- by having Lassen's Manzanita Lake facilities open, and thus run an insurability risk. This is a risk that should be accepted, given the rewards visitors get from Manzanita Lake stay, that they will not get at any alternative site I can identify. The probability of catastrophe is so remote, and the numbers of people that would be involved so small compared to the benefits that great numbers would receive, that I would urge the Government to bite the bullet and take the risk. Self-insurance would not cost much compared to the cost of various defense items approved on a routine daily basis.

It makes no sense, either, to say that the risk is high for overnighting, but that roads, trails, and day visitation are acceptable. Surely it is true that longer stay means more exposure, but ANY exposure would seem to fall under the same risk-avoidance doctrines as espoused for removal of overnight facilities. Drawing the line just the other side of fixed facilities for overnighting seems hard to defend, if catastrophe is really judged as a likely scenario. 1

While I have a natural fondness for the beauty of the Manzanita Lake facilities and area, I would not be so appalled at the disservice to the visiting public, and to public finances, by relocation/removal were there an alternative site of some comparability. When I first heard the concession was to be closed at Manzanita Lake, I spent five days going all over the north portion of the Park and outside the Park as far as Redding and Burney, looking for places to purchase land to use as an alternate holding area. I could not find any suitable location, and others who have made the same search, have the same results. Much outside the Park, and access to the Manzanita area for those who are carless will be very hard indeed, unless an expensive bus shuttle system is to be involved. The same would be true for the aged or infirm.

There is one word to summarize Manzanita Chutes as an alternative: awful. Manzanita Chutes is barren, hot, and often wind-swept. I have visited there several times, seeing NPS friends stationed on it. It is the antithesis of Manzanita Lake in environment and atmosphere, and totally incompatible with the environs and experience of the cool, beautiful north end of the Park. If something HAS to be built there, by all means make it a Sun-River type lodge (Sun River, Oregon), as was suggested at Saturday's hearings -- but this will be an expensive venture that cannot be economically justified (it is true, however, that some of the economic figures cited for relocation appear high -- nonetheless, even halving them would not, on first glance, appear to make a financially viable move).

The Geological Survey report did not recommend immediate closing of Manzanita Lake as an overnight spot -- just recognition of the "danger", and suggestion that phasing out be undertaken. I would strongly urge that this option be taken: that Manzanita Lake be repoened and reused until suitable alternative facilities are built. The public is being denied access at present; the Park is not being served; the public treasury is being subject to potential substantial expenditure which is not necessary; and, most important, one of the major interpretive facilities, and visitor experience enhancements, in the Park is standing idle. Manzanita Lake should be reopened, in my judgement, until an alternative facility can be built. The risk can be taken, by the visitor and by the Government. The present position that "overnighting is dangerous, but the rest is not" appears very weak. Either there is an overwhelming danger, or there's one that can be borne as far as risk. I would urge the latter, and the reopening of Lassen Park Lodge at Manzanita Lake to the many who cannot now enjoy the Park because of its absence.

Miscellaneous minor comments on draft documents

On the following page, I have summarized some minor problems in the draft documents. On the whole, I would like to conclude by indicating that I think the NPS has done a fine job on their documentation. Various alternatives have been considered, in generally very fully, given time and budget restraints. I do not agree with some of the conclusions, and would, as indicated, support other options. However, these options are discussed in the draft in an unbiased manner. I strongly believe that Manzanita Lake decisions have been improper and ill-founded, and hope that hysteria can be replaced with hope, and that the full beauty of Lassen Volcanic National Park can be enjoyed by the many, not the few, in the immediate years ahead. Thank you for this opportunity.

Miscellaeous draft statement observations

May 1977 supplement

- Page 4, initial paragraph: adverse weather would not limit operation with a chair to 50-60 days; this refers to present weekend-only operations. The present concessioner should be consulted on most likely number of operating days with chair, given normal winter snows.

- Page 6, Recommendation: the first sentence indicates that a low-cost, family-oriented ski area would not be the case with a chair proposal. This statement is not supported, nor, in my judgement, is it supportable.

2

- Page 10, Manzanita Chutes discussion. I believe a more honest portrayal of the Manzanita Chutes area -- barren, treeless, hot, and occasionally wind-battered -- would be appropriate here. Also, other Forest Service sites (or non-availability of same) should be stated.

- Page 13, first sentence. I seriously question the "excellent potential for development". I don't believe this would stand up to objective review.

3

- Some indication of potential timing might be given. For example, the statement was made at the August 6th hearings that at least three years would be needed to get money, once requested for development. This would mean at least 4-5 more years of no visitor facilities. This needs to be pointed out, particularly with the vacant and available interim facilities of Lassen Park Lodge possible.

August 1976 draft general management plan

- Page 4, fourth paragraph, first sentence. I would delte reference to "the decision of the Park concessioner not to reopen in the face of the hazard". There was much more to it that this, in terms of discussions that had been ongoing between concessioner and NPS previously.

4

May 1977 supplment once again

- Page 10, first paragraph. Occupancy was generally 100% from mid-July through Labor Day, with no pattern suggesting higher weekend use, during my tenure as concession president. It was also 100% over July 4th. Excess demand for services probably could have supported an expansion of about 50%, based on studies we made in 1972.

  Page 10, third paragraph. The source for the statement "a large percentage of lodging was repeat" is nonsupported, nor, in my experience, is it supportable.

5

- Page 15, first paragraph, last sentence. Agressive management will indeed be required to get anyone to come and stay in numbers at Manzanita Chutes. If Lassen Park Lodge were reopened until alternative suitable facilities were available, people would come with no requirement for aggressiveness.

Environmental Assessment

- p.83, third paragraph. By claiming that creature needs were not resource-oriented, and could have been satisfied in locations other than Manzanita Lake, the writer shows a total lack of understanding of the impact that Manzanita Lake stay had on the non-camping overnighter. This was part of the interpretation and experience of the Park. No alternative site of similar capability has been suggested. Experiencing a Park is more than a day-use series of nature hikes.

  The last paragraph on p.84 is more to the point, and to some extent refutes the lack of sensitivity and objectivity of p.83.

- P 123, second paragraph. The company name was actually just U.S. Natural Resources -- the U.S. was never spelled out.

- p 126, third paragraph. People will not "seek out a comparable resort experience" in great numbers. People come to national parks because they are unique and incomparable national resources, not because they are "resorts", at least for the most part. This expresses a condesencion to the visitor that is not warranted.

6

Draft Environmental Statement

- p. 117 -- third paragraph -- U.S. instead of United States (see second comment, above).

  p.117, fourth paragraph -- weekend pillow counts may have been higher, but room occupancy was 100% from July 15-September 5th, basically.

  also fourth paragraph -- Lassen Peak, not Mount Lassen

- p. 201 -- bottom of page. The emphasis on archaeological sites is overblown here, for a couple of unimportant locations. The last sentence on "modern cultural debris", is a classic of overacademic prose.

7

- p. 242 -- I support this alternative, for reasons outlined earlier, if only on an interim basis until alternate facilities are built.

Attached: "LASSEN": 1972 concessioner's report and philosophical statement.
Minority Hire program descriptions.
Environmental action program descriptions.

RESPONSE TO COMMENTS BY
TERRENCE CULLINAN

1. The National Park Service does not intend to prohibit use in the hazardous area but will make every effort to minimize exposure to the risks while continuing to allow enjoyment of the park. The text in the final environmental statement includes an expanded disucssion of this subject in the proposal, impact, and mitigating measures sections.

2. Discussionsof the economics of an expanded ski area operation have been dropped from the final document since the decision has been made not to expand the ski area. It is true that an expanded ski area could remain a relatively low cost area and that the concessioner could make a profit IF the National Park Service reduces concessioner fees to a level that would assure a low cost operation. The National Park Service would be subsidizing the downhill skiing operation, at least in the initial years. The possibility of significantly increased days of operation appears low but could occur with aggressive management and support by community recreation programs and regional educational facilites.

3. The description of Manzanita Chutes was written as concisely as possible without interjecting bias. There is little disagreement that it is an unattractive site and has all the problems mentioned in your comment. The site does offer "excellent potential for development", since there are few constraints due to soil conditions, terrain, or natural features to be protected. The savings in construction cost due to easy site conditions would offset the high cost of grounds development to made the area attractive.

4. This statement has been modified in the final documents. See Section I.C.2.

5. The figures and statements used were supplied by your former firm; possibly there was some misinterpretation.

6. The comments and corrections suggested have been considered in preparation of the final documents; the Environmental Assessment is not being revised since it was a working document leading to the Draft Environmental Statement.

7. The corrections have been incorporated and comments considered in preparation of the final document. The term "modern cultural debris" has been removed.

9/5/71

W. Stephenson
Superintendent of Lassen National Park

Dear Sir:

Thank you for giving the public the opportunity to comment on your draft general management plan. I am quite concerned about Lassen since I am close enough to come up a couple times a year for hiking and cross-country skiing.

I am very glad to hear that you are continuing your ban on snowmobile use. Besides the potential damage to young trees under the snow and wildlife, they can occasionally be quite hazardous to cross-country skiers. While most snowmobile users seem sane, there is no way to control their speed or keep them from chasing down wildlife. And there is no feasible way to control their use to one area of the park. Besides, cross-country skiing in Lassen is expanding rapidly and the snowmobile would be some hazard as well as noise most people object to and dislike.

I also object to the downhill ski facilities that exist although basically I do believe they should be outside of a national park. I would object strongly to any expansion of what is existing.

The relocation of the Manzanita Lake concessions to outside the park is quite nice. But I don't understand why the government is paying for putting up the buildings. If so, they should be leased on a long term economic basis - repaying cost plus interest -- and even plus concessioner fees for use of the park being the park concessions.

My strongest objection to the management plan is that there is no consideration for additions to the Lassen Wilderness. The Lassen area certainly is unique and wilderness

1

designation is valuable for preserving this lovely land in its natural state. With the Pacific Crest Trail going through the park and growing use of the backcountry a larger wilderness is quite important. It is especially important to review for wilderness addition now that the Forest Service has lands around the park that could be wilderness and they are doing their RARE II review. 1

Sincerely yours,

Shawn Denkler

2133 FIRST ST

NAPA, CA 94558

RESPONSE TO COMMENT BY
SHAWN DENKLER

1. See response to Comment 1 by California Native Plant Society.

4116 Jomandowa Lane
Knoxville, TN 37919

August 27, 1977

William Stephenson, Superintendent
Lassen Volcanic National Park
Mineral, CA 96063

Dear Superintendent:

Surely there are other places for the expansion of downhill skiing than in a National Park! I would have hoped that the Park Service would be asking to remove this activity from the Park.

I enjoyed visits to the Park in 1965 and 1975. It is a beautiful one--dramatic with its residual thermal activity and volcanic debris. The access road has high visibility in places and construction of ski lifts and the related services would render the Park a disservice for the non-winter user. There are certainly enough mountains in California to provide for the winter activities without using Federal lands in which I have an interest.

A downhill ski resort is an energy intensive operation which should not be justified under our national policies of energy conservation. It is incredible that the National Park Service would consider such a project now. In contrast, cross-country travel on skis or snowshoes is an appropriate use in a Park which receives sufficient snow pack, as does Lassen.

I hope that you will help save the Parks from the National Park Service whenever the Service is fixing to give in to the unwarranted use of energy and machines--not to mention manpower--so that folks can ride uphill. Has the Service considered closing the Park in the winter to save the fuel involved in plowing Routes 36 and 89? Let's not Californicate Lassen! 1

Sincerely,

Leroy G. Fox

RESPONSE TO COMMENTS BY
LEROY G. FOX

1. Closing the park in winter was not considered during this planning effort.

August 1, 1977

29900 Highway 20
Fort Bragg, California 95437

W. Stephenson, Superintendent
Lassen Volcanic National Park
Mineral, California 96063

FOR THE RECORD: Lassen General Management Plan.

Dear Mr. Stephenson:

Please include the following comments as part of the official hearing record on the Lassen Volcanic National Park General Management Plan.

1) I heartily concur, and congratulate the Park Service for its plans to continue the ban on snowmobiling in the Park. These obnoxious machines are detrimental to plants and wildlife, air quality, and usually succeed in ruining the increasingly scarce quality of peace and quiet in the winter landscape with noise pollution. I urge that the Park Service stand firmly behind the ban.

In addition, I feel that the following deficiencies in an otherwise excellent management plan should be considered and rectified:

2) I agree that the Manzanita Lake concessioner facilities should be relocated outside the Park, but not at public expense. These facilities should have never been located within the Park in the first place, and the Park Service certainly has no obligation to the concessioner whatever to relocate his facilities at cost to the taxpayer. I firmly support removal, but not relocation at public expense.

3) I disagree that the present downhill ski facilities should be retained and improved, while appreciating that the Park Service does not support major expansion of lifts. The present downhill ski facilities should be removed from the Park so that snowshoeing, crosscountry skiing, and other winter activities more in keeping with the purpose of a National Park could be accomodated.

4) I firmly recommend that the Management Plan take a new look at additions to the present 79,000-acre Lassen Wilderness. There are at least 25,000 acres of wilderness within the present park that could, and should, be added to the park wilderness. 1

Ron Guenther

RESPONSE TO COMMENT BY
RON GUENTHER

1. See response to Comment 1 by California Native Plant Society.

373 Pine Hill Rd.
Mill Valley, CA
94941

William Stephenson, Supt.
Lassen National Park
Mineral, CA 96063

Dear Mr. Stephenson:

Lassen has held a very special place in my heart since last visiting a few years ago. It's an incredibly unique spot, aside from its obvious geologic value. Yet I doubt that without proper care and the acceptance of responsibility by the Park Service and the interested public, this exceptional place will just become another tourist attraction, over used, ill conceived and down graded.

to keep the negative effects from becoming the dominant face it's extremely important that wise management include respecting the natural beauties and assets of Lassen. Allowing snowmobiles to exist scarring and scaring their way through the environment is a foolish proposition. Snowmobiles are fun, but they have their place away from this magnificent area.

I recommend that the wilderness boundaries be enlarged to the proposed 25,000 acre, thus providing a more intelligent management device and protecting the park from exploitation by down-hill skiing and other tourist concessions. 1

thank you for including these remarks in hearing record.

Sincerely,
Howard Harrison

RESPONSE TO COMMENT BY
HOWARD HARRISON

1. See response to Comment 1 by California Native Plant Society.

Laurence E. Hazard
718 Las Trampas Road
Lafayette, California 94549

September 13, 1977

The Honorable Phillip Burton
Subcommittee on National Parks and Insular Affairs
House of Representatives
Washington, D.C. 20515

My Dear Mr. Burton,

I am writing this letter concerning the General Management Plan and Environmental Statement for Lassen Volcanic National Park. Specifically, I would like to concentrate my comments on the proposed changes to the ski area.

Over the past twelve years I have skied at the Lassen Facility and during the 1976 season I worked as a volunteer Ski Patrolman. In addition, my three children have all learned to ski at Lassen during the past six years. Therefore, I believe that I recognize and understand the needs of this area concerning skier safety and the interests of skiing families.

In reading the draft statement (DES77-191) I was quite impressed with the careful and thoughtful attention given to developing a balanced plan which will serve the needs of the park's environment and the visitors to the area. This draft statement clearly identifies the area's needs. It states, "On peak use days in recent years ticket sales have been limited to 800, although at this capacity the area is overcrowded...overcrowding and inefficient circulation have been problems for several years and the local public clearly favors the improvement of the ski area. In addition, the traditional family atmosphere needs to be supported by improving beginners skiing".[1]

Upon reading the supplement to the draft of the General Management Plan and the Environmental Impact Statement, dated May, 1977, the National Park Service reversed its position with regard to improvements to the ski area. The primary rationale for this change appears to be based on the park service's concern that the ski area would not be economically viable. As a holder of a Masters Degree in Business Administration (Northwestern 1964) I have reviewed the facts as presented.

[1]General Management Plan dated 8/76, page 28.

It is my conclusion that the Supplement's cursory feasibility study which indicates that an expansion of the ski area could not be self-supporting is clearly not supported by the facts presented. Further, I am confident that a thorough analysis would show that the expanded ski facility can be economically justified.

Most importantly, if the current recommendations of the National Park Service stand, in my judgement, the following will result:

1. More skier conjestion
2. Breaking up of skiing families due to outmoded facilities
3. Diminishing of the overall safety of the area

In short, this will result in a ski area which is less desirable for skiers in general and skiing families in particular. As a consequence, it may thereby reduce the parks winter use by future generations to a select few.

In contrast, the recommendations proposed by the Friends of Lassen Ski Area seem to provide a balanced solution to Lassen Ski Area's identified problems. In general, this plan:

1. Would provide for better winter use of our National Parks under the guide lines set-up by the National Parks Service.

2. Would eliminate congestions and disperse present skier traffic.

3. Puts a high regard on skier and operation safety.

4. Is not a growth for growth's sake but would contribute heavily to winter employment in the economically depressed areas of Butte, Lassen, Columa, Shasta and Tahema Counties.

Consequently, I urge that you give this plan your thoughtful attention and your favorable consideration.

Sincerely yours,

Lawrence E. Hazard

cc: The Honorable Ron Dellums
The Honorable John Krebs
The Honorable Robert Lagomarsino
Mr. William Whalen
Superintendent LVNP
The HOnorable Harold Johnson

August 22, 1977

Secretary
Department of the Interior
Washington, D. C. 20240

Dear Mr. Secretary:

After perusal of the 1970 U. S. Department of Interior Geological Survey Report, the Draft Environmental Statement, Draft General Management and its Supplement, my husband and I remain skeptical of the need for closure of the existing facilities at Manzanita Lake in Lassen Volcanic National Park.

From the opinions voiced and applauded heartily at the public meeting (held for public comment on the General Management Plan in Redding on August 4, 1977), by far the majority echoed this skepticism.

The survey report upon which the justification for closure was based stated only that the facilities probably should not be expanded - no word of closure.

We strongly support the retention and upgrading (i.e. sewage system), not expansion, of those existing facilities to offer accommodations to the many taxpayers who appreciate the beauty of nature but have no desire to "rough it" in the wilderness areas.

We vigorously oppose the suggested $12-14 million dollar Manzanita Chutes development as being without a single redeeming feature. It lacks beauty, would require landscaping on a massive scale, cooperation between two government agencies with frequently differing policies, and an horrendous outpouring of taxpayer funds (resulting in an unreasonably high lease rate subsequently passed along to the consumer-taxpayer; all this and the site is still not beyond the boundaries of a possible "hazard" area.

Even were we to accept the "hazard" as grave and imminent, we would prefer to take our risks. In our opinion, the risk taken when driving through the southern portion of the park (on high, narrow, curving, shoulderless roads unprotected by any guard rails) is much greater. Still, we would be willing to sign a release protecting the government from liability, as suggested by our District Attorney.

We respectfully request a stop order to prevent demolition or removal of the Manzanita Lake facilities until the desires of the people nationwide (following well-publicized nongovernmental geological surveys) become known.

We appreciate the chance to voice our opinions.

Sincerely,

Judith N. Hermann

Jack J. Hermann

Photocopy to H. T. "Biz" Johnson, Lassen Park Superintendent Wilbur Stephenson, Director of National Park Service William J. Whalen, U. S. Senator Frank E. Moss

RESPONSE TO COMMENT BY
JACK AND JUDITH HERMANN

1. That is correct; the U.S. Geological Survey report did not recommend closure. In 1968, the Geological Survey began studies to identify potential hazards in the park from possible future geologic events. One such potential was for a rockfall-avalanche to fall from Chaos Crags and sweep catastrophically across the Chaos Jumbles and into the Manzanita Lake - Manzanita Chutes area.

   In 1974, the concessioner at Manzanita Lake requested that the National Park Service accept liability for loss of life and property in the face of the potential rockfall-avalanche hazard. Since this could not be done, National Park Service management concluded that the closing and complete elimination of facilities on and adjacent to the Chaos Jumbles was the only suitable action consistent with the responsibility to protect the lives and safety of park visitors.

SACRAMENTO OFFICE
STATE CAPITOL
SACRAMENTO, CALIFORNIA 95814
(916) 445-6747

DISTRICT OFFICES
211 WALL STREET
CHICO, CALIFORINA 95926

(916) 345-6101
319 - 6TH STREET
MARYSVILLE, CALIFORNIA 95901
(916) 743-1828

2400 WASHINGTON PLAZA
SUITE 101
REDDING, CALIFORNIA 96001
(916) 244-6006

State Senator

RAY JOHNSON
FIRST SENATE DISTRICT

STANDING COMMITTEES:
AGRICULTURE AND WATER RESOURCES
TRANSPORTATION
PUBLIC EMPLOYMENT AND RETIREMENT
INDUSTRIAL RELATIONS
VICE CHAIRMAN
JOINT COMMITTEES:
TO OVERSEE AGRICULTURAL LABOR RELATIONS BOARD
FAIRS ALLOCATION AND CLASSIFICATION
SELECT COMMITTEES:
WESTERN STATES FORESTRY TASK FORCE
FIRE SERVICES
SUBCOMMITTEES:
CALIFORNIA'S FOOD AND AGRICULTURAL ECONOMY
CALIFORNIA'S RURAL ROADS (CHAIRMAN)
UNDERGROUND WATER (CHAIRMAN)

August 26, 1977

Mr. William Whalen
Director, National Park Service
U. S. Department of Interior
Washington, D. C. 20240

Dear Mr. Whalen:

I want to go on record as being very much in support of the ski area proposal by the Friends of Lassen Ski Committee for the ski area at Lassen Volcanic National Park. I feel very strongly that this proposal encompasses the best of the National Park Service Master Plan alternatives with environmental safeguards, well rounded use of the winter facilities at Lassen and a high regard for skier and operational safety.

I feel it is an economically feasible plan that will contribute heavily to employment in the winter economically depressed areas of Butte, Lassen, Plumas, Shasta, and Tehama Counties.

I cannot over emphasize the advantages of implementing this proposal.

Sincerely,

Ray Johnson

RAY JOHNSON

RJ/kd
encl.

cc: Superintendent,
Lassen Volcanic National Park

The Honorable Harold T. Johnson

Mr. Jim Gregg

2207 Carroll Street
Apartment 3
Oakland, California 94606
(415) 451-3714
6 September 1977

William Stephenson
Superintendent
Lassen Volcanic National Park
Mineral, California 96063

Dear Mr. Stephenson:

I would like to take this opportunity to submit comments on the Draft Environmental Statement (ES), Draft General Management Plan (GMP) and Supplement for Lassen Volcanic National Park issued in July, 1977.

1. A decision on the proposed action should be delayed pending completion and public review of the following evaluations and impact studies in conjunction with the Draft ES and Draft GMP: (a) The natural resources management plan for Lassen Volcanic NP mentioned on page 1 of the Draft ES; (b) Preparation of a cultural resources management plan for Lassen Volcanic NP; (c) Final determination of the National Register eligibility of all buildings and facilities to be removed, relocated or otherwise impacted in accordance with Advisory Council on Historic Preservation procedures; (d) Preliminary determination of the cultural resource values and potential of the proposed Manzanita Chutes facility, (e) Final determination of the National Register eligibility of the two "highly significant" prehistoric archaeological sites impacted by existing ski facilities in accordance with Advisory Council procedures (pg 12, Draft ES), (f) Consideration is given to meeting the non-industrial needs of proposed facilities through geothermal space-heating, thereby limiting "importation" of commercial power as proposed in the Draft ES.

2. Immediately adjoining Lassen Volcanic NP on the south are the 78,642 acres of the U.S. Geological Survey (USGS) designated Lassen Known Geothermal Resources Area (KGRA). Federal Lands within the KGRA under the jurisdiction of the USFS are subject to commercial exploration and potential geothermal industrial development under a competitive leasing program established by the Federal Geothermal Steam Act of 1970. Other Federally controlled non-KGRA lands adjacent to the park may be non-competitively leased for geothermal purposes. Such industrial development would seriously endanger the natural values of the national park. Impacts could include thermal pollution, Hydrogen sufide pollution, significant changes in the surface manifestation of natural geothermal phenomenon within the park boundaries,

increased noise levels and a number of other individually minor impacts which would cumulatively cause adverse changes in the surrounding environment.

Although the impacts of geothermal industrial development in areas adjoining Lassen Volcanic NP should figure prominently in future planning, no mention has been made of the industrial threat to national park values should USFS administered lands be opened for commercial geothermal purposes. In a geothermal leasing schedule released in March, 1977, moreover, the Lassen KGRA was in fact targeted by the California state office of the Bureau of Land Management as a "high priority" study area. An unconditional moratorium of all geothermal industrial activity on Federal land (including "casual use" operations as defined by USGS standardized geothermal operating orders) in the national forest Ranger Districts adjoining Lassen Volcanic NP is clearly warrented until which time as a USFS-NPS bi-agency planning program can be devised for the Lassen KGRA and submitted for public review. 7

3. It should be noted that Pleistocene and geologic recent volcanic activity in the Lassen region provides an excellent geochronology which may have some significance to prehistoric archaeology. Airfall deposits of ash and tephra, for example, may have buried cultural debris simultaneously over relatively large areas. If so, these datable events would significantly aid archaeologists in dating periods of past human occupation.

4. Given the threat such an undertaking might have upon the natural values of the park, Thermal Power Company should not be permitted under any circumstances to proceed with announced plans to drill a 6,000 foot exploratory geothermal well in Section 36 (pg 67, Draft ES).

5. As pointed out in the Draft ES, a portion of the Lassen Volcanic NP and what is now the Mineral Ranger District of the Lassen NF was the prehistoric "homeland" of the Yahi Yana. This region is of special significance because of its association with the life of the Native-American, Ishi. An evaluation of the integrity of the entire Yahi Yana area as a single geographic unit significant in American history, archaeology and culture in accordance with the National Historic Preservation Act of 1966 is warrented by its association with the life of such an nationally recognized figure and for the same reason, an evaluation of "Ishi Country" for possible inclusion in the National Park System is warrented in accordance with the Antiquities Act of 1906 and the Historic Sites Act of 1935. 8

6. Use of the term archaeology as a synonym for prehistoric cultural remains in the Draft ES should be abandoned. 9

7. The archaeological loss involved in the removal of existing 10

cultural features or ruins and the restoration of the sites to a "natural condition" through razing standing structures; scattering, burying or removing building stones; and burning wood debris should be considered in the impacts upon the cultural environment section of the Final ES. 10

8. An alternative to the proposed action structured around the preservation of historically significant features at Manzanita Lake is needed. In such a senario, the Naturalist quarters and adjacent garage; entrance station kiosk and adjacent residence; stone comfort station and Loomis Museum would be presered as a historic district and restored to a temporal present of the mid-1930's. Other existing cultural features would be removed. Continuing use of these facilities at a diminshed and seasonal level, with most all other visitor services shifted elsewhere, would help maintain the district as a living memorial to an important segment of American culture as well as minimize the possibility of serious loss in the event of a natural disaster. 11

Two of the interpretative themes around which day-use of the district could be based include the history of the NPS in the Far West and the culture history of the Lassen region. Alternatively, the site could be maintained as a full-scale outdoor museum depicting a typical NPS facility of the 1930's. In short, even if the danger from rock fall-avalanche prohibits the occupany of the buildings, the integrity of the district can be preserved and if visitor use of the Manzanita Lake area continues at all, the presense of these cultural features together with the Loomis Museum would enhance visitor experience.

***

Thank you for the opportunity to participate in the environmental review process.

Sincerely,

Clyde Ellen Kuhn

Clyde E. Kuhn

RESPONSE TO COMMENTS BY
CLYDE E. KUHN

1. See Response to Comment 2, Environmental Protection Agency.

2. The cultural resources management program will be prepared in the near future.

3. The current status of National Register Eligibility is indicated in the text.

4. The Manzanita Chutes area has been determined to have no undisturbed archeological sites, due to extensive land disturbance in the past.

5. The Sulphur Creek Archeological District (which includes these two sites) has been placed on the National Register.

6. Use of geothermal power was considered during the formulation of the proposal. With current technology, the development of geothermal energy sources would be a significant intrusion on the natural scene. The potential impacts on geothermal features in the park could not be determined. This was not considered a feasible alternative at the present time.

7. It is recognized that development of geothermal resources in areas adjacent to the National Park could have a serious adverse effect on the park's environment. Because of the tentative nature of any such development, it is difficult to predict what kinds of geothermal industrial facilities would be constructed. A moratorium on all geothermal development adjacent to Lassen Park was not considered during this planning process; however, National Park Service personnel will attempt to work closely with the Forest Service and Geological Survey to insure any such development is in the best interest of the park.

8. Archeological surveys have been conducted in most areas to be affected by proposals in the plan. The intent of the surveys is to identify and evaluate archeological resources. Areas not yet surveyed and proposed for development in the distant future will be surveyed as part of the planning process for the area with compliance with the procedures of the Advisory Council obtained as resources are identified.

9. The term archeology is an accepted subject title for the chapter heading; however, it is not intended to be synonomous with prehistoric cultural remains.

10. All ground disturbance activities are preceded by an internal service procedure called an archeological clearance. This avoids inadvertent impacts on archeological resources and assures compliance with the procedures of the Advisory Council when resources are present.

11. Retaining the historically significant structures at Manzanita Lake along with other structures has been considered in the Environmental Impact Statement. Public safety considerations preclude this in that structures would create an attraction which would encourage people to be in the hazard area.

472 E 2nd Ave
Chico, Ca. 95926
Aug 4, 1977

Mr Bill Stephenson
Supt, Lassen Volcanic N.P.
Dear Mr. Stephenson:

When I saw Reflection Lake about 3 weeks ago I was appalled by the desolation of the place. Besides large mud flats and bare rocks there was a decided change in the flora and fauna, and not a pleasing change. The shrubs and bushes by the lake were drying up, and there were hardly any birds present. It had just about the same appeal as a dead deer by the road that had been struck by a car.

I supposed that this was caused by the drought, but at last night's meeting I found that it was deliberate — to make it "natural."

As far as "natural" is concerned, the level of the lake was raised about 100 years ago and a natural balance was obtained. So why destroy that balance and wait for a new balance to be established in another 50 years, inflicting the present ugly state upon the visitors? 1

Other items at the meeting interested me, but this one really gripes me. Why not let the water back in?

Sincerely
Stephen N. Matteson

RESPONSE TO COMMENTS BY
STEPHEN H. MATTESON

1. It is recognized that Reflection Lake was once a natural lake which has long been modified by man. However, with the apparent end to the drought, the lake level has returned to normal levels (the level prior to the discontinuation of water diversion), and it is expected that the lake level will remain at this level during years with average snowfall. To date, no cause-effect relationship has been established between the lake level at Reflection Lake and the diversion of water from Manzanita Creek.

Neil Moore
35 Gilmore Rd., Sp. 8
Red Bluff, Calif. 96080

September 5, 1977

The Superintendent
Lassen Volcanic National Park
Mineral, California 96063

Dear Mr. Stephenson:

I attended a public meeting on August 5, 1977 in Red Bluff about the Management Planning for Lassen Volcanic National Park. At that time I was allowed to make a presentation in which I read a couple of pages of my October 27, 1974 letter to the Regional Director. These pages were mainly about the Manzanita Lake and the Sulphur Works Ski Area.

A machine copy of my letter is submitted herewith in order to refresh our memories. It, also, covers all of the important areas of the Park.

I asked to make my presentation because at the Mineral meeting there seemed to be groups that would like to commercialize the Ski Area. Their intentions were good but how far can you go?

Since that time I have been given a copy of their Comprehensive Plan for the Ski Area and have read it from beginning to end. This is a challenge. It reads well but some one who is a skier and has some engineering ability should check it out. Several large costs are included such as a million dollar sewer system, a $350,000.00 commercial power set up. For a three month operation these are staggering costs.

In order to make the ski area attractive for a concessionaire would mean a chair lift. It would seem to mean that you do very little or a whole lot. It would seem that more time and study is required.

The Supplement of May 1977 recommends the Manzanita Lake Area accommodations be replaced just outside of the Park boundary in the Manzanita Chutes and be built gradually in phases. My only concern in this decision is the use of the highway accross the Jumbles. If this is agreed upon by all concerned, this is fine. My recommendation in my previous letter would have cost a new approach road around Table Mountain.

Very little has occurred sine my 1974 letter to make any changes in my thinking and recommendations. They used to tease the Park Service People by saying "just look, don't touch". There are millions of acres of land that can be commercialized, why pick on a National Park just because it has a road to it.

Very truly yours,

Neil Moore

Neil Moore

In duplicate
Enclosure: Letter 10/77

Neil Moore
35 Gilmore Rd. Sp. 8
Red Bluff, Calif. 96080

Phone 527-3296
Oct. 27, 1974

[illegible], Director
[illegible]
[illegible]
450 Golden Gate Avenue
San Francisco, California 94102

Dear Mr. Chairman:

Recently there have been public discussion concerning the development and use of Lassen Volcanic National Park. At one time you indicated that if I felt that I could add to the input that you would welcome a written statement.

I attended one meeting at Mineral and listened to several speakers give their views. These were mainly on the Sulphur Works ski area and the Drakesbad-Warner Valley section. However, their appears to be much controversy over the closing of the concession and government facilities at Manzanita Lake, because of the dangers of a recurrence of a rock slide.

My name is William N. Moore and known to my friends and acquaintances as just Neil Moore. My service on the staff of Lassen Volcanic National Park dates from March 1929 to March 1962. My duties kept me in the headquarters office most of the time. My principle duties were as office manager but because of a lack of personnel my individual assignments ranged over the entire field of park management. I grew up with this park and 85% of the development of the area occurred within my span of service. Because of circumstances during my time, I had the privilege of being Acting Superintendent more than any other individual. Once, with Mr. Leavitt's illness, the period was about six summer months. This experience would include much of the planning as well as overall operation.

Sometime before 1925 the National Park Service drew a Master Plan for improvements in Lassen Volcanic National Park. I am not acquainted with the details but I do know the results as they transpired by 1929.

The die was cast on the road system. It was to cross the high west side, come in at the Sulphur Works and leave by Manzanita Lake. Mr. Kittredge told me that he designed the switchbacks necessary to climb the south side. By 1929 there was a graded road from Old Boundary Springs south east Summit Lake. Another section was graded from where the ski area is now up to Jones cut. There was another section surveyed and the right of way cleared from Morgan summit to the present ski area. From Mineral there were county and private roads that served the people. The Supans built their own road to the Sulphur Works in the park below the present highway grade. From Viola to Manzanita Lake and on to Old Boundary Springs the general route of the emigrant trail was used. No bridges or culverts. Streams were forded. So there was much piece meal construction along an established surveyed route. In 1929 no road crossed the Lake Helen area, just horse trails.

Several items culminated at about the same time which could not have happened without a previous plan. Mr. Loomis and his wife donated about 40 acres of land with a newly constructed museum on it complete with exhibits and pictures of the eruption. A life estate was reserved for the construction of a residence and photo studio to be built near the museum. The Pacific Gas & Electric Company sold on a 50/50 basis an acreage of land that included Manzanita and Reflection lakes. The park boundary was extended some distance to the west to include these gifts. At the same time other boundary extensions were made to the north, west and south so that the general make up of the park is as we now know it. By 1931 and the dedication of the park, the Lassen Peak Highway as we now know it was punched through and hard surfaced.

The Butte Lake, Juniper Lake and Warner Valley areas were served by county roads, steep, rough and dirty. They remain primitive to this day with little major improvements. Simple log cabins were constructed at Butte Lake and Summit Lake for ranger stations. The cabin in Warner Valley collapsed under a snow load and a new one built with 2 x 6's laid sideways was finished in 1928. The same cabin plus a barn is the present ranger station for Warner Valley.

The original outline or plan seemed to be to keep the park in a wilderness state except the areas just adjacent to the Peak Highway. The Peak Highway crossed about 70% of the thermal areas and about 70% of the recent active volcanic areas. After forty five years the original concept still seems to be in existence.

It seems that in the original plan it was decided to have a business headquarters in an area that would be available the year around and that most of the utilities needed could be obtained. This was accomplished in 1928 when 80 acres of land below Mineral was transferred from the U. S. Forest Service. By 1929 a small box of an office, a superintendent's residence and a five stall equipment shed had been constructed. The fiscal and administrative records, which had been kept in Yosemite National Park, had just been transferred to Lassen and we were on our own with our nearest assistance in Washington, D. C.

The public statement and the closing of all facilities at Manzanita Lake comes as a shock to us old timers. Chaos Crags had never seemed to us to be of urgent danger. To be told that a rock slide of huge proportions could, with as little an event as an earthquake, could destroy Manzanita Lake with less than two minutes warning seems impossible to realize.

The naturalist program was slow starting at Lassen and any campfire entertainment or lectures on the natural phenomena was carried on by the rangers and others. I helped on this myself the first few years. Our reference for geologic items were taken from Howell Williams' book and from Day and Allen. Also, the first few years I was there was a resident volcanoligist of the Geologic Survey whom we called Doc. Finch. It was he who established the seismograph at the Forest Service in Mineral and the one at Manzanita Lake. No mention was made of possible urgency in future activity.

Over the past two hundred years there have been a number of destructive earthquakes in California. In 1851 a sizeable lava flow came from the base of Cinder Cone. In 1915 a sizeable lava flow and violent eruptions came from Lassen Peak. The hot blast down Lost Creek could be

1

compared to a small atomic bomb. No collapse of any part of Chaos Crags is noticeable. There is a sizeable crater at the fount of the rock slide and above it is a sandy slope on at least a one to one grade. It seems stabilized with weeds etc. growing most of the way up. The crater has not been filled with sand. Snow avalanches do not seem to occur here as they do on the south side mountains. The slope away from the crater does not seem to be great and gravity alone would not carry any falling material very far. The theory of trapped air cannot be understood. Road contractors, pit mining engineers, civil engineers are dealing with these conditions on a smaller scale everyday, so, we should have some experiences to work from. It would seem that an explosive volcanic activity would be necessary to create such far reaching destruction. 1

It would seem that some further study could be made of the slide itself. It is mentioned that it could destroy a standing forest. What was the contour of the land this slide covered up. Was there a standing forest on it. It would seem that by drilling and extracting cores in select locations could tell us this story. Do the geologists believe other parts of the Chaos Crags would crumble under its own weight.

If the National Park Service cannot turn back, I have a general option for consideration. This is to obtain as much land as possible in the Manzanita Chutes beyond the slide area for the rebuilding of the concession and government improvements. At the same time it will be necessary to obtain land north of the park boundary to include Table Mountain so that a road could be constructed from the Chutes across the north slopes of Table Mountain and intersect the Lassen Peak Highway where it makes a hair pin loop just north of Lost Creek Camp. This alternate would also include the rerouting of the State Highway so that it would be west of the newly acquired land. This would allow one entrance into the Park Service domain and the road around Table Mountain to begin in this domain. A small length of road would be parallel so that in making a separation the State route would go west of Eskimo Hill. Water would be derived from Manzanita creek by gravity.

You cannot have a wilderness and civilized comforts on the same acre. It appears to me that some concession will have to be made and the Manzanita Chutes could be the spot for this classification. Over much of the area it has a wonderful view of the high west side including Lassen. Its contours are gentle. Landscaping can be accomplished, improvements erected and roads constructed so that it could be a delightful site.

There are many obstacles to overcome in any alternate. I believe this offers the least number. I believe the citizens of Shasta County would be willing to cooperate on this particular option when it is learned there is no way of using Manzanita Lake. There are grave doubts about the other alternates down Hat Creek. The transfer of Forest Service land to Park Service ownership is not easy. Because of the arrangement of sharing the income on Forest Service land, the local counties seem to have veto power over some arrangements.

Other uses of sections in the northern part of the park can be worked on as needed and time dictates. I have every confidence in the National Park Service that they are very competent to do a professional job. My concern is to retain Lassen Volcanic National Park as a National Park and not just a recreational area. This land in the most northern section of California has been endowed with an over abundance of outdoor recreational areas. There is no need to make something else out of our National Park.

Our next concern is the winter ski area just below the Sulphur Work
It appears now that outside pressure is being made to enlarge the area several
fold. To do this would mean a large expenditure of funds for improvements by
the government as well as a well financed concessioner. If this area is to b
of a size and contain all of the varieties of winter recreation the people wa
would mean the acquisition of additional land near the present southern park
boundary for base facilities.

A ski area in these mountains requires an elevation of 6500 to 7500
feet. It requires long slopes with an eastern and northern exposure. Today a
ski area requires expensive lifts. This is obvious because people do not want
to spend most of their time climbing to the top and also of preparing the slo
for fast skiing. This is expected of the managemat. To make this a profitabl
venture for a concessioner requires a volume of business.

To create this type of business within the Lassen Volcanic National
Park would violate most of the policies of the National Park Service. We are
not in the business of clearing slopes, bulldozing slide areas and erecting
equipment that makes up the landscape. The business is fitted into the area
with as little disturbance of nature as possible.

I bring this out now because within a short distance there is
available a site which could be developed for this purpose on a grand scale.
It is on U. S. Forest Service land, it is a large mountain running to an eleva
of about 8,000 feet, has a northern and eastern slope and is about three air
line miles from highway 36. This is the Butt Mountain site.

This area could be considered commercial. The Forest Service has a
lookout on its summit and there are jeep trails to this spot. Streams eminate
in all directions from high up on this mountain. There is plenty of flat land
in Deer Creek Meadows for overnight accommodations. There is already several
resorts along highway 36 that are open during the summer months and during
deer season.

To attempt to make the Lassen Ski Area on a grand scale would destro
the environment and would have to go much further than any administration of
the Park Service could justify.

In view of these circumstances it is my belief that the present area
be modernized with a small increase of the parking area and possibly with an
extension of the lodge and the construction of recent manufacture lifts. No
extension of the park boundary or construction of improvements outside of the
present boundaries should be contemplated.

As I remember the terrain in this section, there is a terrace or
bench just below the grade of the highway. This narrow part could be used
for utility buildings or even a parking area. There is no law against having
split level parking areas.

Summer use of the Sulphur Works has always been a problem. It has b
in government ownership only about 20 years. The road passing through this ar
is on precarious footing. Slippage of earth and mud slides are common. The
minerals in the soil destroys man made improvements as concrete, pavement and
even vitrified clay pipe. Culverts or pipes become clogged and with the flash
floods earth fills are washed downstream. With major maintenance a roadway
could last about fifteen years.

If there is an engineering solution to this problem by rerouting the highway below the Sulphur Works and still maintain a good grade, then parking places and maintenance can be stabilized. If not then the Sulphur Works section will have to be reconstructed frequently and parking areas limited. Putting a parking area on a fill over a stream is not recommended for reasons above.

There still remains to have an informational center at the South Entrance and probably the ski chalet would be the place. There is need for a stopping place, parking area, public toilets and an exhibit explaining the features of the park. If properly designed traffic control and a manned information office is situated here, I am sure that probably half of the people driving through would stop.

Before going further, I cannot pass over the Morgan Springs property which occupies the Mill Creek Canyon from the park boundary to highway 36. This property has been owned by the Dick Hanna family for many years and their stewardship of this land has been very good. The area is an extension of the Sulphur Works. There are many hot springs, boilers etc. The larger ones are named Morgan Springs and the Growler. A very venerable grove of Cedar trees is located here. Of course there is a large stream and several large meadows. A good view of Lassen Peak and several peaks to the south are visible from a short stretch of highway 36.

3

This property has been examined by Park Service officials in the past but no action of any description has been made. In my opinion the Park Service would be losing a piece of the physical make up of the Park, if no attempt was made to acquire this property.

To me it would seem that negotiations should start at once with the heirs of Mr. Hanna so that some time in the future the property would eventually become a part of the Park. They may require many reservations, probably some money. You cannot know without first approaching them. I believe you will find them very friendly people to do business with. Tomorrow may be too late and the property end up in commercial hands.

The language used so far is in very abbreviated form. No attempt is made toward detail. The subject I am responding to is very broad and complex but I believe that those who are studying the development of the park can read between the lines and understand what I am trying to tell. There are certain concepts of a National Park that cannot be deviated from.

The National Park Service is well equipped with professional assistance and know how to carry out the physical part of the development. This environmental assessment goes farther than previous studies and the National Park Service is to be commended on this work. Master plans have been created for this area since 1916 with much less detail but the basis of the development has been laid many years ago. Volcanic studies in this area have been made for a hundred years or more.

The concluding paragraphs of this letter will take up the minor developments sites peripheral to Wilderness. I will start with Warner Valley and then move on to the other three areas.

I visited Drakesbad the other day and refreshed my memory about various things. I also had the advantage of reading the environmental report for this area.

The major part of the thermal area and the valley floor at Warner Valley have been in private hands since very early times. The owners have been very good stewards of this area and no large destructive improvements have been made. Since the Siffords have transferred this property to the National Park Service very little development has been made with the exception of a water system and a sewage system.

I do not know if the Sifford family has reservations about the use of this land but anyway I have suggestions that I would like to make. When the park boundary was extended it stopped at the private property lines of the Kelly an the Lee families, This made a notched and ragged boundary line at this entrance. About the same time legislation was passed designating that the park boundary would be extended to square off the south east corner of the park but not until all private land within this area had been purchased and in government ownership. To my knowledge no attempt has been made to accomplish this.

It would seem to me that only day use should be made in the thermal and meadow land at Drakesbad. This would mean to abandon the Drakesbad Guest Ranch and restore its area to a natural scene. Purchase of all or part of the Kelly ranch would be necessary and its inclusion within the park boundary. A ranger station and an informational booth is required together with a campground and overnight accommodations. The overnight accommodations should not be elaborate but with a pleasing site and appearance. I am not familiar with the hostels but if such is required they should be here and not in the upper valley.

The trail system should begin near the present campground and picnic area. Starting from the Kelly Ranch seems to me to lengthen the trails beyond the capacity of many people. A small improvement in the roadway that far may seem like it is a concession but I believe it can be done without too much disturbance. It would also be necessary to have a parking spot and rest rooms at this trail head. All roads and parking places should have a light surfacing so that chuck holes and muddy spots could be eliminated.

This development will take time and the use of the Drakesbad Guest Ranch will have to be used until replaced. This means that no expensive repairs or new buildings should be contemplated while negotiations are going on.

The Juniper Lake area is a very scenic one and is about the type one would like to have a summer home on the lake without too many neighbors. The cutting off of the public road at the south end of the lake with a public campground at that site is reasonable. A small ranger station would also be needed. As long as there are private holdings further in the park it would require suitable access for these people. The season of travel in these parts is short and it is not an area for heavy travel. I also might mention that a truck trail for fire use, or, at least a trail that you could get a 4-wheel drive across. The Harkness Lookout is also serviced from this area. I understand that helliconters are used for bringing in and taking out the lookout. However, that system is too expensive for trips in the interim.

Butte Lake is an exciting place to see and in years gone by was extremely popular for fishing, particularly, for people from Lassen County. Since highway 44 has been improved and is part of through travel from Redding to Susanville there must be more pressure for the use of this country.

The Cinder Cone is a very fragile object. The black cinders are underlaid by a light colored soil. Much foot travel erodes the cinders and leaves a messy lookingscene.. The ground west of Butte Lake is very sandy and wagons and cars in the past have become buried and unable to move. To insure that people remain on the trails and to have the trails paved would require major improvements and manpower to enforce. I believe that a small campground and a ranger station with its complement of supporting buildings is all that is needed here. Boating and fishing should be the main use of the area. A climb up Prospect Peak will afford some very fine views of the local park scene. Do not encourage heavy travel.

Summit Lake has always been popular for park visitors. It started on the south side as a campground and campfires were held here before Manzanita. The Ranger Station a little north of the lake was one of the first, probably 1928. To provide for more campers the north side was developed and then more formal rest rooms were build and water and sanitation systems were built. One superintendent tried using areas above the road on Hat Creek. This did not prove feasible and was abandoned. Summit Lake has reached its limit.

Your report keeps writing about hostels at these trail heads. Personally I have not seen these in operation but nothing appears to me to be cheap or economical for the visitor. They have to reach the area by modern means of travel. If they hike and arrive at a different hostel someone has to meet them with modern modes of transportation. This is a young persons activity and for one able to rough it for accommodations. They could save on eating and sleeping accommodations.

Also, at least at Summit Lake, for every hostel occupant there would be a reductions in campers. Young people swarming into the wilderness areas would mean more patrolling by rangers, a permit system with logs of their'route and a fire control unit equipped for this part of the country.

I have read or seen on television that the National Park Service is contemplating let nature take its course and not do anything about wild fires and forest insect pests. Tomight the T V told of a fire in Grand Teton that burned for a month. This I cannot understand. Our park is that small that a fire in our terriority could easily burn our neighboring forest or even endanger structures and improvements. Forest insects could harm neighboring forest forests and such items as blister rust could be perpetuated from our area. 9[illegible] of the fires are started by human beings and this greatly upsets the balance of nature. It would be a grave mistake not to allow the old policy of protection to continue.

There is opposition locally to the closing of Manzanita Lake and one lady in Redding has 9,000 signatures and still getting more. She has a chair and a card table in the mall in down town Redding and is soliciting signatures. The petition is to bring some five questions before our two California Senators and Congressman Johnson with the hope of having Congressional hearings on the matter.

I have read a large portion of the environmental assessment for master plan options for Lassen Volcanic National Park and the Geological Report of the Hazards just published. I realize that you are beginning a new policy of making public the thinking that goes into creating a master plan.

Each option has been carefully checked with the idea of preparing a study for the administration to make a choice. After a choice is made then detailed work plans will be made and cost estimates shown.

In my letter I have made no attempt to go into detail but have just shown my recommendation of what choice to make. Some of the options I do not agree with so recommend my own. My choice at Manzanita, in case the abandonment of Manzanita Lake cannot be reversed, is a modified option three. I believe that if it is hazardous for 500 persons of the public it is hazardous for one. If you allow the public to use the present highway across the Chaos Jumbles, according to you, they would be in jeopardy of their life. With me and the insurance company it makes no difference whether it is 1 or 500. I therefore propose in this case to have a road circle Table Mountain and intersect the Peak Highway near Lost Creek Campground. I have explained this plan in the first part of my letter. I also differ in the options on the ski area. The present chalet and parking places can be enlarged to some extent but the lifts and ski runs should not be extended any further than what the base facilities will accommodate. No southern development, shuttle train etc.

In the event that you abandon Manzanita Lake, it will take a long hard struggle to replace it and also a pocket full of money. I hope this can be resolved easier than we could expect.

Very truly yours,

Neil Moore

CC: Acting Superintendent Lewis S. Albert
Lassen Volcanic National Park
Mineral, California 96063

RESPONSE TO COMMENT BY
NEIL MOORE

1. This comment is now addressed in the text, see Chapter II.C.

2. The potential for development of the Butt Mountain site (Carter Bowl) has been recognized by the Forest Service; see the comments by the Forest Service in this chapter.

3. Acquisition of this land was not considered essential during this planning effort.

4. Acquisition of this land was originally proposed. In response to public comments, it was determined that this was not an essential addition to the park.

5. Removal of the Drakesbad Guest Ranch was considered during the formulation of the proposal. This alternative is described in Chapter VIII. Removal of the Drakesbad facilities was an issue early in the planning effort; public sentiment was generally in favor of retaining the facilities.

August 8, 1977.

Dear Mr. Stephenson,

I have been following with great interest the public meetings concerning the LVNP Draft Master Plan. Although I spoke at the Susanville meeting, I would like to re-emphasize some points and introduce for your consideration some additional things. I encourage you to consider all public comments within the constraints of the purpose of National Parks.

The situation at Manzanita Lake is indeed unfortunate. However, I find your relocation proposal as not being in the best interests of the American people and especially taxpayers. It will be years before your landscape restoration proposal pays off. With the Manzanita Lake area limited to Day use only, the north end of the park leaves much to be desired. On the other hand, the south end of the Park offers outstanding appeal. The potential for development at Bluff Creek should not be overlooked. If done in conjunction with ski area improvements (esp. sewage), economic savings seem assured. I believe that it could be worked within the constraints of the existing U.S. Multiple Use Plan which has zoned this area Travel Influence Management direction

for this area (T.I.) is, "Emphasis is on maintaining or enhancing beauty and attractiveness, and on developing and maintaining suitable recreation sites." — as stated in the Northern California Subregion Guide, FSH 2121.4, 1970. The Multiple Use Plan, which is still in effect, further states, "Coordinate all campground facilities adjacent to Lassen Volcanic National Park with Park officials."

Development of the Bluff Creek area would probably have a beneficial economic effect on resorts to the south of LVNP including Mineral, Child's Meadow, Deer Creek Area, and Chester and Lake Almanor, as compared to the relatively unpopulated area near the north end. It would also be closer to 95% of California's population, the primary users of LVNP.

This area could be used on a year round basis in conjunction with the ski area. A parking area at Bluff Creek with shuttle buses to the ski area, would reduce the sewage problem there, eliminate the need for additional parking space within the Park. Also, the inevitable cost of electric power (commercial) would be offset. An alternative to shuttle buses might be a Tram or Condola to the ski area with piped in interpretive tapes to accompany the scenic ride. 2

Ski Area

An Alternative for the ski area might be trading it with the Forest Service for a chunk of desirable wilderness or roadless area (Caribou or Heart Lake) 3

You should also consider a gradual phaseout or change to "non-mechanized" winter sports (snow-shoeing, x-country skiing — which is one of the fastest growing sports in America, and general snow-play activities) Obviously, this would need close coordination with the development of Butt Mountain. It would seem difficult to justify permanent improvements at Lassen Ski Area with Taxpayer money for such a specialized interest. This seems especially true when considering the legalities of the ski area being there in the first place. 4

The real key seems to be coodinated planning with the U.S.F.S. and the U.S. P.S. It seems apparent that there are some real problems at the Regional levels of these Public agencies. Perhaps more of a "local" approach is needed to best serve the public. The problems of Mineral King and the Tuolomee River should not have an effect on Lassen Park and Lassen Forest. Thank you for your consideration and Good Luck!!

Sincerely,
John Redd
Chester, Cal.

RESPONSE TO COMMENTS BY
JOHN REDD

1. Bluff Creek was considered for a joint Forest Service/National Park Service information/interpretive center. This concept was rejected during the course of this planning effort because a suitable facility could be developed at the ski area and because Forest Service planning has not been started for this area, precluding a cooperative planning effort.

2. See above response and response to comment 3, Friends of the Earth (State Capitol Office), and comment 8, Resources Agency of California. Use of a tram or gondola-type car would create a visual disruption similar to that of a road.

3. Land exchange in this area of the park was not considered during this planning effort.

4. The ski area will be retained in Lassen Park at its present size. Snowmobiling will not be permitted in the park, and except in the ski area, non-mechanized winter activities will be emphasized.

424 S. HURON
HARBOR BEACH, MICHIGAN
48441

DEAR SIR:

I HAVE READ THE DRAFT GENERAL MGT. PLAN & ENVIRONMENTAL STATEMENT FOR LASSEN VOLCANIC NATIONAL PARK. GENERALLY, I THINK IT IS A VERY SOUND PLAN. IN PARTICULAR, I ESPECIALLY FAVOR THE FOLLOWING POINTS:

1. THE PURCHASE OF SECTION 36
2. THE ELIMINATION OF PRIVATE INHOLDINGS NEAR SOME LAKES.
3. COOPERATIVE PLANNING WITH THE FOREST SERVICE.

THE ONLY REAL SUGGESTION I CAN HAVE FOR THE PLAN IS THAT I FAVOR A MORE EXTENSIVE PROGRAM TO DISCOVER THE HABITAT OF RARE & ENDANGERED SPECIES AND A MORE STRENUOUS PROGRAM TO ELIMINATE BACKCOUNTRY USE IN THOSE AREAS. /

YOU HAVE MY CONTINUED SUPPORT.

BEST WISHES,
Joseph C. Schott
JOSEPH C. SCHOTT

RESPONSE TO COMMENT BY
JOSEPH C. SCHOTT

1. Additional studies of rare and endangered species are called for in the Natural Resources Management Plan. Modification of back-country use regulations could result from these studies.

Dr. Robert W. Schultz
PO Box 1503
Quincy, California 95971

September 2, 1977

Mr. W. Stephenson
Superintendent
Lassen Volcanic National Park
Mineral, California 96063

RE: D18

Dear Mr. Stephenson,

I would like to compliment you and your planning team for the preparation of an excellent draft Environmental Statement for the management plan of Lassen Volcanic National Park. The plan is clearly presented and the analysis of alternatives is objective and complete. Although I have an interest in all portions of the park, I would like to direct my comments to the area I am most concerned and most familiar with (roughly 30 years of summer enjoyment), Juniper Lake.

I was very interested in your proposed plan for the Juniper Lake area. It seems to reflect the desire for a more concentrated and intensive use area located Southeast of the lake to which activities can be directed and monitored and backpacking and day trips staged. This alternative seems preferable for ease of administration and perhaps costs, yet does not allow for a dispersed, more relaxed camping and recreational environment, which I would like to see preserved at Juniper Lake. Noting this, I looked for other alternatives in the statement, but found none besides the continuation of the existing situation. In view of this, I decided to present you with a third alternative for your consideration---an alternative which I feel provides less concentration of park visitors, more opportunity for people of all ages and physical capabilities to view, recreate and study the area and provide the environmental safeguards equal in merit to those proposed in your prepared plan. Simply, this alternative compromises the prefered alternative and continuation of the existing situation.

First, moving the ranger station to the Southeast portion of the lake is a fine idea. The public can better be served and the Park can best be protected when campers, hikers and fishermen have immediate and frequent contact with the Park Rangers. Second, I concur with the need for additional camping space on the southeast side of the lake. However, I see no need to close the entire Harkness campground. I agree that the two or three camp sites immediately adjacent to the shoreline should be removed. The pit toilets in the meadow could be replaced with vault toilets and a water supply could be developed which could serve the Harkness campground in addition to new units located away from the lake to the southeast. In a very real sense, it doesn't seem logical to make the decision to close Harkness campground until the carrying capacity of the new campground is determined. 1

Finally, I would like to encourage you to leave the road to the Horseshoe Lake Trail Head open. First, the presence of the road will allow hikers and fishermen to be distributed more evenly throughout the area. Three trailheads (Crystal Lake, Harkness and Horseshoe Lake) would serve the public instead of one, and backpackers and day users would not be concentrated around the southeast portion of the lake. Second, it would allow the elderly, the physically handicapped and those who simply do not enjoy hiking an opportunity to view more of the park. Some 74% of the Park is presently "off limits" to these people now - why cut it back further? Third, the road provides access for fire suppression vehicles in case of wild fire. I would also suggest that the road not be improved beyond its present condition, until personal safety warrants it. 2

The impact of this proposal is best studied by your interdisciplinary staff, but the overall impact on the physical environment would be small. The road to the ranger station and past the private property on the north shore of the lake has stabilized and soil loss is "minor" with no evidence of water quality degradation. The effect of the proposal on wildlife and vegetation would be insignificant. With regard to aesthetics, the road cannot be easily seen from the lake and dust only drifts onto the lake prior to 0900 at which time the downslope winds cease. Dust is not damaging the trees. Water quality impacts would essentially be the same as under the preferred plan as would most other effects. Adverse socio-economic impacts listed on page 225 would be negated under this alternative.

Up until now I have not addressed the private cabins located to the north of Juniper Lake. National Park Service policy of acquiring land on an opportunity basis is a fair one, and eventually this property will be obtained by the Park. But until that time, if you are concerned with visuals, water quality, etc., why not try some public involvement in an attempt to get the cabin owners to reduce some of the visual impacts of their cabins and shorelines; study the effects of the sewage systems on the water quality of Juniper Lake to determine if there are any problems, and if so, resolve them; if there is too much dust and sdeiment from the road, gravel it; if lakeshore vegetation is being impacted within camping areas, design trails around these areas. 3

As I see it you really don't have any major problems in this corner of the Park. Most can be resolved with a little effort and without altering the whole management strategy of the area. Most people seem to like it as it is - as indicated by the Harkness campground and Horseshoe Lake registers. With the relocation of the ranger station and expansion of the camping facilities to the southeast of Harkness Campground, I believe you will maintain the special attraction, uniqueness and beauty that is inherent in the Juniper Lake area.

I understand that the snowmobiling associations are beginning to put pressure on you, with regard to opening portions of the Park to their sport. I have enjoyed cross-country skiing for many years now and I have experienced the exhileration of snowmobiling on many occasions. If anything, I have learned that as a snowmobiler I can tolerate cross-country skiers, but as a skier I can not coexist with snowmobiles. My wife and I have skied both the Lassen

Loop and Juniper Lake road on a number of occassions, primarily because snowmobiles are excluded. The Park is one of the few areas which are closed to snowmobiles in Plumas and Lassen Counties. Please keep it this way.

Thank you for your time in reviewing my comments. I have been involved with preparing environmental statements for land use planning for a number of years now, but this is my first input from the public side. I hope it gives you some interesting options.

Sincerely yours,

Dr. Robert W. Schultz

Dr. Robert W. Schultz

RESPONSE TO COMMENTS BY
DR. ROBERT W. SCHULTZ

1. Specific sites for development of the new campground have not been studied. It may be feasible to retain some of the campsites in the present campground if the cost of providing water and sewage treatment facilities is not prohibitive. We would hope that the new campsites would provide a variety of sites for a more dispersed and relaxed experience. Your comments will be given further consideration during comprehensive design.

2. Retaining the road to the present trailhead was considered early in the planning. Public comment generally favored closing the road. Under the present plan the road will be converted to a trail once all the inholdings have been acquired and all development removed. Since that could be many years away, it is probable that closure of the road will be given further consideration.

3. Your suggestions will be given consideration as we continue to manage this area until the inholdings are acquired and development removed. Water quality is monitored and could become a problem in the not too distant future.

N.E. 1420 Wheatland Dr., #17
Pullman, Washington 99163
August 25, 1977

Superintendent
Lassen Volcanic National Park
Mineral, California 96063

Dear Sir:

I wish to comment on the Draft General Management Plan for Lassen Volcanic National Park. The park should not be viewed primarily as a commercial or recreational zone, but as a natural area where the volcanic features, lakes and pine forests of a small part of northern California can be preserved. To this end, geothermal developments and the Bureau of Reclamation should be kept outside the park boundary.

The National Park Service should provide public transportation between Manzanita Lake, Summit Lake, Kings Creek Meadows, and the South Entrance and phase out cars. The Viola-Mineral road could be improved as an alternate route. Snowmobiles should not be allowed for recreational use in the park. 1

The Manzanita Lake concessions should not be reopened, and any concessions built on lands of the Lassen National Forest should be built at private expense under Forest Service regulation.

Sincerely yours,

John B. Sutherland

John B. Sutherland

RESPONSE TO COMMENT BY JOHN B. SUTHERLAND

1. See response to Comment 3 by Friends of the Earth (State Capitol Office); Comment 1 by the Sierra Club; and Comment 8 by the Resources Agency of California.

JOHN R. SWANSON
P. O. Box 922
Berkeley, California 94701

August 18, 1977.

Mr. William Stephenson, Superintendent
Lassen Volcanic National Park
Mineral, California 96063

Dear Mr. Stephenson:

Please accept my comments, as follows, concerning the Draft General Management Plan, Draft-Environmental Statement and Supplement to same for the Lassen Volcanic National Park.
I am opposed to all forms of mechanical skiing facilities within the units managed by our National Park Service, including current as well as proposed facilities in this national park, and recommend that all forms of mechanical skiing facilities be terminated in the next two years with the total removal of such facilities by that time. Mechanical skiing has no place in our system of national park units.
As to the relocation of the Manzanita Lake concessioner facilities, I concur as concessioners can no longer be tolerated in our national system of parks as they do not provide compatibility with the basic purposes of our national park ideals. Etc. I am opposed to the plan that would pay for the new concessioner facilities relocation. I support only immediate removal of these facilities and no any relocation. A question if any is necessary as this national park should be a wilderness National Park and the area surrounding this Park should be wilderness, as well.
Lassen Volcanic National Park Wilderness should be expanded to include nearly all of the park area and, if possible, to include all of the park in order to fully save and preserve its scenic wilderness, wildlife, historic and cultural resources, such as for example, extend the Juniper Lake road to 1/4 mile north of the Park boundary only, with a longer station and minimum size campground or, expand this park to the Warner Creek campground area with wilderness area just north of this campground area. Similar situation with the Warner Valley area, Butte Lake area, Manzanita Lake area, Snag Lake, Babyfoot and Reba Peak areas. With wilderness brought to the shoulders of highway 89 or Lassen Park Road, and, eventually to remove this road and replace with a trail only from the Sulphur Works to just west of Manzanita Lake.
I propose federal legislation to expand this park so as to provide protection to several contiguous areas of national park caliber, such as the Heart / Huckleberry Lakes area, the current Caribou Wilderness, possibly to Warner Creek campground area, as examples, with Lassen Park to include a total of possibly 150,000 to 160,000 acres with practically all of this included as wilderness.
And to start with the acquisition of all in holdings - private lands - such as Section 36, Juniper Lake and Hat Creek. Also, start to remove all structures and eventually all roads in this national park.
To retain the Baron snowmobile use is urgent to the survival of this park area.
Nearly a century ago, a million acre Lassen National Park could and should have been established. Now this small national park is about the only natural scenic wilderness area remaining in all of northeastern California.

Sincerely, John R. Swanson.

RESPONSE TO COMMENT BY
JOHN R. SWANSON

1. See Response to Comment 3 by Friends of the Earth.

August 6, 1977

Honorable chairman, Members of the National Park Service, ladies and gentlemen:

My name is Susan Watson. I have read the Draft Environmental Impact Statement, the Draft General Management Plans of August 1976 and the supplement of May 1977. I am submitting comments for myself only, as a long time user in various ways of Lassen National Park.

First, may I say that the basic planning for this unique and beautiful Park is being built in a sound and intelligent manner and that the translation of the legislative and legal constraints and directives into management and operational principles is proceeding very well. I want to make my comments following the statements of Section B, Management Objectives, Appendixes, starting on p 55 of the Draft General Management plan:

In Resource Management: the second statement, "Restore and maintain the Terrestrial and Aquatic Ecosystems as they most probably existed prior to technological disturbance by man." Although I have no question with the 5 sub-points with the possible exception of #4, I do question the statement as being nebulous and without definite meaning. On its face, it conflicts immediately with the preservation of historical and archaeological features, which is the next section in management objectives. More seriously, it does not describe what period is preferential or what man or what technology or why. Because almost anything can be read into the statement and because it undoubtably has been founded on the best of intentions, as it stands now, it will lead us into all kinds of semantic and practical difficulties.

Man and his (and her) technology have been around the Park for a very long time, judging from the age of the Native American artifacts in the archaeological sites. Some technologies have obviously become quaint and are to be preserved, as the old dam at Manzanita Lake, and some are newer and useful, as the Loop Highway and septic leach fields. They are in fact technological disturbances. So are hiking boots. Some way of judging the preferable landscape other than simple reference to some technological ante bellum is, in my opinion, necessary and desirable.

"To restore" and "to maintain" imply a high degree of resource management. May I refer you to the ideas and conceptions of the problem expressed by Dr. Ed Stone of UCBerkekly department of Forestry. Dr. Stone is working to perfect methods by which it is possible to "roll back or roll forward" what vegetative associations look like starting from the present. This is done by careful analysis of highly detailed aerial photographs (scale 1 to 5000; one acre to one inch) and field research. Out of these pictures, various management techniques can be developed. What we have are choices of landscapes through successions - we know what will be coming along. We also know [illegible] at different times, what was past.

Although the above sounds "unnatural" and the term "landscape architecture" sounds artificial, we are managing the landscape by our very use of it, whether by technological uses of different intensities or by merely being in it at all. Restoration to some past state may or may not be desirable. Knowledge of states and intelligent choices will be basic to having a - quote, natural, unquote - scene. Perhaps the statement would read better, "Restore and manage the terrestrial and aquatic ecosystems to reflect natural successions commensurate with designated and limited human use of the Park."

Under the section "Achieve a Compatible Pattern of Land Use in the Vicinity of the Park through Regional Planning", p.56, I hope that in #1 the scenic and biological integrity of areas immediately south of the Park, that is, Willow Lake, the north arm of Rice Creek, Rhodes and Spencer Meadows, Huckleberry Lake and Glassburner Meadows, and, southwest, Twin Meadows and Heart Lake can be maintained. It would be preferable to incorporate some of these areas into the Park; however, as incorporation is not immediately likely, planning for the compatible use with other interests is highly desirable. 2

In #2, I should insert the words "within the constraints of Park planning" after the words "public recreation needs." The statement would read, "Cooperate with other public and private entities in identifying Lassen's role in the larger regional context of serving public recreation needs within the constraints of Park planning in the north Sierra/south Cascade travel region.

Under "Acquire private inholdings for Park purposes" - Cheers and Godspeed!

Under Visitor Use: "Provide Public Use and Management Facilities Necessary to Visitor Use and for Protection of Park Resources." The statement is well phrased. Underlying the provision of facilities should be the guiding thought that the National Park Service is not entirely in the recreational business, and, certainly, is not in the entertainment business. Concessioners should understand that their business is not to entertain their customers but rather to facilitate the means by which the outdoor experiences of the Park are made available in diverse ways to the general public.

Lassen has been fortunate to have had a development which was formed in large part by returning family groups, a situation which has brought about an appreciation of the Park for itself and not as a collectible item on a tourist circuit. In this sense, the unfortunate, although entirely necessary, closing of the Manzanita facilities has left a gap in provision for facilities both for the families who returned yearly and for the overnight traveler. I am sorry to read that the supplemental plan contemplates the use of the present road through Chaos Jumbles, as I believe this retention compromises the safety basis for the closing of the area. Equally, I am not satisfied with the selection of the Manzanita Chutes for future development; the area is aesthetically poor, is badly situated for any future pyroclastic flow, and would encourage

by its proximity, illegal and unwise entry into the rockfall area. Obviously, economic constraints and planning with the Forest Service are going to determine what happens in the future in this area.

#1 and #2, regarding the Lassen Ski Area form an adequate basis for the recommendations of the supplemental report. Even without the economic constraints, and solely on park management philosophy the ski area should not be enlarged. Downhill skiing by its very nature is not the type of recreational activity to be fostered by the National Park System. When and if competing facilities are built on non-park land, the downhill facilities should be phased out. On the other hand, the crosscountry skiing and other snow related sports may be an adequate attraction for retaining the facilites for winter use. More summer uses might be made from the area as well. Operational problems of cross country skiing or snowshoeing such as the necessity of patrols, have not been discussed in the literature and need clarification. In my opinion, snowmobiling has no place in a National Park and should remain forbidden. 3

#3 - excellent. #4 - to retain Drakesbad at present levels of development. I am very appreciative of this decision, not so much as to what Drakesbad has done for me, but as to what it has done to me. My abiding interest in the environment, as well as my childrens', was in large part formed by the experiences at Drakesbad, where, if the truth be told, comfort was the last thing one thought of - and had - in the overwhelming presence of this landscape.

#5: In the "provision for a system of trails", I am going to suggest an alternate route for the Pacific Crest Trail. As it stands, the PCT has one good view of Mt. Lassen at the Boiling Lake east bluff and then hits a series of sensitive and overused meadows until it reaches the dry northern part of the Park and looks back on the scenic majesty it missed. This state of affairs is not satisfactory to resource management nor to the philosophy of the PCT. Rerouting from Terminal Geyser to Kelly Camp and then up Kings Canyon does not help, although I am very much in favor of acquisition of the suggested 190 acres at Kelly Camp. May I suggest the following: from Terminal Geyser or Little Willow Lake, use existing routing to the eastern bluff of Boiling Lake where a spectacular view of Lassen is to be seen. Use the eastern trail going north and either rejoin the existing trail or, preferably, construct a small segment directly north to connect with the bridge at the picnic area. This would relieve the heavy use from through and day users of the current "nature trail". Use the existing segment from Warner Valley Campground (the CCC trail), which also has beautiful views of Warner Valley, Mt. Harkness, and Gifford Mountain, but instead of descending to Corral Meadows, continue on the Flatiron Ridge Trail to Lower Kings Creek Meadow on the high trail - not the Falls trail, which is delicate. This trail has some of the most magnificent views of the central and eastern portions of the Park. A road crossing would be necessary at the loop Highway. Contour around Reading Peak to the Shadow Lake-Hat Creek Trail. A second road crossing would be necessary. Proceed down Hat Creek to meet the current PCT, which leaves the Park at that point. This trail would be 4

approximately the same length, would avoid the sensitive central Park meadows and lakes, and would provide unexcelled scenery.

#6,7,and 8 are nicely expressed. Under #8, I shall question the closing of Warner Valley Campground. In several places it is mentioned as being rocky and steep; the PCT, Volume I, Wilderness Press, describes it as "very pleasant" (p126). It is all of these. It seems to me that it is needed as much as the development also at Kelly Camp is needed. If the Park Service wants to discontinue the pit toilet campgrounds in favor of septic tank campgrounds or if the area is botanically impacted, say so, but at least the upper side, has beautiful settings, handsome trees, fine water - and rocks. It also makes a fine and inexpensive overflow from Drakesbad. Unless the management is impossible, retain it. 5

Under the safety section, the retention of the road through Chaos Jumbles is not in accord with its statement #1. 6

Under the interpretive section, I hope you will remember that environmental education, like religion, is caught rather than taught. Although the exhibits, the ranger talks, and the other intellectual approaches are fascinating and are necessary, education will begin by exposure to the Park itself and by developments which do not call attention to themselves but point to the wider and deeper experiences of the natural surroundings.

Under the last section,"Regulate Park Use to Assure that Resource Quality is not Impaired," I think no one will disagree with that aim.

The plan is basically good and is sensitive. It needs polishing in the areas of Manzanita Lake planning in particular and also the Ski Area, and in identification and research of resources.

It has been a pleasure to read the material and to know that Lassen Volcanic National Park is in good hands. Thank you.

Susan Watson

Susan Watson
36 Ardor Drive
Orinda, CA 94563

Corrections to the Environmental Impact Statement:

P72: The severe storm was in October 1962, not 1961. Areas on Flatiron ridge and near Horseshoe Lake were badly damaged by uprooted and felled trees.
p104: There is a very well used connecting trail between Triangle Lake in the Caribou Wilderness and Lassen Park near Widow Lake. It is noted on Forest Service maps but not on other maps. If not official status, it enjoys very obvious customer acceptance.
p72-83: Curiously, there is no mention of Quaking Aspen, especially at the far end of Warner Valley, nor of Black Cottonwood in Kings Canyon and lower Hot Springs Creeks. 7

RESPONSE TO COMMENTS BY
SUSAN WATSON

1. The management objectives for Lassen Volcanic National Park are intended to be a framework for conserving park resources, for integrating the park into its regional environment, and for accommodating environmentally compatible public use in accordance with existing National Park Service management policies. Essentially, the management objectives are a list of desired conditions which spell out ends rather than means. And usually a variety of alternatives are available to meet these objectives.

   In effect, the management objectives are a refinement of the Lassen Park and National Park Service legislation, and the Management Policies of the National Park Service. The management objectives are met through actions described in the General Management Plan and its subsidary plans (for example, the Natural Resources Management Plan).

2. These areas were not considered for acquisition; however, National Park Service personnel will work closely with adjacent landowners to insure that any actions will be compatible with park resources.

3. The day to day operations aspect of a park like Lassen are not discussed in the general management plan. Careful consideration is given to the effects of a proposal on park operations. Through consultations with the park superintendent (who is a member of the planning team) and other members of the park staff, operational aspects of each segment of the plan are analyzed. When a proposal or alternative would have a significant affect on park operations, it is discussed in the document.

4. Re-routing the Pacific Crest Trail was not analyzed in the formulation of alternatives. The alternate route through Kelly Camp has been dropped from the proposal. Re-routing of the trail to avoid sensitive areas will be considered in the Natural Resources Management Plan and the Backcountry Use Plan.

5. The Warner Valley campground is being retained.

6. The management objective has been re-written and says, "1. Provide facilities and public activities in areas affording low exposure to geologic hazard." Although retaining the road through the Chaos Jumbles exposes people to a geologic hazard, not allowing persons to stop reduces the number of people exposed to the potential hazard at any one time.

7. These corrections have been included in the final environmental statement.

September 1, 1977

Harold W. Wood, Jr.
2205 E. Howe
Seattle, WA 98112

William Stephenson
Superintendant
Lassen Volcanic National Park
Mineral, Calif. 96063

Dear Sir:

I would like to submit the following comments on the Draft Environmental Impact Statement for the Draft General Management Plan for Lassen Volcanic National Park.

For the most part, the statement considers and deals with current problems of park management in a positive fashion.

I heartily concur with the proposal to re-locate visitor use facilities from Manzanita Lake to an area outside the park. I encourage the cooperation of the Forest Service and the National Park Service in this regard. Generally, I think the concept of visitor facilities located outside the parks is a good one, which is currently being proposed in legislative proposals now in Congress for the Alaska parks, and ought to be considered more widely throughout the National Park System.

In the specific instance of Lassen National Park, the Master Plan should not overlook the possibility of enlarging the park to include the Caribou Wilderness to the east and to include outstanding features to the northwest such as Subway Lava Cave. While cooperative Forest Service-Park Service planning is desirable, I am greatly concerned that the American public is not being adequately informed as to the missions of the two agencies. A joint visitor center can be an opportunity to eliminate the confusion that exists, but it also could serve to further confuse the visitor who is unfamiliar with the difference between various federal and state land-management agencies. Such a proposed visitor center needs to be designed to illustrate the difference in philosophy and management between the two agencies. All the outstanding scenic features of the Lassen region ought to be included in the Park, and surrounding Forest land needs to be managed as a buffer and more intensive recreation zone than the core National Park. 1

In any case, major tourist facilities as once existed at Manzanita Lake ought to be situated outside the National Park boundaries, and a shuttle-bus system inside the park needs to be given greater consideration. 2

The proposal contained in the DEIS to upgrade and expand the downhill ski facilities receives by complete and total objection. Our National Parks were not intended for such recreational developments. Even if the ski development had a minor physical impact, which it does not, it should be removed completely from the park, as a violation of the National Park Service Organic Act and the spirit of the National Parks as areas where natural beauty is preserved intact for the enjoyment of future generations. The presence of the towers, chair lift, parking lots, denuded ski slopes, etc. present an ugly scar on what is intended to remain pristine. Already, the DEIS states that there has been damage to archeological sites and that sewage is polluting Suphur Creek. The presence of a ski facility encourages overcrowding, and the Park Service ought to be using built-in lack of facilities to automatically control overcrowding. It is ridiculous to provide facilities which encourage crowding, then one day attempt to cut back to meet the recreational carrying capacity which has been exceeded. Too often, the excessively large size of parking lots in Lassen National Park has compromised the natural scene, and clearly it is time for some creative controls on over-use. The first step is to use self-limiting factors. The existing ski area should be completely removed from the park and the area restored to its natural condition. There are other ski areas in the region outside the park. The Park Service has a duty to let the park visitor know that the purpose of a national park is not intensive recreation, but rather spiritual enrichment through appreciation and respect for the natural features which the park was set aside to protect.

I urge the immediate abandonment of the Lassen ski facility and removal of any plans to enlarge it from the draft management plan.

Thank you for this opportunity to comment and I will be looking forward to hearing of the plans as they progress.

Sincerely,

Harold W. Wood, Jr.

Harold W. Wood, Jr.

RESPONSE TO COMMENT BY
HAROLD W. WOOD, JR.

1. Expansion of Lassen Volcanic National Park to include these areas was not considered during this planning effort.

2. Facilities in Manzanita Chutes will be outside the park. A shuttle bus system was considered as one means of reducing air pollution and improving the visitor experience. However, a shuttle bus system was not deemed feasible because of the "drive-through" nature of the park road. Such a system is not needed at Lassen because of low traffic volumes throughout much of the visitor season.

10 August 1977

W. Stephenson, Superintendent
Lassen Volcanic National Park
Mineral, CA 96063

Re: General Management Plan
for Lassen Park

Dear Mr. Stephenson:

I would like to have the following comments included in the hearing record on the above subject:

Additional wilderness: I would like to see this considered, in that increasingly larger numbers of people are visiting the wilderness areas of parks. I understand there are 25,000 acres of wilderness land already within Lassen Park that could be given this classification and thus be protected for wilderness values. 1

Downhill ski facilities: I am glad the Park Service does not favor expanding these facilities. Cross-country skiing is becoming more popular each year, but as long as each kind of skiers can pursue his particular skiing interest in the park, the Park Service is doing its job.

Relocation of Manzanita Lake Concessioner: I don't see why the government must pay this bill. The geologic hazards that require the relocation are not the government's responsibility. It seems to me that the relocation could be paid for by the concessioner. Certainly the cost of over $6 million for doing this seems excessive and the money better used by the Park Service.

Ban on snowmobiling: I heartily applaud the courageous stand of the Park Service on continuing this ban. The damage to vegetation, wildlife, and the noise and danger of these vehicles to skiers and snowshoers is not a use consistent with the preservation of a national park.

Thank you for this opportunity,

Lea Wood

Lea Wood

1745 Cox Road
Aptos CA 95003

RESPONSE TO COMMENTS BY
LEA WOOD

1. See response to Comment 1 by California Native Plant Society.

Ms. Jeri Demon
220 Junipero Serra
San Francisco, CA
94127

Mr. Bill Stephenson
Superintendant Lassen Volcanic Nat. Park
Mineral, CA 96063

Dear Mr. Stephenson,

I have reviewed the Master Plan for Lassen Park but I was surprised that there was no alternative for a free shuttle bus service in the Park. Such a service has proved effective at Yosemite and Grand Canyon in reducing traffic. Furthermore, it would be easily accomplished in a park as small as Lassen. 1

Also I fail to see how moving the lodging from Manzanita Lake to ~~the present~~ Manzanita Chutte will prevent the possible tragedy of an avalanche since they are so close. I think the Manzanita Lake concession as well as the Loomis Museum should be reopened. Further, I do not think the skiing facility should be expanded and snow mobiles should not be allowed in the park. 2

However, I think the biggest failing of the Master Plan itself is that the public had nothing to do with it's creation. We were 3

~~Yosemite~~

Not given the opportunity to create alternatives as was the case with the Yosemite Plan. Instead we were granted one alternative and expected to like it or leave it. Thank you for your time. 3

Sincerely,

Jeri Jemon

RESPONSE TO COMMENTS BY
MS. JERI ZEMON

1. Shuttle bus service in Lassen Park was considered; however, because of the "drive-through" nature of the park road and lack of large numbers of people, this alternative was rejected.

2. This is correct; the distance between the two areas is not sufficient to prevent a possible tragedy. Please see the impact discussion in the text (Section III. C. 1) regarding human safety for full analysis of the hazard to human life.

3. Public involvement is the cornerstone of the National Park Service planning process. Although a similar public involvement program to Yosemite was not undertaken, the public was afforded the opportunity to comment on the "Environmental Assessment, Master Plan Options"; the "Draft Environmental Statement", and "Draft General Management Plan", along with the supplement that accompanied these latter two documents prior to the formulation of the General Management Plan and its final environmental statement.

   Preplanning public meetings were held in October 1972, prior to the formulation of alternatives. Unfortunately, the need for a meeting in the San Francisco area was not recognized early in the planning process.

   The Master Plan Options document (prepared after the preplanning meetings) presented a wide range of alternatives. Public comment on these options helped formulate additional alternatives as well as narrow the range of "feasible" alternatives which were discussed in the Draft Environmental Statement.

X. Selected References

ANDERSON, H.W.

1960 "Storage and Delivery of Rainfall and Snowmelt Water as Related to Forest Environments." Presented in General Assembly of Helsinki, July 25-August 6, 1960. In Publication of International Union of Geodetics and Geophysics/ International Association of Scientific Hydrology 51:478-89.

1970 "Storage and Delivery of Rainfall and Snowmelt Water as Related to Forest Environment." In Proceedings, Third Forest Microclimate Symposium. Seebe, Alberta: Canadian Forestry Service.

BECKER, NANCI

1977 "Mount Lassen User Preference Study." Paper presented at California State University at Chico. On file at Lassen Volcanic National Park.

BORGERSEN, MEL, AND ASSOCIATES

1971 "A Lift Recommendation and a Preliminary Master Plan Program for Lassen National Park Ski Area." Prepared for McKinley-Lassen National Parks Company, Menlo Park, California.

BOYCE, JOHN SHAW

1938 Forest Pathology. American Forestry Series. New York: McGraw-Hill.

CALIFORNIA REGIONAL WATER QUALITY BOARD, CENTRAL VALLEY REGION 5

1975 Water Quality Control Plan Report, Vol. I. Sacramento.

ECOLABS ASSOCIATES

1973 "A Vegetation Study, Ski Area, Lassen Volcanic National Park," by Roman Gankin. Prepared for the National Park Service. On file at Lassen Volcanic National Park.

FIELD, DONALD R.

1971 North Pacific Border Studies: Sociological Studies. Seattle: University of Washington.

FRIENDS OF LASSEN SKI AREA

1977 "Lassen Park Ski Area Draft Comprehensive Plan." Chico, California.

GALLAGHER, TIMOTHY ALAN

1977 "User Expectations in Outdoor Recreation." M.A. thesis, California State University at Chico.

GALLAGHER, NANCI BECKER, AND TIMOTHY ALAN GALLAGHER

1978 "Lassen Volcanic National Park Ski Area Feasibility Study and Examination of Three Alternatives." Paper presented to Lassen Volcanic National Park.

GILLESPIE, VIRGINIA B.
1971 "A Study to Establish Guidelines for Programs of Family Camping in Order That Patterns of Operation Can Be Suggested That Are Based on Validated Principles." Ph.D. thesis, New York University.

GILLETT, GEORGE W., JOHN THOMAS HOWELL, AND HANS LESCHKE
1961 A Flora of Lassen Volcanic National Park, California. Reprinted from Wasmann Journal of Biology. San Francisco: University of San Francisco.

HEATH, J.P.
1960 "Repeated Avalanches at Chaos Jumbles, Lassen Volcanic National Park." American Journal of Science 258:744-51.

JOHNSON, J.J.
1973 "Archeological Reconnaissance of the South Entrance and Ski Area of Lassen Volcanic National Park." Prepared for the National Park Service. On file at Lassen Volcanic National Park.

1975 "Archeological Investigations In and Around Lassen Volcanic National Park." Prepared for the National Park Service. On file at Lassen Volcanic National Park.

JOURNEY, A.E.
1972 "An Archeological Survey of Route 1 and Vicinity of the Park Road in Lassen Volcanic National Park, California." Prepared for the National Park Service. On file at Lassen Volcanic National Park.

KILGORE, BRUCE M.
1971 "The Role of Fire in Managing Red Fir Forests." In Transactions of the Thirty-Sixth North American Wildlife and Natural Resources Conference, March 7, 8, 9, 10, 1971, pp. 405-16.

KROEBER, A.L.
1927 "Disposal of the Dead." American Anthropologist 29:308-15.

LEONARD, ROBERT, AND ROBERT COATS
1974 "Precipitation and Water Quality in the Ward Valley Watershed, Lake Tahoe Basin, California." Presented at the Third National Conference on Fire and Forest Meteorology of the American Meteorological Society and the Society of American Foresters, April 1974, Lake Tahoe, Nevada.

McMILLIN, JAMES
1963 "The Aboriginal Human Ecology of the Mountain Meadows Area in Southwestern Lassen County, California." Masters thesis, California State University, Sacramento.

MIELKE, J.L.
1943 White Pine Blister Rust in Western North America. Yale University School of Forestry Bulletin No. 52. New Haven: Yale University.

OOSTING, H.J., AND W.D. BILLINGS
1943 "The Red Fir Forest of the Sierra Nevada." Ecological Monographs 13:260-74.

TALL TIMBERS RESEARCH STATION
1969 Proceedings of Tall Timbers Fire Ecology Conferences, 1963, 1964, 1967, 1969. Tallahassee, Florida.

TAPPE, DONALD T.
1942 The Status of Beavers in California. State of California, Department of Natural Resources, Division of Fish and Game, Game Bulletin No. 3. Sacramento.

TREGANZA, A.E.
1963 "An Archeological Survey of the Aboriginal and Early Prehistory Sites of Lassen Volcanic National Park, California." Prepared for the National Park Service. On file at Lassen Volcanic National Park.

U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE
1973 "Lassen Volcanic National Park Ski Site Study," by Peter J. Wyckoff. Prepared for the National Park Service. On file at Lassen Volcanic National Park.

U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE, PACIFIC NORTHWEST FOREST AND RANGE EXPERIMENT STATION
1968 Elytroderma Disease of Ponderosa Pine in the Pacific Northwest, by T.W. Childs. Research Paper PNW-69. Portland.

1968 "Some Effects of Alder on the Forest Environment," by Robert F. Tarrant. In Biology of Alder, J.M. Trappe, et al. Portland.

U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE, PACIFIC SOUTHWEST FOREST AND RANGE EXPERIMENT STATION
1960 Biology and Control of the Western Pine Beetle, by J.M. Miller and F.P. Keen. Berkeley.

1970 Natural Regeneration of White and Red Fir--Influence of Several Factors, by Donald T. Gordon. Research Paper PSW-58. Berkeley.

1973 Damage from Wind and Other Causes in Mixed White Fir-Red Fir Stands Adjacent to Clear-Cuttings, by Donald T. Gordon. Research Paper PSW-90. Berkeley.

U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE, REGION 5

1969 Beaver Habitat Management Plan--Lassen National Forest, by Jack R. Kahl. Forest Service Bulletin 2620. San Francisco.

U.S. DEPARTMENT OF THE INTERIOR, GEOLOGICAL SURVEY

1970 "Administrative Report on Geological Hazards at Lassen," by Dwight R. Crandell and Donal R. Mullineaux. Prepared for National Park Service. On file at Lassen Volcanic National Park.

1971 Microearthquakes near Lassen Peak, California, by J.D. Unger and J.M. Coakley. Professional Paper 750-C.

1974 "Chaos Crags Eruptions and Rockfall-Avalanches, Lassen Volcanic National Park, California," by Dwight R. Crandell, et al. Jornal of Research 2(1):49-59.

U.S. DEPARTMENT OF THE INTERIOR, NATIONAL PARK SERVICE

1965 "Lassen Volcanic National Park Survey Project," by DeWitt. On file at Lassen Volcanic National Park.

UNITED STATES DEPARTMENT OF THE INTERIOR, NATIONAL PARK SERVICE, DENVER SERVICE CENTER

1974 Environmental Assessment of Master Plan Options. Denver.

1977 Economic and Development Feasibility Study for Visitor Services, Lassen Volcanic National Park. Denver.

UNITED STATES DEPARTMENT OF THE INTERIOR, NATIONAL PARK SERVICE, LASSEN VOLCANIC NATIONAL PARK

1966 "Long-Range Fishery Management Plan, Lassen Volcanic National Park, 1966-1975," by Lester Bodine. Mineral, California.

1968 "Analysis of Deer Browse and Ecological Relationships in Lassen Volcanic National Park," by Gary B. Donart. Mineral, California.

1972 "Lassen Volcanic Lakes and Streams Survey," by F.A. Ellis. Mineral, California.

1975 Lassen Volcanic National Park Backcountry Management Plan. Mineral, California.

UNITED STATES DEPARTMENT OF THE INERIOR, NATIONAL PARK SERVICE, WASHINGTON OFFICE

1972 Activity Standards. Revised. Washington, D.C.

1978 Management Policies. Washington, D.C.

WEST, JOHN R.

1976 "The Lentic Resources of Lassen Volcanic National Park, California." Prepared for the National Park Service. On file at Lassen Volcanic National Park.

WILLEN, DONALD W.
1963 "Erodibility Indexes and Surface Soil Characteristics of Some Southern Sierra Nevada Forest Soils as Related to Parent Rock, Topography, and Vegetation Type." Masters thesis, University of California, Berkeley.

APPENDIXES

A MANAGEMENT OBJECTIVES

The following statement by the superintendent of Lassen Volcanic National Park reflects park management's needs and goals relative to this general management plan.

PROVIDE FOR MANAGEMENT AND USE THAT DO NOT IMPAIR PRESENT OR PAST EVIDENCES OF VOLCANIC ACTIVITY

RESTORE AND MAINTAIN THE TERRESTRIAL AND AQUATIC ECOSYSTEMS AS THEY MOST PROBABLY EXISTED PRIOR TO TECHNOLOGICAL DISTURBANCE BY MAN

Develop and execute continuing research programs for natural resources

Implement a resources management plan based on data from natural resource research

Monitor and manage fire, insect infestation, and plant disease as natural controlling agents in the forest ecosystem

Restore the original aquatic ecosystem of the park while allowing recreational fishing to continue in places and at levels that do not degrade the natural environment

Allow Manzanita and Reflection lakes to remain in their present condition while not disturbing historic structures associated with their alteration

Collect background data and formulate management plans for deer and beaver in the parks in cooperation with the California Department of Fish and Game and the U.S. Forest Service

PRESERVE AND MAINTAIN THE HISTORIC RESOURCES

Identify and assess the significance of cultural resources

Develop and execute continuing research programs for cultural resources

Complete a cultural resources management plan

ACHIEVE A COMPATIBLE PATTERN OF LAND USE IN THE VICINITY OF THE PARK THROUGH REGIONAL PLANNING

Participate with government agencies and private interests in planning for management and use of resources which affect scenic, natural, cultural, and recreational values near the park

Cooperate with other public and private entities in identifying Lassen's role in the larger regional context of serving public recreational needs in the north Sierra/south Cascade travel region

ACQUIRE PRIVATE INHOLDINGS WITHIN THE PARK BOUNDARY

Private lands within the park boundary will be acquired on a willing-seller, willing-buyer basis or under other circumstances as indicated in the December 1979 Land Acquisition Plan

PROVIDE PUBLIC USE AND MANAGEMENT FACILITIES NECESSARY TO VISITOR USE AND FOR PROTECTION OF PARK RESOURCES WITHIN LEVELS CONSISTENT WITH THE PRESERVATION OF THE NATURAL ENVIRONMENT

Maintain the existing character of the Lassen ski area as a day use facility, providing a variety of recreational activities and appealing to family groups in the Lassen region

Retain Drakesbad as a guest ranch without enlarging its capacity so that it continues to provide a satisfactory level of experience, with relatively litle impact on the environment

Provide a system of trails that offers a variety of hiking opportunities in areas of scenic and natural significance while minimizing the impacts of visitor use in wilderness and in environmentally fragile areas

Implement the backcountry management plan to provide for enjoyable backcountry recreation while protecting the scenic and ecological integrity of the Lassen Volcanic Wilderness

Provide facilities and essential park housing in safer locations where they will support visitor use while providing the least possible impact on resources of Lassen Volcanic National Park and Lassen National Forest; these objectives will be undertaken in cooperation with the U.S. Forest Service

ACHIEVE AND MAINTAIN A SAFE AND HEALTHFUL ENVIRONMENT FOR VISITORS AND EMPLOYEES

Provide facilities and public activities in areas affording low exposure to geologic hazards

Upgrade utility systems in existing developed areas to comply with applicable federal, state, and local standards

PROVIDE AN INTERPRETIVE PROGRAM THAT PROMOTES UNDERSTANDING AND APPRECIATION OF PARK RESOURCES IN BOTH WINTER AND SUMMER SEASONS

Develop the interpretive program to emphasize the following themes:

Volcanism and its impact on the associated natural and historic resources

Biotic features that typify a Cascadian volcanic environment

Influences of man in the use and development of Lassen Volcanic National Park

REGULATE PARK USE TO ASSURE THAT RESOURCE QUALITY IS NOT IMPAIRED

Determine visitor carrying capacities and manage facilities to control adverse use and overcrowding

APPENDIX B

PART I: EXPOSURE TO ROCKFALL-AVALANCHE HAZARD

Estimated Number of People Present on Chaos Jumbles and Adjacent Areas at Selected Times Prior to the Closing of Facilities in 1974

	NPS Employees & Family Members	Concession Employees & Family Members	Visitors	Total
Winter: February				
Dead of night on the average midweek day	10	2	0	12
Peak of public use on the average midweek day (1 p.m.)	6	2	35	43
Dead of night on the average Saturday night	12	2	0	14
Peak of public use on the average weekend day (2 p.m.)	12	2	140	154
Summer: July and August				
Dead of night on the average midweek day	55	85	340 (1)	480
Peak of travel on the average midweek day	45	100	760 (1)	905
Dead of night on the average weekend day	50	85	375 (1)	510
Peak of travel on the average weekend day	50	105	960 (1)	1,115
Dead of night on the day of heaviest use	55	90	440 (1)	585
Peak of travel on the day of heaviest use (2)	55	110	1,250 (1)	1,416

(1) Excludes campground.
(2) Day of heaviest use is either the Sunday of Labor Day or Independence Day weekend, or sometimes the Sunday of one of the first two weeks in August.

PART II: EXPOSURE TO ROCKFALL-AVALANCHE HAZARD ACCORDING TO ACTIVITY PRIOR TO CLOSING OF FACILITIES IN 1974 (3)

A. Main Hazard Area

Activity	Time of Year	Time of Day	Maximum Use (No. of People)	Total Hours of Exposure Each Year (4)
CONCESSION FACILITIES:				
1. Cabins (Occupancy both day and night when guests stayed in or close to cabins)	5/26-10/15	24 hrs.	375	302,600
2. Lodge Building				
a. Lobby	5/26-10/1	0700-2200	43	11,400
b. Dining Room	Same	0700-0930 (B) 1130-1330 (L) 1530-2030 (D)	65	18,000
c. Lounge	Same	1600-2300	45	2,900
3. Souvenir Shops (Both in lodge and in general store)	Same	0900-1800	96	103,400
4. Service Station	5/27-10/15	0700-1800	29	15,600
5. General Store	5/27-10/15	0900-2000	54	20,900
6. Snack Bar (Chaos Counter at the General Store)	6/1-9/30	1000-2000	36	14,800
7. Rowboating	5/28-9/10	0700-2000	28	4,600
8. Concession Employees	(Time spent by all concession employees and families, day and night, with the hazard zone)			203,800
			SUBTOTAL . . .	698,000

Activity	Time of Year	Time of Day	Maximum Use (No. of People)	Total Hours of Exposure Each Year (4)
GOVERNMENT FACILITIES:				
1. Driving-through (time spent by all people on the 2.5 miles of main road between the northern entrance and the point where the road passes off of the Jumbles on the east)	All Year	24 hrs.	110	82,900
2. Roadside Turnouts	5/1-11/30	24 hrs.	24	4,300
3. Reflection Lake Picnic Area	5/1-11/30	0600-2000	65	7,200
4. Manzanita Lake Picnic Area	5/1-11/30	0600-2000	48	4,500
5. Swimming	5/1-11/30	0600-2000	48	9,600
6. Reflection Lake Nature Walk	6/1-10/13	0700-2000	50	3,600
7. Lily Pond Nature Walk	6/1-10/13	0700-2000	50	3,200
8. Environmental Education (Lily Pond Environmental Study Area)	All Year	0800-1700	50	600
9. Loomis Museum	6/1-10/13	0800-2000	200	118,600

Activity	Time of Year	Time of Day	Maximum Use (No. of People)	Total Hours of Exposure Each Year (4)
10. Interpretive Demonstrations	6/15-9/5	1200-1400	100	1,200
11. All Other Personal Interpretive Contacts	All Year	0700-2300	37	20,700
12. Fishing	5/27-11/15	Sunrise-Sunset	55	3,600
13. Hiking (unstructured but in hazard zone)	All Year	24 hrs.	363	101,000
14. Winter Sports	11/15-5/15	0600-1900	81	3,400
15. NPS Employees (summer)	(All time spent by all National Park Service employees and families within the hazard zone)			84,500
16. NPS Employees (off-season)	(All time spent by all National Park Service employees and families within the hazard zone)			53,800
			SUBTOTAL . . .	502,700
TOTAL: ALL USE WITHIN MAIN HAZARD AREA				1,200,700

B. Campground Area

CONCESSION FACILITIES:				
1. Store and Laundromat	5/27-10/1	0900-2100	46	30,400
2. Concession Employees	Same	Same	2	1,700
			SUBTOTAL . . .	32,100

Activity	Time of Year	Time of Day	Maximum Use (No. of People)	Total Hours of Exposure Each Year (4)
GOVERNMENT FACILITIES:				
1. Campground	5/15-10/15	24 hrs.	955	952,600
2. Amphitheater	6/24-9/10	1900-2230	800	66,000
3. NPS Employees				7,200
			SUBTOTAL . . .	1,025,800
TOTAL: ALL USE WITHIN THE CAMPGROUND AREA				1,057,900

(3) Lassen Volcanic National Park Company hired about 95 employees who lived in the park and worked for 12 weeks and about 22 who lived outside of the park and worked for the same 12 weeks. They hired 15 employees who worked earlier or later in the season. In addition, there were 2 concession people living in the park through the entire year. The National Park Service hired about 65 people (employees and families). Most of them lived in Summertown and the two ranger residences for 13 weeks each summer. About 12 National Park Service people lived in the Manzanita area through the rest of the year.

(4) Figures based on use in 1973.

APPENDIX C: ACREAGES IN AND ADJACENT TO THE PARK THAT WILL BE AFFECTED BY THE PROPOSAL

AREA	EXISTING USE	PROPOSED RESTORATION	CONTINUED USE (Previously Disturbed Land)	NEW USE (Previously Undisturbed Land)	TOTAL USE PROPOSED	NET CHANGE
Lassen Park Road	89.5	0	89.5	0	89.5	0
Manzanita Lake/Manzanita Meadows[1]	127.8	61.5	86.3	12	98.3	-29.5
Trail System/Backcountry	100.5	0	100.5	6.9	107.4	+6.9
Lost Creek	8	0	8	0	8	0
Hat Creek	4.9	3.4	1.5	0	1.5	-3.4
Summit Lake	27.4	0.6	26.8	0.1	26.9	-0.5
South West Entrance	93.4	2.7	91.1	2.4	93.5	+0.1
Headquarters	9.2	2.1	6.1	5.1	11.2	+2.0
Warner Valley	24.6	0	24.6	0.3	24.9	+0.3
Juniper Lake	11.2	6.6	4.6	6.0	10.6	-0.6
Butte Lake	29	0	29	0	29	0
TOTAL[2]	525.5	76.9[3]	468.0	32.8	500.8	-24.7

NOTES: 1--Includes acreage in Manzanita Meadows, presently managed for timber harvest, which will be permanently restored to a more natural environment.

2--Total does not include undeveloped private lands within the park which will be acquired and preserved. Developed private lands where development will be removed and the area restored to a natural condition are included in the total.

3--Includes adjacent land not presently in use which will be restored to a more natural condition.

The descriptive list that follows the next paragraph annotates timeframe estimates given in Column 3 (duration) in the following tables. The six categories of use are ranked according to decreasing order of cumulative impact on soil and vegetation.

Short-term use means temporary occupancy from 0 to 10 years, and permanent use means permanent occupancy into the foreseeable future. In regard to natural rates of restoration of sites which have been impacted in the past and now are to be abandoned, 10 years is the maximum expectable time for recovery of soil, plus longer terms for recovery of vegetation. Forest types will recover to minimal aesthetic (visual) standard in about 20 years, and to an ecologic standard of maturity in 80 to 400 years.

(a) Permanent continued use. The acreage already has been used 6 to 75 years for development. This has resulted in compaction of soil and alteration of the natural moisture regime, removal of vegetation, and inhibition of its regeneration. The same conditions will last indefinitely, with trees and other plants tending to decline because of heavy use of adjacent ground.

(b) Permanent new use. The acreage is essentially natural at present. The developments proposed will introduce the same soil/vegetation impacts described in (a). These impacts will persist locally to varying degree of intensity indefinitely.

(c) Permanent change of use. The acreage has been or is being used and will continue to be used in the future. Generally, the future use is more intensive and would have the same degree of impact as described in (a).

(d) Temporary disturbance. The acreage is essentially natural at present. Actions such as placement of utility lines or vegetation removal to restore a more nautral ecosystem will have short-term impacts.

(e) Permanent restoration. The acreage already has been used 20 to 75 years for development. This has resulted in the same impacts on soil and vegetation described in (a). These impacts already have ceased, or soon will cease upon discontinuation of use as proposed by the plan. Land will be restored to natural environment.

(f) Permanent preservation. Resources on this land have potential for consumptive use because of private ownership. The land will be acquired and committed to preservation as natural environment.

Symbols Under Column Headings:

D=Development--roads, structures, etc.
A=Adjacent areas affected by use--foot traffic, leach fiedls, etc.
T=Totals

Key to Vegetative Types:

C - Chaparral
J - Jeffrey pine
L - Lodgepole pine
M - Mixed coniferous
R - Red fir
H - Mountain hemlock
B - Barren, rock
U - Unknown

AREA/FACILITY	ACTION	DURATION & TYPE OF USE/ACRES	EXISTING USE			RESTORATION			CONTINUED USE			NEW USE			TOTAL USE PROPOSED			NET CHANGE		
			D	A	T	D	A	T	D	A	T	D	A	T	D	A	T	EXIST.	PROP.	CHANGE
Lassen Park Road																				
Roadway	No Change	Permanent continued use/83 acres	14(C) 17(J) 27(R) 6(L) 10(H) 9(B)		14(C) 17(J) 27(R) 6(L) 10(H) 9(B)				14(C) 17(J) 27(R) 6(L) 10(H) 9(B)		14(C) 17(J) 27(R) 6(L) 10(H) 9(B)				14(C)) 17(J)) 27(R) 6(L) 10(H) 9(B)		14(C) 17(J) 27(R) 6(L) 10(H) 9(B)	14(C) 17(J) 27(R) 6(L) 10(H) 9(B)	14(C) 17(J) 27(R) 6(L) 10(H) 9(B)	0 0 0 0 0 0
Parking Areas	No Change	Permanent continued use/6.5 acres	1(R) .5(H) 5(B)		1(R) .5(H) 5(B)				1(R) .5(H) 5(B)		1(R) .5(H) 5(B)				1(R) .5(H) 5(B)		1(R) .5(H) 5(B)	1(R) .5(H) 5(B)	1(R) .5(H) 5(B)	0 0 0
		TOTALS	89.5	0	89.5	0	0	0	89.5	0	89.5	0	0	0	89.5	0	89.5	89.5	89.5	0
Manzanita Lake/ Manzanita Meadows																				
Chaos Jumbles Developed Area	Remove all structures, trails, parking areas, etc. except service road & water intake system	Permanent restoration/ 53 acres Permanent continued use/23 acres	26(J) 1(L)	29(J)	55(J) 1(L)	26(J) 1(L)	26(J)	52(J) 1(L)	3(J)	20(J)	23(J)				3(J)	20(J)	23(J)	55(J) 1(L)	23(J)	-32(J) -1(L)
Campground	Short-term: Retain--open all loops for camping. Long-term: Remove.	Permanent continued use/50 acres	10(C)	40(C)	50(C)				10(C)	40(C)	50(C)				10(C)	40(C)	50(C)	50(C)	50(C)	0
Volcanic Monitoring System	Retain	Permanent continued use/0.3 acre	.3(U)		.3(U)				.3(U)		.3(U)				.3(U)		.3(U)	.3(U)	.3(U)	0
Administrative Facilities	Build/relocate maintenance shops, residences, fire camp, access roads, entrance station, utilities; remove temporary facilities	Permanent new use/12 acres Permanent continued use/8 acres Restoration/3.5 acres	3.5(C)	5(J) 3(C)	5(J) 3(C) 3.5(C)	3.5(C)		3.5(C)		5(J) 3(C)	5(J) 3(C)	10(J)	2(J)	12(J)	10(J) 3(C)	7(J)	17(J) 3(C)	5(J) 3(C) 3.5(C)	17(J) 3(C)	+12(J) 0 -3.5(C)
Visitor Facilities (NPS)	Build interpretive center, offices, amphitheater, parking & sewage plant	Permanent change of use/5 acres		5(C)	5(C)				5(C)		5(C)				5(C)		5(C)	5(C)	5(C)	0
Grounds Development	Remove chapparal and introduce other native vegetation	Temporary disturbance and permanent restoration/5 acres		5(C)	5(C)		5(C) to (J)	5(C) to (J)										5(C)	0	-5(C)
		TOTALS	40.8	87	127.8	30.5	31	61.5	18.3	68	86.3	10	2	12	31.3	67	98.3	127.8	98.3	-29.5

AREA/FACILITY	ACTION	DURATION & TYPE OF USE/ACRES	EXISTING USE			RESTORATION			CONTINUED USE			NEW USE			TOTAL USE PROPOSED			NET CHANGE		
			D	A	T	D	A	T	D	A	T	D	A	T	D	A	T	EXIST.	PROP.	CHANGE
Trail System/ Backcountry Northwestern Part of Park	Develop ± 12 miles new trails around Chaos Jumbles (2 miles trails exist)	Permanent new use/5.5 acres Permanent continued use/1.5 acres	1(J) .5(C)		1(J) .5(C)				1(J) .5(C)		1(J) .5(C)	2.5(J) 2.5(C) .5(L)		2.5(J) 2.5(J) .5(L)	3.5(J) 3(C) .5(L)		3.5(J) 3(C) .5(L)	1(J) .5(C)	3.5(J) 3(C) .5(L)	+2.5(J) +2.5(C) +.5(L)
	Build trailhead, parking & picnic facilities at Sunflower Flat	Permanent new use/1.4 acres										.4(J) .4(L)	.3(J) .3(L)	.7(J) .7(L)	.4(J) .4(L)	.3(J) .3(L)	.7(J) .7(L)	0 0	.7(J) .7(L)	+.7(J) +.7(L)
Backcountry Trails	No Change	Permanent continued use of 152 miles of maintained trails/74 acres (53 acres in wilderness)	9(C) 22(J) 21(R) 10(L) 8(H) 4(B)		9(C) 22(J) 21(R) 10(L) 8(H) 4(B)				9(C) 22(J) 21(R) 10(L) 8(H) 4(B)		9(C) 22(J) 21(R) 10(L) 8(H) 4(B)				9(C) 22(J) 21(R) 10(L) 8(H) 4(B)		9(C) 22(J) 21(R) 10(L) 8(H) 4(B)	9(C) 22(J) 21(R) 10(L) 8(H) 4(B)	9(C) 22(J) 21(R) 10(L) 8(H) 4(B)	0 0 0 0 0 0
Backcountry Campsites	No Change	Permanent continued use/25 acres (all in wilderness)	1(C) 5(J) 14(R) 4(L) 1(H)		1(C) 5(J) 14(R) 4(L) 1(H)				1(C) 5(J) 14(R) 4(L) 1(H)		1(C) 5(J) 14(R) 4(L) 1(H)				1(C) 5(J) 14(R) 4(L) 1(H)		1(C) 5(J) 14(R) 4(L) 1(H)	1(C) 5(J) 14(R) 4(L) 1(H)	1(C) 5(J) 14(R) 4(L) 1(H)	0 0 0 0 0
		TOTALS	100.5	0	100.5	0	0	0	100.5	0	100.5	6.3	.6	6.9	106.8	.6	107.4	100.5	107.4	+6.9
Lost Creek Campground	Short-term: No change Long-term: Remove	Permanent continued use/8 acres	2(J)	6(J)	8(J)	0	0	0	2(J)	6(J)	8(J)	0	0	0	2(J)	6(J)	8(J)	8(J)	8(J)	0
Hat Creek Private land	Acquire inholdings & remove structures (3.6 acres)	Permanent restoration/ .3 acre	.3(L)		.3(L)	.3(L)		.3(L)										.3(L)	0	-.3(L)
Access road and trailhead	Convert to trail	Permanent continued use/1.5 acres Permanent restoration/ 3.1 acres	3.1(L) 1.5(J)		3.1(L) 1.5(J)	2.1(L) 1.0(J)		2.1(L) 1.0(J)	1.0(L) .5(J)		1.0(L) .5(J)				1.0(L) .5(J)		1.0(L) .5(J)	3.1(L) 1.5(J)	1.0(L) .5(J)	-2.1(L) -1.0(J)
		TOTALS	4.9	0	4.9	3.4	0	3.4	1.5	0	1.5	0	0	0	1.5	0	1.5	4.9	1.5	-3.4
Summit Lake Campground	No Change	Permanent continued use/25 acres	4.1(R) 2(L)	13.9(R) 5(L)	18(R) 7(L)				4.1(R) 2(L)	13.9(R) 5(L)	18(R) 7(L)				4.1(R) 2(L)	13.9(R) 5(L)	18(R) 7(L)	18(R) 7(L)	18(R) 7(L)	0 0
Trailhead	Build contact station	Permanent new use/.1 acre										.1(R)		.1(R)	.1(R)		.1(R)	0	.1(R)	+.1(R)
	Retain ranger station; build new residence on trailer site	Permanent continued use/.3 acre	.3(R)		.3(R)				.3(R)		.3(R)				.3(R)		.3(R)	.3(R)	.3(R)	0
Corral/Borrow Pit Area	No change to corrals	Permanent continued use/.2 acre	.1(R)	.1(R)	.2(R)				.1(R)	.1(R)	.2(R)				.1(R)	.1(R)	.2(R)	.2(R)	.2(R)	0
	Build parking area in former borrow pit	Permanent change of use/.3 acre	.3(B)		.3(B)				.3(B)		.3(B)				.3(B)		.3(B)	.3(B)	.3(B)	0
Utilities	Replace south unit comfort stations with vault toilets; abandon leach fields	Permanent continued use/1 acre Permanent restoration/ 0.6 acre	1.4(R) .2(L)		1.4(R) .2(L)	.4(R) .2(L)		.4(R) .2(L)	1(R)		1(R)				1(R)		1(R)	1.4(R) .2(L)	1(R)	-.4(R) -.2(L)
		TOTALS	8.4	19	27.4	.6	0	.6	7.8	19	26.8	.1	0	.1	7.9	19	26.9	27.4	26.9	-0.5

AREA/FACILITY	ACTION	DURATION & TYPE OF USE/ACRES	EXISTING USE			RESTORATION			CONTINUED USE			NEW USE			TOTAL USE PROPOSED			NET CHANGE		
			D	A	T	D	A	T	D	A	T	D	A	T	D	A	T	EXIST.	PROP.	CHANGE
Southwest Entrance																				
Parking Area	No change	Permanent continued use/8.3 acres	7.5(R)	.8(R)	8.3(R)				7.5(R)	.8(R)	8.3(R)				7.5(R)	.8(R)	8.3(R)	8.3(R)	8.3(R)	0
Campground	No change	Permanent continued use/2.8 acres	.3(R)	2.5(R)	2.8(R)				.3(R)	2.5(R)	2.8(R)				.3(R)	2.5(R)	2.8(R)	2.8(R)	2.8(R)	0
Ski Slopes & Lifts	Install chairlift & remove Poma lift; Upgrade lift equipment & realign; convert to electric power	Permanent continued use/67.5 acres (temporary disturbance .2 acre) New use/.3 acre Restoration/.3 acre	.7(R)	66.8(R)	67.5(R)	.3(R)	0	.3(R)	.4(R)	66.8(R)	67.2(R)	.3(R)	0	.3(R)	.7(R)	66.8(R)	67.5(R)	67.5(R)	67.5(R)	0
Base Facilities	Construct new interpretive center; remove chalet	Permanent continued use/.4 acre	.3(R)	.6(R)	.9(R)	.3(R)	.6(R)	.9(9)	.2(R)	.2(R)	.4(R)	0	0	0	.2(R)	.2(R)	.4(R)	.9(R)	.4(R)	-.5(R)
	Bring underground commercial power to area; retain generators for auxiliary power	Permanent continued use/.4 acre; along road shoulders and rights-of-way/12 acres	12.4(R)		12.4(R)				12.4(R)		12.4(R)				12.4(R)		12.4(R)	12.4(R)	12.4(R)	0
	Replace sewage treatment facilities; abandon existing facilities	Permanent new use/2.1 acres Restoration/1.5 acres	0	1.5(R)	1.5(R)		1.5(R)	1.5(R)					2.1(C)	2.1(C)	2.1(C)		2.1(C)	1.5(R)	2.1(C)	+2.1(C) -1.5(R)
		TOTALS	21.2	72.2	93.4	0.6	2.1	2.7	20.8	70.3	91.1	2.4	0	2.4	23.2	70.3	93.5	93.4	93.5	+0.1
Headquarters																				
Administration Area	Build headquarters annex	Permanent continued use/.4 acre Permanent new use/.4 acre	.2(M)	.2(M)	.4(M)	0	0	0	.2(M)	.2(M)	.4(M)	.2(M)	.2(M)	.4(M)	.4(M)	.4(M)	.8(M)	.4(M)	.8(M)	+.4(M)
Maintenance Area	Build new facilities; remove old facilities (subject to further study)	Permanent continued use/.62 acre Permanent new use/4.7 acres Permanent restoration/1.94 acres	2.9(M)		2.9(M)	1.3(M)		1.3(M)	.6(M)		.6(M)	4.7(M)		4.7(M)	5.3(M)		5.3(M)	2.9(M)	5.3(M)	+2.4(M)
Roads	Remove excess roads (subject to further study	Permanent continued use/2.7 acres Permanent restoration/.8 acre	3.5(M)		3.5(M)	.8(M)		.8(M)	2.7(M)		2.7(M)				2.7(M)		2.7(M)	3.5(M)	2.7(M)	-.8(M)
Residential Area	Renovate existing older residences	Permanent continued use/2.4 acres	2.0(M)	.4(M)	2.4(M)				2.0(M)	.4(M)	2.4(M)				2.0(M)	.4(M)	2.4(M)	2.4(M)	2.4(M)	
		TOTALS	8.6	.6	9.2	2.1	0	2.1	5.5	.6	6.1	4.9	.2	5.1	10.4	0.8	11.2	9.2	11.2	+2.0

AREA/FACILITY	ACTION	DURATION & TYPE OF USE/ACRES	EXISTING USE			RESTORATION			CONTINUED USE			NEW USE			TOTAL USE PROPOSED			NET CHANGE		
			D	A	T	D	A	T	D	A	T	D	A	T	D	A	T	EXIST.	PROP.	CHANGE
Warner Valley Campground	No change	Permanent continued use/3 acres	1(J)	2(J)	3(J)				1(J)	2(J)	3(J)				1(J)	2(J)	3(J)	3(J)	3(J)	0
Picnic Area	No change	Permanent continued use/.2 acre	.1(J)	.1(J)	.2(J)				.1(J)	.1(J)	.2(J)				.1(J)	.1(J)	.2(J)	.2(J)	.2(J)	0
Ranger Station	No change	Permanent continued use/2 acres	.5(J)	1.5(J)	2(J)				.5(J)	1.5(J)	2(J)				.5(J)	1.5(J)	2(J)	2(J)	2(J)	0
Drakesbad Guest Ranch	No change	Permanent continued use/15 acres	3(L) 1(R)	7(L) 4(R)	10(L) 5(R)				3(L) 1(R)	7(L) 4(R)	10(L) 5(R)				3(L) 1(R)	7(L) 4(R)	10(L) 5(R)	10(L) 5(R)	10(L) 5(R)	0 0
Access Road	Upgrade locally	Permanent continued use/4.4 acres Permanent new use/.3 acre	2.9(J) 1.5(C)		2.9(J) 1.5(C)				2.9(J) 1.5(C)		2.9(J) 1.5(C)	.2(J) .1(C)		.2(J) .1(C)	3.1(J) 1.6(C)		3.1(J) 1.6(C)	2.9(J) 1.5(C)	3.1(J) 1.6(C)	+.2(J) +.1(C)
		TOTALS	10	14.6	24.6	0	0	0	10	14.6	24.6	.3	0	.3	10.3	14.6	24.9	24.6	24.9	+.3
Juniper Lake Private Land	Acquire inholdings & remove structures (2.3 acres)	Permanent restoration/ 1.5 acres	1(R) .5(C)		1(R) .5(C)	1(R) .5(C)		1(R) .5(C)										1(R) .5(C)	0 0	-1(R) -.5(C)
Lakeshore Road	Close and replace with trail	Permanent continued use/1.2 acres Permanent restoration/ 2.8 acres	3.7(R) .3(C)		3.7(R) .3(C)	2.6(R) .2(C)		2.6(R) .2(C)	1.1(R) .1(C)		1.1(R) .1(C)				1.1(R) .1(C)		1.1(R) .1(C)	3.7(R) .3(C)	1.1(R) .1(C)	-2.6(R) -.2(C)
Campground	Relocate	Permanent new use/3 acres Permanent restoration/ 2 acres	.6(R)	1.4(R)	2(R)	.6(R)	1.4(R)	2(R)				1(R)	2(R)	3(R)	1(R)	2(R)	3(R)	2(R)	3(R)	+1(R)
Ranger Station	Relocate - build new residence & trailhead parking	Permanent new use/ 1 acre Permanent restoration/ .3 acre	.1(R)	.2(R)	.3(R)	.1(R)	.2(R)	.3(R)				.5(R)	.5(R)	1(R)	.5(R)	.5(R)	1(R)	.3(R)	1(R)	+.7(R)
Utilities	Build water & sewage treament system	Permanent new use/ 2 acres										2(R)		2(R)	2(R)		2(R)	0	2(R)	+2(R)
Access Road	No change	Permanent continued use/3.4 acres	1.6(R) 1.6(L) .2(C)		1.6(R) 1.6(L) .2(C)				1.6(R) 1.6(L) .2(C)		1.6(R) 1.6(L) .2(C)				1.6(R) 1.6(L) .2(C)		1.6(R) 1.6(L) .2(C)	1.6(R) 1.6(L) .2(C)	1.6(R) 1.6(L) .2(C)	0 0 0
		TOTALS	9.6	1.6	11.2	5	1.6	6.6	4.6	0	4.6	3.5	2.5	6	8.1	2.5	10.6	11.2	10.6	-.6
Butte Lake Residences	Replace trailers with 2 new residences	Permanent continued use/.4 acre	.1(J)	.3(J)	.4(J)				.1(J)	.3(J)	.4(J)				.1(J)	.3(J)	.4(J)	.4(J)	.4(J)	0
Fire Cache	Replace with new structure	Permanent continued use/.2 acre	.1(J)	.1(J)	.2(J)				.1(J)	.1(J)	.2(J)				.1(J)	.1(J)	.2(J)	.2(J)	.2(J)	0
Campground Ranger Station, Trailhead, Utilities	No change	Permanent continued use/25 acres	3(J)	22(J)	25(J)				3(J)	22(J)	25(J)				3(J)	22(J)	25(J)	25(J)	25(J)	0
Access Road	Improve base & pave	Permanent continued use/3.4 acres	3.4(J)		3.4(J)				3.4(J)		3.4(J)				3.4(J)		3.4(J)	3.4(J)	3.4(J)	0
		TOTALS	6.6	22.4	29	0	0	0	6.6	22.4	29	0	0	0	6.6	22.4	29	29	29	0

Advisory Council On Historic Preservation

1522 K Street NW.
Washington D.C.
20005

MEMORANDUM OF AGREEMENT

WHEREAS, the National Park Service proposes to approve and implement a General Management Plan for Lassen Volcanic National Park, California; and,

WHEREAS, the National Park Service, in consultation with the California State Historic Preservation Officer, has determined that this undertaking as proposed would effect numerous historic and cultural properties and would have an adverse effect upon the Loomis Visitor Center and Seismograph Station, Manzanita Lake Area, a property included in the National Register of Historic Places; and, would have an adverse effect on the Park Naturalist's Residence, Comfort Station and Park Entrance Station and Residence in the Manzanita Lake Area, and the Hay Barn and Cook's Cabin in the Drakesbad Area, properties determined on the authority of the Secretary of the Interior to be eligible for inclusion in the National Register of Historic Places; and,

WHEREAS, those structures located in the Manzanita Lake Area are in imminent danger of destruction having historically been located in an area recently defined by the Geological Survey as geological hazard zone and that area having been closed to public access because of the danger since April 1974; and,

WHEREAS, there is no way to protect the Manzanita Lake Area or its structures from a rock slide that could bury the area in a matter of minutes, nor a practical way to relocate the historic properties from the Manzanita Lake Area to a protected area of the Park; and,

WHEREAS, the Hay Barn and Cook's Cabin in the Drakesbad Area of the Park, being in a deteriorated state and suffering major additional damage during the severe winter of 1977-1978, have been determined to present a serious public safety hazard and do not justify the expense required to remove the present safety hazard; and,

WHEREAS, pursuant to Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470f, as amended, 90 Stat. 1320) and Section 2(b) of Executive Order 11593, the National Park Service has requested the comments of the Advisory Council on Historic Preservation; and,

WHEREAS, pursuant to the procedures of the Advisory Council on Historic Preservation (36 CFR Part 800), representatives of the Advisory Council on Historic Preservation, the National Park Service, and the California State Historic Preservation Officer have consulted and reviewed the undertaking to consider feasible and prudent alternatives to avoid or satisfactorily mitigate the adverse effect;

NOW, THEREFORE, it is mutually agreed that implementation of the undertaking, in accordance with the following stipulation and the attached letter of October 6, 1978, from Howard H. Chapman, Regional Director, Western Region, National Park Service, and the procedures outlined in Section 3 and Section 4H and 4I of the "Preliminary Case Report, General Management Plan, Lassen Volcanic National Park, California," also attached, will avoid or satisfactorily mitigate adverse effects on the above-mentioned properties.

STIPULATION

Prior to demolition or alteration of the historic structures within Lassen Volcanic National Park, that have not already been recorded in accordance with the Historic American Buildings Survey (HABS) standards, the National Park Service will record the properties so that there will be a permanent record of their existence. The National Park Service will first contact HABS (Department of the Interior, Washington, D.C. 20240) to determine the level of documentation required. All documentation must be accepted by HABS prior to demolition or alteration.

Robert M. Utley 11/21/28
(date)
Robert M. Utley
Deputy Executive Director
Advisory Council on Historic Preservation

Howard H. Chapman 12/1/78
(date)
National Park Service

Kenneth McCellon 1/15/79
(date)
California State Historic Preservation Officer

Robert W. Smith 1/29/79
(date)
Chairman
Advisory Council on Historic Preservation

United States Department of the Interior
NATIONAL PARK SERVICE
WESTERN REGION
450 GOLDEN GATE AVENUE, BOX 36063
SAN FRANCISCO, CALIFORNIA 94102

IN REPLY REFER TO:
H4217
(WR)RC

OCT 06 1978

Mr. Louis S. Wall
Assistant Director
Office of Review and Compliance
Advisory Council on Historic Preservation
P. O. Box 25085
Denver, CO 80225

Dear Mr. Wall:

The National Park Service, Western Region, proposes to approve and implement a General Management Plan with Environmental Statement for Lassen Volcanic National Park, California.

Lassen Volcanic National Park contains six properties on the National Register and four properties formally determined eligible for the National Register by the Secretary of the Interior.

In accordance with the Procedures of the Advisory Council on Historic Preservation, 36 CFR 800, pertaining to Executive Order 11593 and the National Historic Preservation Act of 1966, we have applied the criteria of effect and find that there will be an effect on properties on and eligible for the National Register of Historic Places. We have applied the Criteria of adverse effect and find that some proposals will not adversely affect the qualities that qualify the properties for the National Register. However, we also find that certain proposals will adversely affect National Register properties.

An analysis of these effects, including the proposed mitigation is described in detail in the Preliminary Case Report as provided for by 36 CFR 800.4 (f). A copy of the Preliminary Case Report and other planning documents for the undertaking were supplied to your office with a copy of the letter of the August 30, 1978, to the State Historic Preservation Officer.

In accordance with the Procedures of the Advisory Council on Historic Preservation, we have obtained the comments of the State Historic Preservation Officer by letter of October 3, 1978, copy enclosed.

We fully concur with the comments of the State Historic Preservation Officer and will carry them out as set forth in the letter and Preliminary Case Report. We would like to note that the records pertaining

to the structures recorded for the Historic American Building Survey (HABS), located in Lassen Volcanic National Park, are on file and available to the public and students of architectural history in the HABS Collection in the Library of Congress in Washington.

Two structures located at Drakesbad in Lassen Volcanic, the Cook's Cabin and Hay Barn, represent serious public safety hazards. Both structures are rapidly deteriorating and the Cook's Cabin has completely lost its structural integrity and is collapsing at an accelerating rate with more of the structure failing at an almost weekly rate. The park is making a concentrated effort to keep the public away from the structures with fencing, signing and personal contacts. We are extremely anxious to take immediate action to eliminate the serious hazard. We would appreciate any action which your office can take in regard to this matter for we have a serious public safety hazard and at the same time, we wish to fully comply with the National Historic Preservation Legislation.

Sincerely yours,

Howard H. Chapman

Howard H. Chapman
Regional Director
Western Region

Enclosure

cc:
WASO(560)-Assistant Director, Cultural Resources w/c enc.
(DSC)TWE-Attention: Mr. Cornell w/c enc.
(DSC)QE-Quality Control and Compliance w/c enc.
Superintendent, Lassen Volcanic w/c enc.

NOTE: PLEASE REFER TO THE COMMENTS OF THE STATE HISTORIC PRESERVATION OFFICER

EXCERPTS FROM

PRELIMINARY CASE REPORT

EXECUTIVE ORDER 11593
and the
NATIONAL HISTORIC PRESERVATION ACT OF 1966

GENERAL MANAGEMENT PLAN

LASSEN VOLCANIC NATIONAL PARK
CALIFORNIA

Western Regional Office
National Park Service
1978

Section 3

Evaluation of Effect, 36 CFR 800, of the undertaking on properties on or formally determined eligible for the National Register

This is based on the Procedures of the Advisory Council on Historic Preservation, 36 CFR Parts 800.8 and 800.9, and the proposed action in the General Management Plan.

A. Effects which will be beneficial

The Plan proposes the maintenance/preservation of structures and sites. This would be accomplished in accordance with the National Park Service Management Policies for Cultural Resource Management and Preservation and Service directives on preservation. Professional assistance would be provided as indicated by the type of resource, Historian, Archeologist or Architect(Historical).

The properties include:

(1) On or nominated to the National Register
Prospect Peak Fire Lookout
Horseshoe Lake Ranger Station
Summit Lake Ranger Station
Warner Valley Ranger Station
Nobles Emigrant Trail
Headquarters Building
Sulphur Creek Archeological District

(2) Properties felt to be eligible for the National Register
Gas Station (Headquarters)
Mount Harkness Fire Lookout and Stone Outhouse

The Sulphur Creek Archeological District includes the lower section of the Lassen Ski area. The Archeological District encompasses ten sites of prehistoric and historic significance. Two archeological sites, Teh-583 and Teh-596, have been damaged by previous construction and use associated with maintenance of facilities.

The impacts or potential impacts include:

(1) Construction and maintenance of septic tanks, leach field, and sewer line. The Plan proposes to replace this sewage system with a new treatment plant so located as not to impact archeological resources. The existing system would probably be discontinued and left in place since removal would result in more damage to archeological resources. With the system discontinued, possible impacts resulting from maintenance of the system would not occur.

(2) The lower tower for the beginning ski tow was installed impacting archeological resources. Proposals to make minimal improvements to the base facilities and existing tows are being advanced in the Plan and a comprehensive design will be coordinated with archeologists to avoid further adverse effects on archeological resources. It should be noted that when skiing use occurs, the area is well covered with snow so potential impacts involve only actual ground disturbance actions.

(3) A question has been raised about the deposition of modern trash during the operation of the ski tow which, with the melting of the snow, would end up on the ground surface and potentially could affect the archeological resources. The concessioner that operates the ski area is responsible for trash collection. The Park, in monitoring the area, found very little litter and feels that the concessioner is fulfilling his obligation to keep the area clean.

(4) A question has been raised about illegal collection of stone projectile points and other artifacts from the surface. A three hour visual check of the area resulted in seven obsidian chips and one projectile point being seen. If a larger number of artifacts should be discovered or uncovered by erosion, an archeological surface collection of the material will be accomplished at professional standards including a report. Park law enforcement personnel will be alert to illegal collecting in the area.

The proposed actions at the ski area will eliminate the existing adverse effects of the sewage system on archeological resources and other actions will prevent or eliminate potential effects. Actions undertaken in the archeological district will be in accordance with the Procedures of the Advisory Council on Historic Preservation, 36 CFR 800.

3. Effects which will be adverse

(1) Manzanita Lake Area

The Plan proposes to remove all structures in the area, both historic and nonhistoric. These have been closed to the public since 1974 due to the geological hazard.

These include:

On the National Register

Loomis Visitor Center and Seismograph Station

Determined eligible for the National Register

Park Naturalist's Residence
Comfort Station
Park Entrance Station and Residence

(2) Drakesbad Area (Sifford Structures)

The Plan recognizes the condition of two structures as clearly unpreservable in the sense of maintaining their historic fabric. They could not be retained without radically altering, by almost total reconstruction, what little remains of their historic fabric.

Determined eligible for the National Register

Hay Barn
Cook's Cabin

During a recent inspection by the Park Safety Officer, both structures were determined to present serious public safety hazards as a result of additional snow damage which occurred this past winter. The removal of both structures is proposed on the basis of their highly deteriorated condition and the public safety hazard.

Additional information on the structures and their significance is included in Appendix C.

H. Review of alternatives which would mitigate adverse effects

(1) Recording of the structures for the Historic American Building Survey in accordance with Executive Order 11593, Section 2(c). Under the recording program, a joint program of the Heritage Conservation and Recreation Service, the American Institute of Architects and Library of Congress, the records would be permanently preserved and available to the public in the Library of Congress.

Seven structures possess what is felt to be architectural significance and four historical significance, several structures possessing both. The recording will result in safeguarding the data, particularly important since six of the structures could be lost at any time as the result of a rockfall-avalanche.

Thirteen structures, all of the structures of architectural and historical significance which are easily reached by vehicle in Lassen, have been recorded for the Historic American Buildings Survey and the records are at the Library of Congress. This recording includes the structures at Manzanita Lake and Drakesbad.

(2) The Loomis Museum contained until 1974, the Loomis collection of historic photographs taken in 1914 during the eruption of Lassen Peak. Since 1974, the photographs have been in the park collection for safeguarding. When a new Visitor Center is constructed in the future, the outstanding photographic collection will again be used to interpret the 1914 eruption.

(3) Prior to the removal of historic structures, each will be inspected by a Historical Architect to identify architectural features/hardware for possible re-use in the maintenance and preservation of other historic structures in the park. Items so identified will be removed and placed in storage for re-use.

(4) All actions in the General Management Plan will comply with the Procedures of the Advisory Council on Historic Preservation (36 CFR 800) pertaining to Executive Order 11593 and Section 106 of the National Historic Preservation Act of 1966. Undertakings will also be in compliance with the National Park Service Management Policies, Cultural Resource Management and Preservation. It is proposed to accomplish the items above as mitigation.

I. Actions to prevent inadvertent effects on Cultural Resources and to achieve compliance with Executive Order 11593

(1) To avoid inadvertent effects

a. Archeological Clearance procedures

The National Park Service procedures for obtaining clearances will be followed. A professional archeologist will be on-site during construction to prevent damage to known archeological resources near project locations. All construction contracts will require halting construction if archeological resources are encountered pending evaluation and compliance under the Procedures of the Advisory Council.

b. Archeological Surveys

Archeological surveys will be conducted at Juniper and Summit Lake along with other areas proposed for development and not yet surveyed.

c. The structures and setting of the Park Headquarters area will be evaluated under the National Register Criteria as a potential district.

d. The one mile section of the Nobles Emigrant Trail (on the National Register) proposed for use as part of a new trail system, will be studied by a professional historian to determine possible impacts on its trace and to provide recommendations to avoid effects on the qualities that qualified the property for the National Register.

e. Historic Structures Reports will be accomplished prior to undertaking the preservation of historic and architecturally significant structures. Historic Structures Maintenance Guides will also be accomplished for all historic structures.

f. Historic and Archeological Base Maps will be accomplished for Lassen.

g. A special history study (historical records/on-site evaluation) will be accomplished for the Nobles Emigrant Trail and the Supan Wagon Road (associated remains, structures and sites).

E: PLANNING TEAM AND CONSULTANTS

The following team members and consultants participated in the preparation of the Draft General Management Plan and Draft Environmental Impact Statement:

TEAM:

Allen Hagood
Team Captain, Geologist/Planner, Denver Service Center

Wilbur Stephenson
Superintendent, Lassen Volcanic National Park

Glenn Caldaro
Landscape Architect, Denver Service Center

Richard Vance
Naturalist, Lassen Volcanic National Park

Jean Swearingen
Interpretive Planner, Denver Service Center

Revisions to the draft plan and statement were incorporated in the final General Management Plan and Final Environmental Impact Statement by the following National Park Service personnel:

Douglas Cornell, Jr.
Architect/Planner, Denver Service Center

Jonathan Halpern
Environmental Specialist, Denver Service Center

Jon Haman
Environmental Specialist, Denver Service Center

Leslie Hart
Cultural Resources Specialist, Denver Service Center

John Sacklin
Environmental Specialist, Denver Service Center

and the staff, Lassen Volcanic National Park

CONSULTANTS:

Western Regional Advisory Committee, National Park Service

Keith Anderson
Arizona Archeological Center, National Park Service

Barrett & Associates, Inc., in association with
Mackinlay, Winnacker, McNeil; SWA Group; and
Jay Price, Ski Industry Consultant (engineering, skiing,
landscaping and architectural consultants under contract to NPS)

Dwight Crandell and Donald Mullineaux
Branch of Engineering Geology, Geological Survey

Terrence Cullinan and Gerald Smith
Former Presidents, Lassen Volcanic National Park Company

Roman Gankin
Ecolabs Associates, Davis, California

Jerrald Johnson
Department of Anthropology, California State University, Sacramento

John Koeberer
Concessioner, Lassen Volcanic National Park

Larry Tillman
Interpretive Planner, Harpers Ferry Center, National Park Service

Peter Wyckoff
Sequoia National Forest

Staff, Historic Preservation Team
Denver Service Center, National Park Service

Staff, Lassen National Forest

Staff, Lassen Volcanic National Park

As the nation's principal conservation agency, the Department of the Interior has basic responsibilities to protect and conserve our land and water, energy and minerals, fish and wildlife, parks and recreation areas, and to ensure the wise use of all these resources. The department also has major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

Publication services were provided by the graphics staff of the Denver Service Center. NPS 1070A

☆ U.S. GOVERNMENT PRINTING OFFICE: 1980—677-120/60