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 at 7 CFR 2.42, 36 CFR 251.23, and 36 CFR Part 219, I hereby establish the Table Cliff 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 Table Cliff 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 National Forest 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 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 on the Environmental Analysis, I find that designation of the Table Cliff Research Natural Area is not a major federal action significantly affecting the quality of the human environment.

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

This 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

7/24/91
Date

SIGNATURE PAGE

for

RESEARCH NATURAL AREA ESTABLISHMENT RECORD

Table Cliff Research Natural Area

Dixie National Forest

Garfield 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 May 9, 1991
Nicholas S. Van Pelt, The Nature Conservancy
Joel S. Tuhy, Utah Natural Heritage Program

Recommended by Kevin R. Schulkoski Date 6/5/91
Kevin Schulkoski , District Ranger
Escalante Ranger District

Recommended by Hugh C. Thompson Date 6/5/91
Hugh C. Thompson, Forest Supervisor
Dixie National Forest

Recommended by Robert P. Joslin for Date 6/24/91
Gray F. Reynolds, Regional Forester
Intermountain Region

Recommended by Laurence E. Lassen Date 6/10/91
Laurence E. Lassen, Station Director,
Intermountain Research Station

DESIGNATION ORDER

By virtue of the authority vested in me by the Secretary of Agriculture under regulation 7 CFR 2.60 (a) and 36 CFR 251.23, I hereby designate as the Table Cliff Research Natural Area the lands described in the following report by Jan Bal, Frederic Johnson and Charles Wellner, dated May 15, 1979. Said lands shall hereafter be administered as a research natural area subject to the said regulations and the instructions thereunder.

_____ _____

Date Chief

ESTABLISHMENT REPORT FOR

TABLE CLIFF RESEARCH NATURAL AREA

WITHIN DIXIE NATIONAL FOREST

GARFIELD COUNTY, UTAH

Prepared by: Jan Bal, Frederic Johnson and Charles Wellner Date May 15, 1979

Recommended by: _____ Date _____
District Ranger

Recommended by: _____ Date _____
Forest Supervisor

Recommended by: _____ Date _____
Chairman, R-4 RNA Committee

Recommended by: _____ Date _____
Regional Forester R-4

Recommended by: _____ Date _____
Station Director, INT

Approved by: _____ Date _____
Director of Recreation, WO

Approved by: _____ Date _____
Deputy Chief for Research

Approved by: _____ Date _____
Chief

ESTABLISHMENT REPORT FOR

TABLE CLIFF RESEARCH NATURAL AREA

WITHIN DIXIE NATIONAL FOREST

GARFIELD COUNTY, UTAH

INTRODUCTION

The proposed Table Cliff Research Natural Area (RNA) includes a part of the Henderson Creek drainage at the southern end of the Aquarius Plateau. It is within the Escalante Ranger District of the Dixie National Forest in southern Utah. The area includes a forested part of Table Cliff Plateau, magnificant cliffs to the west, and forested land at the base of the cliffs.

The proposed RNA is practically undisturbed, mainly because the area it occupies is either very rugged or forested. Parts of it may have been grazed by livestock many years ago, but even this use probably was minimal. It is not grazed at present and there is no current evidence that grazing use was destructive. A low standard road, that borders the eastern boundary of the area, permits very light recreation traffic to Powell Point, a very scenic overlook at the southern tip of Table Cliff Plateau. This viewpoint overlooks Bryce Canyon National Park to the southwest. Timber values are minimal and no cutting has occurred in the area. The major values, which at present receive little attention, include the tremendous scenic vista from the Powell Point overlook, the magnificant cliffs below Table Cliff Plateau which are striking in color and magnitude and match much of the scenery in Bryce Canyon National Park, and the occurrence of bristlecone pine in both its gnarled weatherbeaten form and as a forest tree.

The Anasazi culture occupied this part of Utah about 1,000 to 1,200 A.D. Probably the first white men to take notice of the country were Cavalrymen under the command of Brigadier General Erastus Snow of St. George, Utah, who in 1866 were in pursuit of Black Hawk Indians that had been stealing livestock and harassing settlers in Dixie country. One of the first men to record observations of the Aquarius Plateau country was C. E. Dutton of the Powell Survey, 1872-77: "It is a sublime panorama. The heart of the inner Plateau Country is spread out before us in a birds' eye view. It is a maze of cliffs and terraces lined off with stratification, of crumbling buttes, red and white domes, rock platforms gashed with profound canyons, burning plains, barren even of sage - all glowing with bright color and flooded with blazing sunlight." Even as the Powell Survey was underway, Mormon exploring parties were looking over the country to the east of the Aquarius Plateau, for settlement. This exploration led to settlement of Escalante 17 miles (27 km) east of the proposed RNA, in 1876.

Several years ago the general area of Table Cliff Plateau was considered for addition to Bryce Canyon National Park. More recently (in 1968 and 1971) the southern part of Table Cliff Plateau and surrounding country was recommended for establishment as a scenic area by the Intermountain Region Research Natural Area Committee. The proposed RNA occupies only a part of the larger tract proposed for a scenic area.

JUSTIFICATION

The proposed Table Cliff RNA is a truly unique tract of land. It contains very beautiful and scenic geological features, Great Basin bristlecone pine [1/], and forest types and plant species not included in any other research natural area. It would be a valuable addition to the National Forest RNA system.

PRINCIPAL DISTINGUISHING FEATURES

The proposed Table Cliff RNA includes a number of features, as follows:

1. Massive scenic red and white cliffs of Wasatch Formation, similar to those in Bryce Canyon National Park but at slightly greater elevations.

2. Great Basin bristlecone pine, at the southeastern limit of its range; cliff-edge trees are gnarled and wind swept while well-formed trees occur in mixed stands.

3. A mixed conifer forest type not included in any other RNA. This type includes Great Basin bristlecone pine, blue spruce, ponderosa pine, white fir, Rocky Mountain juniper, limber pine, Douglas-fir, aspen, and pinyon pine. This mixture of trees is thought to be unique; at least it has not been described.

4. Several unusual plants such as a small-leafed form of *Acer glabrum*, a prostrate form of *Purshia tridentata*, a larger than usual concentration of *Monardella odoratissima*, and *Parnassia palustris* far south of its reported range.

5. At least the following species on the federal list of proposed threatened plants:

   Oxytropis jonesii - *Jones oxytropis*

   Silene petersoni - *Peterson silene*

1/ Scientific names are given in Appendix A of this report.

LOCATION

The proposed RNA is located in the Escalante Ranger District of the Dixie National Forest in Garfield County, Utah (figures 1, 2, and 3). The center of the area is approximately 111° 54' west longitude and 37° 43' north latitude. The proposed RNA is in unsurveyed land in protracted sections as follows (figure 4):

	Estimated Area	
	Acres	Hectares
T 35 S, R 1 W, Salt Lake Meridian		
Part of Section 32	230	93
Part of the S½ of section 33	185	75
Part of the SW¼ of section 34	60	24
T 36 S, R 1 W		
Part of the W½ of section 3	90	36
Most of section 4	555	225
Part of the W½ of section 5	115	47
	1235	500

Figure 4 shows the location and boundaries of Table Cliff RNA.

The proposed RNA contains an estimated 1235 acres (500 hectares).

Elevations range from 8,120 feet (2475 m) in Henderson Canyon to 10,292 feet (3137 meters) on Table Cliff Plateau, for a total elevation variation of 2172 feet (662 m).

Table Cliff RNA is approximately 31 air miles (50 km) southeast of Panguitch, Utah and approximately 17 miles (27 km) southwest of Escalante, Utah (figure 1). It is accessible by road from Bryce Junction, via State Highway 22 toward Widsoe. Turning to the right on USFS road 131 about 2½ miles (4 km) south of Widsoe, the road proceeds to Pine Lake Campground. Here the road follows Pine Canyon to Table Cliff Plateau, and then southward on USFS road 091, a jeep road, to the Plateau part of the proposed RNA. Access to the Henderson Canyon part of the RNA is from Pine Lake Campground on USFS road 131 across Pine Lake dam to an overlook of Henderson Canyon, then cross country by foot to the part of the RNA below the cliffs (figure 3).

AREA BY COVER TYPES

Estimated area by cover types is as follows:

Cover Type	Type Number	Estimated Area Acres	Hectares
Society of American Foresters			
Engelmann spruce-subalpine fir	206	355	144
Bristlecone pine	209	80	32
Interior Douglas-fir	210	200	81
Blue spruce	216	45	18
Rocky Mountain juniper	220	10	4
Interior ponderosa pine	237	400	162
Küchler Types (Küchler types do not fit very well)			
Western spruce-fir forest (*Picea-Abies*)	15	355	144
Arizona pine forest (Pinus)	19	355	144
Spruce-fir Douglas-fir forest (*Picea-Abies-Pseudotsuga*)	20	170	69
Great Basin pine forest (*Pinus*)	22	80	32
Mountain mahogany - oak scrub (*Cercocarpus* - *Quercus*)	37	20	8
Community Types			
Cliff-top types			
1. *Picea engelmannii/Juniperus communis* c.t.		200	81
2. *Abies lasiocarpa/Juniperus communis* c.t.		80	32
3. *Picea engelmannii/Ribes cereum* c.t.		75	31
4. *Pinus longaeva*/rock plants c.t.		80	32
Colluvial Toe Slopes and Dissected Basin Vegetation			
5. Cliff toe colluvium vegetation		170	69
6. *Pinus ponderosa/Arctostaphylos patula* c.t.		245	99
7. *Quercus gambelii/Symphoricarpos parishii* c.t.		20	8
8. *Hordeum brachyantherum* - *Scirpus* c.t.		1	0.4
9. *Pinus ponderosa/Agropyron scribneri* c.t.		110	45
10. Filled marsh		4	1.6
Rock cliffs, talus, and bare rock		250	101
	Total	1235	500

PHYSICAL AND CLIMATIC CONDITIONS

There are striking contrasts in the topography of the proposed Table Cliff RNA (photo 1). The plateau above the cliffs is gentle and rolling. Deep valleys with rounded sides are formed by the headwaters of the streams flowing into Henderson Canyon.

The plateau falls away abruptly on all sides. The streams have cut deep, narrow gashes into the pink and white cliffs beneath the plateau. Wind and water have further eroded these walls into intricate fins, spires, and minarets (photos 2, 3).

The cliffs surround a broken lower basin of abraided colluvium (photos 5, 6). Wherever this loose material has remained stationary long enough vegetation has grown over to stablize it. However, mudrock flows from the cliffs and the constant undercutting action from streams in canyon bottoms, are continually changing the topography. New canyons ranging from about three feet (1 m) to 50 or 60 feet (15 or 18 m) in depth are formed while others are filling in (photo 6). Some of the filled-in canyons have left low marshy spots (photo 4). A few of these marshes have been covered by mudrock flows.

Climate

The land system inventory, on the Escalante Ranger District (U.S. Forest Service 1973) summarizes the climate as follows:

"Three major storm systems determine the precipitation regime of the District. The first is the storm system from the Pacific. These storms move into the area from the Pacific northwest and the northern California coast. Precipitation from these storms is mostly snow. The second storm system is the high altitude, low pressure system that develops over Nevada and southwestern Utah from October to April. These two storm systems account for 65 percent of the moisture received."

"The third storm system develops in the summer. Moisture from the Gulf of Mexico is transported into the Colorado Plateaus and high intensity thunderstorms are generated."

Table Cliff RNA varies so greatly in elevation that climate on the plateau is much different from that on the exposed cliffs and the broken country at the base of the cliffs. The nearest weather station is in Tropic, 11 miles (18 km) to the southwest at an elevation of 6280 feet (1914 m), which is 2,000 feet (610 m) lower than the lowest point in the RNA. Climate in Tropic is considerably warmer and dryer than in the RNA. Another weather station is at Bryce Canyon National Park headquarters, about 15 miles (24 km) to the west from the RNA and at an elevation of

7915 feet (2413 m). Climate at Park Headquarters probably isn't greatly different from that in the RNA at the base of the cliffs. However, it too, is somewhat warmer and dryer than climate on the plateau. Records for these stations follow:

Climatic Records for Tropic and Bryce Canyon National Park Headquarters, Utah.

(Compiled from NOAA Climatological Records for 1968 - 1977)

Precipitation	Tropic		Bryce Hdqts.	
	In	Cm	In	Cm
Mean annual	11.19	28.69	13.61	34.90
Mean October - March	6.00	15.38	7.15	18.33
Mean April - September	5.19	13.31	6.46	16.57
Minimum year for period	6.87	17.62	10.52	26.97
Maximum year for period	17.76	45.54	18.05	46.28

Temperature	°F	°C	°F	°C
Mean annual	46.3	7.9	41.0	5.0
Mean January	26.4	-3.1	22.7	-5.2
Mean July	68.4	20.2	62.9	17.2
Maximum for period	97	36	95	35
Minimum for period	-14	-26	-23	-31

DESCRIPTION OF VALUES

Flora

The Table Cliff R.N.A. consists of two strikingly different physiographic units; the mesa top and the eroding colluvial toe-slope separated by near vertical cliffs and 1,500 to 2,000 feet (457 to 610 m) elevation. The mesa is in the "pink cliffs-colluvial slopes" landforms, while the basin below is classed as "dissected colluvial slopes." These two units differ also in environment and thus in community structure. The mesa top at 10,000 feet (3048 m) is essentially a subalpine forest, a unit of the Rocky Mountain spruce-fir forests. The eroded toe slopes and the strongly dissected basin below represent the mid-elevation forests where maximum tree species richness is the rule throughout the Rockies.

Thus for practical purposes, the vegetation is divided into two areas, cliff top/mesa and colluvial toe slopes/dissected basin.

Vegetation classes described in this report reflect present stand composition, hence can be termed community types (c.t.). These may be related to S.A.F. types, which are also based on present vegetation or to potential climax vegetation such as Küchler or Pfister (1972). An ocular estimate of abundance/dominance was made for several understory classes where pattern in the species present was distinctive enough to warrant this descriptor.

Cliff-top Vegetation

The top of Table Cliff is flat to gently rolling; it is, in fact, a mesa. Stream headwaters develop but a short run and then plunge 1,000 to 2,000 feet (305 to 610 m) almost vertically over the cliff-edge. The scarp, the ragged edge of the cliff, is a rapidly eroding, exposed habitat. Four forest communities can be recognized on the cliff-top in the proposed research natural area each on different physiographic setting:

1. mesa forest, 2. steep north slope, 3. steep south slope and, 4. cliff edge. The north and south slope communities are depauperate versions of the mesa forest, while the cliff edge vegetation is but a few yards wide.

Soils are developed from the decomposing white limestone seen so strikingly in distant views of Table Cliff. Very little profile development has taken place. Soils could be classified as inceptosols with a high rock and stone content. However, weathering has provided soil depths in excess of a foot in places on the mesa top, with less on the slopes and virtually no soil whatsoever on the cliff edge.

The cliff top vegetation is primarily a subalpine forest, feathering at the cliff edge to a ragged stand of Great Basin bristlecone pine. By Küchler's classification the mesa top, and north and south slope would all be classed as western spruce-fir forest, by the S.A.F. system, a Engelmann spruce/subalpine fir forest. Pfister (1972) describes the subalpine forests of Utah. By his classification, all of the mesa forest would be a Abies lasiocarpa/Ribes montigenum h.t. - Ribes montigenum phase. This is based on constant, though often sparse, presence of Abies lasiocarpa and the absence of mesic indicator species which would determine some other phase. However, the stands here have a high coverage of Juniperus communis and contain Ribes cereum both atypic of his described types. If Pfister's types are representative, this leads to the conclusion that these stands are most likely depauperate examples of more widespread habitat types. Another possibility is that they are a new habitat type or phase, since they appear to be in climax condition.

1. Picea engelmanii/Juniperus communis c.t.

The mesa top of Table Cliff is covered by a moderately dense mature subalpine forest. Elevation ranges from 10,000 to 10,200 feet (3048 to 3109 m). Mature trees are mostly under 15 inches (38 cm) dbh and average 50-60 feet (15-18 m) tall. Only an occasional limber pine achieves larger diameters. This community can be considered the climatic climax of the cliff top with slope forests being topographic variations and the cliff-edge community a topoedaphic climax.

Engelmann spruce and subalpine fir share dominance in both the overstory and in tree reproduction, which is sparse, but overall there is a bit more spruce than fir. There are scattered large limber pine, both dead and alive; bristlecone pine, Douglas-fir and quaking aspen are rare.

The understory is very scattered and large patches of open rocky soil are continuous. Low shrubs dominate the understory, these individually appearing as circular clones several feet in daimeter and mostly under 2 feet (.6 m) tall. Shrubs and estimates of abundance (Ab): 2/

Juniperus communis - 2	Ribes cereum - 1-2
Ribes montiginum - 1-2	Shepherdia canadensis - 1
Symphoricarpos parishii - 1	Berberis repens - 1

Forbs and graminoids are also widely scattered and only a few inches tall. A few like, Hedysarum, occur in colonies of a few hundred but generally one to a few individuals are found quite removed from the rest of the vegetation. The Cirsium is the tallest understory plant, about 2 to 2.5 feet (.6 to .8 m) tall. Forbs and graminoids and their abundance ratings are:

Hedysarum - 2	Fragaria - 1
Pyrola secunda - 1	Solidago parryi - 1
Cymopterus grayanus - 2	Cirsium utahense - 1-2
Penstemon - 1	Potentilla concinna - 1
Arenaria eastwoodiae - t	Bromus anamolus - 1
Cirsium arizonicum - t	Poa sp. - 1

2. Abies lasiocarpa/Juniperus communis c.t.

This community is found on moderately steep (40-50%) north slopes at elevations near 10,000 feet (3048 m), on the extreme upper portion of the south fork of Henderson Creek. Soils are very rocky and derived from weathered white limestone. The forest is moderately dense with mature trees small, 10-12 inches (25-30 cm), dbh and 40-55 feet (12-17 m) tall. At the cliff edge this community degrades to the bristlecone pine type.

2/ Key to abundance: 1- rare, 2- occasional, 3- common, 4-abundant, 5- very abundant.

Engelmann spruce is the dominant tree, followed closely by subalpine fir and Great Basin bristlecone pine while limber pine are scattered and Douglas-fir rare.

The understory is very sparse. Widely spaced common juniper dominates, and the lower, layered branches of subalpine fir and Engelmann spruce add an unusual dimension, having the appearance of additional low coniferous shrubs. Other low shrubs include occasional Ribes montiginun and Shepherdia canadensis. Hedysarum sp. is the only forb easily seen, and it occurs only in rather scattered colonies. Pyrola secunda is occasional in protected areas, mostly on very rotten wood.

3. Picea engelmannii/Ribes cereum c.t.

This community is essentially a more depauperate version of No. 2 and occurs on the opposite slopes, a south exposure. However, the increased importance of bristlecone pine, decrease in subalpine fir and virtual absence of common juniper merit consideration of this community as a separate entity.

Bristlecone pine dominates this mature but dwarfed forest. Engelmann spruce is common but subalpine fir is very rare. Limber pine is scattered. The depauperate understory is dominated by widely scattered Ribes cereum and Shepherdia canadensis while common juniper is rare. The most common forbs are Cymopterus and Hedysarum. Other forbs, all widely scattered, include: Penstemon sp., Arenaria eastwoodiae, and Cirsium utahense. The only grass found was a trace of Poa.

4. Pinus longaeva/rock plants c.t.

This community is found on the narrow strip of unstable scarp slope on the edge of Table Cliff. It is essentially an ecotone between no plants and communities 2 and 3. The dominance of bristlecone pine creates a community of exceptional aspect and interest. The pines are widely scattered, most have many exposed roots as the cliff-edge rapidly erodes their bases. Many dead and down trees show the effects of this process. Young bristlecones are reasonably common considering the adverse environment. The only other trees present are very occasional Engelmann spruce and limber pine.

Few "understory" plants can endure in this actively eroding cliff-edge. Those that do, resemble the caespitose plants of alpine scree slopes. There are no shrubs or grasses and the following forbs are all very widely scattered, caespitose and quite small:

Silene petersonii	Erigeron vagus
Astragalus miser	Oxytropis jonesii
Cymopterus grayanus	Hymenoxys richardsonii

Colluvial Toe Slopes and Dissected Basin Vegetation

Below the vertical pink and white Table Cliffs lies a basin formed by the tributaries of upper Henderson Creek at an elevation of about 8,500 feet (2591 m). This basin is a maze of erosion channels, with frequent masses of new material sloughed from the cliffs above. Some of the gullies are so actively eroding and steep that one must search for several hundred yards to find a place of safe descent and then search again along the rocky bottom for a place to get up the other side. New erosion channels are continually being formed as old ones are plugged with masses of colluvial rock and debris. Application of any kind of climax vegetation classification is very chancey, virtually the entire area for some half mile or more below the cliffs lends the impression of great topographic and thus vegetational unstability. This unstable terrain constitutes the bulk of the proposed RNA below the cliffs.

This portion of the RNA would be an excellent location for long-term successional studies. For here the vegetational patterns are constantly shifting. Included are marshes developed from plugged gullies and ex-marshy areas covered with recent colluvium. A wet site this year may be a gully or a rock field next year!

Farther downstream the numerous small gullies become deep V-shaped tributaries of Henderson Creek, all apparently seasonal streams. Here the colluvial terraces between tributaries are more stable and the climax concept can apparently be applied to some of the communities.

5. Cliff toe colluvium vegetation

The jumble of rocks at the base of the Table Cliff support varied but scattered plant life. This is an area of rocky and stoney "soils", outcrops of country rock formed into steep ridges, erosion channels with near vertical walls and fans of smaller rock talus. All aspects and slope steepness are found, but flat areas do not excede .1 acre (.04 ha). Some sorting might be attempted on a few gentler aspects, but due to the obvious dynamic nature of succession, only one classification unit is described.

There is no dominant tree species in the scattered "forest" occupying these toe slopes. Trees appear in various mixtures. A pure grove appears, while on the same habitat a hundred yards away four species are dominant.

Understories are as variable as the tree layer. Shrubs dominate and the total number of species is quite large, reflecting the micro-habitat variation. There appears no long-lasting shrub dominated communities, that is, trees seem to be able to invade wherever shrubs can exist. One community type may be recognized:

A. Ponderosa pine/mixed shrubs c.t.

On the convex to flat ridges between gullies a community usually dominated by ponderosa pine is found. Other tree species may dominate locally but ponderosa pine has greater success in terms of numbers. With several more mesic species present, this is not considered to be even close to a ponderosa pine climax, but the dynamic nature of the habitat makes reaching climax unlikely.

Due to the scattered nature of vegetation, no abundance ratings were attempted.

Trees are widely spaced. Old ponderosa pines are 12 to 18 inches (30 to 46 cm) dbh and 45 to 65 feet (14 to 20 m) tall. No other tree species exceeds ponderosa in size or frequency. Other common trees include Great Basin bristlecone pine, limber pine, blue spruce, concolor fir, and Douglas-fir. There are a few scattered pinyon, Rocky Mountain juniper and even a few small groves of aspen.

It seems unusual to find bristlecone pine accompanying such mesic trees as blue spruce and concolor fir. We can find no reference or experience in those contacted of such a mixture having been described. The overlap of bristlecone and pinyon also seems extraordinary.

The major shrubs are: Arctostaphylos patula, Juniperus communis, Symphoricarpos purshii, Ceanothus fendleri, Purshia tridentata (prostrate), and Cercocarpus montanus. Minor shrubs include: Holodiscus dumosus, Acer glabrum var. neomexicanum, Eriogonum sp., Chrysothamnus sp., Haplopappus sp., Shepherdia canadensis, Rosa woodsii, Ribes cereum, Amelanchier utahensis, Clematis sp. Monardella odoratissima, and Berberis repens. Forbs include: Cirsium arizonicum, Aster sp., Chaenactis sp., Penstemon sp., Castilleja sp., Solidago parryi, Machaeranthera sp., Frasera sp., Cymopterus grayanus, Eriogonum sp. Monardella odoratissima. Grasses and grasslike plants include: Oryzopsis hymenoides, Carex sp., Juncus sp., Sitanion sp.

6. Pinus ponderosa/Arctostaphylos patula c.t.

This is a rather extensive type of vegetation which is located on slightly convex and gentle slopes below the toe slope/dissected colluvium at the cliff base. It occupies the major part of the more stable areas between the deep erosion channels. Here the soil is still very poorly developed, but more clayey with considerable stoniness.

Ponderosa pine is the dominant tree, often forming near pure stands of a few acres. However both blue spruce and concolor fir are common and Douglas-fir are scattered, all indicate a more mesic habitat and hence the ponderosa pine is presumed seral.

Major shrubs include: Arctostaphylos patula, Juniperus communis, Purshia tridentata, Symphoricarpos parishii, Cercocarpus montanus, Rosa woodsii, and Berberis repens. Scattered shrubs of Juniperus scopulorum, Shepherdia rotundifolia, Sambucus cerulea, and Yucca standleyi lend a clearly distinct physiognomy to this community.

Forbs include: Aster sp., Eriogonum alatum, Castilleja sp., Solidago sp., Cirsium utahense, Euphorbia sp., Arenaria macradenia Apocynum sp.

Grasses and grasslike plants are remarkably uncommon. Agropyron scribneri was scattered and a few Carex sp. complete the list.

7. Quercus gambelii/Symphoricarpos parishii c.t.

This is a topoedaphic community which is restricted to the very steep (80%) sides of erosion channels. Aspect is east and the soil is rocky clay. Gambel oaks to 20 feet (6 m) tall form a dense thicket of gnarled sub-trees. Beneath, Symphoricarpos parishii is abundant but there are a great many Smilacina stellata, Amelanchier alnifolia and Rosa woodsii are scattered.

8. Hordeum brachyantherum - Scirpis sp. c.t.

A small marsh was formed by the blockage of an old erosion channel. The total extent to standing water was about .2 acres (.08 ha), but the occurrence of a marsh in this jumble of rocks is interesting.

The wetter center was strongly dominated by Hordeum and Scirpus, with the halophytic Potentilla concinna scattered throughout. Aster sp. occurred in dense patches. Equisetum laevigatum and Juncus sp., were scattered.

The marsh is contained by steeper slopes which just above the wet area support a narrow fringe of herbaceous plants dominated in places either by dense patches of Potentilla, or Scirpus and Potentilla co-dominate. Other forbs include Gentiana tortuosa, Ranunculus sp., Juncus sp., Machaeranthera sp., Eriogonum sp., and Gilia aggregata. A few scattered Juniperus scopulorum mark the upper edge of this fringe where there is a rapid transition to the Pinus ponderosa/Arctostaphylos patula c.t.

9. Pinus ponderosa/Agropyron scribneri c.t.

This community gives every impression of being climax yet it occupies a seemingly more favorable habitat than the Pinus ponderosa/ Arctostaphylos c.t. where ponderosa pine is clearly seral. It is unique in the absence of blue spruce, concolor fir, and Douglas-fir

and in fact any other tree species. The Pinus ponderosa/Agropyron type occupies flat areas interspersed among the more extensive Pinus ponderosa/Arctostaphylos c.t. of convex slopes. The two types from a mosaic on the gentle slopes and flats. Here ponderosa pine reaches its largest sizes in the proposed RNA, 3 to 4 feet (91 to 122 cm) in diameter and some 80 to 100 feet tall (24 to 30 m).

The sparse understory is clearly dominated by Agropyron scribneri with Symphoricarpos purshii scattered throughout. Arctostaphylos patula is fairly common while less common shrubs include Yucca standleyi, Ceanothus martinii and Rosa woodsii. A few scattered Juniperus scopulorum make small trees.

Forbs include: Circium utahense, Carex sp., Linum perenne, and Phlox sp. The absence of grasses other than Agropyron seems unusual.

10. Filled Marsh

This is an interesting area which well illustrates the dynamic nature of natural successional processes caused by the debris raining off the steep cliffs and the numerous erosion channels. This area was at one time a flat, dry habitat; many dead Juniperus scopulorum suggest that it may have been a Pinus ponderosa/Agropyron type. A blockage caused by a shifting erosion channel caused water to collect and fairly extensive marsh developed, with dead snags of the previous tree community interspersed. More recently, a mud/rock flow has filled much of the former marsh with a veneer of broken rock 0.5 to 2.0 or more feet (0.15 to 6 m) thick spread rather evenly over the area. Rocks are white limestone, 1 to 5 inches (2.5 to 13 cm) cube. A small stream (from recent rains) flows over the center of the rock-flow at a slightly higher elevation than the edges. Remnants of the former marsh exist on either side of the tongue of rock which has filled the marsh. There is a 2 to 5% slope on the rock veneer facing south; the marsh remnants are flat. Elevation is 8,500 feet (2591 m).

Three habitats are distinct, the new rock flow, a standing water marsh and a wet marsh.

10A - Rock veneer habitat - This is a severe site with early successional plants well scattered. It may be sub-irrigated during periods of high water when the covered marsh undoubtedly still fills. But it is also still shifting and it will be some years before it will be stabilized.

There are no dominant plants. Monardella odoratissima is one of the most common plants and this seems to be an unusually large concentration of this beautiful aromatic shrub. Scattered plants include Purshia tridentata, Senecio sp., Machaeranthera sp., Physaria newberryi, Cirsum utahense, Achillea millefolium, Equisetum laevigatum, Rosa woodsii, Ribes cereum and two speices of Salix, residual from the former

marsh. Seedlings of blue spruce and limber pine were common, though there is no implication as to their permanence.

The mud/rock flow split the marsh into two residual tracts of a few tenths acre each.

10B - East Marsh - The standing water portion is co-dominated by Juncus sp. and Equisetum laevigatum. Scattered within the rank rush are Habenaria sp., Parnassia palustris, Epilobium sp., Rosa woodsii, Equisetum arvense, Gentiana sp., and Bromus sp. Several scattered shrubs up to 8 feet (2.4 m) tall of Salix spp. add a distinct appearance as do a few shrubby Betula occidentalis.

10C - West Marsh. The standing water marsh on the west side is occupied almost exclusively by Juncus sp. and Carex sp. A shrub fringe of scattered Potentilla fruticosa, Betula occidentalis, Salix sp., Juniperus communis, Arctostaphylos patula, and Lonicera involucrata form the only riparian community seen in the area and attest to the permanence of water in the marsh. Parnassia palustris is the only herbaceous species of note in this riparian fringe.

The filled Marsh area is a contained unit of about 4 acres. It grades rapidly on the slopes immediately above to the Pinus ponderosa/ Arctostaphylos c.t.

Fauna

No inventory of fauna has been made for the Table Cliff RNA. Following is a list of mammals, taken from Durrant 1952, that may occur in the area:

Canis latrans lestes	coyote
Cervus canadensis nelsonii	elk
Citellus lencurus pennipes	antelope ground squirrel
Cynomys parvidens	Utah prairie dog
Erethizon dorsatum epixanthum	porcupine
Entamias minimus consobrinus	least chipmunk
Entamias quadrivittatus adsitus	Say chipmunk
Felis concolor kaibabensis	mountain lion
Lepus americanus bairdii	snowshoe rabbit
Lepus californicus deserticola	black-tailed jack rabbit
Lepus townsendii townsendii	white-tailed jack rabbit
Lynx rufus bailey	bobcat
Marmota flariventer engelhardti	yellow-bellied marmot
Mephitis mephitis major	striped skunk
Microtus longicandus lafus	long-tailed meadow mouse
Mustela frenata nevadensis	long-tailed weasel
Neotoma cinerea acraia	bushy-tailed wood rat

Ochotona princeps utahensis	pika
Odocoilens hemionus hemonus	mule deer
Peromyscus maniculatus sonoriensis	deer mouse
Reithrodontomys megalotis megalotis	western harvest mouse
Sorex obscurus	dusky shrew
Thomomys talpoides parowanensis	northern pocket gopher
Ursus americanus cinnamomum	black bear

Geology and Soils

Geologic formations in the proposed Table Cliff RNA are the same as those found in Bryce Canyon National Park. Table Cliff formations, however, have been uplifted from 1,000 to 2,000 feet (305 to 610 m) higher than Bryce. The entire proposed RNA is of the spectacular Wasatch Formation. Brightly colored pink cliffs below the plateau rim are visible for long distances. The upper member of the formation is nearly white. There is an intermediate sequence of pink limestone and calcareous shales together with a red conglomerate. Boundaries between these strata are not persistent.

The Land Systems Inventory on the Escalante Ranger District provides the following information on land types and soils that occur within the proposed RNA. Figure 5 shows distribution of these land types.

Type 6

Pink cliffs and colluvial slopes Wasatch limestone formation. Precipitation 18 to 25 inches (46 to 64 cm) per year. Because rock outcrops dominate, no soils of consequence in this type.

Type 22

Stony alluvial bottom lands of mixed alluvium. Precipitation 14 to 18 inches (28 to 46 cm). Soils are deep cobbly silt loams and cobbly sandy loams. Cobbles and stones often scattered over the soil surface and overland flow is common.

Type 49

Ridges, mesas, colluvial slopes, and benches of limestone, sandstone, and shale. Precipitation 20 to 25 inches (51 to 64 cm) per year. Soils are moderately deep gravelly loams with some clays.

Type 54

Dissected colluvial slopes of limestone and shale. Precipitation 14 to 20 inches (28 to 51 cm). Soils are shallow to moderately deep gravelly loams and gravelly silt loams with erosion active on most sites.

Type 69

Plateau top and scarp slopes of intermediate volcanic rocks and limestone. Precipitation is 20 to 25 inches (51 to 64 cm). Soils are moderately deep gravelly clay loams and clays.

A more technical description of the soils, from the land inventory, is as follows:

Type 22

Typic Ustorthent, loamy-skeletal, mixed calcareous, frigid.
Entic Haplocoroll, loamy - skeletal mixed
Typic Ustosthent, fine-loamy, mixed, calcareous frigid all in alluvial bottoms.

Type 49

Typic Cryochrept, loamy-skeletal, mixed (benches).
Glossic cryoboralf, fine, mixed (swales)
Mollic Cryoboralf, fine-loamy, mixed (benches)

Type 54

Entic Haploborall, fine loamy mixed (side slopes)
Entic Haploborall, loamy-skeletal, mixed (slopes)
Lithic Ustorthent, loamy-skeletal, calcareous, frigid (ridges)

Type 69

Pachic cryoboroll, fine, mixed (sideslopes & benches)
Typic cryoboroll, loamy-skeletal, mixed (ridges)
Argic Pachic Cryoboroll, fine, montimorillonitic (benches)

IMPACTS AND POSSIBLE CONFLICTS

Cultural Values

Although this section of Utah was inhabited by the Anasazi cultures, the area of the proposed RNA contains few if any artifacts of any kind. At the time of settlement this part of Utah was occupied by Piute Indians but they apparently did not use the rough country of the proposed RNA for anything but hunting, as there is no permanent water.

Mineral Values

The surrounding country has a number of mineral developments including coal, oil, and limestone. Table Cliff Plateau is underlain with coal but at a very great depth. There is no evidence that mineral values pose any real conflict.

Grazing

Although the plateau part of the proposed RNA was used many years ago by livestock, it apparently has not been used for a long time, largely because it is heavily timbered and is without water. The area at the base of the cliffs within the proposed RNA probably never has been grazed because it is such rough, broken, unstable land. Even sheep would have difficulty in traversing this terrain.

There are no signs of grazing, and fencing is not needed to protect the area.

Timber

Timber in the area would not be used whether or not the area was established as a RNA because the entire area surrounding Table Cliff Plateau has been proposed as a scenic area. No cutting of timber has taken place in the area and none is planned.

Watershed

Water is the livelihood of southern Utah and water from the proposed RNA is important for agricultural use. The proposed RNA contains a number of intermittent streams and the area near the base of the cliffs has several year round streams which vary greatly in flow, frequently reaching flood proportions after heavy rains.

Establishment as on RNA poses no conflict with watershed use.

Recreation

There could be a very minor conflict with recreational use. The area within which the proposed RNA is situated has been proposed as a scenic area. The road bordering the east boundary of the proposed area provides access to Powell Point, a very scenic overlook. Recreationists along the road and a few hikers along the cliffs might enter the area. A few hunters may get into the area both on the plateau and at the base of the cliffs.

Wildlife

Many species of wildlife inhabit the proposed RNA. Establishment as a RNA would provide an undisturbed habitat for these species, except for hunting which would continue as it has in the past. This use does not represent a serious conflict.

Transportation Plans

Neither roads nor trails are planned within the proposed RNA. Over time the road along the east boundary probably will be improved to provide better access to Powell Point.

ADMINISTRATION, PROTECTION, AND RECORDS

The Table Cliff RNA will be protected and administered by the District Ranger, Escalante Ranger District, Dixie National Forest. The Director, Intermountain Forest and Range Experiment Station, or his designated representative, will be responsible for research conducted in the proposed RNA and requests to conduct research in the area should be referred to him. The Director will send each proposal for research to the Escalante Ranger for his review and information.

No special protection measures are foreseen as needed at this time. Signing is unnecessary and not advisable as it would draw unnecessary attention to the area.

Records for Table Cliff Research Natural Area will be maintained in the following offices:

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

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APPENDIX A

Partial List of Plants in the Proposed Table Cliff Research Natural Area.

Trees

Abies concolor	white fir
Abies lasiocarpa	subalpine fir
Acer glabrum var. *neomexicanum*	threeleaf Rocky Mountain maple
Betula occidentalis	water birch
Juniperus scopulorum	Rocky Mountain juniper
Picea engelmannii	Engelmann spruce
Picea pungens	blue spruce
Pinus edulis	pinyon pine
Pinus flexilis	limber pine
Pinus longaeva	Great Basin bristlecone pine
Pinus ponderosa	ponderosa pine
Populus tremuloides	quaking aspen
Pseudotsuga menziesii var. *glauca*	Rocky Mountain Douglas-fir
Quercus gambelii	Gambel oak

Shrubs

Amelanchier alnifolia	serviceberry
Amelanchier utahensis	Utah serviceberry
Arctostaphylos patula	greenleaf manzanita
Berberis repens	creeping barberry
Ceanothus fendleri	Fendler ceanothus
Ceanothus martinii	Martin ceanothus
Cercocarpus montanus	true mountain-mahogany
Chrysothamnus sp.	rabbitbrush
Clematis sp.	clematis
Eriogonum sp.	wild buckwheat
Holodiscus dumosus	bush ocean-spray
Juniperus communis	mountain common juniper
Lonicera involucrata	bearberry honeysuckle
Potentilla fruticosa	bush cinquefoil
Purshia tridentata	antelope bitterbrush
Ribes cereum	squaw currant
Ribes montigenum	gooseberry currant
Rosa woodsii	Woods rose
Sambucus cerulea	blueberry elder
Shepherdia canadensis	russet buffaloberry
Shepherdia rotundifolia	roundleaf buffaloberry
Symphoricarpos parishii	roundleaf snowberry
Yucca baileyi	yucca

Grasses and Grasslike Plants

Agropyron scribneri	Scribner wheatgrass
Bromus anamolus	nodding brome
Carex rossii	Ross sedge
Carex sp.	sedge
Juncus sp.	rush
Oryzopsis hymenoides	Indian ricegrass
Poa sp.	bluegrass
Sitanion sp.	Squirreltail
Stipa lemmonii	needlegrass

Forbs

Achillea millefolium	western yarrow
Apocynum sp.	dogbane
Arenaria eastwoodiae	sandwort
Arenaria macradenia	sandwort
Astragalus miser var. oblongifolius	weedy milkvetch
Castilleja sp.	Indian paintbrush
Chaenactis sp.	chaenactis
Cirsium arizonicum	Arizona thistle
Cirsium utahense	Utah thistle
Cymopterus grayanus	spring parsley
Equisetum arvense	field horsetail
Equisetum laevigatum	smooth horsetail
Erigeron vagus	fleabane
Eriogonum alatum	wing eriogonum
Eriogonum sp.	wild buckwheat
Euphorbia sp.	euphorbia
Fragaria sp.	strawberry
Frasera sp.	elkweed
Gentiana tortuosa	gentian
Geranium richardsonii	Richarson geranium
Gilia aggregata	gilia
Habenaria sp.	rain orchid
Haplopappus sp.	goldenweed
Hedysarum sp.	sweetvetch
Hymenoxys richardsonii	Pingue hymonoxys
Lesquerella fendleri	Fendler bladderpod
Linum perenne	flax
Machaeranthera sp.	aster
Monardella odoratissima	Pacific monardella
Oxytropis jonesii	crazyweed
Parnassia palustris	wildworld parnassia
Petradoria pumila	petradoria
Penstemon sp.	penstemon

Forbs

Physaria newberryi	Newberry twinpod
Potentilla concinna	elegant cinquefoil
Pyrola secunda	sidebells pyrola
Silene petersonii	silene
Smilacina stellata	starry solomon-plume
Solidago parryi	Parry goldenrod
Thalictrum fendleri	Fendler meadowrue