

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

D60-3

ESTABLISHMENT RECORD
FOR
TIMBERED CINDER CONE RESEARCH NATURAL AREA
WITHIN
DIXIE NATIONAL FOREST
IRON COUNTY
UTAH



USDA-FOREST SERVICE

PHOTOGRAPHER

DATE SUBMITTED

PHOTOGRAPHIC RECORD

Joel S. Tuhy

February 15, 1983

(See FSM 1643.52)

HEADQUARTERS UNIT

LOCATION

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TEMP.	PERMANENT (To be filled in by the WO)					
(1)	(2)	(3)	(4)	(5)	(6)	(7)
				ALL: Utah Dixie NF Cedar City RD Iron Co.	ALL: Timbered Cinder Cone proposed Research Natural Area (RNA)	ALL: 23 x 35 mm color slides
1			7/20/83		Telephoto picture of the Timbered Cinder Cone...taken from the northwest near Cedar Breaks National Monument	
2			7/7/83		View northwest from the west side of the Cone, showing the lava flow	
3			7/7/83		<u>Aquilegia coerulea</u> (columbine) and a species of <u>Carex</u> (sedge) grow in a pocket of soil in the lava field	
4			7/8/83		A small, turfy community in the middle of rough lava	
5			7/8/83		Interior of one of the small spruce "islands" in the lava field	
6			7/8/83		Margin zone between lava and forest on the side of the Cone	
7			7/8/83		Subalpine fir/mountain gooseberry habitat type on the side of the Cinder Cone	
8			7/8/83		Subalpine fir/Oregon grape habitat type on the south side of the Cinder Cone	
9			7/8/83		Open forest dominated by limber pine near the top of the Cone	



Photo 1. Telephoto picture of the Timbered Cinder Cone in middle distance, taken from the northwest near Cedar Breaks National Monument.



Photo 2. View northwest from the west side of the Cone, showing the rough, jumbled nature of the nearly-barren lava flow.



Photo 3. Tiny colonies of plants are widely scattered in the lava field. Here Aquilegia coerulea (columbine) and a species of Carex (sedge) grow in a pocket of soil. Lichens are common on rocks throughout the lava field.



Photo 4. A small, turfy, herbaceous community exists in the middle of the rough lava flow. The Timbered Cinder Cone is about one-quarter mile (0.4 km) away in the background.



Photo 5. Interior of one of the small "islands" in the lava field on the east side of the Cinder Cone. Picea engelmannii (Engelmann spruce) is the sole conifer present, and understory vegetation is sparse.



Photo 6. View of the margin or transition zone between lava and forest, on the southeast side of the Cinder Cone. The small brighter-green plants scattered through the center of the picture are Erigeron compositus.



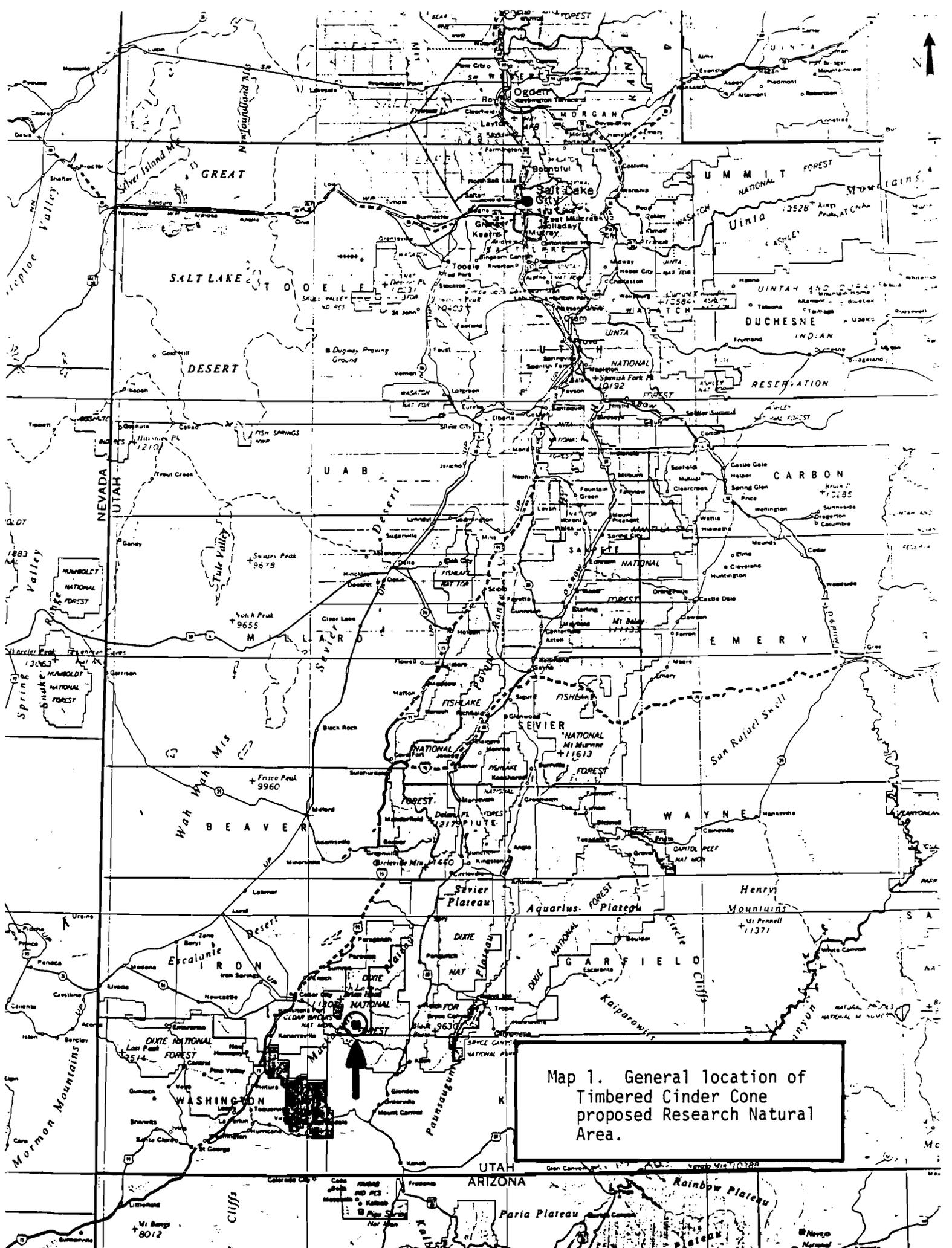
Photo 7 (left). Abies lasiocarpa/
Ribes montigenum (subalpine fir/
mountain gooseberry) habitat
type on the northwest side of
the Cinder Cone.



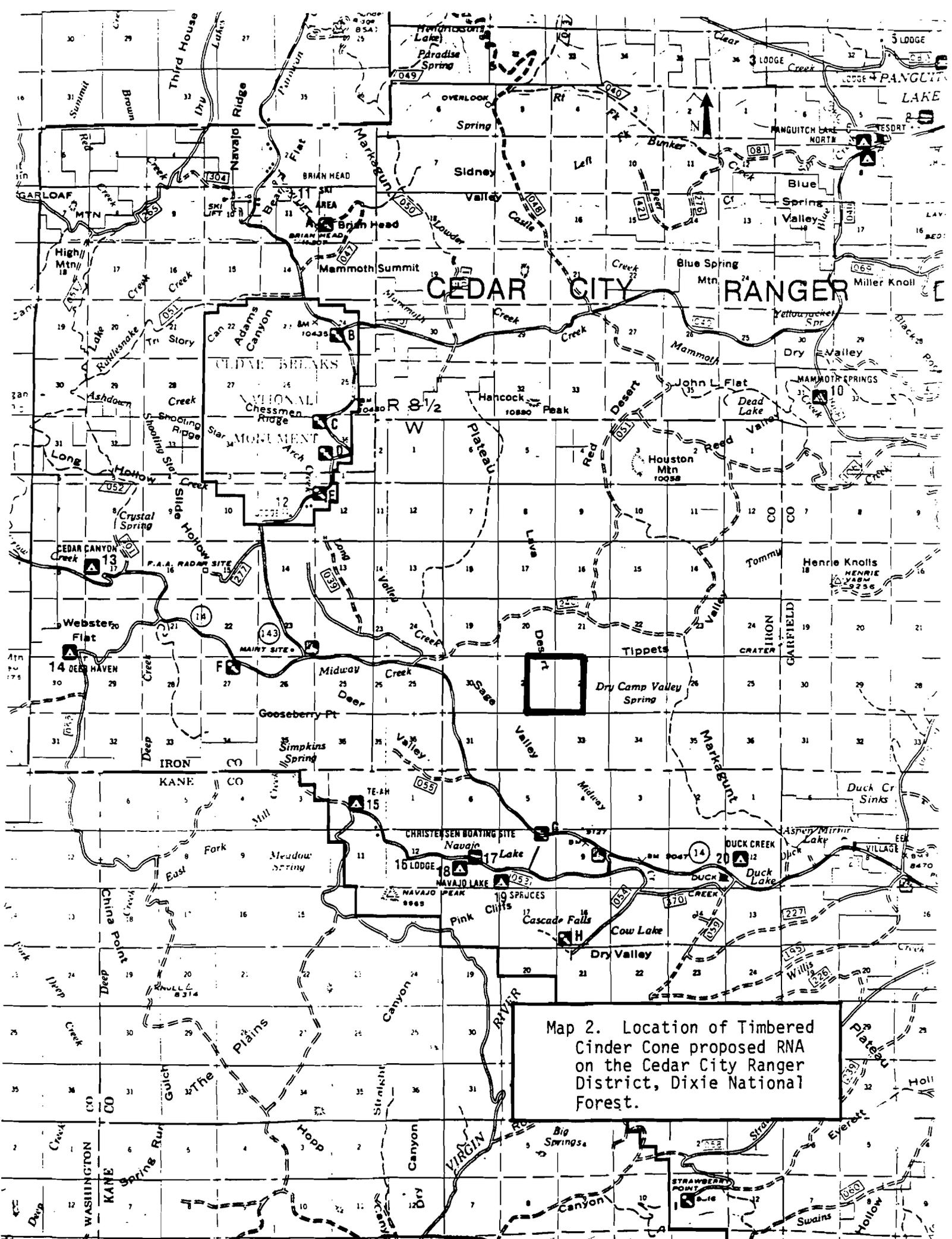
Photo 8. Abies lasiocarpa/Berberis
repens (subalpine fir/Oregon
grape) habitat type on the south
side of the Cinder Cone.



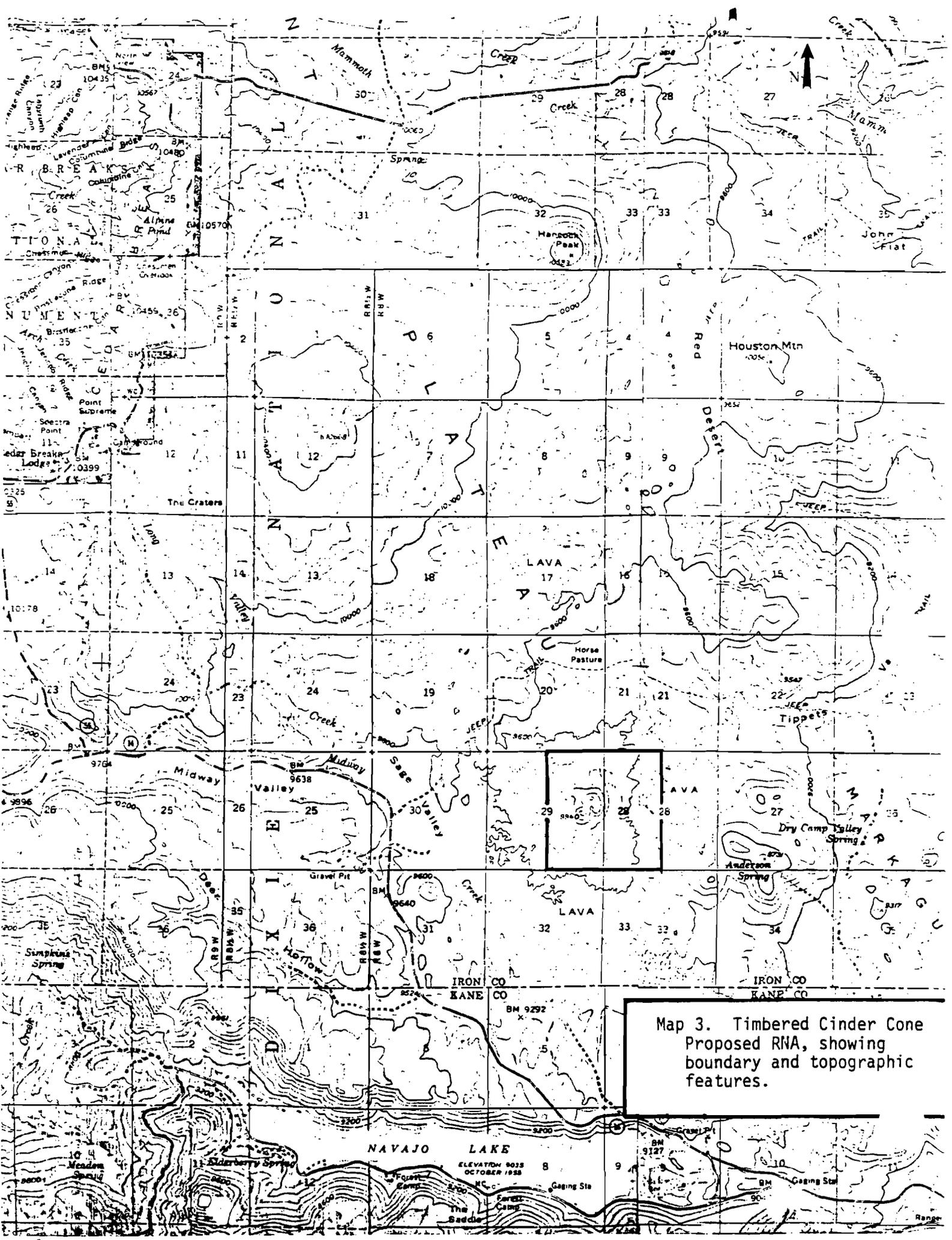
Photo 9. Open forest dominated by Pinus flexilis (limber pine) near the southwest "summit" of the Timbered Cinder Cone.



Map 1. General location of Timbered Cinder Cone proposed Research Natural Area.



Map 2. Location of Timbered Cinder Cone proposed RNA on the Cedar City Ranger District, Dixie National Forest.



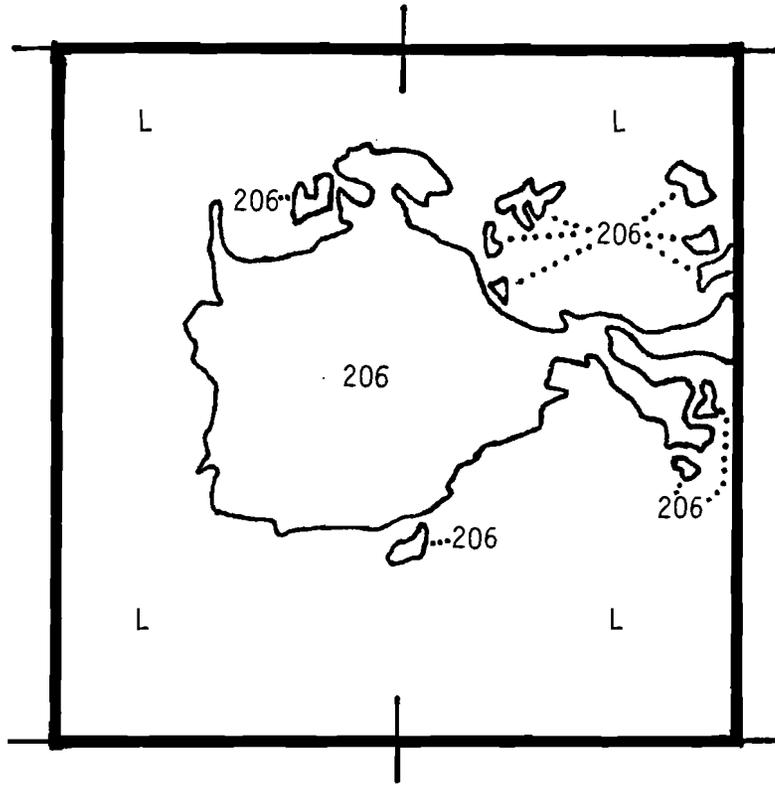
Map 3. Timbered Cinder Cone Proposed RNA, showing boundary and topographic features.

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ELEVATION 9033
OCTOBER 1958

THE SADDLE

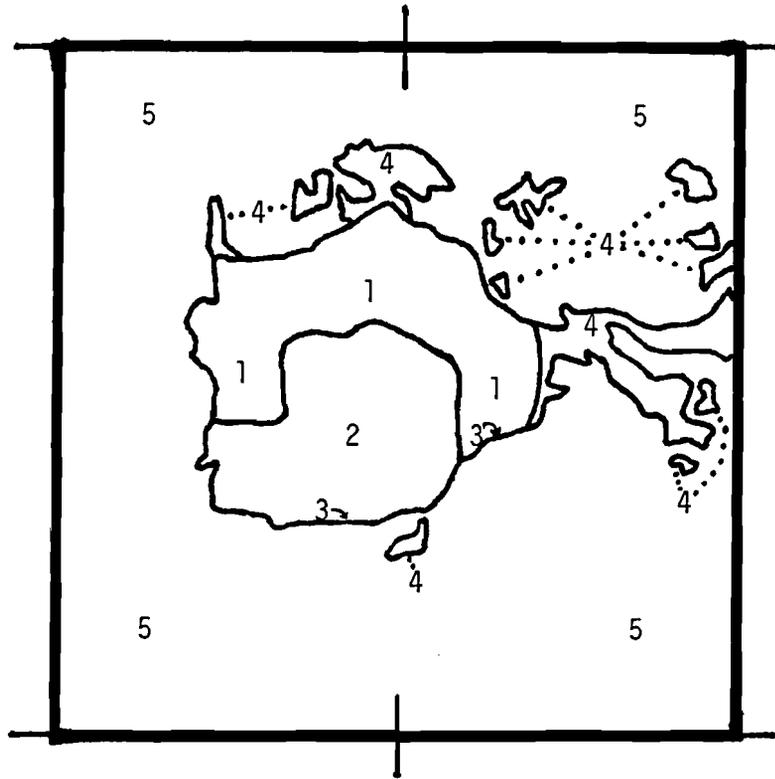
GAGING STA



Scale 1:18000

<u>Map Designation</u>	<u>Cover Type</u>
206	Engelmann spruce - subalpine fir
L	Lava

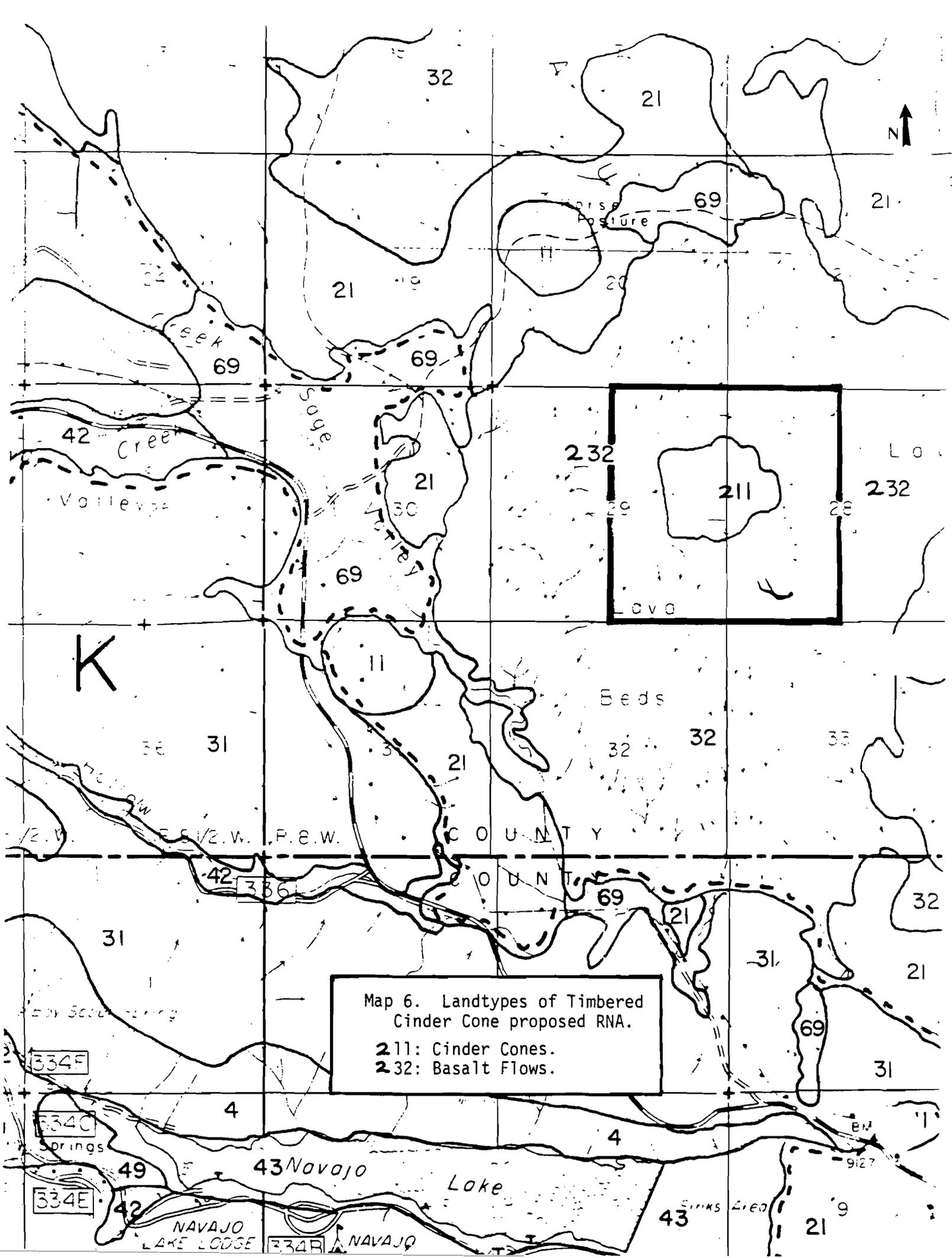
Map 4. Distribution of SAF Cover Types.



Scale 1:18000

<u>Map Designation</u>	<u>Habitat Type/Community Type</u>
1	<u>Abies lasiocarpa/Ribes montigenum</u> h.t.
2	<u>Abies lasiocarpa/Berberis repens</u> h.t.
3	"Cone margin" c.t.
4	<u>Picea engelmannii</u> ("islands") c.t.
5	Lava

Map 5. Distribution of habitat types and community types.



Map 6. Landtypes of Timbered Cinder Cone proposed RNA.

- 211: Cinder Cones.
- 232: Basalt Flows.

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NAVAJO LAKE LODGE

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DECISION NOTICE/DESIGNATION ORDER

Decision Notice
Finding of No Significant Impact
Designation Order

By virtue of the authority vested in me by the Secretary of Agriculture under regulations 7 CFR 2.42, 36 CFR 251.23, and 36 CFR Part 219, I hereby establish the Timbered Cinder Cone Research Natural Area. It shall be comprised of lands described in the section of the Establishment Record entitled "Location."

The Regional Forester has recommended the establishment of this Research Natural Area in the Record of Decision for the Dixie National Forest Land and Resource Management Plan. That recommendation was the result of an analysis of the factors listed in 36 CFR 219.25 and Forest Service Manual 4063.41. Results of the Regional Forester's Analysis are documented in the Dixie National Forest Land and Resource Management Plan and Final Environmental Impact Statement which are available to the public.

The Timbered Cinder Cone Research Natural Area will be managed in compliance with all relevant laws, regulations, and Forest Service Manual direction regarding Research Natural Areas. It will be administered in accordance with the management direction/prescription identified in the Establishment Record. I have reviewed the Dixie Land and Resource Management Plan (LRMP) direction for this RNA and find that the management direction cited in the previous paragraph is consistent with the LRMP and that a Plan amendment is not required.

The Forest Supervisor of the Dixie National Forest shall notify the public of this decision and will mail a copy of the Decision Notice/ Designation Order and amended direction to all persons on the Dixie National Forest Land and Resource Management Plan mailing list.

Based upon the Environmental Analysis, I find that designation of the Timbered Cinder Cone Research Natural Area is not a major Federal action significantly affecting the quality of the human environment. (40 CFR 1508.27.)

This decision is subject to appeal pursuant to 36 CFR Part 217. A Notice of Appeal must be in writing and submitted to:

The Secretary of Agriculture
14th & Independence Ave., S.W.
Washington, D.C. 20250

and simultaneously to the Deciding Officer:

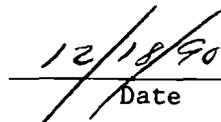
Chief (1570)
USDA, Forest Service
P.O. Box 96090
Washington, D.C. 20090-6090

The Notice of Appeal prepared pursuant to 36 CFR 217.9(b) must be submitted within 45 days from the date of legal notice of this decision. Review by the

Secretary is wholly discretionary. If the Secretary has not decided within 15 days of receiving the Notice of Appeal to review the Chief's decision, appellants will be notified that the Chief's decision is the final administrative decision of the U.S. Department of Agriculture (36 CFR 217.17(d)).



Chief



Date

SIGNATURE PAGE

for

RESEARCH NATURAL AREA ESTABLISHMENT RECORD

Timbered Cinder Cone Research Natural Area

Dixie National Forest

Iron County, Utah

The undersigned certify that all applicable land management planning and environmental analysis requirements have been met and that boundaries are clearly identified in accordance with FSM 4063.21, Mapping and Recordation, and FSM 4063.41 5.e(3) in arriving at this recommendation.

Prepared by Nicholas Van Pelt / Joel S. Tuhy Date March 13, 1990
Nicholas S. Van Pelt, The Nature Conservancy
Joel S. Tuhy, Utah Natural Heritage Program

Recommended by Ronald S. Wilson Date 7/26/90
Ronald S. Wilson, District Ranger,
Cedar City Ranger District

Recommended by Hugh C. Thompson Date 9/25/90
Hugh C. Thompson, Forest Supervisor,
Dixie National Forest

Recommended by Randall K. Hall Date 10/30/90
for J.S. Tixier, Regional Forester, Intermountain Region

Recommended by Laurence E. Lassen Date 10/30/90
Laurence E. Lassen, Station Director,
Intermountain Research Station

TITLE PAGE

Establishment Record for Timbered Cinder Cone
Research Natural Area within Dixie
National Forest, Iron County, Utah

ESTABLISHMENT RECORD FOR
TIMBERED CINDER CONE RESEARCH NATURAL AREA
WITHIN DIXIE NATIONAL FOREST
IRON COUNTY UTAH¹

INTRODUCTION

The Dixie National Forest contains an unusual diversity of rangeland and forest types. Prominent among these are vast subalpine forests, dominated by Engelmann spruce and subalpine fir, on the High Plateaus of southwestern Utah. These forests are pervasively used for timber production, domestic livestock summer range and dispersed recreation. Such uses have proceeded from the presence of explorers and settlers beginning in the early 19th century (T. G. Alexander 1987). Accordingly, little of the spruce-fir ecosystem on these high, accessible plateaus is in a pristine condition, and none of it has been protected in research natural areas.

One untouched and little-known stand of spruce-fir, representative of managed subalpine forests in the general vicinity, occupies a small cinder cone on the Markagunt Plateau east of Cedar City, Utah (Map 1 and Photo 1). The Timbered Cinder Cone has been protected from man-caused disturbance and visitation because it is entirely surrounded by a lava field. The rough lava has buffered the Cone from livestock and from all but the most purposeful human visitors, who must approach on foot. The consequent integrity and isolation of this location suggest an opportunity to recognize its special nature through protective designation. Thus, all of this distinct landform and part of the encircling lava field form the proposed Timbered Cinder Cone Research Natural Area (TCCRNA).

The site was brought to the attention of the Forest Service by Mr. and Mrs. Bernard Vinograde of Brian Head. It was subsequently listed among places in Utah that appeared to qualify strongly for RNA candidacy (Van Pelt 1982). Early field visits were made to the area in June 1982, and again in July 1983. A short detour the author made to its edge in September 1989 revealed no noticeable changes. Dixie National Forest officials had earlier confirmed (June 1989) that no land-use changes had occurred around the proposed TCCRNA, since the first reports, that would compromise its candidacy.

¹This Establishment Record is a revision of one prepared in 1984 for the area of the same name and legal description by Joel Tuhy.

Land Management Planning

The Land and Resource Management Plan for the Dixie National Forest lists the TCCRNA as one of three candidate areas comprising Management Area 10A, "Recommended Research Natural Areas" (USDA Forest Service 1986; and see Appendix 2). One of the other three areas, Red Canyon, has been approved by the Chief of the Forest Service, whereas the Establishment Record for the third, Table Cliff, has been submitted concurrently with this Record. No Plan amendment, nor any formal or informal public appeal, has arisen in the intervening years that would affect the TCCRNA's candidacy for the approval process culminating in the Chief's signature.

OBJECTIVES

The major objective of the Timbered Cinder Cone RNA is to preserve in an undisturbed (by man and natural catastrophes) condition a typical, yet uncommon, volcanic landform, a section of associated lava field and commercial forest types. The TCCRNA will provide a reference site for study, a baseline for assessing long-term ecological changes and a comparison area for determining effects of management techniques and practices applied to similar ecosystems.

JUSTIFICATION

A number of strong justifications exist for establishing the Timbered Cinder Cone RNA. Two major categories to be discussed are need and research potential.

A first estimate of RNA needs in Utah and Nevada (Van Pelt 1982, Table 30) lists the following as a key need:

"Undisturbed montane and subalpine forests exemplifying both common and rare habitat types on sedimentary and volcanic parent materials."

Table 25b of the same document also lists forests and woodlands of the Utah High Plateaus as outstanding RNA deficiencies.

The recommended TCCRNA will help fill this need and remedy these deficiencies. Specifically, the following types are represented here:

1. Abies lasiocarpa (subalpine fir) forest series, including two fairly common habitat types (Youngblood and Mauk 1985):

- a) Abies lasiocarpa/Ribes montigenum habitat type.
- b) Abies lasiocarpa/Berberis repens habitat type.

2. Geologic features, including:

- a) Extrusive-igneous rock type.
- b) Volcanic geomorphic processes, specifically lava flows and fields.

Therefore a chief justification for RNA designation here is representation of two fairly common subalpine forest habitat types on volcanic parent materials, a situation currently unrepresented in a federal RNA in Utah. The Cinder Cone's forests are in an exceptional state of preservation. All man-caused influences have been excluded, including early-day grazing. In addition, there are no detectable signs of major natural catastrophes like insect outbreaks, windthrow or severe fires.

A second major justification arises from the potential for scientific and managerial studies in the whole area. There are three major categories of possible research: silvicultural applications, "island" biogeography and lava-field succession.

Dixie National Forest officials confirmed that the forests on the Cinder Cone are representative of forests under timber management on the Markagunt Plateau (with the possible exception of fire regime). There are opportunities here for long-term studies of forest stand structure, growth, mortality, size/density relationships and other properties and processes (R.R. Alexander 1987, Hanley and others 1975, Veblen 1986).

The lack of livestock, recreational or logging disturbance of the forest floor constitutes an outstanding study value. According to Pfister (1972), livestock trampling may have affected seedbeds under coniferous forests throughout the subalpine zone of southern Utah. On the Timbered Cinder Cone, researchers could be confident that this has not occurred.

The forests on the Cone occupy a situation of scientific interest and importance. A very knowledgeable natural-area scientist in the Northwest, where there are large areas of Recent lava, was unable to cite an area there where a well-developed forest of commercial species is so starkly isolated (Sarah Greene, Pacific Northwest Forest and Range Experiment Station, personal communication).

A second broad research topic involves island biogeography. The theory of island biogeography (MacArthur and Wilson 1967) deals

with changes in species composition on islands as functions of their area and isolation from a mainland. The validity of this theory has been questioned by Gilbert (1980) and others, especially where small-scale, terrestrial "habitat island" situations such as the Cinder Cone are concerned. Carter-Lovejoy (1982) studied small islands amongst lava flows in Idaho, and found that theory-predicted relationships did not hold for plant and small-mammal assemblages. The recommended TCCRNA would be a good situation in which to test further the tenets of island biogeography as they might pertain to natural fragments of commercial forests.

A related research topic involves species composition differences between "islands" and "mainlands" where the two are more or less connected by corridors of similar habitat (see MacClintock and others 1977). The Cinder Cone may be appropriate for such research because a tenuous corridor does exist. It consists of a discontinuous series of timbered patches or "islands" from the east side of the Cone northeastward to the main body of plateau forest over a mile (1.6 km) away.

A third general research theme concerns rates of rock weathering and soil/vegetation development on the lava flows. Several studies of this type, for example that of Egger (1941), have been conducted in lower-elevation, semiarid habitats. The proposed TCCRNA provides a place to study succession on subalpine lava flows subjected to heavy snowfalls.

PRINCIPAL DISTINGUISHING FEATURES

The Timbered Cinder Cone RNA encompasses rugged, entirely undeveloped lands. It is comprised of a distinct, well-vegetated cinder cone completely surrounded by a nearly-barren lava field. These two features are very young geologically, probably extruded in the Recent Epoch. The TCCRNA contains a number of distinguishing features, as follows:

An excellent example of a cinder cone. It retains a rather symmetrical shape, and its crater is intact and little altered by erosion or mass movement. Vegetation, soils, and landform have developed in concert here, without human intervention or, as far as could be discerned, significant natural disturbance for millenia.

Engelmann spruce-subalpine fir stands. The forests on the Cone, and the "stringer" of spruce extending toward the mainland, are essentially pristine. Two habitat types described by Youngblood and Mauk (1985) are present. The subalpine fir/mountain gooseberry type is characteristic of relatively cool and moist subalpine habitats in southern Utah. Such forests on the Cone (Map 5) are

old and largely dominated by Engelmann spruce, with high basal areas and unusually dense stocking. The subalpine fir/Oregon grape type reflects warmer and effectively drier subalpine conditions. The stands atop the Cone are less dense and generally contain a mixture of subalpine fir, limber pine, and aspen.

Undisturbed, extensive lava flows. This part of the TCCRNA, which entirely lacks roads, airstrips, quarries and trails, is quite rough and mostly unvegetated except for lichens. A few widely scattered colonies of vascular plants grow in crevices and depressions where some soil has accumulated. The "flora" of the lava beds, restricted to small scattered patches, is distinct from that of the Cone. Only a few lava species are found on the Cone, and then only along its transitional margins. Likewise, virtually no forest species occur in the lava. This and other, nearby lava fields are primary water recharge areas for the Markagunt Plateau and adjacent semiarid valleys.

The above combination of geologic and vegetation features occurs in a distinct setting, and is not duplicated in an RNA elsewhere in Utah or the Intermountain Region.

LOCATION

The proposed TCCRNA is located on the Cedar City Ranger District of the Dixie National Forest. It lies about 19 air miles (30 km) east-southeast of Cedar City, in southeastern Iron County, Utah (Maps 1 and 2). Geographic coordinates for the RNA are 37° 34' North latitude and 112° 45' West longitude. A specific legal description for the proposed RNA is:

W 1/2 section 28
E 1/2 section 29
T. 37 S., R. 8 W.
Salt Lake Meridian

As shown on the GLO-dependent survey of T. 37 S., R. 8 W., dated August 26, 1940; the intent of this description being to accept the monument established in said survey as the boundaries of the Timbered Cinder Cone Research Natural Area.

Boundaries

Because there are no recognizable terrain features in the lava field surrounding the Cinder Cone, the RNA boundary was chosen to coincide with the land lines surveyed in the area (Map 3). The quarter-section corners at the four corners of the RNA are marked with brass caps, as are the two section corners midway along the northern and southern boundaries (General Land Office 1945). The quarter-section corner directly in the center of the TCCRNA, on the

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east flank of the Cone, is also marked with a brass cap. Therefore, the boundary corresponds entirely with surveyed land lines and marked corners.

Basis of bearings is astronomic north. Basis of elevations is mean sea level, and as shown on USGS 15-minute topographic quadrangle maps Cedar Breaks, Utah (1958) and Panguitch Lake, Utah (1958). All legal land descriptions are referenced to the Salt Lake Meridian.

Area

The proposed TCCRNA encompasses an area of 640 acres (259 ha), derived from two adjacent, regular half-sections. About 23% of the RNA is vegetated, whereas the remainder (some 77%) is rough lava.

Elevations

Elevation ranges from 9940 feet (3030 m) at the highpoint on the southwest "summit" of the Cone, down to about 9500 feet (2895 m) near the northeastern and southeastern corners of the RNA. This represents a vertical relief of about 440 feet (135 m).

Access

Vehicular and foot access is good during the snow-free months. Utah state highway 14 passes to the south of the TCCRNA between Cedar City and Long Valley Junction (Maps 1 and 2). At a point on this road about 20 miles (32 km) east of Cedar City, a turnoff northward enables closer access to the RNA. This spur road branches almost immediately. The right fork, Forest Road #240, is a rather primitive dirt road which winds eastward around the north side of the (now visible) Timbered Cinder Cone. One may walk from this road directly onto the lava, or first through intervening stands of conifers and aspen. A good approach starts from a point in the southeastern part of section 19, with a hike of about a mile southeastward across the lava to the Cone proper.

Despite the forbidding look of the lava, the Cinder Cone is rather accessible to the careful, well-shod walker. About an hour should be allowed for this crossing. Researchers camping in the vicinity can thus expect to have 6 to 8 working hours in the area each day. Camping on the Cone is possible, but there is no water. The terrain precludes access by horse or off-road vehicle, but a helicopter might land carefully near the edge.

Maps

Various USDA Forest Service maps of the Dixie National Forest show the Cinder Cone, the lava field and the vicinity in detail. In addition to planimetric general-purpose maps (see Map 2), the vicinity appears on the "Final Management Area Map" accompanying the Forest Plan (USDA Forest Service 1986). The TCCRNA is not, however, shown on the map for the Forest's Off-Road Vehicle Travel Plan. The recommended Timbered Cinder Cone RNA is covered by these US Geological Survey quadrangle maps, all of them in-print:

Cedar Breaks 15', 1958
Panguitch Lake 15', 1958
Henrie Knolls 7.5', 1985 (Provisional Edition)
Navajo Lake 7.5', 1985 (Provisional Edition)

Map 3 of this Report is a composite of the east and west sides, respectively, of the two 15-minute sheets.

Photos

The following black-and-white aerial photos cover the TCCRNA, and together enable full stereoscopic coverage:

F16 49021 DX276, Frames 9 and 10
Flown September 5, 1975
Scale: 1:15,840

They can be viewed in the Intermountain Regional Office (Ogden, Utah), the Dixie National Forest Supervisor's Office (Cedar City) and the Great Basin Field Office (Salt Lake City) of The Nature Conservancy.

AREA BY VEGETATIVE AND OTHER TYPES

The following table shows the estimated areas of the different vegetation types present in the proposed TCCRNA. Three classification systems are applied. Classifications of potential

natural vegetation by Kuchler (1966) and of forest cover types by the Society of American Foresters (Eyre 1980) are both limited in their ability to distinguish differences within the forested portion of the area. Thus, a subdivision by forest habitat types (Youngblood and Mauk 1985) and miscellaneous community types is also presented. Maps 4 and 5 show the distribution of SAF cover types and habitat/community types, respectively.

Table 1
Estimated Areas of Cover Types and Habitat Types
in the
Timbered Cinder Cone Research Natural Area

SAF Cover Types (Eyre 1980) and other types	Estimated Area	
	Acres	Hectares
206 Engelmann spruce-subalpine fir	150	60
- Nearly-barren lava	<u>490</u>	<u>199</u>
Total	640	259
<hr/>		
Kuchler Types (Kuchler 1966)		
14 Western spruce-fir forest (<u>Picea-Abies</u>)	150	60
- Nearly-barren lava	<u>490</u>	<u>199</u>
Total	640	259
<hr/>		
Habitat Types (Youngblood and Mauk 1985) and other types		
ABLA/RIMO <u>Abies lasiocarpa</u> ² <u>Ribes montigenum</u> h.t.	50	20
ABLA/BERE <u>Abies lasiocarpa</u> / <u>Berberis repens</u> h.t.	55	22
<u>Picea engelmannii</u> ("stringers") c.t.	35	14
"Cone margin" c.t.	10	4
Nearly-barren lava	<u>490</u>	<u>199</u>
Total	640	259

²Nomenclature for plants follows Welsh and others (1987) except for trees which follows Little (1979).

PHYSICAL AND CLIMATIC CONDITIONS

Physical Conditions

The Cinder Cone is the central topographic and visual feature of the TCCRNA, with lava beds sloping away gently on all sides. The Cone itself has a central crater, which is bounded by an uneven rim with high points at the northeastern and southwestern sides. This crater and rim are evident on aerial photographs (especially when viewed in stereo), and can be followed on the ground. From the crater rim, the sides of the Cone slope downward at gradients ranging from 25 to 65 percent, with 30 to 40 percent most common.

The surrounding lava abuts the Cone at a higher elevation on the west than on the east. The lava field slopes away from the cone at gradients of 1 to 20 percent, with 5 to 15 percent most common. The sharp, jagged lava has formed a series of innumerable small ridges and basins. Small pockets of soil have accumulated in a few depressions in the midst of the jumbled boulders.

Climatic Conditions

The climate in this area is influenced by two different systems, which seasonally vary in their relative influence. From November through March, storms move into the area from the Pacific Northwest and northern California. Precipitation then is almost entirely in the form of snow, and contributes about 70 percent of the annual precipitation received on the Markagunt Plateau. Subalpine snowpacks up to 12 ft (3.7 m) deep may accumulate in some winters, with the maximums probably somewhat less in the elevational range the TCCRNA occupies. During the summer, a weather pattern characterized by afternoon thunderstorms is common. Some of these storms are intense, with heavy rainfall and high winds.

Long-term records indicate an average annual precipitation of about 30 inches (762 mm) for the proposed TCCRNA (USDA Soil Conservation Service 1979). About 40 frost-free days per year probably occur in this vicinity. No weather stations are located within or especially close to the recommended boundaries of the TCCRNA.

Four Soil Conservation Service precipitation stations are located in this part of the Markagunt Plateau. Data from four of these (USDA Soil Conservation Service 1979) are summarized below.

Table 2
Selected Data from SCS Stations in the TCCRNA Vicinity

<u>SCS Station and Elevation</u>	<u>Length of Record</u>	<u>Distance from the TCCRNA</u>	<u>Precipitation</u>	
			<u>Annual Mean</u>	<u>June-Sept. Mean</u>
Castle Valley 9700 ft (2960 m)	1957-78	7 mi to N (11 km)	26.3 in (667 mm)	6.9 in (174 mm)
Duck Creek RS 8700 ft (2650 m)	1956-78	5 mi to SE (7 km)	29.4 in (746 mm)	7.1 in (180 mm)
Midway Valley 9800 ft (2990 m)	1971-78	5 mi to W	31.2 in (792 mm)	6.4 in (162 mm)
Webster Flat 9200 ft (2800 m)	1956-78	8 mi to W	32.3 in (820 mm)	7.8 in (198 mm)

In addition, Castle Valley, Midway Valley, and Webster Flat have had temperature gauges for about the past ten years, but data from these are not in summarized form.

Several National Oceanic and Atmospheric Administration installations in the larger area maintain records of temperature and precipitation (NOAA 1964-1982). However, all except the Blowhard Radar FAA facility are valley locations, much warmer and drier than the TCCRNA. Mean annual precipitation and temperature from that exposed station, at 10,700 ft (3260 m) elevation, are about 31 in (790 mm) and 34° F (1.3° C).

DESCRIPTION OF VALUES

Flora

A list of plant species collected or observed during field inventories was compiled, and appears on the next two pages (Table 3). Scientific nomenclature follows Welsh and others (1987) with two exceptions. Berberis repens Lindl. is preferred over Mahonia repens (Lindl.) G. Don, because the former name is used in the applicable forest classification literature in Utah. Also, the treatment of Allred (1976) is followed in using the name Frasera speciosa Dougl. rather than Swertia radiata (Kellogg) Kuntze. There are no threatened, endangered, or sensitive species present in the area (USDA Forest Service 1989).

Table 3
List of Plant Species Within the
Timbered Cinder Cone Research Natural Area
(Observed or Collected June 1982 and July 1983)

Trees

<u>Abies lasiocarpa</u>	subalpine fir
<u>Picea engelmannii</u>	Engelmann spruce
<u>Pinus flexilis</u>	limber pine
<u>Populus tremuloides</u>	quaking aspen

Shrubs

<u>Amelanchier alnifolia</u>	serviceberry
<u>Juniperus communis</u>	common juniper
<u>Ribes inerme</u>	*whitestem gooseberry
<u>Ribes montigenum</u>	*mountain gooseberry or gooseberry currant
<u>Rosa sp.</u>	wild rose
<u>Sambucus racemosa</u>	*elderberry
<u>Shepherdia canadensis</u>	*soapberry
<u>Symphoricarpos oreophilus</u>	*mountain snowberry

Forbs

<u>Aquilegia caerulea</u>	*Colorado columbine
<u>Berberis (Mahonia) repens</u>	*Oregon grape
<u>Cryptogramma crista</u> [fern]	*rock-brake
<u>Epilobium angustifolium</u>	fireweed
<u>Erigeron compositus</u>	*fern-leaf daisy
<u>Fragaria virginiana</u>	mountain strawberry
<u>Frasera speciosa</u>	elkweed
<u>Mertensia arizonica</u>	tall bluebell
<u>Penstemon sp.</u>	penstemon
<u>Pyrola secunda</u>	secund wintergreen
<u>Rubus idaeus</u>	*raspberry
<u>Senecio multilobatus</u>	Uinta groundsel
<u>Smilacina stellata</u>	solomon-seal
<u>Viola canadensis</u>	*Canada violet

(Table 3, continued)

Graminoids

<u>Bromus</u> sp.	brome or brome grass
<u>Carex occidentalis</u>	*western sedge
<u>Carex rossii</u>	*Ross sedge
<u>Poa</u> sp.	*bluegrass
<u>Poa fendleriana</u>	*mutton grass
<u>Poa nervosa</u>	*Wheeler bluegrass

*Collected and deposited in herbaria at Utah State University
and Brigham Young University

Five habitat or community types were clearly identified during inventories. Three of these occur on the Cinder Cone itself. The other two are confined to the lava surrounding it.

1. Abies lasiocarpa/Ribes montigenum (subalpine fir/mountain gooseberry) habitat type (ABLA/RIMO), Ribes montigenum phase.

This type, described by Youngblood and Mauk (1985) occurs on the northwest, north, and lower east sides of the Cinder Cone. It is elsewhere associated with some of the highest and coolest sites in southern Utah and occupies vast acreages on the High Plateaus.

The forests occupying this habitat type on the Cone are rather striking and exemplary. They are dominated by mature Engelmann spruce, with abundant subalpine fir reproduction (Photo 7). The stands are fairly evenly stocked and support a high basal area. Basal area computed by tallying trees in one 500 m² (0.124 ac) survey plot was 63.5 m²/ha (276.5 ft²/ac) for spruce and 7.1 m²/ha (31.0 ft²/ac) for subalpine fir. Most of the spruce in this plot were in the 11-21 inch (28-53 cm) DBH range, though few subalpine fir are larger than 7 inches (18 cm) DBH. Other stands in this habitat type here, on the north side of the Cone, contain larger trees. Van Pelt and Hiatt (1983) inventoried a stand with many spruce in the 26-30 inch (66-76 cm) DBH range.

The small recent diameter growth, an average of 0.2 in (5 mm) 10-year radial increment (based on five trees cored), indicates that the forest is maximally stocked. Very little mortality is evident in the mature to overmature spruce overstory, however.

Youngblood and Mauk (1985, Appendix E) represent the yield capability of the ABLA/RIMO type as about 60 ft³/acre/year (4 m³/ha/yr). Cores and height measurements here indicated a lower corresponding site index, but these were probably obtained from trees whose height growth has greatly slowed in recent decades. Standing, defect-free volumes may attain the maximums known for this habitat-type phase, especially since the stand is quite free of insect-killed or windthrown trees.

Understory vegetation is low and depauperate throughout the stands of this type, probably because of deep shading and thick accumulations of duff (Table 4).

Table 4
Canopy Cover for Understory Species in One 500 m² (0.124 ac) Plot
Placed in the ABLA/RIMO Habitat Type

<u>Species</u>	<u>Cover Class*</u>
Shrubs	
<u>Ribes montigenum</u>	1
<u>Shepherdia canadensis</u>	1
<u>Juniperus communis</u>	T
Forbs	
<u>Fragaria virginiana</u>	T
<u>Pyrola secunda</u>	T
*Applicable cover classes: T=0-1%; 1=1-5%	

2. Abies lasiocarpa/Berberis repens (subalpine fir/Oregon grape) habitat type (ABLA/BERE).

This type, described by Youngblood and Mauk (1985), occupies the southwest, south, and upper east sides of the Cinder Cone. The type encompasses lower, warmer, and/or drier sites in the subalpine zone of southern Utah.

There appear to be two ABLA/BERE expressions on the Cone. The first, more widespread one is characterized by a rather open overstory of Engelmann spruce, subalpine fir, and aspen, with a few limber pine (Photo 8). The most abundant regeneration is of subalpine fir and aspen.

Basal area computed by tallying all trees in one 500 m² (0.124 ac) survey plot was 42.8 ft²/ac (9.8 m²/ha) for subalpine fir, 36.8 ft²/ac (8.4 m² for spruce, 14.0 ft² (3.2 m²/ha) for aspen, and 8.7 ft²/ac (2.0 m²/ha) for limber pine. Most overstory trees of all these species were smaller than 13 inches (33 cm) DBH, though a few spruce are as large as 19 inches (48 cm). Ten-year radial increment averaged 0.6 inches (16 mm), measured on three spruce trees.

These forests occupy low to moderate sites for timber productivity. An average site index was computed as 42 (50-year base), using three selected spruce trees with an average breast-height age of 102 years and an average height of 68 feet (21 m). This site index equates with an estimated yield capability of about 52 ft³/ac/yr (3.6 m³/ha/yr) (Youngblood and Mauk 1985, Appendix E). The actual productivity in uneven-aged stands such as these is probably lower.

Understory vegetation is more diverse than on the north side of the Cone. However, total cover is relatively low, with appreciable bare ground exposed (Table 5).

Table 5
Understory Composition in One 500-Meter-Square Plot Placed
in the ABLA/BERE Habitat Type

<u>Species</u>	<u>Cover Class*</u>
Shrubs	
<u>Berberis repens</u>	2
<u>Symphoricarpos oreophilus</u>	1
<u>Juniperus communis</u>	2
<u>Rosa sp.</u>	T
<u>Shepherdia canadensis</u>	1
Forbs	
<u>Epilobium angustifolium</u>	T
<u>Frasera speciosa</u>	1
<u>Penstemon sp.</u>	T
<u>Senecio multilobatus</u>	1
<u>Smilacina stellata</u>	1
Graminoids	
<u>Carex rossii</u>	1
<u>Bromus sp.</u>	T
<u>Poa sp.</u>	T

* Applicable cover classes: T=0-1%; 1=1-5%; 2=2-25%

The second, minor expression of the ABLA/BERE type, which probably corresponds to the limber pine (PIFL) phase, has the same tree and understory species present. However, limber pine dominates an even more open overstory stratum, and spruce trees are scarce (Photo 9). This stand occupies the warmest, driest sites on the Cinder Cone. One portion of the stand was briefly inventoried, but the data are not summarized here.

3. Cone-margin communities.

A narrow margin or band around much of the Timbered Cinder Cone is a transition between the raw lava and the forested slopes

of the Cone proper. This zone is most noticeable along the Cone's southern margin. Mineral soil material, probably transported from slopes above, has combined with gravel and cobbles up to 8 inches (20 cm) in size to fill the voids between lava boulders. Large areas of this margin habitat thus have fairly smooth surfaces.

Several plant species from both forests and lava grow on this margin. In addition, some species such as Erigeron compositus grow only on the margin sites. Table 3 lists species observed in these habitats.

4. Picea engelmannii (Engelmann spruce) "island" communities

These rather fragmentary communities consist of open forests of spruce plus some stunted aspen (Photo 5). They comprise the wooded "islands" that adjoin the Cinder Cone, primarily on its northern and eastern sides. The origin of these "islands" is unclear. They appear to be another kind of transitional habitat between the raw lava and the slopes of the Cone. Enough soil has accumulated for spruce to grow, but large lava boulders remain and give a very uneven character to the surface.

Understory vegetation is very sparse and consists of a few Cone-margin and lava species (Table 3). The spruce "islands" are the only communities in which Ribes inerme was observed in the proposed TCCRNA.

5. Lava beds

The flora of the lava beds is seldom anywhere aggregated into anything larger than micro-communities. Large expanses are barren save for lichens on the jagged boulders (Photo 2). Some crevices or depressions have accumulated enough soil material to support small colonies of plants, seldom covering more than a few square meters (Photo 3). Species characteristic of these sites include Aquilegia coerulea (columbine), Mertensia arizonica (blue-bells), Viola canadensis (violet), Sambucus racemosa (elderberry), Rubus idaeus (raspberry), and/or the fern Cryptogramma crispa. These species are essentially restricted to the lava beds, though several were observed on the Cone margin and in the spruce "islands".

A few "meadowy" habitats exist in the midst of the lava field (Photo 4). One such site, of about 300 m² (0.07 ac), is barely west of the proposed RNA boundary, in the north half of section 29. (It appears as a lighter spot on aerial photographs). This relatively flat area, with a rather well-developed turf growing between weathered basalt blocks, is in sharp contrast to the piles of jagged boulders on all sides. It could be a remnant, weathered lava surface not covered by later flows.

This spot is of interest because it supports seven plant species which were observed neither elsewhere in the lava field nor on the cinder cone. They are Achillea millefolium, Androsace septentrionalis, Cymopterus lemmonii, Gentiana affinis, Geum triflorum, Potentilla crinita, and Solidago sp.

Fauna

The 1982 and 1983 field inventories did not include purposeful observations of animal life. Neither Forest Service documents nor conversations with staff biologists at the time revealed the presence, or supported the likelihood, of endangered or threatened wildlife in the proposed TCCRNA.

The Dixie National Forest has identified a number of wildlife Management Indicator Species (MIS; USDA Forest Service 1986). By monitoring their populations and habitat relationships, Forest managers might understand the impact of human uses and natural successional trends on them and other, associated species. The known or extrapolated occurrence of MIS within the RNA is:

<u>Management Indicator Species</u>	<u>Present in TCCRNA?</u>
Mule Deer	Unlikely
Rocky Mountain Elk	Unlikely
Wild Turkey	Unlikely
Goshawk	Unlikely
Common Flicker	Not Seen; Possibly
Yellowbreasted Chat	Not Seen; Unlikely
Bonneville Cutthroat Trout	No
Resident Trout (Rainbow, Brook, Brown, Cutthroat)	No
Macroinvertebrates	Probably

Some small mammals and birds are surely present on the Cone. At least one species of squirrel inhabits the forests, and two large burrows, excavated by mammals, were observed along the southern cone-margin. It is doubtful that deer or elk are present on the Cinder Cone; no signs of either were observed. Several species of nongame, nonraptorial birds were seen but not identified.

Animal life in the lava field appears to be even more scarce than on the Cone. Hummingbirds were seen and heard there. The small "meadow" previously described, surrounded by at least a quarter mile (370 m) of lava on all sides, supports a fairly large ant colony.

Aquatic

These values are non-existent here, inasmuch as no streams or standing water occur anywhere, even in ephemeral form. The lava, and the light soils of the Cinder Cone, are probably far too permeable to permit water to collect, and the terrain is too jumbled for watercourses to have formed.

Geology and Soil

Extensive lava flows on much of the Markagunt Plateau are generally associated with the Miocene through Holocene (Recent) episodes of block faulting of the southwestern High Plateaus and adjacent Great Basin (Rowley and others 1975). The cinder cones and flows of olivine basalt near and including the proposed TCCRNA are among the youngest on the Plateau. Gregory (1950) states that there have been two or three episodes of lava extrusion since Pliocene time. Based on stratigraphy, topographic form and relation to faults, he concluded that the basaltic (versus rhyolitic) lavas and associated cinder cones post-date the faulting. Thus these lavas were extruded long after the Markagunt Plateau was uplifted to about its present height. Wilson and Thomas (1964) believe that these flows began in the Pleistocene and probably continued into the Recent Epoch.

Gregory (1950) further described the results that this geologically-recent vulcanism has had on the landscape. The source of most of the younger lava is marked by cinder cones about which are accumulated rugged masses of basalt and scoria and from which lava streams extend 1 to 3 miles (1.6 to 4.8 km). In the region east and southeast of Cedar Breaks National Monument, many of the lava flows may be traced from their source to their abrupt termination, and the cones have slopes normal for materials accumulated about volcanic vents. Most volcanic cones on the Plateau, including the Timbered Cinder Cone, retain their summit craters.

From the sides of the cones extend streams of cellular, scoriaceous lava, marked by ropy structures, gas mounds, pressure faults, and other features characteristic of recent flows. These flows consist of irregularly overlapping sheets that together have added 300 to 1000 feet (90 to 300 m) to the height of the Markagunt Plateau. The ends and sides of individual flows are clearly discernable and their surfaces unmodified except for the accumulation of blocks produced by frost action.

Recent volcanic activity near and including the Timbered Cinder Cone has influenced the hydrology of the area (Wilson and Thomas 1964). These lava beds are among the primary water recharge areas for the Markagunt Plateau, and thus for the adjacent arid valleys as well. The blocky, unvegetated basalt flows are able to completely absorb maximum snowmelt and thunderstorm precipitation without surface runoff. Water percolates rapidly downward through the lava.

The surface and groundwater systems of the area are closely interrelated. Lava flows have cut off many pre-existing surface drainage channels. However, the runoff water is able to flow through subterranean channels dissolved in the underlying limestone of the Wasatch Formation. Surface streams that encounter lava barriers are thus able to flow beneath the lava, joined by water percolating directly from the lava surfaces. Such subsurface streams then reappear as springs and seeps, often miles away from where they disappeared upstream.

The Dixie National Forest's progressive soil survey on the Markagunt Plateau, now underway, identifies two landtypes in the proposed TCCRNA (Map 6).

Landtype 211. Cinder Cones [tentative name]

The Timbered Cindered Cone itself makes up this landtype expression. The summit crater is still present, and sideslope gradients range from 25 to 65 percent, with 30 to 40 percent most common.

The parent material from which soil has developed is comprised of cinders rather than solidified lava. Stearns (1930) describes cinder cones as "heaps of lava froth or spray formed by the fire fountains which played at the time of the eruptions".

The majority of the soils are classified as Argic Cryoborolls on headslopes and toeslopes, and Typic Cryochrepts on most other positions. Members of a proposed soil order, Andisols, are probably also present. Profiles are characterized by gravelly and cobbly clay loams, or gravelly loams over cinders. Most soils are greater than 20 inches (50 cm) deep, with moderately high coarse fragment contents. Egger (1941) notes that cinder-derived soils have characteristically high water-holding capacities. Some variation in soil depth, coarse fragments and organic matter content exists, depending on aspect and slope position.

Landtype 232: Lava Flows

This landtype makes up the remainder of the proposed RNA surrounding the Cinder Cone. The flows slope away from the Cone in all directions with gradients of 1 to 20 percent. The lava is of the broken, jagged type known as (Hawaiian term) "aa".

Little soil has developed on the lava field. Gregory (1950) writes that soil on this terrain is notably absent, given the especially favorable conditions for mechanical weathering of rocks on the Markagunt Plateau. Most of the lava surrounding the Timbered Cinder Cone is thus devoid of vegetation, save for lichens on the basalt boulders. In discussing succession on lava flows, Egger (1941) describes sequences where soil accumulates in crevices and depressions of different sizes, thus allowing plants to colonize the lava. A number of such soil-accumulation sites, supporting small colonies of plants, were observed in the lava fields of the proposed RNA.

Lands

The RNA is entirely made up of reserved National Forest System land and is surrounded by such land. No private inholdings or portions of State-owned sections occur within the proposed boundary. The Dixie National Forest's 1986 Land and Resource

Management Plan includes the TCCRNA in Management Area 10A. This Area, which also includes the two other RNA's on the Forest, carries a sole emphasis of "Research Natural Area", with the "Compatible FORPLAN Emphasis" as "No Harvest".

Cultural Values

No sites or artifacts of historical, cultural, or archeological significance are known to exist in the proposed RNA.

IMPACTS AND POSSIBLE CONFLICTS

Mineral Resources

Three categories of mineral resources are leasable, common variety and locatable. Leasable resources relevant to this general area include oil and gas, geothermal, and coal. The only common variety mineral relevant to the proposed RNA is cinders. Locatable resources, such as hard rock minerals, silica, and limestone, are not expected to occur in the TCCRNA.

The geographic index to mining claims, maintained on in the Bureau of Land Management's Utah State Office, reveals no valid claims within the proposed boundary as of October 12, 1989. Also, no claim markers or prospect pits whatsoever were seen during visits to the area.

Bureau of Land Management plats reveal that no currently (as of February 1990) valid oil and gas leases cover the TCCRNA. A number of previous leases were terminated in 1984. Some of the vicinity lands may be available for lease in the near future, on a noncompetitive basis. Industry interest is apparently quite low, however.

There was past interest in exploring for geothermal energy in the lava fields north of Navajo Lake. In August 1975 Hunt Oil Company applied for a geothermal prospecting permit in this vicinity. Later that year, they formally withdrew all applications for geothermal leases. No such leases are currently known to exist. The Land and Resource Management Plan (USDA Forest Service 1986) indicated at the time of its adoption that there had been no known discoveries of geothermal energy in the area. Cedar City Ranger District personnel confirmed (February 1990) that no subsequent discoveries had been documented.

Gregory (1950) notes that there are large quantities of coal in Cretaceous sedimentary rocks exposed on the west slope of the Markagunt Plateau. These deposits are well west of the proposed TCCRNA, so there should be no coal-related conflicts with its designation.

The Cinder Cone itself is a possible source of cinders. However, the need for extracting them is extremely low because (a) it is far less accessible than other deposits; (b) there are no roads to it; and (c) removal would destroy the vegetation cover. An active cinder pit exists about one mile (1.6 km) east of the Navajo Lake dike, providing an accessible alternative.

Unlike leasable and locatable minerals, the Forest Service has direct control over the exploration for and extraction of common-variety minerals such as cinders. Therefore it is unlikely that conflicts would ever develop in this regard.

In summary, no mineral-related conflicts appear to encumber designation of the TCCRNA. The only potential conflict might stem from new oil and gas leases, but no discoveries have been made to date. When the Establishment Record is approved by the Chief, the RNA will be withdrawn from mineral entry.

Grazing and Fences

The proposed TCCRNA is not included in a grazing allotment. No maintained or defunct fencelines occur anywhere within the boundaries. Probably no domestic stock have ever been on the lava field or on the Cone, and no new fencing is needed to prevent their intrusion. In short, there appear to be no grazing conflicts with permanent Research Natural Area designation and appropriate management.

Timber

Although the Timbered Cinder Cone supports several hundred thousand board feet of primarily spruce timber (no cruise data are available), these volumes are not included as part of the Dixie National Forest's timberland base (USDA Forest Service 1986). Future logging potential is not entirely absent, but either destructive roadbuilding or costly helicopter yarding would be necessary, for negligible gains in the Forest's timber output. Approximately 150 acres (60 ha) of (inoperable) commercial forest occur here, all on the cone.

Watershed Values

Research Natural Area status should have absolutely no impact on the water-recharge properties of the surrounding Markagunt Plateau lands and their contribution to low-elevation water supplies. To the extent that unaltered lava receives and stores snowfall in particular, all watershed values would remain at their current levels.

Recreation Values

The Cone appears to receive very light and infrequent recreation use, not excluding the major hunting seasons. A few carved aspen trunks and one cut stump were about the only signs seen of past human presence. Human visitation is negligible because access is fairly rugged, and because there are no attractions other than solitude and small-scale scenic appeal. Designation should not affect patterns of recreational use.

The only recreational mode of travel that is practicable here is hiking. At current or somewhat higher levels of visitation, no detectable impact on the RNA from recreationists should result. Hunters must avoid the area, considering it to lack any game or ready means of vehicle access. In summary, it is difficult to envision any recreational or tourism pursuit that could affect the proposed RNA's vegetation, surfaces, and research values.

Wildlife and Plant Values

Designation should have no impact on wildlife values in the proposed RNA. If anything, the Cinder Cone provides an undeveloped refuge for a few species of birds and small mammals, along with opportunities for nondestructive censuses for comparisons with other forested habitats on the "mainland".

Unlike the other two RNA's on the Dixie National Forest (Table Cliff and Red Canyon), the TCCRNA apparently has no threatened, endangered or sensitive vascular plant species (USDA Forest Service 1989). Welsh (1978) rates volcanic substrates as among the least promising for endemic plants of the Colorado Plateau landscapes. The TCCRNA's potential for sustaining introduction of TES plants (for example, to further recovery plans) is unknown but probably slight, given the inhibiting forest cover and the prevalence of sterile lava or duff-covered surfaces.

Special Management Area Values

The TCCRNA is not within any of the subunits of Management Area 8A, "Wilderness", delineated and described in the final Land and Resource Management Plan (USDA Forest Service 1986). Conversely, the entire RNA is one of three subunits of Management Area 10A, "Research Natural Areas", which is not a subcategory of any other Management Area.

Transportation Plans

No roads or trails enter the area, nor have plans for any been made. Establishment of an RNA should have no impact on existing transportation systems, nor will it hinder any proposed new systems or extensions of present ones. Road and trail excavation across the lava would be exceptionally expensive and scarring.

MANAGEMENT PRESCRIPTION

The Dixie National Forest Land and Resource Management Plan includes the Timbered Cinder Cone RNA in Management Area 10A. The Plan describes the Management Area and the management standards, direction and guidelines which apply (refer to appended Plan excerpts, pages IV-153-155). The management area direction states, "Emphasis is on research, study, observations, monitoring and educational activities that are nondestructive and nonmanipulative, and that maintain unmodified conditions" (USDA Forest Service 1986, page IV-153).

The "desired future condition" of the TCCRNA upon designation is that it be "shaped by natural forces only" and that no management activities will alter it (USDA Forest Service 1986, page IV-153). Research or monitoring-plot markers and scientific equipment may be installed, however, subject to a study proposal approved by the Director of the Intermountain Research Station.

No special protection measures are foreseen as being needed at this time. Signing and other interpretive measures for casual visitors are probably superfluous, because few people other than purposeful hikers or researchers are likely to approach the area.

ADMINISTRATION RECORDS AND PROTECTION

Administration and protection of the Timbered Cinder Cone RNA will be the responsibility of the Dixie National Forest. The District Ranger, Cedar City Ranger District, has direct responsibility. No special efforts are required, hence funding and staff time required will be very minor.

The Director of the Intermountain Research Station will be responsible for any studies or research conducted in the area. He will evaluate research proposals and coordinate all studies and research in the TCCRNA with the District Ranger. All plant and animal specimens collected in the course of research conducted in the area will be properly preserved and maintained within the Southern Utah State College herbarium or Brigham Young University's Bean Life Science Museum, as approved by the Intermountain Research Station Director.

Records for the Timbered Cinder Cone RNA will be maintained in the following offices:

Regional Forester, Ogden, Utah
Forest Supervisor, Dixie National Forest, Cedar City, Utah
District Ranger, Cedar City Ranger District, Cedar City, Utah
Director, Intermountain Research Station, Ogden, Utah
Intermountain Research Station, Provo, Utah

ARCHIVING

The Provo office of the Intermountain Research Station will be responsible for maintaining the Timbered Cinder Cone RNA research data file, reports, and lists of plant and other samples collected and deposited in herbaria and museums.

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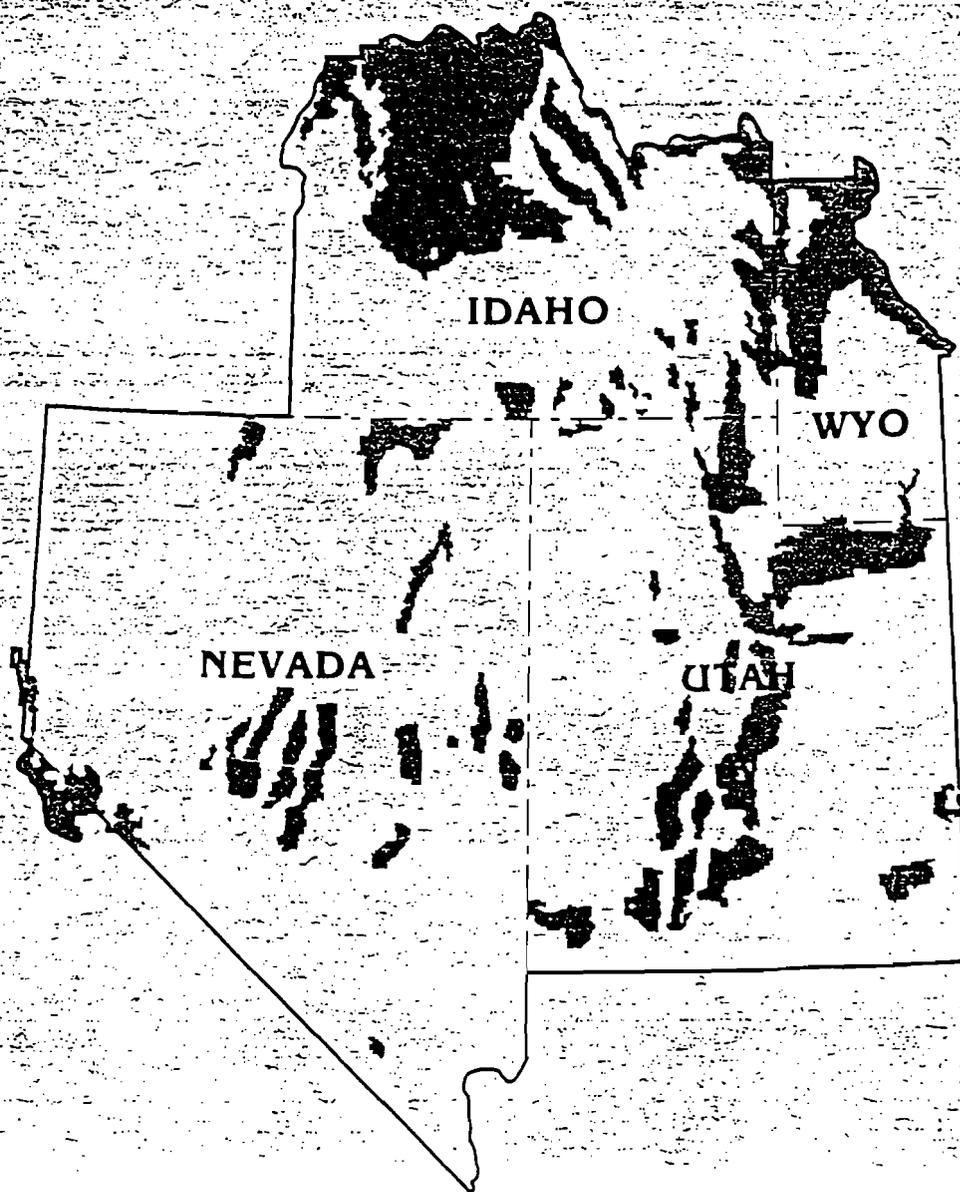
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Regional Guide for the Intermountain Region

Appendix A.

Region 4 Document Excerpt



REGIONAL GUIDE
FOR THE
INTERMOUNTAIN REGION

Covering Forest Service programs that affect
Southern Idaho, Utah, Nevada, Western
Wyoming, and portions of California and Colorado

January 1984

Intermountain Region
U.S. Department of Agriculture
Forest Service
Federal Building
Ogden, Utah 84401
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5. Before approving new corridors or the widening of existing corridors, consideration will be given to wheeling, uprating, or multiple circuiting of transmission lines or increasing pipeline capacity by the addition of compressors, or looping.
6. Future corridors will be based on the window, exclusion area, and avoidance area concept and should be inventoried and identified during Forest planning. Transportation, utility, and major water transmission uses shall be given equal consideration with other uses in the land management planning process for these areas.
7. Consult with power administrations and the Western Utilities Group study for electrical transmission and pipeline facilities planned for local areas.
8. Give consideration to the added social and economic costs when corridors deviate substantially from their shortest route.

Research Natural Areas

Research natural areas (RNA's) need to be established to promote and protect natural diversity in all of its forms. These areas should typify important forest, shrubland, grassland, alpine, aquatic, and geologic types in each Region, and also other natural situations that have special or unique characteristics of scientific interest and importance.

Policy. Selection and establishment of research natural areas (RNA's) shall be a part of the continuing land and resource management planning process for National Forest System lands. Forest Plans will identify the botanic, aquatic, geologic, and other special types represented on the Forests that should be reserved in natural areas and will propose natural areas to include these situations. Research activities planned for the area and its administration should be reflected in the Forest Plan. The Forest Plan shall provide the specific management and protection direction needed for each area.

General Guides. Potential RNA's should show little evidence of major disturbance by man, such as livestock grazing or timber cutting. Usually 300 acres will be the minimum size. However, high-quality areas of smaller size should be considered when other areas cannot be found.

Where possible, small drainage basins should be selected. Such areas provide ecosystems embracing a number of terrestrial and aquatic situations.

Regional Planning Requirements. The National Forest System land and resource management planning regulations (36 CFR 219) indicate that typical examples of important botanic, aquatic, and geologic types that are needed to complete the national network of RNA's must be identified in Forest planning. The national network presently consists of the forest cover types as identified and defined by the Society of American Foresters (SAF types) and the potential natural vegetation types (PNV types) identified by Kuchler for the United States. The planning regulations indicate that aquatic and geologic types also must be identified. The Intermountain

Region has adopted the aquatic ecosystem declassification for Idaho natural areas by Rabe and Savage, and developed a general geologic classification based on rock type, geomorphic process, and unique features.

As a minimum, the Intermountain Region will attempt to establish at least one RNA that includes the necessary vegetation, geologic substrata, and aquatic types. The geologic type criteria will be used to help define the abiotic variation within each type when considering a proposed RNA.

It is recognized that SAF types and PNV types only represent gross cover types and that, in fact, each contains substantial variation within each of them. While habitat type classifications are not yet available for all vegetation types throughout the Region, substantial areas, in particular Idaho and western Wyoming, now have such classifications available. Where they are available, habitat types should be used as an optimum standard against which to evaluate how well the variation within SAF and PNV types is represented in the Regional system of RNA's. The optimum would be to have an example of each habitat type represented in the Regional system of RNA's. Recognizing that such a goal is impossible at this time, the median solution is to encompass the major variations within the PNV and SAF types within the Region. The Forests in Idaho should use the needs as identified by the Idaho Natural Area Committee as their minimum standard.

Forest Planning Requirements. The Forest Plan shall provide the specific management and protection direction needed for each area as outlined in FSM 4063, keeping in mind the purpose for which the area was established. Forests should be alerted to identify any other RNA opportunities. Forest Plans should recognize the significance of these areas and assure that no activities are permitted, which would reduce their natural status and research significance pending administrative classification. Refer to FSM 4063 for permissible activities and protective requirements.

Suitability Analysis

1. Requirement

Regulation 36 CFR 219.14 requires a timber resource land suitability analysis for all National Forest System lands. A three-step screening process is described. In the first step, non-Forest land; land that cannot be harvested without irreversible damage to soil productivity or watershed conditions; lands where adequate restocking cannot be ensured; and lands that have been withdrawn from timber production by act of Congress, the Secretary of Agriculture, or the Chief are all classed as unsuitable for timber production. The remaining lands, including lands that failed to meet the biological growth standard set forth in the Draft Regional Plan dated July 1981, are classed as tentatively suitable for timber production.

The second and third steps of the screening process both require financially based analyses. These analyses are made for all of the tentatively suitable lands.

United States
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Dixie
National
Forest

Land and Resource Management Plan

Appendix B.

Plan and Related Document
Excerpts

for the

DIXIE NATIONAL FOREST



MANAGEMENT AREA 10A
RECOMMENDED RESEARCH NATURAL AREAS

Characteristics

This management area consists of proposed research Natural areas. These areas are: (1) timbered cinder cone on the Cedar City Ranger District and (2) Table Cliff Plateau on the Escalante Ranger District, and Red Canyon on the Powell Ranger District.

Desired Future Condition

The future condition of these areas, if approved as Research Natural Areas, will be shaped by natural forces only; except that research study markers and/or equipment may be in place. No planned management activities will affect the condition. If these recommended areas are not approved as RNA's by the Chief of the Forest Service, they will be managed according the Management Prescription: General Forest Direction.

Size

This management area contains 2335 acres. All acres are unsuitable for timber harvest.

Management Area Direction

Emphasis is on research, study, observations, monitoring, and educational activities that are nondestructive and nonmanipulative, and that maintain unmodified conditions.



PRACTICES/MIH CODE

MANAGEMENT DIRECTION

STANDARDS AND GUIDELINES

MANAGEMENT PRESCRIPTION 10A - RECOMMENDED RESEARCH NATURAL AREAS

B. MANAGEMENT REQUIREMENTS

Visual Resource Management (A04)	1. Meet stated visual quality objective.	A. Do not go below an adopted visual quality objective (VQO) of retention
Recreation Site Construction and Rehabilitation (A05 & 06)	1. Prohibit construction of developed recreation sites.	
Dispersed Recreation Management (A14 & 15)	1. Discourage or prohibit any public use which contributes to impairment of research or educational values. 2. Permit and encourage use by scientists and educators.	A. Reference FSM 4063.36.
Wildlife Habitat Improvement and Maintenance (C02, 04, 05, and 06)	1. Prohibit any direct habitat manipulation.	
Range Resource Management (D07)	1. Restrict grazing by livestock to that essential for the maintenance of a specific vegetation type.	
Silvicultural Prescriptions (E03, 06 & 07)	1. Prohibit any logging activity.	
Special Use Management (non-recreation) (J01)	1. Use special use permits or cooperative agreements to authorize and document scientific activity.	A. Reference FSM 4063.37.
Property Boundary Location (J06)	1. Monument all corners or turning points and document and record the monumentation in the establishment report. Mark boundaries in the field when appropriate to ensure integrity of the area.	

PRACTICES/MIH CODE

MANAGEMENT DIRECTION (10A)

STANDARDS AND GUIDELINES

Transportation
System Management
(L01 & 20)

1. Generally, physical improvements, such as roads are not permitted.

Trail System Management
(L23)

1. Limit trails to those needed for access to conduct research and for educational purposes.

Fire Planning and
Suppression
(P01)

1. Extinguish wildfires endangering the RNA. Allow fires within the RNA to burn undisturbed unless they threaten persons or property outside the area, or the uniqueness of the RNA.

A. Leave fire-caused debris for natural decay.

2. Do not reduce fire hazard within the RNA.

Law Enforcement
(P24 thru 27)

1. Use special closures when necessary to protect the RNA from actual or potential damage from public use.

A. Issue closure order under provisions of 36 CFR 261.50 (FSM 4063.3).

Protection
(P35:39)

1. Take no action against endemic insects, diseases or wild animals.

Mineral Management
Oil, Gas, and Geothermal

1. Review and process mineral lease applications, permits, and licenses in a timely fashion, recommending to Bureau of Land Management measures and stipulations necessary to protect surface resources.

A. Include special stipulation #1. (No-surface-occupancy.) (See Appendix C)

