

N2 - 6221



GREAT RIFT

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* Due to printing costs, copies of the Appendix are available at either the Wilderness Institute Office or the Idaho Falls district office.

APPENDICES (continued)

- J. Brochures printed by the Park Service, Craters Of The Moon National Monument.
- K. Outdated "Backcountry Management Plan" for Craters Of The Moon National Monument.
- ☒ L. Article printed in the August 21, 1975 issue of the Arco Advisor, entitled "How Important would an Arco-Minidoka road be?"
- M. Legal descriptions of those lands recommended for 1) Primitive classification and 2) protective withdrawal.
- ☒ N. Map overlay set including: land features, land status, and recommended boundaries.
- ☒ O. Two by two inch slides of the Great Rift Study.

Brochure by Andy?

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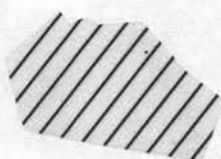
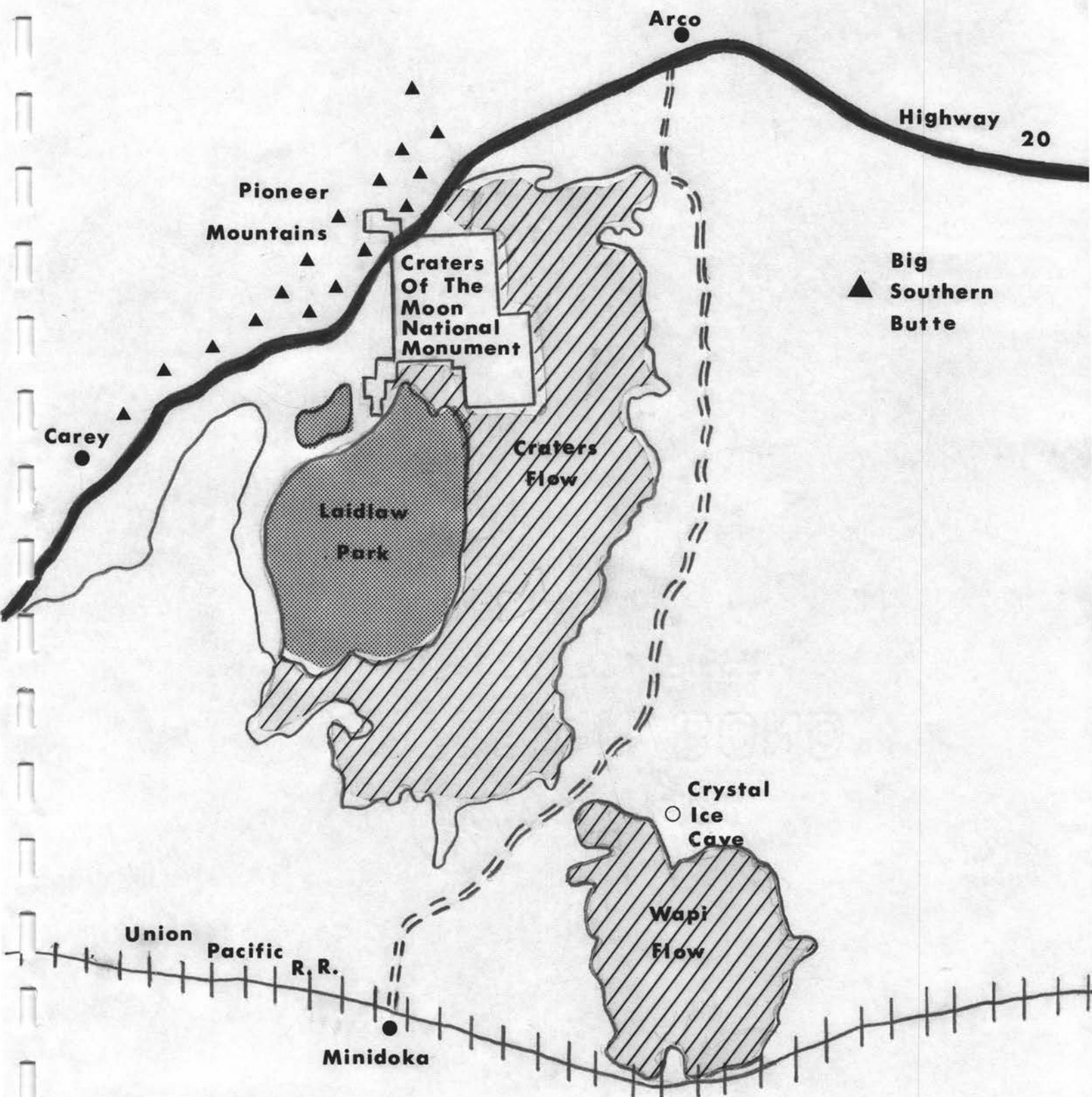
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At this time I would like to express my sincere thanks for having had the opportunity to work with such fine folks on the Great Rift study.

Andrew D. Gibbs

Andrew D. Gibbs

GREAT RIFT



**- Lava Flow Recommended
For Primitive Classification**

Scale : 8 miles to 1 inch

INTRODUCTION

The objectives of this study are to provide preliminary information and analysis for eventual designation and management of the Bureau of Land Management (BLM) proposed Great Rift Primitive Area. This report describes the resources and current land uses within these lands suitable for Primitive Area classification. Management alternatives, designation procedures, and specific recommendations will be discussed.

The Idaho Falls District BLM contracted with the Wilderness Institute of the University of Montana to conduct field studies from mid-June through mid-September in 1975. In addition to conducting field studies, time was given to discussion of field observations and to gathering of base information from personnel of both the Idaho Falls and Shoshone District BLM offices and Craters Of The Moon National Monument. It was impossible to see all lands which are affected by the proposed designation. However, a detailed photo documentary was conducted on roadless area boundaries and the most prominent features within. Maps, slides, government memos, and other data are included in the Appendix.

Further studies and administrative procedures will be necessary before the final designation and implementation of a management plan. Public meetings, drafting of a management plan, creating an interpretation brochure and studying the management alternatives in more detail are several of the activities that need be carried out before designation. Special attention has been given to these needs in the following set of recommendations and conclusions. It is hoped this report will be a service to the Bureau of Land Management and the general public in the forthcoming planning pro-

cedures. In the meantime, the Wilderness Institute is more than willing to provide additional assistance, if so desired by the Bureau.

GENERAL CONCLUSIONS AND RECOMMENDATIONS

In lieu of writing both an introductory abstract and a detailed conclusion section, general conclusions and recommendations have been arranged at the beginning of the report. Thus, the reader can read the context to see how conclusions and recommendations were derived. Each conclusion is generally arranged in the chronological order as its subject matter appears in the report. Specific recommendations are given in the context of the report.

Previous work - Previous work is limited primarily to scientific studies by mostly geologists and a few botanists. Geologists have focussed their attention on several unique features associated with the Great Rift system. Minimal BLM field work is reflected by the agency's current lack of information on the area.

Area description - The proposed Primitive Area is a vast 275,000 acre roadless area of public land contiguous to Craters Of The Moon National Monument and Wilderness Area. The proposal affects portions of the Craters Of The Moon Lava Flow and the entire Wapi Lava Flow, both 2,000 year old flows which erupted from the Great Rift. The area is located in the Snake River Plain of south central Idaho between Arco and the Snake River to the south.

Geology - The Great Rift is thought to be both the longest and the deepest rift system in the world. This phenomena, augmented by many cinder cones, spatter formations, lava cascades, craters, kapukas, lava tubes, and other lava formations, contribute to the area's outstanding geologic, scientific, and primitive values.

Plant life - The lava beds are characteristicly barren with very little soil

and plant cover. This lends them great potential as an area for scientific study of plant succession from the beginning pioneer stages of lichens to the climax dominant sagebrush grasslands. Trees are small, scarce, and scenic on the landscape.

Wildlife - Predominate wildlife species include antelope, mule deer, sage grouse, mourning dove, bobcat, coyote, and prairie falcon. Significantly present in smaller numbers are mountain lions and golden eagles. Paleontological evidence reveals past inhabitation by grizzly bears, wolves, red fox, elk and bison.

Water sources - Within the lavas only five sources of water have been found, all probably contaminated and seasonal besides being difficult to locate.

Grazing - The predominant land use of public desert lands surrounding the lava beds is sheep and cattle grazing within leased allotments. The forage value of kapukas within the lavas is marginal and is not figured into the carrying capacity of outlying grazing allotments. It is recommended that grazing be administratively closed in Bear Park and all kapukas within the proposed boundaries as well as the described area south of Laidlaw Park. Surrounding allotment management plans should be developed both to minimize the impact of grazing upon natural processes and to forgo additional range developments within at least one-fourth mile of the Primitive Area boundary.

Scientific research - Kapukas in ungrazed native range conditions are valuable study areas for soil scientists and range conservationists. The Rift and associated volcanic formations are significantly valuable for study by volcanologists and astrogeologists.

Archaeology - Evidence indicates that the flows, parks, and buttes of the Great Rift area were inhabited by earlier man.

Wildness - The area's wildness and suitability for Primitive classification

have been recognized by the Bureau, the public, and the Wilderness Institute.

Minerals - There are no known gas, oil, mineral or geothermal deposits, and as of yet there are no patented mining claims or mineral leases in the area. A recent application for geothermal exploration within portions of the proposed Primitive Area has been filed in the BLM state office, Boise. If granted, geothermal exploration and potential development thereof may have serious irretrievable impacts upon the wild resource.

State Inholdings - Eighteen state sections, all unroaded and undeveloped, are encircled by the proposed boundaries. It is recommended that necessary actions be taken to make exchange for these state lands so they may be included in the BLM Primitive Area.

Craters Of The Moon National Monument - The most scenic features of the Great Rift and lava beds are found here. Most recreationists in exploring this unusual volcanic region will seek the conveniences and facilities provided by the National Park Service. The NPS developments are capable of supporting high density recreation and providing easy access to the wilderness, foregoing the need for BLM development to further facilitate public access to the wild region. BLM and NPS officials should coordinate planning in the management of one wilderness, the Great Rift ecosystem.

BLM "Organic Act" - If passed, the BLM Organic Act will make both BLM Primitive Areas and nonclassified roadless areas, greater than 5,000 acres, eligible for classification within the National Wilderness Preservation System.

Recreation - The proposed Primitive Area receives an estimated less than 250 visitor use days annually. Low use is probably due to the area's remoteness, inaccessibility, public ignorance of its existence, and a lack of tangible resources that would attract man. Land managers should anticipate an increase in visitor use after administrative classification of the Great Rift.

Visitor Impacts - Man's imprints are particularly noticeable in this simple, fragile environment. There is no immediate need for the establishment of a "carrying capacity" and/or a permit system. However the Bureau should closely monitor all visitation and impacts so that those management methods may be employed if and when necessary.

Interpretation brochure and map - Through a brochure the Bureau can facilitate the public's interpretation while a schematic map drawn to scale can facilitate public access. The brochure should include an area description, administrative regulations, survival techniques, and wilderness use etiquette.

Manpower needs - There is need for a recreation specialist to continue evaluation and classification procedures involving both office and field work. Following designation wildland management expertise is needed to monitor recreational activities and impacts in order that management objectives may be accomplished.

Primitive Area management - Under Bureau policy guidelines, BLM Primitive Areas are to be managed essentially as those lands are under the National Wilderness Preservation System. Public use of BLM Primitive Areas for recreation purposes is encouraged "only to the extent consistent with the maintenance of the primitive environment." It is recommended that land managers initially place a moratorium on developments that may encourage public use of the area. This approach at least preserves the management options that otherwise might be lost through a development approach. Close monitoring of use, impacts, and trends will enable the Bureau to later fulfill public needs in such a manner that does not impair future primitive recreation.

Road access - There are numerous roads and jeep trails providing adequate access routes to the proposed boundaries. There is no need either for im-

provement of these existing roads and trails or for construction of new ones. If a later assessment of the access system reveals a genuine need for improvement, improvements can be made by upgrading the directional sign system.

Sign systems - Only the major routes of travel are indicated by directional signs. There is no immediate need for additional construction of directional signs.

Off Road Vehicle use - There appears to be little Off Road Vehicle use in the vicinity. Primitive Area classification may attract some ORV enthusiasts particularly as surrounding populations increase. ORV restrictions should be placed on several significant features outside the proposed Primitive Area. Vehicular and motorized use regulations should be included in the interpretation brochure.

Road closures - The lava's ruggedness has generally impeded vehicular travel on the lavas. Only a few jeep trails need be closed where they are hazardous to public safety.

Trails - There are no well defined trails on the lavas. The openness of the volcanic landscape does not inhibit travel in any one direction. No construction of cairns or trails is recommended as it would be tedious and expensive work that at best may be only a convenience to what few recreationists may use them.

Boundaries - Generally the boundaries should follow the lava margins. Where private lands and other encroachments of civilization are adjacent the lava, it is recommended a buffer zone be established between them and the Primitive Area boundary. Two legal descriptions are given, one for the protective land withdrawal, the other for the classification of the Primitive Area.

Land Withdrawal - There is foreseeable conflict between withdrawal of lands for Primitive classification and the request for geothermal exploration. As its next step in the designation process, the Bureau should propose land withdrawal

from all forms of appropriation including the mining and mineral leasing laws.

Research Natural Areas - Roads and other imprints of man impair suitability for Primitive classification of Split Butte, Bear Butte and Crater, and Snow-drift Crater. It is recommended these three outstanding features be designated as Research Natural Areas.

PREVIOUS WORK

Prior to the Wilderness Institute's summer studies, only a limited amount of study had been done in the vicinity. The field study boundaries were delineated by the BLM without any previous field investigations. The Bureau planning system has been completed on only two of the four planning units partially contained within the proposed Primitive Area. One, the Big Desert Management Framework Plan (MFP) recommends Primitive Area classification in order to "protect the scenic, scientific and wilderness values of the volcanic landscape." (see Appendix A) Big Lost River MFP is the other completed planning unit while the remaining two, Minidoka and Wildhorse planning units of the Shoshone District, are expected to be completed by 1980 at the earliest.

Previous work in the area is essentially limited to that of a few geologists and biologists. Urban and Bullard (1971) were contracted by the Park Service to study and report on potential desert park lands within the Great Rift region. Prinz (1970) has made an analysis of the Idaho Rift System which is commonly referred to as the Great Rift. More recently, Duane Champion (1973) completed a master's thesis that investigates the large scale morphology of the Wapi Lava Flow while Lawrence Kelley (1975) analyzed the geology of Bear Butte. An excellent field guide to the volcanics of the south central Snake River Plain was compiled by Ronald Greeley and John S. King in 1975.

AREA DESCRIPTION

The geographic limits of the proposed Primitive Area are approximately 275,000 acres of land within The Craters Of The Moon and Wapi Lava flows. It lies within the Idaho Falls and Shoshone BLM districts, and includes segments of Butte, Blain, Power and Minidoka counties of southern Idaho. Nearby towns are Arco to the north, Carey and Kimama to the west, Minidoka and American Falls to the south with Blackfoot and Idaho Falls to the east.

All of the proposed Primitive Area is public land, principally administered by the BLM, with numerous inholdings of state lands. The surrounding lands are also primarily public: those administered by the Park Service at Craters Of The Moon National Monument, and other lands managed by BLM (see land status-map overlay, Appendix N) Craters Of The Moon Wilderness is contiguous to the proposed Primitive Area's northwest boundary within the Craters Of The Moon Lava Flow. Private lands used for farming and grazing lie adjacent to the proposed northern boundary near Arco. Flanking the eastern edge of the Wapi Flow are private agricultural lands, mostly fields of dry land wheat and irrigated potatoes. The Great Northern Railroad follows the southern margin of the Wapi Flow.

Only ten miles separate the Wapi Flow from the southern-most portion of the larger Craters Of The Moon Flow. This corridor between lava flows is the route of the Arco-Minidoka road. Because the two distinct flows are associated with the same rift system, they are being considered for inclusion into one BLM Primitive Area. Such classification should simplify study, designations and management plans for the two wild areas.

Nearby features include a prominent landmark to the northeast known as Big Southern Butte, The Pioneer Mountain Range rising to the north and Crystal Ice Cave located between the two lava flows. The Crystal Ice Cave is a privately developed commercial cave operated under a Special Land Use Permit issued by the BLM. Guided tours take visitors 150 feet below the lava surface and overlooking the Great Rift to see spectacular ice formations. This area's uniqueness was formally recognized in 1971 when it was registered as The Great Rift National Landmark.

The Great Rift is located within the Snake River Plain of south-central Idaho, a sagebrush-grassland region within the Northern Desert.

The Plain is a flat accumulation of Quarternary lava flows containing occasional eruptive centers (Champion, 1973). The plateau's eastern surface is covered with late Pleistocene and recent basalts and is controlled by a late Tertiary downwarp, with some minor marginal faulting. The fault block mountains north and south of the east half appear to plunge beneath the surfaces of the lava (Malde 1965). The late lavas of the eastern half, including those of the Wapi and Craters Of The Moon fields are known as the Snake River Group. Geologists believe that basalt accumulations have gradually forced the Snake River to its present south marginal position.

The aggregate thickness of the lava of the eastern half is not known as there is no well drilling data through the pile. Seismic data between Craters Of The Moon and Idaho Falls indicate at least 1,300 meters of lava and electrical resistivity data indicate a 2,000 meter maximum for a profile from Arco to Blackfoot (Zohdy and Stanley, 1972).

Climate in the Great Rift country is semi-arid and similar to that which prevails over the Snake River Plain. The entire plain generally lacks precipitation, high relief, and streams. Due to the very porous nature of

basalt lava and soils formed from it, water penetrates the surface rapidly and is absorbed into the Snake River aquifer system. This area of the Snake River Plain receives an average annual precipitation of less than ten inches, falling primarily as snow. Average annual snowfall in the Craters Of The Moon National Monument is about 40 inches with snow recorded every month but July and August.¹ Desert areas near the Monument and Pioneer Range receive slightly more precipitation than the Wapi region to the south.

Summer temperatures at nearby Arco average 77°F, although surface temperatures on the lava may commonly exceed 100°F. The mean annual temperature is 40.8°F, while winter temperatures are often below zero.

The year round prevailing wind direction is southwest.

¹ Taken from records of the U.S. Weather Bureau, Arco, Idaho

NATURAL

RESOURCES

GEOLOGY

The volcanic features within the proposed Great Rift Primitive Area are the most outstanding of the resources contributing to the character of the region. The lava's presence has greatly affected all forms of plant and animal life. An unusual combination of lava and desert fauna and flora, all in a pioneer stage of succession, provides incomparable scientific and educational opportunity in a natural ecosystem.

Thought to be the longest and deepest rift system in the world, the Great Rift's singularity is augmented by its many cinder cones, spatter cones, lava cascades, craters, kapukas, and lava tubes. The profusion of lava is remarkably fresh and virtually unweathered.

As mentioned, the proposed Primitive Area encompasses the Wapi Lava Flow and most of the remaining Craters Of The Moon Flow not already withdrawn for the National Monument. These represent two of the most recent basalt lava flows in the eastern Snake River Plain. The others include the King's Bowl Flow at Crystal Ice Cave, Hell's Half Acre Flow near Idaho Falls and Blackfoot, and the Cerro Grande Flow in the vicinity of Big Southern Butte.

The depth of individual flows was estimated by Russell (1902) to be 50-80 meters. Recently, Champion (1973) calculated the depth of the Wapi Flow to be about 35 meters.

Idaho Rift System

The most significant feature in the Snake River Group lava is the Great Rift. It was the first described and named at Craters Of The Moon National Monument by Sterns in 1924:

"The source of the lava was a reservoir of unknown size and depth some miles below the crust in

this part of Idaho. Many geologists think the original source of the lava lies in a basaltic substratum about 11 miles below the earth's crust. Whether the lava ascended directly to the surface from such a substratum or proceeded upward from a large pod-shaped reservoir that lay several miles above is unknown. Regardless of the depth and shape of the supplying reservoir, the lava rose through the upper part of the crust along several well defined fissures parallel to each other and confined to a narrow belt known as the Great Rift Zone."

Actually there is a whole series of fissures that trend southeasterly toward the Snake River. According to Champion (1973), the rifting or fracturing of the earth's crust structurally controlled most of the vents in the eastern Snake River Plain. The Rift was likewise responsible for formation of the Wapi and Craters Of The Moon lava fields.

Referring to the fissures as the "Idaho Rift System," Prinz (1970) recognized four distinct but somewhat continuous rift sets (see map, page i). These include the Great Rift Set within Craters Of The Moon Flow, the Open Crack and King's Bowl Rift Sets both located outside the proposed Primitive Area between the Wapi Flow and Fissure Cave region, and the Wapi Rift Set. The latter set is merely inferred as there is no surface evidence of fissures anywhere on the Wapi Flow. The Open Crack Rift Set is the only one of the four sets not having any major volcanic features directly associated with it. All four sets trend in a southeasterly direction, suggesting that all are related to one large rift zone. The length of the entire rift system is 60 miles, the longest known rift zone in the United States.

By a radiocarbon dating method Prinz (1970) estimated the age of the King's Bowl Rift at 2,130 years. Ages of the Wapi and Craters Of The Moon Flows are presumably about the same.

Actual formation of the Great Rift was probably the result of crustal movements associated with movement of the mantle. Extension of the crust opened the rifts, relieving pressure on the mantle which partially

melted to form basalt magmas which rose to the surface and erupted to form the lava fields we see today. The earth was opened at least two to five feet along the Rift allowing dike complexes to feed the surface flows. The fluid nature of the flows, which erupt at a temperature of 2,000°F, is evidenced by the several long "fingers" of lava which flowed to the southwest, especially within the Wapi Flow. As the lava receded it spilled back into the Rift, plugging it up along most of its length.

The King's Bowl Rift Set is the most distinguished rift set within the Idaho Rift System. Crystal Ice Cave, King's Bowl and King's Bowl Lava Flow are all associated with it. All these features are protected within the Great Rift National Landmark.

Pahoehoe and Aa Lavas

The basalt lavas of the Craters Of The Moon Flow include both flow types, pahoehoe and aa. The pahoehoe type is more common; the aa type is scattered throughout the northern two thirds of the Craters Flow. Except for the Pillar Butte area, the entire Wapi Flow consists of pahoehoe type lava. Its relatively smooth surface makes pahoehoe easier to walk upon.

An interesting feature of pahoehoe flows is the wrinkled surface which formed when the lava's cool crust was dragged into ropy looking folds by the hot and still liquid mass moving beneath. When ropy pahoehoe flowed down a steep slope, it created cascades of lava. Referred to as "blue lavas" some pahoehoes have an irridescent blue crust of glassy basalt formed by rapid chilling of the surface skin. The blue lavas are very brittle and weather much more rapidly.

In contrast, aa lava is a rough mass of lava blocks either floated along on a pasty lava mass or pushed along the edges. Aa contains minute spines made when viscous lava was pulled out by escaping gases.

Cinder Cones, Spatter Cones and Lava Tubes

Cinder cones and spatter cones are common along the Great Rift. The prominent cinder cones average two hundred feet high. During their formation, explosive vents sent cinders skyward which fell back around the vent. Some cinders, called breadcrust bombs, filled with air and expanded in flight. One outstanding feature of cinder cones is their cinder gardens of wild flowers dominated by dwarf buckwheat (Eriogonum ovalifolium var depressum). Others include scorpionweed (Phacelia hastata), bitterroot lewisia (Lewisia rediviva) and dwarf monkey flower (Mimulus nanus). North Laidlaw Butte and Blacktail Butte are excellent cinder cone examples.

Smaller spatter cones and spatter ramparts are found at several points along the Rift; they may be anywhere from ten to 100 foot high. Spatter ramparts frequently line the Great Rift set on either side. The most impressive are directly southeast of Blacktail Butte. Smaller spatter cones can be distinguished within most cinder cones and major vents.

Spatter globs of hot viscous lava were ejected from a vent by escaping gases. The spatter piled up in layers creating red and orange colored cones. Aerodynamically spiraled and twisted forms known to volcanologists as ribbon and spindle bombs, can be found around all spatter formations.

Lava tubes are common within the lava flows. The hollow tubes were formed when a central core of liquid lava continued to flow after its surface and sides had cooled and hardened. Lava tubes occur solely in pahoehoe type flows. The tubes vary in size from three to 50 feet inside diameter. As the main tubes flowed they divided and sub-divided into smaller tubes, thus feeding the entire flow. Their lengths average several thousand feet, but entire systems may branch and extend for several miles.

Although lava tubes are probably quite common, there are only a

few places where a portion of the roof has collapsed to allow entrance. The best example is Bear Trap Cave, easily accessible on the Arco Minidoka road. Numerous depression pits found throughout the lavas, but primarily along the edges, are thought to be associated with these collapsed lava tubes. It is these 20-40 foot deep depression pits that give the landscape a lunar appearance, resembling numerous craters.

The interiors of most lava tubes display a perforated appearance similar to that of a sponge. As the tubes inner shell cooled, dripping or stalagmites formed in a more rounded fashion. These cave drippings are quite brittle, often only a thin "bubble" of lava, formed as gas escaped the basalts.

Magnetite Crystals

All lavas contain iron minerals including a magnetic iron oxide known as magnetite. The presence of magnetite causes compass needles to deviate from true magnetic north, often making compass readings inaccurate when taken on the lavas. The deviation is different from place to place, depending on the orientation of the earth's magnetic field when the eruption occurred.

By measuring its magnetic orientation it is possible to determine the relative age of a lava feature by referring it to the known position of the north magnetic pole during the recent geologic past. Such an analysis to compare the age of various lava flows is currently being made by Duane Champion.

Parks-Kapukas

The landscape of the Craters Of The Moon and Wapi Flows isn't represented entirely by barren lava rock. When the lava flowed from its source vents, certain high desert lands were not inundated by the molten mass. Small islands of sagebrush communities can be found throughout the lavas and more frequently near the marginal areas. Hawaiians refer to these parks of land as "kapukas".

Most of the kapukas are remnants of earlier volcanic activity, either cinder cones, craters, or lava shields. The largest kapuka is Bear Park located in the center of the Craters Of The Moon Flow.

These parks have an especially high recreational value. They offer color and variety to the volcanic landscape. Wilderness users in the future may utilize these areas for overnight camping.

SPECIFIC LAND FEATURES

Craters Of The Moon Lava Flow

The Craters Of The Moon Flow contains the most significant features within the proposed Primitive Area including many cinder cones, spatter cones, aa lava fields and the only evident surface openings of the Great Rift. Over 50,000 acres of the Craters Flow is protected in the Craters Of The Moon National Monument, while approximately 200,000 acres of the flow lie within the proposed Great Rift Primitive Area.

The Craters Flow within the proposed Primitive Area is nearly 40 miles long from north to south and averages ten miles wide from east to west. On the northern and eastern perimeters lie two fields of older lavas which are estimated to be 4,000-5,000 years old.

Following is a general description of some of the more specific features within the Craters Of The Moon Flow.

Great Rift

This extraordinary volcanic feature is the deepest open volcanic rift known in the world. It is probably the surface expression of a fracture that cuts entirely through the continental crust. It begins in Craters Of The Moon National Monument where numerous cinder cones are associated with it. The Rift extends from the Pioneer Mountains southeast through the Monument's Vermillion Chasm and beyond to Blacktail Butte in the proposed Primitive Area. It is intermittently open throughout its length, yet for the most part it was filled by receding lavas. From Blacktail Butte southeast to Fissure Cave the Rift is easily recognized, representing about eight miles of open fissures. Throughout this stretch, spatter cones and spatter ramparts line the Rift

while Blacktail Butte augments the volcanic horizon.

Human descent into the Rift is seldom possible; where possible one can readily descend anywhere from 30-60 feet or until the Rift is plugged by talus. The deepest descent made by speologists has been 800 feet, the level at which solid ice blocked further descent.

The spatter ramparts immediately southeast of Blacktail Butte are especially fascinating. Walls of viscous lava were built up as high as 50 feet on either side of the Rift. As globs of the fiery lava were ejected from the Rift, they caked to one another, building intricately designed layers. Several bridges of spatter lava span the Rift while a series of 15 foot tall spatter cones stretches immediately northwest of the Butte.

The Rift is a natural animal trap containing numerous dead snakes, rodents, and skeletal remains. The cool moist air rising out of the Rift provides a sanctuary during hot dry summers. Kangaroo rats and pack rats are frequently seen near the Rift, while nests of the latter can be distinguished. At one point bison bones were identified 40 foot deep in the Rift. Other animals frequently seen inhabiting microniches around the Rift include bees, wasps and bats.

Blacktail Butte

Blacktail Butte is the highlight of the Craters Flow with the Great Rift bisecting it. The two-thirds mile long and one-fourth mile wide cinder cone has six major vents down its midsection. Spatter formations extend out either side of the Butte as well as within it.

Unnamed on the map, Blacktail Butte lies in Range 26 East, Township 2 North, section 36. This central location allows one to see the 200 foot high cone from any prominent position within the Craters Flow. Likewise, the cone's height affords one an excellent view of the Craters Flow.

The vegetation and wildlife are similar to that found on cinder cones in the nearby Monument. It supports limber pine (Pinus flexillis), antelope bitterbrush (Purshia tridentata), big sagebrush (Artemisia tridentata), dwarf buckwheat (Eriogonum Ovalifolium v. depressum), and monkey flower (Mimulus nanus) on the cinder slopes. In particular, the north and east slopes are covered with large limber pines, while the west slope is a steep, unvegetated wall of cinders. Thick stands of junipers are located one-half mile west and one mile east of the Butte, offering good wildlife habitat. Clark's nutcrackers are especially common on the Butte and a pair of koestrels were seen on two separate occasions, presumably nesting nearby.

Two discoveries on the Butte are unexplainable. First, a short but obviously worn trail leads down a cinder slope just above one of the major vents on the south end. By July, water was still standing in the bottom of this vent. Spring and early summer use by Indians to get water is one plausible explanation. The other mystery is the broken remains of a wooden barrel and a three meter section of two inch water pipe found at the east base of the Butte.

Purple Butte

Purple Butte is a 200 foot tall crater kapuka which lies about three miles southwest of Blacktail Butte. Surrounded by aa lava, it is less accessible than other features. From its top one can easily see Laidlaw Park, Craters Of The Moon National Monument, Blacktail Butte, Coyote Butte, and Bear Park. The vegetation found here is much like other kapukas, being dominated by threetip sagebrush (Artemisia tripartita).

Fissure Cave

Fissure Cave is located two miles west of Cox's Airstrip. In reality there is no cave, but only a portion of the Rift which is mostly filled in with

talus and soil. Planimetric maps show a jeep trail leading up to the fissure; however, field inspections and examination of aerial photographs reveal no such trail.

Bear Park

Bear Park is the largest kapuka within all of the proposed Primitive Area. Located in Township 3 South midway across the lava flow, the Park covers approximately two and one half square miles. Geologically, Bear Park is the eroded remnant of an old vent area containing a shallow crater at its summit (Urban and Bullard 1971). The summit served as a triangulation station for the U.S.G.S.

During the springtime of some recent years a band of sheep has been trailed across one and one half miles of lava to reach the Park. The trail is intermittently marked with cairns and flagging material, yet remains difficult to follow. Trailhead access is reached by taking seven miles of jeep trails from the Arco-Minidoka road.

Grazing by domestic sheep has noticeably altered natural vegetation. The ridges have been affected most severely, evidenced by mustard (Sisymbrium altissimum) and cheat grass (Bromus tectorum). The fringes and flats are dominated by native plants, sagebrush and bluebunch wheatgrass (Agropyron spicatum). These dominants would likely outcompete and eliminate undesirable plant species and restore Bear Park to native range conditions in several years if grazing were to be discontinued.

Table I (page 24) is a list of the positively identified plants and their common names, arranged in accordance to plant classes and abundance.

TABLE I: PLANT COMPOSITION OF BEAR PARK

A - Abundant
N - Nonabundant

GRASSES

<u>Scientific Name</u>	<u>Common Name</u>
<u>Agropyron spicatum</u> (A)	bluebunch wheatgrass
<u>Bromus tectorum</u> (A)	cheatgrass brome
<u>Elymus cinereus</u> (A)	giant wild rye
<u>Festuca idahoensis</u> (N)	Idaho fescue
<u>Koeleria cristata</u> (N)	prairie Junegrass
<u>Oryzopsis hymenoides</u> (N)	Indian ricegrass
<u>Poa nevadensis</u> (N)	Nevada bluegrass
<u>Poa secunda</u> (A)	Sandberg bluegrass
<u>Sitanion hystrix</u> (N)	bottlebrush squirreltail
<u>Stipa comata</u> (N)	needle and thread
<u>Stipa thurberiana</u> (N)	Thurber needlegrass

FORBES

<u>Allium</u> spp. (A)	onion
<u>Aster</u> spp. (N)	aster
<u>Balsamorhiza sagittata</u> (A)	arrowleaf balsamroot
<u>Crepis acuminata</u> (N)	tapertip hawksbeard
<u>Eriogonum ovalifolium</u> (N)	cushion Eriogonum
<u>Leptodactylon pungens</u> (N)	lava phlox
<u>Lomatium</u> spp. (A)	Lomatium
<u>Lupinus</u> spp. (A)	lupine
<u>Opuntia polyacantha</u> (N)	plains pricklypear cactus
<u>Phlox</u> spp. (N)	phlox
<u>Purshia tridentata</u> (A)	antelope bitterbrush
<u>Sisymbrium altissimum</u> (A)	tumblemustard
<u>Tragopogon dubius</u> (N)	salsify
<u>Zigadenus paniculatus</u> (N)	foothill deathcamus

SHRUBS

<u>Artemisia tripartita</u> (A)	threetip sagebrush
<u>Artemisia tridentata</u> (A)	big sagebrush
<u>Chamaebatiaria millefolium</u> (N)	tansybush
<u>Chrysothamnus nauseosus</u> (A)	rubber rabbitbrush
<u>Chrysothamnus viscidiflorus</u> (A)	Douglass rabbitbrush

North Laidlaw Butte, Snowdrift and Bowl Craters.

These features are located around the north end of Laidlaw Park, within one mile of the National Monument boundary. The most prominent, North Laidlaw Butte, is a steep, rounded cinder cone containing some spatter formations. At 5900 feet it is the highest point both within the proposed Primitive Area and the entire Craters Flow. The steep relief on unstable cinder slopes makes it a challenging 500 foot climb. The butte is completely surrounded by recent lavas, but is an easy hike from a road at nearby Snowdrift Crater.

Snowdrift Crater resembles an elongated football stadium, 150 foot deep, and three-quarters of a mile long. Situated on the north facing slope at the south end is a dense stand of quaking aspen (Populus tremuloides). The presence of aspens in the desert is unusual since they are usually found in moist mountainous regions. Other somewhat disjunct plants identified include common chokecherry (Prunus virginiana) and snowbrush ceanothus (Ceanothus velutinus). Man's influence around the crater includes an often traveled dirt road, a trash pile on the rim, and livestock trails leading into the crater. These imprints impair its suitability for Primitive classification, however a suitable alternative would be designation as a Research Natural Area.

Two miles east of Snowdrift Crater lies Bowl Crater, another remnant of earlier volcanic activity. Jeep tracks lead up to the rim of this crater, but access is best made by walking from Snowdrift Crater because of a locked gate controlling access to the Ellsworth Well and surrounding private lands.

Numbers of mule deer in this vicinity are larger relative to the flows farther south. A summer herd concentrates around this particular area, where numerous limber pines offer excellent cover habitat upon the lavas. The mule deer's favorite browse plant, Antelope bitterbrush (Purshia tri-dentata), is significantly abundant throughout the lavas and even on North

Laidlaw Butte.

Parks

The Park indicated on the map in sections 27 and 34, of Range 25 East, Township 3 South, is one-half mile from the lava's edge. This kapuka shows evidence of a hot fire having passed through within the past ten to 20 years as indicated by the numerous large stumps of burned sagebrush. A relative lack of vegetation makes it apparent that the fire's intensity sterilized much of the soil. In many places only Sandberg bluegrass (Poa secunda) has reinhabited the burn. This park offers a good study area for post-fire plant succession and soil analysis.

Two more sizeable parks are located in sections 18 and 19, Range 25 East, Township 4S. Access to these parks is made by foot from near South End Lake in Laidlaw Park. There is no evidence of recent fire or grazing in either park. The soil is shallow and there are no sizeable stands of sagebrush. Without fire control these kapukas could likewise make an excellent study area following a fire.

Parks in general offer good habitat and forage for what few mule deer (Odocoileus hemionus) inhabit the lavas and surrounding desert. Three bucks were sighted in the latter set of parks.

Bear Crater

Bear Crater is a large triangular summit vent found on Bear Butte in section 18, Range 27 East, Township 4 South (see map, p.101). The 250 foot deep crater is one-half mile long and contains several sinuous channels through which lava poured. This prominent landmark north of Crystal Ice Cave was the subject of intensive graduate study by Lawrence M. Kelley during the summer of 1974. His thesis is available at the Idaho Falls district office. Kelley defined the geologic history of Bear Butte and described the relationships of

several volcanic flow features associated with it. His work also involved field mapping and petrographic analysis of the basalt rocks. A final section provides criteria for comparative analysis to Martian analogs.

Wapi Lava Flow

The Wapi Lava Field marks the southern end of the Great Rift System. The olivine basaltic lava is predominantly filamented pahoehoe. Lying just south of Crystal Ice Cave and 20 miles west of American Falls, the Wapi covers 415 km^2 (Champion 1973). Champion estimated an average thickness of 35 m. and volume of $14.5 \times 10^9 \text{ m}^3$. The Wapi is elongated north and south for 18 miles while it averages ten miles wide. Several three mile long lobes extend out from the main flow; one extends to the west toward Split Butte, others to the north and east. Along the eastern and northern margins the lava flow was generally "ponded" whereas along the west and south the margin was broken up into long and narrow flows. These lingular flows no doubt represent the southwesterly slope of the Snake River Plain. Furthermore, Champion reasons that the southern edge of the Wapi Flow was shaped by the prevalent sand dune blowouts in this region.

Whereas Prinz (1971) feels the Wapi originated from a separate rift set, Champion feels the flow was associated with an extension of the King's Bowl Rift Set. Neither hypotheses have been proven since the Wapi's source is buried under the Pillar Butte vent area, leaving no surface evidence. A higher relief and general lack of large scale features as one gets closer to Pillar Butte support this hypotheses of Pillar Butte overlying the Wapi's source.

Pillar Butte

Pillar Butte is a large spatter rampart on a low mound of lava. It culminates the Wapi Flow about 25 km. north of the Snake River. Travelers along the Oregon Trail used its striking relief as a landmark.

Much of the lava around Pillar Butte is the aa type with prominent channels. These aa flows overlies and were preceded by the large pahoehoe

flows which compose the majority of the Wapi Flow. Yet the difference in ages is probably a matter of only weeks or months (Champion 1973).

There are ten major vents in the summit area, each contributing to the more recent flows which cover the source of the Wapi Flow. Besides these ten craters, the Pillar Butte contains many well preserved volcanic features. Lava tubes of various sizes and lengths flow in all directions from the summit. Lava cascades and channels of aa contribute to the unusual landscape.

The Pillar is near the northeast end of the Wapi and is accessible by four miles of jeep trail leading from the Crystal Ice Cave Road into Wapi Park. It is approximately a 45 minute one and one-half mile walk from the trail's end. From the Pillar's top one can see nearly all the Wapi stretching to the southwest.

Wapi Park

Wapi Park is an interesting peninsula of an older vent area surrounded in every direction but the north by the more recent Wapi lavas. Thus Wapi Park is not a true park or kapuka. It is located three and one-half miles south of Crystal Ice Cave. A continuous stand of quaking aspens abut the lava's edge for three-fourths of a mile. The presence of aspens is perplexing in this otherwise desert environment. It's likely that a source of water lies close beneath the surface.

There is little evidence of established use in Wapi Park. Outside of the primitive jeep trail leading from the Crystal Ice Cave road, the only other imprint of man is one fire ring.

Access into the area is difficult requiring at least a pickup. The road could easily be closed in the northeast corner of Wapi Park where it is difficult crossing a rocky high point (see map, page 98). If protected

from vehicular access, Wapi Park would serve as an ideal primitive walk-in campsite and still provide an access point to Pillar Butte. Its aesthetic beauty and primitive values may offer a more pleasurable experience by walking rather than driving.

Section 36 Kapuka

An interesting kapuka lies at least three miles from the nearest lava's edge in the middle of the Wapi Flow. Located in section 36, Range 27 East, Township 6 South, the crater has no name. Geologically, the kapuka is a cinder and spatter cone whose crater wall was partly flooded by the more recent Wapi lavas.

Mule deer are present around the kapuka while the vegetation is similar to that of other kapukas under natural range conditions. The outer slopes of the cone are covered with an association of Artemisia tripartita and Grayia spinosa while the subdominates include Festuca idahoensis, Opuntia polyacantha, and Eriogonum microthecum (Urban and Bullard 1971). One of the fascinating features of this kapuka is the presence of several large junipers along the crater's inner rim. The largest one is estimated to have a three foot diameter while several others have at least a two foot diameter. The large growth is probably due to the lack of fires on this barren landscape, and its inaccessibility to man and his saw.

Old Wood Road

Juniper trees inhabit the eastern and southern portions of the Wapi. During the depression, those who braved the desert searched for wood to use for fence posts and firewood. At least two places upon the Wapi still reveal the tracks left by horse drawn wagons, while numerous large stumps are scattered among the living junipers. Elliot Davis of American Falls reported that in

1930, 139 posts were made from just one tree in the vicinity of Winter Kapuka, four miles due east of the Pillar.

The other wood road is located approximately ten miles east of Minidoka. Here tracks cross the lava three times before reaching a large park where junipers are numerous on surrounding lavas. Upon field inspection one can see the remnant stumps of once majestic junipers. The historic value and the tree covered lavas add noticeable variety to the Wapi.

Split Butte

Split Butte Crater is by far one of the most unique volcanic features in the Snake River Plain, comparable to Menan Butte. The butte consists of an outer tephra cone which encloses an inner lava lake and pit crater. The Butte's uniqueness triggered studies by Dr. Ronald Greeley in 1969. Others, including Dr. John S. King, have since completed extensive field research to uncover the mysteries of its formation. A publication entitled "Geologic Field Guide to the Quarternary Volcanics of the Snake River Plain, Idaho" was printed in May, 1975.

Minimal evidence of ORV was recorded and photographed.

Because a well established jeep road passes the crater's base, it may not be suitable for Primitive classification. Designation as a Research Natural Area is a suitable alternative to protect the scenic, scientific, and educational values of Split Butte.

BIOLOGICAL FEATURES

Vegetation

Most of the landscape in the proposed Primitive Area is bare lava rock, virtually unweathered. Since the most recent eruptions 2,000 years ago there has been little formation of soil. The freezing and thawing effects within porous basalts combine with wind actions and lichen colonies to break down the lavas. Soil then accumulates in the crevices, cracks, and pressure ridges, where moisture combines with it to provide a niche for a unique kind of desert plant community.

Different stages of natural plant succession can be seen within the lavas. Pioneer species including mosses, lichens and ferns are the first to invade the barren landscape. After sufficient soil formation and retention of water, the more advanced flowering plants establish themselves. Eventually large crevices support shrubs and even trees, although not as a commercially valuable resource. As organic matter and soil accumulates, sagebrush will become the dominant plant and unless further eruptions occur, the area will some day resemble the surrounding Snake River Plain.

To supplement any previous brief descriptions of specific vegetative features, a list of the most common plants has been compiled (see Table II, p. 34). Most plants listed occur in both the Craters Of The Moon and the Wapi Flows. However, Urban and Bullard (1971) feel that plant communities of the Wapi Flow are strikingly similar to those of the Great Basin (salt-desert shrub) biotic province while those of the Craters Of The Moon Flow are more typical of the Northern Desert province. To support their hypothesis, they pointed out that the southern and eastern margins of the Wapi Flow support an unusual stand

of curl-leaf mountain mahogany (Cercocarpus ledifolius), as well as the Rocky Mountain Juniper (Juniperus scopulorum).

Table II - Common Plants of the Proposed Great Rift Primitive Area¹

Antelope Bitterbrush	<u>Purshia tridentata</u>
Range:	mostly Craters Of The Moon Flow, especially northern regions
Habitat:	cinder cones and broken pahoehoe flows
Importance:	favorite deer browse and provides food and shelter for insects and small mammals.
Big Sagebrush	<u>Artemisia tridentata</u>
Range:	Craters Of The Moon and Wapi Flows
Habitat:	cinder cones, crevices, and especially kapukas
Importance:	climax dominant species and food source for many animals
Bush Rock Spirea	<u>Holodiscus dumosus</u>
Range:	Craters Of The Moon and Wapi Flows
Habitat:	deep crevices and pressure ridges
Cushion Eriogonum	<u>Eriogonum ovalifolium</u>
Range:	Craters Of The Moon and Wapi Flows
Habitat:	crevices and older pahoehoe flows
Desert parsley	<u>Cymopterus terebinthinus</u>
Range:	Craters Of The Moon and Wapi Flows
Habitat:	shallow crevices of pahoehoe
Importance:	foliage used by Indians as a salad green
Dwarf buckwheat	<u>Eriogonum ovalifolium</u> var. <u>depressum</u>
Range:	Craters Of The Moon and Wapi Flows
Habitat:	cinder cones and shallow crevices
Importance:	soil stabilizer
Dwarf monkey flower	<u>Mimulus nanus</u>
Range:	Craters Of The Moon and Wapi Flows
Habitat:	cinder cones and broken lavas
Fernleaf fleabane	<u>Erigeron compositus</u>
Range:	Craters Of The Moon and Wapi Flows
Habitat:	shallow crevices
Gland cinquefoil	<u>Potentilla glandulosa</u>
Range:	Craters Of The Moon and Wapi Flows
Habitat:	shallow crevices
Importance:	soil stabilizer
Golden currant	<u>Ribes aureum</u>
Range:	Craters Of The Moon and Wapi Flows
Habitat:	pressure ridges and deep crevices
Importance:	edible berries

1. This table, compiled from an excellent photo-documented book entitled Common Plants of Craters Of The Moon National Monument by Karl Urban, is by no means complete. Urban also compiled a revised checklist of plants (see Appendix H).

- Hairy goldaster Chrysopsis villosa
 Range: Craters Of The Moon and Wapi Flows
 Habitat: shallow crevices
 Importance: soil stabilizer
- Indian paintbrush Castilleja chromosa
 Range: primarily Craters Of The Moon Flow
 Habitat: shallow crevices
- Lewis mockorange (syringa) Philadelphus lewisii
 Range: Craters Of The Moon and Wapi Flows
 Habitat: pressure ridges and deep crevices
 Importance: Idaho state flower
- Limber Pine Pinus flexilis
 Range: northern half Craters Of The Moon Flow
 Habitat: cinder cones and lava flows
 Importance: provides niche for chipmunks, squirrels, birds, and insects; source of organic matter
- Prickly pear cactus Opuntia polyacantha
 Range: Craters Of The Moon and Wapi Flows
 Habitat: shallow crevices and older pahoehoe flows
 Importance: food source for many desert animals; fruits were eaten by Indians
- Rocky Mountain Juniper Juniperus scopulorum
 Range: Craters Of The Moon and Wapi Flows
 Habitat: crevices
 Importance: food and shelter for birds and mammals
- Rubber rabbitbrush Chrysothamnus nauseosus
 Range: Craters Of The Moon and Wapi Flows
 Habitat: shallow crevices, cinder cones, and especially kapukas
 Importance: soil stabilizer; food and shelter for jack rabbits and cottontails.
- Sandberg bluegrass Poa secunda
 Range: Craters Of The Moon and Wapi Flows
 Habitat: shallow crevices
 Importance: most common grass on lavas
- Scabland Penstemon Penstemon deustus
 Range: Craters Of The Moon and Wapi Flows
 Habitat: shallow crevices
 Importance: most abundant plant of shallow crevices
- Scorpionweed Phacelia hastata
 Range: Craters Of The Moon and Wapi Flows
 Habitat: cinder cones
 Importance: soil stabilizer

Tansy bush

Chamaebatiaria millefolium

Range: Craters Of The Moon and Wapi Flows

Habitat: pressure ridges and deep crevices

Importance: Indians rubbed the aromatic leaves of this plant
over their bodies to repel insects

Endemic Species

Although the presence of any disjunct or endemic species along the Great Rift is unrecorded, the possibility of such presence still remains. In a recently printed manual entitled A Directory to Disjunct and Endemic Plants of Central and Southern Idaho, author Robert W. Steele acknowledges the presence of several endemics in this region. Antennaria arcuata was found nine to ten miles east of Carey in Blaine County and Allium simillimum (onion) was identified at the west entrance to Craters Of The Moon National Monument. Finally, Oryzopsis swallenii (ricegrass) was located at various places along the northern edge of the Snake River Plain. These locations are in the general proximity of the proposed Primitive Area.

Wildlife¹

Although the volcanic landscape is generally barren, it still provides the habitat necessary for most animals common to the Idaho desert. The ecosystem's carrying capacity is lower for most animals; water is scarce while food and shelter is limited. For those animals that it does support, there is little, if any human pressure. The animals must undergo natural stages of succession just as the plants do. While bitterbrush and junipers are present, mule deer (Odocoileus hemionus) will thrive; but as sagebrush succeeds as the dominant plant type, pronghorn antelope (Antilocapra americana) will likely out compete and displace the mule deer.

Lava tubes, pressure ridges, and collapse depression pits offer endless shelters for predator dens. Coyotes (Canis latrans), bobcats (Lynx rufus), and badgers (Taxidea taxus) are probably the most common predatory mammals, coyotes being the most prevalent. Mountain lions (Felis concolor)

1. See Appendixes B and C for a complete list of birds and mammals found in Craters Of The Moon National Monument.

are present, as one was seen July 16 in a more remote area south of Laidlaw Park. Paleontological remains indicate that grizzly bears (Ursos arctos), wolves (Canis lupus), and red fox (Vulpes vulpes) were present at one time.

Predatory birds are present and possibly nesting in remote areas as several falcon-like nests were seen. The most common species is the marsh hawk (Circus cyaneus), seen most every day hovering near and sometimes over the lavas. Other species positively identified in and around the proposed Primitive Area include the American kestrel (Falco sparvius), Ferruginous hawk (Buteo regalis), golden eagle (Aquila chrysaetos), prairie falcon (Falco mexicanus), Swainson's hawk (Buteo swainsonii), and several unidentified owls.

The presence of rodents is especially dependent upon the amount of vegetation available. What few limber pines are found in the Craters Of The Moon Lavas provide food and shelter for goldenmantled ground squirrels (Citellus lateralis), least chipmunks (Eutamias minimus), and yellow pine chipmunks (Eutamias amoenus). Other rodents include kangaroo rats (Dipodomys ordii), pack rats (Neotoma cinerea), and the yellow bellied marmot (Marmota flaviventris). Closely related Lagomorpha include the Pygmy rabbit (Sylvilagus idahoensis), Nuttall's cottontail (Sylvilagus nuttallii), and the black-tailed jack rabbit (Lepus californicus).

The most commonly seen ungulate is the pronghorn antelope. They were seen in groups of two to six throughout the western portions of the Big Desert. Several mule deer bucks were observed utilizing forage and cover in kapukas within the Craters Of The Moon Flow. Mule deer are probably more abundant in the northern half of the Craters Flow where bitterbrush is widespread. Drop-pings and tracks were seen in nearly every kapuka. Elk (Cervus canadensis) have been seen as far south as the Wapi during severe winters. Elk and bison bones were also discovered in the "Open Crack Rift Set" of the Great Rift.

Game Birds

The eastern half of the Snake River Plain provides excellent habitat for sage grouse and mourning doves. By far the most abundant species of nesting bird on the lavas, the dove builds its simple grass nest in a crevice or under a ledge of lava rock. Nests were observed throughout the Craters Of The Moon and Wapi Flows, incubation lasting from mid-June through mid-August. In one of the larger vents on Pillar Butte, a small water hole attracts doves from surrounding lavas. As many as 75 game birds were recorded at this natural sanctuary at one time.

Sage grouse are known to utilize the lavas. Numerous early season (June-July) broods of eight to ten chicks were observed in the western half of the Big Desert P.U. By early September broods were smaller with four to six juveniles, each as large as the hen. Some biologists believe that the sage grouse migrates out of the desert into the Pioneer foothills to the north once vegetation dries up in the summertime.² If such a migration takes place, then undeveloped sagebrush habitat is critical along the migration route. Thus a protective withdrawal and Primitive classification of lands along the north end of the Craters Flow and south of Arco would be beneficial for management of the sage grouse.

Snakes

This wildlife description would not be complete without mentioning reptiles. Gopher snakes and rattlesnakes occur on the lavas, mostly on the margins near dense vegetation. Rattlesnakes were also observed in Bear Park and other kapukas as well. All snakes were seen more frequently in early morning and just before sunset.

2. A study to substantiate this hypothesis is being conducted by Idaho State Fish and Game Biologist, Russ Kozacek of Arco. He has trapped and banded sage chicks at numerous breeding grounds throughout the northern Big Desert.

WATER SOURCES

The water resource is atypical of the average watershed found in forest lands as accumulation of surface water in the desert area is negligible. This is due to several factors: ten inches average precipitation per year, a very porous parent material, and the lack of high relief. The only sources of water found were in two depression pits, two deep vents, and at various places down in the Great Rift (see Table III). The first four sources are highly seasonal and probably contaminated from the birds which come from miles around. Other vents and deep depression pits might also hold water in the spring and early summer. However the only dependable source of water is what a person takes with him; for even the Rift may dehydrate in a dry summer.

Table III - Water Sources

<u>Type Source</u>	<u>Location</u>
Hole in depression pit	Rge. 26 E., Twp. 2N., SW $\frac{1}{4}$ sec. 27
Hole in depression pit	Rge. 26 E., Twp. 2N., SE $\frac{1}{4}$ sec. 3
Vent in Blacktail Butte	Rge. 26 E., Twp. 1S., SW $\frac{1}{4}$ sec. 36
Great Rift from 30-50 feet deep	Southeast of Blacktail Butte
Vent on Pillar Butte	Beneath the Pillar

-
1. Water samples taken in the Rift indicated presence of intestinal bacteria. Even with climbing equipment and lights it is extremely dangerous descending into the Rift.

FORAGE AND GRAZING

The Snake River Plain is a vast desert of which several million acres are public domain administered by BLM. Most tangible resources, including minerals, timber, water, and fisheries are either scarce or non-existent. The predominant tangible resource is forage, which is leased to area ranchers for use by their domestic livestock, primarily during spring and fall months. Range improvements including fences, wells, reservoirs, and corrals are quite common throughout the desert. Most allotment boundaries extend up to and along the lava margins (see Appendix N , Map overlay).

The Institute anticipates little, if any, opposition to designation from constituents of the livestock industry simply because of a negligible forage resource on the lava. A few large kapukas within the lava flows are the only areas having potential grazing value. Lava margins constitute a natural barrier to domestic livestock due to their steep, rough, and rocky terrain. Because of the relative inaccessibility and lack of water in kapukas, coupled with the abundance of more accessible vast expanses of grazable public lands in the region, most kapukas have a history of no grazing.

All kapukas, with the exception of Larkspur Park, aren't figured into the carrying capacity of any grazing allotment. The plant communities in these small tracts of remote country have miniscule forage value compared to desert lands outside the lavas. In essence, any grazing use of kapukas in the Wapi and Craters Of The Moon flows may be considered a "free lunch".

An example of the above type grazing use occurs during wet spring seasons in Bear Park. More precisely, the carrying capacity figure for the nearby Big Desert sheep allotment does not include any allowable Animal Unit Months (AUM's) on Bear Park, according to the area manager of the Twin Buttes

Resource Area. In this line of reasoning, a formal closure of Bear Park to grazing would not alter the carrying capacity of the Big Desert Allotment. The Area Manager feels there is plenty of excellent range in the Big Desert Allotment to fit livestock needs without utilizing marginal forage in Bear Park.

Another area of consideration for closure to grazing is in the "Old Lava" region just south of Laidlaw Park (see map, page 99). Here, at least a narrow strip along the jeep trail is grazed, but only occasionally during seasonal sheep migrations to and from Laidlaw Park. The large scale flow features of this 4,000-5,000 year old lava flow are still discernible. Partially weathered features are sparsely vegetated. The grazing suitability of this region is marginal and is not allotted any AUM's or range improvements such as reservoirs and fences. Closure of this region to grazing would likewise not alter grazing capacity of nearby range. A short drift fence could control use. Continued grazing under a management system can be a compatible use within any wilderness so long as the allotment management plans are developed to minimize the impact of grazing on natural processes. In a BLM Primitive Area, grazing of domestic livestock "may be permitted by the authorized officer under such conditions and restrictions as he deems necessary to preserve primitive value" (BLM Manual, section 6221.06K).

In review of the attributes common to parks, the scientific, aesthetic, recreational, and primitive values are more significant than those forage values. For this reason it is recommended the Bureau adopt a policy prohibiting grazing of all kapukas within the Primitive Area boundary excepting those already allocated into grazing allotments. Furthermore, it is suggested that surrounding allotment management plans allow for minimal changes in plant composition and for no additional range developments within at least one-fourth mile of the Primitive Area boundary.¹

1. On this recommendation, there is a general consensus among managers of both the Shoshone and Idaho Falls districts.

 TABLE IV: GRAZING ALLOTMENTS IN AND AROUND THE PROPOSED GREAT RIFT PRIMITIVE AREA

<u>Allotment #</u>	<u>Allotment Name</u>	<u>Season of Use</u>
<u>Twin Buttes Resource Area</u>		
7017	Rudeen	Consult Area Manager
7000	Big Desert	Consult Area Manager
7004	Cox's Well	Consult Area Manager
<u>Lost River Resource Area</u>		
1010	Crater	4/16-6/30
1035	Bliss	5/1-12/15
1034	Nickles	7/1-7/30
1047	Maude-Babcock	Consult Area Manager
1043	Quaking Aspen	4/16-6/30
1044	Sunset	4/16-6/30 & 10/16-12/31
1045	Smith	4/16-6/30
1049	Huttle's Hole	Consult Area Manager
<u>Wild Horse Resource Area</u>		
0706	Laidlaw Park	4/16-6/23 & 10/16-12/15
0712	Isolated	4/16-10/30
1212	Poison Lake	4/1-6/15 & 10/16-12/31
1210	Minidoka	4/1-6/15 & 10/16-12/31
1208	Kimama	4/1-6/15 & 10/16-12/31
1215	Schodde	4/16-10/30
1214	Sand	4/16-9/30

SCIENTIFIC RESEARCH

Relict Areas

Most of the kapukas found in the Great Rift area are representative of native range plant associations. There are probably more of these relict areas in the Great Rift region than throughout the remaining entire Northern Desert. Because of their relative inaccessibility and smallness in size these kapukas have had a history of no grazing and no fire control, making them valuable for study as natural areas. Up until several years ago relict area studies were conducted on three kapukas by Vern K. Hugie and H.B. Passey of the SCS Soil Range Research Team from Salt Lake City, Utah.¹ They analyzed soil profiles and native plant associations. The kapukas studied include Carey Kapuka located in the southwest corner of the National Monument, Winter Kapuka and Little Crater Kapuka, both located in Range 28 East, Township 6 South, S. $\frac{1}{2}$ sec. 24 on the Wapi Flow. Another kapuka, just west of the National Monument and locally known as "Tomcat Hill", has already been designated as a BLM Research Natural Area.

Although there are no known plans for future relict area studies, establishment of the Primitive Area will preserve, protect, and enhance all areas of scientific interest for those who may some day wish to resume soil and vegetation studies on these and/or other kapukas (see Table VII). Primitive Area management objectives are to "allow an unrestrained natural ecological succession" and to "preserve natural ecosystems as a standard against which the effects of civilization can be measured" (BLM Manual 6221.02A).

1. Results of these studies are available in the Idaho Falls District Office within a notebook entitled "Relict Areas".

Table VII - Additional Kapukas With Relict Area Potential

<u>Location</u>	<u>Distance Inside Lava Margin</u>
Rge. 26 E., Twp. 1N., sec. 36	2½ miles
Rge. 27 E., Twp. 1S., NW. ¼ sec. 33	¼ mile
Rge. 25 E., Twp. 3S., sec. 24	2 miles
Rge. 25 E., Twp. 3S., secs. 27, 34	½ mile
Rge. 25 E., Twp. 4S., secs. 18, 19	1½ miles

Numerous small kapukas lie along the western edge of the Wapi, but are not listed above.

Geologic Studies

Until recently, the Bureau was unaware of several of the scientific studies being conducted on public land in the Great Rift area. During field research, several completed publications and theses were unveiled, as well as on going projects. It is evident that this region of the Snake River Plain can significantly contribute to the new field of geology known as astrogeology. Results of recent satellite missions indicate that the surfaces of extraterrestrial bodies so far studied are sometimes covered with basalt lava. With a limited amount of available remote sensing data (mostly aerial photographs) used in the research of planetary surfaces, any comparative studies can help us better understand the origin of similar features on other planets. Most of these comparative studies have been funded at least in part, by NASA (National Aeronautics and Space Administration) grants. Several sources indicate that similar studies will continue for at least several more years.

Archaeology and Paleontology

Although no archaeological survey has been made of the proposed Great Rift Primitive Area, enough evidence has been accumulated by Idaho State University and the Idaho Falls BLM to indicate that the flows, parks, and buttes of the Great Rift area were inhabited aboriginally.

Some sites have been located within the Great Rift area. These are usually open type sites identified by scatters of obsidian flakes. Arrowheads are often found, but visitors might be reminded that it is unlawful to remove these. Even seemingly isolated points may be part of a "fragile pattern" which may indicate to archaeologists something about the former inhabitants of an area. Other types of sites include trails, tipi rings and caves utilized as shelters.

Paleontological remains may occur in caves in the form of subfossil remains of animals no longer indigenous to the lavas. In one cave the remains of red fox, wolf, grizzly bear, elk, pronghorn and bison were found, along with numerous rodent bones. Such features may prove valuable to scientists involved in research on the paleoecology of the lavas. Therefore, animal remains should be left in place, particularly if they are discovered in caves or crevices.

WILDNESS

"The fringe benefits are priceless: clean air to breathe; stillness, solitude and space; an unobstructed view every day and every night of sun, sky, stars, clouds, mountains, moon; a sense of time enough to let thought and feeling range from here to the end of the world and back; the discovery of something intimate--though impossible to name--in the remote."

Edward Abbey

A wilderness area is frequently described by giving an account of its tangible resources. For instance what type of land forms, geology, and climate does it possess; how many different species of plants and animals inhabit the area, or how many fishable streams and lakes are there? These kinds of questions are important, but may overlook other values of wilderness, especially when evaluating a wilderness such as the Great Rift. The Great Rift contains few species of plants and animals; there are no lakes or streams to fish, no peaks or basins yet to discover. There remains only wildness, and one self, to harmonize in this great volcanic region.

Wilderness is more than just a repository of ecosystems in their natural state, it is a preserve of the resource of wildness. The cultural, humanistic, and spiritual attributes of wildness are intangible and variable in benefits among users, managers, and non-users. Mere imagination that a primitive desert exists, shelters cougars, and is protected for present and future generations, may generate more satisfaction in a life-long city dweller than in one who actively experiences wilderness.

The wilderness environment of the Great Rift is such that users can experience a wide range of intangible values: feeling of solitude, inspiration, elation, sense of wonder, sense of freedom, beauty, spirit-of-adventure and excitement, refreshment, spiritual awareness, serenity, and

self-reliance. These arise to a varying degree from man's interaction with a wild environment.

At this time the author wishes to share a poem that speaks to this fine country.

South central Idaho,
 hot summer sun,
 Heat waves, dancing
 endless Black,
 stimulated by dry winds
 in the Snake River Plain

Smell of pine.
 Lone limber pine born
 from the womb of a recent volcanic era.
 Its siblings,
 a family of junipers,
 two hundred rings,
 only seedlings.

Lava tube cave,
 cool moist air,
 shade
 darkness
 water.

Fifty feet beneath the basalt hell
 Ice and lava stalgtites,
 stalagmites,
 Together conceiving new life.
 Wild, untouched, unseen,
 without carbide, graffiti.

Pahoehoes, aas, kapukas, hornitos
 all random, ever maturing,
 shedding skin with the season.
 Lichens pioneering lava,
 building soil,
 providing niches for cinquefoil.

Pentstemmons, prickly pears, bitterroots
 huddling under his boots
 knowing only the mocassins,
 dove dressed in natal down
 rattlesnakes shading in sage
 muley bucks nipping bitterbrush

Magma, deep down
 Devilish forces
 Great Rift
 volcanoes
 lava beds
 wild country
 that mother of us all.

The area's 275,000 acres represents the largest public domain administered by BLM in a roadless, primitive condition. Bureau officials and the public have already recognized the area's suitability by making MFP recommendations to classify the Craters Of The Moon and Wapi Lava flows as Primitive. The Great Rift meets the BLM criteria necessary for Primitive Area establishment (BLM Manual Section 6221.11, see Appendix D):

Contains natural, wild, and undeveloped lands in a setting essentially removed from the effects of civilization.

Has outstanding opportunities for solitude or a primitive and unconfined type of recreation.

Is of sufficient size as to make practicable its preservation and is in an unimpaired condition.

May also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

MINERALS AND LAVA STONE

There are no known natural gas, oil, mineral, or geothermal deposits in the region and as of yet there are no patented mining claims or mineral leases in the area. In October, 1973 Al Teske, Idaho Mining Association Executive Secretary, expressed the Association's non-interest in either of the two lava fields (see Appendix I). However, recently the BLM State office in Boise received an application for geothermal exploration in the vicinity of the Great Rift and Craters Of The Moon National Monument. If granted, the drilling operations would likely necessitate construction of roads across the rugged lavas. The application directly affects at least 57,000 acres of the roadless primitive area within the Idaho Falls District alone. Some of the area's most extraordinary features, including Blacktail Butte and the Great Rift, lie within the proposed exploration area. Indications are that an Environmental Impact Statement won't be completed on the proposed action before 1978.

The building stone industry may have an interest in the lava stone which is used in masonry and landscape design. Known public land trespass in the form of surface lava excavation has already occurred on the fringes of the Wapi and King's Bowl lava flows. Surface lava flows do not fall under the category of hard rock minerals, therefore they are not subject to the 1894 Mining Laws. Extraction of "slab lava" on the fringes has transpired without preliminary application for a Special Land Use Permit. Building material companies may search for more sights containing the easily extractable slab lava. Most will be unaware of BLM's plans to establish a Primitive Area; others may disregard public land laws and trespass anyway.

In view of this, it is critical that the Bureau deal with potential

trespasses before they occur and not after the damage is done. A survey of other lava fields, such as Hell's Half Acre, might locate other potential material sites. Such a measure can help preserve the natural integrity of the unique geological phenomena.

 TABLE V: TOWNSHIPS INCLUDED IN GEOTHERMAL APPLICATION

<u>Township</u>	<u>Range</u>	<u>Portions</u>
1South	26East	all
1South	27East	all
2South	26East	all
2South	27East	West $\frac{1}{2}$
3South	26East	North $\frac{3}{4}$
3South	27East	North $\frac{1}{4}$
2North	25East	West $\frac{3}{4}$
2North	24East	all
3North	24East	South $\frac{1}{2}$
3North	25East	Southwest $\frac{1}{4}$

Plus lands in the Shoshone District not described here.

STATE INHOLDINGS

Portions of 18 sections, comprising 11,520 acres, are state lands encircled by the proposed boundaries (see Table VI). Every section 16 and 36 of each township were set aside from the Idaho Territory for the benefit of public schooling. Several sections, 16 and 36, in the Craters Of The Moon Flow are unsurveyed and therefore still public domain to be vested to the state upon survey. There are no developments on or easements to any of the state sections, and none are anticipated although there has been interest in acquiring sections for their lava stone.

During planning of the Big Desert MFP Bureau officials recognized the need for working closely with the Idaho State Department of Public Lands in an effort to "promote coordinated efforts with regard to the Bureau Planning System" (see Appendix E). It would be in the best interest of the public if those state sections encompassed by the proposed Primitive Area could be exchanged for with equivalent BLM lands elsewhere in the district, such as Hell's Half Acre Lava Flow. If those inholdings were acquired, then all lands within the proposed boundaries would be public since there are no private lands within them.

Unless all state enclaves are exchanged and classified these lands may lose their natural character through development, effectively altering at least the visual resource on surrounding public lands. It is recommended that actions be taken to initiate land exchange.

 Table VI - State Sections to be Acquired by BLM

State Sections embraced by the Craters Of The Moon Lava Flow:

<u>Rge.</u>	<u>Twp.</u>	<u>Secs.</u>
23E.	1N.	36
23E.	4S.	36
24E.	1N.	16
24E.	4S.	16 & 36
24E.	5S.	16
25E.	2N.	16 & 36
25E.	3N.	36
25E.	1S.	36
25E.	2S.	16 & 36
25E.	3S.	36
25E.	5S.	16
26E.	1N.	36
26E.	2N.	16
27E.	1S.	16
27E.	3S.	16

State Sections embraced by the Wapi Lava Flow:

<u>Rge.</u>	<u>Twp.</u>	<u>Secs.</u>
27E.	5S.	36
27E.	6S.	16 & 36
27E.	7S.	16 & 36
28E.	6S.	16 & 36
28E.	7S.	16
28E.	8S.	16

 Unsurveyed and Unclaimed Sections Title to State
 To Vest on Approval of Survey:

<u>Rge.</u>	<u>Twp.</u>	<u>Secs.</u>
26E.	1S.	36
26E.	2S.	36
27E.	2S.	16
26E.	3S.	36
25E.	4S.	16 & 36
26E.	4S.	36

RECREATION

AND

PRIMITIVE AREA

MANAGEMENT

CRATERS OF THE MOON NATIONAL MONUMENT AND WILDERNESS

Eighty-three square miles of this extraordinary volcanic region have been established under The National Park Service (NPS) as Craters Of The Moon National Monument. Its features are readily accessible for the public's exploration, study and enjoyment. A seven-mile paved loop road allows the visitor to drive across the lava flow to the base of cinder cones and spatter cones. From the Spatter Cones Parking Lot, it is a mere 100-foot walk to look down into Crystal Fissure, one of several fissures that make up the zone of weakness, called the Great Rift. The top of Big Crater, a giant cinder cone bisected by Crystal Fissure, is just several hundred feet further.

Seven trails lead the visitor from the road to scenic lava tube caves, tree molds, volcanic cones, and other spectacular features within the Monument. Paved nature trails are developed with interpretive signs and brochures are available (see Appendix J). Interpretive displays at various places explain the volcanic formation while plant and animal checklists explain the flora and fauna. A visitor center is open year round. On summer evenings, Park naturalists present slide-talk programs, depicting and discussing the natural wonders for which the Monument was set aside.

A developed campground, with restrooms and over 50 available spaces, combines with the loop road and nature trail system to provide the recreationist with a unique and satisfying experience. In fact, every dominant volcanic feature within the Craters Of The Moon Flow can be seen from an automobile or by walking the short trails.

To the south, east, and west of the loop drive lies the Craters Of The Moon Wilderness Area, classified in 1972. Of the Monument's 53,545 acres, better than 80 percent is protected by the Wilderness Preservation Act

of 1964. Any one of the established parking lots and nature trails provides easy access into the wilderness. Nonetheless, in 1975 only 120 overnight visitors had entered the wilderness through the month of August. This is a 400 percent increase over all use in 1974.¹ There are apparently few people who will leave the convenient developments for a unique overnight venture into the wilderness.

Evidently, only a few wilderness enthusiasts are searching for a unique experience on the volcanic frontier at the Monument. We might therefore assume that equally few people will explore the proposed Great Rift Primitive Area, which is geographically similar. Those seeking campground convenience or volcanic interpretation through trails, signs, and naturalists should be encouraged to visit the Craters Of The Moon National Monument.

Perhaps the major reason for the lack of wilderness visitors is the presence of only two "trails" leading into it. One is a simple cairn trail which leaves behind a paved nature trail to extend across the lava for a distance of 1.5 miles to Needles Cave. At the paved trail's end, no sign indicates either Needles Cave or the wilderness beyond. Park Service officials estimate only 50 visitors per year, at the most, follow the cairns to the lava cave. Officials aren't necessarily discouraging visitation of the wilderness, but neither are they encouraging use of it. Present NPS Wilderness policy is to encourage human use while considering the limits of the land, thereby preserving wilderness for those present and future generations who seek to enjoy it.

The other trail is the remnant of an old "road" once used for fire suppression measures.² Originating at the termination point of the loop drive, it has now been closed and allowed to begin natural rehabilitation. After the fire trail ends, there are no cairn markers or signs to indicate direction.

1. Figures were compiled by Park Service personnel.

2. A "Let-Burn" policy has been in effect for five years.

Only the Great Rift, a line of cinder cones, and an individual's own imagination mark the trail from this point on.

The Park Service's Backcountry Use Plan is outdated (see Appendix K). Revisions are currently being made to update policies. For instance, no additional trails are planned for the wilderness as it is felt that access is adequate. Projected revisions will prohibit the building of campfires and require acquisition of a permit for overnight wilderness adventures.

Proposed BLM Organic Act

Perhaps upon passage of a BLM Organic Act, the proposed Great Rift Primitive Area will become Wilderness under The National Wilderness Preservation System. The wilderness character of the Great Rift, as a whole, can best be recognized and protected if it is entirely managed under the same legal mandate, the Wilderness Act.

As proposed, The Public Land Policy and Management Act will require the Secretary of the Interior to review "Those roadless areas of 5,000 contiguous acres or more and roadless islands of the public lands administered by him through the Bureau and shall report to the President his recommendation as to the suitability or unsuitability of each such area or island for preservation as wilderness." The Secretary's recommendation to the President and in turn the President's recommendation to Congress would follow within no more than ten years after the date of enactment. Meanwhile, such lands would be administered according to the Secretary's existing authority and in a manner so as to "preserve the wilderness character of each such area, subject only to the continuation of existing mining and grazing uses in the manner and degree in which the same was being conducted." Once BLM lands have been designated for preservation as wilderness, the provisions of The Wilderness Act shall apply with respect to the administration and use of such designated area, including mineral development, in the same manner as they apply

to National Forest Wilderness.

If passage of a BLM Organic Act precedes administrative classification of Primitive Area, it may be in the Bureau's best interest to recommend Wilderness Classification. The Bureau should at least anticipate an Organic Act which some day will require a suitability study and recommendation to the Secretary. Keeping this in mind, the Bureau should classify a Primitive Area that not only meets BLM administrative standards, but also meets those criteria set forth in the Wilderness Act.

RECREATION, IMPACTS, AND WILDERNESS CARRYING CAPACITY

Although no Bureau statistics are available, it is estimated that the public domain within the proposed Primitive Area boundaries receives less than 250 visitor use days annually. Not once did the author record visitors during the ten week study. Visits by a few scientists and rock hounds, increasing over the past ten years, accounts for most use. Low use is probably due to several factors including the area's remoteness and poor accessibility, the public's ignorance of its existence, and a general lack of tangible resources that attract man. This absolute lack of visitor use prior to establishment as a Primitive Area makes the Great Rift an extraordinary case among BLM Primitive Areas.

Beforehand, land managers should anticipate a surge in visitor use after designation of the Great Rift. Any increased use will most likely occur around the more prominent and most accessible features such as Pillar Butte. Most initial use can be anticipated on the more accessible eastern sides of the Great Rift, which is closer to the population centers of southeastern Idaho.

Primitive Area management plans should be set up so as to minimize any irretrievable impacts. Any visitation by man will have increasing effects upon the wild resource, possibly damaging fragile and scenic features. Man's forces can be particularly evident on the cinder cones, spatter cones and lava flows as fragile lava rock buckles under the weight of man's foot. Nature's forces of wind, water, freezing, and thawing are continually changing the face of the landscape without the works of man accelerating the processes.

The concept of "carrying capacity" is one which every outdoor recreation planner considers. Carrying capacity may be defined as the number

of visitor use days a designated area can reasonably withstand before jeopardizing its physical, biological, and aesthetic attributes. Regardless of the type of recreation in a biotic community, its carrying capacity should not exceed its environmental capabilities. When dealing with wilderness, as in the Great Rift area, the carrying capacity is low biologically, physically, and aesthetically. Man's mere presence and slightest imprints may have a heavy impact upon the resource of wilderness. There is no exception, especially when dealing with a relatively flat and treeless volcanic landscape.

Damage to the environment is not the only factor that tells a wilderness manager how much use is "too much". Wilderness visitors' experiences must also be figured into the wilderness carrying capacity (Lucas, 1974). Different amounts of physical change and use confrontations individually affect wilderness visitors' expectations of a satisfactory wilderness experience. A survey of 500 visitors in four Wilderness Areas in 1969 indicated that almost all visitors defined solitude as an "important attraction and enjoyed experiencing it" (Lucas 1974).

When increased visitor use justifies more administrative monitoring and regulation of the primitive environment it may become necessary to implement a permit system. Although the Institute foresees no immediate need for adopting any type of recreation use permit system, it is relevant to discuss the merits of the two most popular systems, the self-registration trailhead method, and mandatory permit system. Forest Service researchers have determined self-registration systems to be anywhere from 30 to 75% effective in terms of recording all visitors (personal communication with George Stankey). Periodic maintenance of self-registration systems is often neglected by managers, resulting in even more distorted figures.

A mandatory permit system would require each visitor to register

his/her identity by securing a permit from a BLM office or administrative site before entering the Primitive Area. The permit could also require information about the group size, route and destination, length of stay, and anticipated activities. Hendee and Lucas (1973) outline several benefits of the mandatory permit system. First, there are safety benefits of knowing the route, destination, and estimated time of return. Permits would include official regulations that are pertinent to users. Also, the required visit by recreationists gives them a chance to obtain maps, a brochure, and ask any questions.

If recreation planners are able to gather enough data on visitor use to efficiently protect and administer the Primitive Area, then no type permit system may be necessary. It is important to make visitor contact to find out what wilderness users are like, what they do, and how they think. Factual knowledge pertaining to wilderness users is scarce, particularly in the proposed Great Rift Primitive Area.

If there is an increase in visitor use upon designation, it will probably be minimal for several years. Present low use in the vast area encircling the Rift renders it outstanding among wildernesses. Low use can be to the Bureau's advantage, enabling them to begin recording visitor use and impacts while the area's resources are unimpeded by man.

A wilderness does not recognize jurisdictional boundaries between agencies. BLM managers should communicate closely with Park Service personnel to relate all management considerations of resource damage, visitor preferences, and carrying capacity. Management considerations may or may not be applicable to both a Park Service Wilderness and a BLM Primitive Area. Both agencies should make a conscious effort to coordinate planning in a manner that recognizes the totality of the Great Rift wilderness ecosystem.

In the meantime, the Bureau can encourage dispersed and proper

wilderness use through an interpretation brochure, before restrictions and reservations become necessary.

PUBLIC INTERPRETATION AND MAP

Designation of the Great Rift as a Primitive Area will necessitate having some type of brochure and map available to facilitate the public's interpretation of the area. This brochure should not only present a map and general description of the Primitive Area, but also information regarding regulations, survival techniques, and wilderness etiquette.¹

A descriptive interpretation brochure made available at BLM offices, can save the Bureau the expense, construction, and maintenance of interpretation signs in and around the Primitive Area. Table VIII covers the primary considerations for an interpretation brochure.

1. The Institute is capable and willing to do such a brochure.

Table VIII Ideas to be Considered in an Interpretation Brochure

1. Physical description including size, location, climate, etc.
2. Biological description of common fauna and flora.
3. Geological description of volcanic features that make this a unique primitive area.
4. Recommended survival gear including durable boots, matches, cook stove, 100% of the anticipated water use, hiking companion, etc.
5. Instructions on how to avoid getting lost and if one does, what to do.
6. Encourage dispersed recreational use to protect the wild resources.
7. Wilderness etiquette: a definition of wilderness, how to enjoy it, respect it, and preserve it at the same time.
8. Regulations pertaining to: motorized use, building of fires, requirement of permits and road closures.
9. "Pack it in, Pack it out".
10. Schematic map (see below).

Ultimately, the Bureau may decide to print a one-half inch to the mile planimetric map of the Primitive Area. In order to fill the public's immediate needs upon designation the Institute recommends the Bureau design a scaled schematic map that includes only those features and roads necessary to facilitate public access to the perimeter.

MANPOWER NEEDS

To ensure achievement of management objectives upon designation, the Bureau should program beforehand for at least several man-months to monitor activities in and around the primitive area.¹ A recreation specialist assigned to the Great Rift could have several duties including: patrolling the boundaries and checking compliance with all Off-Road Vehicle restrictions, road closures, and grazing regulations; maintaining directional signs, removing litter, and conversing with visitors.

The frequency of patrols will depend upon the level of use in a given area. Those areas which are not under grazing allotments or receiving public use might be visited only once or twice per season. On the other hand, areas such as Bear Park, Wapi Park-Pillar Butte, and Blacktail Butte might be visited more often. At first, minimal visitation probably won't necessitate frequent patrols. An occasional aerial visitor count on a vacation weekend such as Memorial Day would be sufficient to give Bureau officials at least an indication of the trend.

Management of the Primitive Area may eventually require seasonal establishment of an administrative site in the desert.² When recreational use and patrols become more frequent it may be more economical and practical to coordinate activities from the general vicinity as opposed to from Idaho Falls, which is at closest a two hour drive. If an administration site is ever established, two potential locations are along the Arco-Minidoka Road

1. A budget request containing anticipated manpower and financial needs for the designation and management of the Great Rift, as well as other proposed Idaho BLM Primitive Areas, has been submitted by the State Outdoor Recreation Planner. (see Appendix F)
2. A small mobile trailer could serve as an administrative site.

near Cox's Well and Bear Trap Cave.

Following are the kinds of questions the recreation specialist should try to answer when making visitor contact:

1. How much total visitor use is there?
2. How many people are in each party entering the Primitive Area?
3. What is the length of stay in each case?
4. How much overnight use is there and where does it occur?
5. Around which features and within which zones of travel does use appear to be concentrated?
6. Are there any excessively impacted sites within the primitive area?
7. For what type of experience is each visitor searching?
8. What are the people's perception of other users and their impacts in the Primitive Area?

In the interim the Bureau needs expertise in wildland management to continue evaluation and designation procedures. The Bureau should present the facts, issues and alternatives to the general public before preparation of a management plan. It may be necessary to write an Environmental Analysis Report or Environmental Impact Statement on the proposed action, the classification of a Primitive Area. An interpretation brochure, maps, and a Recreation Activity Plan should be completed by designation time.

PRIMITIVE AREA MANAGEMENT

"Recreational development is a job not of building roads into lovely country but of building receptivity into the still unlovely human mind."

Aldo Leopold

Without predesigned management goals, the integrity of a classified Primitive Area may be in jeopardy. Proper management requires more than direct protection of the wildland resource, it also requires that human behavior be analyzed, influenced, and sometimes regulated. Several BLM representatives have indicated it would be best to implement a management plan before designation (see Appendix G). The management plan should present the fundamental objectives of the agency, and outline the alternatives, their issues and possible consequences if implemented. Implementing a wise plan is necessary to help prevent irreparable damage to a finite resource, the Great Rift, and at the same time allow for visitor use.

The primary goals of primitive area management should be to provide a high quality wilderness experience characterized by few encounters with others in an environment where man's influence is minimal. It is Bureau policy that Primitive Areas are established "to preserve, protect, and enhance areas of scenic splendor, natural wonder, scientific interest, primitive environment and other natural values for the enjoyment and use of present and future generations" (BLM Manual, section 6221.06A). They are to be managed "to maintain the same quality as lands included in the National Wilderness Preservation System" (section 6221.06B). Similar to the Wilderness Act there are Bureau regulations prohibiting the use of motorized equipment and motorized vehicles within a Primitive Area. Construction of roads, range improvements, and other permanent facilities are generally prohibited except where necessary to preserve primitive values.

A critical issue in the management of any wilderness is the managing agency's approach toward the area's public use for recreation. It is Bureau policy that "Public use of Primitive Areas for recreation purposes is encouraged only to the extent consistent with the maintenance of the primitive environment" (section 6221.06R). Public recreational use of any wilderness area can be encouraged by constructing trails, improving access, and developing nearby high-density recreation areas. Formal designation alone may result in increased public use in the Great Rift Primitive Area by those already visiting its two nearby high density recreation areas, Craters Of The Moon National Monument and Crystal Ice Cave.¹ Their facilities will provide valuable comforts and interpretation of the phenomena within a few miles of vast acreages of pristine, fragile, and scenic wilderness.

It has already been suggested that the slightest visitation by man along the Great Rift has critical impacts upon its wildness in the relatively flat and treeless environment. Therefore land managers may want to minimize encouragement of public use by neither developing trails, improving access, nor constructing campgrounds. Management tools such as these are far more compatible within the previously established high density recreation areas.

Biocentric vs. Anthropocentric Management Approach

Hendee and Stankey² (1973) have recognized two contrasting philosophies about wilderness management. These are the biocentric and anthropocentric approaches. An anthropocentric management approach may be defined as one in which man's use of wilderness is the primary objective, while the

1. Recent purchasers of the Crystal Ice Cave private concession facilities have plans of improvement to attract more people, as there are less than 10,000 visitors annually.
2. The authors are, respectively, Recreation Research Project Leader, U.S.D.A., Forest Service, Pacific Northwest Forest and Range Experimentation Station, Seattle, Washington, and Research Social Scientist, Intermountain Forest and Range Experiment Station, Missoula, Montana.

goal of maintaining the integrity of the natural environment, although important, is secondary to enhancing and providing opportunities for recreational and other human uses in a primitive setting. For example, this approach might involve development of such things as primitive campsites, cairn trails, and improved access, those things desirable to convenience-oriented recreationists. Conversely the biocentric philosophy emphasized natural integrity of wilderness ecosystems at the expense of recreational and other human use, if necessary. The biocentric approach at least preserves the options available to the administration, a critical consideration when dealing with a non-substitutable and scarce resource such as wilderness.

MANAGEMENT ALTERNATIVES AND RECOMMENDATIONS

It would be difficult to make specific recommendations on Bureau management of the proposed Primitive Area without first exploring some general management approaches. Three hypothetical sets of management goals are listed below, followed by the management actions¹, and their resultant social, economical, and environmental impacts. An underlying assumption in each alternative is actualization of Primitive Area designation. The approaches are intended to present possible alternatives that the Bureau and public might consider during the Primitive Area management planning process.

ALTERNATIVE A: Biocentric approach

- | | |
|---------------------|--|
| Management Goals: | The primary objectives are to allow the area's primitive resources to maintain, at maximum, the natural processes of environmental change, and to preserve its wild integrity for the present and future generations. |
| Management Actions: | <ol style="list-style-type: none"> 1. Implement classification. 2. Print Primitive Area map and brochure. 3. Monitor public recreational use in and around Primitive Area by periodic patrol. 4. Erect no trailhead or additional directional signs. 5. Improve no roads or jeep trails. 6. Identify and mark no foot trails. 7. Establish no trailhead access points. 8. Construct no outlying campgrounds. 9. Designate no inlying campsites. 10. Provide no interpretation signs. |
| Potential Impacts: | <ol style="list-style-type: none"> 1. Inevitable but negligible adverse environmental impacts resulting from a minimal increase in visitor use. 2. Will allow the natural processes of pioneer succession to continue without noticeable imprints of man. |

1. The "management actions" are hypothetical actions which the Bureau and public might wish to implement in order to achieve the underlying goals in a given management approach.

3. Will have a miniscule impact upon the social and spiritual benefits of wilderness.
4. Would require minimal allocation of BLM funds and manpower toward Primitive Area management.

ALTERNATIVE B: Anthropocentric approach

Management Goals: The primary objective is to provide for greater public use of the Primitive Area by enhancing and providing greater opportunities for recreation.

- Management Actions:
1. Implement classification.
 2. Print Primitive Area map and brochure.
 3. Increase desert patrols to monitor activities.
 4. Improve the major access route -- Arco-Minidoka road.
 5. Identify and sign several jeep trails as access routes to the Primitive Area.
 6. Post "Primitive Area" signs and registration boxes at all trailheads and at the end of all jeep trails which are signed as access routes.
 7. Construct one or more outlying desert campgrounds such as at Bear Trap Cave.
 8. Designate one or more inlying campsites in various kapukas.
 9. Identify and mark by rock cairns one or more trails to such prominent features as Pillar Butte and Blacktail Butte.
 10. Provide for one or more interpretation signs recognizing the BLM Primitive area at locations such as along the Highway near Craters Of The Moon and/or near Crystal Ice Cave.

- Potential Impacts:
1. Increased adverse environmental impacts resulting from additional visitor use.
 2. Noticeable imprints left by signs, cairns, road improvements and camping facilities.
 3. Wilderness experiences may be less rewarding because of increased user confrontations.
 4. Wilderness values found around the more prominent features may be irretrievably damaged.
 5. Would require more manpower and money to maintain signs trails, roads, and campgrounds.
 6. Vandalism of registration boxes, signs and any constructed facilities.
 7. Increased visitor use opportunities would be at the expense of the area's natural integrity.

ALTERNATIVE C: Maximization of opportunities for Primitive Area recreation

Management Goals: The primary objective is to provide for maximization of public use by supplying numerous recreational opportunities and encouraging use of them.

Management Actions:

1. Implement classification.
2. Print Primitive Area map and brochure.
3. Actively publicize designation and actively encourage primitive recreation.
4. Increase desert patrols to monitor activities.
5. Improve all major access routes including the Arco-Minidoka road, Crystal Ice Cave-Bear Trap Cave road, Carey-Laidlaw Park road, Kimama-Laidlaw Park road.
6. Construct several outlying campgrounds and designate several inlying campsites.
7. Identify and sign numerous jeep trails as access routes to the Primitive Area.
8. Identify and mark cairn trails to all of the prominent features including Blacktail Butte, Pillar Butte, section 36-Wapi kapuka, along the Great Rift and other unique geologic phenomena.
9. Post "Primitive Area" signs and registration boxes at the end of all jeep trails on the area's perimeter.
10. Provide several Primitive Area interpretive and directional signs at locations on highways 20, 24, 39.
11. Develop several water sources at key access points.
12. Provide several interpretive centers and/or one large visitor center and administrative site near the Primitive Area.

Potential Impacts:

1. Assuming increased visitation, there would be severe impacts upon the area's wildness as well as the obvious environmental degradation.
2. Noticeable imprints left by signs, cairns, road improvements, and camping facilities.
3. Loss of sense of purpose for establishment of a Primitive Area.
4. Greater human travel through surrounding remote areas of the desert may result in irreconcilable conflicts with the natural propagation of abundant wildlife species.
5. Additional human presence would accrue more litter, emergency rescues, and further monitoring and regulating.
6. Wilderness seekers would have to search for

- remote areas to find solitude in an area primarily affected by the forces of nature, and not man.
7. The integrity of wilderness backcountry in Craters Of The Moon National Monument may be jeopardized.
 8. Increased ORV use and causal degradation of unique and scenic outlying geologic features such as Split Butte, Bear Butte, and those features of the Great Rift National Landmark.
 9. Implementation of actions would require the highest cost and manpower of the three alternatives.

If given the three above management approaches, the Institute would recommend implementation of Alternative A. This alternative would be the most consistent with the Bureau's objectives in the designation and management of Primitive Areas, as outlined in the BLM Manual (section 6221.02A):

1. "Allow an unrestrained natural ecological succession."
2. "Preserve public values that would be lost if the lands were developed for other purposes."
3. "Preserve the ecological communities which possess outstanding qualities of solitude, physical challenge, inspiration, and primitive recreation values."
4. "Preserve natural ecosystems as a standard against which the effects of civilization can be measured."

Alternative A would encourage public recreational use only "to the extent consistent with the maintenance of the primitive environment." Mere designation will enhance the area and encourage some use. A biocentric approach would preserve all future management options so that if, at a later date, the Bureau decided to implement further management actions or policies, the opportunity to do so will not have been irretrievably lost.

Other reasons for support of Alternative A are economic considerations. It may be several years before money is allocated for the purposes of managing the Great Rift. At least until allocation of money, a conservative administrative approach should be taken. Several years after designation, recreation planners may be able to estimate recreational trends in the

Great Rift ecosystem. Without a conception of recreational trends it would be unwise to implement Alternatives B or C. Use figures at Craters Of The Moon Wilderness indicate it may be years before substantial numbers of people will seek unconfined recreational experiences in this extraordinary country.

To encourage and channel visitor use with convenience-oriented developments, as in Alternatives B & C, would result in economic mismanagement if the public did not utilize these developments. Furthermore, a potential loss of wildness would result in forfeited opportunities of wilderness users to enjoy to their fullest, the physical, humanistic and spiritual attributes of the Great Rift.

It is felt under present conditions there are endless opportunities for the public to enjoy primitive recreation in the Great Rift. Its physical geography is not limiting as it would be if there were high mountain ranges impeding accessibility on all sides. On the contrary there are numerous jeep trails, some accessible by car, that lead to the lava perimeters.

ROAD, SIGN,

&

TRAIL SYSTEMS

ROAD ACCESS

Roads circumventing the primitive area are mostly of the unimproved dirt type. The Arco-Minidoka, Carey-Laidlaw Park, and public land portions of the Crystal Ice Cave roads are primarily dirt, are graded occasionally, and can and do support sedan travel. The Arco-Minidoka road is nearly all dirt, and is periodically surface graded. However, the Minidoka-Bear Trap Cave segment (20 miles) has been neglected by engineers for at least one year; it has ruts two feet deep in places. The Carey-Laidlaw Park road is gravel up to the park and maintained dirt on east through it. The North Pleasant Valley-Crystal Ice Cave road is either paved or gravelled for all but the last four miles. It supports heavy summer tourist traffic. Entrepreneurs of the recently purchased private concession facilities at the commercial cave have revealed plans to improve the road from the pavement's end of the Ice Cave to encourage tourist travel.

Each of the above major roads provides an adequate access route to the perimeters around both lava flows. Numerous dirt tracks (jeep trails) cross the major roads at unsigned junctions. Travel down a typical dirt track is often unadvisable for a sedan because of potential hazards. Most jeep trails are unmaintained in any manner, having numerous ruts and high places of exposed basalt bedrock. Travel on these requires at least a truck. Regenerated vegetation frequently covers wheel tracks making the trail difficult to follow.

Excepting the Crystal Ice Cave road, current use of the major roads is limited primarily to that of livestock operators, hunters, and a few recreationists. Most all human presence in the desert occurs from the months of April through November. Winter and spring precipitation are

inducive to muddy springtime roads, often requiring a four-wheel drive vehicle.

The Arco-Minidoka road serves the majority of north-south traffic across the desert and follows through a desert corridor which separates the Craters Of The Moon from the Wapi Lava Flow. For 65 miles along the road there are neither towns nor permanent human inhabitants, only miles of desert. The road parallels the lava flows at an average distance of three to five miles. For years, some local citizens have pushed for a major improvement of this road. An editorial appearing in the Arco Advisor on August 21, 1975, discusses the value of such a road to the economy of the Lost River Valley (see Appendix L). The region's primitive values were unspoken and overshadowed by the economic benefits of potential "thousands of additional tourists in the area" if the road was improved. Road improvements might augment tourist visits to Craters Of The Moon and EBR-1 facilities, the Ice Caves area, and "open the Great Rift to the public . . ."

Other local citizens recognize the primitive values of the Great Rift. They are anxious to gain access to the primitive area, but don't advocate extensive grading, surfacing and signing. An accurate map indicating jeep access trails would fit their needs.

Specific Description of Roads and Access

In order to present a general idea of road locations and potential access routes with respect to the primitive area, a map overlay was completed. It indicates major highways, the Arco-Minidoka road and all other potential access routes. Only the "better" roads and trails are recognized as potential access routes. Field studies revealed that planimetric maps are often inaccurate from the standpoint of roads. Several jeep trails indicated on the map were found to be either non-existent or merely a cow trail. Similarly,

several existing jeep trails are not included on maps, and are so indicated on the overlay (see Appendix N - map overlay).

Instead of attempting to describe every road and jeep trail around the primitive area, only those of significance will be discussed. As previously mentioned, the general quality of roads and jeep trails can adequately support primitive area enthusiasts.

Roads Around Craters Of The Moon Flow

Northern Portion -

Highway 20 follows closely to the north end of the Craters Flow; this highway connects Craters Of The Moon National Monument to Arco. There are no public roads off this highway, only three seldom used jeep trails that are not indicated on map (see map p.96). One trail begins on the highway opposite the Blizzard Mountain Road turnoff. All use of these trails is uncertain however past use by sheepherders is evident. At least two junk piles were located along these trails.

Saddle Butte and The Hole -

The Arco-Minidoka road cutoff from Highway 20 lies southwest of Arco between the Big Lost River and the Arco Airport. There is no sign indicating this junction. Four miles south of the highway the gravel road crosses a cattle guard into public domain, turning into a dirt road. One half mile further south the main road forks to the southeast while one road, travelable by sedan, continues south seven miles to the Saddle Butte and Huttie's Hole vicinity.

Rattlesnake Butte -

The jeep trail whose end is indicated on the map one and one-half miles west of the Rattlesnake Butte, actually joins into the jeep trail in the northwest one-fourth of section 11 (see map, p.102). At least two stock troughs were found along this trail.

Fissure Cave -

No jeep trail or even the faintest tracks appear to lead into Fissure Cave from the road in mid section 24 (see map, p.102).

Bear Crater -

The west rim of Bear Crater located in Rge. 27E., Twp. 4S., section 18 can be reached by jeep trail. It unites with both the shown jeep trail in mid section 8 to the northeast and the trail in mid section 29 to the southeast (see map, p.101). This system of jeep trails is a mere set of tracks used primarily by sheepherders.

Southern portion of Craters Flow -

The most used east-west jeep road along the southern end of the Craters Flow joins the Arco-Minidoka road at Cream Can Junction. This ungraded road goes west beyond Brigham Point and Trapper Cabin until it intersects the Kimama-Laidlaw Park road. This is a major route of travel by sheepherders during spring and fall herd migrations.

Several jeep trails were found not to be indicated on the map. One proceeds due north of the corral located in Rge. 25E., Twp. 5S., SW $\frac{1}{4}$ section 13, and ends at the lava's edge (see Appendix N - map overlay). Another is located in section 21 and 16 of the same Township; it goes into the desert peninsula created by the Brigham Point lavas. Two other jeep trails interconnect northeast of the Trapper Cabin.

Although minimal vehicular use might occur in Larkspur Park in conjunction with sheepherding, no jeep trail was locatable. Likewise, no jeep trail is evident crossing the north end of Brigham Point, as maps indicate.

Southwest portion of Craters Flow -

Good access up to but not beyond the "Old Lava" is possible via a north-south dirt track located one mile east of Flat Top Well. North, into the "Old Lava" and "New Lava", the jeep trail is rocky, extremely hazardous even with four-wheel drive, difficult to follow and the trail emerges into Laidlaw Park at Lake Bottleneck; this trail obviously receives only minimal use coming into and out of Laidlaw Park (see map, p.99). Most ranchers use the Kimama-Laidlaw Park road three miles to the west.

Laidlaw Park -

The main north-south route of travel in Laidlaw Park is a road from South Park Well to North Entrance Indian Well. From this point a gravel road continues northwest to Highway 20, four miles northeast of Carey, Idaho. Snowdrift Crater can be reached by a relatively good road beginning near Piss Ant Butte; this road completes a U-shape when it rejoins the main east-west road one mile northeast of Turnball Butte (see Appendix N - map overlay).

One recently built road, not shown on the map, stretches across one-half mile of aa lava one mile south of Purdy Reservoir, connecting what is known as "The Thumb" of Laidlaw Park, near Lava Butte.

Maps indicate a jeep trail traversing two miles of recent lava from northeastern Pedleford Flat to Highway 20. In actuality it is no more than a foot trail, used to herd sheep across the rugged lava toward summer range in the Pioneer Mountains.

Roads Around the Wapi Flow

Crystal Ice Cave Road -

The road best capable of providing access to the Wapi Flow is the North Pleasant Valley-Crystal Ice Cave road. From Crystal Ice Cave a road continues to Bear Trap Cave where it meets the Arco-Minidoka Road.

Eastern portion of Wapi Flow -

Generally speaking, there are no public access roads around the eastern margin of the Wapi Flow where private agricultural lands are contiguous to the lava. Because there are numerous other access alternatives on the Wapi, the Bureau need not bother acquiring access rights.

Southern portion of Wapi Flow -

Roads along the south boundary are limited to the Union Pacific R.R. access road.

Western portion of Wapi Flow -

There are numerous roads between the Arco-Minidoka road and the western fringes of the Wapi Flow. The best possible access road begins one mile southwest of Cream Can Junction and extends beyond Split Butte and Schodde Well.

At least three trails indicated on the map are non-existent. One is a cow trail which extends west from Schodde Well through sections 6 and 5. Similarly, the two jeep trails shown in sections 27 and 28, and 33 of Rge. 27E., Twp. 7S., were nonlocatable (see Appendix N - map overlay).

PRIMITIVE AREA ACCESS RECOMMENDATIONS

The Great Rift area is primitive because it is remote, it lacks both nearby permanent improvements and easy accessibility, and has been avoided by man. To improve roads and increase tourist travel could endanger the wildland values that the Bureau wishes to preserve in its designation of a Primitive Area.

The Wilderness Institute recommends the following:

1. Neither construct nor improve roads or jeep trails around the proposed Primitive Area.
2. Periodically grade the Arco-Minidoka road to mitigate hazardous ruts and holes.
3. If, during the planning process, there is public support to improve access to the Great Rift, and if the Bureau decides it would be a suitable management action, then and only then should access be improved by amending the directional sign system.
4. If and when Primitive Area approach roads or trails become too hazardous, close them for the public's welfare, and require visitors to walk to the lavas. Jeep trails to be considered for formal closure should include both "wood roads", the Wapi Park trail, and the jeep trail across the lavas into southern Laidlaw Park (see "Road Closure Recommendations", p. 86). All road closures should be posted to coincide with any physical barriers.

SIGN SYSTEMS

Although numerous dirt tracks veer off the main road toward the lavas, none of these junctions have directional signs so indicating. This in itself does not impede public access, since the lavas can often be seen three to five miles to the west from the Arco-Minidoka road. If a wilderness visitor has predetermined his destination, he can follow signs and/or a map to reach that end. However, a complete planimetric map of the proposed Primitive Area is not available. Consequently, the Institute advises that a schematic map be drawn to fill the initial public needs for access.

Before devising a schematic map the Bureau should complete a detailed analysis of the already indicated potential access jeep trails (see map overlay) off the main routes such as the Arco-Minidoka road. Such an analysis could be easily completed in one week, and would improve efficiency of the map. Analysis considerations should include sign possibilities, jeep trail locations, mileage distances, and alternatives to jeep trail closure where it is hazardous and where there are no foreseeable conflicts with pre-existing range developments such as wells, corrals, and stock troughs. The schematic map should indicate mileage distances between and along jeep trails.

Creation of a schematic map, in many respects, is a suitable alternative to numerous directional signs. Given the present negligible visitor use and anticipated small increase, it may not be economically advisable to construct, place, and maintain signs. There are already existing signs that are not properly maintained. Establishing several signed access routes to the lava flows might have the effect of concentrating use in those areas and damaging the pristine character. Signs might also attract people whose motives are nonconforming with Bureau regulations, such as ORV recrea-

tionists or people seeking to extract lava stone.

Public input and BLM monitored trends in visitation may eventually determine a genuine need for directional signs at strategic locations. If so, development of any signs should be carefully planned for those jeep trails which will have been further studied by the Bureau.

Recommendations Pertaining To Sign Systems

1. Make no initial developments of directional signs for the purpose of facilitating public access.
2. Conduct a more conclusive study of the potential jeep trail access routes indicated on map overlay (see Appendix N), their conditions, mileage distances, existing signs, and possible closure areas. Further study should be completed prior to designation so that information may be included on a schematic map.
3. Before designation, indicate on a schematic map of the Primitive Area the features, directions, road and jeep trail locations and mileage distances, all which will facilitate safer public access.
4. Only if, and when recreation planners and the general public determine a real need for improved access to facilitate public use of the Primitive Area, then place a few directional signs on the Arco-Minidoka and Laidlaw Park roads to indicate the best jeep trails to the lava fields.
5. Initially place "Primitive Area" signs only at the end of those trails identified for road closure.

OFF-ROAD VEHICLE USE AND RECOMMENDATIONS

At present, there appears to be little Off-Road Vehicle (ORV) use either within the proposed Primitive Area boundaries or in the immediately surrounding desert. However, recent upward trends in ORV popularity have been experienced throughout the Idaho Falls BLM District.¹ Given time, expanded populations, and improved roads, ORV recreation will become more demanding in once remote areas.

Volcanic buttes and craters, besides having significant scientific and aesthetic values, are challenging obstacles for ORV enthusiasts. Most buttes and craters are represented by thin and extremely fragile soils, which are endogenous to erosion without supplemental external forces of cycles and jeeps.

In the past, ORV use has occurred in more accessible areas, those buttes and craters near roads and jeep trails. Tracks from an all-terrain vehicle were noticeable on Split Butte, near the Wapi and accessible by jeep trail. A hill climb area was discovered in another crater south of Split Butte, in Rge. 27E., Twp. 7S., sec. 27.

As long as the area remains remote and relatively inaccessible, ORV use may continue to be negligible. Nevertheless, administrative measures should be taken to place ORV restrictions on specific features:

1. Upon designation eliminate all forms of vehicular and motorized use in the Primitive Area in accordance with Bureau regulations.
2. Notice of such formal closure should be included in the interpretation brochure and posted around boundaries.

¹. Under a similar contract, the Institute is currently making recommendations for administrative policies concerning ORV recreation on the Idaho Falls district.

3. ORV restrictions should be placed upon several significant buttes and craters in the surrounding desert area:

Bear Butte and Bear Crater

Split Butte

Bowl Crater

Snowdrift Crater

Bear Den Lake Crater

crater: Rge. 27E., Twp. 7S., sec. 27

ROAD CLOSURE RECOMMENDATIONS

Very few roads or jeep trails are recognized as potential threats to the integrity of the proposed Primitive Area. Most jeep trails serve as access to reservoirs, wells, and other range improvements for livestock operations in the surrounding desert. Closing any of these jeep trails might result in operator dissatisfaction, non-compliance, and subsequent formation of new trails; thus widespread closure would only compound problems.

There are a few intrusions, however, which should be considered for closure because of predominate wildland values. In one instance the affected lands are adjacent to the proposed Primitive Area; the other two cases involve jeep trails and lands within the proposed boundaries. In each instance there are no range improvements or water developments that might necessitate vehicular travel. Lack of water developments and good range forage quality in all cases limit their grazing value. Road closure, as such, would not hamper grazing operations, while primitive attributes might be enhanced.

An idea expressed by some local citizens is the possibility of closing vehicular travel on some approach trails leading to the lavas. Closure at hazardous locations on access trails would allow one to walk to the lava fields, undisturbed by motor vehicles. To many people, a walk-in experience would be more desirable and fulfilling than driving directly to the Primitive Area boundary. Restrictions to foot travel in outstanding areas might enhance the hiker's perspective on the desert and the approaching volcanic landscape. Outstanding features, such as aspens skirting pressure ridges on the lava margins, might be appreciated on foot, whereas they might go unnoticed by vehicle.



Wapi Park is one such area the Institute recommends for road closure. A three quarter mile long row of aspen trees display their remarkable adaptation to the desert. The desert peninsula has outstanding potential as a primitive campsite one and one-half miles from Pillar Butte. The jeep trail presently serving motorized access into Wapi Park has a hazardous crossing of exposed bedrock approximately one-half mile into the park. The Institute suggests closure and a sign indicating so at this point (see map, p.98).

The Institute also advises road closure on the jeep trail beginning at Rge. 24E., Twp. 5S., sec. 6 crossing the "Old Lava" and ending approximately one mile south of Lake Bottleneck at the fence gate (see map, p.99). Aside from the minimal impact of dirt tracks, there are no intrusions in this remote corner of the Craters Flow. The faint jeep trail would make an excellent foot trail. The sighting of a mountain lion in this area reflects the importance of sustaining primitive character and restoring natural conditions to the seldom used jeep trail.

The final roads recommended for closure and inclusion into the Primitive Area are the trails previously referred to under "Old Wood Roads". There is no evidence of recent vehicle travel to Winter Kapuka, which is reached via private lands. Nonetheless a closure sign should be placed on the trailhead (see map, p. 97).

The other "wood road", ten miles east of Minidoka, has evidently received more recent use. The amount and type of use is uncertain, however, recreational vehicles may account for most of it. It may be that some local people drive into the parks to explore surrounding lavas which support numerous juniper trees. This area is excellent representation of the successional stages of plant communities; surrounding lavas support pioneer plants such as junipers and forbs while the desert parks support a sagebrush-

grass dominant community lacking trees.

The "wood road" could easily be closed at the first of three lava ridges which vehicles must cross before reaching the large park (see map, p.100).

TRAILS

There are no well defined trails in the lavas which hikers might use. The only discovery of a trail is the one sheepherders use to herd sheep from the desert to Bear Park. Aside from a half dozen four foot high rock cairns and a few strips of white flagging material attached to sagebrush, a path is nearly impossible to distinguish. Sheepherders apparently use these as landmarks to keep them in the proper direction; and as such no one "trail" is used from year to year.

Possible occurrence of Indian trails traversing the lava flows could not be substantiated. It is likely that Indians historically relied on specific features as landmarks to guide them to and from the mountains.

The ruggedness and lack of regularity of the lava flows make it equally difficult to navigate across in any given area. When trekking over lavas it is advisable to actively observe those prominent features within the viewing spectrum in order to avoid getting lost. Similar instructions can be included in the interpretation brochure.

There is no need for trails or rock cairns because access is adequate. The openness of the volcanic landscape does not inhibit travel in any one direction. Construction of rock cairns would be tedious and expensive work that at best may be a mere convenience to what few recreationists would use them. Primitive Area guidelines for visitor use structures and facilities state that "no improvements will be permitted that are primarily for the comfort and convenience of visitors". (Section 6221.06T)

BOUNDARIES

&

MAPS

BOUNDARIES

A wilderness or primitive area may be defined as "an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. It is an area affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable." The above criteria, as set forth in the Wilderness Act of 1964, have been used in making recommendations for Primitive Area boundaries.

Although the proposed Great Rift Primitive Area has no major mountain ranges impeding man's intrusion, the lava margins act as a physical obstruction, barring man and his influence upon nature. Jeep trails, range improvements and other works of man generally end along the lava perimeters, while primeval conditions prevail inwardly.

To facilitate boundary study of the proposed Primitive Area the Bureau delineated a "general proposed boundary" (see map overlay, Appendix N). Most of these proposed boundaries had apparently received little, if any, field reconnaissance prior to summer field studies by the Institute. Consequently, boundary study of the Great Rift occupied a substantial amount of field study time. Field methods of cross checking aerial photos with planimetric maps¹ revealed several errors in the maps, some of which would affect the proposed boundary. As previously discussed planimetric maps show discrepancies in jeep trails.

The Bureau's apparent intention to preserve as much of the recent lavas as possible is reflected by their general proposed boundary which for the most part extends outside the lava boundary. These intentions are fully

1. U.S.G.S. Topo maps of the area are incomplete.

supported by the Institute, as a protective withdrawal of those lands would preserve their natural integrity. However, through field inspection, some proposed lands were found to include private lands, jeep roads, wells, reservoirs, fences, and other influences of man that are considered unsuitable for Primitive classification.

In a few instances, several hundred acres of desert lands outside the lava margins have been recommended for inclusion. These areas, such as section 6, R. 27E., T.4S., are remote, unroaded, and free of any range improvements (see map, p.101). Variety of the proposed Primitive Area is enhanced by the inclusion of these areas.

Where the works of man have encroached to the edge of the lavas, such as represented by irrigated private lands east of the Wapi Flow, it may be desirable to delineate the Primitive Area boundary back and in effect create a buffer zone of public land between man's encroachments and the Primitive Area (see map, p. 97).

Creation of a buffer zone would be effective only if that buffer zone was precluded from any development or alteration of the natural volcanic landscape, even on the fringes. In other words, a buffer zone, if created, should receive equal administrative protection and management considerations as those lands in the adjoining Primitive Area, their difference being in name only.

Both classifying the Great Rift and simultaneously recognizing the need for a buffer zone in which natural conditions will prevail, can be achieved in one withdrawal. In order to classify those lands within the Primitive Area, they need be withdrawn from all forms of appropriation including the Mining Laws. Only one withdrawal is necessary; one whose purpose is to protect the primitive values. The legal description for protective withdrawal would then include all buffer zones as well as the contiguous

lands of the proposed Primitive Area. In classification of the proposed Great Rift, a separate legal description would include only those lands for the Primitive Area, and not those in the buffer zone.²

Management constraints to preserve lands within the buffer zone in an unaltered natural condition could be recognized in the Recreation Activity Plan, Allotment Management Plans, and MFP's to be completed.

There is foreseeable conflict between withdrawal of lands for Primitive classification and the request for geothermal exploration. Before primitive lands can be classified, those lands must be withdrawn and segregated from all forms of appropriation including the Mining Laws, and possibly (depending upon the decision by the Secretary of Interior) the Mineral Leasing Laws. Before the Bureau can file an application for withdrawal an Environmental Analysis Report must be submitted to the Assistant Secretary of Interior. If the Assistant Secretary grants the application then the land is segregated at that time, and notice of the proposed withdrawal is published in the Federal Register. During a following interim period, there will be field investigations and an analysis of the proposed withdrawal to determine conflicts and alternatives. If the proposed withdrawal is so controversial, public hearings will be held.

Geothermal exploration is regulated under the Mineral Leasing Laws. Whether or not the land withdrawal precludes mineral leasing, is at the discretion of the Secretary of Interior. It is hereby recommended that the Bureau at least apply for complete withdrawal from all forms of appropriation including both the Mining Laws and Mineral Leasing Laws. Geothermal exploration within the proposed Primitive Area would have serious irretrievable impacts

2. This idea of a buffer zone was discussed at considerable length with BLM personnel. There was a general consensus that such an approach on the boundary issue would be a feasible and logical way of both designating a credible Primitive Area and in turn protecting its integrity. A similar approach was implemented in designation and withdrawal of the BLM managed Centennial Mountains Primitive Area, near Dillon, Montana.

upon the wild resource.

The proposed Primitive Area is presently bisected by the boundary separating the Idaho Falls and Shoshone BLM districts. Upon designation it is recommended that all lands within the Primitive Area be administered solely by the Idaho Falls district. Thus, the district boundary should be shifted to the west (see Appendix N - map overlay).

Approximately 275,000 acres are recommended for Primitive classification. A legal description of these lands is contained in Appendix M.

The following criteria are those the Institute used in delineation of its recommended Primitive Area boundaries:

1. The boundaries include natural ecological communities living under conditions of unrestrained succession.
2. The boundaries contain no powerlines, pipelines, roads (excepting to closable primitive jeep trails), irrigation canals, reservoirs, wells, fences, lookouts, building, or other structures and facilities.
3. There are no private land inholdings within the boundaries, thus eliminating the need for private land exchange.¹ Where private land is contiguous to the lava flow, generally a one-fourth mile buffer zone has been left between it and the boundary.
4. The boundaries are generally one-fourth mile from roads, jeep trails, and stock developments including fences, reservoirs, wells and corrals.
5. The boundary is generally drawn along the edge of the lavas, mitigating future potential conflicts and encroachments.
6. Boundaries were consistently delineated so as to include no less than multiples of 40 acres of any one section. This will limit the complexity of the final legal description and its delineation on map.
7. Certain contiguous remote areas of roadless desert land have been included within the boundaries to enhance diversity on the otherwise volcanic landscape.

1. There is still need for initiating exchange for state lands.

DESCRIPTIONS AND MAPS OF SPECIFIC BOUNDARY RECOMMENDATIONS

Map I, Page 95, Carey Kapuka-Northern Laidlaw Park:

The BLM's general proposed boundaries extend around the Monument's Carey Kapuka to include lava beds southwest of the Monument. The reasons for delineating boundaries thus was to consider protection of Carey Kapuka as a relict area and also to recognize the primitive value of approximately 15,000 additional acres of recent lava contiguous to the southwest Monument boundary. Several imprints of man lie along this corridor around Carey Kapuka, including a well, jeep trails, and reservoirs. It is recommended that the Primitive boundary end one-half mile north of North End Indian Well.

Alternatives for the remaining 15,000 acres of lava include Primitive designation (as an area noncontiguous to the rest of the proposed Primitive Area), nondesignation, and land acquisition by the National Park Service for expansion of the National Monument. The consensus among the author, BLM and Park Service personnel is that Monument expansion may be the most suitable alternative.

Map II, page 96, Northern Portion Craters Flow:

Previously unmapped jeep trails intrude into marginal areas of the flow from Highway 26 near Blizzard Mountain Road. These trails would be difficult to effectively close as they are an established use by sheepherders in the Crater Allotment. It is recommended to exclude this area in the delineation of boundaries.

Map III, page 97, Eastern Portion Wapi Flow:

Heavily developed private agricultural lands are contiguous to the lava flow. It is recommended that boundary designation allow for a buffer zone between the Primitive Area and private lands. Lands within the buffer

zone should be withdrawn for protection of primitive values, but not classified as Primitive.

Map IV, page 98, Wapi Park:

Scenic, scientific and primitive recreational values are outstanding in Wapi Park. A recommended road closure and Primitive classification would ensure its preservation for enjoyment of present and future generations.

Map V, page 99, "Old Lava" Jeep Trail-south of Laidlaw Park:

The faint imprints of a hazardous and seldom used jeep trail would disappear if closed to vehicular travel. This region is one of the most remote corners of the Craters Of The Moon Lava Flow; it is recommended for Primitive classification.

Map VI, page 100, "Old Wood Road"-southwest Wapi Flow:

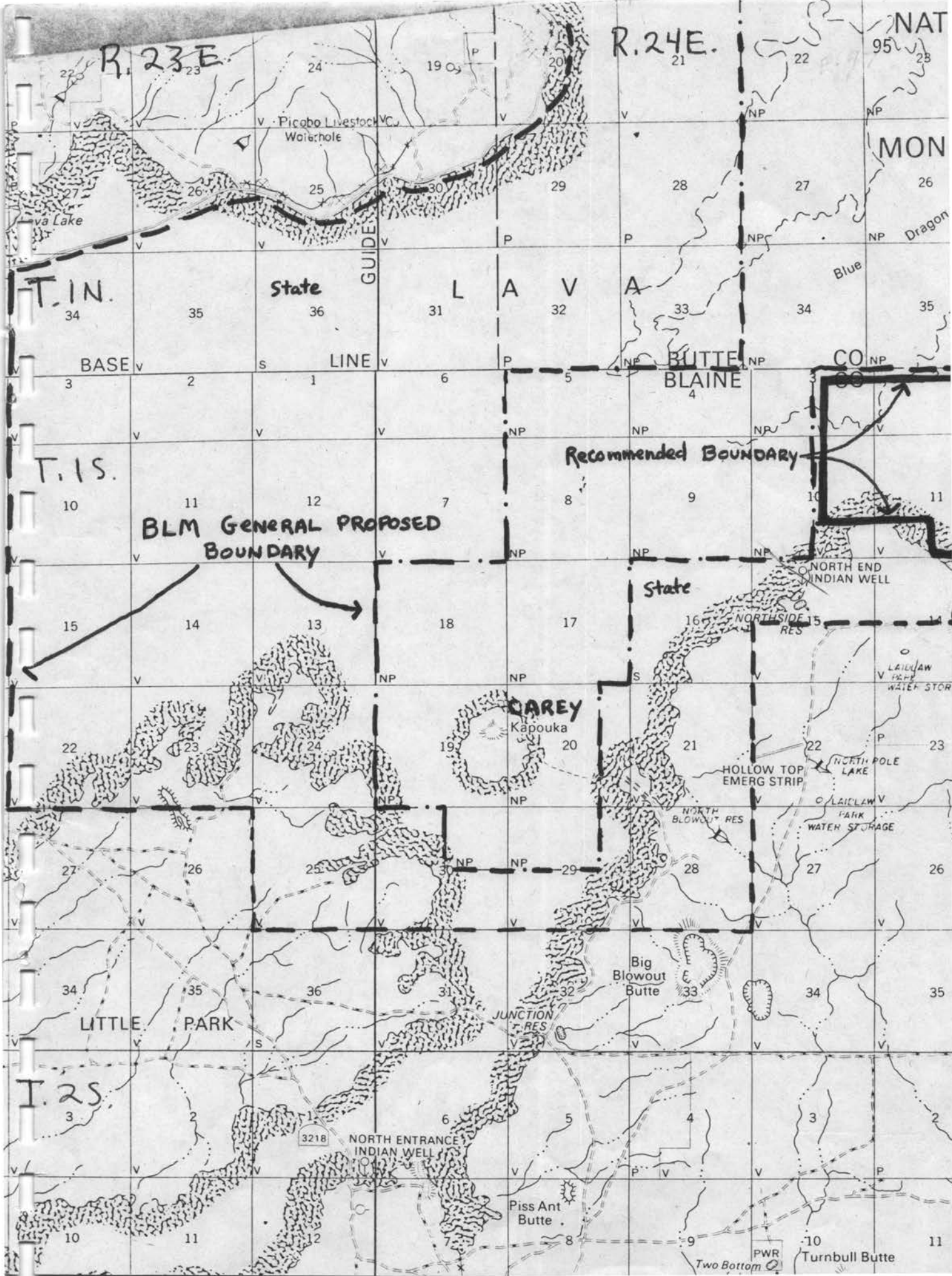
Two parks were previously unmapped while nonexistent jeep trails were erroneously mapped. The map is also incorrect in depicting Brigham Point in section 23; the point lies in section 24 and no lavas extend into section 23. Closure of the "Old Wood Road" and Primitive classification would enhance the juniper covered lavas found in sections 1 and 2 of Range 27E., Township 8S.

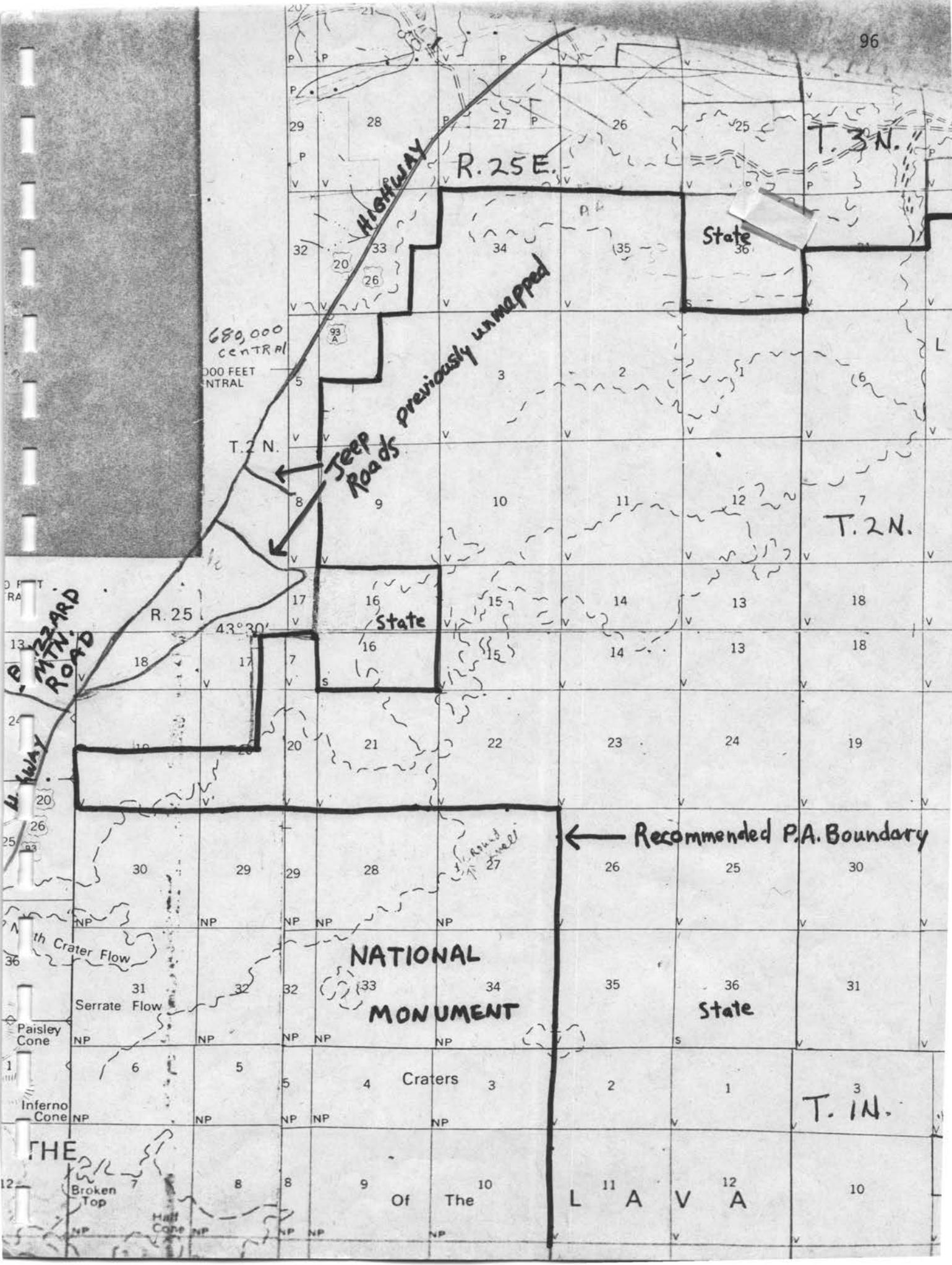
Map VII, page 101, Bear Crater-Bear Butte:

Several unmapped jeep trails including one across the rim of Bear Crater have altered the natural conditions. The crater is approximately one mile from the Craters Flow; the area is recommended for recognition as a Research Natural Area.

Map VIII, page 102, Fissure Cave:

Maps erroneously indicate jeep trail access to Fissure Cave. This portion of the Great Rift is recommended for Primitive classification.





STATE

97

R. 28 E.

"Oldwood Road"
Recommended
FOR closure

R. 29 E.

PUBLIC LANDS
Recommended FOR
WITHDRAWAL BUT
NOT DESIGNATION

STATE

WAPI

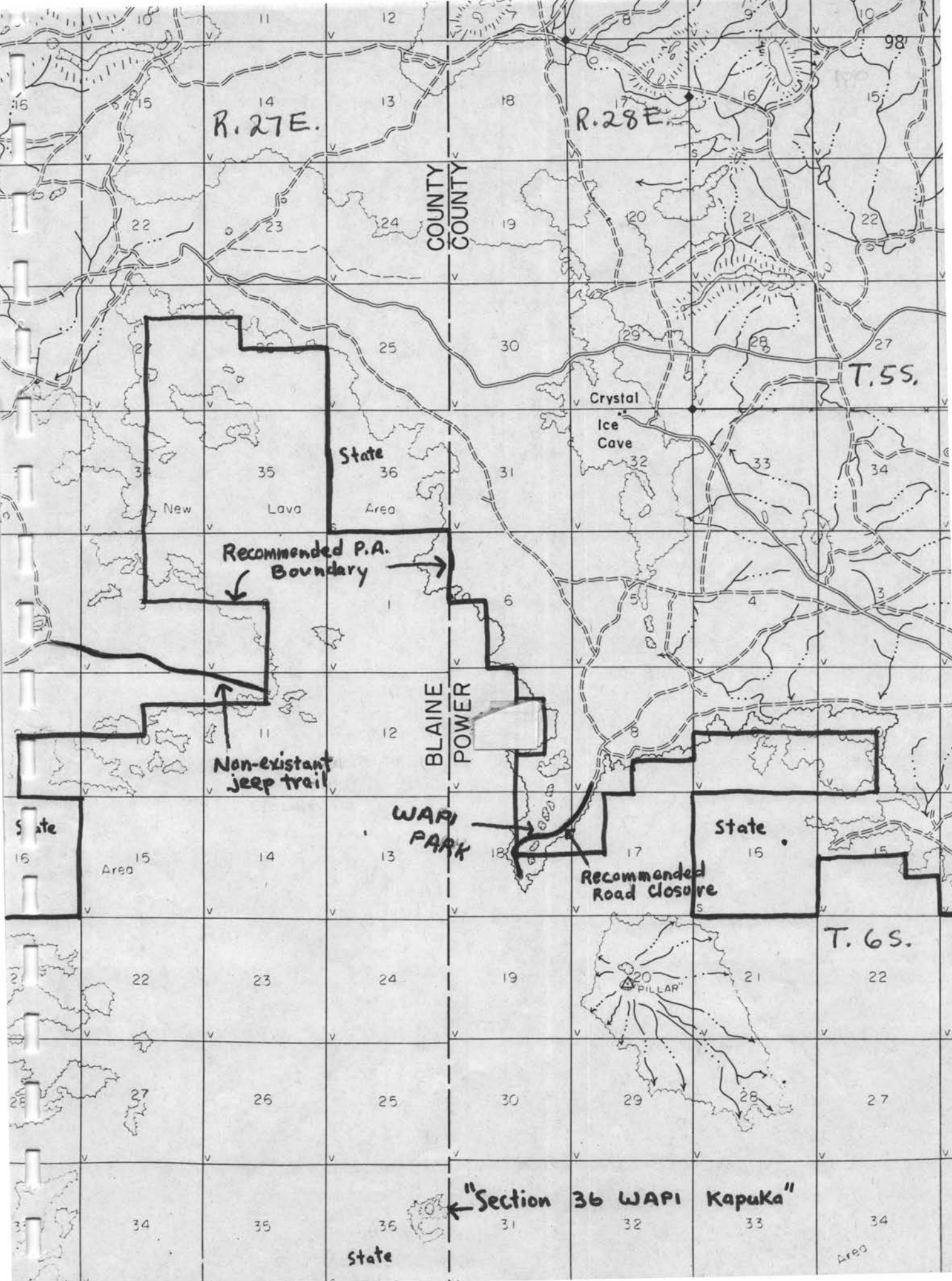
FLOW

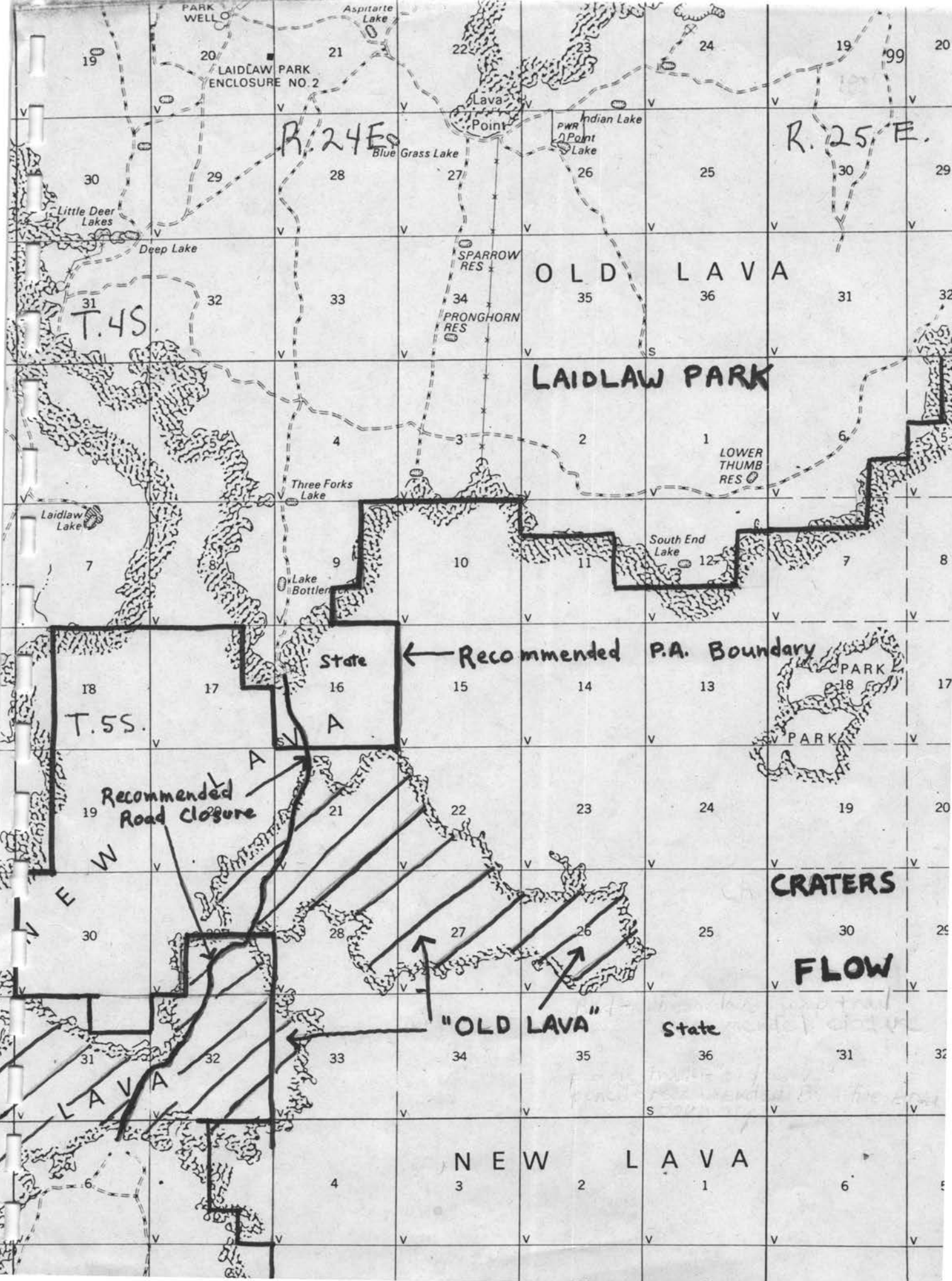
PRIVATE
AGRICULTURE
LANDS

State

Recommended P.A. Boundary

COUNTY
COUNTY





CRATERS
FLOW

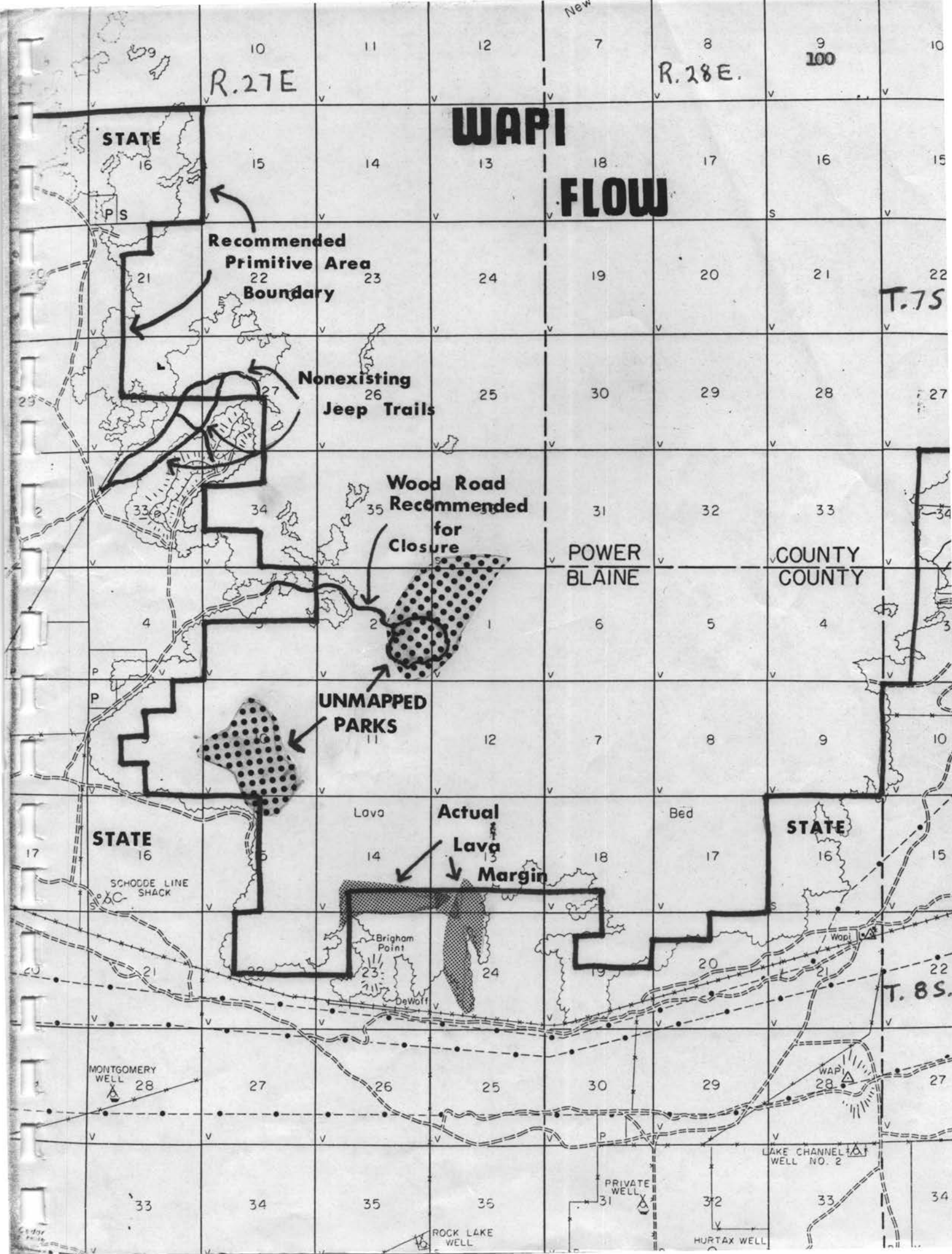
"OLD LAVA"

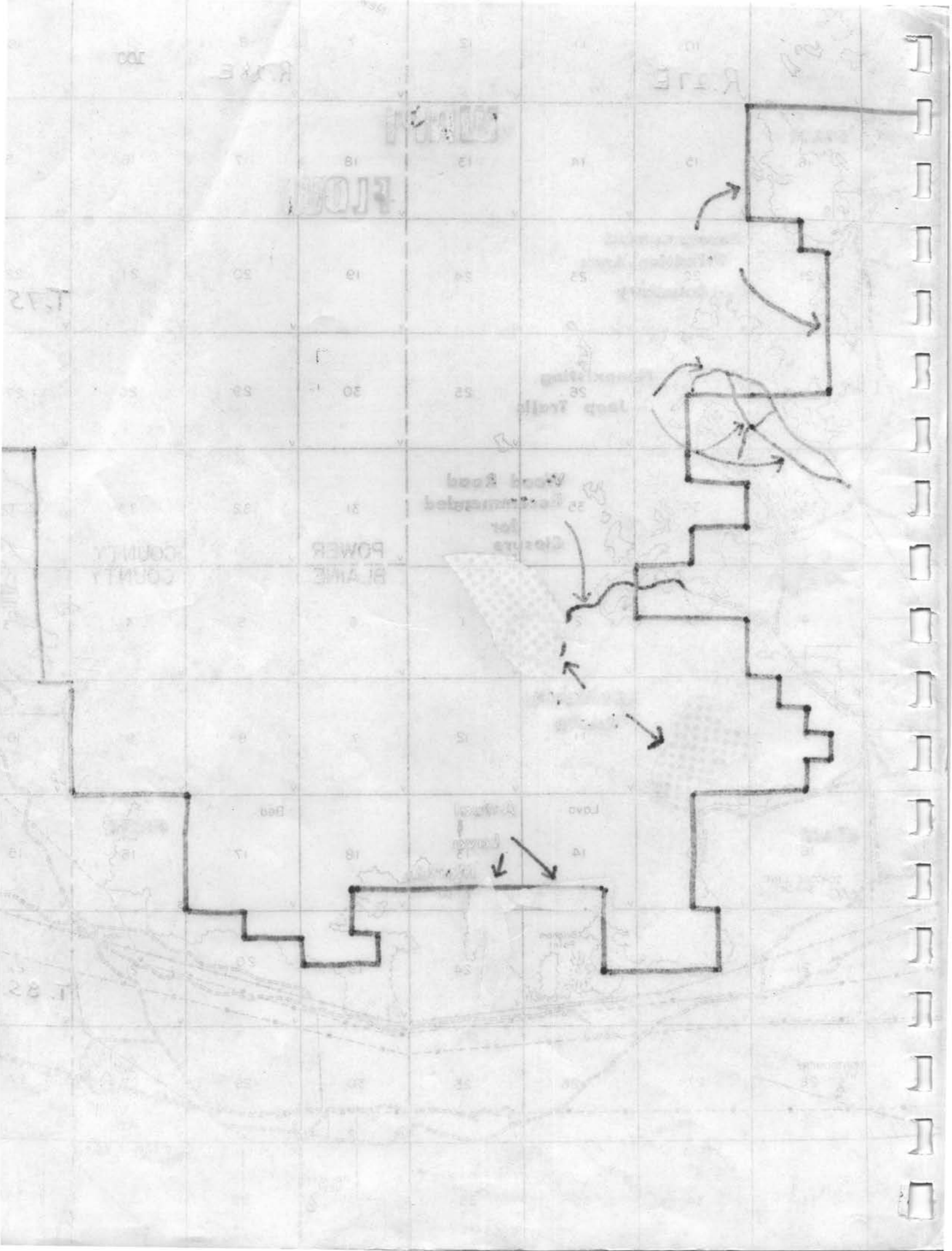
Recommended
Road Closure

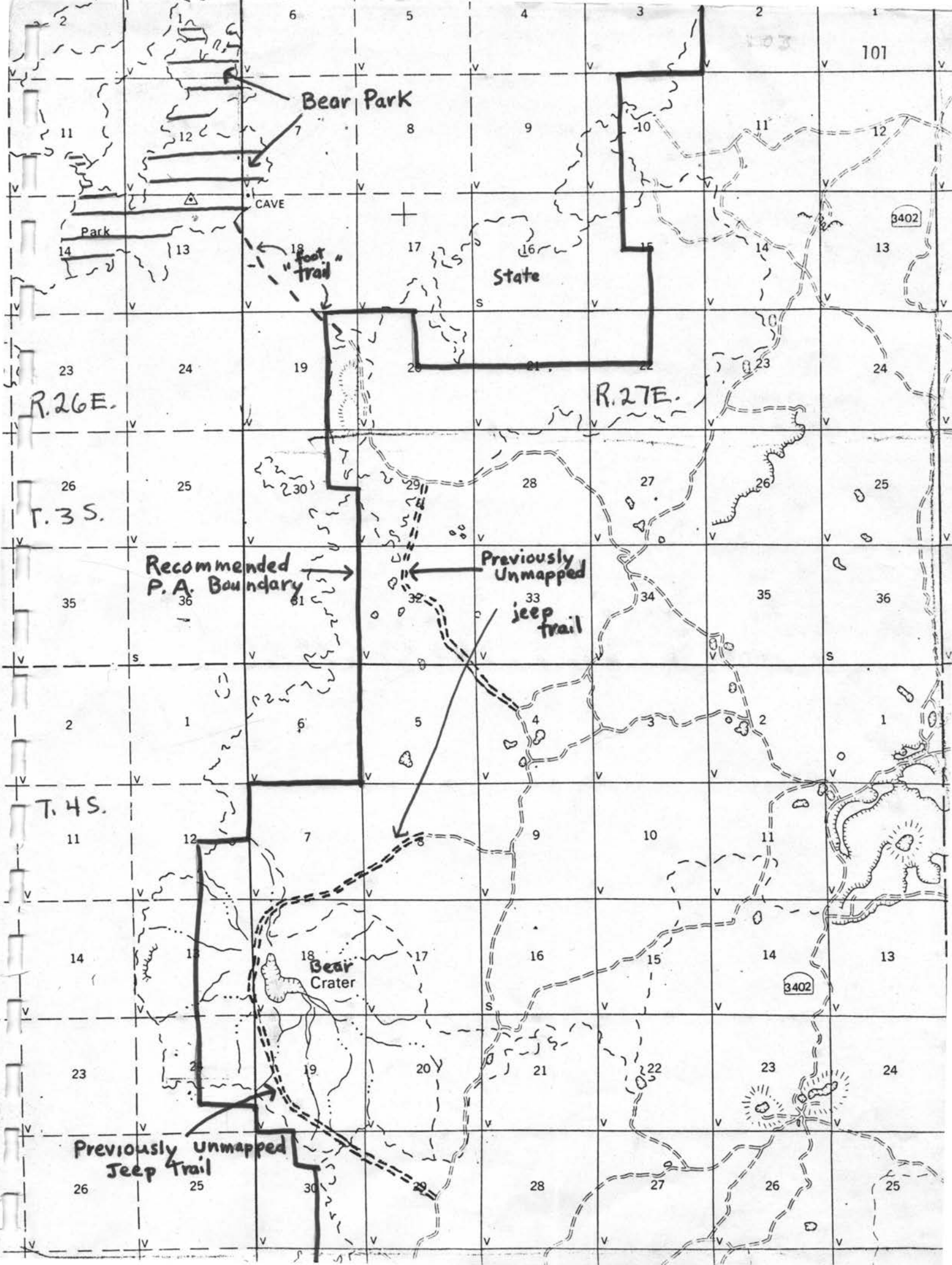
State

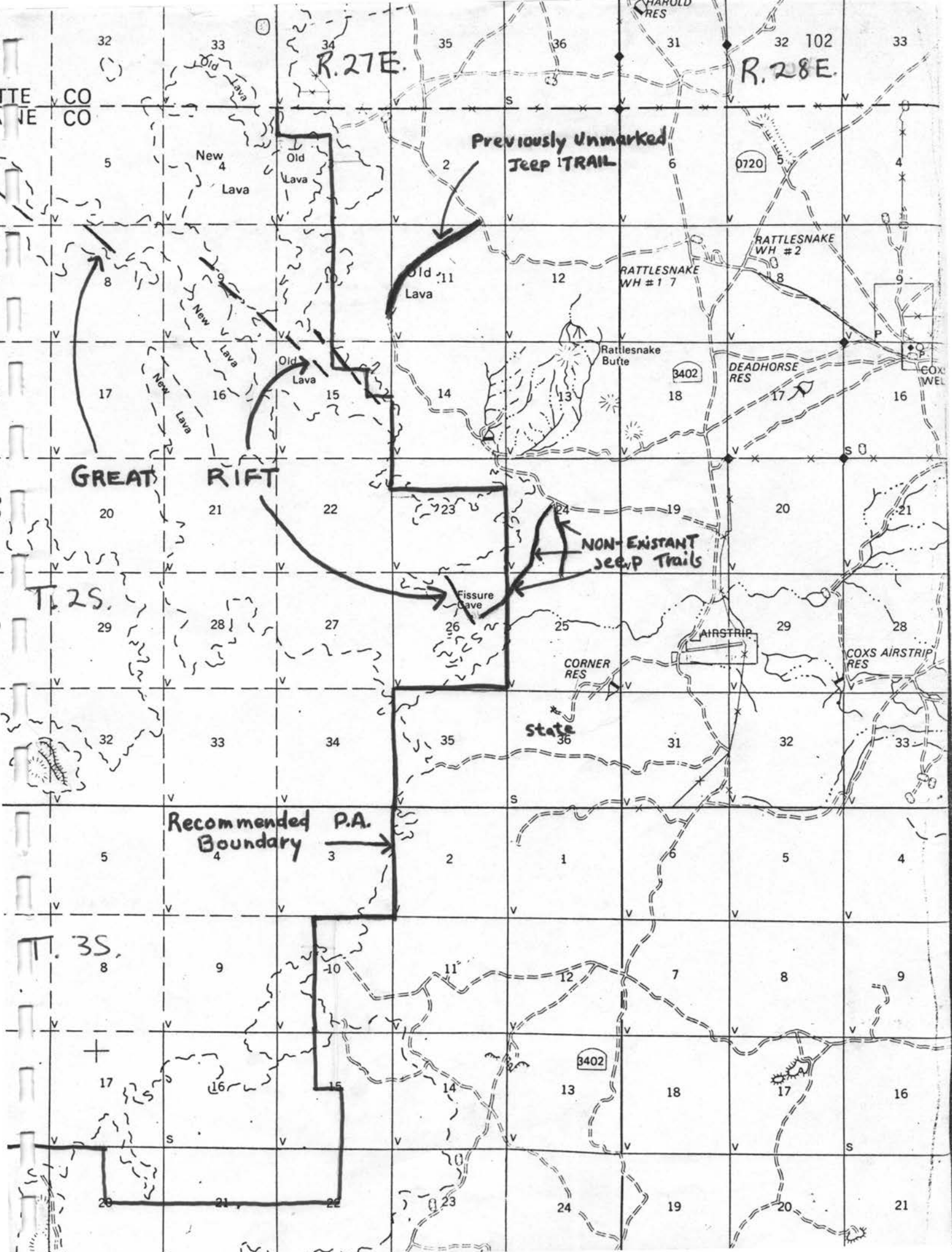
Recommended
Road Closure

LAIDLAW PARK









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