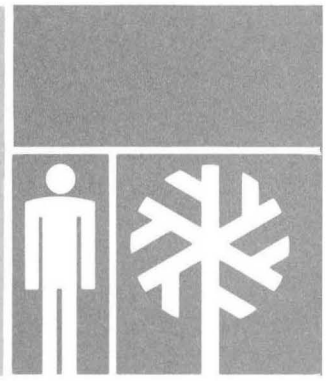
study of alternatives

february 1981

GREAT BASIN

SNAKE RANGE / SPRING VALLEY STUDY AREA



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ACKNOWLEDGEMENTS

The National Park Service wishes to express its appreciation to the citizens of Baker and Ely, Nevada, for providing helpful information in the development of this study and for providing public meeting places and team work space. The Park Service extends special thanks to the U.S. Forest Service, Bureau of Land Management, Heritage Conservation and Recreation Service, and the state of Nevada for assistance and contribution to the study.

United States Department of the Interior / National Park Service

study of
alternatives

GREAT BASIN

SPRING VALLEY / SNAKE RANGE STUDY AREA

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PREFACE

In 1976 Congress passed Public Law 94-458 which amended section 8 of the 1970 General Authorities Act. It directed the secretary of the interior to

> investigate, study, and monitor the welfare of areas whose resources exhibit qualities of national significance and which may have potential for inclusion to the National Park System
>
> transmit to Congress, on an annual basis, comprehensive reports on each area for which studies have been completed and a priority list of at least 12 areas which appear to be of national significance and which may have potential for inclusion to the National Park System
>
> transmit to Congress a complete and current list of all areas included on the Registry of Natural Landmarks and the National Register of Historic Places that exhibit known or anticipated damage and threats to the integrity of the resources (responsibility of Heritage Conservation and Recreation Service)

The goal of this process is to analyze an area's resources and suggest alternative means for protection, use, and management of the area. In order to accomplish this goal and the intent of section 8, the National Park Service has developed the following three-phase planning process.

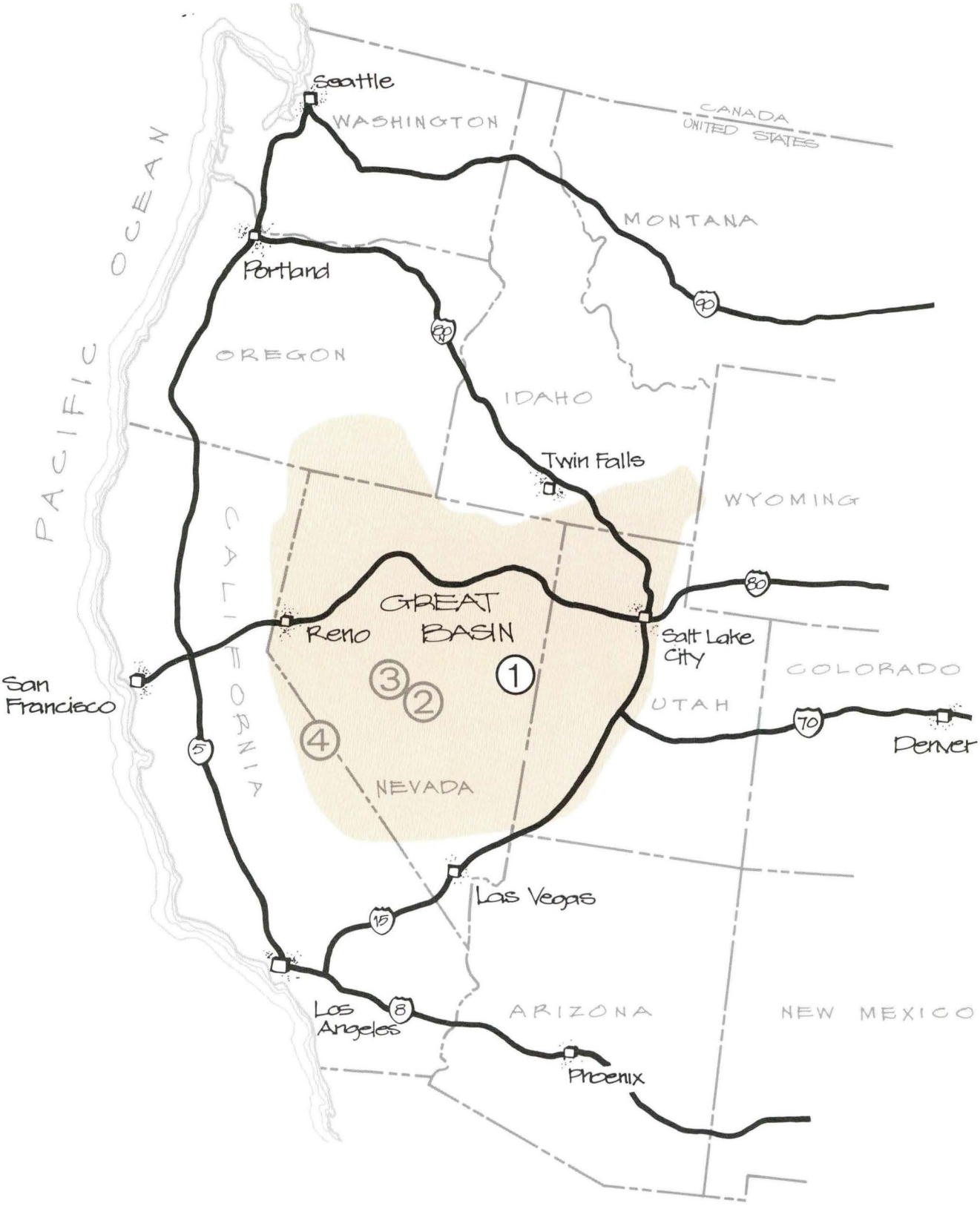
Phase I Conduct reconnaissance surveys on the requested areas and develop a priority list of areas through the Land and Water Conservation Fund Policy Group* (LPG) that should be evaluated in a study of alternatives for possible inclusion in the National Park System

Phase II Prepare a study of alternatives for management and use of the area's resources, including other than National Park Service involvement, and assess the impacts and implications of each alternative

Phase III Decide which areas should be included on the list submitted through LPG and the Office of Management and Budget to Congress as having potential for inclusion to the National Park System, or make a recommendation for alternative means of management other than National Park Service

*LPG was established to serve in an advisory and interagency coordinating role with respect to the federal portion of the Land and Water Conservation Fund. The following federal agencies are represented: U.S. Fish and Wildlife Service, Bureau of Land Management, Heritage Conservation and Recreation Service, U.S. Forest Service, and the National Park Service.

SUMMARY



NORTH NO SCALE

1. SNAKE RANGE / SPRING VALLEY STUDY AREA
2. RAILROAD VALLEY STUDY AREA
3. MONITOR / BIG SMOKY VALLEY STUDY AREA
4. WHITE MOUNTAINS / FISH LAKE VALLEY STUDY AREA

GREAT BASIN REGION

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

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SUMMARY

BACKGROUND

The Great Basin physiographic region consists of a multitude of valleys separated by a series of long, parallel, north-south mountain ranges. The basin is immense and includes most of Nevada, half of Utah, and portions of Oregon, Idaho, and California.

The Great Basin has attracted private and federal interests for its mineral deposits, oil and gas resources, geothermal potential, grazing and farming opportunities, suitability for military testing, and more recently the proposed MX missile system. State and federal agencies and the private sector have been involved in promoting and preserving some of the basin's most significant attributes and providing recreational, educational, and interpretive opportunities.

Lehman Caves National Monument was established in 1922 under the jurisdiction of the U.S. Department of Agriculture. In 1924 a legislative proposal was made to expand this area by adding Wheeler Peak and establishing it as a national park. However, due to insufficient support, the legislation was dropped. The National Park Service did not become involved again until 1933 when Lehman Caves National Monument was transferred from the U.S. Department of Agriculture to the U.S. Department of the Interior. In 1955 another proposal was made to enlarge the national monument by including adjacent national forest land and designating the area as Great Basin National Park. At the request of Congress in 1958, the Park Service evaluated the area and determined that it qualified for national park status. Between 1959 and 1965 several bills were introduced in an attempt to add the area to the National Park System, but none were successful.

In 1973 the Park Service initiated a study to inventory, and list by priority, natural features in the Great Basin with potential for nomination to the National Registry of Natural Landmarks. The study was also to recommend an area that could be added to the National Park System as Great Basin National Park. In 1975 the completed landmark study suggested four potential areas: Snake Range, Railroad Valley, Monitor Valley, and White Mountains. In 1977 these recommendations were transmitted to Congress. Two years later a reconnaissance survey was initiated under section 8 of the General Authorities Act of 1970 (see Preface) to determine whether any of these four areas should be studied in detail. During the early phases of this survey, three additional areas were suggested for study by various agencies and individuals. When these areas were evaluated, two (Ruby and Roberts Mountains) were determined not to satisfy NPS criteria for a national park representing the Great Basin (see appendix B). The third area, Big Smoky Valley/Toiyabe Mountains, did meet the NPS criteria and was added to the Monitor Valley study area. Consequently, four areas were evaluated in the 1979 Great Basin Reconnaissance Survey: the Snake Range/Spring Valley, Railroad Valley, Monitor/Big Smoky Valley, and White Mountains/Fish Lake Valley.

During the reconnaissance survey it became apparent that all four areas have a number of landforms in common, such as fault-block mountain ranges dissected by rugged canyons, downthrown valleys edging the ranges, playa lakes, alluvial fans, and springs of varying temperature. There are evidences of prehistoric and historic Native American habitation, gold and silver mining with related settlement, and early ranching. Today, mining continues in all four areas but is predominant in Railroad Valley and Monitor/Big Smoky Valley. All areas have potential for mining and oil and gas development to increase. Although ranching continues, smaller operations are being absorbed by agribusiness. Increased grazing is likely in Monitor/Big Smoky Valley and heavy agricultural use in White Mountains/Fish Lake Valley. Recreational opportunities in all areas focus on the mountains and water.

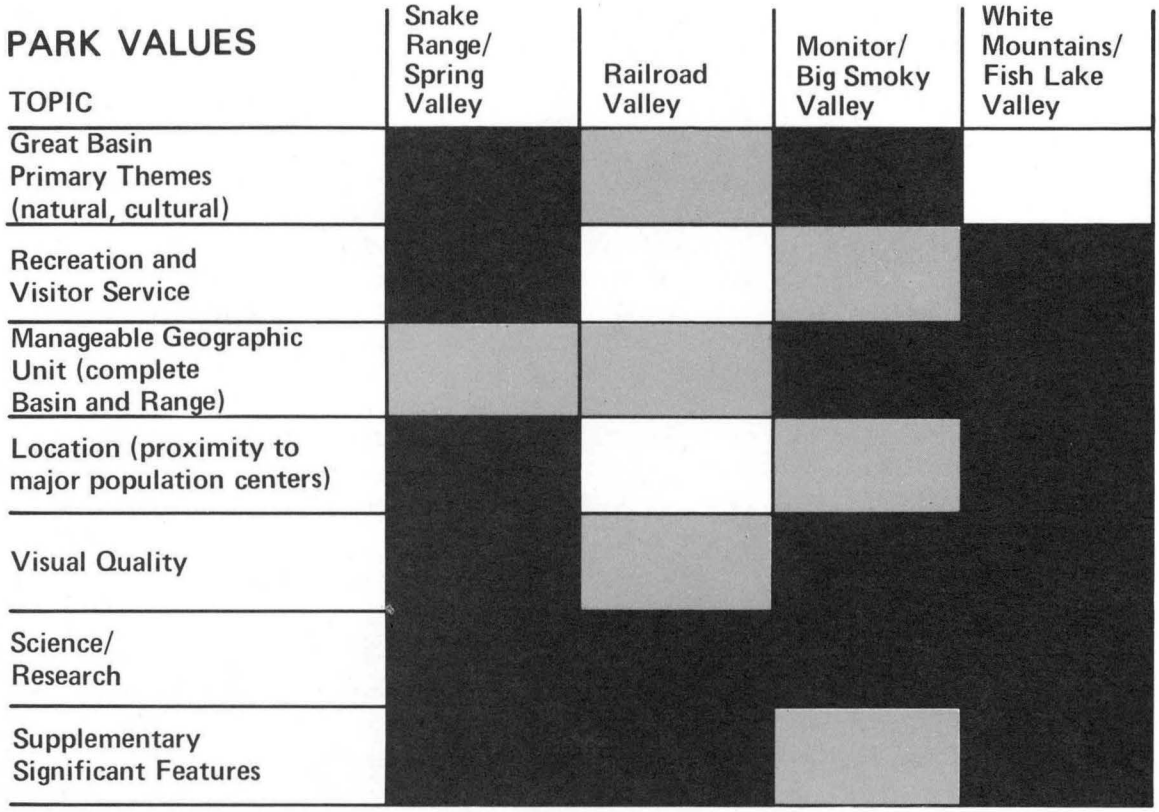
After inventorying the resources, the four study areas were evaluated according to the natural and cultural themes for the Great Basin contained in part one and part two of the National Park System Plan. The plan was established in 1969 to provide criteria for evaluating an area's potential for inclusion in the National Park System (see appendix C).

During the reconnaissance survey, it was determined that each of the four areas contained most of the 24 natural and cultural themes that are of primary importance in representing the Great Basin. The Snake Range/Spring Valley and Monitor/Big Smoky Valley study areas include all 24 themes; Railroad Valley has 22; and the fourth area, White Mountains/Fish Lake Valley, has 19. Several of the more important themes are not represented in the latter two.

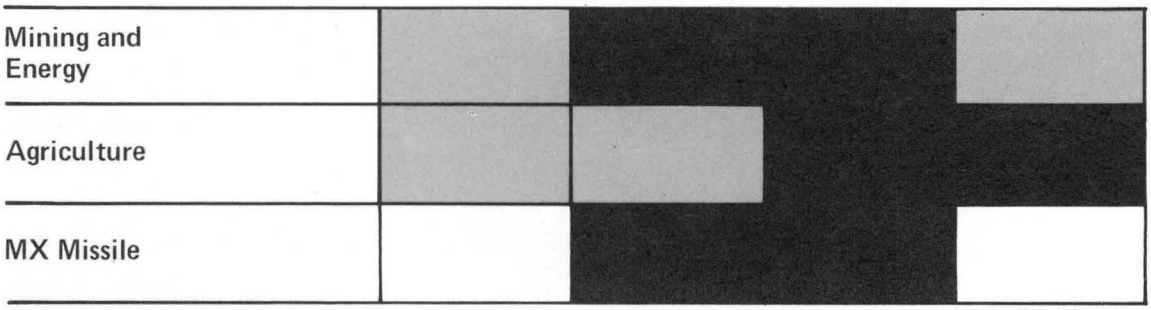
Since the analysis of the Great Basin primary themes resulted in three areas with similar representation, the study team designed the following study area evaluation chart which consists of nine additional topics. Because the Snake Range/Spring Valley area includes all 24 primary themes and ranks highest in eight of the nine additional topics, the National Park Service recommended during the 1979 Great Basin Reconnaissance Survey that a study of alternatives be made of the Snake Range/Spring Valley area.

Comments from the Nevada Division of State Parks, Bureau of Land Management (BLM), Forest Service (FS), and Heritage Conservation and Recreation Service (HCRS) were incorporated in the draft reconnaissance survey. The results of the survey and comments received by the previously mentioned federal agencies and LPG substantiated the recommendation that a study of alternatives be made of the Snake Range/Spring Valley area. On December 7, 1979, a summary of this study, including the recommendation, was presented to the House Committee on Insular Affairs. During that same week, the Park Service decided that the study of alternatives for the Snake Range/Spring Valley area should be completed in 1980. The Park Service, in cooperation with LPG, determined the project's scope and then asked the state and concerned federal agencies for assistance in the project. An interagency team was formed, headed by the Park Service. The other participating agencies include Nevada State Parks, FS, BLM, and HCRS.

STUDY AREA EVALUATION



NON-PARK VALUES



LEGEND

Degree of representation / potential

High

Medium

Low

As stated earlier, the purpose of this study is to determine the feasible alternatives for the protection, use, and management of the study area's resources and to assess the impacts and implications of each alternative. This document will provide information that will enable the Department of the Interior to submit to Congress, a recommendation on whether or not the Snake Range/Spring Valley area should be included in the National Park System or if other means of management and protection should be pursued.

In July two workshops and an open house were held in Baker and Ely, Nevada, to provide the public with information on the study and to provide interested individuals an opportunity to present their concerns about the study. Their major concerns focused on such issues as private lands, mining, grazing, increased use, tax loss, additional federal regulations, and the MX proposal. Two additional workshops on the draft alternatives were held in September in Baker and Ely. The draft alternatives were distributed to all the people on the Great Basin mailing list. The results of public participation indicated that the local populace is against the creation of a Great Basin National Park (see appendix D for results of public workshops). Comments expressed by the public and the involved federal and state agencies were then incorporated in this document.

SNAKE RANGE/SPRING VALLEY STUDY AREA

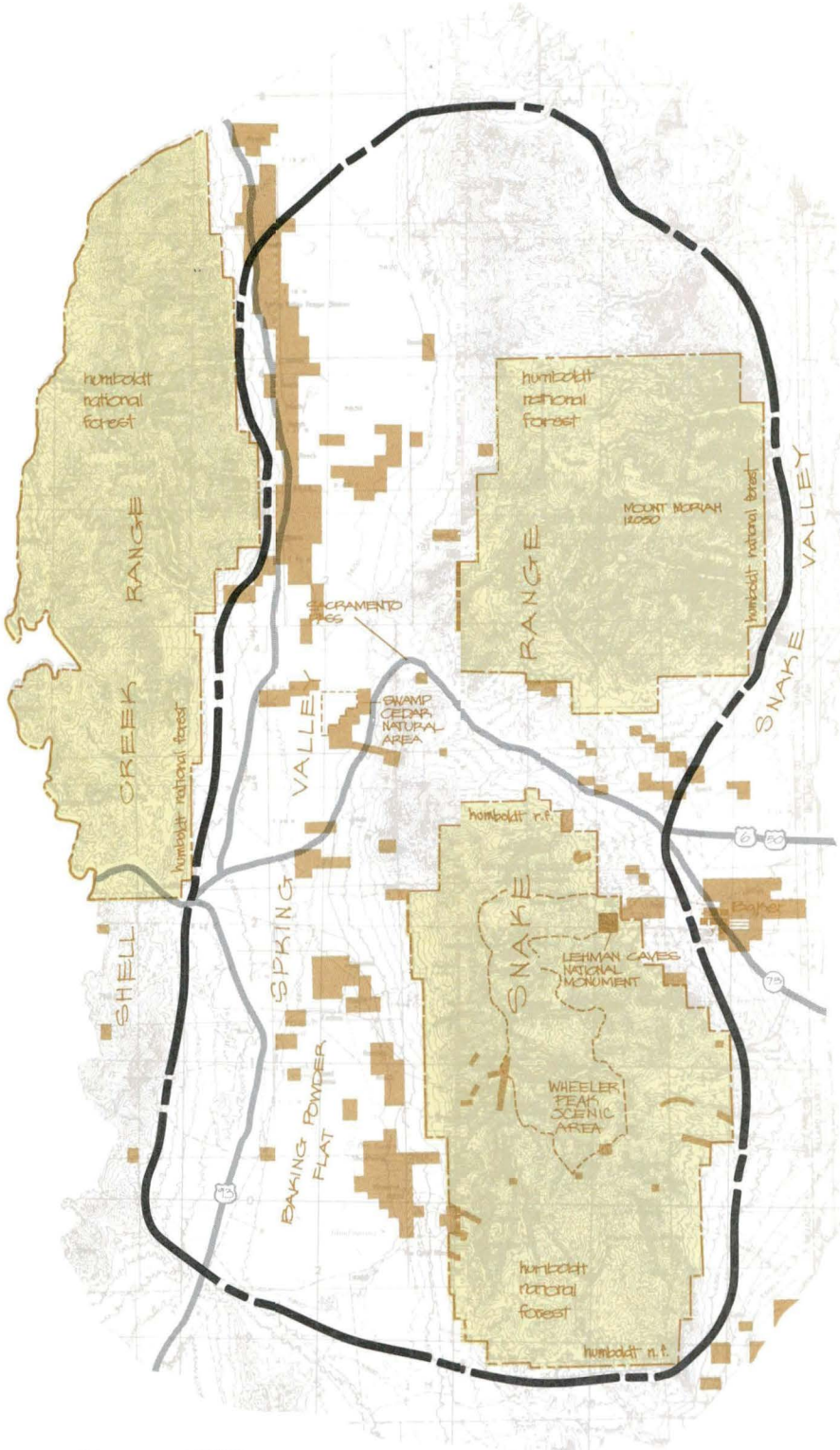
The Snake Range/Spring Valley area encompasses approximately 811,600 acres in eastern White Pine County, Nevada, along the Nevada/Utah border. U.S. Highways 93, 50, and 6 provide the major vehicular access to the study area. Approximately 94 percent of the area (763,165 acres) is currently managed by the Bureau of Land Management, the Forest Service, and the National Park Service. The remaining 48,435 acres are in private ownership.

The county population is less than 9,000, with the majority of people residing in Ely, McGill, and Ruth. Grazing, mining, and recreation are the major land uses. Kennecott Copper operation provided the major economic base before the Ruth mine closed in 1978. To compensate for this loss, White Pine County is attempting to attract new industries. A portion of the study area (Spring Valley) is being considered as a potential site for a portion of the MX system.

Resource Significance

Features within the study area include 13,063-foot Wheeler Peak; Spring Valley with two barren playa basins that are locally referred to as alkali flats; four terrestrial ecosystems containing alpine tundra, springs, streams, and alpine lakes; and areas of prehistoric and historic significance typical of the Great Basin.

There are currently no designated or registered national natural landmarks in the study area. Two proposed natural landmarks--Wheeler Peak Scenic Area/Mount Moriah area (218,200 acres) and Lexington Arch



NORTH

0 5 10 15 MILES

0 5 10 15 KILOMETERS

STUDY AREA BOUNDARY

PRIVATE LAND (ALSO OCCURS WITHIN BLM AND USFS BOUNDARIES)

STATE LAND

BUREAU OF LAND MANAGEMENT (ALL OTHER AREAS)

U.S. FOREST SERVICE

STUDY AREA

SNAKE RANGE / SPRING VALLEY GREAT BASIN

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

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(40 acres)--have been recommended for national landmark designation. These two areas contain 15 resources that are nationally significant (see table 1). Another site, the Spring Valley Swamp Cedar in the vicinity of Shoshone Ponds, is under further study as a potential landmark because it is thought to have national significance as a unique ecosystem. Two additional sites in Spring Valley--White Sage Flats and the Pygmy Sage area--were considered for landmark designation but were rejected because they lacked national significance.

There are currently no national historic landmarks within the study area. Although the Spring Valley slough has been identified by the Bureau of Land Management as having potential for national significance, it has not been evaluated for national historic landmark designation. Two sites in Lehman Caves National Monument are currently listed on the National Register of Historic Places as having local significance. Three more sites in the monument will be nominated to the register as having local significance.

As previously mentioned, there are 24 themes (19 natural and 5 cultural) in the National Park System Plan that were of primary importance in selecting an area to represent the Great Basin. During the study of alternatives one additional theme--America at Work (science and invention subtheme)--was determined to be applicable, which raised the total number of primary themes to 25. Although all 25 of these themes are represented in the area, two of these themes--works of volcanism and hot/warm water phenomena--are not well represented. Volcanism is represented within isolated localities in the extreme southern tip of the Snake Range and in the Sacramento Pass area. No hot water springs exist in the study area, but some of the Shoshone Ponds contain warm water. Hot springs have been identifed within 10 miles of the study area along the southern slopes of Gandy Mountain.

The study team determined that 15 of the 25 primary themes were crucial in representing the Great Basin. The two potential natural landmarks that have been mentioned include nine of these crucial themes. The study area also contains seven plant and one animal species included on the federal list of threatened and endangered plants and animals. Two other animal species are proposed for the list and one other is on the state's sensitive species list.

Although the study area is remote, it is the junction of two primary transportation corridors--U.S. 6/50 and U.S. 93 (north-south). Access to the area and the natural, cultural, and scenic resources would ensure national as well as regional visitation. It should be noted that one of the area's most pleasing attributes is its isolation and the limited number of visitors. If the existing visitor experience is to be continued and the resource integrity perpetuated, then the area could not accommodate a large increase in visitation or development.

Alternatives

Seven alternatives have been identified as feasible means to protect and manage the area's significant resources, while providing educational,

Table 1. Snake Range/Spring Valley Great Basin
Resource Theme Representation

Natural Themes	
Landforms of the Present	
Plains/Plateaus/Mesas	▨
Mountain Systems	▨
Works of Volcanism	□
Hot Water Phenomena	□
River Systems and Lakes	□
Works of Glaciers	▨
Lakeshores and Islands	
Earthquake Phenomena	▨
Caves and Springs	▨
Geologic History	
Cambrian to Lower Silurian	▨
Silurian to Devonian	▨
Mississippian to Permian	▨
Oligocene to Recent	▨
Terrestrial Ecosystems	
Desert Communities	▨
Dry Coniferous Forest	▨
Boreal Forest	▨
Tundra	▨
Aquatic Ecosystems	
Streams	▨
Lakes and Ponds	▨
Cultural Themes	
Original Inhabitants	
Earliest Americans	□
Westward Expansion	
Great Explorers	▨
Western Trails and Travelers	▨
Mining Frontier	□
Cattlemen's Empire	□
America at Work	
Science and Invention	▨

Note: All primary themes are located in study area.

Primary Themes Located Within Potential Natural Landmarks	▨
Crucial Themes (Determined by Team)	□
Crucial Themes Located Within Potential Natural Landmarks	▨

interpretive, and recreational opportunities. The proposals under each alternative vary in size, type of management, and degree of regulation. Alternative 1 describes the existing situation and the current means of resource protection and management. Alternative 2 includes a series of seven detached units that would be managed to protect the area's most significant resource values without any change in agency jurisdiction. Alternative 3 combines the most important resources in these detached units into two manageable units. Strict regulations are placed on types of land use, and resource preservation is emphasized. Alternative 4 increases the acreage and emphasizes a greater range of land uses with fewer regulations. Alternative 5 encompasses the entire Snake Range and most of Spring Valley to recognize the overall landform and scenic values of the Great Basin. Like alternative 4, a balanced range of land uses with fewer regulations is stressed. Alternative 6 includes the entire study area and establishes a multiagency commission, including the general public, for planning and monitoring use of the area. Alternative 7 incorporates, under a comprehensive management plan, 26 detached units in Utah, Nevada, and California that are most representative of the Great Basin's nationally significant natural, cultural, and scenic values. Resource protection would be emphasized at these sites.

Although these alternatives differ in their approach, the following objectives are common to each, with varying levels of achievement.

Identify and protect natural, cultural, scenic, and recreational resource values representative of the Great Basin region

Increase recreational, interpretive, and educational opportunities for people to understand and appreciate the attributes of the Great Basin environment

Recognize the existing Great Basin lifestyle, particularly the rich and continuing heritage of ranching and mining

Balance preservation efforts with the need to maintain and enhance the local economy's viability which is largely dependent upon use of local resources

Consider the Great Basin and the Snake Range/Spring Valley area as one overall resource which includes the natural values that are to be preserved as well as the economic and social attributes

RESOURCE DESCRIPTION AND ANALYSIS

RESOURCE DESCRIPTION AND ANALYSIS

SOCIOECONOMIC PROFILE

The Snake Range/Spring Valley study area is located in White Pine County Nevada. The state has a strong urban/rural dichotomy, with an estimated population of 790,000 (1980 statistics). Most of these people live in urban areas (81 percent), the two largest of which are Reno/Sparks and Las Vegas. The growth rate is the highest in the nation (70 percent per decade since 1959) because people are attracted primarily by employment in the expanding gaming and mining industries and by the vast, undeveloped open space.

The average income per capita is above the national average; however, it varies by county (see table 2). Personal income is derived largely from wages earned by government and service employees. Mining employs only a small percentage of the work force, even though the rural counties rely principally on it for work. Agriculture is important in several counties, employing a significant number of people. White Pine County has shown the most rapid growth in agricultural employment of any county in the state of Nevada.

Statewide unemployment in March 1978 totaled five percent. The unemployed are largely migrants and ethnic minorities, with the highest rates of unemployment concentrated on Indian reservations and a high percentage of blacks in the urban pockets. White Pine County has a high unemployment because the Kennecott open pit mine in Ruth closed recently.

Open space is important to those interested in tourism and recreation development. Since the state does not wish to be totally dependent on the gaming industry, it promotes industrial development and rural revitalization. Federal landownership (87 percent in the state and 93 percent in the county) has been identified by some as a barrier to industrial development since it inhibits land use and management options.

A regional project in White Pine County that could have major effects on the local economy is the MX missile site. Any sites chosen for the MX would be heavily impacted. The announced $33 billion project, which is expected to rise well over $50 billion due to inflation, would require 30,000 construction workers and 14,000 employees during the permanent operations. Numerous spinoff jobs would develop as a result of the MX project.

An environmental impact statement for the MX is scheduled to be completed in 1981, and it is anticipated that the president will select the sites shortly after the document's approval. Once approved, development of the missile system is expected to require approximately five years to implement.

Other projects that could affect the local economy are the Kennecott Copper Company's mine near Ruth, metal processing in McGill, and construction of a major coal-fired power plant near Ely. Cumulative

effects of these projects would possibly generate 4,353 new jobs. In the long run over 2,000 jobs could be created on an annual basis.

Table 2. Socioeconomic Statistics, White Pine County, Nevada

Population (by city) - 1980	
Ely (county seat)	4,897
McGill	1,405
Ruth	443
Lund Township	347
Baker Township	210
Goshute	30
Other	852
TOTAL	8,184

Employment - 1978	
Total labor force	3,300
Unemployment (17.2%)	570
TOTAL	2,730

Private Income - 1978	
Net dollars	$61,001,000
Per Capita	6,648

Landownership (acres) - 1980	
Federal	2,050,547
State	0
County	0
Indian reservation	66,142
Private ownership	84,807
Other	889
TOTAL	2,202,385

Work Force - 1979	
Mining	412
Contract Construction	176
Manufacturing	340
Transportation/Utilities	221
Trade	638
Finance/Insurance/ Real Estate	79
Service Industries	472
Government	909
Agriculture	439
TOTAL	3,685

NATURAL RESOURCES

General Setting

The Snake Range is a north-south fault block mountain system typical of the basin and range topography found throughout the Great Basin. It is approximately 60 miles long and 15 to 20 miles wide. Located in east-central Nevada, the range rises up between two valleys--Snake Valley on the east and Spring Valley on the west. Within the study area, which encompasses the entire Snake Range and a portion of Spring Valley, there is topographic relief of 6,000 to 7,500 feet between the playa surfaces (alkali flats) and highest mountain peaks. Spring and Snake valleys, like most valleys in the Great Basin, are playa basins with very high rates of evaporation.

There are several major differences between the northern and southern portions of the study area. One of the most significant differences is the availability of surface water--the Mt. Moriah area is much drier than the Wheeler Peak area. There are no alpine lakes and only five perennial

streams (Smith, Silver, Negro, Hendrys, and Hampton) in the Mt. Moriah area, whereas the Wheeler Peak area has six alpine lakes, numerous streams, and many more springs. The Wheeler Peak area is generally higher and contains more mountain peaks above 11,500 feet. The vegetation reflects this difference in elevation and the availability of water. In the Moriah area vegetation is more typical of the Great Basin (sagebrush and pinon juniper), whereas the Wheeler Peak area reflects a strong Rocky Mountain influence (Engleman spruce, Douglas fir, ponderosa pine). Although the area above timberline in the Wheeler Peak area is larger, it is more barren than the extensive alpine meadows north of Mt. Moriah. Mt. Moriah has the only plateau (Mt. Moriah Table) in the study area and contains better examples of ancient shorelines.

There is more surface water in north Spring Valley because of the influence from the Shell Creek Range, and it contains better examples of playa lakes and halophytic (salt tolerant) vegetation. Although the southern part of Spring Valley has less water, it has the only warm springs in the study area.

Geologic History

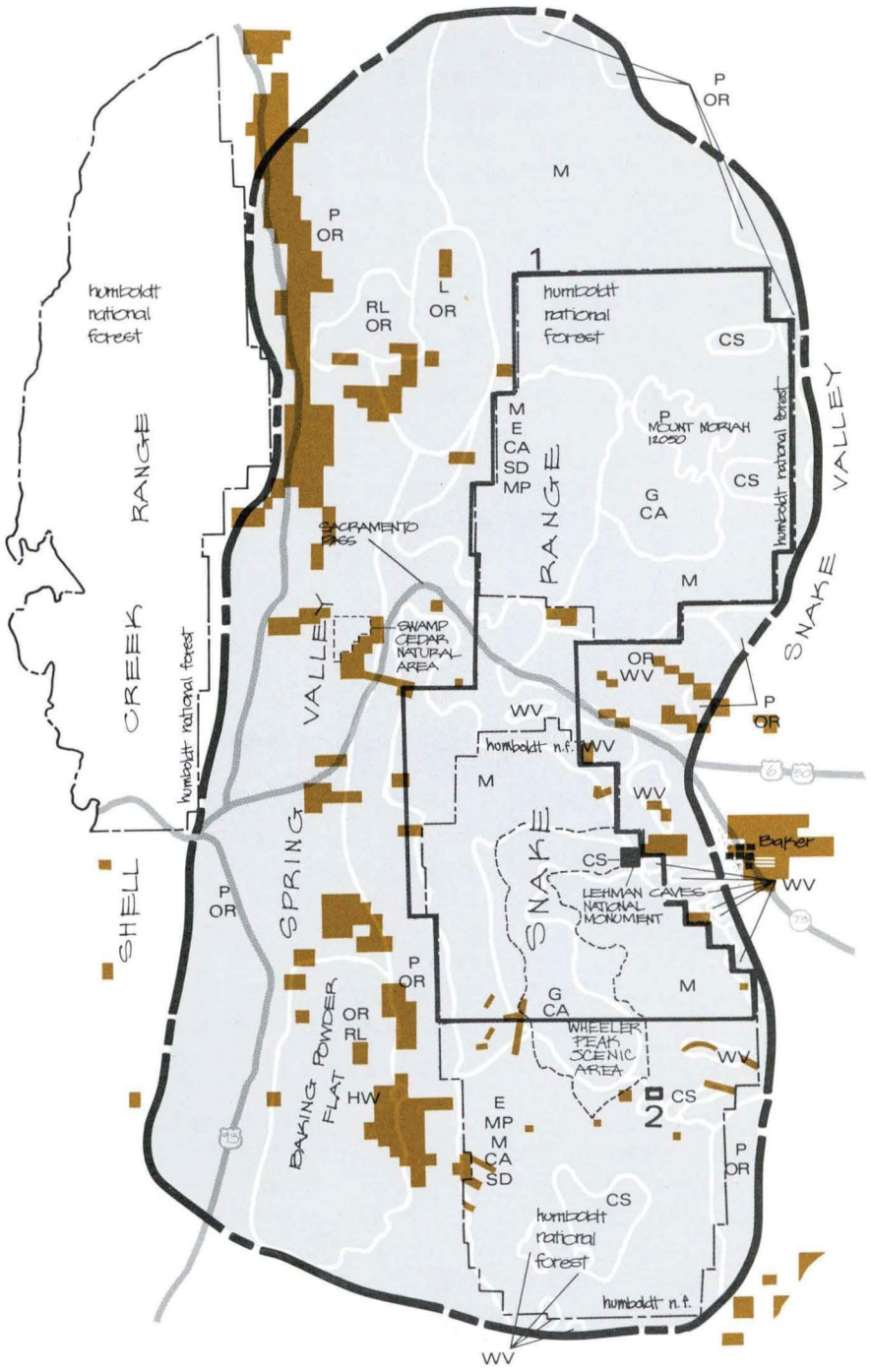
The Snake Range contains a relatively complete record of Great Basin geologic history. Rocks of Precambrian Age are present, along with a nearly complete representation of the Paleozoic era--230 to 570 million years ago. The Mesozoic era--65 to 230 million years ago--was largely a time of uplift and mountain building in the Great Basin. There are not many sedimentary rocks from this age in the Snake Range, but two major bodies of granitic molten rock, emplaced under the range during the latter part of this time, have been exposed by erosion. These bodies of rock are found in scattered locations throughout the northern part of the range and in the Johnson Lake and Strawberry Creek areas in the southern portion.

The Tertiary and Quaternary periods, representing the last 65 million years of geologic history, are also adequately represented, mostly in the Sacramento Pass area (near Baker and Lehman Caves) and in the valleys. Most of the volcanic rocks found in the Snake Range were formed within the last 25 to 35 million years. It was during this time that the second major mountain building episode of the region's history occurred, creating the faultblock range that exists today.

About 2 to 3 million years ago a series of glacial cycles began in the Great Basin and ended some 10,000 years ago, filling the valleys on each side of the range with meltwater. The last page of Great Basin geologic history, a trend toward a drier climate since the last glacial cycle, created the present arid environment.

Landforms

The Snake Range is typical of most Great Basin ranges; it is a long, narrow, north-south mountain range, which is a block of the earth's upper continental crust that has been faulted on both sides and uplifted



0 5 10 15 MILES
0 5 10 15 KILOMETERS
NORTH

STUDY AREA BOUNDARY

PRIVATE LAND (ALSO OCCURS WITHIN BLM AND USFS BOUNDARIES)

STATE LAND

BUREAU OF LAND MANAGEMENT (ALL OTHER AREAS)

U.S. FOREST SERVICE

SD PRIMARY NATURAL THEME

POTENTIAL NATIONAL NATURAL LANDMARKS
1. SNAKE RANGE / MT. MORIAH
2. LEXINGTON ARCH

PRIMARY NATURAL THEME DISTRIBUTION

SNAKE RANGE / SPRING VALLEY GREAT BASIN

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PRIMARY NATURAL THEMES

GEOLOGIC HISTORY

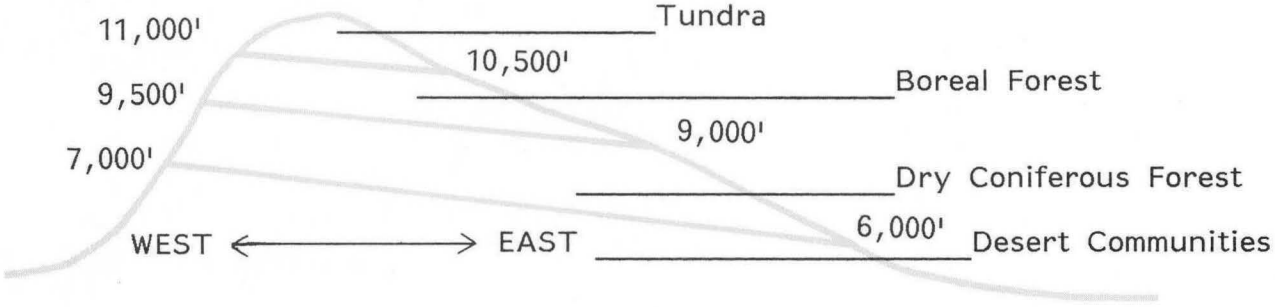
CA	-	Cambrian to Lower Silurian
SD	-	Silurian to Devonian
MP	-	Mississippian to Permina
OR	-	Oligocene to Recent

LANDFORMS

P	-	Plains, Plateaus, Mesas
M	-	Mountain Systems
WV	-	Works of Volcanism
HW	-	Hot Water Phenomena
RL	-	River Systems and Lakes
G	-	Work of Glaciers
L	-	Lakeshores and Islands
E	-	Earthquake Phenomena
CS	-	Caves and Springs

TERRESTRIAL ECOSYSTEMS

In general, major terrestrial ecosystems will dominate at the elevation ranges shown on the profile diagram below, but because of local variation in soil moisture due to slope and aspect, these individual themes cannot be accurately shown on the theme distribution map.

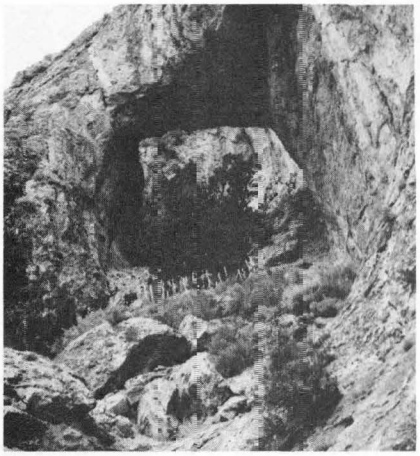


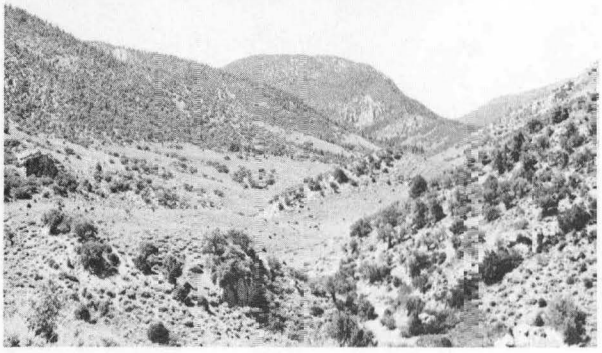
AQUATIC ECOSYSTEMS

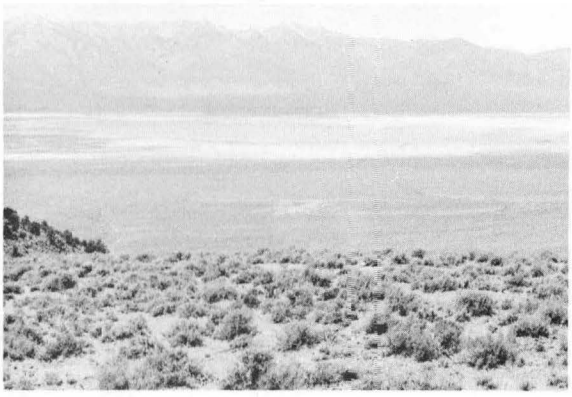
Aquatic ecosystems are highly localized and related to the major lakes and streams of the study area. These localities are not shown on the theme distribution map but are listed below.

Lakes and Ponds: Stella Lake, Theresa Lake, Brown Lake, Baker Lake, Johnson Lake, and Dead Lake.

Streams: Lehman Creek, Baker Creek, Snake Creek, Big Wash, Lexington Creek, Big Spring Wash, Murphy Wash, Miller Basin Wash, Silver Creek, Hendrys Creek, and Smith Creek.







to form a horst (uplifted block). On each side of this horst are major valleys that run north-south like the mountains. These valleys, called grabens, are downthrown blocks that were created by the same fault movements that brought the Snake Range into being. The Snake Range and Spring Valley is exemplary of the basin and range topography of the Great Basin. Relief between the Snake Range and the valleys on each side reaches a maximum of 7,500 feet, which is unusually high for most Great Basin ranges. Mountain building in the Great Basin is a very recent event in relation to geologic time, and a number of faults along the flanks of the Snake Range have been found to displace sediments that are only a few thousand years old. Earthquakes in the study area have not yet ceased, indicating that the Snake Range is still being gradually uplifted today.

The recent uplift of the Snake Range was accompanied by volcanic activity that left its mark in the form of volcanic ash, tuff, sediments, and lava flows, primarily in the central and extreme southern parts of the range. These volcanic deposits are not as widespread as in some of the ranges farther west, but they are fairly typical of the volcanic rocks found in the Great Basin.

Weathering and erosion have not been as instrumental in shaping the Snake Range and other Great Basin ranges as they have in other physiographic regions, because of the relatively young age of these mountains. Streams have dissected the Snake Range into a number of deep, sometimes rugged valleys. Erosion has also produced several limestone arches in the Snake Range. The 75-foot Lexington Arch, located 2.5 miles east of Granite Peak in Arch Canyon, has been recommended for designation as a national natural landmark. Another typical feature of the Great Basin is the gently sloping accumulations of sand and gravel (alluvial fans) that form at the mouths of all major mountain canyons. Alluvial fans are common in the study area; one northwest of Wheeler Peak is especially well formed.

Sand dunes, a common element of the Great Basin valleys, are found in several locations. One is on the large central playa in north Spring Valley west of Mt. Moriah. The dunes are less than 10 feet high and are stabilized by vegetation. Other dunes, which are also less than 10 feet high and stabilized by vegetation, are also found in several localities south of U.S. Highway 6/50, especially on Baking Powder Flat.

Within Spring Valley two closed basins exist, which is a phenomenon that is one of the more typical features of Great Basin topography. Neither of these two basins are entirely encompassed by the study area, and they have experienced some degree of human disturbance.

The unusually high elevation of the Snake Range makes it one of the few Great Basin ranges that have experienced glaciation during the most recent Ice Age that ended some 8,000 to 10,000 years ago. Glaciers once occupied the higher elevations of the eastern side of the range, carving bowl-shaped depressions called cirques near the divide and grinding out broad U-shaped valleys from previously formed narrow stream canyons. A remnant ice field exists near Wheeler Peak, from what was one of the largest glaciers in the Great Basin. This ice remnant is unique not only to the Snake Range but to the Great Basin as a whole.

Numerous caves occur in most ranges within the Great Basin where limestone is common. To date, only scattered evaluations of potential cave areas have been completed. In addition, management agencies and knowledgeable spelunkers (cave explorers) seldom disclose the specific locations of caves. Although many caves have probably been discovered, they are only known to a few select individuals; the Snake Range is no exception.

A major cave in this area is Lehman Caves, a highly decorated cavern system that exhibits a large variety of cave formations. Lehman Caves is famous for its large quantity of uncommon shield formations. This cavern system is an indicator of the potential cave resources of the Snake Range and other Great Basin ranges. The majority of the area's caves are formed in metamorphosed limestone formations of early Cambrian age and range in elevation from 6,000 to 7,500 feet above sea level. The estimated ages of the caves range from glacial periods (10,000 to 100,000 years old) to well over 10 to 20 million years old.

In order to gain a reasonable understanding of the region's caves, each cave must be investigated on its own merit. Some caves of the Snake Range exhibit a spectacular assortment of cave formations, while others have aragonite crystals (a polymorph of calcite) extending over 6 inches in diameter.

Unique fauna have been found to inhabit some of the caves of the area. Among the cave dwelling groups, bats are common, and the rare spotted bat has been reported to reside within certain Snake Range caverns. Certain members of the pseudoscorpion group have been collected that have not been found elsewhere, and numerous examples of beetles, cave crickets, spiders, and mites have been sighted. Scientific investigation has only been represented in a few specific studies. From all indications, some animals found in these cave systems could well be the only living representatives of their species.

Many large lakes filled the closed valleys of the Great Basin. An extension of the largest of these lakes, Lake Bonneville, reached southward to the eastern flank of the Snake Range. This lake, along with another smaller one on the west side of the Snake Range that occupied Spring Valley, left traces of ancient shorelines along the lower flanks of the range. Since these ancient lakes were an important part of Great Basin history, evidence of their shorelines is significant among the geologic features of the study area. Traces of ancient shorelines are most visible on the eastern edge of north Spring Valley, northwest of Mt. Moriah.

Because of the unusual height of the Snake Range, average annual snowpack is substantial. Annual snowmelt provides water for numerous springs on the east and west sides of the range. Underground water percolates along bedding planes and fracture zones but to the greatest extent along alluvial fill of mountain valleys. As it reaches the mountain front, the water accumulates in the alluvial fans bordering the Snake Range. Where the mountain front joins the valleys, large springs are often found where downslope movement is checked by impervious rock, silt, or clay layers. A few large springs are related to fracture zones

along faults. These types of springs have constant year-round discharge and do not dry up during years of low precipitation. Big Springs, at the southern tip of the Snake Range, is an example of a deep-seated spring. Although most springs contain cold water, the hot water phenomena theme is marginally represented by lukewarm water coming from an artesian spring at Shoshone Ponds in southeastern Spring Valley. The Civilian Conservation Corps did limited construction work at the site in the mid 1930s, which included a picnic facility and several ponds. Another spring containing warm water is located 10 miles northwest of the study area next to Gandy Mountain, just east of the Nevada-Utah border. All available surface water in the Snake Range, Spring Valley, and Snake Valley has been appropriated for use, and it is expected that demands for groundwater in the valleys will increase in the future.

Biological Resources

The study area contains all four terrestrial ecosystems of the Great Basin (desert communities, dry coniferous forest and woodland, boreal forest, and tundra) and a wide range of plant and animal species. The Snake Range, as any other Great Basin range, cannot be considered a typical or average representation of the biology found in the Great Basin because this type of situation does not exist. This is due to several factors--the rapid decrease in precipitation as one travels east to west, the variable size and elevation of Great Basin ranges, and the isolation of the mountain ranges that act as continental islands, all of which result in unique assemblages of species. Influence of Rocky Mountain plant life also decreases to the west. However, if one area is to be selected to represent the Great Basin, the Snake Range/Spring Valley area provides more biological diversity than any other range/valley complex in the region.

Vegetation. All of the major Great Basin vegetation types and a large percent of the individual plant species common to each are represented in the study area. In addition, several ecosystems unique to the Great Basin are located within the area. Habitat diversity is afforded by a 7,000-foot range in elevation and the variable substrate, topography, and moisture conditions. As a result of the interaction of these and other environmental factors, the vegetation types are not distributed in clear-cut altitudinal zones but intermingle with each other. For example, the sagebrush-rabbitbrush type extends from the valley floor to near timberline in some areas. Vegetation types can be recognized and discussed in a sequence from the desert types found mostly in the valleys ascending to the alpine tundra found at the highest elevations.

Three typical cold desert plant associations are found in Spring Valley. Associations of halophytic (salt tolerant) plants are found at the lowest part of north Spring Valley where runoff collects to form ephemeral salt-encrusted playas. Only plants that can tolerate high concentrations of salt can survive in this habitat; these include pickleweed, greasewood, and saltgrass. Where salinity is extremely high in the center of the dry lakes, no plant life is found. Where salinity is more moderate and aridity remains excessive, shadscale and greasewood dominate the landscape.

Above the basin floor, and extending to elevations of 10,000 feet on dry ridges, is the sagebrush-rabbitbrush association. The habitat is also arid, but soils are well-drained and have low salinity. Plant life is dominated by big sagebrush, black sagebrush, and rabbitbrush. Other common shrubs include horsebrush, Mormon tea, and bitterbrush. Between the evenly spaced shrubs, clumps of Indian rice grass, galleta grass, and a variety of wild flowers make up a sparse ground cover. The sagebrush-rabbitbrush association is the most common vegetation type of the Great Basin.

In addition to the representative Great Basin desert vegetation types, at least one other unique type is present--the Swamp Cedar in Spring Valley. A specially adapted variety of Rocky Mountain juniper is found on the valley floor, some 3,000 feet below its normal lower range of distribution. Also, stands of white sage and pygmy sage occur in Spring Valley. These two stands of vegetation could be, in part, the result of heavy grazing by sheep and may not be as rare as reported in past literature.

Many ephemeral and some permanent streams penetrate the dry valley floor. Due to the higher water availability along the streams, overall vegetation cover is more dense with a striking contrast of species. Narrow leaf cottonwoods, willows, wild roses, grasses, ferns, rushes, sedges, and a variety of wildflowers that make up a thin ribbon of lush vegetation along the streams.

Above the desert floor, the low elevation timberline is found between 6,000 and 7,000 feet elevation, marking the beginning of the dry coniferous forest and woodland. As one proceeds up the foothills, scattered dwarfed Utah juniper are found. Farther up the slope, the Utah junipers are larger and become intermixed with pinyon pine. At increasingly higher elevations, the Utah juniper gradually decreases and merges in almost pure stands of pinyon pine. Mature and unusually well-developed pinyon pine forests can be found in the Lehman Creek area. Pinyon-juniper woodlands are a common vegetation type surrounding most of the Great Basin ranges.

Above the pinyon-juniper woodland, the transition from dry coniferous forest and woodland vegetation to boreal forest begins. This transition corresponds to decreases in temperature and higher precipitation, increasing the amount of water available for plant growth. On the drier, south-facing slopes, extensive mountain mahogany woodlands are observed. Mountain mahogany trees reach record size on the eastern side of Wheeler Peak and Mt. Moriah. Mountain Mahogany is very characteristic of Great Basin vegetation. Due to the open nature of the woodland, many shrubs, dominated by manzanita and sagebrush, contribute to the ground cover.

At similar elevations on north facing slopes and in valleys, Rocky Mountain juniper, ponderosa pine, and white fir make up the dominant tree species. The relative abundance of these species shifts from one area to another, depending upon slope, aspect, and availability of water.

At intermediate elevations, the Douglas-fir/white fir/aspen association is found in the canyons and on shady slopes. White fir is usually dominant, but Douglas-fir dominates in isolated areas such as Lexington Canyon and the upper portions of the Snake Creek drainage. Aspen trees form scattered groves throughout the intermediate elevations. Unusually large aspen trees, up to 3 feet in diameter, are found along some of the major drainage systems.

At elevations above 9,500 feet, temperatures become cooler, precipitation increases, and conditions become favorable for the development of subalpine forests (boreal forest). Dense forests of large Engelmann spruce blanket the moist upper slopes and extend to timberline. Limber pine is found scattered in the open exposed areas, along with beautiful meadows that have brilliant wildflower displays in July.

At comparable elevations, scattered stands of bristlecone pine survive the harshest conditions found below timberline. In the Wheeler Peak cirque bristlecone stand, one tree was found to be the oldest living thing known to man, with an age in excess of 5,000 years (the tree has since been removed). The growth form of the trees and stands varies from dense, erect trees found on the slopes of Mt. Washington, to the open stands of twisted and gnarled trees found on the top of Mt. Washington, in the Wheeler Peak cirque population, and on the Mt. Moriah table. In addition, a fossil timberline, consisting of dead bristlecone fragments, is found some 500 feet above the present timberline at Mt. Washington.

The riparian vegetation along mountain streams and around alpine lakes provides a striking contrast to the surrounding vegetation. The number of species and their productivity is increased due to more moisture. In addition, a general downward shift of species is found along the numerous perennial streams. For example, white fir and Ponderosa pine can be found extending through the pinyon-juniper woodland and into the sagebrush-rabbitbrush association. Riparian species include Englemann spruce, aspen, water birch, willows, and choke cherry. A variety of ferns, rushes, sedges, mosses, and water-tolerant wildflowers also exist.

Above the subalpine forest, timberline is reached rather abruptly at elevations between 10,500 and 11,300 feet. The transition is characterized by leaning and fallen limber pine and Englemann spruce. In the tundra above a zone of shrubs, grass and wildflowers are found where sufficient soil development has occurred. Characteristic grasses include species of fescue, wheat, and timothy. Sedges and dwarfed alpine flowers add to the ground cover. This vegetation type is best represented by the plateau on Mt. Moriah.

Talus slopes cover extensive areas above timberline where the only soil is scattered in rock crevices. The vegetation is dominated by green, orange, and black lichens growing on the light-colored rocks. Mosses and cushion forms of flowering plants are scattered in the rock crevices.

Animal life. The diversity of habitat types found in the Snake Range/Spring Valley study area support a large variety of animals that are representative of the Great Basin. Animal life ranges from microscopic aquatic organisms in the numerous streams and alpine lakes to

large mammals, such as the mule deer and mountain lion in the forested areas. Low visitation to the area also contributes to the large number and diversity of animals found within the study area.

A total of 53 species of mammals are recorded for the Snake Range, including such large herbivores as the mule deer, pronghorn antelope, and about 24 reintroduced Rocky Mountain bighorn sheep. Carnivores include unusually high numbers of mountain lion, bobcats, coyotes, and badgers. Rodents, such as porcupine, beaver, squirrels, rats, and mice are abundant in the valleys and lower mountain slopes. Pika, hares, and rabbits are also present, along with four species of shrews and twelve species of bats. Mexican free-tailed bats have been identified in Bat Cave and Guano Mine, which is one of their northernmost breeding colonies.

The study area contains a wide variety of bird life. About 89 species of songbirds, nine species of nonsinging birds, nine species of terrestrial game birds, numerous aquatic game birds, and over 20 species of raptors, including the golden eagle, are reported. A small percent of the bird species are permanent residents, with a larger percent being summer residents or migrants.

Reptiles are abundant in the valleys and lower slopes. Eight species of snakes (including the Great Basin rattlesnake) and nine species of lizards have been reported within the study area. Amphibians are represented by three species of toads and six species of frogs.

Examples of Great Basin native fishes, which are rare at other locations in the Great Basin, are found in the study area. Four native basin fish are represented, plus an additional introduction, the brown trout. A native variety of the Utah cutthroat trout is found only in several streams within the Snake Range. Three introduced trout species support most of the sport fishing in the area.

Threatened and Endangered Plant and Animals. No plants in the study area are included on the current federal list of endangered and threatened plants. However, ten plant species that could be located in the study area are on the state list of sensitive species. Seven of these species are currently under review for potential federal listing; the other three are no longer being reviewed for federal listing because of their abundance.

Four endangered animal species are on the federal threatened and endangered list, and three others are on the state list. The following table identifies these plant and animal species.

Table 3. Plant and Animal Species

Species Name	Common Name-Plants	Tentative Status (State)
Astragalus lentiginosus latus	Broad milk velch	Recommended species of special concern*
Cryptantha interrupta	Interrupted cryptantha	Recommended species of special concern
Eriogonum holmgrenii	Holmgren buckwheat	Recommended threatened*
Haplopappus watsonii	Watson goldenweed	Recommended species of special concern
Penstemon francisci-pennallii	Pennell penstemon	Recommended threatened*
Primula nevadensis	Nevada primrose	Recommended threatened*
Sclerocactus pubispinus	Great Basin fishook cactus	Recommended endangered*
Thelypodium sagittatum ssp. qualifolium	Oval-leaf thelypody	Recommended threatened*
Penstemon moriahensis	---	Recommended threatened*
Eriogonum darrouii	Wild buckwheat	Recommended threatened

Species Name	Common Name-Wildlife	Tentative Status
Haliaeetus leucocephalus	Bald eagle	Endangered (federal & state)
Falco peregrinus anatum	American Peregrine falcon	Endangered (federal & state)
Empetrichythys lates	Pahrump Killifish	Endangered (federal & state)
Gila robusta jordani	Pahrangat Bonytail	Endangered (federal & state)
Euderma maculatum	Spotted bat	Rare (state)
Relictus solitarius	Steptoe Relic Dace	Rare (state)
Salmo clark; Utah	Utah cutthroat trout	Endangered (state)

*Plants currently being reviewed for potential listing

Hydrology

The hydrologic resources of the study area are varied and contrasting. Located near the center of the Great Basin, the Snake Range is part of an extensive, internally drained region lying between the Sierra Nevada Mountains in California and the Wasatch Mountains in Utah. Streams originating in the Snake Range have no outlet to the sea but flow into closed evaporative basins. Water flowing west from the Snake Range enters Spring Valley where it collects in two evaporative basins, one in the northern part of the valley and one in the south. Water flowing eastward from the Snake Range enters Snake Valley, which is a gently sloping basin open to drainage on the north end. Although Snake Valley is not a closed basin, it does contain numerous small playas and salt marshes due to local undulations in the valley floor.

Two highly contrasting hydrologic systems are in operation within the study area. The high elevation of the Snake Range is a zone of snowmelt

and water surplus where permanent streams originate. The dry basins on each side of the Snake Range are water deficit areas where streams evaporate as they terminate in playa lakes.

Water in the higher elevations is generally pure, cool, and very low in mineral content. As it reaches the evaporative playas, it is warmer and very high in minerals and salts.

The Snake Range is one of only a few ranges in the Great Basin containing alpine lakes. A total of six lakes are found in the southern part of the Snake Range. Stella, Teresa, and Brown lakes are at the head of Lehman Creek, which is one of the major perennial streams flowing eastward toward Baker. Baker Lake supplies water to Baker Creek, which also flows eastward toward Baker. Lehman Creek furnishes water to the Baker Ranch, and underground flow from both Lehman and Baker creeks supply water through wells to the town of Baker. Johnson and Dead lakes provide water to the Snake Creek drainage. Snake Creek flows eastward to the town of Garrison. Baker and Johnson lakes are the only lakes deep enough to support fish throughout the year; both contain introduced cutthroat trout. Other major streams in the southern Snake Range are Big Wash and Lexington creeks, which flow eastward to Pruess Lake. Major springs in the extreme south end of the Snake Range supply water to Big Springs Wash and Johns Wash. However these streams, as well as those on the south and southwest end of the range, do not flow continually.

The northern Snake Range is much drier than the southern. No alpine lakes are found, and few streams flow continually through the summer. The largest and most continually flowing stream is Silver Creek, originating at Silver Creek Spring and flowing southward to the saddle between the northern and southern portions of the Snake Range, where it supplies water to a ranch and a number of nearby residences. Other perennial streams in the northern part of the Snake Range are Negro Creek, draining westward into Spring Valley, and Hendrys, Hampton, and Smith creeks, draining eastward into Snake Valley.

Air Quality

The study area has relatively clean air; air pollution in eastern Nevada is generally not a problem. The Kennecott Copper refinery at McGill has produced localized industrial smoke, but the refinery has had little effect on the Snake Range or Spring Valley. The recent shutdown of copper production from the Ruth pit has decreased activity at McGill, but the smelter continues to process ore brought in from other locations. Additional regional pollution may result from a proposed coal-burning power plant to be located near Ely and the possible MX missle construction activities at the south end of Spring and Snake valleys.

During the last few years smog has become visible in the study area as pollutants are carried into the area by prevailing winds, which usually occur during the winter months.

Dust is frequently picked up by high winds in Spring and Snake valleys. More locally, dust from county roads and other access roads is frequently seen. Sonic booms from military aircraft are common in the general vicinity of the Snake Range. More widespread use of supersonic aircraft is increasing the frequency of sonic disturbances over much of this part of Nevada and Utah.

All of east-central Nevada, including Lehman Caves National Monument, is currently a class II air quality area, per section 162 (b) of the Clean Air Act, as amended August, 1977. In accordance with section 164 (d) of the act, the National Park Service completed its reclassification recommendations and did not request a change of classification for Lehman Caves National Monument. Since the review for reclassification was a one-time opportunity for all federal land managing agencies, the National Park Service is no longer in a position to recommend redesignation to class I for either Lehman Caves or for any newly established unit of the National Park System. Section 164 (a) of the Clean Air Act gives the authority for reclassification to the concerned state, with federal land managers acting only in an advisory capacity.

CULTURAL RESOURCES

Resource Overview

The Bureau of Land Management and Forest Service conducted survey work of cultural resources on approximately 10,000 acres within the study area; 49 prehistoric sites, 10 historic sites, 151 prehistoric isolated areas, and several hundred historic dump sites were identified. As money is programmed, additional surveys will be conducted by the BLM. The Forest Service reports that no new survey work or sites for nomination to the National Register are anticipated in the study area.

Reviewing the significance of the Snake Range/Spring Valley's cultural resources is an integral aspect of the study. There are no national historic landmarks located in the study area. Although a number of cultural resources have been identified and evaluated, only the Spring Valley slough archeological complex reflects national significance. This area may be nominated to the National Register of Historic Places by the Bureau of Land Management.* The locally significant Lehman Orchard and Aqueduct and the Rhodes Cabin at Lehman Caves National Monument are listed on the National Register; three other sites within the national monument (prehistoric archeological site, Lehman Cave Trail, and Panama Canal), which are also locally significant, will be nominated. There are several excavated archeological sites, including a number of cave shelters

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*The Spring Valley slough consists of many individual sites in the dunes, with uses ranging back to early man. Different dunes were probably occupied at different times as the lake bed and sloughs filled and receded. Sites contain lithics, pottery, midden, and some fire hearths. The scientific value of such a complex in interpreting prehistoric occupation of the Great Basin is invaluable.

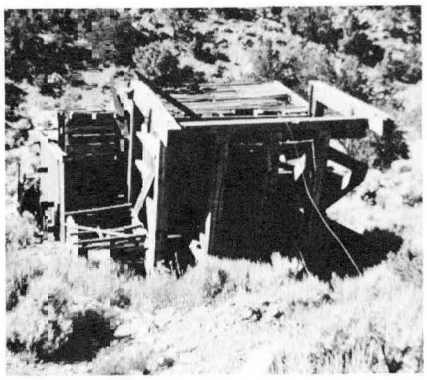
near Mount Moriah. Other historic period mining ventures, ranches, and communities exist throughout the study area that have not been evaluated for National Register significance as of July 1980. Discounting unevaluated sites, no other known cultural resources in the study area appear to meet NPS national significance criteria in the NPS "Management Policies."

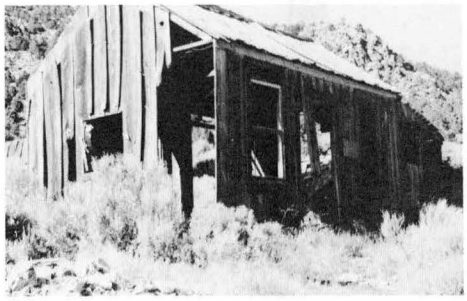
Three cultural resources themes--"Original Inhabitants, Westward Expansion, and America at Work"--listed in part one of the National Park System Plan are applicable to the Great Basin, and six subthemes are represented by resources in the study area. These subthemes--"The Earliest Americans," "Great Explorers," "Western Trails and Travelers," "Mining Frontier", "Cattlemen's Empire" and "Science and Invention"--are the six primary cultural attributes for Great Basin. Although all are represented, "Western Trails and Travelers" is not well represented because no major trails, such as the Oregon or California trails, crossed the study area.

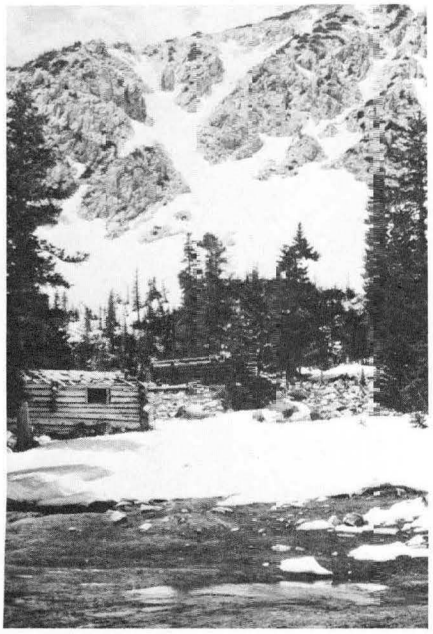
Original Inhabitants

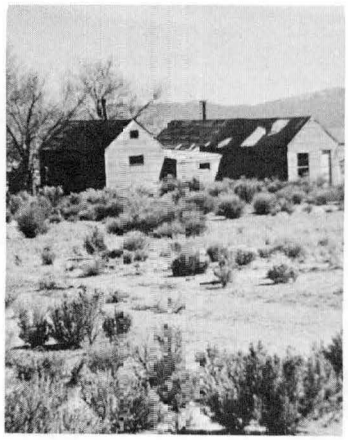
Radiocarbon dates fix the earliest known occupation of this area between 9000 and 8000 B.C. Because undated sites are situated on dunes and terraces of former lakes (common among sites of the earlier Western Pluvial Lakes tradition), it is possible that occupation began earlier. The archeological sequence contains three major periods defined on the basis of scattered surveys and excavations: Desert Archaic (ca. 9000 B.C. to A.D. 1000); Western Fremont (ca. A.D. 800 to A.D. 1200); the northernmost and westernmost extension of "puebloid" groups in Nevada; and Shoshone (ca. A.D. 1200 to historic present). The variety of sites within the study area includes prehistoric caves and rockshelters (some with stratified living floors); burial grounds; spring sites; open sites that contain lithics, potsherds, hearths, or rock circles; pueblos; pictographs that include kachina figures and petroglyphs; and hunting blinds and corrals.

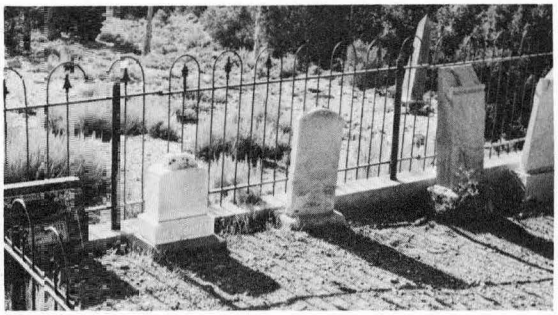
The entire study area was occupied by the Western Shoshone, mixed with Southern Paiute at the south end of Spring and Snake valleys. Goshute may have occupied a part of the unit in the Snake Valley. This unit had an unusually favorable subsistence environment and an unusually dense population (seven to nine villages). Historic sources also indicate that many Native Americans have moved to western Nevada near Reno. Other places of ceremonial or traditional significance could include former village locations (particularly those where dance ceremonies were held), burial grounds, or caves. No descendants of these Native Americans are known to live on nearby ranches. There is, however, a Goshute colony in nearby Ely, and some descendants may live on the Goshute Reservation to the north or on the Duckwater Reservation to the west.

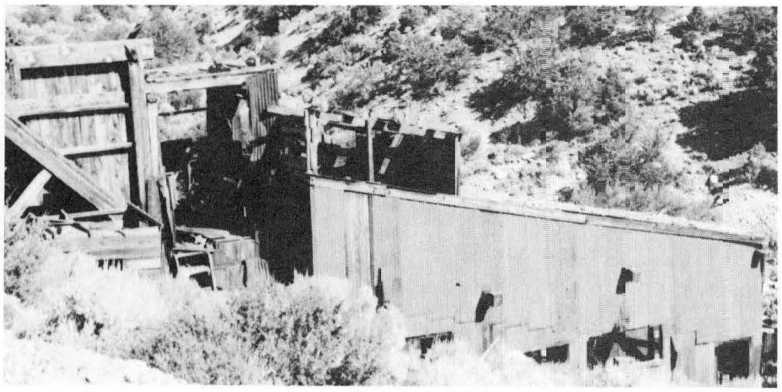


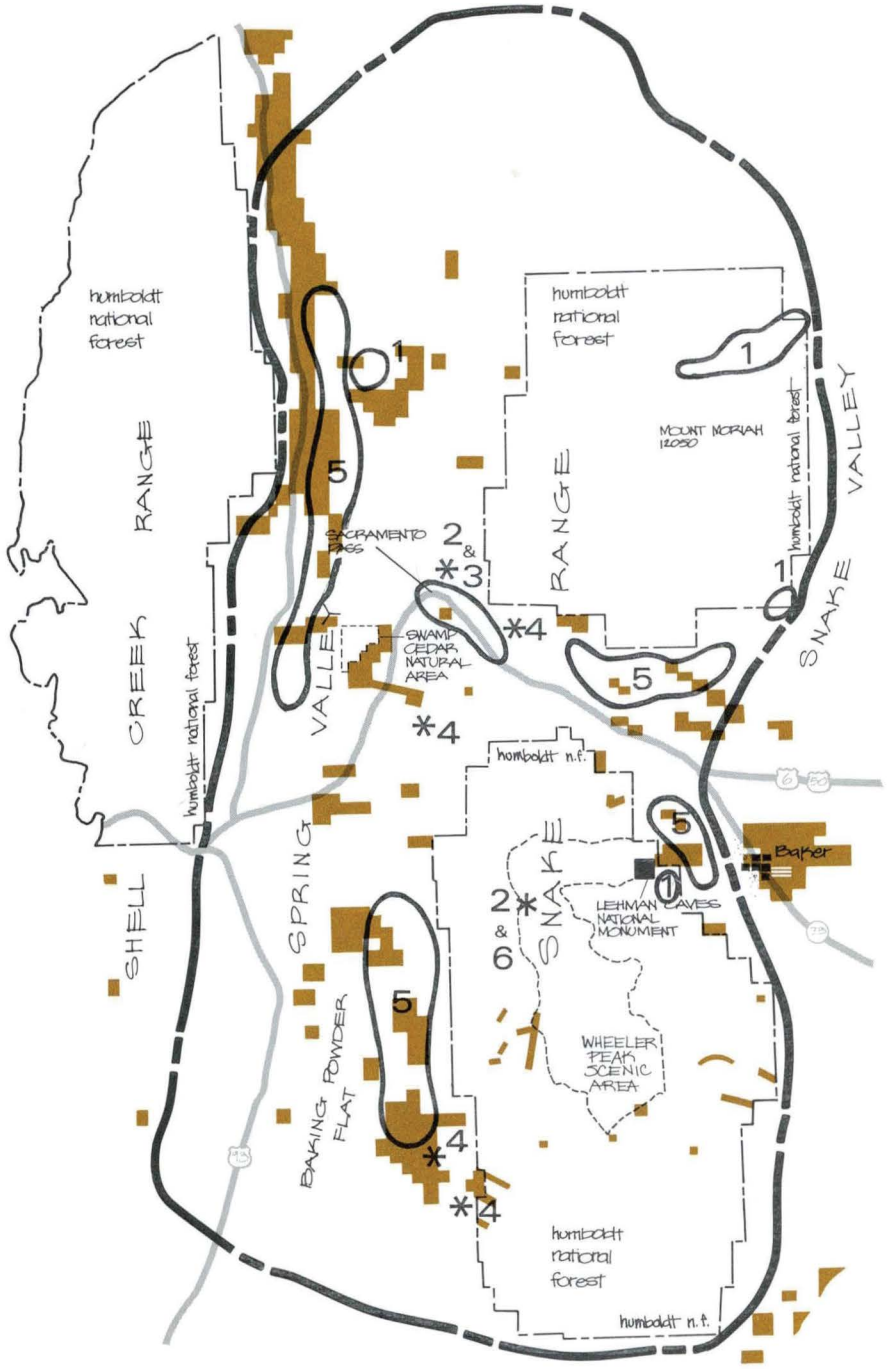












NORTH

0 5 10 15 MILES

0 5 10 15 KILOMETERS

STUDY AREA BOUNDARY

PRIVATE LAND (ALSO OCCURS WITHIN BLM AND USFS BOUNDARIES)

STATE LAND

BUREAU OF LAND MANAGEMENT (ALL OTHER AREAS)

U.S. FOREST SERVICE

* PRIMARY CULTURAL THEME

PRIMARY CULTURAL THEME DISTRIBUTION

SNAKE RANGE / SPRING VALLEY GREAT BASIN

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NA/GB | 20002A
DSC | JAN 81

PRIMARY CULTURAL THEME DISTRIBUTION

ORIGINAL INHABITANTS

1. Earliest Americans

WESTWARD EXPANSION

2. Great Explorers of the West
3. Western Trails and Travelers
4. The Mining Frontier
5. The Cattlemen's Empire

AMERICA AT WORK

6. Science and Invention

Westward Expansion

A number of explorers crossed this general area in the 19th century. Jedediah Smith, the famed mountain man, was the first recorded nonaboriginal to cross the region, traveling 50 to 75 miles north of Wheeler Peak in 1827. Howard Egan, a Mormon pioneer, was the first person recorded as crossing Sacramento Pass (1855); other coreligionists moved westward from Utah, crossing the Snake Range to organize small communities in eastern Nevada. Army survey parties traversed the area from the late 1850s, when Army Captain George Wheeler's party climbed Union Peak (formerly Mount Jefferson Davis). The state mineralogist then renamed it Wheeler Peak.

Early travelers used the Sacramento Pass route to move between western Utah and eastern Nevada. Also, the development of an early communications system influenced the region. The route of the Pony Express crossed Spring Valley about 15 miles north of the study area in 1860-61.

It was the mining industry that provided the most growth, wealth, and influence in the Snake Range. Of the local mining districts--Osceola, Sacramento, Hogum, Snake, Black Horse, and Minerva--that flourished and disappeared, the Osceola district produced $5 million in mineral wealth, thrived the longest, and supplied the most mineral production, beginning with the discovery of gold in 1872. Although these mining districts were important in the region's growth, they never rivaled the great strikes in Western Nevada (Virginia City, Goldfield, and Tonopah).

The town of Osceola was founded in 1877. Osceola scored an important first in Nevada mining technology when the Osceola Placer Mining Company channelized a number of small streams flowing from Mt. Wheeler to form the Osceola Ditch which powered hydraulic hoses to wash gold from thick alluvial gravel beds. In 1881 Osceola could boast as having a stamp mill, two stores, a hotel, a restaurant, a livery stable, a blacksmith shop, and a schoolhouse. White Pine County's largest gold mining center developed as the main supply point for the ranches of eastern Nevada, and its post office served clients until 1920.

Besides gold and silver, tungsten was a much sought-after mineral in the Snake Range. The tungsten mining district was established northeast of Minerva in 1900, and the Minerva mining district was established in 1915. A post office and school were built in Shoshone 1-1/2 miles north of Minerva. In the 20th century, tungsten production rose during wartime and declined later. The late 1970s and the first part of the 1980s witnessed a renaissance of tungsten and other mineral activity in the Snake Range.

East of the Snake Range, a number of ranches and communities--Burbank, Baker, and Garrison--were developed in the late 19th century. Isolated ranches produced livestock, hay, grain, fruits, and vegetables. Other ranches developed in Spring Valley to the west of the Snake Range. Here early settlers, such as the Yellands, Kirkeys, Swallows, Willards, and Robinsons, raised sheep and cattle. In 1800 the non-Indian population in Spring Valley totaled 150, but that number has declined. Today, livestock and alfalfa production are the primary agricultural activities.

According to White Pine County historian Effie Read, the Hockman family were the first Anglo-American emigrants to settle in the Snake Valley in 1869. George W. Baker and Dave Weaver were other early settlers. Absolom S. Lehman, who discovered the noteworthy cave that bears his name, settled in the Weaver Creek area in the late 1860s, and by the mid-1880s Lehman guided visitors to "his" cave. In the late 1800s and early 1900s residents cut enough timber to supply miner's and settler's demands. During this time almost all of the major canyons in the study area contained at least one sawmill--Calvin Warlick's mill on Snake Creek (then Lexington Creek), W.H. Hendrys on Hendrys Creek, Tilford and Merchan's operation on Baker Creek, and other timber mills on Lehman and Strawberry creeks.

America At Work

Science and invention affected the cultural development of the Wheeler Peak area. In 1882, the U.S. Coast and Geodetic Survey erected a heliograph signal station on Wheeler Peak. The heliograph station was one of a series of outposts the surveyors used to map the Great Basin in the early 1880s.

RECREATION AND VISITOR USE

Most visitation occurs in the mountains of the study area--Lehman Caves, Wheeler Peak, and Mount Moriah. Lehman Caves and Wheeler Peak are more accessible and developed and consequently are the primary visitor attractions. Visitor opportunities include sightseeing, hiking, camping, picnicking, fishing, and hunting.

Lehman Caves National Monument (640 acres) and the Wheeler Peak trailhead are located west of Baker and are accessible by paved road. Lehman Caves was established to preserve the cave's natural, scientific, and scenic attributes. The monument is a day-use area that provides cave and spelunking (cave exploration) interpretive tours. A visitor center for administrative, information, and interpretive purposes is shared by the National Park Service and Forest Service. Food services and picnic facilities are also available on a seasonal basis in the monument. Yearly visitation ranges between 30,000 and 40,000 visitors.

Wheeler Peak, the second highest mountain in Nevada, was designated as Wheeler Peak Scenic Area in 1959 due to its 28,000 acres of spectacular scenery. The designation recognized the area's scenic, natural, and recreational attributes. The area remains open to mining and grazing, but major use areas, such as campgrounds and primary features, are closed to grazing until after Labor Day.

A series of trailheads and hiking trails provide access to the backcountry and a number of natural features that are interpreted -- Wheeler Peak, a perennial ice field, a bristlecone pine forest, and six alpine lakes. The Forest Service provides camping facilities in the drainages of Baker and Lehman creeks. Recorded visitor days in the scenic area totaled approximately 57,650 in 1979. The majority of this use is from May to

October. Additional recreational opportunities, such as the petroglyph nature trail, are being developed or have been proposed for increasing visitor opportunities.

The Mount Moriah area is more primitive and less accessible than the other areas. There are no developed campgrounds, picnic areas, comfort facilities, or paved roads. The primary activities include hiking, hunting, and backcountry camping. Recorded visitor days totalled 150.

As previously mentioned, hunting and fishing are major recreational activities in the area. Hunting opportunities include mule deer, pronghorn antelope, upland game birds, and predators. The largest concentration of these occupies the foothills of the south Snake Range. Fishing occurs in all the major perennial streams, most of which are in the Wheeler Peak/Lehman Caves area. Although fish species vary by stream, they normally include cutthroat, rainbow, brown, and brook trout. Hunting is controlled by the state of Nevada. On federal lands, a cooperative agreement exists between the administrative agency and the state.

LAND USE AND OWNERSHIP

The following discussion highlights the major land uses in the Snake Range/Spring Valley area and provides an overview of how current and future land use trends may affect the area. All public lands within the study area, except for Lehman Caves National Monument, are being managed under a multiple-use concept and no lands have been withdrawn for specific purposes. Under RARE II legislation, the Forest Service has recommended three units, totaling 225,000 acres of the 811,600-acre study area, for future wilderness evaluation: Mount Moriah, Wheeler Peak, and Highland Ridge. In addition, all BLM lands have been inventoried and one area (23,400 acres) in the north Snake Range has been recommended for further wilderness consideration. This portion of BLM land did not qualify on its own merit but was included because it is contiguous with the Forest Service's Mount Moriah recommendation.

Recent surveys have analyzed seven areas proposed for national natural landmark designations as well as one area that may be nominated to the National Register of Historic Places. Three areas--the Snake Range, Lexington Arch, and the Spring Valley Swamp Cedar--are being recommended as national natural landmarks. The Bureau of Land Management has evaluated the Spring Valley slough for National Register designation. National Landmark or National Register designations recognize features for significance but do not provide additional protection. However, management options are being analyzed for these areas in the BLM and FS planning process.

Mining and Oil and Gas Development

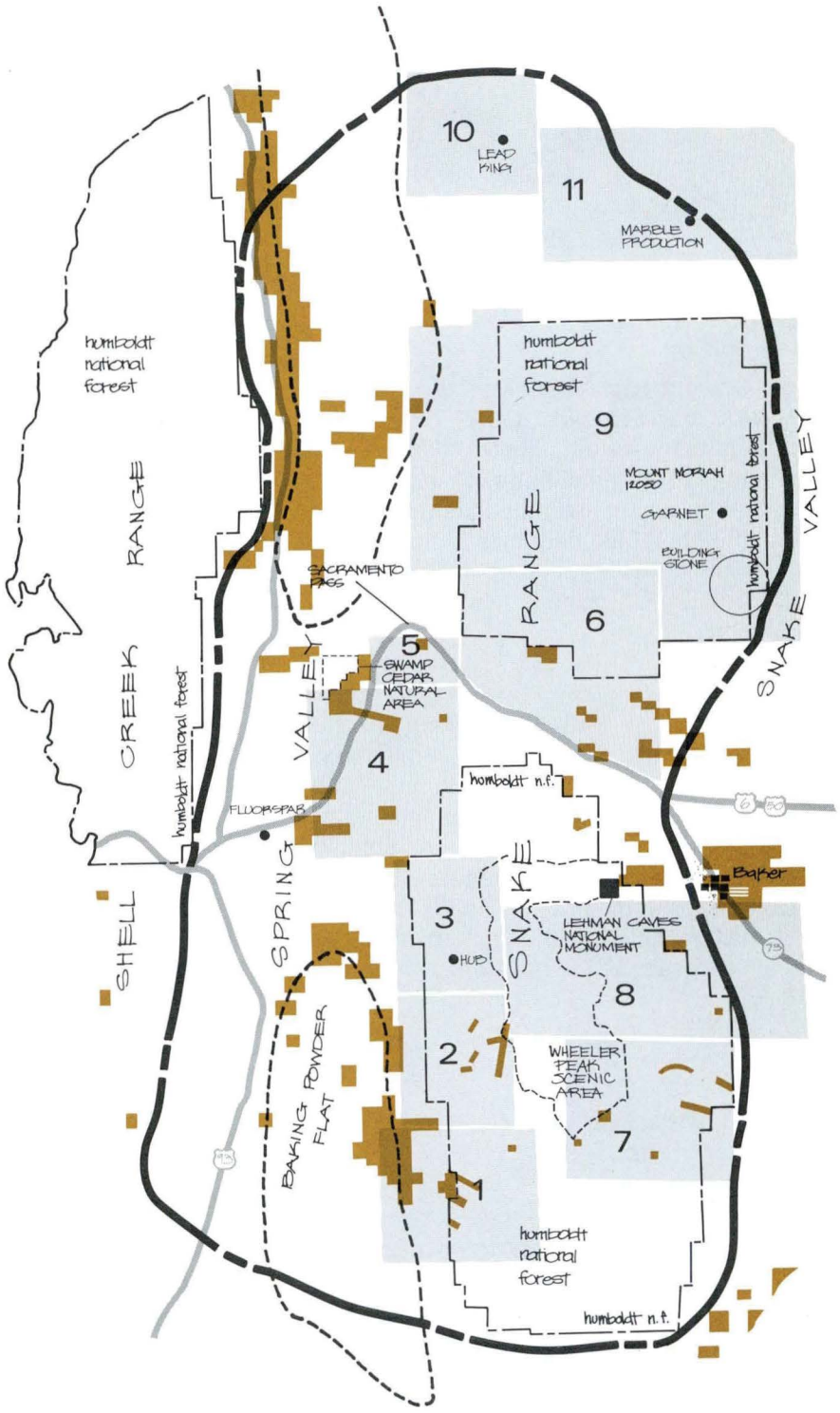
The Snake Range, like most mountain ranges in the Great Basin, has a high mineral content. Numerous intrusive bodies and major faults created geologic environments favorable to the formation of metallic minerals.

MINING DISTRICTS

Mining District	Mining Claim or Claim Group		Mineral Occurrences
	Unpatented*	Patented	
1. Shoshone	13 (as of 1978)	3	Tungsten, lead, silver
2. Mount Washington	205	5	Tungsten, beryllium, lead, silver
3. Tungsten	+	None	Tungsten
4. Osceola	101	4 groups totaling over 500 claims	Gold, silver
5. Sacramento	29	None	Tungsten, gold
6. Black Horse	120	None	Gold, silver, lead, tungsten
7. Lexington	32	1 group	Tungsten
8. Snake	7	None	Lead, silver
9. Mount Moriah	63	None	Silver, lead, zinc, garnet, building stone (quartzite)
10. White Cloud	+	None	Lead, silver
11. Marble Canyon	+	None	Marble

* Records not totally up to date

+ None recorded with Bureau of Land Management, but records not up to date



NORTH

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STUDY AREA BOUNDARY

PRIVATE LAND (ALSO OCCURS WITHIN BLM AND USFS BOUNDARIES)

STATE LAND

BUREAU OF LAND MANAGEMENT (ALL OTHER AREAS)

U.S. FOREST SERVICE

CLASSIFIED BY U.S.GEOLOGICAL SURVEY AS POTENTIALLY VALUABLE FOR LEASEABLES (Na, K)

MINING DISTRICT

1. SHOSHONE
2. MOUNT WASHINGTON
3. TUNGSTEN
4. OSCEOLA
5. SACRAMENTO
6. BLACK HORSE
7. LEXINGTON
8. SNAKE
9. MOUNT MORIAH
10. WHITE CLOUD
11. MARBLE CANYON

EXISTING MINING DISTRICTS AND PROSPECTIVE LEASEABLE SODIUM AND POTASSIUM

SNAKE RANGE / SPRING VALLEY GREAT BASIN

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

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During the last 120 years, many mineral commodities have been extracted from the Snake Range. Tungsten and gold have been the highest yielding commodities. Lesser amounts of silver, lead, zinc, and copper have been extracted, along with small quantities of garnet, decorative stone (quartzite), and marble. Although not yet produced in commercial quantities, several other prospective mineral resources exist in the study area. These resources are beryllium, fluorspar, and leasable salines (sodium and potassium).

There are ten mining districts and a marble quarry in the Snake Range. The following map shows that these districts cover most of the range. The accompanying chart lists the number of claims on record for each mining district and the types of mineral occurrences. The study area has 15 patented claims or claim groups covering approximately 1,000 acres. As of May 1980, BLM records showed 557 unpatented claims in the study area, but recent intensive prospecting activity suggests that there may be several hundred more patented claims that are currently being added to the records.

During the last few years geologists have determined that the Snake and Spring valleys have subsurface environments favorable for the formation of oil and gas resources. Consequently, oil and gas leasing has become intense in both valleys. Leases and lease applications cover virtually all of Spring Valley with some leases approaching the Sacramento Pass area from the east. Snake Valley is also heavily leased. Leasing is highly volatile, with locations of leases and lease application changing almost daily. Although exploration and drilling activities have been occurring for some time in both valleys, there have been no reported discoveries of either oil or gas as of July 1980.

Agriculture

There are 15 ranches located in the study area, with 39,980 acres of privately owned land.

Livestock grazing is important to the local economy, with most of the private land in the area being utilized for grazing and alfalfa production. Grazing in the area relies heavily on federal range land; consequently all public lands within the study area are covered with grazing allotments. Any reduction in grazing could eliminate a particular permitee. The Forest Service has nine allotments that sustain 7,110 animal unit months, with the highest level of cattle and sheep grazing occurring from June through October. To minimize conflicts between cattle and visitors, cattle are restricted from major visitor use areas until after Labor Day. The Bureau of Land Management has 18 grazing allotments, with approximately 59,200 animal unit months. Both agencies are currently inventoring and evaluating the range conditions to determine the number of animals that should be permitted to graze on each allotment.

The Forest Service has chained or mechanically removed perennial vegetation on 300 acres of the Silver Creek allotment and 1,800 acres on the Strawberry Creek allotment. An additional 100 acres in Murphy's Wash have been burned to increase range production. Range improvements by

the Bureau of Land Management will not be made until a grazing plan is completed in 1981. Other improvements in the study area include fencing small canals, improved springs, pipelines, and artificial water entrapments.

Cattle drive corridors in the study area are considered unclassified lands by the Bureau of Land Management. All BLM lands, including the corridors, are open to desert land entry filings, and private individuals are expected to file for and settle on these lands. As of July 1980, desert land filings (lands that must be used for agricultural purposes) totaled 26,000 acres within the study area.

Forest Uses

Although there is no commercial timbering within the study area, a number of other forest uses do occur, including Christmas tree cutting, gathering of firewood (dead and down timber), cutting of junipers for fence posts, and pinyon nut harvesting. In general, most of these forest uses occur where access is easiest and where slopes are no greater than 30 percent. Although the most heavily used forest lands are located in the general vicinity of Sacramento Pass, the other favorable timber areas near the Utah border receive heavy use.

Local residents are heavily dependent on the Snake Range for firewood. Chained areas are used intensively, but other portions of the study area are also used. A number of commercial operations cut Christmas trees on the Snake Range, primarily in the vicinity of Sacramento Pass. In 1979, the Bureau of Land Management authorized the cutting of 500 trees but observed that a large number of additional trees were also taken without permit. Firewood is also collected commercially, again usually by Salt Lake City operators who sell pinyon wood for approximately $160 per cord. Some unauthorized firewood cutting occurs, but not as much as Christmas tree cutting.

Fence post cutting occurs near O'Neill Peak, and pinyon nut gathering occurs primarily in the Sacramento Pass area. The Bureau of Land Management does not permit any cutting of the higher elevation tree species, but limited cutting of some of these trees may be allowed on an individual basis for local residents desiring to build log homes.

Other existing or proposed forest uses in the study area include collection of cedar duff for garden mulch and possible future use of pelletized wood to be burned with coal in the proposed new power plant near Ely.

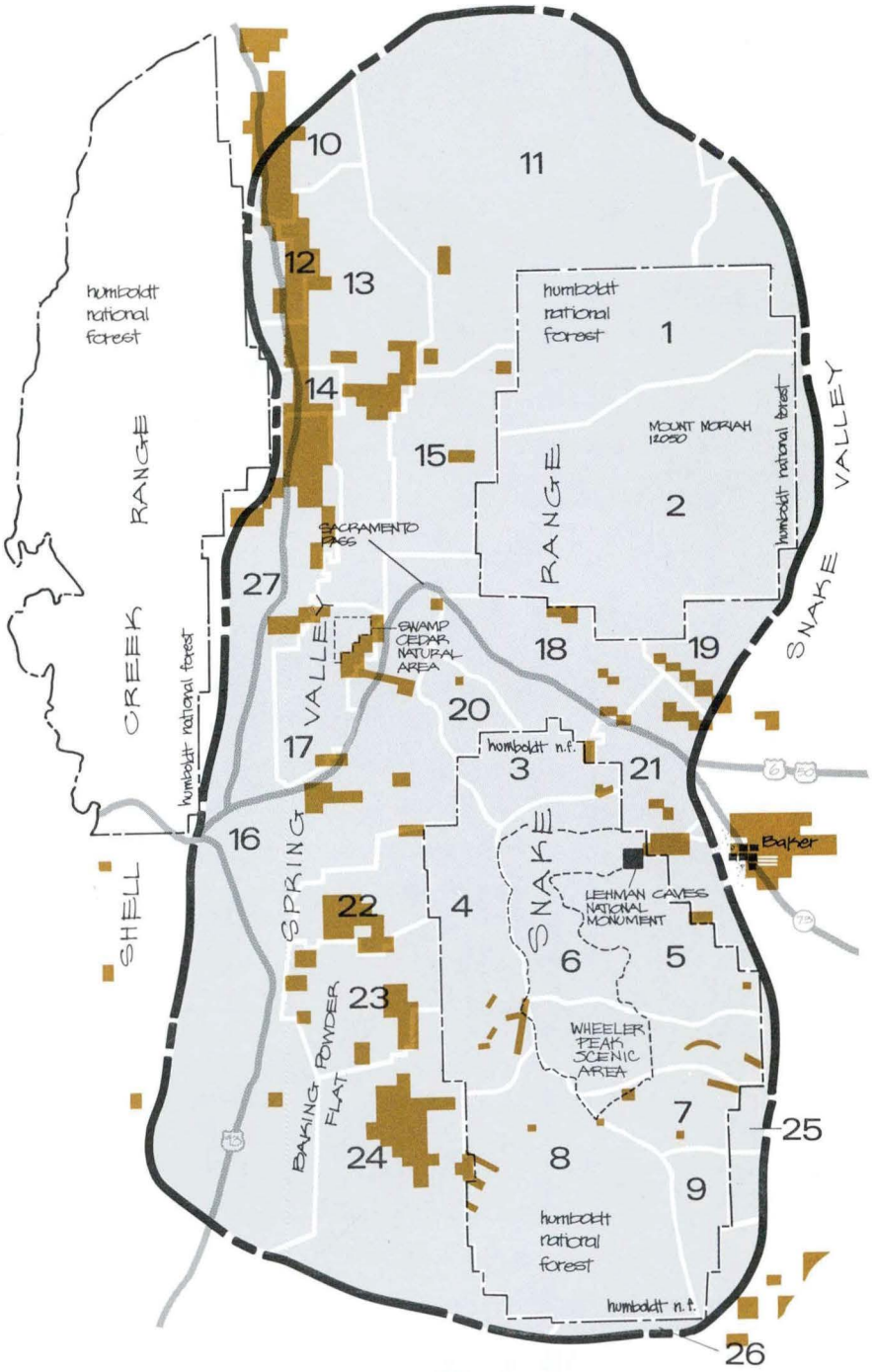
In summary, forest products of the Snake Range are collected over most of the accessible timbered portions of the study area, but use of public lands in the Sacramento Pass area for Christmas trees, firewood, and pinyon nuts are definitely more intense. On a national scale, overall use of forest products is limited when compared to other more densely wooded public lands near more heavily populated areas.

GRAZING ALLOTMENTS

FOREST SERVICE	Animal Unit Months *
1 - Rye Grass George Eldridge & Sons, Inc.	1,617
2 - Silver Creek - Moriah Ranches	871
3 - Strawberry Creek - Baker Ranches	657
4 - Shingle Creek - El Tejon Cattle Company	843
5 - Snake Community - Baker Ranches, Moriah Ranches, Owen Gonder	1,226
6 - Big Wash John Osborne	176
7 - Lexington Creek - Owen Gonder	503
8 - Murphy Wash - El Tejon Cattle Company	1,000
9 - Chokecherry Creek - Chester Wheeler	59
TOTAL	6,952

BUREAU OF LAND MANAGEMENT	
10 - Bassett Creek	1,561
11 - Munchy Creek	12,384
12 - McCoy Creek	508
13 - Taft Creek	1,831
14 - Stephen Creek	318
15 - Nigger Creek	3,727
16 - Willow, Majors & Cleveland	20,164
17 - Bastian Creek	1,778
18 - Sacramento Pass	1,694
19 - Smith Creek	4,140
20 - Strawberry Creek	1,971
21 - Baker Creek	4,313
22 - Williard Creek	1,132
23 - Scotty Meadows	1,227
24 - South Spring Valley	6,329
25 - North Chokecherry	770
26 - Hamblin Valley	8,177
27 - Cleveland Ranch	1,021
TOTAL	73,045

*Some of the allotments are only partially within the study area



NORTH

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STUDY AREA BOUNDARY

PRIVATE LAND (ALSO OCCURS WITHIN BLM AND USFS BOUNDARIES)

STATE LAND

BUREAU OF LAND MANAGEMENT (ALL OTHER AREAS)

U.S. FOREST SERVICE

3 GRAZING ALLOTMENT

GRAZING ALLOTMENTS

SNAKE RANGE / SPRING VALLEY GREAT BASIN

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

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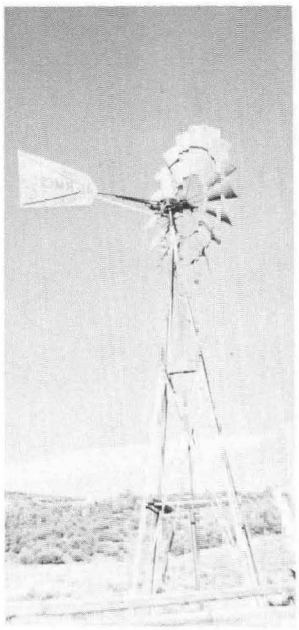
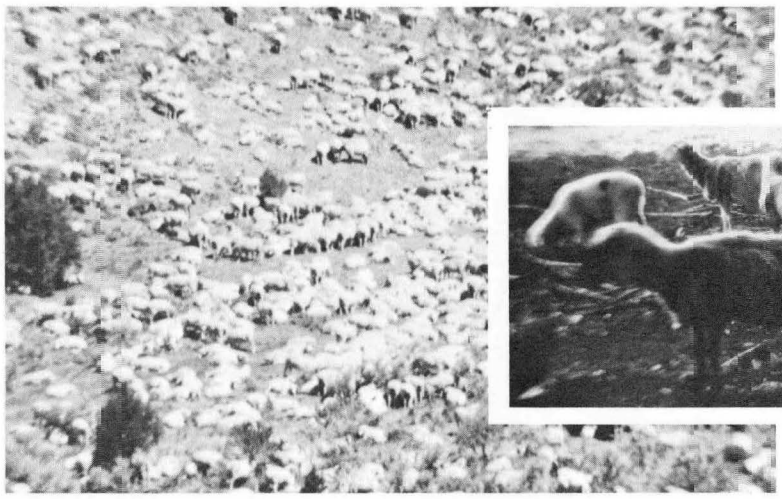
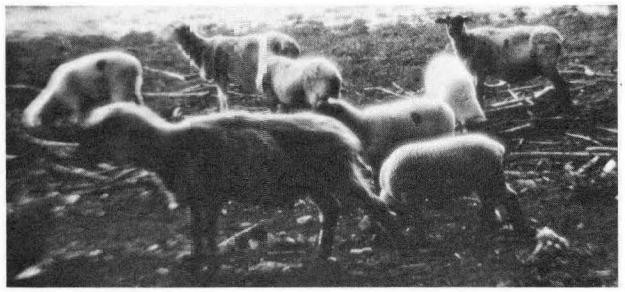
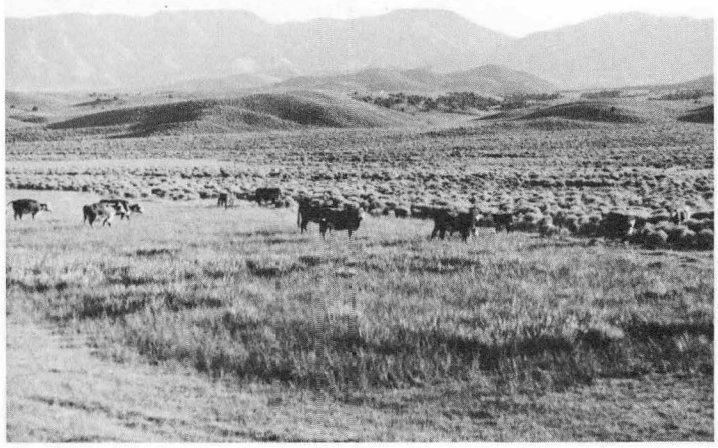
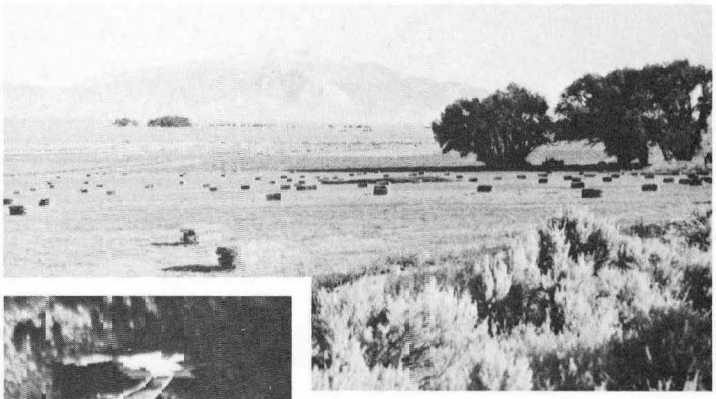
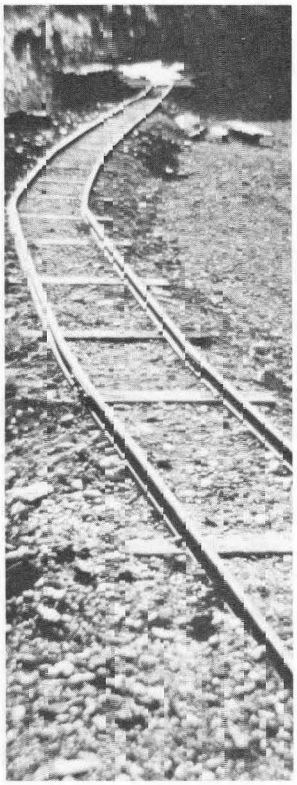


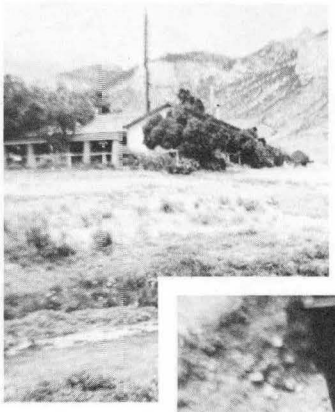


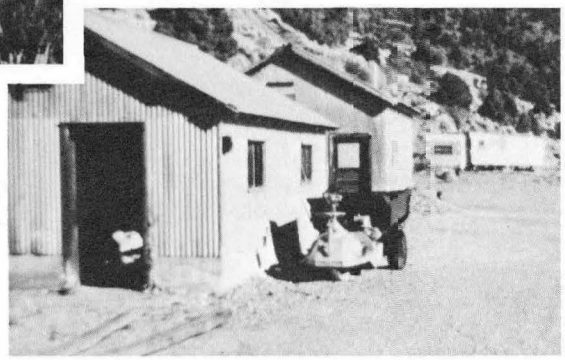


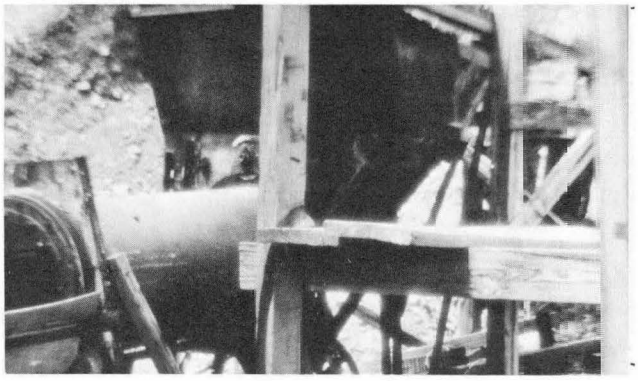












Military Defense and Utility Development

The MX missile project and Ely power plant could have major effects on land use patterns in White Pine County. The U.S. Air Force and the Bureau of Land Management are currently evaluating portions of 6 to 8 million acres in Nevada and Utah for the MX. The exact site and number of acres that must be withdrawn has not been determined as of January 1981, but the air force does project that approximately 12,000 acres will be fenced around the missile sites. Although portions of the study area are being assessed for the MX, it is currently unknown whether any sites will be located in the study area. Thus far the Department of Defense and its consultants have conducted surveys in the Spring and Snake valleys, and the draft environmental impact statement on the MX identifies major portions of both valleys as suitable for MX sitings. The proposed system, as illustrated in the draft environmental impact statement, would be located in a major portion of south Spring Valley as well as most of Snake Valley. Any sites chosen for the MX would be heavily impacted. The project is expected to require 10,000 miles of roads and 2,000 miles of railroad tracks.

Possible construction of a major coal-fired power plant near Ely could also affect land use in the study area. Potential locations that are currently being studied are Butte Valley, Smith Valley, and Steptoe Valley. At this stage of planning, Butte Valley, which is located northwest of Ely, appears to be the most likely location for the plant.

Currently a major east/west transmission corridor (one 230 kv line) bisects the study area over Sacramento Pass. Additional transmission lines may be located in this corridor, and possibly in south Spring Valley. Existing transmission lines may be upgraded to handle additional load, requiring more time and money.

Special Use Permits

There are a number of BLM and FS special use permits issued for road building, powerline easements, microwave stations, telephone relay stations, pipelines, and small water diversions and reservoirs. Application for and issuance of these permits is on an upward trend and will probably continue to increase with additional commercial activity.

ALTERNATIVES AND IMPACTS

ALTERNATIVES AND IMPACTS

The following alternatives have been identified by the interagency team as feasible ways of managing and protecting the study area's most significant resources, while providing educational, interpretive, and recreational opportunities. The alternatives are conceptual and should not be construed as comprehensive land use or resource management strategies. They are intended to provide general guidelines for possible future actions.

In developing these alternatives, a number of existing and proposed management models that could apply to the Great Basin were analyzed. These included the proposed legislation for Jackson Hole Scenic Area, legislation that created the New Jersey Pine Barrens National Preserve, and alternatives mentioned in new area studies such as Irvine Coast/Laguna Beach and the Columbia Gorge. In addition to these protective measures, the existing national landmark programs were analyzed.

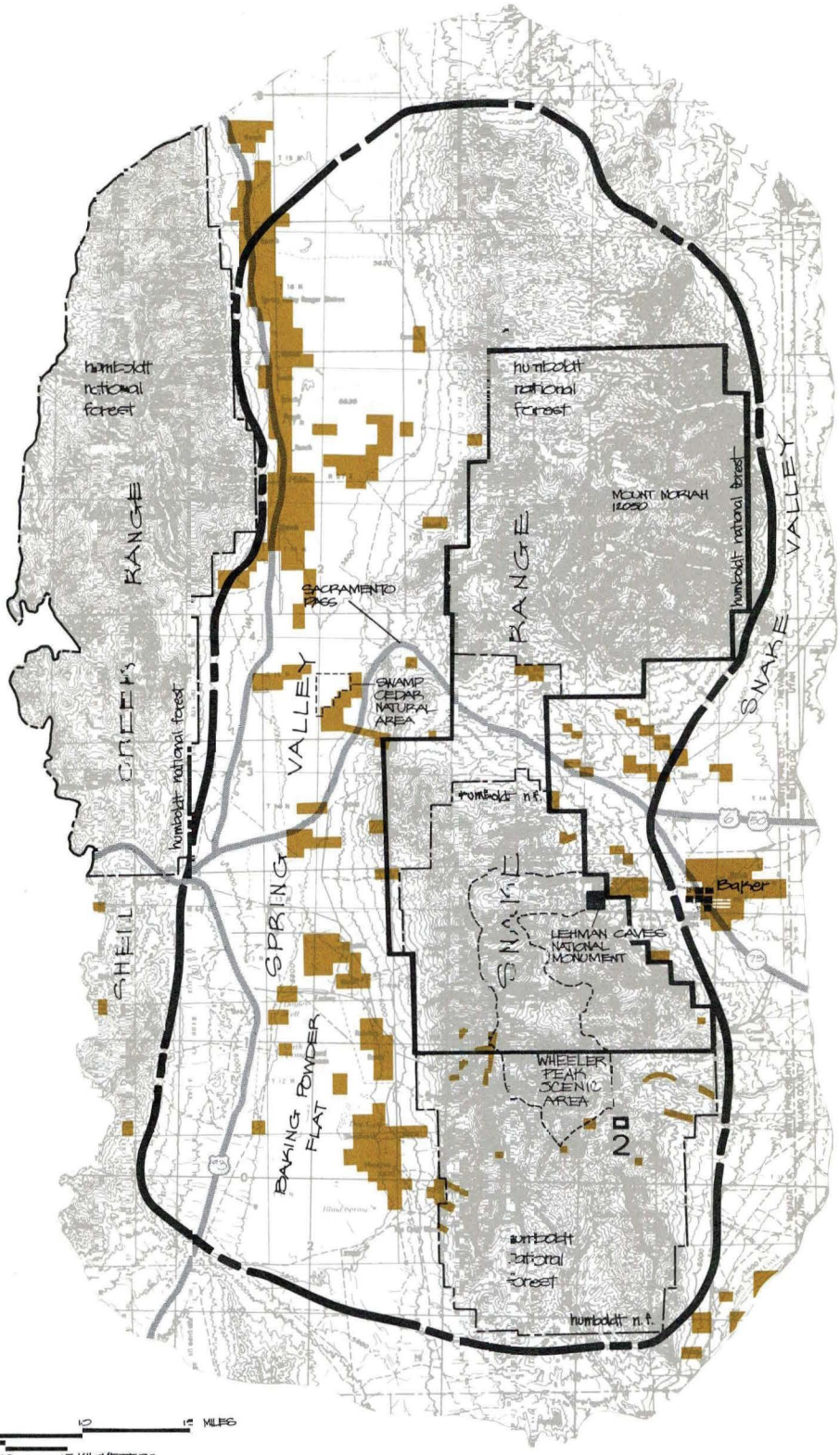
Several of the management strategies were found to be well suited to the Great Basin and have been incorporated into one or more of the alternatives. Each area, whether it be Jackson Hole or the Pine Barrens, has its individual characteristics and different concerns. Consequently, the following alternatives are designed to meet specific concerns and issues related to Great Basin. In addition to the present management programs, the alternatives range from small detached units within the study area to a number of sites scattered throughout California, Utah, and Nevada (the Great Basin physiographic region).

ALTERNATIVE I: CONTINUE PRESENT MANAGEMENT PROGRAMS

Under this alternative, planning, development, and management of the Great Basin resources within the Snake Range/Spring Valley study area would continue under the direction of the existing landowners and land managing agencies.

Legislation may be required to create specific designated areas as deemed appropriate. Multiple use would continue on lands administered by the Bureau of Land Management and Forest Service. Lehman Caves National Monument would continue to be managed by the National Park Service for the preservation and protection of its natural and cultural values.

Private land would not be affected, and the desert land entries would continue. All present and future resource uses and rights in the study area would be managed by the existing agencies. These uses would include, but not be limited to, grazing, mining, recreation, and forest products. Uses administered by the state of Nevada, such as hunting, fishing, trapping, and water rights, would not be affected. This alternative should not cause increased use of the area; however, the MX project, the proposed White Pine County power plant, and major mineral or energy discoveries could change these existing use patterns.



NORTH

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STUDY AREA BOUNDARY

PRIVATE LAND (ALSO OCCURS WITHIN BLM AND USFS BOUNDARIES)

STATE LAND

BUREAU OF LAND MANAGEMENT (ALL OTHER AREAS)

U.S. FOREST SERVICE

POTENTIAL NATIONAL NATURAL LANDMARKS

1. SNAKE RANGE / MT. MORIAH
2. LEXINGTON ARCH

ALTERNATIVE 1

SNAKE RANGE / SPRING VALLEY GREAT BASIN

UNITED STATES DEPARTMENT OF THE INTERIOR
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Planning (including wilderness considerations of 248,000 acres) for FS and BLM lands would continue. Changes in land use and/or levels of use (such as grazing intensity) would probably occur as the managing agencies analyze and monitor their respective resources and as the public provides input into updated plans.

Designation of the Snake Range, Lexington Arch, and Swamp Cedar as national natural landmarks within the study area is a possibility; however, this designation would not change present ownership, administration, or land use patterns. The Snake Range could continue to be considered for inclusion in the National Park System.

ALTERNATIVE 2: SNAKE RANGE/SPRING VALLEY DETACHED UNITS

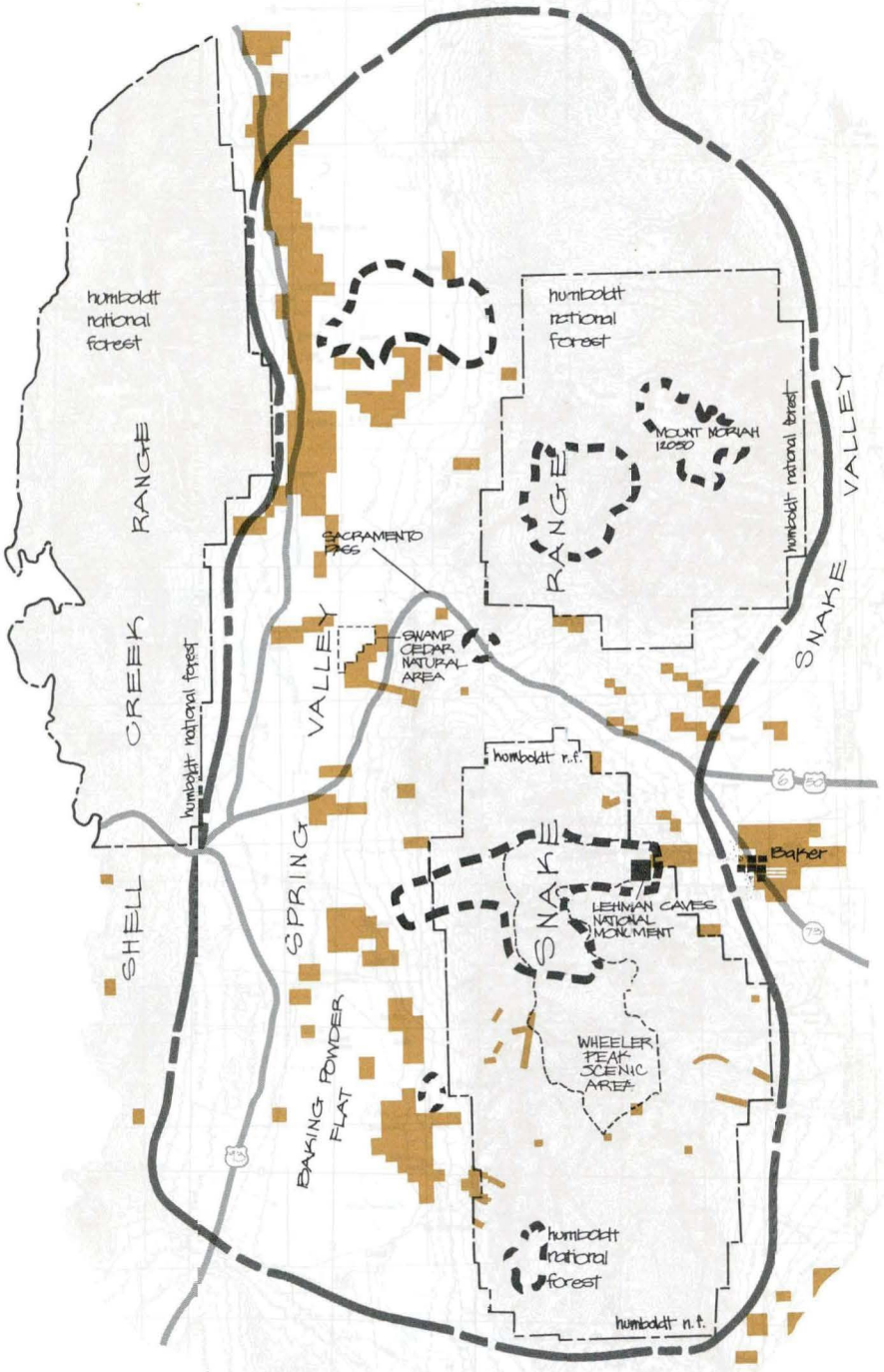
Under this alternative, the seven smallest feasible units (49,900 acres) of the study area that represent 23 of the 25 primary Great Basin natural and cultural themes would be identified, protected, and interpreted. Due to the dynamic character of the resources that reflect the mining frontier and cattlemen's empire themes, these values would remain in private ownership outside the seven units. Special designations for these units would be established, with emphasis on resource preservation and land use restrictions. This alternative would be implemented on a site-specific basis through legislation, interagency cooperative agreements, and/or administrative procedures. These units would continue to be managed by the current land management agencies, but resource protection would be the highest priority.

Acquisition of private lands and rights would be avoided wherever possible. Consumptive uses, such as mining, oil and gas development, grazing, and forest products, would not be permitted in the units. Valid existing rights for mining and oil and gas development would be acquired. The MX system would not be developed within these units, but it could possibly be located elsewhere in the study area.

Information and interpretive services would be expanded in the Lehman Caves/Wheeler Peak areas. Additional onsite interpretation of the natural and cultural values would be provided to help visitors understand and appreciate the Great Basin environment. Day and overnight use, including interpretation, camping, and backcountry camping, would continue to be provided. This alternative is not expected to cause a large increase in visitation, but greater protection and interpretation of significant resources would enhance visitors' appreciation of the Snake Range and Spring Valley as a representative example of the Great Basin environment.

ALTERNATIVE 3: SOUTH SNAKE RANGE AND NORTH SPRING VALLEY

Under this alternative two manageable units would be established. They would be managed under strong regulations, emphasizing resource preservation. The best and most representative examples of 20 of the 25 primary Great Basin natural and cultural resource themes would be protected, and recreational, educational, and interpetive opportunities



ALTERNATIVE 2

SNAKE RANGE / SPRING VALLEY GREAT BASIN

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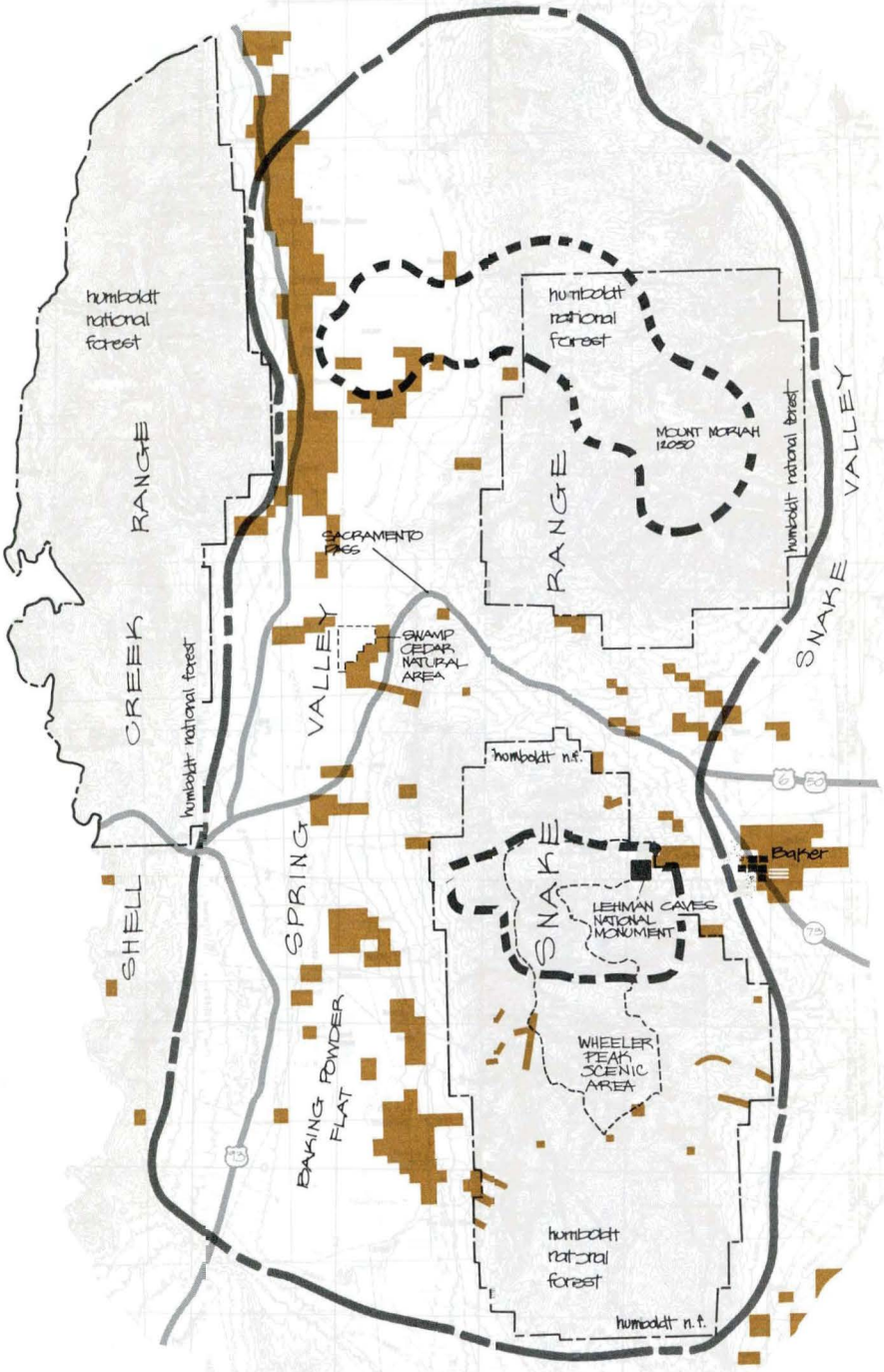

ALTERNATIVE 3

SNAKE RANGE / SPRING VALLEY
GREAT BASIN

UNITED STATES DEPARTMENT OF THE INTERIOR
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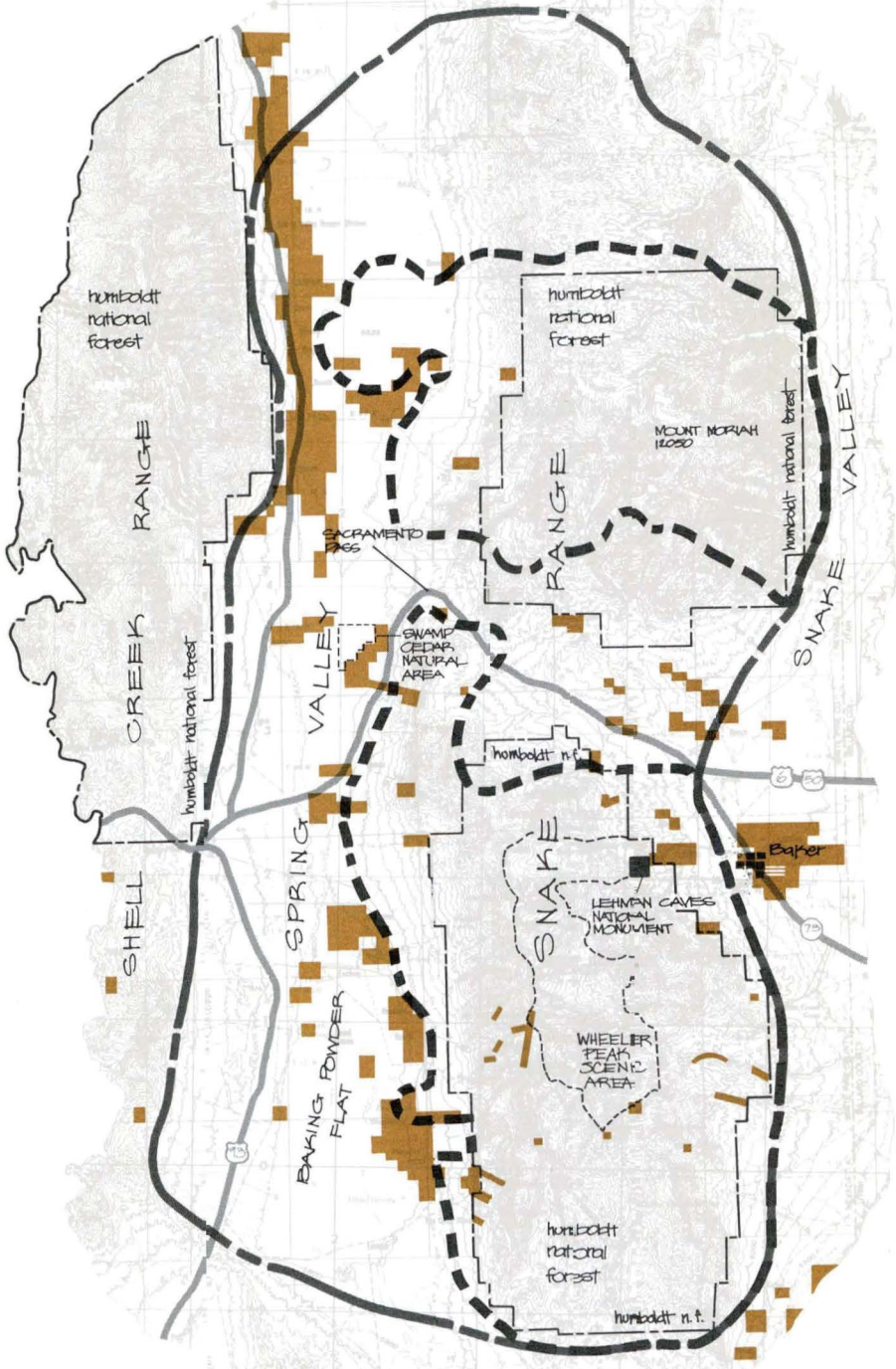
would be provided. The hot water, works of volcanism, and western trails and travelers themes are not included because they would require three more detached units. As in alternative 2, mining and the cattlemen's empire themes are not included because of their dynamic nature. It is hoped that these values would be perpetuated through private ownership. Legislation would be required to establish 27,600 acres in north Spring Valley and 59,700 acres in the south Snake Range. These areas would be the primary sites because the north Spring Valley has the best examples of basin resources, and the south Snake Range has the best mountain range. Mount Moriah and the north Spring Valley provide a representative sample of the Great Basin biological life zones and a progression in geologic landform from basin to range crest.

Acquisition of private lands would be avoided to the extent possible. If private interests were deemed necessary to accomplish the purpose of the area, they would be acquired through either fee, donation, easement, exchange, or transfer. All agricultural uses would be eliminated, and the area would be closed to future mineral entry and oil and gas development. Existing mineral rights and oil and gas leases would be acquired. Commercial and/or private forest products use and off-road vehicle use would not be permitted. Although the MX would not be constructed in these units, it could be constructed in the south Spring Valley.

Since the purpose of this alternative would be to preserve and interpret the Great Basin resources under strict regulations, the enabling legislation would establish the 87,300-acre area as a unit of the National Park System or as a special designation administered by the Bureau of Land Management or Forest Service. A possible designation would be establishment of an area of critical environmental concern managed by the Bureau of Land Management. Lehman Caves National Monument would be incorporated into this unit, and together with the facilities in the Wheeler Peak vicinity, would continue to serve as the focal point for visitors. Day and overnight facilities would be provided; activities would include interpretation, picnicking, hiking, camping, and backcountry use. The primary focus in the north Spring Valley would be on interpretation of the playa lake, ancient lake terraces, and desert ecosystems. Although the area would be designated an NPS unit, the Park Service would cooperate with other land managing agencies to ensure appropriate planning, development, and use of all lands within the study area.

ALTERNATIVE 4: SNAKE RANGE AND NORTH SPRING VALLEY

This alternative provides opportunities for perpetuation for all 25 primary Great Basin themes and a greater range of land uses than alternative 3. Legislation would be required to establish 106,700 acres in the north Snake Range and north Spring Valley and 286,800 acres in the south Snake Range. The area provides a better representation of the biologic life zones and geologic landforms, from basin to range crest, than alternative 3. The Mining and Cattlemen's Empire themes would be perpetuated through private ownership. Acquisition of private lands would be avoided to the extent possible. If private interests were deemed necessary to accomplish the purpose of the area, they would be acquired through such means as fee, donation, easement, exchange, or transfer.



ALTERNATIVE 4

SNAKE RANGE / SPRING VALLEY GREAT BASIN

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Although the purpose of this alternative is to preserve and interpret Great Basin resources, the enabling legislation would address traditional and current land uses. As part of the historic scene, ranching/grazing/crop production and associated rights would be permitted by legislation unless detrimental to the purpose for which the area was originally established. Mining is a historic use, and since valid patented and unpatented claims are protected by the 1872 mining law, it would be permitted subject to approved plans of operation. The area would be closed to future mineral entry. Land use applications and valid existing oil/gas leases would be honored subject to review and permit. Private and commercial forest products use would be subject to regulation. Off-road vehicle use and deployment of MX would be prohibited within these two units, but MX construction could occur within other portions of the study area.

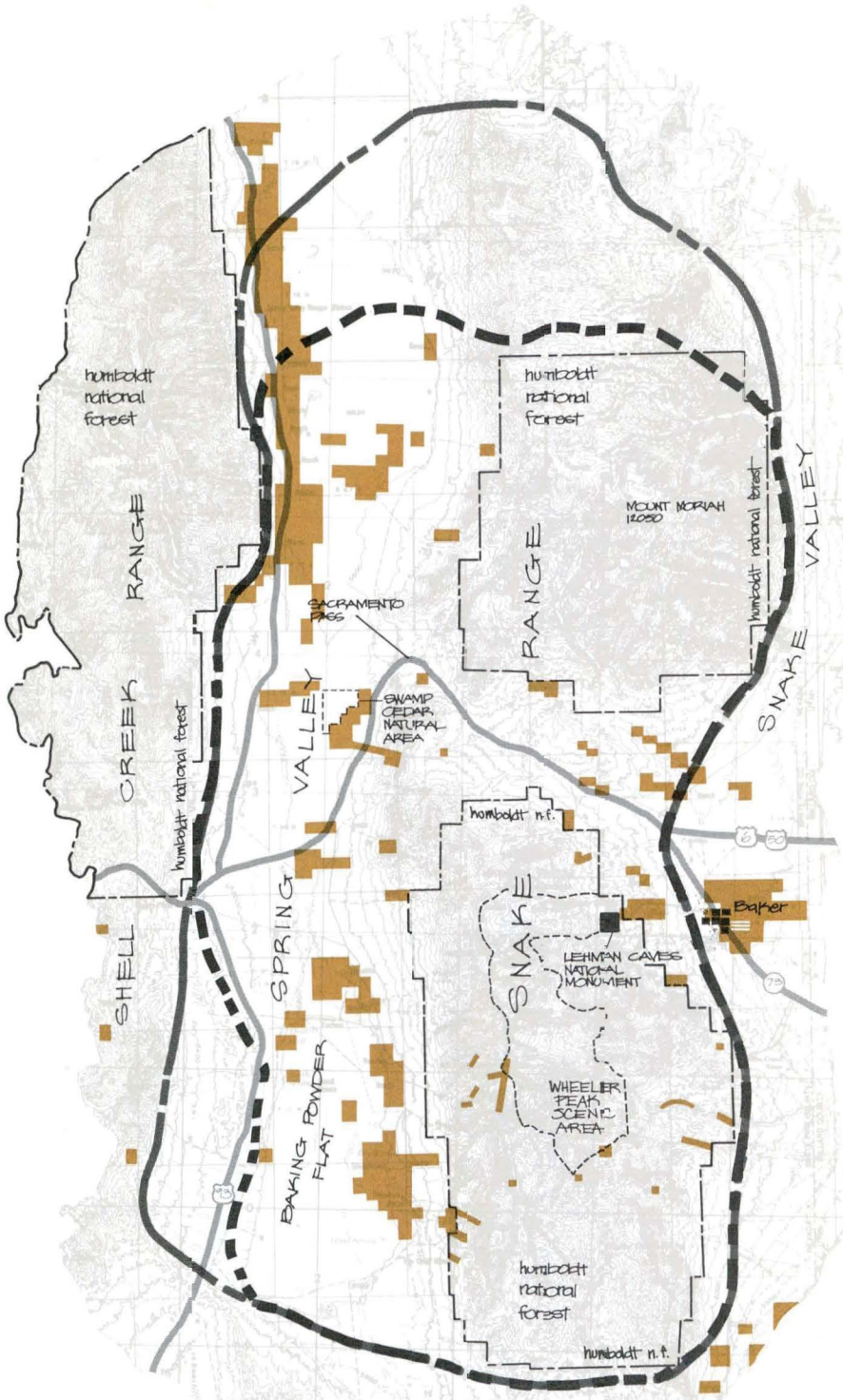
As in alternative 3, Wheeler Peak and Lehman Caves would continue to be the focal points for visitor use, providing opportunities for day and overnight use. The primary use of the northern section would focus on backcountry use and interpretation of the playa lake, ancient lake terraces, desert ecosystems, Mount Moriah, and the Moriah Table with its ancient bristlecones and tundra vegetation.

Under this alternative, there are numerous management options for the area. However, since most of the resources are nationally significant and over 95 percent of the area is under federal jurisdiction, all management options involve federal participation. The area could be managed by either the Forest Service, Park Service, or Bureau of Land Management. More restrictions would probably be enforced under NPS management, with greater emphasis on resource preservation.

ALTERNATIVE 5: SNAKE RANGE AND SPRING VALLEY

Under this alternative a large single unit is proposed with a management philosophy of multiple use similar to alternative 4. In order to protect the broad panoramic views and self-contained drainage patterns typical of the Great Basin, the large area (including a basin and range) has been delineated. All 25 primary Great Basin natural and cultural themes are represented in the area. Such an area would provide recreational, educational, and interpretive opportunities for the public and yet allow traditional land uses to continue. The Wheeler Peak/Lehman Caves area would continue to be the focal point for visitor use. Legislation would be required to establish the 664,900-acre area.

As stated under alternative 4, acquisition of private lands would be avoided and historic uses, such as ranching and mining, would continue unless these uses would be detrimental to the purpose for which the area was established. Proposed uses, such as MX, that are incompatible with the area's purpose would be excluded. The area would not be closed to mineral entry, and oil and gas development would continue, subject to approved plans of operation. The area could be managed by the Forest Service or Bureau of Land Management or both agencies. The National Park Service could not manage the area because the Mining in the Parks Act of 1976 (PL 94-429) closes all Park Service areas to mineral entry under 1872 mining laws.



ALTERNATIVE 5

SNAKE RANGE / SPRING VALLEY GREAT BASIN

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ALTERNATIVE 6: GREAT BASIN AREA OF NATIONAL CONCERN

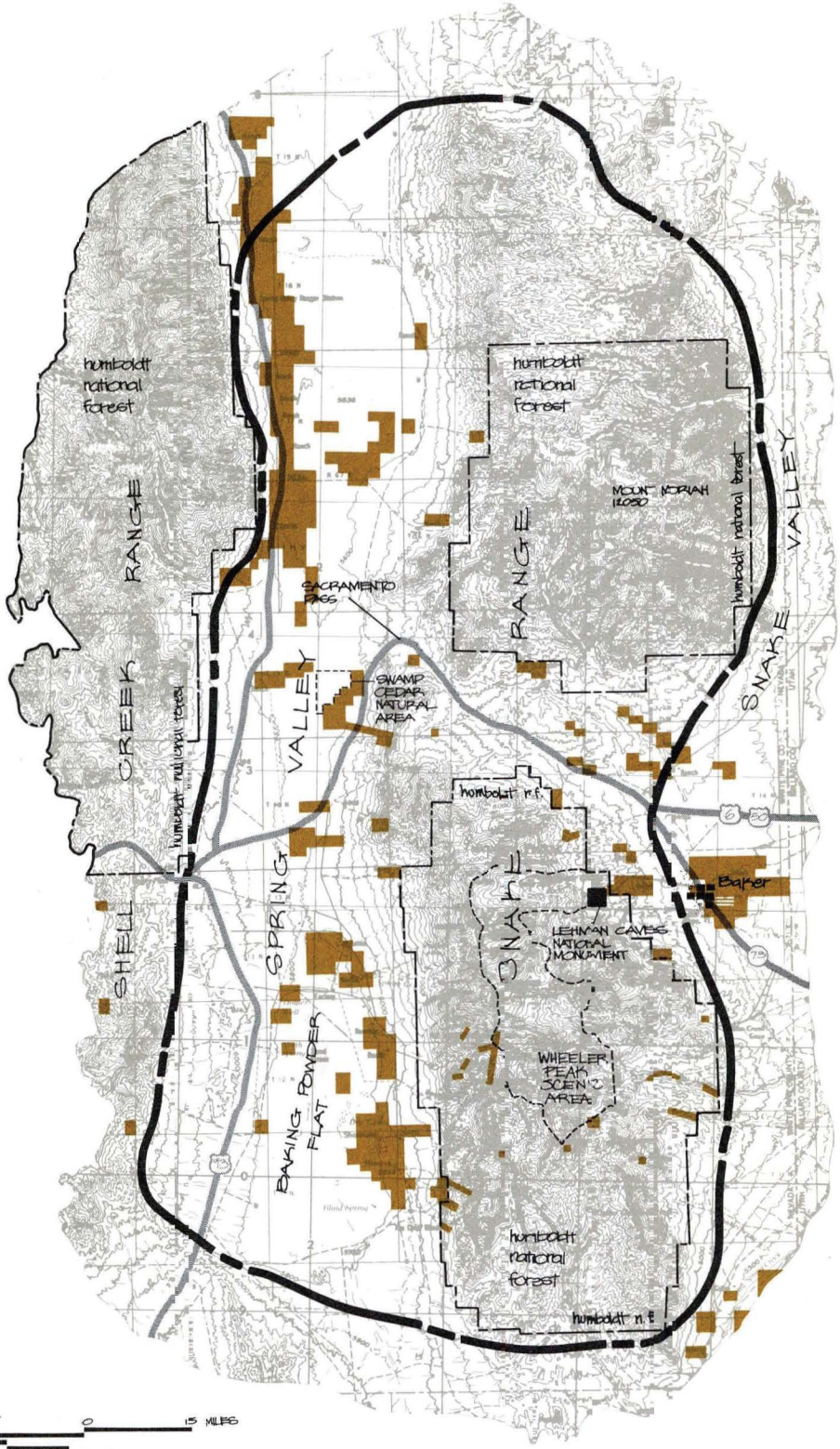
This alternative would recognize the protection, conservation, and restoration of identified major resource values representative of the Great Basin. It would allow orderly planned development and growth that would not adversely affect those resources for which the area was established. Recreational, interpretive, and educational opportunities for people to understand and appreciate the attributes of the Great Basin environment would be increased. In addition, it would recognize the present occupants and their lifestyles to be an integral part of the Great Basin setting and would encourage their perpetuation along with other resource features. It would also recognize that the area's present administration is effective in preserving the setting but also recognizes that change is inevitable, and that the integrity of the area might be threatened in the future.

In order to accomplish these objectives, legislation would be required to establish an 811,600-acre Great Basin Area of National Concern and to provide a financial and administrative framework for cooperative planning, development, and use of the area.

Lands and rights currently in private ownership would remain where feasible. If possible, where these rights must be acquired, techniques emphasizing less than fee acquisition would be employed. Uses such as mining, grazing, and crop production would continue as long as these uses do not jeopardize natural, cultural, recreational, and scenic values for which the reserve was established. Current land uses that conflict with these resource values would be restricted or eliminated. Proposed uses, such as MX, are incompatible with the area's purpose and would be excluded.

In order to accomplish this cooperative planning and management, an advisory commission would be established. There would be two options for creating the commission. Under the first option, the commission could be composed of representatives from the private sector and agencies with land use regulatory powers, including White Pine County, the state of Nevada, Bureau of Land Management, U.S. Forest Service, and Park Service. The second option would add representatives from the local public to the existing Land and Water Conservation Fund Policy Group that includes the Forest Service, Bureau of Land Management, National Park Service, Heritage Conservation and Recreation Service, and the U.S. Fish and Wildlife Service. This approach would provide the public with direct involvement on how the area should be managed and used.

An interagency team of professionals from the Department of the Interior, Department of Agriculture, and the state of Nevada would prepare a comprehensive plan for the area in cooperation with the advisory commission. Once the secretaries of the departments and the governor of Nevada approve the plan, the advisory commission would monitor the area on a regular basis to ensure that significant features of the Great Basin are not compromised. In addition, the commission would evaluate proposed land use modifications that would impact significant features and/or regional lifestyles. The secretaries and the governor would have final review and approval of all major land use changes. In case of disagreement, a majority shall constitute final authority.



ALTERNATIVE 6

SNAKE RANGE / SPRING VALLEY GREAT BASIN

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State and county governments would retain their present authority and responsibility but would be encouraged to modify their plans to complement the commission's comprehensive areawide plan. The Bureau of Land Management, U.S. Forest Service, and the National Park Service would continue to be responsible for managing their areas consistent with each agency's mission.

ALTERNATIVE 7: GREAT BASIN DETACHED UNITS

Recognizing that no single mountain range and valley provides outstanding examples of all of the major Great Basin resources, this alternative would protect and interpret a series of detached units which have been identified throughout the Great Basin physiographic region.

Implementation would entail a focal point such as the Lehman Caves/Wheeler Peak area which could provide exhibits, multimedia presentations, printed materials and tours to interpret the Great Basin. Units representing various Great Basin resources would be selected. Whenever possible these units would be located on existing public lands, such as state parks, BLM, FS, and NPS areas which have already been developed for recreation and/or interpretation. Private lands would be avoided whenever possible. If private interests were deemed necessary to accomplish the purpose of the units, they would be acquired through such means as fee, donation, easement, exchange, or transfer. Other selective factors would include site quality, accessibility, and number of resources represented within an area.

Consumptive uses, such as mining, oil and gas development, ranching, and forest products would be permitted only where these uses do not jeopardize the integrity of these management units. Proposed uses, such as MX, are incompatible with the unit's purpose and would be excluded. Although valid existing mining rights would continue subject to regulations, no further mineral entry would be permitted.

In cooperation with the other land managing agencies, the National Park Service and the Heritage Conservation and Recreation Service would prepare a comprehensive plan for the development, management, and use of the individual units. This plan would be implemented through legislation, cooperative agreements, and/or administration procedures. These areas would continue to be managed by the current land management agencies, but protection would be the highest priority for these special units. Since these resources would represent the Great Basin in the NPS Plan, the Park Service would be responsible for cooperating with the existing land managing agencies to monitor these areas.

The planning team has tentatively identified 26 sites that could represent the Great Basin, which are shown on the following map. These are intended only as suggested sites; the final ones would have to be selected and agreed upon by the previously mentioned agencies. A description of each site is in appendix E.

ALTERNATIVE 7

GREAT BASIN DETACHED UNITS

SNAKE RANGE / SPRING VALLEY
GREAT BASIN

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IMPACTS

Major impacts associated with the study area's significant natural, cultural, and scientific resources and the socioeconomic considerations are shown on the following table.

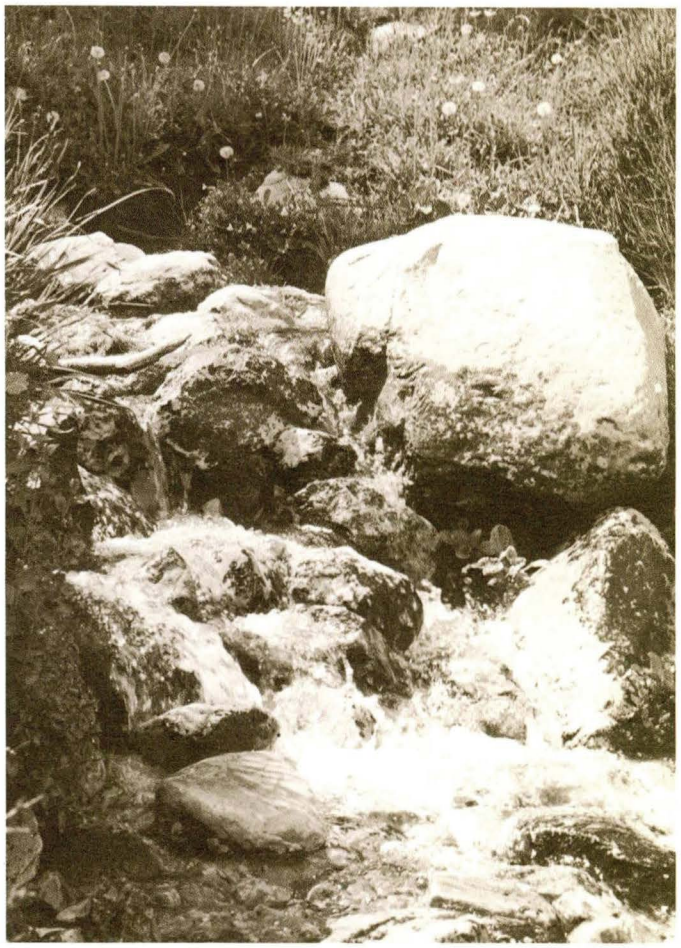
TABLE 4. IMPACTS OF ALTERNATIVES

IMPACT CATEGORY	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5	ALTERNATIVE 6	ALTERNATIVE 7
Private Land	No effect.	No effect.	400 acres of private land in north Spring Valley and all could be acquired.	4,300 acres of private land in area, with acquisition of 480 acres anticipated.	36,500 acres of private land in area, with acquisition of 1,500 acres anticipated.	Total amount of private lands would be determined by the proposed interagency commission's land-use plan.	Acreage unknown until specific areas were selected; purchase of minimum private lands anticipated.
Acquisition Costs (Based on $500 to $2,000 per acre, excluding valid existing claims)	None.	Costs for acquisition of valid existing mining and oil and gas rights would require a detailed appraisal study.	Acquisition costs, excluding valid patented and unpatented mining claims, would range between $200,000 and $800,000; costs on mining rights would require a detailed appraisal study.	Same as alt. 3, but slightly more private land if 480 acres acquired. If all the private land is acquired, costs would range between $240,000 and $960,000.	Acquisition cost would range between $750,000 and $150,000,000.	Amount of private lands to be acquired would be determined by commission's land-use plan.	Acreage unknown until specific areas were selected; minimum acquisition costs.
Tax Revenue	No tax loss.	Some taxes could potentially be lost by the removal of up to 52,000 acres of federal land from multiple use.	Taxes could potentially be lost on 400 acres of private land, and 48,000 acres of federal land would be removed from multiple use.	Taxes could potentially be lost on up to 4,300 acres of private land; anticipated loss would be on 480 acres. Losses could also be incurred by the removal of 389,200 acres of federal land from multiple use.	Taxes could potentially be lost on up to 36,500 acres of private land; anticipated loss would be on 1,500 acres. Losses could also be incurred by the removal of 528,400 acres of federal land from multiple use.	Tax loss would be determined by commission's land-use plan.	Acreage unkown until specific areas were selected; minimum tax loss.
Grazing & Agricultural Crops	Some reduction of animal unit months is anticipated under the existing agencies current management.	Portions of nine allotments would be further regulated, resulting in a small reduction of grazing; two allotments would be reduced substantially.	Small portions of four and major portions of two allotments would be eliminated.	Grazing allotments in area would not be affected unless it was detrimental to resources for which the area was established.	Same as alt. 4.	Same as alt. 4.	Exact number of allotments unknown--small reduction in grazing would occur on individual Great Basin-wide sites.
Mining	No effect on current or or anticipated mining activities.	49,900 acres would be closed to further mineral entry; valid mineral rights in the detached units would be acquired.	87,300 acres would be closed to further mineral entry; valid mineral rights would be acquired.	393,500 acres closed to further mineral entry; valid mineral rights would be honored subject to approved plans of operation.	Area would remain open to mineral entry; mining activities might be regulated in local areas.	Same as alt. 5.	No effect on mining unless it jeopardized the resources for which the area was established.
Oil and gas/energy	No effect.	Valid existing leases and lease applications would be acquired; 49,900 acres would be closed to further leasing.	27,600 acres in north Spring Valley would be closed to oil and gas exploration and further development. Existing leases would be acquired.	Same as alt. 3, except that existing oil and gas leases would be permitted to continue, subject to review and permit.	Exploration and development would be permitted, but existing leases and lease applications would be subject to review and approval.	Same as alt. 5.	Subject to specific agency regulations unless it jeopardized the resources for which the area was established.
Forest Products	No effect.	No effect; firewood gathering in Miller Basin would continue.	Use would be eliminated in Young and Pole canyons; other nearby areas would get increased use.	Use would not be eliminated but would be subject to further agency regulation.	Same as alt. 4.	Same as alt. 4.	Subject to agency regulations unless uses jeopardizes the resources for which the area was established.
Water Rights	No effect.	No effect.	No effects, unless water rights were included in private land acquisition.	Same as alt. 3.	Same as alt. 3.	Same as alt. 3.	Same as alt. 3.
Trapping and hunting	No effect.	Subject to further agency regulation.	Use would be eliminated.	Same as alt. 2.	Same as alt. 2.	Same as alt. 2.	Same as alt. 2.
Fishing	No effect.	No effect.	No effect, except the number of fishermen could increase because area designation could increase use.	Same as alt. 3.	Same as alt. 3.	Same as alt. 3.	No effect.

IMPACT CATEGORY	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5	ALTERNATIVE 6	ALTERNATIVE 7
Natural Resources There are 19 primary Great Basin natural themes (12 of these are critical) nine state sensitive plant species, four federally endangered wildlife species, and three state rare or endangered species). Under all alternatives the rare, threatened, and endangered plants and animals would continue to be protected by federal and state legislation.	The area is under multiple use; existing agencies have management mechanisms and authorities to protect the primary Great Basin resources, although management strategies include options other than strict resource preservation.	Protection of representative examples of all Great Basin primary and critical natural resources would be possible, however, it would be difficult to protect total ecosystems.	Examples of most significant Great Basin resources would be protected. The following 3 critical Great Basin themes would be absent--hot water, volcanism, and earthquake phenomena. In addition, two primary themes - Silurian/Devonian and Mississippian/Permian (periods of geologic history) would not be represented.	Same as alt. 2, except continuation of some multiple uses could affect the degree of resource protection.	Same as alt. 2, except continuation of multiple uses would probably lessen the degree of protection.	All Great Basin primary and critical resources would be represented but no assurance of level of protection until commission completed management plan and administering agencies implemented it.	Representative examples of Great Basin resources would be protected; degree of protection would depend upon effectiveness of individual management agencies.
Cultural Resources There are 6 primary Great Basin cultural resource themes (3 of these are critical). Mining Frontier and Cattlemen's Empire are critical themes, but due to their dynamic nature they cannot be frozen in time to fill theme voids and could remain in private ownership in all alternative.	The area is under multiple use; existing agencies have management mechanisms and authorities to protect the primary Great Basin resources, although management strategies include options other than strict resource preservation. Increased use and limited staff on public lands encourages pothunting. Where significant disturbance is anticipated by an activity, the current agencies conduct surveys to determine if archeological sites are present; if present, other alternatives are considered to eliminate or minimize conflict to these resources.	Although Mining Frontier and Cattlemen's Empire are not included, existing private ownership would continue. Regulated levels of exploration and development would lessen impact on pothunting. If grazing continued, unknown archeological resources could be destroyed.	Same as alt. 2. Interpretive development would help preserve known cultural resources from grazing and pothunting. Strict enforcement would protect known and unknown cultural resources.	Mining Frontier included, but Cattlemen's Empire theme would be represented by private ownership. Impact could be slightly higher than those outlined under alt. 2, depending on the location and regulation of uses such as mining and grazing.	Same as alt. 4; all six primary resource themes would be represented within areas boundaries.	Same as alt. 5.	Same as alt. 5.
Scenic Resources	Scenic areas have been designated in the study area. Although scenic values have the highest priority in these areas, they are still open to consumptive uses such as mining.	The areas protected are small and thus management would have minimal effects on overall scenic values at the study area unless regulations were established on land within the Snake Range viewshed.	Same as alt. 2.	Same as alt. 2, except area would be much larger.	There are no assurances that the scenic values of the Great Basin would be protected but a management framework would be created to protect the scenic qualities.	Same as alt. 4.	Same as alt. 4.
Recreation, Interpretation, and Education	No anticipated increases unless demand warrants further development.	Moderate increases in interpretation and education.	Moderate increases in interpretation, recreation, and education.	Same as alt. 3.	Same as alt. 3.	Moderate increases in all three would be possible, depending on goals of commission's management plan.	Substantial increase in interpretation and education, moderate increases in recreation.
Wilderness	Wilderness study will continue.	Same as alt. 1, except the boundaries of the wilderness area might change slightly.	Same as Alt. 2.	Same as Alt. 2	Same as alt. 2.	Same as alt. 1 unless commission's plan recommended otherwise.	Same as alt. 1.
Air Quality	No effect on air quality reclassification.	Same as alt. 1.	Same as alt. 1.	Same as alt. 1.	Same as alt. 1.	Same as alt. 1.	Same as alt. 1.

IMPACT CATEGORY	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5	ALTERNATIVE 6	ALTERNATIVE 7
Potential MX System	MX could be constructed in the study area after NPS study is completed; secondary effects such as increased recreational demands, dust, reduction in the water table, and degradation of visual quality could occur even if MX was not constructed in study area.	Same as alt. 1.	No MX in north Spring Valley; however, it could be built in south Spring Valley with possible secondary effects in north Spring Valley and Snake Valley (see alt. 1).	Same as alt. 3.	No MX development in Spring Valley; however, secondary effects could occur from nearby MX activities (see alt. 1).	Same as alt. 5.	Development would not be permitted on Great Basin-wide sites; possible secondary effects would be the same as alt. 1.
Visitation	No effect from study, but if MX were constructed, visitation and recreational demands would increase.	Slight increase in visitation; impact from MX same as alt. 1.	Moderate increase in visitation; impact from MX same as alt 1.	Slight to moderate increase in visitation; impact from MX same as alt. 1.	Same as alt. 4.	Same as alt. 4.	Same as alt. 4, except increase would be dispersed over a larger area.
Development and Maintenance Costs*	No significant increases in current development or yearly operation and maintenance costs would be incurred unless visitation increased substantially.	Development costs would range between $400,000 and $450,000; yearly maintenance and operational costs would range between $400,000 and $500,000, depending on the size and scale of development.	Development costs would range between $800,000 and $900,000; yearly maintenance and operational costs would range between $400,000 and $500,000, depending on the size and scale of development.	Development costs would range between $1,500,000 and $1,600,000; yearly maintenance and operational costs would range between $500,000, and $600,000, depending on scale and size of development.	Same as alternative 4, except the maintenance and operational costs might be slightly more because of the potential for future mining.	Same as alternative 4, except costs incurred by the Commission would be an additional $50,000 per year.	Development costs would range between $2 and $5 million, depending on the number and location of the sites finally selected; yearly maintenance and operational costs would range between $800,000 and $1.5 million, depending on scale and size of development.
White Pine County Power Plant	No direct effect from power plant; secondary effects from increased recreational demands.	Same as alt. 1.	Same as alt. 1.	Same as alt. 1.	Same as alt. 1.	Same as alt. 1.	No effect. May have several local effects on sites in Spring Valley and Snake Range.
Current Management	No effect	Existing management would continue but up to 49,900 acres would be withdrawn from multiple use.	If the FS did not manage this area, the remaining fragments of the Snake and Moriah divisions of Humboldt National Forest would be difficult to manage by the FS and would probably be turned over to BLM.	If NPS managed the area, the FS would be left with three small unmanageable land fragments; these would probably be turned over to BLM. If existing agencies continued to manage their existing jurisdiction, there would be a strong emphasis on resource preservation.	Existing agencies would continue to manage the area in accordance with the requirements put forth by the establishing legislation. Although multiple uses would continue, there would be a greater emphasis on resource protection than is currently taking place.	Existing agencies would continue to manage lands under their present jurisdiction, but in accordance with the mutually developed comprehensive plan for the study area.	Existing agencies would manage the individual areas, but emphasis would be on preservation of resource values.

*All costs are subject to change pending more detailed data



APPENDIXES

95th Congress, 1st Session - - - - - - - - - - - - - - House Document No. 95-264, Part VII

PROPOSED GREAT BASIN NATIONAL PARK, NEV.

Submitted as an accompanying part of the

COMMUNICATION

FROM

THE SECRETARY OF THE INTERIOR

TRANSMITTING

REPORTS ON STUDIES OF NEW AREAS WITH POTENTIAL FOR INCLUSION IN THE NATIONAL PARK SYSTEM

NOVEMBER 15, 1977.—Referred to the Committee on Interior and Insular Affairs and ordered to be printed

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U.S. GOVERNMENT PRINTING OFFICE

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A GREAT BASIN NATIONAL PARK

Our recommendations for a Great Basin National Park are not as explicit as those outlined for a Mohave Desert National Park. For the Mohave Desert we feel that there is only one logical choice and that is Death Valley and three valleys adjacent to it. For an area to represent the Great Basin north of 37° latitude there are several choices. We considered four: the Snake Range, the White Mountains, Railroad Valley and Monitor Valley.

Snake Range:

This is the area proposed and considered for a Great Basin National Park (NPS, 1959). It includes six areas that we have proposed as Natural Landmarks: Lexington Arch, Spring Valley Swamp Cedar, Spring Valley White Sage Flat, Shoshone Pygmy Sage Natural Area, Mount Moriah, and Wheeler Peak Scenic Area. The latter two are truly outstanding and are priority 1.

We agree that this area ranks first for scenic grandeur. However, a number of objections have been raised to making it a National Park; these need to be considered. It is rather small for a National Park, 147,000 acres; some private land, 2,600 acres, would need to be acquired or there would be the problem of in-holdings; the Federal land is mostly under the administration of the Forest Service (124,200 acres) which would require an inter-department transfer; the area as a whole is not remote back-country, it is comparatively well developed and there would be a number of conflicting uses and here strong local opposition to excluding these uses. All of this is a matter of record in the Public Hearings on this proposal.

We addressed ourselves only to the question: How well does this area represent the natural features of the Great Basin?

Three of the study team members are immigrants from the Rocky Mountains. We feel right at home here; we love the Snake Range, but regretfully, we have to answer that it is not very representative of the Great Basin.

The Snake Range is of limestone and limestone mountains occur only along the eastern edge of the Great Basin. And being at the eastern edge it is far removed from the rain shadow of the Sierra Nevada which is a dominant influence in the ecology of the Great Basin. For example, the boreal forest is alpine fir and Engelmann spruce; this is the typical boreal forest of the Rocky Mountains and is not found west of the Snake Range.

Some of the landforms that are characteristic of the Great Basin are absent. There are no examples of the works of volcanoes, nor or hot water phenomena.

White Mountains:

The White Mountains are the highest in the Great Basin, and have many outstanding natural features. These are summarized in our synopsis which appears in Chapter 3. The area we considered is roughly the same as that we proposed as a Natural Landmark.

It is mos y Federal land, but it is admi stered by the Forest Service a making it a National Park would require an inter-department transfer. There is not much opportunity to expand the proposed area. However, we are concerned primarily with the question: How well does the White Mountains represent the natural features of the Great Basin? This is an outstanding area (we give it priority 1 as a proposed Natural Landmark); but again our answer has to be: not very representative.

The White Mountains are granite, and granite mountains occur only along the west edge of the Great Basin. They are adjacent to the Sierra Nevada Range and hence the rain-shadow effect is intense. But they are so much loftier (almost a mile higher) than the more typical Great Basin ranges of central Nevada, and the increased elevation is somewhat compensating. However, the vegetation of the White Mountains is definitely Great Basin and not Sierran.

Our main objection to the White Mountains as a Great Basin National Park is that they lack some of the features that characterize the Great Basin. There are no playas or playa lakes, nor sand dunes. There are no examples of the works of volcanoes, nor of hot water phenomena.

Since the two superb mountain ranges at either edge of the Great Basin do not typify the Great Basin, it is obvious that we need to look at the thinly popu'ated and little known central Nevada to find a more representative area of the Great Basin.

Railroad Valley:

This may be a poor name for a huge chunk of country (roughly a million acres) that takes in the Grant Range, the Pancake Range, the Hot Creek Range and the two valleys between them. This is in the heart of the Great Basin and represents well its natural features. It includes four areas we have proposed for Natural Landmarks: Troy Peak-Hooper Canyon, Lunar Crater, Morey Peak, and Hot Creek Range and Valley. Lunar Crater is a registered Natural Landmark; the other three are all priority 1.

The Grant Range is a limestone range in which the lower strata, Early and Middle Cambrian, are recumbent folds of metamorphosed sediments. Several thousand feet of Cenozoic conglomerate and silicic volcanic rocks overlie the Paleozoic limestones. There are a several deep narrow canyons with shear walls. These may be the work of glaciers.

In contrast the the Grant Range which rises to a maximum height of 11,300 feet at Troy Peak, the Pancake range is a long, low (about 8,000 feet), narrow, volcanic fault-block mountain so typical of Great Basin ranges. Questas are rare in the Great Basin and the Pancake Range contains the only examples known to us. At the south end of the Pancake Range is Lunar Crater, a

large maar, which is a registered Natural Landmark. In the vicinity are a number of cinder cones and fine examples of recent lava flows.

Between these two ranges is a typical structural depression, Railroad Valley. The low part of Railroad Valley is a large, typical playa. In a sump near the north end, there is a remnant saline lake that is good waterfowl habitat, the Railroad Valley Wildlife Management Area. A number of large springs originate around the edge of the playa and provide a habitat for endemic desert fish (Hubbs & Miller, 1948b).

Between Pancake Range and Hot Creek Range is a typical Great Basin structural valley. Hot Creek Valley was transferred from BLM to AEC for use as the Central Nevada Test Site. Four deep holes were drilled; only one device was detonated. These tests were moved to Amchitka Island, and we believe that Central Nevada Test Site has been abandoned and will be returned to BLM. The nuclear test was completely contained and there is no radioactive contamination in Hot Creek Valley.

Hot Creek gets its name from its large thermal spring, and there are others. Warm Springs might be a good site for the Park entrance and headquarters. Hot Creek Range is a fine example of a typical Great Basin volcanic mountain, and its highest point, Morey Peak, is magnificent. Beauty is a purely personal evaluation, but at certain seasons and for some people, Morey Peak may excell even Wheeler Peak for rugged beauty. If we consider a playa to be a plain, then nearly all landforms are represented; only caves, sand dunes and meteor impact sites are absent. There are no outstanding fossil sites known to us, but ecological themes are well represented.

Monitor Valley:

North and west of the area designated as Railroad Valley, is another million acre block that meets the criteria for a Great Basin National Park. This is the Monitor Range and the Toquima Range and the valley between them. It contains good examples of nearly all of the inland landforms except cuestas and hogbacks and sand dunes. It includes two areas we have proposed for Natural Landmarks: Mount Jefferson and Dianas Punch Bowl.

Plateaus and meases are uncommon in the Great Basin, but both of these ranges are flat topped. They are otherwise typical volcanic, fault-block mountains; there are other examples of the works of volcanoes. Dianas Punch Bowl is perhaps the finest and most spectacular example of hot springs in the Great Basin, and this area has several other examples of hot water phenomena. These ranges have been glaciated (Muir, 1918) and abound in spectacular canyons. There is a large playa in Monitor Valley. The Toquima Range even has a noted cave.

Great Basin ecology is well represented. There are examples of all land ecosystems typical of the Great Basin from alpine tundra to deserts. There are several mountain streams. Most of the land is in federal ownership, although both mountain ranges are part of the Toiyabe National Forest and would require an inter-department transfer. Monitor Valley is administered by BLM.

APPENDIX B

REPORT ON STUDIES OF NEW AREAS WITH POTENTIAL FOR INCLUSION IN THE NATIONAL PARK SYSTEM

by

Vernon Bostick

As we pointed out at the conclusion of our regional study for the Natural Landmarks Program, it is not easy to find in an area of reasonable size (a million acres) all of the natural features that exemplify the Great Basin. At that time we considered four areas as having potential for inclusion in the National Park System. This report considers three additional areas and summarizes all seven.

Big Smoky Valley

This area in central Nevada includes the Toquima Range and the Toiyabe Range and the north half of Big Smoky Valley which lies between them. The Toquima Range was included in the area previously reported as Monitor Valley. At that time (1975) Monitor Valley was chosen over Big Smoky Valley because it was less developed with less private land and because it included Diana's Punch Bowl, the Great Basin's finest hot spring. At that time Round Mountain in Big Smoky Valley was bustling but there was no mining activity in Monitor Valley.

If the boundaries in Big Smoky Valley are drawn to exclude Round Mountain on the south and the Kingston Canyon development on the north, then Big Smoky Valley does not have more economic conflicts than Monitor Valley.

Big Smoky Valley is the most impressive structural depression in the Great Basin; it extends for more than one hundred miles. The north half which is within the boundaries of the proposed National Park is a bolson. Therefore, it meets the criteria, "A park in the Great Basin should have at least one complete internal drainage system to exemplify the overall character of the entire Great Basin drainage."

Both the Toquima and Toiyabe ranges are typical of the Great Basin. Of the 200 mountain ranges in the Great Basin, the Toiyabe Range ranks about fifth for elevation, length, and scenic grandeur. Arc Dome, the highest point, is higher than any peak in the Ruby Mountains and only 100 feet lower than the highest crest of the Schell Creek Range. Mount Jefferson is higher than either Arc Dome or the Schell Creek Peaks, but the rest of the Toquima range is not as lofty.

The Natural Landmarks study recommended three sites in this proposed park for evaluation as Natural Landmarks: Mount Jefferson, Arc Dome, and The Wild Granites.

This area exemplifies the Great Basin about as well as any single area can. Not many of the natural features are truly outstanding, but very few of the features that characterize the Great Basin are absent. Of the landforms of the present only sand dunes and lakeshores and islands are missing. The geologic history is almost complete. The terrestrial ecosystems are well represented. The boreal forest is sparse and scattered, and for that very reason more typical of the Great Basin than the magnificent stands of birstlecone pine on Troy Peak (Railroad Valley) or the spruce-fir stands in the Snake Range.

Oases and remnant Pleistocene lakes are two important features that are absent.

All of the Great Basin's brushy little brooks are much alike. They come tumbling down out of the mountains and are either diverted to irrigate hay fields or water livestock, or disappear into the alluvial fan. Some have been well studied; most are little known. If any can be considered outstanding, my vote is for Jett Creek because it has the most stable watershed. Spring runoff following winters with several times normal snowfall is very destructive to most streams in the Great Basin. The damage to Jett Creek at such times is imperceptible.

The suggested boundaries (see map) include 734,200 acres. This includes 17,280 acres of private land, 235,640 acres of federal land administered by BLM and 481,280 acres administered by the Forest Service.

Ruby Mountains

The Ruby Mountains are magnificent. The highest peaks are not quite as high as the highest peaks of half a dozen other ranges, but there are more high peaks. Of the 200 ranges of the Great Basin, the Ruby Mountains rank among the top three for scenic grandeur. The White Mountains, the Snake Range, and the Ruby Mountains are all grand, but they are too different to be compared. Of the three, the Ruby Mountains are the most typical of the Great Basin.

The crest of the Ruby Mountains was recommended for evaluation as a Natural Landmark in that study. A larger area would need to be considered for a National Park. Unfortunately, there is not much room for expansion.

Ruby Valley at the base of the east escarpment is typical Great Basin interior drainage, but it is all privately owned except for the southern half which was purchased from the owners to establish the Ruby Lake National Wildlife Refuge.

The west slope of the Ruby Mountains drains into the Humboldt River. This river eventually ends up in Humboldt Lake in typical Great Basin fashion, but only after a journey of more than 200 miles from the Ruby Mountains. Therefore the Ruby Mountains fail to meet the criteria "A park in the Great Basin should have at least one complete internal drainage system to exemplify the overall character of the entire Great Basin drainage."

The Ruby Mountains are outstanding in the Great Basin for displaying the work of glaciers. The U-shaped canyons have sheer walls as much as 2,000 feet high. The area is famous for its lakes. There are about twenty tarns nestled in hanging valleys that are the source of streams cascading downward in ribbon-like falls.

The works of volcanism is well represented but there are no hot springs and no lakeshores or islands. The geologic history is well represented. Desert ecosystems are represented only by sagebrush. Pinyon and juniper woodland occurs along the base of the mountains, the boreal forest is sparse and typically Great Basin. The Ruby Mountains have the most extensive alpine tundra to be found in the Great Basin. The area abounds in streams but there are no true desert oases. Remnant Pleistocene lakes and playas are absent.

The suggested boundaries (see map) inclose 288,480 acres. This includes 10,880 acres of private land, 261,280 acres of federal land administered by the Forest Service, and 16,320 acres administered by BLM. Extending the boundary to include all of the north end of the range would increase very appreciably the amount of private land that would have to be acquired as these are checkerboard lands.

Roberts Mountains

The Roberts Mountains are remote and little known. They have been studied intensively by geologists interested in Silurian-Devonian biostratigraphy, but by no one else that we know about. They are not a typical Great Basin range; they are so atypical as to be almost unique. They may be the most fascinating mountains in the Great Basin; they are intriguing, but they are not representative.

Instead of being long and narrow, they are short and only twice as long as they are wide. Many of the Basin ranges bear a little east of north, but the Roberts Mountains are oriented northeast. They are essentially limestone mountains rather than volcanic.

The Roberts Mountains are outstanding for thrust faulting, and thus demonstrate very well that the Great Basin is the fractured part of the continent. Lateral movement has been established as 16 miles (which is as long as the mountain range) and some geologists believe it may be 50 miles.

In spite of all the tectonic activity the paleozoic strata are intact in some places. The Silurian-Devonian series are better represented here than anywhere else in America.

Charlie Watson reported that the canyons were carved by glaciers, but geologists report that the canyons are structurally controlled and there is little evidence of glaciation in the Roberts Mountains.

The desert ecosystem is represented by sagebrush. The base of the mountains have the usual pinyon-juniper woodland and mahogany woodland on the higher

slopes. Watson reported a boreal forest of limber pine, bristlecone pine, and aspen, but half of the Roberts Mountains summits and slopes are bald. A number of Great Basin ranges are similarly bald, but the reasons for the absence of trees has not been satisfactorily explained.

When I visited the Roberts Mountains I did not have time to hike to the summit, so I can't be sure there is any tundra. The vegetation was rather lush for a Great Basin Range and I would expect to find small patches of tundra in favored situations. Dr. Katherine Bell of UNLV has been studying the alpine tundra of the Great Basin for several seasons, but she has not visited the Roberts Mountains.

The Roberts Mountains are not the usual horst with a graben on either side of it; it is a lone mountain with valleys on three sides. The streams do not drain into a bolson, so it does not meet the criteria: "A park in the Great Basin should have at least one complete internal drainage system to exemplify the overall character of the entire Great Basin drainage."

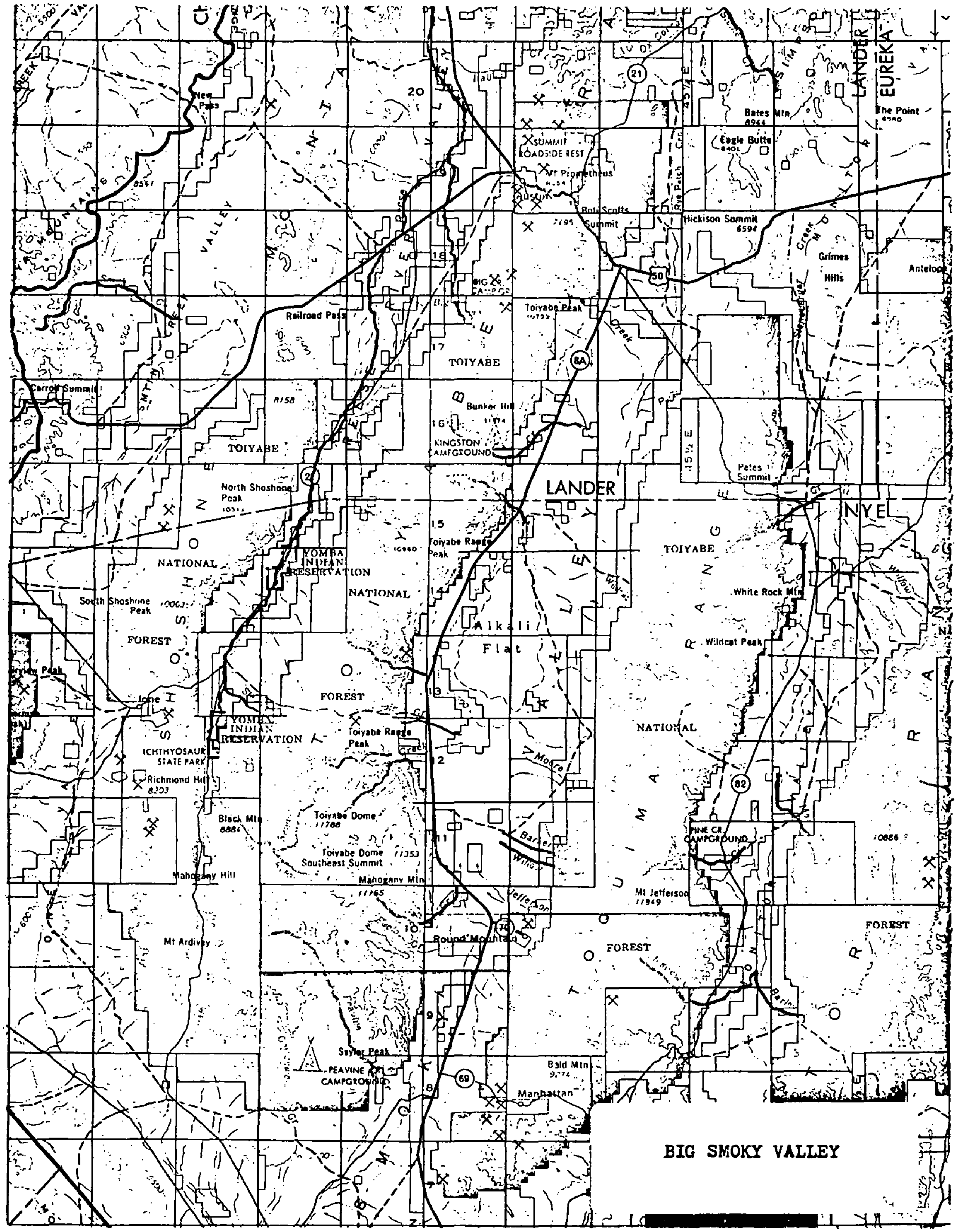
The suggested boundaries (see map) are the same as recommended for evaluation as a Natural Landmark. It incloses 62,500 acres, all administered by the Battle Mountain District of BLM.

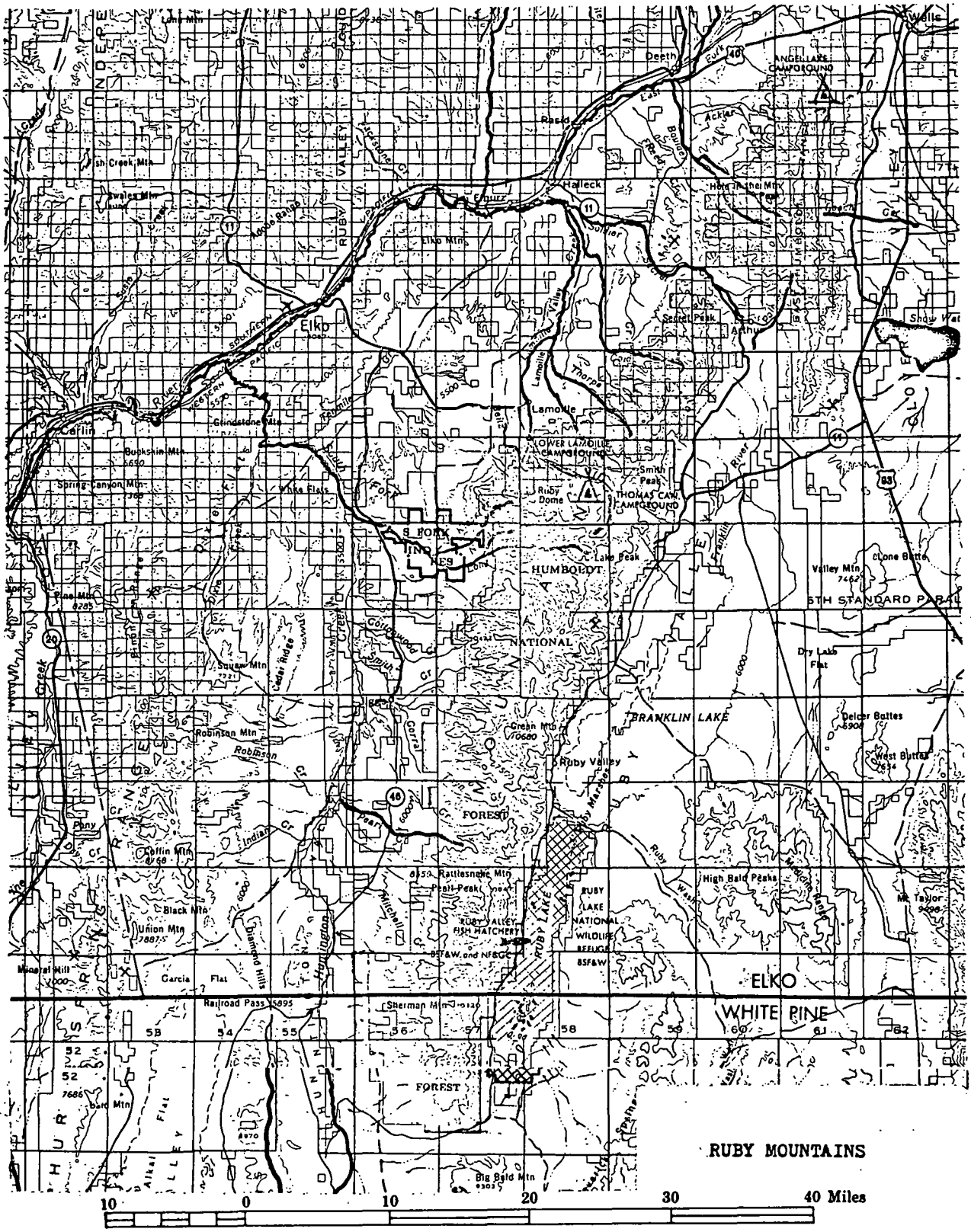
In order to make it easier to compare these seven study areas, I have summarized the information in chart form which follows. The numeral "1" signifies that the feature as represented by that area is outstanding; that is, that it is either the best in the Great Basin or tied with others for first rank. The numeral "2" signifies that the area affords good representation to that feature but that it is not outstanding.

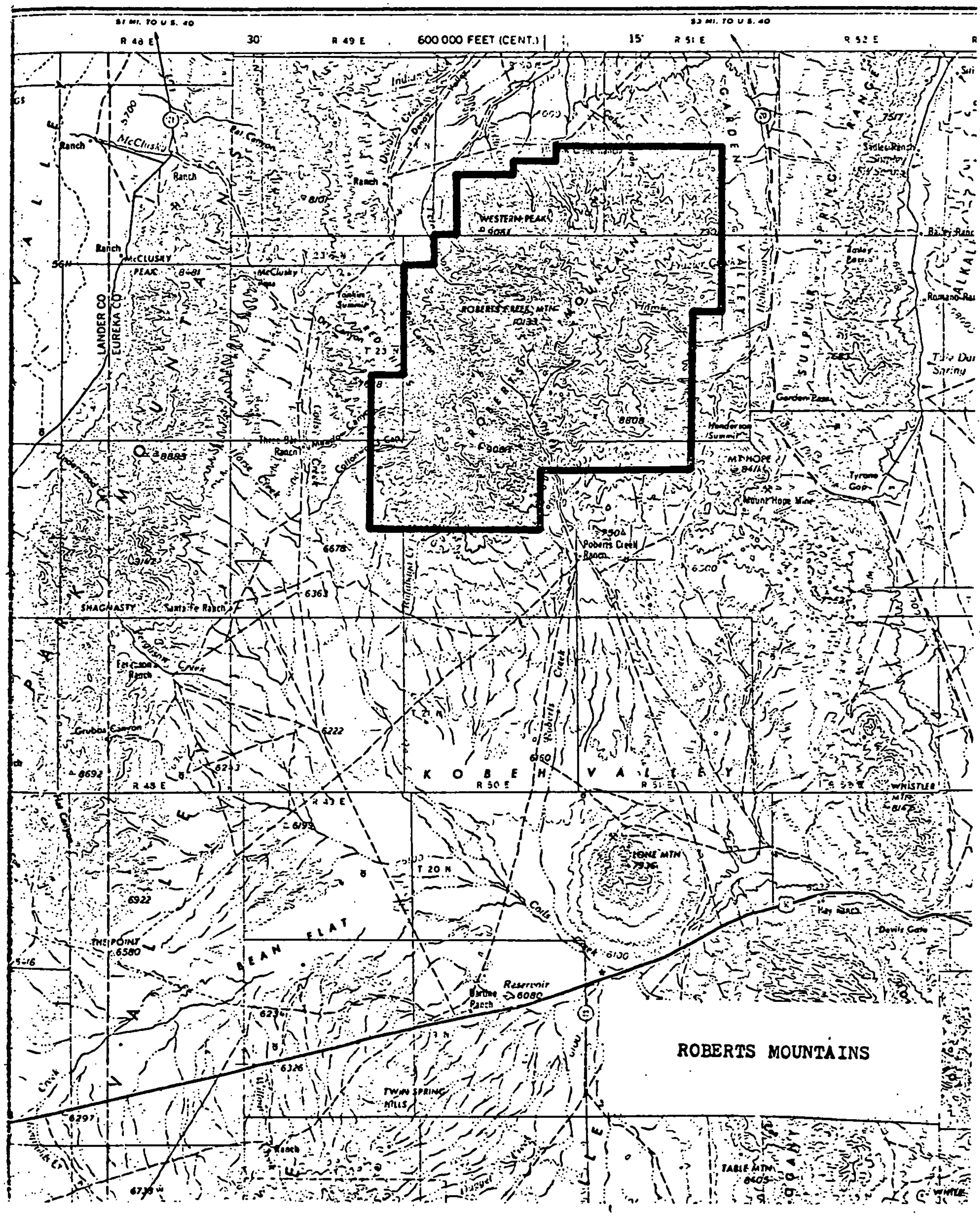
A "2" rating doesn't always mean that this feature is better represented somewhere else. A shadscale community is a shadscale community; it would be pretty difficult to judge that one valley represents the community better than another. The same is true for dry coniferous forest and sagebrush communities. The absence of a "1" rating may mean that the finest example of the feature does not occur on any of the study areas. For playas, Bonneville Salt Flat is "1"; all others are "2."

Potential Areas for a Great Basin National Park

*Themes considered of major importance in the Great Basin New Areas Study #Includes Deep Springs	Snake Range	White Mountains#	Railroad Valley	Monitor Valley	Big Smoky Valley	Ruby Mountains	Roberts Mountains
LANDFORMS OF THE PRESENT							
Plateaus	2			2	2		
Cuestas			2				
*Mountain systems	1	1	2	2	2	1	2
*Works of volcanism			1	2	2	2	2
*Hot water phenomena			2	1	2		
*Sculpture of the land	2	2	2	2	2	2	2
Eolian landforms							
*River systems & lakes (complete internal drainage system)	2		2	2	1		
*Work of glaciers	2	2	2	2	2	1	
*Lakeshores and islands							
*Earthquake phenomena	2	2	2	2	2	2	1
*Caves and springs							
caves	1			2	2		
springs	2	1	2	2	2	2	2
GEOLOGIC HISTORY							
Precambrian							
*Cambrian to lower Silurian			2		2	2	2
*Silurian & Devonian						2	1
*Mississippian to Permain	2			2	2	2	2
Permain through Cretaceous					2		2
Oligocene through Pliocene	1					2	
*Pleistocene	2	2	2	2	2	1	2
*Post-Pleistocene		2	2	2	2		
TERRESTRIAL ECOSYSTEMS							
*Desert communities							
cold desert							
sagebrush	2	2	2	2	2	2	2
shadscale			2	2	2		
winterfat	1						
halophyte					2		
barren desert (playa)			2	2	2		
*Dry coniferous forest and woodland	2	2	2	2	2	2	2
*Boreal forest	1	1	2	2	2	2	2
*Tundra	2	2	2	2	2	1	2?
SPECIAL ECOSYSTEMS							
*Hydrothermally altered substrate							
*Oases		1					
AQUATIC ECOSYSTEMS							
*Streams	2	2	2	2	2	2	2
*Lakes and ponds							
remnant lakes		2	2	2			
alpine tarns	2				2	1	2


LANDER
EUREKA
New Pass
Bates Mtn
The Point
Eagle Butte
SUMMIT ROADSIDE REST
Mt Prometheus
Austin
Bob Scotts Summit
Hickison Summit
6594
Grimes
Hills
Antelope
Railroad Pass
Toiyabe Peak
TOIYABE
Carroll Summit
Bunker Hill
KINGSTON CAMPGROUND
TOIYABE
North Shoshone Peak
Petes Summit
LANDER
NYE
TOIYABE
NATIONAL
YOMBA INDIAN RESERVATION
Toiyabe Range Peak
NATIONAL
South Shoshone Peak
White Rock Mtn
FOREST
Alkali Flat
Wildcat Peak
Ione
FOREST
NATIONAL
YOMBA INDIAN RESERVATION
Toiyabe Range Peak
ICHTHYOSAUR STATE PARK
Richmond Hill
Black Mtn
Toiyabe Dome
Toiyabe Dome Southeast Summit
PINE CR. CAMPGROUND
Mahogany Hill
Mahogany Mtn
Mt Jefferson
Round Mountain
FOREST
FOREST
Mt Ardivey
Saylor Peak
PEAVINE CAMPGROUND
Bald Mtn
Manhattan
BIG SMOKY VALLEY


RUBY MOUNTAINS
ELKO
WHITE PINE
Elko
Carlin
Halleck
Lamoille
Ruby Valley
Ruby Dome
Lake Peak
Smith Peak
Valley Mtn
Dry Lake Flat
Delcer Buttes
West Buttes
Mt. Taylor
High Bald Peaks
Pearl Peak
Rattlesnake Mtn
Union Mtn
Black Mts
Railroad Pass
Sherman Mtn
Big Bald Mtn
Robinson Mtn
Coffin Mtn
Buckskin Mtn
Spring Canyon Mtn
Pine Mtn
Cedar Ridge
Cedar Hills
Diamond Hills
Huntington Valley
Ruby Marsh
Ruby Lake
Ruby Valley Fish Hatchery
Ruby Lake National Wildlife Refuge
BSF&W
BSF&W and NF&GC
Thomas Canyon Campground
Lower Lamoille Campground
Angel Lake Campground
South Fork Reservoir
Humboldt National Forest
Franklin Lake
Mineral Hill
Garcia Flat
Alkali Flat
Bard Mtn
Elko Mtn
Seitel Peak
Shaw Wat
Clone Butte
6TH STANDARD PARALLEL
10 0 10 20 30 40 Miles


600 000 FEET (CENT.)
WESTERN PEAK
ROBERTS CREEK MTN
McCLUSKY PEAK
LANDER CO
EUREKA CO
KOBEH VALLEY
LONE MTN
BEAN FLAT
THE POINT
TWIN SPRING HILLS
TABLE MTN
Roberts Creek Ranch
Santa Fe Ranch
Henderson Summit
Mount Hope Mine
ROBERTS MOUNTAINS

APPENDIX C

GREAT BASIN THEMES - COMPARED TO THEMES PRESENTED IN PART ONE AND PART TWO: NATIONAL PARK SYSTEM PLAN

I. NATURAL

The criteria for evaluating natural resources in the Great Basin is based on the themes discussed in Part Two: National Park System Plan. These themes are very general because they were designed to apply to all physiographic regions of the United States.

It was necessary to make the following minor adjustments. The themes "Sculpture of the Land" and "Eolian Landforms" are not listed in the park system plan as significant for the Great Basin but, since they are both present throughout the region, they have been retained in the criteria. An additional theme, "Earthquake Phenomena," has been added because the Great Basin is one of the most actively faulted and fractured segments of the earth's crust. Within the geologic history theme, the Precambrian period has been added because of the presence of Precambrian rocks in a sizeable portion of the White Mountains. The Mississippian- Triassic/ Permian-Cretaceous time periods were changed to Mississippian-Permian and Triassic-Cretaceous to avoid an overlap between the two time spans.

The themes dealing with land ecosystems are basically the same as those in Part Two of the National Park System Plan but, as is true for geological themes, some minor adjustments have been made. A "Special Ecosystems" group of themes was added to account for oases, hydrothermally altered substrate, and habitat of special interest. The specialized group of themes entitled "Aquatic Ecosystems" was not changed. All of these specialized themes represent localized environments somewhat unique to the Great Basin.

The themes considered of primary importance in the Great Basin are marked with an asterisk (*).

A. PRESENT LANDFORMS

*Plains, plateaus, mesas

The Great Basin is not a single large basin as the name implies, but consists of more than 150 desert basins separated by nearly 200 mountain ranges. These basins generally contain much alluvial fill eroded from surrounding mountains. When closed, these basins frequently have intermittent lakebeds (playas) at the

lowest elevation that are surrounded by alluvial slopes (bajadas) that grade upward into the bedrock of the eroded mountain range (pediment).

There are no plains in the Great Basin unless dry lake beds are interpreted as plains. The theme study interprets playas to be lakes, not plains.

Plateaus and mesas are rare in the Great Basin. A few of the Basin ranges have somewhat flattened tops, such as Mount Moriah, Mount Jefferson, and Steens Mountains.

Plateaus and mesas are locally common in the northwest part of the Great Basin where it grades into the lava flows of the Columbia Plateau province.

*Mountain systems

Of the 200 ranges present in the Great Basin, about 150 are typically fault-block mountains, long and narrow, oriented north-south, with a steep escarpment on one side.

The structure of the Great Basin is basically a series of alternating horsts and grabens. The major valleys have been created by downwarping of strata and, as a result, most are closed basins (bolsons) with no exterior drainage.

The alternating valley-mountain range structure is the primary geologic characteristic of Great Basin physiography. Any representative park area should include at least one range and one valley. This theme along with the present ecosystem are the two most significant themes in the Great Basin.

*Works of volcanism

Volcanic features abound in the Great Basin because of the highly fractured crust. A wide variety of volcanic landforms and features are present from small cinder cones to large calderas, lava flows, pumice-covered valley floors, rhyolitic domes, basalt dikes, etc.

*Hot water phenomena

Hot and warm springs are common in the Great Basin because of deep seated fault systems and related volcanic activity within the "recent" geologic past.

Sculpture of the land

Although this is not a major theme in the Great Basin, there are numerous unusual features of the landscape locally shaped by physical and chemical phenomena and by erosive action of wind and water.

Eolian landforms

Dune systems are common in the Great Basin. Areas within the mountains where wind patterns are slowed allow sands to be deposited. Source materials for these sands are the valley floors, or playas where fine particulates are concentrated.

*River systems and lakes

Rivers are almost extinct in the Great Basin since the pluvial (Pleistocene) period.

With a few minor exceptions, water does not leave the Great Basin via major river systems draining to the oceans.

A park in the Great Basin should have at least one complete internal drainage system to exemplify the overall character of the entire Great Basin drainage.

*Work of glaciers

The Great Basin was not generally glaciated; some of the higher mountain ranges have fine examples of nearly all alpine glacial features.

*Lakeshores and islands

Lakes in the Great Basin are saline remnants or playas left over from the abundant lakes of the pluvial period. Ancient shorelines of these pluvial lakes are scientifically significant in interpreting the geologic history of the region.

*Earthquake phenomena (movements of the earth's crust)

This theme is not discussed in Part Two: The National Park System Plan but is important in the Great Basin. The earth's crust is highly fragmented in this portion of the continent and is the basic cause of the physical makeup of the Great Basin. There is considerable overlap with other themes: the mountain systems are fault-block mountains, volcanism is associated with shear

zones (plate boundaries), and caves and springs are largely controlled by faults.

Although faults are easily traced, the structural history is very complex. The lack of vegetation and overburden makes the Great Basin an ideal place to study faulting and understand the structural history.

*Caves and springs

The Great Basin contains excellent examples of both caves and springs. Springs often occur along fault lines. Many of the warm springs are habitats of endemic fish.

The larger springs create special ecosystems (oases), which are habitats of special interest.

Limestone caverns are common, especially in the eastern ranges, where limestone is the primary rock type.

B. GEOLOGIC HISTORY THEMES

Precambrian

Precambrian rocks, although present in the Great Basin, are not of special significance.

*Cambrian to lower Silurian

Early Paleozoic rocks are widespread, many being richly fossiliferous. Cambrian carbonates (limestones and dolomites) and shales are widespread and well exposed, often as banded cliffs in the highest parts of the ranges. Ordovician fossils are somewhat distinct and unique in southern Nevada. Cambrian trilobites are distinct and locally common.

*Silurian and Devonian

Rocks and fossils of Silurian and Devonian times are better exposed and more completely represented in central Nevada than in any other comparable area in North America. They represent a more normal marine environment and continuous deposition not present in the east. The best exposures are in the Roberts Mountains.

*Mississippian through Permian

Rocks of this age are commonly exposed in the Great Basin. Many of these rocks are the sources of limestone

caverns, and some are of considerable economic importance.

Triassic through Cretaceous

Rocks of the Mesozoic era are common in the Great Basin but are not of unusual importance. One exception is in western Nevada where exposures of Triassic marine sediments (best in the United States) contain fossils of the large fish-like marine reptile Ichthyosaurus. This is in Ichthyosaur State Park, a registered natural landmark.

*Oligocene through Recent

Oligocene through Pliocene. Oliogocene to Pliocene age units are found in the Great Basin; some contain vertebrate remains, generally not common in Cenozoic age nonmarine rocks. Numerous mammal fossils are found in rocks at Mount Moriah.

Pleistocene. Perhaps the most significant portion of geologic time in the Great Basin is the Pleistocene epoch. During this time the earth's crust experienced major faulting and thrusting that created the topography of the Great Basin as we see it today. The "pluvial" climate during the Pleistocene created major bodies of water within the Great Basin that later evaporated as a result of the rain-shadow effect caused by the continually rising Sierra Nevada.

Postpleistocene. The aridity that developed in postpluvial time has made the Great Basin highly sensitive to changes in plant species distribution and variations in climate. Ancient lakeshores and cyclic fluctuation of playa levels are examples of evidence of long-term versus short-term climatic changes.

C. TERRESTRIAL ECOSYSTEMS

*Desert Communities

Several cold desert subitems are listed because the desert theme is such a key element in the Great Basin and because of its variability.

Cold Desert. The most widely distributed of the cold desert communities are dominated by sagebrush (Artemisia) in its various forms. The other major community of cold deserts is dominated by shadscale (Atriplex). Another species of interest is winterfat or white sage (Eurotia lanata). Generally, this species is

widely distributed throughout the southwest; however, areas termed "white sage flats" only occur in the intermountain region.

Halophyte. These communities are determined by the degree of soil salinity. They are little influenced by temperature and occur in both the warm and cold deserts. Saline soils develop under conditions of poor drainage and high evaporation; in the Great Basin region this means the borders of playas or shallow lakes or ponds. These areas are dominated by Pickleweed (Allenrolfea), greasewood (Sarcobatus), and saltgrass (Distichlis).

Barren Desert. Considerable areas in the Great Basin are barren of vegetation: playas, dunes, and desert pavement. These areas are essentially lifeless. In the case of playas, pure salt can be harvested on the surface. Playas, when recharged, feature populations of brine shrimp (Artemia salina). Their eggs can withstand extreme heat and cold and can survive in saturated salt solutions. Also, sand dunes are included under this category and the biota occurring on dunes are often endemic to that substrate.

*Dry Coniferous Forest and Woodland

This system cannot be defined by elevation, as the desert associations could not be. Generally, this association can be described as that region between desert and boreal forest.

The pinyon/juniper woodland (Pinus monophylla and Juniperus osteosperma) is the most extensive forest type within the intermountain region. It is a very uniform association but does have some variation. There are two species of pinyon and four of juniper occurring in geographically isolated stands throughout the Great Basin. On calcareous mountains, curl-leaf mahogany forms extensive woodland stands, replacing pinyon/juniper.

*Boreal Forest

Makeup of this community type varies both with latitude and longitude (as a response to the decreasing effect of the Sierra Nevada rain shadow). There is no "typical" boreal forest in the Great Basin.

This association of the higher elevations is usually dominated by limber pine (Pinus flexilis) and, depending on latitude, bristlecone pine (Pinus longaeva). Boreal

forests of Utah support a mixture of Englemann spruce (Picea engelmannii) and alpine fir (Abies lasiocarpa). The mountain ranges in south central Nevada support boreal forests, which are a mixture of all the above-mentioned species. Aspen (Populus tremuloides) are associated with the boreal forest, usually as a successional stage following burns.

*Tundra

Arctic-alpine vegetation is poorly represented in the nearly 200 mountain ranges of the Great Basin; only a dozen support any appreciable tundra. This association, highly variable and extremely isolated, contains a number of endemic species. It should be mentioned that numerous studies are currently being conducted to identify the plant species of these isolated islands in the Nevada mountains.

D. SPECIAL ECOSYSTEMS

Oases

Oases are significant ecologically, as they are many times more productive than the surrounding arid ecosystems and illustrate great diversity in both plant and animal life. This heading would include bogs, marshes, riparian habitats, and meadows.

Habitats of special interest

The diversity in climate and geology in the Great Basin produces a diversity of ecosystems, many of which do not easily fit into the ecosystems already discussed. These elements include unique and relict populations in addition to areas of wildlife concentrations.

E. AQUATIC ECOSYSTEMS

*Streams

Most of the mountain ranges of the Great Basin have no permanent streams. Most of the streams are intermittent and ephemeral, depending on seasonal precipitation. All streams have interior drainage either saturating the alluvium or recharging the playas.

*Lakes and Ponds

In Pleistocene times the Great Basin's topography, climate, and vegetation were much like Minnesota today.

The landscape abounded in lakes. Climatic change to aridity brought about by the rising Sierra Nevada reduced these lakes to playas.

These intermountain lakes can be divided into two classes; most are Great Basin in nature, large saline lakes that are remnants of Pleistocene lakes. Others are alpine lakes that owe their origin to glaciation.

Endemic Wildlife

Fish distribution within the Great Basin has provided valuable information in the hydrologic history and zoogeography of the region. Nevada has a large number of endemic fishes, an outstanding feature of the area. The depletion of this fish fauna is well documented, and this element is typical of the Great Basin.

II. CULTURAL (Archeological and Historical)

The major heading "Cultural" has replaced "Historical"; this denotes both archeological and historical resources. Standard information concerning these themes has been extracted from Volume 1 of the park system plan. A category termed "Ancillary Themes" has been added to the end of the previously developed themes. This category illustrates contemporary trends that are particularly indigenous to the Great Basin.

A. THE ORIGINAL INHABITANTS

*The Earliest Americans (1a)

Recent archeological evidence points to Great Basin occupation some 8,000-10,000 years ago.

Native Villages and Communities (1b)

Great Basin Indians such as the Shoshone, Washoe, and Paiute did not attain the level of societal complexity of the Plains or Southwestern peoples.

Living Remnants (1d)

There are a number of reservations in the Great Basin.

B. EUROPEAN EXPLORATION AND SETTLEMENT

Spanish Exploration and Settlement (2a)

The Spanish crossed the Basin area but did not erect communities of major importance. Early Spanish trails pretty much skirted the Basin.

C. MAJOR AMERICAN WARS

Great Basin part of Old Mexico (4c)

This land was ceded to the United States in 1848. No large scale military action occurred there during the Mexican War.

Civil War (4d)

Gold and silver production was important to the Union. During the war, Lincoln pushed for Nevada statehood for strategic reasons.

D. POLITICAL AND MILITARY AFFAIRS

Political and Military Affairs, 1830-1860 (5b)

The era of Manifest Destiny, typified by John C. Fremont's expeditions, influenced the Great Basin.

E. WESTWARD EXPANSION

*Great Explorers of the West (6a)

Peter Ogden, Fremont, and Joseph Walker.

The Fur Trade (6b)

Jedediah Smith traversed this region.

Military/Indian Conflicts (6c)

Minor in this region, compared to Plains or Southwest.

*Western Trails and Travelers (6d)

Mormon Trail and Settlement of the Great Basin: One of the study areas in northwestern Nevada contains the site of Applegate-Lassen Trail, a shortcut from the Humboldt River country to the gold camps of northern California and settlements in Oregon. (National Park Service evaluated this area in 1962.)

*The Mining Frontier (6e)

Great Basin, Nevada and Utah: Nevada significant in gold, silver, and copper production. This theme provides a major thrust for early and subsequent settlement patterns.

The Farmers' Frontier (6f)

Irrigation Frontier of the Far West
Pioneer Mormon Farmers in Great Basin Kingdom.

*The Cattlemen's Empire (6g)

Early range cattle industry destroyed by severe weather in mid-1880s but regrouped and expanded.

F. AMERICA AT WORK

Science and Invention

The discovery or invention of significant concepts, priorities and devices in the United States applied in such fields as commerce, industry, agriculture, transportation, communication, and medicine.

G. ANCILLARY THEMES

Items not outlined in NPS plan:

1. Cold War Military, Nuclear Testing

2. Twentieth Century Oil, Gas, Uranium Exploration

APPENDIX D: RESULTS OF PUBLIC WORKSHOPS

Baker, Nevada - List of Concerns (July)

Group A

Concerns

1. What is a park
2. Will private land be taken if a park is instituted
3. What are proposed park boundaries
4. Will cattle be allowed to graze on the yet undefined boundaries
5. Will people be allowed to cut and take wood on park boundaries (A lot of people rely on wood for heat)
6. Will our hunting and fishing privileges be revoked or limited
7. Will mining be allowed within park areas
8. Will trapping be allowed to continue
9. Will park lead to a wilderness area where only backpacking is allowed
10. If a national park is implemented, will not more people enter into an area with limited campground facilities and endanger more wilderness areas than if it was left alone with less national attention
11. Will a national park endanger local water rights
12. Lack of information about what constitutes a park and all it proposes
13. Will a national park restrict local people's recreational use of the area by park restricted laws
14. If people are allowed to have land within park boundaries, will they be able to use the land as they see fit for such things as gardening, planting, building, and septic systems
15. Is this meeting just a token gesture to pacify local residents who question government motives
16. Will the fact that the park proposal for the Snake Range has been turned down three times before be considered
17. People have lost faith in how much government will consider our concerns and our way of life which we want to preserve; for example, the MX missile system proposal has had a direct bearing on people's attitude--the government does what it wants and asks later

Alternatives

1. No park (people feel the status quo is okay)
   - Leave area under existing management
   - Sagebrush Rebellion (Turn management over to state)

Group B

Concerns

1. Mining
2. Grazing rights and private land
3. Multiple Use
4. Increased use - more people
5. Limited access to resources

Baker, Nevada - List of Concerns (Cont'd)

6. Hunting
7. Quality of life for residents
8. Tax base
9. Increased federal control "foot-in-the-door"
10. Resource protection - present management
11. Substandard area for park
12. Energy use

Five Greatest Concerns

1. Multiple Use
   - mining
   - grazing
   - recreation
   - hunting, fishing, trapping
   - firewood, posts, Christmas trees, pine nuts
   - oil
   - residents - private land
   - water development
   - farming
2. Increased Use - More People
   - traffic impact
   - quality of life
   - energy use increases
   - environmental impact
3. Increased Federal Control
   - MX missile system
   - Sagebrush Rebellion
   - limited access to resource use
   - loss of tax base
   - wilderness proposals
   - "foot-in-the-door"
4. Protecting Fragile Resources
5. Not True Representation of Great Basin

Group C

Concerns

1. Grazing rights
2. Private land
3. Maintain status quo because resource isn't deteriorating
4. Park boundaries
5. Justify the park resource (no bears)
6. Destruction of resource by increased visitors
7. Multiple use more important than preservation
8. Mining
9. Quality of life - human environment
10. Inholdings - limitations, restrictions, etc.
11. Building - concessions support services
    What are impacts under park status
12. Why expand existing park service boundaries
13. Overregulation by government agencies
14. How does MX system relate to park

Baker, Nevada - List of Concerns (Cont'd)

15. Negative effect on hunting and fishing
16. Alternate energy resource will be locked up if park is established

Priority list

1. Maintain status quo
   - resource isn't deteriorating
   - limited development and population

   Multiple Use More Important
   - livelihood dependent on multiple use
   - unique physical resources that need protection are fine under multiple use
   - park would cause more problems than status quo
   - destruction by increased visitors

2. Land Use Status

   Boundaries
   - No private land included

   If private land is included, no restrictions should be made

   Grazing land and rights should be maintained - also water and trapping rights

   Mining claims should be left alone

   Maintain recreation use of land
   - hunting and fishing
   - park would restrict above items

   Wood gathering an important energy resource for local/ county residents

3. Quality of Life

   A park will have a negative impact on quality of life for residents

   MX impact and park impact is more than we can stand

4. Conclusion

   Serious consideration of other alternatives should be made

Ely, Nevada - List of Concerns (July)

Alternatives

Alternative 1 Continue Present Management (Status Quo)
1. Park Service stand on MX
2. Impact of national landmark status
3. Status of wilderness vs. park

Alternative 2 Minimum Preservation (Detached Units)
1. Size of individual areas
2. Access to areas
3. Input from other agencies on areas
4. Status regarding Clean Air Act and this alternative

Alternative 3 Minimum Contiguous Unit (Limited Restrictions)
1. Conflicts with contiguous unit
   Private property - U.S. Highway - powerline corridor
   Grazing rights - Water rights
2. Hunting and other recreation concerns (allowed if legislated)
3. Private Property: change of use (commercial or inheritance)
4. Mining: negotiated use

Alternative 4 Minimum Contiguous Unit (Maximum Protection)
1. Mining: valid existing rights honored; access negotiated
2. No grazing
3. Private property rights: dependent on legislation
4. Contiguous: split in two parts
5. Attracting more people: destruction of resource
6. Limited visitation or use

Alternative 5 Area of Concern (Entire Study Area)
No discussion

Miscellaneous - No NPS

Be Specific (By Alternatives)
   Air Quality
   Boundary
   Restricted uses and where

Baker, Nevada - List of Concerns (September 1980)

1. Why and who determined we should do this study
2. How are mining and ranching going to be interpreted in the area
3. What would happen to homes and individual parcels of land under alternative 4
4. How large an area would be affected by management restrictions for each of the areas under alternative 7
5. Why can't the state of Nevada protect areas considered under alternative 7
6. Define the terms protection and preservation
7. Why does the Park Service think it can preserve the study area any better than the local people have for the past 120 years
8. Can the area be managed by the Park Service, but not strictly as a national park
9. Address the conflict of putting a national park next to the MX system; what are the secondary effects of MX development; what is Park Service offering in contrast to the other agencies
10. Impacts are not presented as an analysis of specific property under alternatives; how often will use be studied to see if impact occurs
11. Can reserved private rights be transferred
12. How many more studies are going to be done; too many agencies have already studied, and too many tax dollars have been spent
13. No one in a federal agency can plan or manage the area as well as those who live there and love it
14. How much land does federal government own in Nevada and White Pine County
15. How long can a park a month go on
16. Estimates on the amount of use should be provided
17. Maybe we should be combining alternatives; want alternative 7

Ely, Nevada - List of Concerns (September 1980)

1. What is intended for the Spring Valley/Swamp Cedar area under alternative 7
2. Are all alternatives subject to change at any time by the National Park Service
3. Why can't the small areas indicated under alternatives 2 or 3 be open to mining
4. Alternative 2 is superimposed on alternatives 4 and 5
5. Who determines what is detrimental to the protected themes and what action would result
6. Would any use of idle land be considered an incompatible use
7. Can a building be constructed in an undisturbed area or would that require National Park Service approval
8. Pattened claims should be honored; past generations have been deprived of mining valuable minerals
9. Underground mining is one of most expensive mining methods; if this is the only allowed method, it would deprive some people of their livelihood
10. What effect would National Park Service management have on ranching (pipes, irrigation, burning, and planting lands); will ranching continue to be economical
11. How would units under alternative 2 be managed; how would visitation be controlled in Wheeler Park area
12. Question of specifics - too many ifs and maybes; concepts in document can't be pinned down
13. Select alternative or alternatives that protect private property rights yet preserve resource values for wider society; eliminate some alternatives
14. There is currently a limited tax base (3%); concerned about eroding the tax base to fund public services
15. What are the acreages for Great Basin-wide detached units in alternative 7
16. Will air quality standards be maintained and/or additional restrictions imposed
17. Alternative 7 - Take selected units of the Snake Range to represent Great Basin values; question resource valdalism, virgin ponderosa/Big Wash., and Bristlecone in Mount Washington
18. Alternative 7 - Need a map to illustrate areas in Snake Range/ Big Wash; include acreages for alternative 7
19. Opposed to federal management/ownership. At some point state will control lands in Nevada-Sagebrush Rebellion
20. Alternative 7 appears to be the most reasonable
21. The costs of management development for each alternative needs to be presented
22. Under alternative 7 - diffused visitation - reduce concentration of visitors
23. Snake Range is representative of the Great Basin natural/cultural values
24. Everything cannot be included in one area
25. Concern about Park Service involvement in resource preservation; doubt that the name National Park Service will mean that much
26. How would one area represent Great Basin; alternative 7 is most representative of Great Basin values--smaller acreages than those expressed in alternatives 2-6

APPENDIX E: ALTERNATIVE 7 - ANNOTATED LIST OF POTENTIAL INTERPRETIVE SITES

These following sites are only a suggestion; a thorough study should be completed before any specific sites are established. The themes listed are the most important to the Great Basin. Many sites display other themes and subthemes.

NEVADA SITES

Lehman Caves National Monument, White Pine County, Nevada (Great Basin Interpretive Center) 640 acres

Present status: National Park Service (NPS) administered national monument

Themes represented: Caves and springs;** Dry coniferous forest and woodland*

Wheeler Peak Scenic Area/Mt. Moriah Area, White Pine County, Nevada (218,200 acres)

Present status: U.S. Forest Service multiple-use area under wilderness consideration. Interpretive Center at Lehman Caves, Bristlecone interpretive trail, pictograph trail, numerous hiking trails and camping facilities. Part of Snake Range; a potential national natural landmark (NNL)

Themes represented: Mountain systems,** Caves and springs*, River systems and lakes - Alpine lakes and streams**, Work of glaciers**, Tundra**, Boreal forest**, Dry coniferous forest and woodland**, Desert communities* Plains - plateaus - mesas*, Caves and springs**

Spring Valley Swamp Cedar Natural Research Area (NRA), White Pine County, Nevada (40 acres)

Present status: Designated a national recreation area under Bureau of Land Management administration

Themes represented: Special ecosystems** Desert communities*

Lexington Arch, White Pine County, Nevada (40 acres)

Present status: Forest Service multiple-use area. A 2-mile hiking trail allows access to the area; a potential NNL

*Theme has good representation

**Theme has excellent representation

Themes represented: Sculpture of the land**, Dry coniferous forest and woodland*

Hot Creek Range, Nye County, Nevada (no acreage data available)

Present status: Bureau of Land Management multiple use area

Themes represented: Mountain systems**, Hot water phenomena*, Dry coniferous forest and woodland**, Desert communities**

Robert's Mountains, Eureka County, Nevada (62,000 acres)

Present status: Bureau of Land Management multiple-use area. Grazing and outdoor recreation are major uses; a potential NNL

Themes represented: Mountain systems**, Earthquake phenomena*, Boreal forest*, Dry coniferous forest and woodland**

Lunar Crater, Nye County, Nevada (2,560 acres)

Present status: Bureau of Land Management multiple-use area--inventoried for recreational potential; a registered NNL

Themes represented: Works of volcanism** Desert communities*

Diana's Punchbowl, Nye County, Nevada (160 acres)

Present status: Under private ownership; a potential NNL

Themes represented: Hot water phenomena**, Works of volcanism*

Black Rock Desert, Humboldt and Pershing Counties, Nevada (132,000 acres)

Present status: Bureau of Land Management multiple-use area; a potential NNL

Themes represented: River systems and lakes -- largest playa**, Works of volcanism*, Hot water phenomena**, Desert communities --barren desert** and early explorers.

Red Rock Canyon Recreation Lands, Clark County, Nevada (78,000 acres)

Present status: Recreation area under joint Bureau of Land Management and state administration; a potential NNL

Themes represented: Earthquake phenomena**, Sculpture of the land*, Special ecosystems -- Great Basin - Mohave Desert flora ecotone*

Pyramid Lake - Anaho Island, Washoe County, Nevada (142,000 acres)

Present status: Anaho Island is a national wildlife refuge (NWR); the remainder of the area is within the Pyramid Lake Indian Reservation. The main uses are fishing and boating; a potential NNL

Themes represented: River systems and lakes -- remnant Pleistocene Lake**, Seashores, lakeshores, islands*, Caves and springs*, Special interest species - endemic and endangered fish*, Special habitats of special interest - bird colonies*

Humboldt River, Humboldt County, Nevada (10 acres)

Present status: Private agricultural land; although highly impacted, it is Great Basin's only river

Themes represented: River systems and lakes -- Great Basin's only river*

Ichthyosaur Site, Nye County, Nevada (200 acres)

Present status: The site is on USFS land but administered by Nevada State Parks under a special use permit; a registered NNL

Themes represented: Age of reptiles (triassic)**

Ruby Mountains Scenic Area, Elko County, Nevada (40,000 acres)

Present status: USFS scenic area; a potential NNL

Themes represented: Mountain systems**, Earthquake phenomena**, Work of glaciers**, Tundra**, Boreal forest*

Ruby Marsh, Elko County, Nevada (37,000 acres)

Present status: A national wildlife refuge and registered NNL

Themes represented: Habitats of special interest -- bird nesting sites**, Lakes and ponds**, Caves and springs*, Special interest species -rare birds*

Valley of Fire State Park, Clark County, Nevada (30,000 acres)

Present status: Nevada State Park and registered NNL

Themes represented: Earthquake phenomena**, Mountain systems*, Sculpture of the land*, Desert ecosystems - Great Basin floristic boundary**

Humboldt River Sink (Peter Skene Osden) Churchill County, Nevada (no acreage data available)

Present status: Public ownership

Themes represented: Westward expansion (Great Explorers)*

Leonard Rock Shelter, Pershing County, Nevada (no acreage data available)

Present status: National historic landmark, privately owned

Themes represented: Original inhabitant Earliest Americans**

Fort Churchill, Lyon, Nevada (50 acres)

Present status: National historic landmark, public ownership - state park

Themes represented: Westward Expansion (Western trails and travelers)**

Virginia City Historic District, Storey County, Nevada (14,700 acres)

Present status: National historic landmark, privately owned

Themes represented: Westward Expansion (Mining frontier)**

Dansberg Ranch, Douglas County, Nevada (3 acres)

Present status: nominated to national register

Themes represented: Westward Expansion (Cattlemen's Empire)*

UTAH SITES

Antelope Trilobite Beds, Millard County, Utah (10,000 acres)

Present status: Bureau of Land Management multiple-use land and state of Utah lands; potential NNL

Themes represented: Age of primitive invertebrates (cambrian)**, Dry coniferous forest and woodland*

Bonneville Salt Flats, Tooele County, Utah (40,000 acres)

Present status: Bureau of Land Management land and a Utah State Reserve; a potential NNL

Themes represented: River systems and lakes -- remnant of largest Great Basin pleistocene lake**, Desert communities -- barren desert**

Red Mountain, Washington County, Utah (16,000 acres)

Present status: Bureau of Land Management multiple-use area; potential NNL

Themes represented: Plains - plateaus - mesas**, Works of volcanism*, Dry coniferous forest and woodland - ponderosa pine*, Desert communities*

CALIFORNIA SITES

Cima Dome, San Bernadino County, California (14,000 acres)

Present status: Bureau of Land Management natural area; a potential NNL

Themes represented: Sculpture of the land**, Desert communities**

Eureka Dunes, Inyo County, California (4,500 acres)

Present status: Bureau of Land Management recreation area; a potential NNL

Themes represented: Eolian landforms**, Special interest species -rare and endemic grass**

White Mountains, Mono and Inyo County, California and Esmeralda County, Nevada (35,000 acres)

Present status: Scientific research, multiple-use management by USFS with due regard to natural values. A large portion of the area is under wilderness study. Other designations within the area include the White Mountain Scientific Area, the White Mountains National Recreation Area, and the Ancient Bristlecone Pine Forest

Themes represented: Mountain systems**, Rivers and lakes*, Work of glaciers*, Tundra**, Boreal forests - bristlecone**, Dry coniferous forest and woodland**, Desert communities

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