A SURVEY OF POTENTIAL NATURAL LANDMARKS OF THE CHIHUAHUAN DESERT - MEXICAN HIGHLANDS REGION

LANDFORM AND BIOTIC THEMES

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I. INTRODUCTION

The National Natural Landmarks Program was established in 1963 by the Secretary of the Interior to encourage the preservation of areas that best illustrate the ecological and geological character of the United States. The program is administered by the National Park Service. Through an evaluation process, sites recommended from surveys on each of the 33 natural regions are selected for listing on the National Regestry of Natural Landmarks which is periodically published in the Federal Register. This study consitutes one of the regional surveys.

The study was conducted under a contract with the National Park Service, Department of Interior. The award was to New Mexico State University for an analysis of natural features found in the Chihuahuan Desert - Mexican Highlands region of the United States. Sites whose features (themes) were thought to be worthy of entry on the National Registry of Natural Landmarks were to be recommended.

William A. Dick-Peddie, Ecologist, New Mexico State University, was the Project Director and Project Ecosystem Specialist. Dwight W. Deal, Chihuahuan Desert Research Institute, was Landform-Geological Specialist.

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Betty Coughlin - Editorial Assistant

Many people were helpful during the time of this project. Considerable assistance was given by Elizabeth

Romero, Paul Gordon, and Will Moir of the U.S. Forest Service; Jeff Jarvis, Donita Cotter, and Dan Rathbun of the Bureau of Land Management; Bill Isaacs, New Mexico Heritage office; Marshall Conway, and John Hubbard, New Mexico Department of Game and Fish; P. Wayne Lambert, U.S. Geological Survey; Francis Ugolini, Garry Waggoner, and William Halvorson of the National Park Service; Barry Kues, Department of Geology, University of New Mexico; Tom Todsen, John Ludwig, and Carolyn Quintana, New Mexico State University.

A. Chihuahuan Desert - Mexican Highlands Region

The area included in this theme study results from a highly diverse hodge-podge of the other more discrete theme areas' boundaries. As a consequence, there is little agreement as to logical boundaries for this study. The Chihuahuan Desert - Mexican Highlands study has been under way for a very long time for reasons known by the NMPS Landmark office. Because of this, all surrounding region studies have been completed. These projects correctly drew boundary lines well into the CD-MH region. We have liberally "poached" other Landmark regions bordering this study for reasons explained in a subsequent section. Figure 1 shows the present boundaries which have resulted from completed surrounding studies.

There is little conformity in physiographic mapping. This is due in part to disagreement among physiographers and in part due to the proposed use for the map. Dr. Carolos G. Para, formerly professor in the Earth Sciences Department, NMSU, produced a physiographic map of New Mexico in 1975 (Figure 2a.). One of the more recent maps including New Mexico was compiled by Kenneth E. Brown and Richard M. Kerr, Bureau of Land Management, 1979 (Figure 2 b.). This project which covered conterminous United States, utilized soil and vegetation features as an aid in locating their region

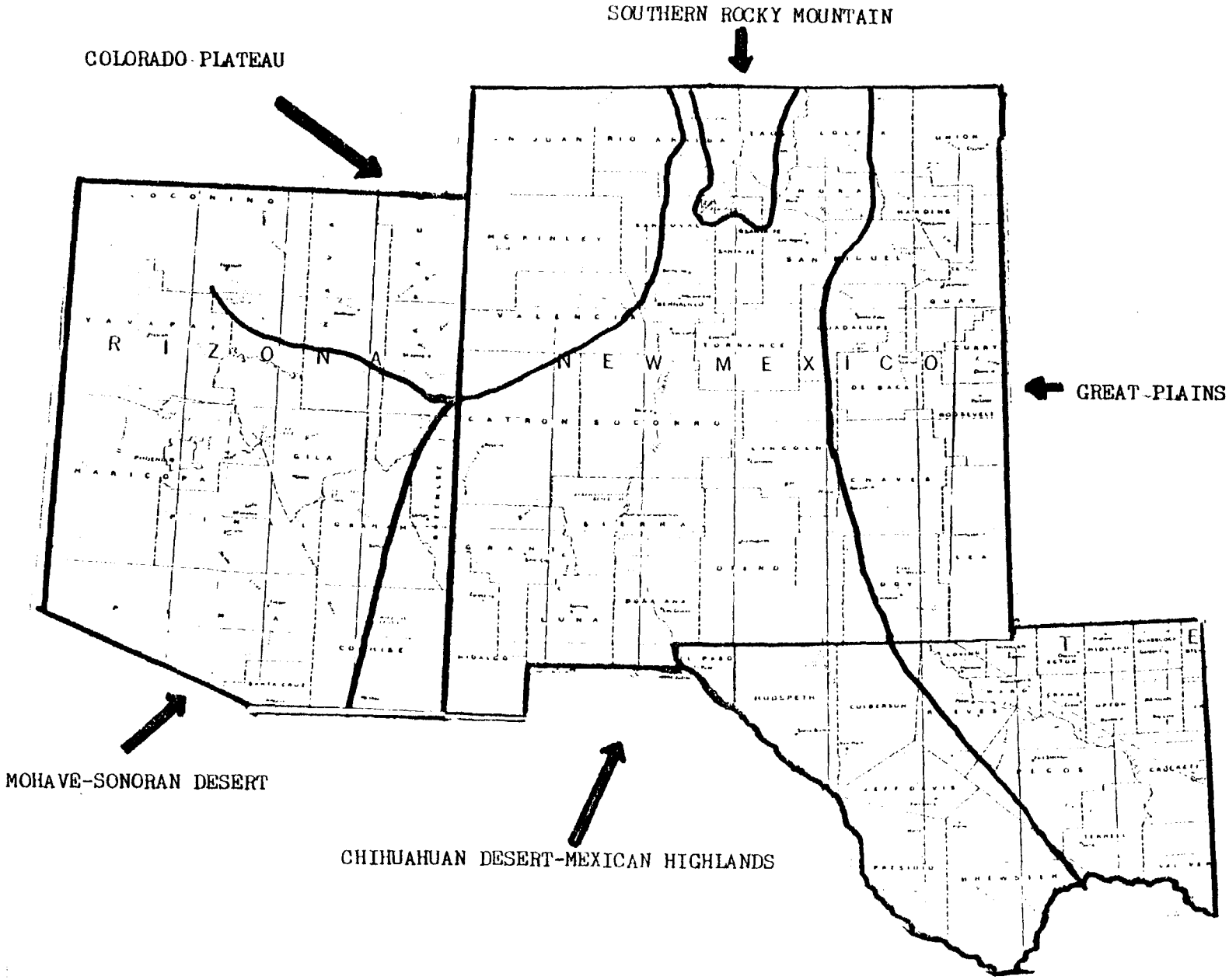
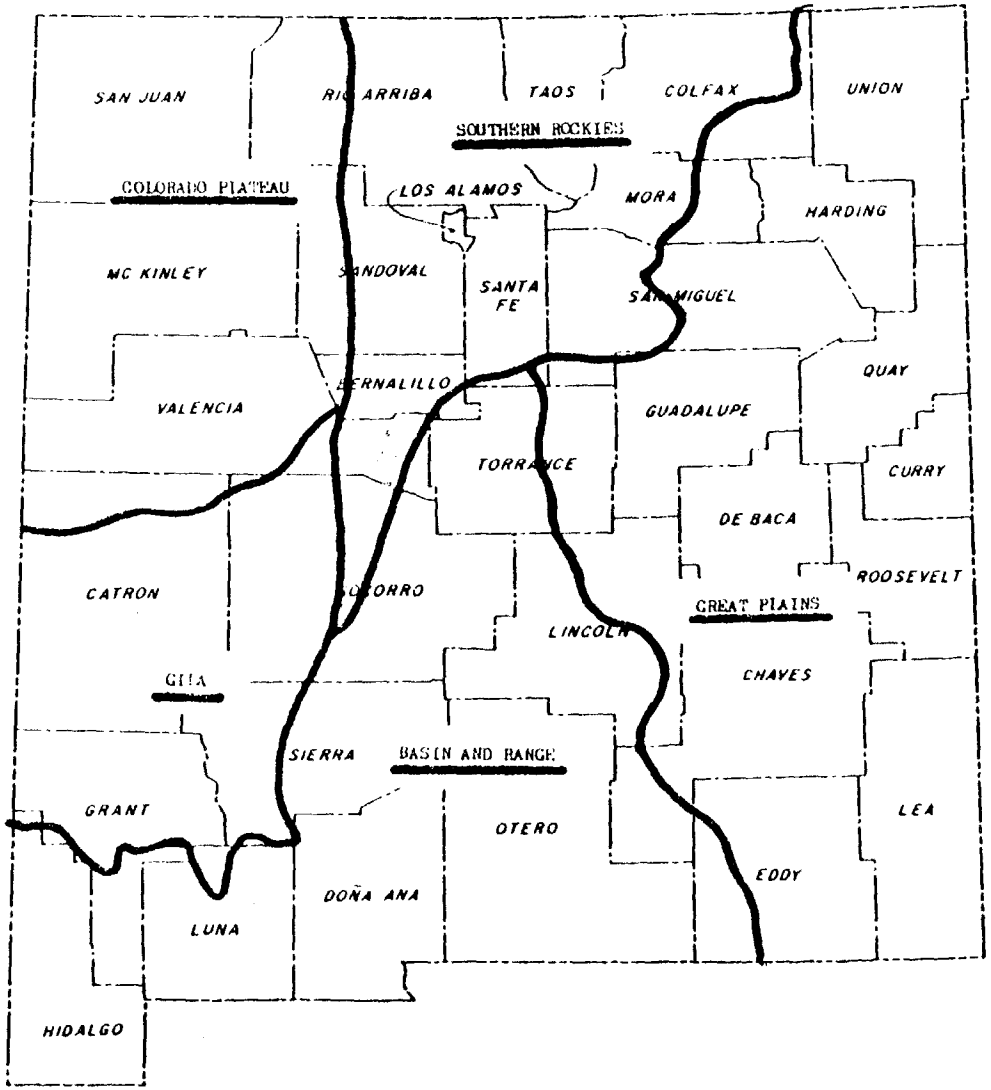


FIGURE 1. Chihuahuan Desert - Mexican Highlands and Surrounding Regions



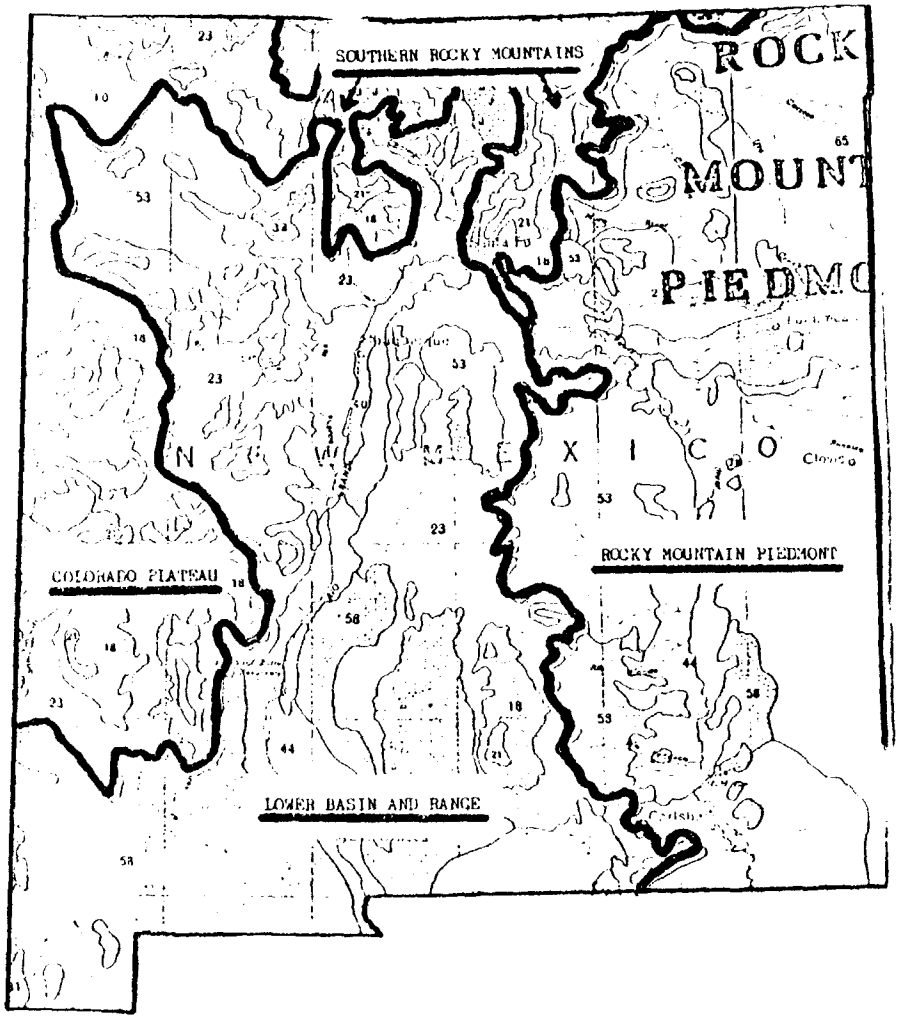


FIGURE 2. Physiographic Maps A - Para, B - Brown-Kerr

boundaries. In our opinion, this is the best physiographic rendition to date.

It is interesting to note how little agreement there is among the region boundaries of the three maps (Figures 1 and 2 a,b). The Piedmont concept of Brown-Kerr is excellent because by having the Great Plains region on its east boundary (not shown) this region suits the biotic conditions found in both regions very well. The BLM map recognizes an expanded Basin and Range region which also suits biotic assemblages.

The physiography of the region is classical "Basin and Range". There are chains of mountain ranges having generally a north-south orientation creating basins (often closed basins) of valleys in between the chains. The major mountain chains are west to east; Chiracahua, Peloncillo, Pyramid-Animas, Little Hatchet-Big Hatchet, Black Range, Fra Cristobal-Sierra Caballo-Sierra de Las Uvas, Sierra Oscura-San Andres-Organ-Franklin; Jicarilla-White-Sacramento-Guadalupe-Delwaware, and Quitman-Sierra Vieja-Chinati. Some of the created basins are San Bernardino Valley, Animas Valley, Plains or San Agustin, Jornada del Muerto, and Tularosa Valley.

The mountain chains range in length from 40 miles (Chircahua) to over 200 miles (Jicarilla-White-Sacramento-Guadalupe-Delaware). Elevations range from 9,000'-12,0000'

above sea level and 3,000'-7,000' above the surrounding landscape. The highest peak in the region (Sierra Blanca) is also the southern most glaciated peak in North America.

Most of the mountains are surrounded by erosion piedmont slopes called "bajadas" in the southwest. The bajada slopes and their drainage patterns vary considerably. The lower bajadas often have little slope and the drainages (arroyos) outline extensive tablelands (mesas).

Much of the region has had a history of volcanism and the landscape includes calderas, volcanic mountains, lava flows, dikes, etc.

Post pleistocene climate in the region has been xeric and mesic conditions are found only in the relatively high (6,500') portions of mountain masses and their canyons. This aridity has also resulted in gypsum deposites and in considerable eolian activity creating sand dunes in many areas. There is great geological diversity in the region with exposures of rock from metamorphic, igneous, and sedimentary origins.

The region contains a portion of one major river drainage, the Rio Grande, and portions of minor river systems which originate in the region. Some of these are the Gila, Chaco, San Francisco, and Mimbres rivers. The continental divide runs through the region and these latter systems drain west while the Rio Grande drains to the Gulf of Mexico. The Pecos river which is east of the divide

originates in this region but most of the drainage is outside the region.

As would be expected from the great landform diversity of the region; there is also great floral and faunal diversity.

The Coniferous Forests of the region vary on an altitude-latitude gradient (high to low) from engelmann spruce-subalpine fir to mixed conifers of white fir, southwestern white pine, douglas fir, and ponderosa pine. There are small stands of corkbark fir and limberpine in the region. In drainages and at the foot of talus slopes there are stands of blue spruce at the higher elevations.

Following disturbance (fire or logging) aspens occupy the opened sites at higher elevations while gambel oak, wavyleaf oak, and new mexico locust occupy such sites lower down.

Coniferous Woodlands, commonly called Pinyon-Juniper Woodlands, take over from the lower ponderosa forest. This region's Pinyon-Juniper type is extensive and varied. The colorado pinyon dominates most of the type but gives way to mexican pinyon in the southwestern portion. One-seed juniper is the most ubiquitous juniper in the region but a number of other junipers may be dominant or share dominance with one-seed juniper. These are utah juniper in the northwest giving way to rocky mountain juniper to the east

then to the south alligator juniper becomes important. Finally in the southeast red-berry juniper and drooping juniper take over. In the mountains of southwest portion a pine-oak woodland is found with a distinctly Mexican flavor. The dominant pines are chihuahua pine, apache pine, and mexican pinyon along with ponderosa pine. There are commonly five species of oaks in these woodlands.

The next more xeric vegetation is grassland. In some areas there occurs what appears to be an extensive ecotone or "savanna" (widespread juniper in a grass matrix) Between the P-J woodland and grassland. These savannas are or relatively recent origin and appear to be the result of long and intensive livestock grazing. The grasslands of the region may be disjuncts of the prairie composed of little bluestem or buffalo grass and grama grasses. Further west these may be dominated by indian ricegrass or western wheatgrass. To the south the grasslands are dominated by blue and black grama grass.

This grassland is often referred to as desert grassland because there has always been a mosaic of desert shrubs on dry microsites in the grass. Through grazing most of this desert grassland has become Chihuahuan Desert over the past 120 years. Edaphic conditions in the mountains may result in mountain meadows dominated by arizona or thurber fescue in the higher meadows and by mountain muchly in the middle elevations.

The hot xeric portion (southern lowlands)) of the region supports Chihuahuan Desert vegetation dominated by creosotebush, tarbush, and sandpaperbush. Rocky slopes often have cacti, yuccas, agaves, sotol, and sacahuista. Compared to Mexico the Chihuahuan Desert in the region is depauparate of species due to its temperature climate.

The cold dry portions of the region (northwest) have some elements of the Great Basin (Cold or Sagebrush) Desert. Examples are stands of bigsage, shadscale, and greasewood. Most of this type in this region is of recent origin and is likely the result of heavy grazing.

Some of the most interesting vegetation is that which is associated with drainage systems or catchments. This vegetation is referred to as "riparian" vegetation. Beginning with shrubs such as thinleaf alder, beaked willow, and red-osier dogwood at upper elevations, the deciduous dominants along the streams progress through maple, arizona alder, buckthorn, narrowleaf cottonwood, boxelder, walnut and ash. Then further south sycamore, rio grande cottonwood, and black willow. The dry arroyos support desert willow, littleleaf sumac, and apache plume. Playas and swales (ephemeral catchments) are often circled by mesquite and four-wing saltbush with tobosa grass covering the swales. The dry portions of the region have extensive gypsum, saline, and dune areas which support highly

specialized species of plants. These plants are often narrow endemics and therefore many are rare and endangered.

The fauna of the region reflects the diversity of the vegetation. In addition to the common western mountain mammals and birds such as deer, bear, beaver, mountain lion, bighorn sheep, elk, eagle, turkey, etc. Some less common forms are found such as the Abert squirrel in the western mountains. The coatimundi in the southwest and the harlequin quail in the central and southern mountains. Of the three species of kangaroo rats common to the region; the banner-tailed kangaroo rat is virtually restricted to the grasslands of this region. The peccary (javalina) is rarely found in the United States outside this region. As would be expected in a dry region there is a rich herptile fauna including many narrow endemics such as the ridged-nose rattlesnake. Mexican forms such as the trogon and aplomado falcon are virtually restricted to this region in the United States.

Due to the rich diversity and the periferal nature of many of the ecosystems, we have recommended a considerable number of sites which superficially appear to be very similar but which actually contain important variants. The disjunct nature of many of these ecosystems make preservation for bench-mark purposes of great importance and should demand high priority. Consequently, the various threat categories used in the priority rankings do not

convey the urgency for Landmark status. This observation should be emphasized during any future evaluation of sites in the Chihuahuan Desert - Mexican Highlands region.

B. Themes and Theme Classifications

Landform Theme (I.)

The Landform Theme classification (Table 1.) was initially made by Dwight Deal, C.D.R.I., Alpine, Texas, and has been modified by Wayne Lambert, Dave Sitzler, and George Bachman, Department of Interior, USGS, Albuquerque, New Mexico. Only the first two units of the classification have been used as theme summaries in the site briefs. The third units which are headed by lower case letters will be included if appropriate under the Natural Values section of the briefs.

Paleontological-Archaeological Theme (II.)

The nature of the proposed fossil areas are such that we have used an all-inclusive them (Paleontological-Archaeological) for the theme summaries. The details regarding geological periods and floral-faunal representatives are given in the Natural Values portion of the briefs.

Ecosystem Theme (III.)

The third major theme is called Ecosystem Theme and has two sub-units. One is a terrestrial ecosystem unit and

the other an aquatic ecosystem unit. Terrestrial ecosystems are extensive and varied in the CD-MH region and they also usually dictate the general animal populations which can be expected to be included.

Terrestrial Ecosystem Themes.

Tundra Formation. Alpine tundra is found on high mountain peaks in the north central portion of this region which is a southern extension of the Rocky Mountain Province. The Sedge Series include communities of sedge (Carex), tufted hairgrass (Descaampsia caespitosa), willow (Salix) and avens (Geum). These communities represent the southern extension of Tundra in the United States and the gene pools are likely to contain unique groupings of this vegetation type.

Forest and Woodland Formation. As with the tundra the forests found in this region represent southern boundries of many Series found to the north. However, some 10 habitat types have been recognized from the Boreal Forest alone in this region. Good examples of these habitat types are uncommon a suitablely protected excamples are rare. These communities have upper canopies dominated by either engelmann spruce (Picea englemannii) or subalpine fir (Abies lasiocarpa) or both. Understory dominants are shrubs such as raspberry (Rubus) or blueberry (Vaccinium) or forbs

and grasses such as groundsel (Senecio) and Jacobs ladder (Polemonium) or wildrye (Elymus).

The Petran Montana Forest of the region has also been found to contain sufficient stands to constitute habitat types. These are included in the White Fir (Abies concolor)-Douglas Fir (Pseudotsuga menziesii) Series and the Douglas Fir-Southwestern White Pine (Pinus strobiformis) series or series dominated by one of these species. Understory dominants vary from shrubs such as mountain ninebark (Physocarpus) and oak (Quercus) to grasses such as creeping wildrye (Elymus triticoides) or screwleaf muhly (Muhlenbergia virescens). These habitat types only exist as mature stands and are relatively rare in the region.

Ponderosa pine (Pinus ponderosa) communities are found in the region as successional-disturbance communities in eventual mixed conifer or spruce-fir communities; as a forest dominant in relatively closed stands with occasional oak openings; and as a dominant in pine meadows or savannas with mountain muhly (Muhlenbergia montana) or arizona fescue (festuca arizonica) as understory dominants. These meadows are now uncommon but represent a previously widespread type prior to settlement and development.

The woodlands of the region are highly varied and include communities which are virtually unique to the region, such as the Chihuahua Pine (Pinus leiophylla)-Mexican Pinyon Series found in the southwestern corner of

the region. As discussed in the vegetative overview (page 8) Pinyon-Juniper Woodlands are ubiquitous and are more diverse than in any other region.

Scrubland Formation. The themes here have extensions from the Great Basin such as the mountain mahogany (Cercocarpus) - serviceberry (Amelanchier) and the mountain mahogany-cliffrose (Cowania) communities. Also types occur from the Interior Chaparral Series such as mountain mahogany-desert ceanothus (Cenothus greggii)-pointleaf manzanita (Arctostaphylos pungens) communities. However, there are important scrubland types which are restricted to the region such as the grey oak (Quercus grisea)-mountain mahogany-datil yucca (Yucca baccata) communities.

Grassland Formation. Once again there are units in this formation which represent extensions from other regions. These extensions may be direct continuations such as the Buffalo Grass Series from the Great Plains or disjunct outliers such as the Mixed Bluestem Series also from the Great Plains. There are fairly extensive areas of Great Basin Shrub-Grassland in the northwestern portion of the region. This region contains the best and possibly the only stands or "Desert Grassland", referred to as Warm Temperate Scrub-Grassland. Included here is the Black Grama-Scrub Series which in turn includes communties of black grama (Bouteloua eriopoda)-soaptree yucca (Yucca

elata) and creosotebush (Larrea tridentata)-black grama-bush muhly (Muhlenbergia porteri).

Desert Formation. The only bonified examples of the Chihuahuan Desert found in the United States occur in this region. Although much of the Chihuahuan Desert area in the region is recent resulting from livestock grazing. There are some areas which have always been Chihuahuan Desert. These areas have creosotebush as a dominant in common with the Sonoran desert but they included a co-dominant, tarbush (Flourensia cernua) or sandpaperbush (Mortonia scabrella) neither of which occurs in the Sonoran desert.

Riparian Formation. Vegetation associated with drainages and catchments is a very important facet of the region's vegetation and has been treated as a separate formation. Stands of this vegetation (bosques) in major floodplains were once extensive but today they are few and decreasing through urbanization, water manipulation, and recreation. Some are rapidly disappearing which are normally found along smaller but generally perennial drainages. One of these is the fremont cottonwood (Populus fremontii)-arizona alder (Alnus oblongifolia) community.

The Terrestrial Ecosystem themes are based upon a detailed classification developed by William A. Dick-Peddie, Biology Department, New Mexico State University. This classification is being put on the New Mexico Heritage Office computer in Santa Fe and will eventually serve to

standardize all references to New Mexico vegetation for both management and preservation functions. Usually only two organization levels from the classification were used in the theme summaries of the briefs. These were the one digit and the two digits to the right of the decimal point--for example: 121.3 and 121.31. Occasionally the next lower category (121.311) was included if it was known to occur and was important to the priority ranking. Following is an explanation of the classification which is given in Table 2.

CLASSIFICATION OF NEW MEXICO'S TERRESTRIAL VEGETATION

This system has incorporated features of the Heritage classification (Radford), the Brown and Lowe system, and the Habitat Typing system used by the U. S. Forest Service.

The digitized portion is compatible with the Brown and Lowe classification (1980). When numbers differ from Brown and Lowe they are numbers not used in their system. For example, the Riparian Formation in this system uses "170". This number position is not used by Brown and Lowe.

The lowest vegetation unit used in this system (association or community type) is equivalent to the association of the Brown-Lowe system, to the community type of the Heritage system and to the Habitat Type of the U.S. Forest Service system. As in the Heritage and Habitat Type systems, the associations (community types) include major synusia (life form layers) in their names. The diagnostic species of each layer are separated by a slash (/) from other layers. If there are no consistent diagnostic dominant species in a layer, the following symbols are used:

MS	=	Mixed shrub species
MG	=	mixed grass species
MF	=	mixed forb species
MG-F	=	mixed grass and/or forb species
L	=	low (sparse) number of plants in this layer

The Habitat Typing people prefer to restrict "series" names to one dominant plant even when the habitat types within a series are composed of co-dominants. This stricture has not been applied to this classification. Where habitat types are known from New Mexico anddhave been formally recognized (Moir and Ludwig, 1980) they are indicated by an asterisk (*) after the association name. Additional types were added in 1980 and undoubtedly more will be found in 1981. These can be accommodated in this classification when they have been officially accepted.

Brown, D.E. and C.H. Lowe, 1980. A digitized systematic classification for ecosystems with an illustrated summary of the natural vegetation of North America. USDA For. Serv. Tech. Rpt. RM-73, 93p. Rocky Mt. For. and Range Exp. Stn, Fort Collins, Colo.

Moir, W.H. and J.A. Ludwig, 1979. A classification for spruce-fir and mixed conifer habitat types of Arizona and New Mexico. USDA For. Serv. Res. Pap. Rm-207, 47p. Rocky Mt. For. and Range Exp. Stn, Fort Collins, Colo.

The Aquatic Ecosystem sub-unit is simple and self-explanatory (see Table 3.).

Species of Special Concern Theme (IV.)

The fourth major theme, Species of Special Concern, has been so named because the terms "threatened" and "endangered" are federal terms which connote official actions and decisions. Also, New Mexico has terms for certain species that are narrow endemics or rare in the state. The Species of Special Concern heading allows all such categories to be included and the specitics of the species' status can be explained under the Natural Values heading. The outline for this theme is given in Table 4.

C. Site Selection

Priority Ranking.

Priority rankings generally follow the NPS priority system but with some modification and with one important addition.

There are three "recommended" categories and two "not recommended" categories. The first two (1 and 2) recommended categories are as the NPS system suggests: 1 - high national significance; and 2 - appears to be nationally significant.

Category 3 includes existing or recommended NNLs. The site numbers on the county site tables are used to locate the sites on the county map figures. In Arizona sites which are existing or proposed NNLs are not located on the map. The sites not recommended are given a category "4" or "5" as suggested by MPS (4 - insufficient information; and 5 - lacks significant and/or natural qualities). Some of the sites given a "4" are very large areas such as a wilderness or proposed wilderness. Some of these areas undoubtedly contain potential landmark features but sufficiently detailed information is not currently available.

A summary of the priority ranking system used in this study is as follows:

Recommended sites

1 - high national significance

2 - appearing to be nationally significant

3 - existing or recommended NNL

Sites not recommended

4 - insufficient information

5 - lacks significance an/or natural qualities

Recommended sites and areas are further coded as follows:

A - site is in serious, impending danger

B - some jeopardy

C - no apparent jeopardy

D - relative jeopardy unknown

Priority Criteria

In addition to the criteria recommended by the NPS for arriving at recommendations, there is an important recent activity initiated by the U.S. Forest Service. As an aid to management and inventory, the Forest Service has instituted a "habitat typing" program. Groups of mature stands are examined in considerable detail both quantitatively and qualitatively. This information results in the establishment of "habitat types" which can subsequently be used by the Forest Service as benchmarks or standards on which to base inventories of mature and successional forest.

Some of these habitat type sites contain rare and excellent examples (modal types) of mature vegetation. Such habitat type areas are given highest priority of NNL designation because of the quality of the sites and the amount of information known about the sites. All Special

Use Designations such as RNA are also considered when evaluating sites (see Table 4).

There are a number of New Mexico fossil areas which have been given a "1" priority because they are not only excellent but are threatened in varying degrees. Following are summary comments concerning these areas, written by Dr. Barry Kues, Department of Geology, University of New Mexico.

> The fossil areas suggested for inclusion on the National Natural Landmarks list are all dominated by "badlands" topography, where erosion has sculpted multi-colored strata of Late Cretaceous and early Tertiary (Paleocene) age into visually impressive and unusual land-forms. Fossils, particulary vertebrate fossils, but also plants and invertebrates, are abundant in these badlands and are constantly eroding out, resulting in new specimens and sometimes new types of fossil organisms previously unknown to science. Dinosaurs, including complete skulls and skeletons, other reptiles, and primitive mammals are the most important groups of fossils in the badlands. Many of the types of fossils found in both the Late Cretaceous and early Tertiary beds of these areas are unique to New Mexico. Though other badlands areas exist in the southwestern U.S., the combination of highly and variously colored (black, gray, pink, maroon, brown, etc.) strata, unusual topographic features (such as "hoodoo" fields of isolated erosional remnants of Sandstone units), and one of the world's best sequences of fossil remains extending from dinosaur-dominated to primitive-mammal-dominated paleo-communities, make these New Mexico badlands areas collectively unique in the Southwest. Most of these areas are still in a relatively "natural" state, though dirt roads are abundant. Gas wells are operating in Kutz Canyon and north of the Fruitland-to-Nacimiento Formation Fossil beds. Much of the latter area is either leased or of interest to coal companies for the extraction of coal by strip mining. the areas cited are virtually uninhabited and are composed primarily of federal land, with minor parcels of state and private land interspersed within the federal areas.

Scope of Study

The scope of this study has gone beyond the originally assigned boundaries. There are a number of reasons for this. First, the Unique Ecosystem Study instituted by the U.S. Fish and Wildlife Service to assess the potential of privately owned lands, was not completed in this area until 1978. This program covered portions of New Mexico where Landmark studies had already been completed. Second, the results of the Forest Service's habitat typing program were not available to these earlier studies. In addition, much of the paleontological material from San Juan was evidently overlooked. A final reason is that he delay in completion of this study allows it to serve as a summary inventory of the use status of natural features found in a sizable portion of the southwestern United States, in additiona to landmark recommendations.

D. Study Format

The recommended sites are arranged in three sections - Arizona, New Mexico, and Texas. Within each state section the sites are arranged by counties. This was done to facilitate the subsequent site evaluations. Each county group of sites is preceded by a table and figure. The table lists the sites alphabetically and gives a key number to the location of each site on the map. The priority ranking is given for each site and if a site's priority is a 1 or 2,

the table gives the page for the site brief.

Large administrative units such as refuges may include one or more areas worthy of recommendation as sites. If this is the case the site name will include the larger unit name in front. For example: Bitter Lakes - Ink Pot. On occasion the large area itself may also be a recommended site.

Under the heading Location: in the site descriptions, ranges and townships are give for sites located in Arizona and New Mexico. Latitudes are lognitudes are given for sites located in Texas because there was no U.S. Territorial Survey in that state.

E. Site Summary

A master list of sites which received consideration is given in Table 7. This table is included in the body rather than in an Appendix because of the summary-inventory nature of the CD-MH study. The sites considered are listed alphabetically and their county-state locations, priorities, owner/administering agency, and other use designations are included. A summary of sites by various categories (Table 9) follows the master list.

TABLE 1. Landform Classification for Chihuahuan Desert - Mexican Highland Theme Study

A. MOUNTAIN
   1. Fault-block
   2. Volcanic (see also Volcanic Features)
   3. Folded
      a. High relief
      b. Ancient, eroded
   4. Tertiary Intrusive Mountain Ranges

B. DESERT BASIN
   1. Undissected Bolson
      a. Clay playa
      b. Salt basin
   2. Dissected Bolson
      a. Cut by major river (see also Major River)
      b. Intermittent master drainage
   3. Bajadas

C. MAJOR RIVER
   1. Dissected Bolson
   2. Canyon Country
   3. Disappearing into a Closed Basin

D. VOLCANIC FEATURES
   1. Major Mountain Complex
      a. Caldera
      b. Complex
   2. Individual Volcanic Mountain
      a. Relatively undissected
      b. Deeply dissected
   3. Maarr Volcano
   4. Lava Flow
   5. Local Feature
      a. Dike
      b. Sill
      c. Volcanic neck
      d. Laccolith
      e. Other special interest feature
   6. Ash Flow

E. LOCAL PERENNIAL WATER OCCURRENCE
   1. Cold Spring
   2. Thermal Spring
   3. Saline
   4. Perennial Stream Segment
   5. Desert Waterfall

TABLE 1. (continued)

F. EOLIAN
   1. Dunes
      a. Silica
      b. Gypsum
   2. Ancient Eolian Deposit

G. GLACIAL LANDFORM
   1. Cirque
   2. Other

H. SOLUTIONAL LANDFORM
   1. Limestone Cave and Karst
   2. Gypsum Caves and Karst

I. PLAIN, PLATEAU, MESA, CUESTA, AND HOGBACK

J. UNUSUAL LANDFORM AND FEATURE
   1. Astroblem
   2. Glacial Phenomena
   3. Earthquake Phenomena
   4. Miscellaneous Oddities
   5. Reef and Atoll
   6. Shoreline
   7. Unusual Mineral Occurrence
   8. Unusual Fossil Occurrence
   9. Erosional Remnant
   10. Arroyo Cutting

K. SPECIAL
   1. Southern Great Divide Basin
   2. Rio Grande

L. STRUCTURAL GEOLOGY
   1. Holocene Fault
   2. Other

TABLE 2. Terrestrial Vegetation Classification for Chihuahuan Desert - Mexican Highlands Theme Study

1,100 Nearctic Upland Vegetation

110 Tundra Formation

111 Alpine Tundra

111.5 Rocky Mountain Alpine Tundra

111.51 Sedge Series
111.511 Carex/Deschampsia
111.512 Salix/Carex
111.513 Geum rossii/Carex

111.52 Moss-Lichen Series

120 Forest - Woodland Formation

121 Boreal Forest

121.3 Petran Subalpine Coniferous Forest

121.31 Engelmann Spruce Series
121.311 Picea engelmannii/Acer glabrum/MG-F*
121.312 Picea engelmannii/MS/Elymus triticoides*
121.313 Picea engelmannii/L/Moss
121.314 Picea engelmannii/Vaccinium spp./MF*
121.315 Picea engelmannii/Vaccinium spp./Polemonium delicatum*

121.32 Subalpine Fir-Spruce Series
121.321 Abies lasiocarpa-Picea engelmannii/Juniperus communis/L*
121.322 Abies lasiocarpa-Picea engelmannii/Rubus parviflorus/MF*
121.323 Abies lasiocarpa-Picea engelmanni/Ribes spp./Senecio sanguisorboides*

121.33 Subalpine Fir Series
121.331 Abies lasiocarpa/L/Erigeron superbus*
121.332 Abies lasiocarpa/Vaccinium spp./MF*
121.333 Abies lasiocarpa/Vaccinium spp./Linnaea borealis*

121.34 Bristle-Cone Pine Series

122 Cold Temperate Forest and Woodland
122.3 Petran Montane Coniferous Forest

122.31 White Fir-Douglas Fir Series
122.311 Abies concolor-Pseudotsuga menziesii/Acer glabrum-MS/MG-F*
122.312 Abies concolor-Pseudotsuga menziesii/Quercus gambelii/MG*
122.313 Abies concolor-Pseudotsuga menziesii/MS/L*
122.314 Abies concolor-Pseudotsuga menziesii/L/Elymus triticoides*

122.32 Douglas Fir-Limber Pine Series
122.331 Pseudotsuga menziessii-Pinus strobiformis/L/Muhlenbergia virescens*

122.33 Douglas Fir-Blue Spruce Series
122.331 Pseudotsuga menziessii-Picea pungens/MS/MG-F*

122.34 Douglas Fir Series
122.341 Pseudotsuga menziesii/L/MG-F*
122.342 Pseudotsuga menziesii/Physocarpus monogynus/L*
122.343 Pseudotsuga menziesii/Quercus hypoleucoides/MG*

122.35 Southwestern White Pine Series
122.351 Pinus strobiformis/L/MG*

122.36 Ponderosa Pine Series
122.361 Pinus ponderosa/L/Festuca arizonica
122.362 Pinus ponderosa/Quercus grisea/MG-F
122.363 Pinus ponderosa/MS/Bouteloua gracilis
122.364 Pinus ponderosa/Quercus gambelii/MG
122.365 Pinus ponderosa/L/Muhlenbergia montana-Festuca arizonica
122.366 Pinus ponderosa-Juniperus/MG

122.37 Successional-Disturbance (subclimax) Series
122.371 Populus tremuloides/MS/MG-F
122.372 Pinus ponderosa/L/Muhlenbergia virescens
122.373 Pseudotsuga menziesii/Quercus gambelii/MG-F
122.374 Quercus gambelii-Robinia neomexicana/MG-F

122.4 Great Basin-Mogollon-Madrean-Chihuahuan Coniferous Woodland

122.41 Colorado Pinyon Pine-Juniper Series
122.411 Pinus edulis-Juniperus monosperma/Artemesia tridentata/L
122.412 Pinus edulis-Juniperus monosperma/Artemesia tridentata/Bouteloua gracilis
122.413 Pinus edulis/Oryzopsis hymenoides(sandy soil)
122.414 Pinus edulis-Juniperus deppeana/Quercus grisea/MF
122.415 Pinus edulis-Juniperus monosperma/MS/Bouteloua gracilis
122.416 Pinus edulis-Juniperus scopularum-Juniperus monosperma/MG-F
122.417 Pinus edulis-Juniperus osteospermum/MS/MF
122.418 Pinus edulis-Juniperus spp./MS (scarp woodland)

122.42 Juniper Series
122.411 Juniperus spp./MG

123 Warm Temperate Forest and Woodland

123.3 Madrean Evergreen Forest - Woodland

123.31 Chihuahua Pine-Mexican Pinyon Series
123.311 Pinus leiophylla/Quercus hypoleucoides/MG-F
123.312 Pinus cembroides/MS/MG-F

123.32 Encinal (Oak) Series
123.321 Quercus grisea/MS/MF
123.322 Quercus hypoleucoides/MF
123.323 Quercus arizonica/MF
123.324 Quercus emoryi/Bouteloua gracilis (alluvial fan)
123.325 Quercus emoryi/Bouteloua hirsuta (colluvial slope)
123.326 Quercus emoryi-Quercus arizonica/Nolina microcarpa/Bouteloua gracilis

130 Scrubland Formation

132 Cold Temperate Scrublands

132.1 Montane Scrub

132.11 Mountain Mahogany-Mixed Scrub Series
132.111 Cercocarpus breviflorus-Amelanchier spp./MF

132.112 Cercocarpus breviflorus-Cowania stansburiana/MF

133 Warm Temperate Scrublands

133.3 Interior Chaparral

133.31 Scrub Oak Series
133.311 Quercus grisea/Cercocarpus breviflorus-Yucca baccata/MF
133.312 Quercus toumeyi-Arctostaphylos pungens/MG-F

133.36 Mixed Evergreen Sclerophyll Series
133.361 Cercocarpus breviflorus-Ceanothus greggii-Rhus choriophylla/MG-F
133.362 Pinus cembroides/Quercus toumeyi-Arctostaphylos pungens/MG-F

140 Grassland Formation

141 Alpine Boreal Grassland

141.4 Subalpine Grasslands

141.41 Bunch Grass Series
141.411 Festuca ovina
141.413 Carex-Deschampsia-Poa pratensis

142 Cold Temperate Grassland

142.1 Plains and Desert Grassland

142.11 Mixed Bluestem Series
142.111 Artemisia filifolia/Andropogon hallii(sandy soil)
142.112 Quercus havardii/Andropogon (dunes)
142.113 Quercus havardii-Aremesia filifolia/Andropogon spp.
142.114 Andropogon gerardii-Bouteloua curtipendula
142.115 Andropogon gerardii-Sporobolus cryptandrus-Sporobolus airoides
142.116 Juniperus monosperma/Andropogon gerardii-Bouteloua curtipendula

142.12 Buffalo Grass Series

142.121 Buchloe dactyloides-Bouteloua gracilis

142.13 Gramma Grass Series
142.131 Bouteloua gracilis-Hilaria jamesii
142.132 Bouteloua gracilis-Bouteloua eriopoda
142.133 Bouteloua gracilis-Bouteloua eriopoda-Bouteloua curtipendula (piedmont)

142.134 Bouteloua eriopoda-Sporobolus cryptandrus-Sporobolus flexuosus
142.135 Bouteloua eriopoda-Hilaria jamesii
142.136 Bouteloua eriopoda-Hilaria belangeri

142.2 Great Basin Shrub-Grassland

142.21 Wheatgrass Series
142.211 Agropyron smithii-Bouteloua gracilis
142.212 Artemisia tridentata/Agropyron smithii

142.23 Indian Ricegrass-Galleta Series
142.231 Oryzopsis hymenoides-Sporobolus spp.
142.232 Juniperus monosperma/Oryzopsis hymenoides-Hilaria jamesii
142.233 Juniperus monosperma/Oryzopsis hymenoides
142.234 Artemisia tridentata/Hilaria jamesii

142.4 Rocky Mountain Montane Grassland

142.41 Fescue Series
142.411 Festuca thurberi-Festuca arizonica
142.412 Festuca arizonica-Muhlenbergia montana

142.42 Sedge-Junegrass Series
142.421 Carex-Koeleria cristata

142.43 Successional-Disturbance Series
142.431 Poa pratensis

143 Warm Temperate Grasslands

143.1 Interior Scrub-Grassland

143.11 Blue Grama-Scrub Series
143.111 Opuntia/Bouteloua gracilis
143.112 Yucca elata/Bouteloua gracilis-Muhlenbergia torreyi
143.113 Yucca glauca/Bouteloua gracilis-Bouteloua eriopoda (plains)

143.12 Black Grama-Scrub Series
143.121 Yucca elata/Bouteloua eriopoda
143.122 Prosopis glandulosa/Bouteloua eriopoda (sandhills)
143.123 Ephedra trifurca/Bouteloua eriopoda
143.124 Parthenium incanum/Bouteloua eripoda (lower piedmont slopes)
143.125 Larrea tridentata/Bouteloua eriopoda-Muhlenbergia porteri
143.126 Juniperus monosperma/Bouteloua spp.-Hilaria belangeri

143.127 Acacia constricta/Panicum obtusum-Bouteloua eriopoda

143.13 Grama Grass-Rosette Scrub Series
143.131 Yucca baccata-Parthenium incanum/Bouteloua eriopoda (piedmont)
143.132 Yucca torreyi-Parthenium incanum/Bouteloua eriopoda (piedmont)
143.133 Dasylerion wheeleri-Haplopappus laricifolius/Bouteloua eriopoda (piedmont)
143.134 Agave parryii/Bouteloua eriopoda (piedmont)
143.135 Agave palmerii/Bouteloua eriopoda (piedmont)
143.136 Agave schottii/Bouteloua eriopoda
143.137 Nolina microcarpa/Bouteloua gracilis-Hilaria jamesii

150 Desert Formation

152 Cold Temperate Deserts

152.1 Great Basin Desert Scrub

152.11 Sagebrush Series
152.111 Artemisia tridentata/Agropyron smithii-Hilaria jamesii

152.12 Shadscale Series
152.121 Atriplex confertifolia/Bouteloua gracilis
152.122 Juniperus monosperma/Atriplex confertifolia/Oryzopsis hymenoides

152.13 Winterfat Series
152.131 Eurotia lanata/Bouteloua gracilis

152.14 Four-wing Saltbush Series
152.141 Atriplex canescens/Bouteloua gracilis

153 Warm Temperate Deserts

153.2 Chihuahuan Desertscrub

153.21 Creosotebush Series
153.211 Larrea tridentata/Erioneuron pulchellum
153.212 Larrea tridentata-Flourensia cernua/Erioneuron pulchellum

153.22 Whitethorn Series
153.221 Acacia constricta/MF

153.23 Sandpaperbush Series
153.231 Mortonia scabrella/MF

153.24 Mesquite Series
153.241 Prosopis glandulosa-Atriplex canescens/MF

170 Riparian Formation

171 Arctic Riparian

171.1 Rocky Mountain Alpine Riparian

171.11 Sedge Series
171.111 Carex-Deschampsia caespitosa
171.112 Carex-Agrostis scabra-Glyceria

171.12 Willow Series
171.121 Salix nivalis/Carex

172 Boreal Riparian

172.1 Rocky Mountain Subalpine Riparian

172.11 Blue Spruce Series
172.111 Picea pungens/MS/Poa pratensis*
172.112 Picea pungens/S/Carex forenea*

172.12 Willow Series
172.121 Salix exigua/MS/F
172.122 Salix scouleriana/MS/MF

172.13 Willow-Alder Series
172.131 Salix bebbiana-Alnus tenuifolia/MF

173 Cool Temperate Riparian

173.1 Great Basin Arroyo-Playa Riparian

173.11 Shadscale-Sacaton Series
173.111 Atriplex confertifolia/Sporobolus airoides

173.12 Greasewood Series
173.121 Sarcobatus vermiculatus/Suaeda suffrutescens
173.122 Sarcobatus vermiculatus-Atriplex spp./Sporobolis airoides

173.13 Rabbitbrush Series
173.131 Chrysothamnus nauseosus-Sarcobatus vermiculatus/MF

173.2 Great Basin Stream (montane) Riparian

173.21 Maple Series
173.211 Acer glabrum/MS/S

173.22 Serviceberry Series
173.221 Amelanchier oreophila/S

173.3 Great Basin River (floodplain) Riparian

173.31 Cottonwood-Willow Series
173.311 Populus fremontii/Salix exigua/G-F
173.312 Populus fremontii-Populus acuminata/Salix exigua/MG-F
173.313 Populus augustifolia/Salix exigua/MG-F

173.4 Rocky Mountain Stream (montane) Riparian

173.41 Willow-Dogwood Series
173.411 Salix irrorata-Cornus stolonifera/S

173.42 Cottonwood Series
163.421 Populus fremontii-Alnus oblongifolia/MS/MG-F
173.422 Populus augustifolia/Forestiera neomexicana/MG-F
173.423 Populus augustifolia/S/Poa pratensis

173.43 Successional Disturbance Series
173.431 Elaeagnus angustifolia-Populus fremontii/-Rhus trilobata/S

174 Warm Temperate Riparian

174.1 Southwestern Interior Stream (canyon) Riparian

174.11 Alder-Boxelder Series
174.111 Alnus oblongifolia-Acer negundo/Rhus trilobata/MG-F

174.12 Ash-Walnut Series
174.121 Fraxinus velutina-Juglans major/MS/MG-F

174.13 Cottonwood Series
174.131 Populus fremontii/Prunus virginiana/MG-F

174.14 Sycamore Series
174.141 Platanus wrightii/Rhamnus betulaefolia/MG-F
174.142 Platanus wrightii/Populus fremontii/MS/MG-F
174.143 Platanus wrightii/Quercus arizonica/MS/MG-F

174.15 Hackberry Series
174.151 Celtis reticulata-Quercus grisea/Garrya wrightii/MF
174.152 Celtis reticulata-Morus microphylla/Mimosa biuncifera/MF

174.2 Southwestern Interior Arroyo-Playa Riparian

174.21 Brickelbush Series
- 174.211 Chilopsis linearis/Brickellia laciniata/MF
- 174.212 Brickellia laciniata-Fallugia paradoxa/MF
- 174.213 Brickellia laciniata-Rhus microphylla/MF

174.22 Burro-brush Series
- 174.221 Hymenoclea monogyra-Brickellia laciniata/MF
- 174.222 Prosopis glandulosa/Hymenoclea monogyra/MF

174.23 Four-wing Saltbush Series
- 174.231 Atriplex canescens/MF
- 174.232 Atriplex canescens-Lycium pallidum/MF

174.24 Alkali Sacaton Series (Swales)
- 174.241 Sporobolus airoides-Distichlis stricta
- 174.242 Sporobolus airoides-Scleropogon brevifolius
- 174.243 Sporobolus airoides-Hilaria mutica

174.25 Tobosa Series (Swales)
- 174.251 Hilaria mutica-Scleropogon brevifolius
- 174.253 Yucca elata/Hilaria mutica
- 174.254 Prosopis glandulosa/Hilaria mutica-Scleropogon brevifolius

174.3 Southwestern Interior River (floodplain) Riparian

174.31 Cottonwood Series
- 174.311 Populus fremontii/Baccharis glutinosa/Distichlis stricta
- 174.312 Populus fremontii/Prosopis pubescens/Pluchea sericea
- 174.313 Populus fremontii-Salix gooddingii/MS/Distichlis stricta

174.32 Mesquite Series
- 174.321 Prosopis glandulosa
- 174.322 Prosopis glandulosa/Atriplex canescens
- 174.323 Prosopis glandulosa/Pluchea sericea

174.33 Successional-Disturbance Series
- 174.331 Tamarix spp.
- 174.332 Tamarix spp.-Prosopis glandulosa
- 174.333 Tamarix spp.-Distichlis stricta

TABLE 3. Classification of Aquatic Systems for the Chihuahuan Desert - Mexican Highland Theme Study

A. Lentic System	B. Lotic System
1. Lake	1. Spring
2. Pond	2. Stream
3. Marsh (cienega)	3. River
4. Playa	4. Marsh

TABLE 4. Classification of Species of Special Concern for The Chihuhuan Desert - Mexican Highland Theme Study

A. Plant	B. Animal
1. Grass-sedge	1. Invertebrate
2. Forb	2. Fish
3. Shrub	3. Amphibian
4. Tree	4. Reptile
5. Other	5. Bird
	6. Mammal

TABLE 5. Symbols used in this study for existing use designations

ACEC	-	Area of Critical Environmental Concern
EcP	-	Ecology Plot
EPNA	-	Ecology Plot Natural Area
HT	-	Habitat Type
NA	-	Natural Area
NA-P	-	Proposed Natural Area
NERP	-	National Environmental Research Park
NWLR	-	National Wildlife Refuge
ONA	-	Outstanding Natural Area
RNA	-	Research Natural Area
RNA-P	-	Proposed Research Natural Area
StA	-	Study Area
StP	-	State Park
UE-P	-	Proposed Unique Ecosystem Site
W	-	Wilderness
W-P	-	Proposed Wilderness
WFA	-	Waterfowl Area
WLA	-	Wildlife Area
WSA	-	Wilderness Study Area
WSA-P	-	Proposed Wilderness Study Area
WSA-N	-	Rejected Wilderness Study Area

TABLE 6. Symbols used in this study for Owner/Administering Agency

ASL	-	Arizona State Land
BLM	-	Bureau of Land Management
DOD	-	Department of Defense
FWS	-	U.S. Fish and Wildlife Service
IR	-	Indiana Reservation
M	-	Multiple Ownership
NMGF	-	New Mexico Game and Fish
NMP	-	New Mexico Park
NMSL	-	New Mexico State Land
NPS	-	National Park Service
P	-	Private
TNC	-	The Nature Conservancy
TSL	-	Texas State Land
USFS	-	U.S. Forest Service

TABLE 7. Master List of Sites with County, Owner/ Administering Agency, Priority, and Page in Document

Site	Priority	County (A)=Arizona (T)=Texas	Owner/ Admn. Agency	Designation	Page
Aden Lava Flow	1-C	Dona Ana	BLM	RNA	149
Ah-She-Sle-Pah Fossil Area	4	San Juan	BLM		305
Aldo Leopold-Gila	4	Catron, Grant, Sierra	USFS	W	94
Alamo Hueco Mountains	5	Hidalgo	BLM	WSA	200
Animas Mountains	1-B	Hidalgo	BLM	WSA	202
Apache Kid	5	Socorro	USFS	W	340
Apache Mountain	4	Catron	USFS		94
Artesia	5	Eddy	NMGF	WFA	166
Bear Creek	4	Socorro	USFS	StA	340
Belen	5	Valencia	NMGF	WFA	380
Bernardo	5	Socorro	NMGF	WFA	340
Bert Clancy	4	Santa Fe	NMGF	WLA	319
Bertoglio-Merril	4	Hidalgo	BLM	RNA-P	200
Big Bend		Brewster-Presidio (T)	P		
BB - Bofecillas Mts.	1-B				385
BB - Chorro Canyon	1-C				392
BB - Fresno Canyon	1-C				395
BB - The Solitario	1-C				401
Big Hatchet Mountains	2-C	Hidalgo	BLM	WSA	210
Big Yucca	2-C	Socorro	BLM	WSA-N	343

TABLE 7. (continued)

Site	Priority	County (A)=Arizona (T)=Texas	Owner/ Admn. Agency	Designation	Page
Bisti	3	San Juan	BLM		305
Bitter Lake		Chavez	FWS	NWLR	
BL - Bitter Lake	3			RNA	139
BL - Ink Pots	1-C			RNA	141
BL - Lake St. Francis	3			RNA	139
BL - Salt Creek	3			WSA	139
Blue Creek	4	Grant-Hidalgo	BLM	WSA	200
Blue Range	2-C	Greenlee(A)-Catron	USFS	W	81
Blue Spring	1-B	Eddy	P	UE-P	168
Boardwell	5	Otero	BLM	ONA	257
Boquillas Ranch	3	Cochise (A)	P		53
Border Hills Structure Zone	3	Lincoln	M		227
Bosque Del Apache		Socorro	FWS	NWLR	
BdA - Apache Camp	2-C			RNA	345
BdA - Chupadera	5			RNA	340
BdA - Indian Well	4			W	340
BdA - Jornada del Muerto	5			RNA	340
BdA - Little San Pasqual	4			W	340
BdA - Rio Grande Marsh	2-C			RNA	348
BdA - San Pasquel	5			RNA	340
Bottomless Lakes	5	Chaves	NMP	StP	139
Brannon Park	4	Grant	USFS		181
Brazos Box	3	Rio Arriba	P		269

TABLE 7. (continued)

Site	Priority	County (A)=Arizona (T)=Texas	Owner/ Admn. Agency	Designation	Page
Brokeoff Mountains	4	Otero	BLM	WSA	257
Brushy Mountain	4	Sierra	USFS		329
Buckhorn Marsh	2-B	Grant	P	UE-P	183
Bunk Robinson-Whitmire Canyon	4	Hidalgo	USFS	WSA	200
Caballo Group	5	Sierra	BLM	NA	329
Cabezon	2-C	Sandoval	BLM	WAS	291
Cabresto Creek	1-B	Taos	USFS	RNA-P	366
Cain	5	Sierra	BLM	EcP	329
Canadian Escarpment	3	San Miguel	P		319
Canon Salado	4	McKinley	USFS		253
Capitan Mountains	2-C	Lincoln	USFS	W	229
Carrizalillo Spring	5	Luna	P		248
Carrizozo Lava Field (Flow)	2-C	Lincoln-Otero	BLM	Part WSA	232
Carthage Fossil Area	1-C	Socorro	BLM	RNA-P	350
Cedar Mountains	4	Luna	BLM	RNA-P	248
Central Peloncillo Mts.	1-C	Hidalgo	P BLM	RNA	214
Center Fire Bog	1-B	Catron	P	UE-P	97
Cerro Alesna	4	McKinley	USFS		253
Chaco Mesa	5	McKinley	BLM	W-P	253
Chama River Canyon	1-C	Rio Arriba	USFS	W	271
Charette Lakes	5	Mora	NMGF	WFA	363

TABLE 7. (continued)

Site	Priority	County (A)=Arizona (T)=Texas	Owner/ Admn. Agency	Designation	Page
Chiricahua	4	Cochise (A)	NPS	W	53
Chuska-Lukaciaukai Mts.	3	San Juan	USFS		305
Cienega Springs	4	Hidalgo	P	UE-P	200
Cimarron Canyon Palisades	3	Colfax	NMGF		363
City of Rocks	5	Grant		StP	181
Cloverdale Dunes	5	Hidalgo	NMSL		200
Colin B. Neblett	5	Colfax	NMFG	WLA	363
Columbine - Hondo	4	Taos	USFS	W	363
Continental Divide	1-C	Catron	BLM	WSA	101
Cooke Peak	2-C	Luna	P BLM	UE-P	250
Cooke Range	5	Luna	BLM	WSA	248
Cork Bark Fir	1-B	Lincoln	USFS	RNA-P	237
Cornudas Desert Plains Grassland	3	Hudspeth (T)	Univ. Texas		383
Cornudas Mountains	4	Otero	USFS		257
Cottonwood Cave	3	Eddy	USFS		166
Cowboy Spring	5	Hidalgo	BLM	WSA	200
Cox Canyon Scenic Strip	5	Otero	USFS		257
Cruces Basin	4	Rio Arriba	USFS	W	269
Cuchillo Mountains	5	Sierra	BLM	NA	329
Cuchillo Trap	5	Sierra	BLM	EPNA	329
Culberson	5	Hidalgo	BLM	RNA-P	200
Culp	4	Otero	USFS		257

TABLE 7. (continued)

Site	Priority	County (A)=Arizona (T)=Texas	Owner/ Admn. Agency	Designation	Page
Culp Canyon	4	Otero	BLM	WSA	257
Dark Canyon	5	Eddy	P	UE-P	166
Datil Well	5	Catron	BLM		94
De-Na-Zin - Bisti	5	San Juan	BLM	WSA ACEC	305
Devils Backbone	4	Socorro	BLM	WSA	340
Devil's Creek	4	Catron	USFS		94
Devil's River	1-B	ValVerde (T)	P		425
Diamond Creek	1-B	Sierra	USFS		331
Dixie Canyon	2-C	Cochise (A)	USFS		56
Dolan Springs - Dolan Falls	2-C	ValVerde (T)	P		428
Dome - Bandelier	4	Sandoval	USFS	W	289
Dripping Springs	2-B	Dona Ana	P	UE-P	151
Dry Creek	4	Sierra	USFS		329
Duran Canyon	1-B	Mora	USFS	HT	377
Eagle Creek	4	Greenlee (A)	USFS		54
Eagle Creek Bat Cave	2-B	Greenlee (A)	USFS		84
East Fork Thomas Creek	1-B	Greenlee (A)	USFS	HT	87
Edward Sargent (Little Chama Valley)	1-C	Rio Arriba	NMGF	WLA	274
Elk Mountain	4	Catron	USFS		94
Elliott S. Barker	5	Colfax	NMGF	WLA	363
El Malpais	3	Cibola	BLM	RNA	127

TABLE 7. (continued)

Site	Priority	County (A)=Arizona (T)=Texas	Owner/ Admn. Agency	Designation	Page
Escondido Canyon	5	Otero	P	UE-N	257
Espanola Barrancos	3	Santa Fe	IR		319
Florida Mountains	5	Luna	BLM		248
Fort Stanton	2-C	Lincoln	BLM	NA	241
Fort Stanton Cave	3	Lincoln	BLM		227
Fossil Forest	1-B	San Juan	BLM		307
Franklin Mountains	2-C	El Paso	BLM		413
Frisco Box	4	Catron	USFS		94
Fruitland-Nacimiento Badlands Fossil Area	1-B	San Juan	BLM		310
Gallina Creek	1-B	Rio Arriba	USFS	HT	278
Ghost Ranch	3	Rio Arriba	P		269
Gila Box	4	Grant-Hidalgo	BLM	WSA	181
Gila Hot Springs No. 1	2-C	Grant	USFS		187
Gila Riparian	5	Grant	TNC	RNA	181
Gila River-Middle Box-Redrock	1-C	Grant	BLM USFS	WSA-N W-P	189
Gila River Bird Area	4	Grant	P	UE-P	181
Gila River Sycamore Stands	1-B	Grant	P	UE-P	196
Goudy Canyon	4	Graham (A)	USFS	RNA	54
Granite Gap	2-C	Hidalgo	BLM		218
Grants Lava Flow	3	Cibola	BLM		127
Grants Lava Flow Ice Caves	1-C	Cibola	P	UE-P	129
Grants Lava Sink Hole Ponds	1-C	Cibola	P		132
Grapevine	4	Otero	USFS		257

TABLE 7. (continued)

Site	Priority	County (A)=Arizona (T)=Texas	Owner/ Admn. Agency	Designation	Page
Great Salt Basin	2-B	Hudspeth (T)	TSL P		416
Guadalupe Canyon	1-B	Hidalgo	P BLM	UE-P ONA	220
Guadalupe Escarpment-Carlsbad Caverns Group	1-C	Eddy	USFS NPS BLM	WSA W WSA	173
Harvey	5	Socorro	BLM	RNA-P	340
Heart Bar	5	Grant	NMGF	WLA	181
Hell Hole	4	Grant	USFS	WSA	181
Horse Mountain	1-C	Catron	BLM	WSA	104
Hub	4	Catron	USFS		94
Ignacio Chavez Group	5	McKinley	BLM	WSA	253
Independence Creek	2-B	Terrel (T)	P		422
Indian Creek	1-B	Catron	USFS	HT	107
Jackson Lake	5	San Juan	NMGF	WFA	305
Jefferies Canyon	4	Otero	USFS		257
Jemez Hot Springs	3	Sandoval	P USFS	RNA	289
Jesse James	5	Cochise (A)	NPS	RNA	53
Jornada del Muerto	5	Socorro-Sierra	BLM	WSA	329
Kelly	5	Catron	USFS		94
Killbourne Hole	3	Dona Ana	BLM		147
Kutz Canyon Fossil Area	2-B	San Juan	BLM		313
Kutz Canyon - Angel Peak	3	San Juan			305
La Joya	5	Socorro	NMGF	WFA	340

TABLE 7. (continued)

Site	Priority	County (A)=Arizona (T)=Texas	Owner/ Admn. Agency	Designation	Page
Lake Lucero	1-C	Dona Ana	NPS	Nat'l Monument RNA	154
Lake Valley Ocotillo Site	1-C	Sierra	BLM	ONA	334
Last Chance Canyon	4	Eddy	USFS		166
Las Uvas Mountains	5	Dona Ana	BLM	WSA	147
Las Vegas		San Miguel	FWS	NWLR	
LV - Gallinas	4			RNA	319
LV - Maxwell	3			RNA	319
LV - Vegosa	5			RNA	319
Latir Peak	2-C	Taos	USFS	W	369
Lavendar Pit	3	Cochise (A)	P		53
Lee	5	Otero	BLM	RNA-P	257
Leslie Canyon	1-B	Cochise (A)	P		59
Little Dog Canyon Group	5	Otero	BLM	WSA	257
Little Turkey Creek	1-B	Catron	USFS	HT	109
Lordsburg Playa	4	Hidalgo	BLM		200
Los Alamos	1-C	Los Alamos		NPRP	301
Lower Frisco	1-C	Greenlee (A) Catron	USFS	WSA	112
Madre Mountain	4	Catron	USFS		94
Magdalena A, B, and C	5	Socorro	BLM	WSA	340
Mammelon Hill Fossil Area	1-B	San Juan	BLM		316
Manzano	5	Torrance-Valencia	USFS	W	380
Marquez	4	McKinley	NMGF	WLA	253

TABLE 7. (continued)

Site	Priority	County (A)=Arizona (T)=Texas	Owner/ Admn. Agency	Designation	Page
Mathers	3	Chavez	BLM	RNA	139
McCarty's Flow	3	Cibola	P		127
McKittrick Hill Caves	3	Eddy	BLM		166
Mesa Alta	3	Rio Arriba	USFS		269
Mesa Gallina	1-B	Rio Arriba	USFS	RNA-P HT	280
Mescalero Escarpment	3	Chaves			139
Mescalero Ridge	5	Eddy	BLM		166
Mescalero Sands	3	Chaves	BLM	CNA WSA	139
Mescalero Sands Archaeological Site	1-C	Chaves	BLM	RNA-P	143
Mesita Blanca - Eagle Peak	1-B	Catron	BLM	WSA	115
Military Hills	3	Cochise (A)	BLM		53
Miller Mesa	5	Rio Arriba	NMGF	WFA	269
Miller Peak	4	Cochise (A)	USFS	W-P	53
Millrace - Crocket Caves	3	Lincoln			227
Mineral Creek	1-B	Catron	USFS	HT	118
Mineral Spring	5	Sandoval	BLM	NA	289
Mogollon Savanna	1-B	Catron	USFS	HT	121
Monument Canyon	3	Sandoval	USFS	RNA	289
Mora Cuesta	3	Mora	P		363
Mountain View	1-B	Pima (A)	P ASL	NA	90
Mount Taylor	3	Cibola	USFS		127
Navajo Peak	4	Rio Arriba	BLM	WSA	269

TABLE 7. (continued)

Site	Priority	County (A)=Arizona (T)=Texas	Owner/ Admn. Agency	Designation	Page
Nolan	4	Catron	USFS		94
Nordstrom Trap	5	Sierra	BLM	EPNA	329
North Dunes	5	Chaves	BLM	Rec. Site	139
Ojito	5	Sandoval	BLM	WSA	289
Open Diamond	5	Luna	BLM	RNA-P	248
Organ Mountains	2-C	Dona Ana	BLM	WSA	156
Otero Mesa	1-C	Otero	BLM DOD	Ecol. Res. Area	259
Owl Canyon	4	Hidalgo	P	UE-P	200
Paramore Crater	2-C	Cochise (A)	ASL		64
Pecos	4	Mora, Rio Ariba, Santa Fe, Taos, San Miguel	USFS	W	269
Penasco Marsh	5	Otero	P	UE-P	257
Petaca Pinta	4	Cibola	BLM	WSA	127
Picket Park	1-C	Cochise (A)	NPS	RNA	66
Pine Canyon	5	Brewster (T)	NPS	RNA	382
Pole Bridge Canyon	5	Cochise (A)	USFS	RNA	53
Posey Springs	5	Otero	P	UE-P	257
Poverty Creek	4	Sierra	USFS		329
Prairie Chicken	5	Chaves	BLM		139
Presilla Group	5	Socorro	BLM	WSA-N	340
Quitman Mountains	5	Hudspeth (T)	P TSL		383

TABLE 7. (continued)

Site	Priority	County (A)=Arizona (T)=Texas	Owner/ Admn. Agency	Designation	Page
Ranger Cabin	4	McKinley	USFS		253
Rattlesnake	5	San Juan	BLM	WSA	305
Redrock	5	Grant	NMGF	WLA	181
Redondo Peak - Redondo Border	1-B	Sandoval-Rio Arriba	P	UE-P	294
Reiley Canyon	3	Cochise (A)	USFS		53
Rio Chama	5	Rio Arriba	NMGF	WLA	269
Rimrock Group	1-C	Cibola	BLM	WSA	136
Rio de los Pinos	5	Rio Arriba	NMGF	WLA	269
Rio Grande	4	Taos	USFS BLM	Wild & Sc. Riv.	363
Rio Grande Gorge	3	Taos	BLM		363
Robledo Mountains	5	Dona Ana	BLM	WSA	147
Rock Hound	5	Luna	NMP	StP	248
Rock Lake Group	5	Guadalupe	P		319
Rodrick	5	Dona Ana	BLM	RNA-P	147
Ryan Hill	4	Socorro	USFS		340
Sabinosa	2-C	San Miguel	BLM	WSA	321
Sacramento Escarpment	4	Otero	BLM USFS		257
Sage	5	Dona Ana	NMSU	Ecol. Res. Area	147
Saliz Mountains	1-B	Catron	USFS	HT	123
San Andres	1-C	Dona Ana	FWS	NWLR	159
San Antonio	2-C	Rio Arriba	BLM	WSA	283
San Antonio Mountains	3	Rio Arriba	BLM		269

TABLE 7. (continued)

Site	Priority	County (A)=Arizona (T)=Texas	Owner/ Admn. Agency	Designation	Page
San Bernardino Volcanic Field	3	Cochise (A)	ASL		53
Sandia	4	Bernalillo	USFS	W	289
Sandia Cave	3	Bernalillo	USFS		289
San Francisco Hot Springs	4	Catron	USFS		95
San Lorenzo Canyon	5	Socorro	BLM	ONA	340
San Pedro Parks	1-C	Rio Arriba	USFS	W	286
San Simon Cienega	5	Hidalgo	BLM		200
San Simon Valley	1-C	Cochise (A)	P ASL	NA	69
Santa Fe Riparian	1-B	San Miguel, Santa Fe	USFS	W	324
Santa Fe River	1-C	Santa Fe	USFS	StP	326
Santa Teresa	4	Graham (A)	USFS	W-P	54
San Ysidro Mineral Area and Cave	2-C	Sandoval	BLM		299
Sevilleta	1-C	Socorro	FWS	NWLR	352
Shoemaker	4	Cibola	BLM	WSA-W	127
Shiprock	3	San Juan			305
Sierra Blanca Peak	1-C	Otero	IR		263
Sierra Diablo		Culberson (T)	P		
SD - Marble Canyon	2-C				408
SD - Salt Flat	5				382
SD - Victorio Canyon	1-A				410
Sierra Ladrones	2-C	Socorro	BLM	WSA	357

TABLE 7. (continued)

Site	Priority	County (A)=Arizona (T)=Texas	Owner/ Admn. Agency	Designation	Page
Sierra Vieja		Jeff Davis-Presidio (T)	P		
SV - Camp Holland	5				382
SV - Capote Falls	1-B				405
Silver Springs Canyon	2-C	Otero	P	UE-P	266
Simon	5	San Juan	BLM	ONA-P WSA-N	305
Sinkhole Group	3	Chaves	FWS		139
Slaughter Canyon	4	Eddy	USFS		166
Snow Lake Site	1-C	Catron	USFS	HT	127
Soledad Rock Gardens	5	Dona Ana	BLM		147
South Dunes	5	Chaves	BLM		139
South Fork Cave Creek	1-C	Cochise (A)	USFS	RNA	74
South Guadalupe Mountain	4	Eddy	USFS	StA	166
South Shake Spring	4	Cochise (A)		RNA	53
Stallion	5	Socorro	BLM	WSA	341
St. David	3	Cochise (A)	P	NA	53
Stone Canyon	4	Catron	USFS		95
Taylor Creek	4	Catron	USFS		95
Tent Rocks	3	Sandoval	M		289
Three Rivers	5	Otero	BLM		257
Timber Peak	1-B	Socorro	USFS	HT	360
Todilito Peak	3	McKinley			253
Torgac Cave	3	Lincoln	BLM		227

TABLE 7. (continued)

Site	Priority	County (A)=Arizona (T)=Texas	Owner/ Admn. Agency	Designation	Page
Toriette Lake	5	Catron	P	UE-P	95
Torreon Wash Fossil Area	1-B	McKinley - Sandoval	USFS		255
Tres Piedras	5	Taos	NMGF	WLA	363
Trujillo	2-C	Sierra	BLM	RNA-P	337
Tucson Mountain	5	Lincoln	USFS		227
Tularosa Wetlands	4	Catron	P	UE-P	95
Turkey Mountains	3	Mora	P		364
Upper Madera Canyon	2-C	Davis (T)	P		419
Urraca	2-C	Taos	NMGF	WLA	372
Vallejo Ranch	5	Colfax	P	UE-P	363
Valley of Fires	5	Lincoln	NMP	StP	227
Valley of Fires Lava Cave	2-C	Lincoln	BLM		243
Vermejo Park	3	Colfax-Taos	Pr		363
W.A. Humphries	5	Rio Arriba	NMGF	WLA	269
W. Danley	5	Otero	BLM	EPNA	257
Wagon Mound Lake	5	Mora	NMGF	WFA	364
Wahoo Mountain	4	Catron	USFS		95
Wall Lake	5	Catron	NMFG	WFA	95
Water Canyon	5	Cibola	NMFG	WLA	127
West Potrillo Mountains	2-C	Dona Ana	BLM	WSA	163
Wheeler Peak	2-C	Taos	USFS	W	374
White Dunes	5	Hudspeth (T)	Pr		383

TABLE 7. (continued)

	Priority	County (A)=Arizona (T)=Texas	Owner/ Admn. Agency	Designation	Page
White Mountain	2-C	Lincoln	USFS	W	245
Whitlock Hills	2-C	Graham (A)	BLM		54
Willcox Playa	3	Cochise (A)	ASL		53
Winchester Mountains	4	Cochise (A)	USFS		53
Withington	4	Socorro	USFS	W	341
Zuni Salt Lake	3	Catron	NMSL		95

TABLE 8. Summary of Number of Sites in Various Categories

A. Sites by priority Designation	Number of Sites
I. Recommended Sites	
Priority 1 (high national significance)	62
Priority 2 (appears to be nationally significant)	38
Priority 3 (existing or recommended NNL)	48
II. Sites Not Recommended	
Rejection Category 4 (insufficient information)	67
Rejection Category 5 (lacks significance and/or natural qualities)	87
B. Priority 1 and 2 Sites by Major Themes	
I. Landform Theme	34
II. Paleontological-Archaeological Theme	11
III. Ecosystem Theme	
A. Terrestrial	110
B. Aquatic	7
IV. Species of Special Concern Theme	34
C. Priority 1 and 2 Sites within Owner/Administering Agency Categories	
Bureau of Land Management	32
U.S. Forest Service	32
U.S. Fish and Wildlife Service	5
New Mexico Game and Fish	2
Private	32
Other (NPS, State Lands, DOD, etc.)	9

TABLE 9. Sites Considered from Cochise, Graham, and Greenlee Counties in Arizona, including priority, and page of brief. Numbers preceding names locate sites on county map, facing page.

Map Location Number	Site	Priority	Brief Page
Cochise County			
1	Boquillas Ranch	3	
2	Chiricahua	4	
3	Dixie Canyon	2-C	56
4	Jesse James	5	
5	Lavender Pit	3	
6	Leslie Canyon	1-B	59
7	Military Hills	3	
8	Miller Peak	4	
9	Paramore Crater	2-C	64
10	Picket Park	1-C	66
11	Pole Bridge Canyon	5	
12	Reiley Canyon	3	
13	San Bernandino Volcanic Field	3	
14	San Simon Valley	1-C	69
15	South Fork Cave Creek	1-C	74
16	South Shake Spring	4	
17	St. David	3	
18	Willcox Playa	3	
19	Winchester Mountains	4	

TABLE 9 (continued)

Map Location Number	Site	Priority	Brief Page
Graham County			
20	Goudy Canyon	4	
21	Whitlock Hills	2-C	79
22	Santa Teresa	4	
Greenlee County			
23	Blue Range (also Catron, NM)	1-C	81
24	Eagle Creek Bat Cave	2-B	84
25	East Fork Thomas Creek	1-B	87
26	Lower Frisco (write-up Catron, NM)	1-C	
Pinon County			
27	Mountain View	1-B	90

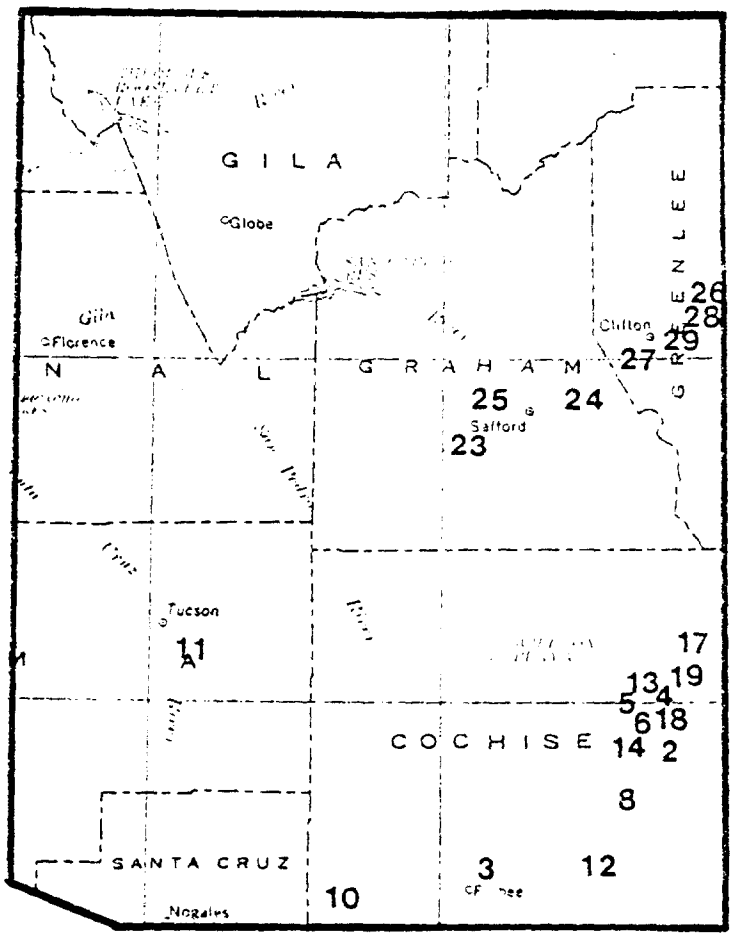


FIGURE 3. General Locations of Arizona Sites

DIXIE CANYON

CMB 56

PRIORITY: 2-C

OTHER USE DESIGNATION: None

THEMES:

III. Terrestrial Ecosystem Theme
133.3 Interior Chaparral
153.1 Sonoran Desert Scrub
174.2 Southwestern Interior Arroyo-Playa Riparian

IV. Species of Special Concern Theme
A. 3 Shrub

LOCATION: Cochise,Arizona. Five miles north of Bisbee, Arizona.

T22s R24E USGS Maps: Bisbee, Gleeson, 15'

SIZE: 9,600 acres (389 hectares)

OWNER/ADMINISTERING AGENCY: USFS, ASL, (Phelps Dodge, Madeline Carter)

NATURAL VALUES:

Dixie Canyon is located in the south central portion of cochise county on the eastern side of the Mule Mountains. The site is composed of four connecting canyons with springs and a little running water. There are petroglyphs in the Mexican Canyon portion.

Most of the canyon side-hills support elements of the Interior Chaparral such as pointleaf manzanita (Arctostaphylos pungens) and turpentine bush (Aplopappus laricifolius). Plants from 37 families have been listed from the site including narrow endemics and threatened species such as (Graptopetalus bartramii, Echinocereus pectinatus var. rigidissimus, and Agave arizonica. The

toumey oak (Quercus toumyi) of the chaparral here is only found in south eastern Arizona.

Current Use: Cattle Grazing

Dangers To Integrity: Vandalism and possible future development.

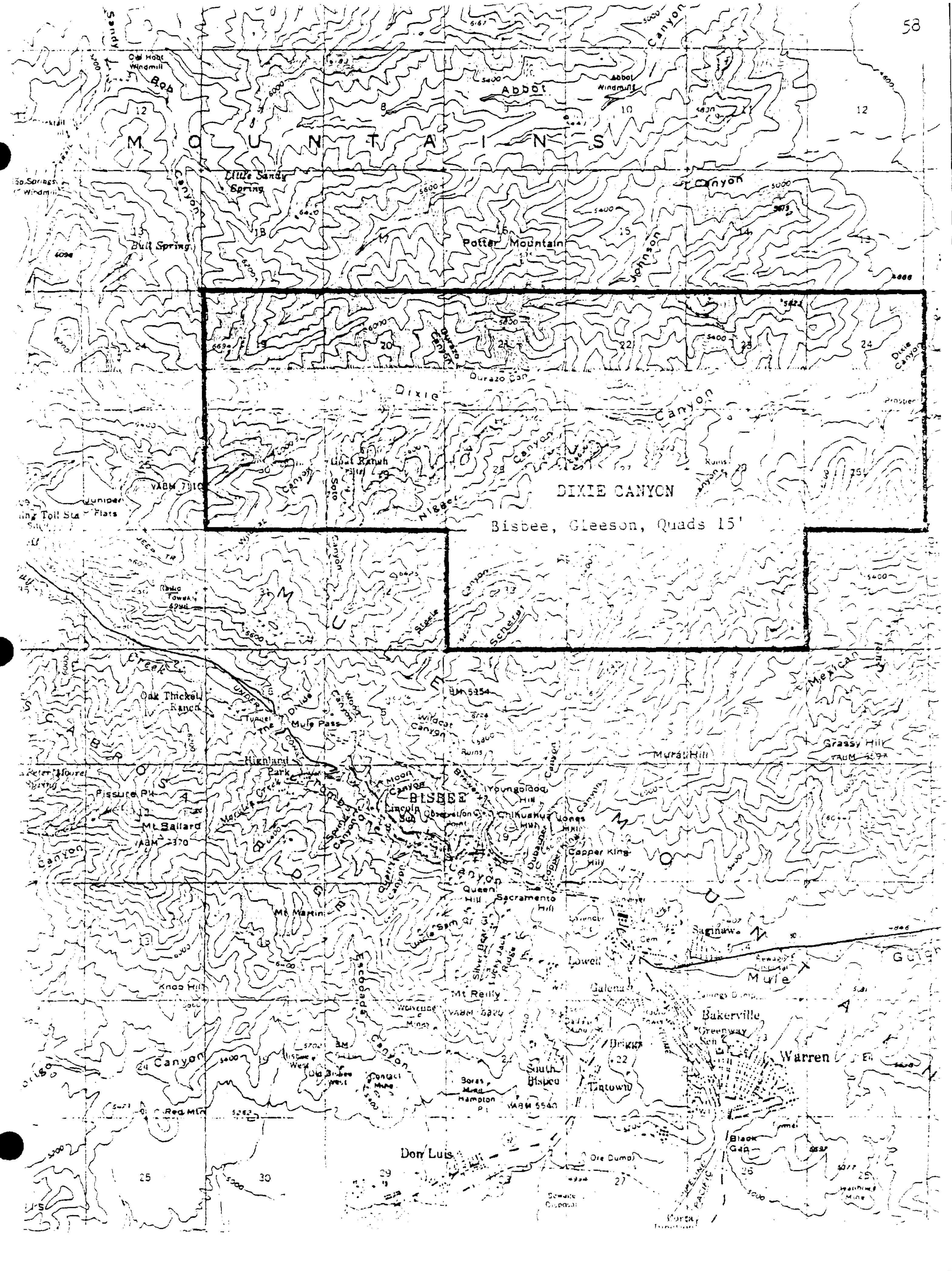
Public Sensitivity: Moderate

Data Source: Natural landmarks survey form from Catherine Wertz (Dings).

Knowledgeable Persons:

Catherine Wertz (Dings), Bisbee, Arizona

Vick Evans, Coronado Resource Conservation and Development, Bisbee, Arizona


DIXIE CANYON
Bisbee, Gleeson, Quads 15'
MOUNTAINS
Abbot
Abbot Windmill
Little Sandy Spring
Bull Spring
Potter Mountain
Johnson
Canyon
Dixie
Canyon
Durazo Can
Goat Ranch
Juniper Flats
Radio Towers
Oak Thicket Ranch
The Divide
Mule Pass
Wildcat Canyon
Highland Park
Fissure Pk
Mt Ballard
BISBEE
Youngblood Hill
Chihuahua Hill
Jones Hill
Copper King Hill
Queen Hill
Sacramento Hill
Mt Martin
Saginaw
Lowell
Galena
Mt Reilly
Bakerville
Greenway
Warren
Briggs
South Bisbee
Tintown
Knob Hill
Red Mtn
Don Luis
Ore Dump
Black Gap
Mexican
Grassy Hill
Mule
Gulch
Escabrosa

LESLIE CANYON

CMB 59

PRIORITY: 1-B

OTHER USE DESIGNATION: None

THEMES:

III. Terrestrial Ecosystem Theme
174.11 Alder-Boxelder Series, 174.12 Ash-Walnut Series, 174.13 Cottonwood Series, 174.14 Sycamore Series, 174.15 Hackberry Series, 174.21 Bricklebush Series.

IV. Species of Special Concern Theme

LOCATION: Cochise County, Arizona. In the southwestern corner of the Chiricahua Mountains in southeastern Cochise County, approximately 17 miles (27.2 km) north of Douglas.

T21s R28E USGS Maps: Swisshelm Mountain 15', Pedgregosa 15'

SIZE: 700 acres (283 ha)

OWNER/ADMINISTERING AGENCY: P. Lamberson and Riggs Ranch

NATURAL VALUES:

Leslie Canyon is near the southern end of the Swisshelm Mountains, a relatively isolated, small range on the east side of Sulphur Springs Valley. The Swisshelms are a rather low group of mountains (maximum elevation about 7,000 ft (2,134 m)) with a rather complex geologic make-up of old sedimentary and meta-morphic rock. The site, at approximately 4,680 feet (1,426 m) includes a portion of Leslie Creek flowing through a steep-walled canyon. The stream normally flows for a very short distance from its point of emergence near an old head dam in section 21 to the

point where it disappears into the sand in section 20. Most of the permanent portions of the stream occur in the steep-walled, upper reaches of Leslie Canyon. The principle vegetation along Leslie Creek consists of willow (Salix sp.), cottonwood (Populus fremontii), walnut (Juglans major), ash (Fraxinus pennsylvanica), and mesquite (Prospis velutina). All of the preceeding tree species normally occur along permanent streams at lower elevations in Arizona. Of note are the walnut trees which are very large specimens. Also, mesquite, though present, is not an abundant species and the cottonwood-willow gallery association along Leslie Creek probably represents a relatively undisturbed example of pre-settlement (by whites) riparian vegetation. Other major plant species that are present in Leslie Canyon are net-leaf hackberry (Celtis reticulata), seep-willow (Baccahris sarothrae), desert willow (Chilopsis linearis), and an occasional oak (Quercus sp.). A large, dry cienega above the head dam consists primarily of sacaton (Sporobolus airoides) with grama grasses (Bouteloua sp.). The countryside east of Leslie Canyon is rolling oak savannah with an understory of grasses, primarily Bouteloua while west of Leslie Canyon, the Sulphur Springs Valley is dominated by creosotebush (Larrea divaricata) and tarbush (Flourensia cernua) associations.

Leslie Creek is one of the most northernmost reaches of the Yaqui River which drains east-central Sonora, the west slope of the Sierra De La Madera and enters the Gulf of

California between Guaymas and Ciudad Obregon in Sonora, Mexico. Some elements of the ichthyofauna of the Yaqui River thus occur in the United States in extreme southeastern Arizona. Four of the six known Yaqui River species in the United States occur in Leslie Creek (McNatt, 1974): Yaqui Chub (Gila purpurea), Mexican Stoneroller (Campostoma ornatum), Sonora Topminnow (Poeciliopsis sonoriensis), and a distinctive form of the Longfin Dace (Agosia chrysogaster). The other vertebrate forms that occur at Leslie Canyon have not been as well studied as the fish fauna. A few representatives species that probably occur here are: Plains Spadefoot (Scaphiopus bombifrons), Southwestern Toad (Bufo microscaphus), Canyon Treefrog (Hyla arenicolor), Leopard Frog (Rana pipens), Sonoran Mud Turtle (Kinosternon sonoriense), Sonoran Spiny Lizard (Sceloporus clarki), Great Plains Skink (Eumeces obsoletus), Sonora Whiptail (Cnemidophorus burti), Arizona Alligator Lizard (Gerrhontus kingi), Mexican Garter Snake (Thamnophis eques), Black-necked Garter Snake (Thamnophis cyrtopsis), Ringneck Snake (Diadophis punctatus), Big Brown Bat (Epesicus fuscus), Long-nosed Bat (Leptonycteris nivalis), Desert Cottontail (Sylvilagus audubonii), Rock Squirrel (Citellus variegatus), White-throated Wood Rat (Neotoma albigula), Coyote (Canis latrans), Racoon (Procyon lotor), Hooded Skunk (Conepatus mesoleucus), Bobcat (Lynx rufus), White-tailed Deer (Odocoileus virginianus), Yellow Warbler (Dendroica

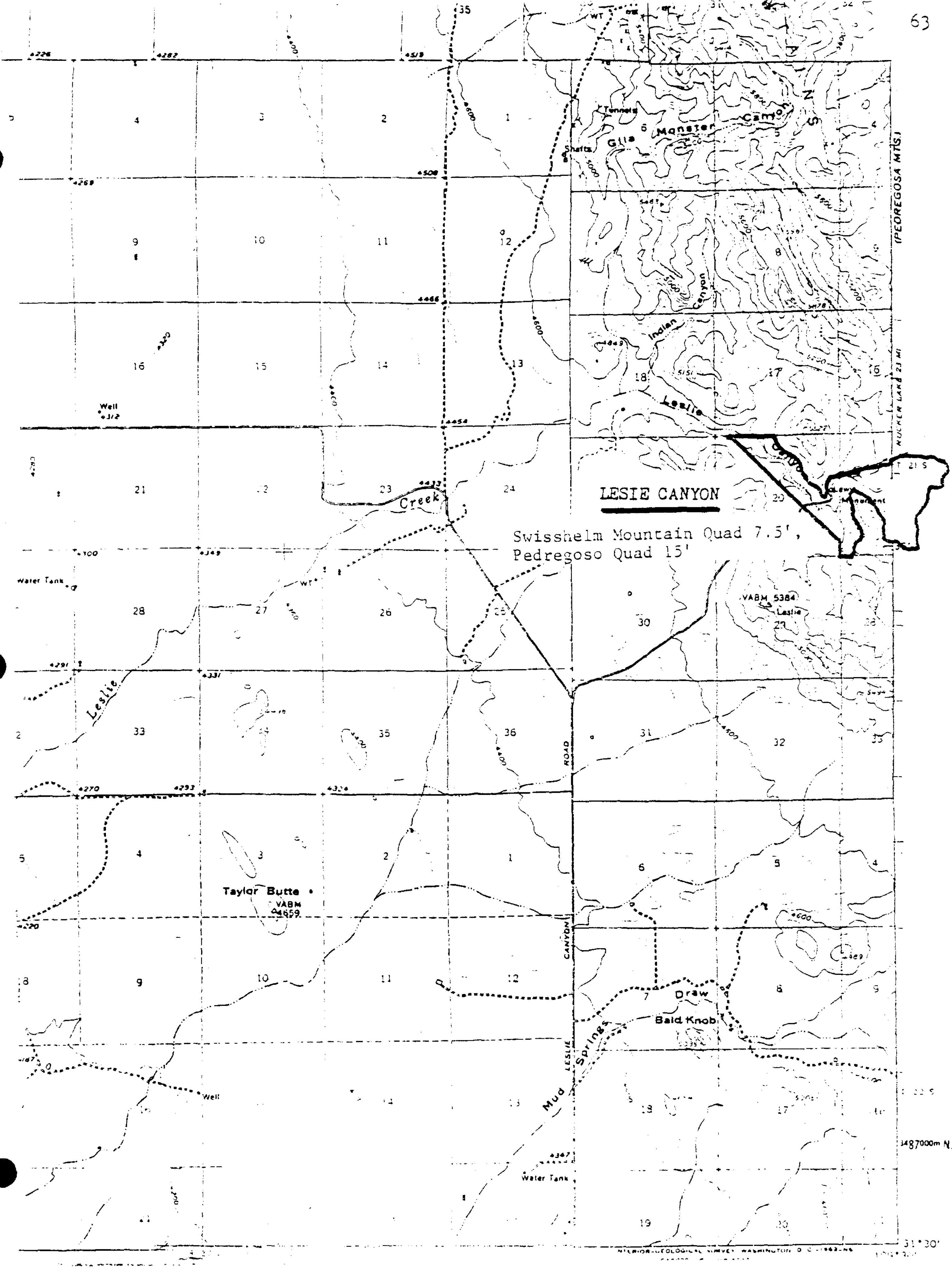
petechia), Summer Tananger (Piranga rubra), Bullock's Oriole (Icterus glabula bullockii), and Blue Grosbeak (Guiraca caerulea).

CURRENT USE: CATTLE GRAZING

DANGERS TO INTEGRITY: Possibility of a dam and lake for recreation.

PUBLIC SENSITIVITY: Moderate

DATA SOURCE: Smith, E.L. and G.L. Bender 1974. Proposed NATURAL AREAS: Leslie Canyon Report No. 66. Arizona Academy of Science.


LESIE CANYON
Swisshelm Mountain Quad 7.5',
Pedregoso Quad 15'
Gila Monster Canyon
Tunnels
Shafts
Indian Canyon
Leslie
Creek
Leslie
Water Tank
Well
Taylor Butte
VABM 4659
VABM 5384
Leslie
ROAD
LESLIE CANYON
Draw
Bald Knob
Mud Springs
Water Tank
Well
(PEDREGOSA MTS.)
RUCKER LAKE 23 MI
3487000m N.
31°30'

CMB64

PARAMORE CRATER

PRIORITY: 2-C

OTHER USE DESIGNATION: None

THEMES:

I. Landform Theme
D. 3. Maarr Volcano,, 4. Lava Flow, 5. Local Feature

LOCATION: Cochise, Arizona. 30 miles northeast of Douglas, Arizona

T21-22S R31E USGS Map: Apache 15'

SIZE: 500 acres (+202 hectares)

OWNER/ADMINISTERING AGENCY: ASL

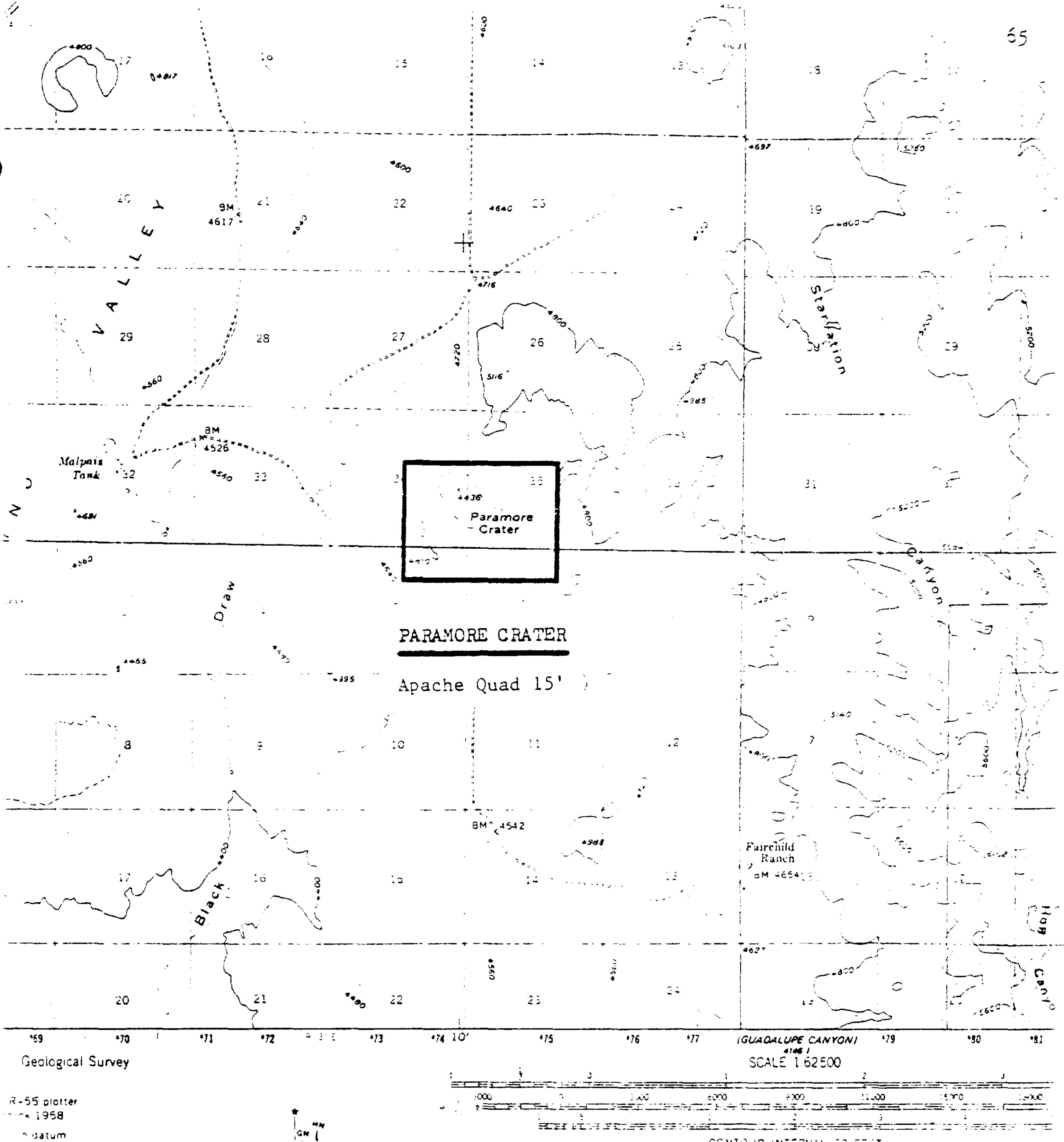
NATURAL VALUES: Paramore Crater is an explosion-formed crater (a maarr). It is approximately one mile long, 200 feet deep, with a surrounding rim of 150 feet in height. The walls of the crater are composed of basalt, while the rim contains lava fragments, limestone and sand. It is similar to, but less spectacular than, Kilbourne Hole in New Mexico.

CURRENT USE: None

DANGERS TO INTEGRITY: Possible vandalism

PUBLIC SENSITIVITY: Low

DATA SOURCE: Smith, E.L. and G.L. Bender 1974. Proposed Natural Areas. Arizona Academy of Science.



Geological Survey

R-55 plotter
1958

datum
system,
west zone
grid ticks.

1983
58 meters east

UTM GRID AND 1958 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:62500

CONTOUR INTERVAL 50 FEET
DOTTED LINES REPRESENT 40-FOOT CONTOURS

NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 2
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

PICKET PARK

CMB 66

PRIORITY: 1-C

OTHER USE DESIGNATION: RNA

THEMES:

III. Terrestrial Ecosystem Theme
- 122.41 Colorado Pinyon Pine-Juniper Series
- 123.31 Chihuahua Pine-Mexican Pinyon Series
- 123.32 Encinal (Oak) Series
- 133.31 Scrub Oak Series

IV. Species of Special Concern Theme

B. 4. Reptile, 5, Bird, 6. Mammal

LOCATION: Cochise, Arizona. 1 1/2 miles north northwest of Chiricahua National Monument Headquarters.

T16S R29E USGS Map: Cochise Head 15'

SIZE: 211 acres (84 hectares)

OWNER/ADMINISTERING AGENCY: NPS

NATURAL VALUES:

This site includes the East Picket Park, West Picket Park, and Picket Park research natural areas. The landforms include volcanic cliffs, canyons, ravines, stream cut terraces, and columns.

There is great vegetational diversity including the mexican pinyon (Pinus cembroides) and two species of juniper, J. monosperma and J. deppeana. Four or five species oak including toumey oak (Quercus toumeyi) which is limited to southeastern Arizona. There are good stands of Arizona cypress (Cypressus arizonica), apache pine (Pinus latifolia) and chihuahua pine (Pinus chihuahuana).

The rare, threatened, and narrow endemic animal species

unique in their numbers. They include the mammals-kit fox, apache squirrel, mexican wolf, Jaguarundi, and peccary; the birds-bald eagle, peregrine falcon, prairie falcon, and aplomado falcon; the reptiles- Crotalis lepidus, Crotalis pricei and the alligator lizard.

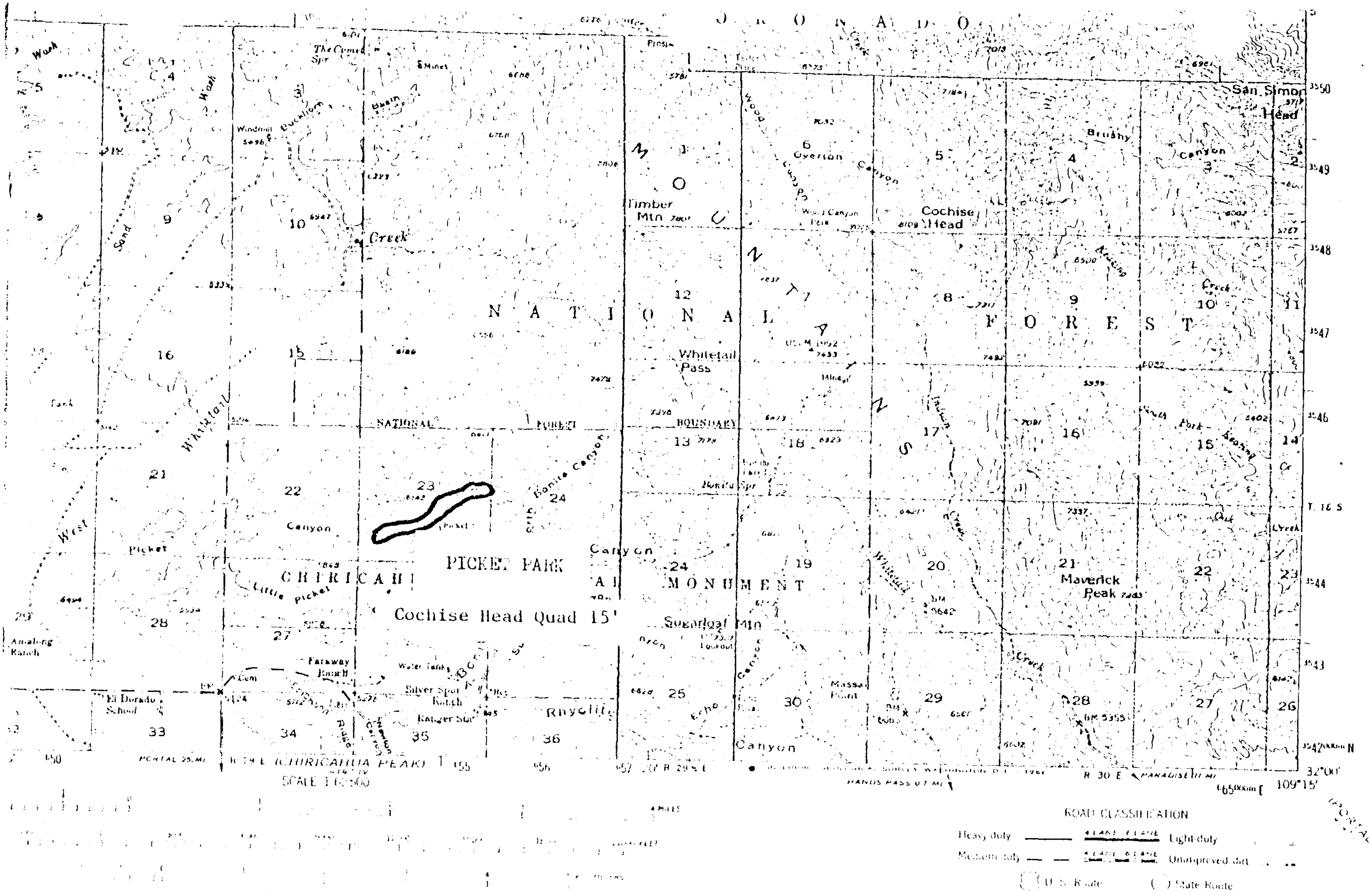
CURRENT USE: Camping, hiking

DANGERS TO INTERITY: None if recreational use is controlled

PUBLIC SENSITIVITY: Low

DATA SOURCE: A director of research natural areas on federal lands of the United States of America. 1977. USFS.

KNOWLEDGEABLE PERSONS: Superintendent, Chiracahua National Monument, Portal Arizona.



32109I3

COCHISE HEAD ARIZ.

1950

CM3 69

SAN SIMON VALLEY

PRIORITY: 1-C

OTHER USE DESIGNATION: RNA-P

THEMES:

III. Terrestrial Ecosystem Theme

153.21 Creosotebush Series, 153.22 Whitehorn Series,
153.24 Mesquite Series,
174.21 Bricklebush Series, 174.32 Mesquite Series

LOCATION: Cochise County, Arizona. 5 miles north of Portal, Arizona.

T16-17S R31E USGS Map: Portal 15'

SIZE: 3,200 acres (1,296 ha)

OWNER/ADMINISTERING AGENCY: State of Arizona and Private

NATURAL VALUES:

The area is on the west side of the broad, flat San Simon Valley and is characterized by nearly level topography. Elevation ranges on the site are between 4,320 and 4,720 feet (1,317-1,439 m). Land rise is toward the west and the above elevational changes occur over a linear distance of approximately three miles (4.8 km). Soils are shallow and overlay an alluvium of coarse gravel and small boulders. Caliche hardpan occurs at a depth of .5 to 3 feet (15-90 cm) (Chew and Chew, 1970).

San Simon Valley contains a good example of creosotebush (Larrea tridentata) dominated Chihuahuan Desert scrub which, in Arizona, occurs only in the southeastern corner of the state and primarily in Cochise County. In addition to creosotebush, common plants are tarbush

(Flourensia cernua), catclaw (Acacia greggii), whitehorn (Acacia constricta), mesquite (Prosopis velutina), and mariola (Parthenium incanum). A rather poorly developed wash community consists of catclaw, whitehorn, mesquite, desert sumac (Rhus microphylla) and desert willow (Chilopsis linearis). At the upper elevations (about 4,800 feet) palmilla (Yucca elata), sotol (Dasylirion wheeleri), agave (Agave sp.), apache plume (Fallugia paradoxa), gray thorn (Condalia sp.), and paper daisy (Psilotrophe cooperi) occur rather commonly. Only two grasses, bush muhly (Muhlenbergia porteri) and desert fluff grass (Erionuron pulchellus) are common.

Mammals which inhabit the area: Merriam's kangaroo rat (Dipodomys merriami), southern grasshopper mouse (Onychomys torridus), silkly pocket mouse (Pergnathus flavus), Bailey's pocket mouse (Perognathus baileyi), desert pocket mouse (Peromyscus penicillatus), cactus mouse (Peromyscus eremicus), deer mouse (Peromyscus maniculatus), western harvest mouse (Reithrodontomys megalotis), white-throated wood rat (Neotoma albigula), Harris' antelope ground squirrel (Ammospermophilus harisi), spotted ground squirrel (Spermophilus spilosoma), desert cottontail (Sylvilagus audoboni) and black tailed jackrabbit (Lepus californicus), coyote (Canis latrans), bobcat (Lynx rufus), and gray fox (Urocyon cinereoargenteus) are also likely residents of the area. Some common birds of the area are: scaled quail

(Caillipepla squamata), roadrunner (Geococcyx californianus), loggerhead shrike (Lanius ludovicianus), cactus wren (Campylorhynchus brunneicapillus), and black-throated sparrow (Amphispiza bilineata). Reptiles likely to be encountered at are: tree lizard (Urosaurus ornatus), side-blotched lizard (Uta stansburiana, Texas horned lizard (Phrynosoma cornatum), round-tailed horned lizard (Phrynosoma modestum), Arizona whiptail (Cnemidophorus arizonae), Texas blind snake (Leptotyphlops dulcis), gopher snake (Pituophis melanoleucus), and western diamondback rattlesnake (Crotalus atrox).

The proposed San Simon Valley site is an excellent example Chihuahuan desert scrub in Arizona that, moreover, has an established history of research. The work done by Chew and Chew at this proposed site greatly enhances its value. The proximity of the site to the Southwestern Research Station of the American Museum of Natural History underscores the potential value of the area.

CURRENT USE: Cattle grazing and research

DANGERS TO INTEGRITY: Possible development in the future on the private portion.

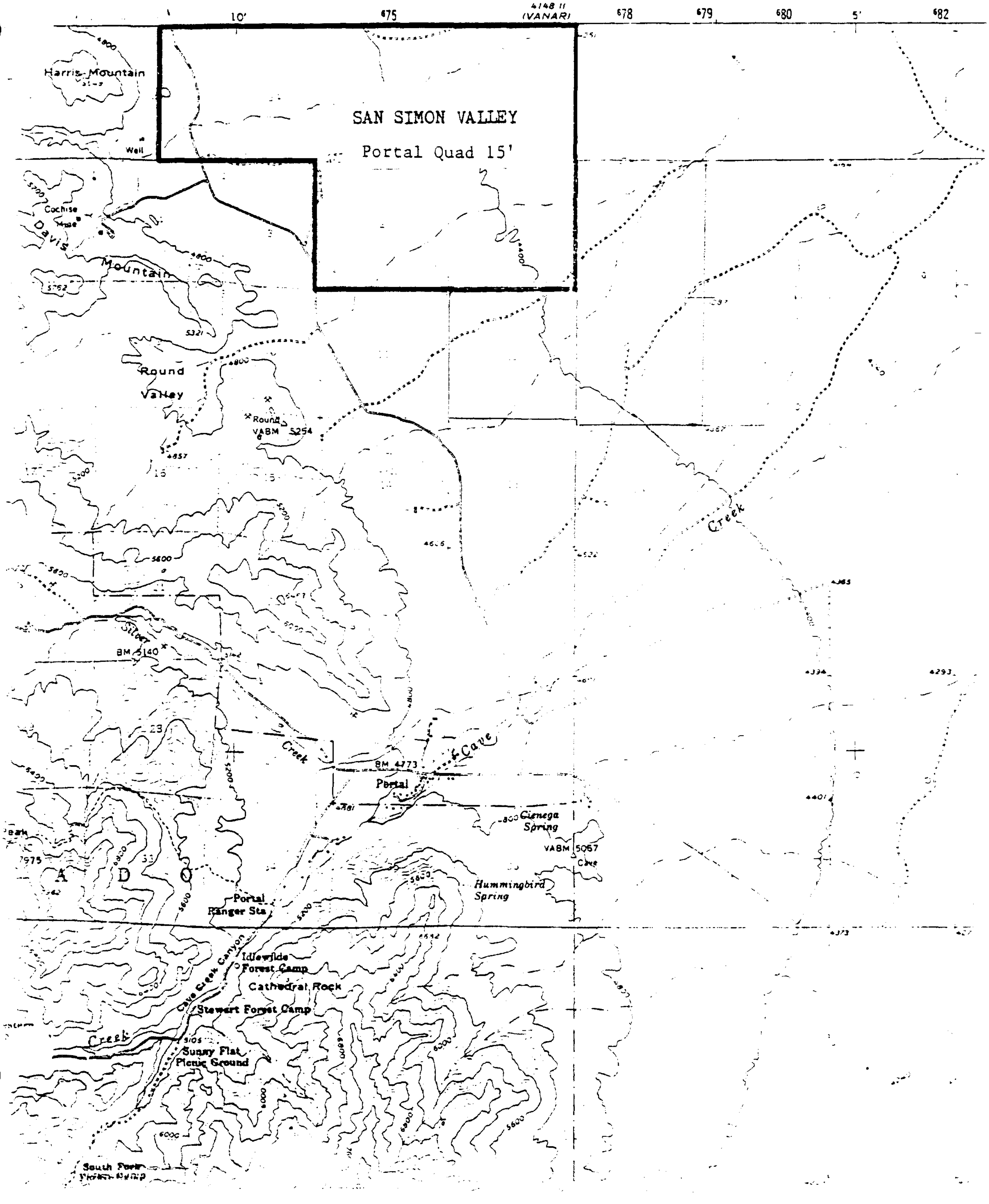
PUBLIC SENSITIVITY: Low

DATA SOURCE: Smith, E.L. and G.L. Bender. 1974 Proposed Natural Areas: San Simon Valley report no. 65. Arizona Academy of Science.

KNOWLEDGEABLE PERSONS: Robert Chew

REFERENCES:

Chew, R.M. and A.E. Chew. 1970. Energy relationships of the mammals of a desert shrub (Larrea tridentata) community. Ecol. Monogr. 40: 1-31.
1965. The primary productivity of a desert shrub (Larrea tridentata) community. Ecol. Monogr. 35: 355-375.


SAN SIMON VALLEY
Portal Quad 15'
Harris Mountain
Well
Cochise
Davis Mountain
Round Valley
Round VABM 5254
Silver
BM 5140
Creek
Cave Creek
BM 4773
Portal
Cienega Spring
VABM 5067
Cave
Hummingbird Spring
Portal Ranger Sta
Idlewilde Forest Camp
Cathedral Rock
Stewart Forest Camp
Cave Creek Canyon
Sunny Flat Picnic Ground
South Fork
10'
675
4148 II (VANAR)
678
679
680
5'
682

SOUTH FORK CAVE CREEK

CMB 74

PRIORITY: 1-C

OTHER USE DESIGNATION: RNA

THEMES:

III. Terrestrial Ecosystem Theme

123.31 Chihuahua Pine-Mexican Pinon Series
123.32 Encinal (Oak) Series,
174.11 Alder-Boxelder Series, 174.12 Ash-Walnut Series, 174.13 Cottonwood Series, 174.14 Sycamore Series, 174.15 Hackberry Series

IV. Species of Special Concern Theme

A. 2. Forb, 3. Shrub, 4. Tree, B. 4. Reptile, 5. Birds, 6. Mammal

LOCATION: Cochise County, Arizona. 4 miles southwest of Portal, Arizona.

T18s R31E USGS Map: Portal 15'

SIZE: 70 acres (+28 hectares)

OWNER/ADMINISTERING AGENCY: FS

NATURAL VALUES:

The proposed site is an excellent example of undisturbed riparian woodland, whose major tree species include Arizona cypress (Cupressus arizonica), sycamore (Platanus wrightii), big-tooth maple (Acer grandidentatum), and large madrones (Arbutus arizonica). Important animals include ring-tailed cats, javelinas, coatis, and a widely reknowned wealth of birds. Several deep permanent pools harbor native fish which may otherwise be in jeopardy of extinction in the Southwest. The area receives numerous visits by scientists and educational groups, and excellent

facilities to accommodate them exist at the nearby Southwestern Research Station (of the American Museum of Natural History). Such undisturbed habitat is no longer widespread along permanent streams in the Chiricahuas or other mountain areas of the Southwest.

Perhaps the finest example of canyon woodland in the Chiricahua Mountains is found here. The woodland vegetation is typical of low elevation canyons of the mountains of southern New Mexico where permanent or nearly-permanent streamflow occurs (Whittake and Niering, 1965). The woodland flora has strong floristic similarity to forests of eastern North America and to California and Pacific northwestern forests where a common derivation from the Arcto-Tertiary Geoflora exists (Axelrod 1958), for example, sycamore, big-toothed maple, chokecherry, velvet ash (Fraxinus velutinus), Arizona walnut, and the rare scarlet sumac (Rhus glabra) are all Arcto-Tertiary derivatives within the area. Most of these species are restricted to mesic stream sides in the Southwest. The woodland flora also includes valuable trees of Madrean origin: principally Arizona cypress, Apache pine (Pinus engelmanni), Chihuahua pine (P. leiophylla), and large specimens of interior madrone (Arbutus arizonica). The Chihuahua pines also attain large size in this riparian habitat.

Common species of the riparian woodland in the proposed area also include oaks (Quercus arizonica, Q. hypoleucoides), alligator bark juniper (Juniperus deppeana),

willows, mountain yucca (Yucca schottii), leadplant (Amorpha californica), and numerous herb species. Some of the grasses of the region have their optimal range in this streamside habitat (e.g.., Stipa pringlei, Panicum bulosum, Bromus lanatipes).

Among the rare plant species warranting preservation in this proposed natural area are the aforementioned scarlet sumac and the spectacular, orange butterfly weed (Ascleppias tuberosa). Further botanical investigations will doubtless augment the listing of rare plants here.

The Chiricahua Mountains are widely known for their faunistic richness. Because of the diversity of life zones in the region and the geographic location of this range near the Mexican border and near the southern extreme of the Rock Mountains of the United States, the faunistic variety is outstanding. The sycamore-cypress canyon woodlands provide critical habitat for numerous animal species, and the variety of mammals, birds and fish within the boundaries of the proposed natural area is exceeded by few, if any, other such canyon woodlands in the Southwest.

Some of the important mammal species frequenting the area include javelina (Pecari tajacu), coatis (Nasua narica), ring-tailed cats (Bassaricus astutus), black bear (Euarctos americanus), mountain lion (Felis concolor), hooded skunk (Conepatus mesoleucus), and the endemic Apache squirrel (Sciurus apache).

The National Audubon Society and others have recognized the very important status of canyon woodland habitat in the Chiricahua Mountains for bird life. The sycamore- cypress avifauna along Cave Creek has been described by Brandt (1954). The proposed natural area harbors one of the few breeding populations in the U. S. of the coppery-tailed trogon. Other birds attracted to this streamside habitat include the red-faced warbler, sulfur-bellied flycatcher, hooded oriole, Arizona woodpecker, brown wren, blue-throated hummingbird, hepatic tanager, and whip-poorwill. Of course, many species common to the adjoining pine-oak woodland (Marshall 1958), such as bridled titmouse, Mexican Chickadee, Mexican jay, bushtit, black-throated gray warbler, and others, are also found in the natural area, adding considerably to the total bird diversity of this canyon woodland.

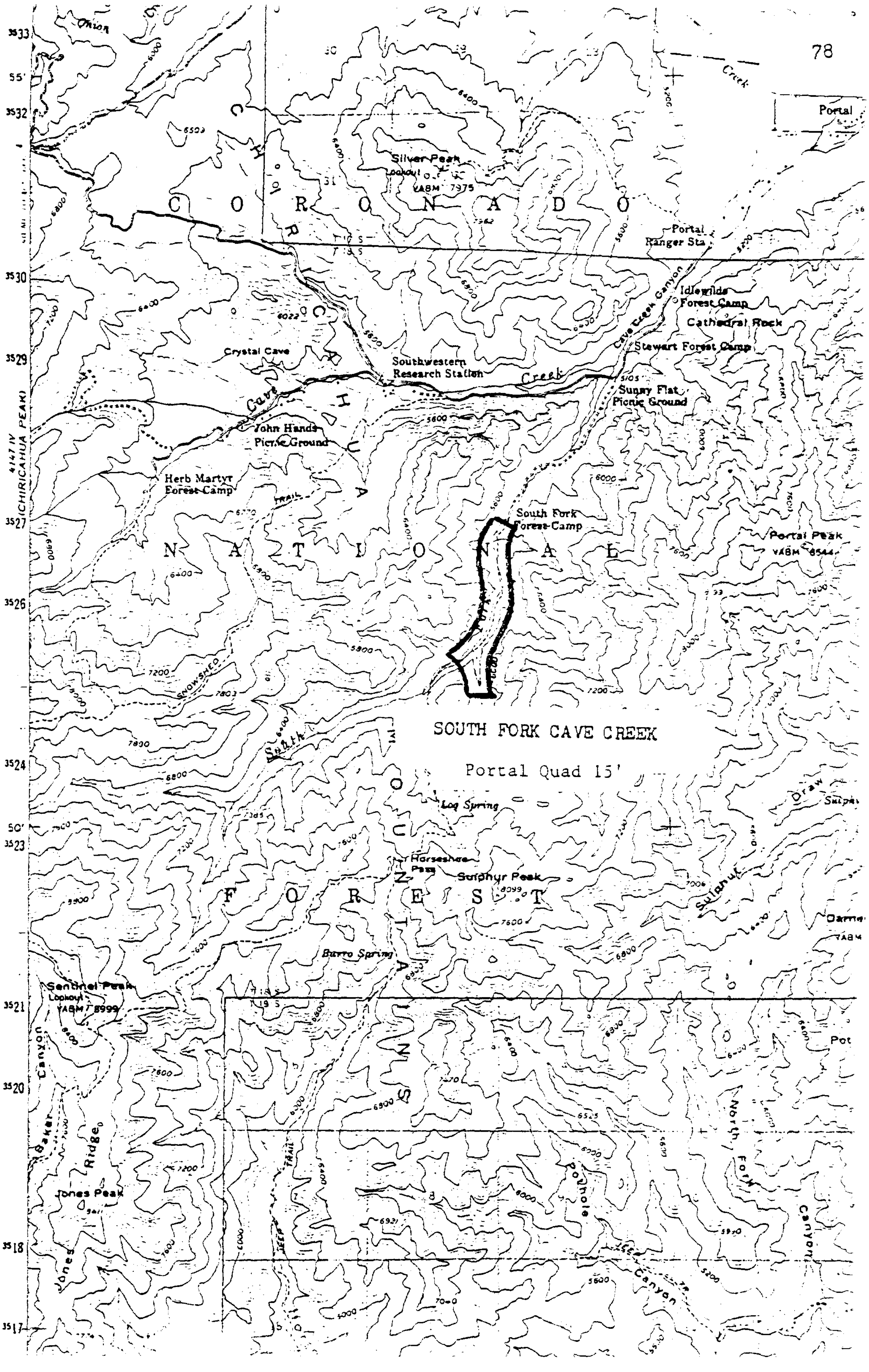
CURRENT USE: Limited grazing, camping, hiking.

DANGERS TO INTEGRITY: None if RNA status is protected

PUBLIC SENSITIVITY: Moderate

DATA SOURCE: Moir, W.H. and R.J. Raitt. 1968. Proposed natural area report. USFS.

KNOWLEDGEABLE PERSONS: W.H. Moir, USFS, Albuquerque, NM.
R.J. Raitt, Department of Biology, NMSU, Las Cruces, NM.
Vicent Roth, SW Research-Station, Portal, Arizona.


SOUTH FORK CAVE CREEK
Portal Quad 15'
CORONADO
NATIONAL
FOREST
CHIRICAHUA
MOUNTAINS
Silver Peak
Lookout
VABM 7975
Portal
Portal Ranger Sta
Idlewilde Forest Camp
Cathedral Rock
Cave Creek Canyon
Stewart Forest Camp
Sunny Flat Picnic Ground
Southwestern Research Station
Crystal Cave
Cave
Creek
John Hands Picnic Ground
Herb Martyr Forest Camp
South Fork Forest Camp
Portal Peak
VABM 8544
SNOWSHED
TRAIL
South
Log Spring
Horseshoe Pass
Sulphur Peak
Sulphur Draw
Burro Spring
Sentinel Peak
Lookout
VABM 8999
Baker Canyon
Ridge
Jones Peak
Jones
Pothole
North Fork Canyon
Canyon
(CHIRICAHUA PEAK)
3533
55'
3532
3530
3529
3527
3526
3524
50'
3523
3521
3520
3518
3517

WHITLOCK HILLS

CMB 79

PRIORITY: 2-C

OTHER USE DESIGNATION: None

THEME:

II. Paleontological-archaeological Theme
A. Paleontological

LOCATION: Graham, Arizona. 19 miles west southwest of Duncan, Arizona.

T8S R29E USGS Maps: Dry Mountain, Whitlock Mountains NE 7.5'

SIZE: 960 acres (388.5 hectares)

OWNER/ADMINISTERING AGENCY: BLM

NATURAL VALUES:

This site is recommended because it is the only occurance of prehistoric camel tracks in volcanic ash. The tracks are well preserved and are .5 million years old.

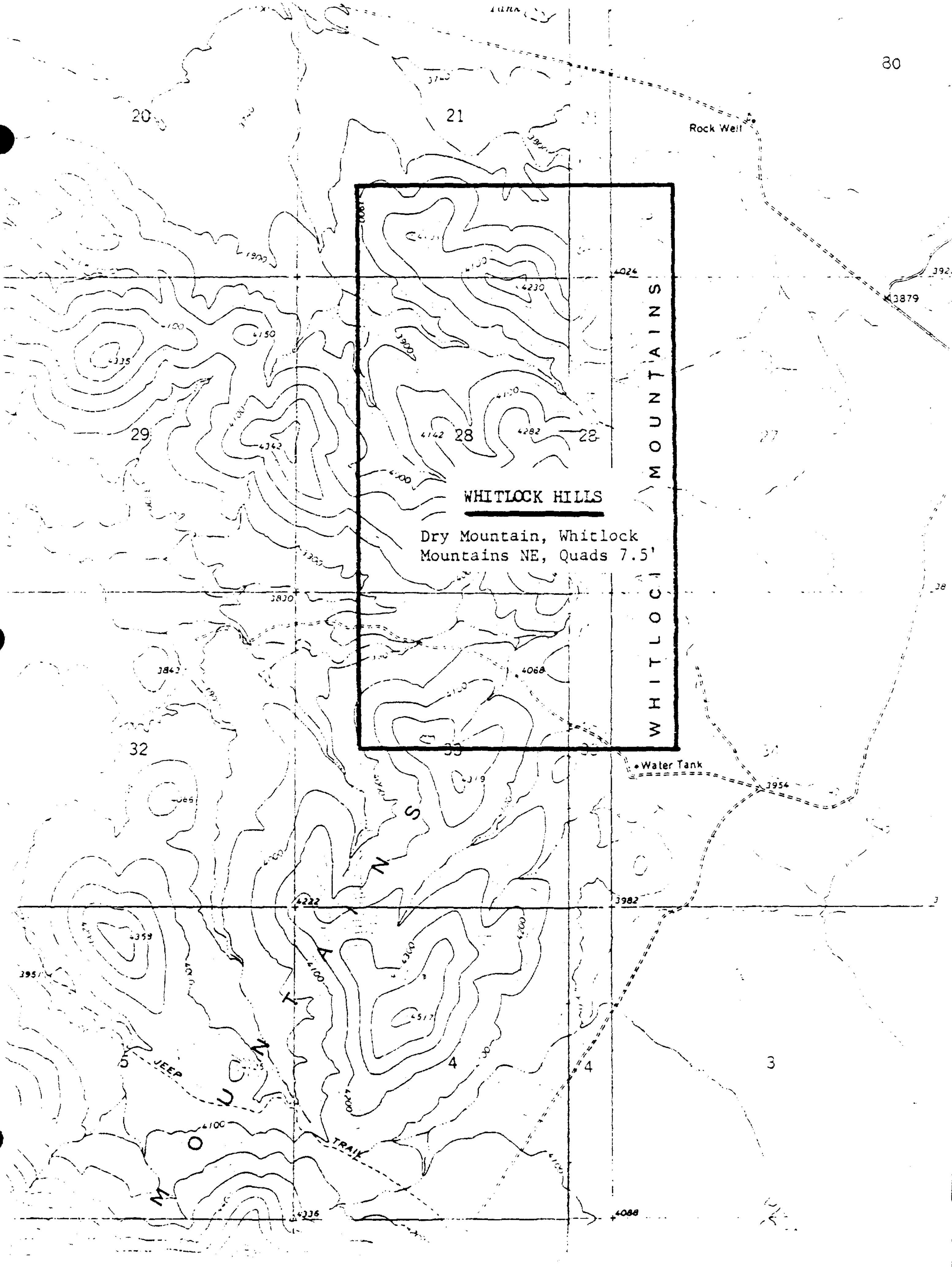
CURRENT USE: Cattle grazing

DANGERS TOO INTEGRITY: None under present ownership

PUBLIC SENSITIVITY: Moderate

DATA SOURCE: Paul Martin, University of Arizona, Tucson

KNOWLEDGEABLE PERSONS: Ed Linsely, University of Arizona, Tucson, Arizona


WHITLOCK HILLS
Dry Mountain, Whitlock
Mountains NE, Quads 7.5'
WHITLOCK MOUNTAINS
MOUNTAINS
Rock Well
Water Tank
JEEP
TRAIL
20
21
29
28
32
33
4
3
4230
4335
4150
4342
4142
4282
4068
4024
3879
3830
3842
3954
3982
4222
4359
4512
4336
4088

BLUE RANGE CMB 81

PRIORITY: 2-C

OTHER USE DESIGNATION: W

IV. Species of Special Concern
B.2 Fish

THEMES:

SUBTHEMES:

I. A. Mountain
C. 2. Canyon Country

III. Terrestrial Ecosystem Theme
122.34 Douglas Fir Series, 122.36 Ponderosa Pine Series, 122.37 Successional-Disturbance (subclimax) Series,
122.4 Great Basin-Mgollon-Madrean-Chihuahuan Coniferous Woodland,
173.1 Great Basin Arroyo-Playa Riparian, 173.4 Rocky Mountain Stream (montane) Riparian.

LOCATION: Catron, New Mexico - Greenlee, Arizona. 12 miles southeast of Alpine, Arizona.

T7-9S R20-23W USGS Map: Clifton 1:250,000

SIZE: 205,000 acres (83,025 hectares)

OWNER/ADMINISTERING AGENCY: USFS

NATURAL VALUES:

The eastern end of the Mogollon rim is contained within this rugged mountainous site. Elevations range from 4,500-9,100 feet.

This is a remote area with vegetation from aspen at the higher elevations down through douglas fir and ponderosa pine to mexican pinyon (Pinus cembroides) and alligator juniper (Juniperus deppeana). There are deer, elk, bear, turkey, mountain lion and javelina on the site.

The site is recommended because it supports the endangered apache trout in Grant and K.P. creeks. The riparian habit includes walnut (Juglans), ash (Fraxinus), boxelder (Acer negundo) and narrow leaf cottonwood (Populus angustifolia).

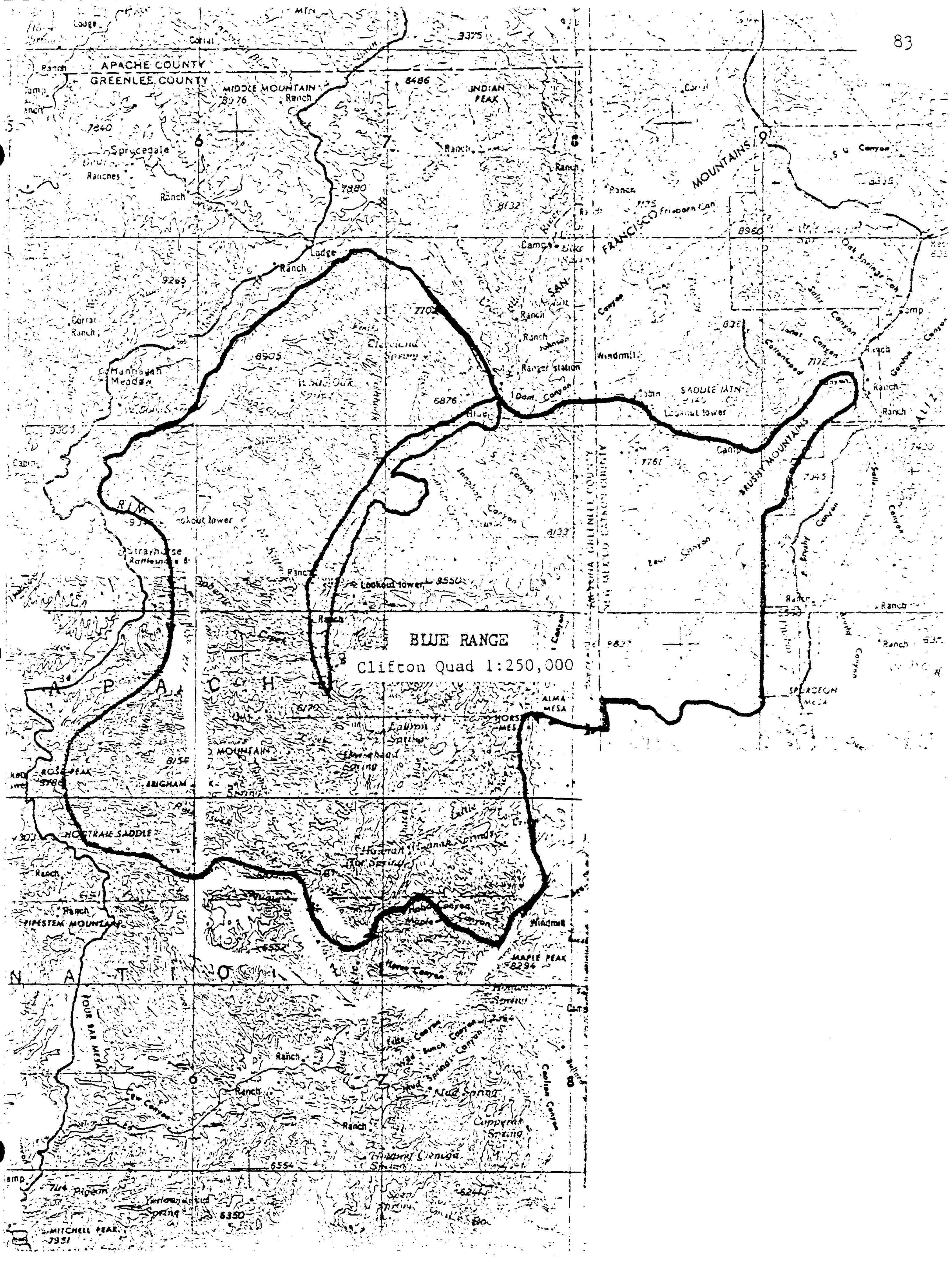
CURRENT USE: Wilderness

DANGERS TO INTEGRITY: None

PUBLIC SENSITIVITY: Low

DATA SOURCE: Proposed wilderness files, USFS, Albuquerque, NM.

KNOWLEDGEABLE PERSONS: Supervisor wilderness areas, USFS, Albuquerque, NM.



BLUE RANGE
Clifton Quad 1:250,000

CMB BU

EAGLE CREEK BAT CAVE

PRIORITY: 2-B

OTHER USE DESIGNATION: None

THEMES:

I. Landform Theme
H. 1. Limestone cave and karst

LOCATION: Greenlee, Arizona. 6 miles southwest of Morenci, Arizona.

T5S R28-29E USGS Map: Clifton 15'

SIZE: 640 acres (259 hectares)

OWNER/ADMINISTERING AGENCY:

NATURAL VALUES:

Eagle Creek Bat Cave is located on Eagle Creek in the western portion of Greenlee County, Arizona.

The Eagle Creek Cave provide summer habitat for 100,000 Mexico free-tailed bats. This population migrates north to Arizona in May to give birth to and raise their young. By early October, the population leaves for their wintering area at an unknown place in central Mexico. The large cave is primarily used as a maternal colony (90 percent) and used for raising young. The remaining males utilize other nearby caves for roosting sites.

At least 50 percent of the diet of these bats is composed of moths and beetles which are found in abundance in the Gila River Valley nearby.

The cave, about a hundred feet above creek level, is entered through a large vertical slit that leads to a single, football-shaped chamber about 288 feet long, 65 feet

wide, and 80 feet high. The bats roost in a 6-foot-wide crack that extends nearly one-third the length of the ceiling.

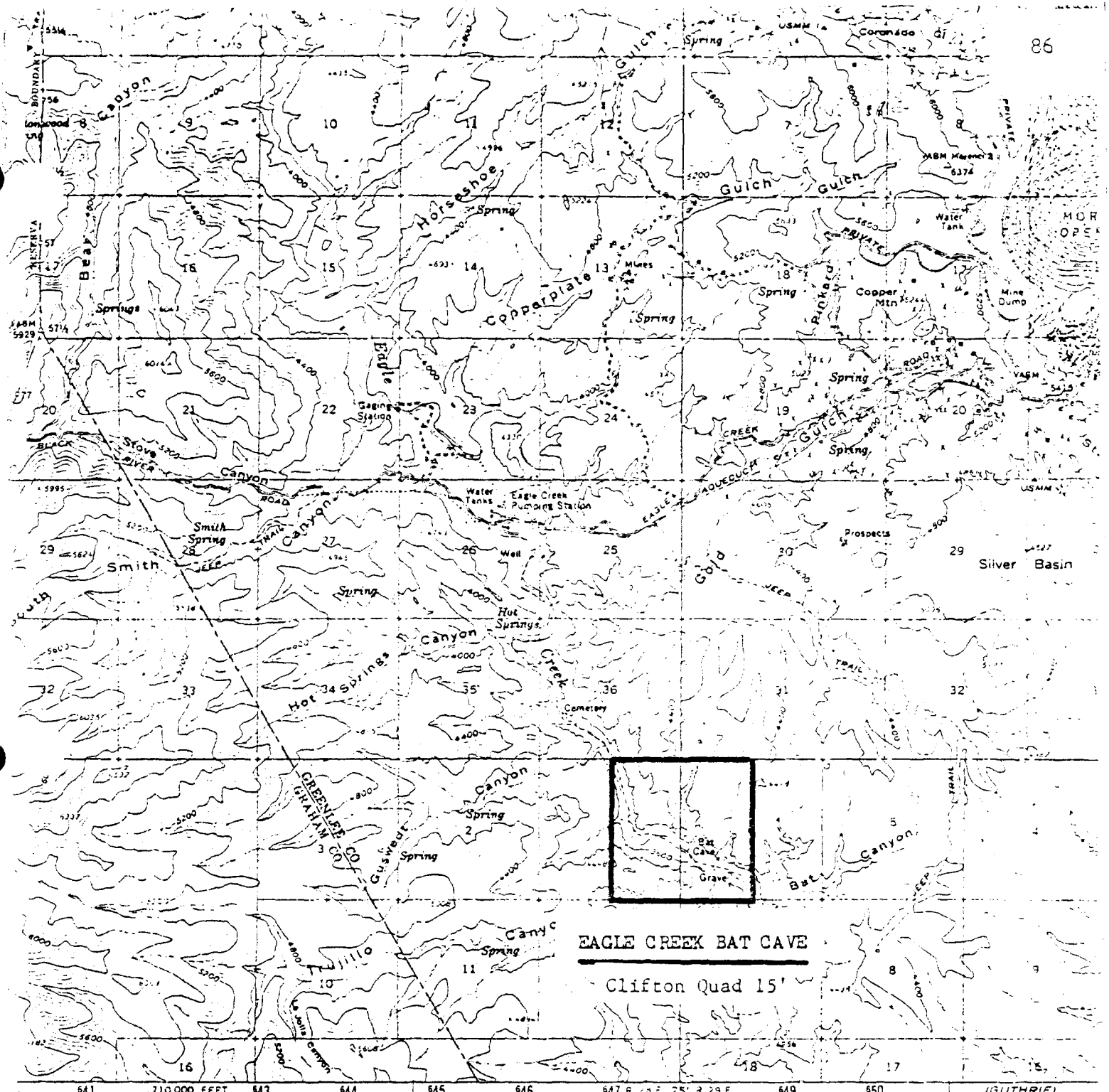
In the early 1950s, E. Lendell Cockrum of the University of Arizona estimated the bat population in the Eagle Creek cave at several million. The bat population now numbers approximately 100,000 and is decreasing by about 10 percent each year. Similar reductions in the colony of Mexican free-tailed bats at Carlsbad Caverns have also occurred. There is no evidence that the subspecies is increasing its population anywhere over its range.

CURRENT USE: Fishing, hunting, off-road vehicles

DANGERS TO INTEGRITY: E.L. Cockrun, University of Arizona, Tucson, indicated in the early 1950's that numbers may be declining in part due to indiscriminent and careless entrace into the roosting areas on the cave.

PUBLIC SENSITIVITY: High

DATA SOURCE: Paul Martin, University of Arizona, Tucson, Arizona.



ed, edited, and published by the Geological Survey

ol by USGS, USC&GS, and U.S. Soil Conservation Service

graphy by photogrammetric methods from aerial
ons taken 1959 Field checked 1962

projection. 1927 North American datum
O-foot grid based on Arizona coordinate system, east zone
O-meter Universal Transverse Mercator grid ticks,
12, shown in blue

omitted, land lines have not been established

EAST FORK THOMAS CREEK

CMB 87

PRIORITY: 1-B

OTHER USE DESIGNATION: HT

THEMES:

III. Terrestrial Ecosystem Theme
121.31 Englmann Spruce Series, 121.33 Subalpine Fir Series,
122.31 White Fir-Douglas Fir Series, 122.33 Douglas Fir-Blue Spruce Series,
172.11 Blue Spruce Series.

LOCATION: Greenlee, Arizona. 4 miles northeast of Hannagan Meadow, Arizona.

T3-4N R29E USGS Map: Hannagan Meadow 30'

SIZE: 1,250 acres (506 hectares)

OWNER/ADMINISTERING AGENCY: USFS

NATURAL VALUES:

This site contains mature stands of englemann spruce (Picea englemannii), subalpine fir (Abies lasiocarpa), blue spruce (Picea pungens), white fir (Abies concolor), and douglas fir (Pseudotsuga mensiesii). The englemann spruce-blue spruce/L/groundsel (Senecio cardamine) habitat type exists here in "benchmark" condition. The stands are 200-350 years old. This vegetation is rare in the region because it is high value timber type. The site includes the subalpine fir phase of the spruce habitat type. There are approximately 40 different forb species found on this site including relatively rare species such as yellow gentain (Halenia recurva) and the goldenrod (Solidago spathulata var. neomexicana.

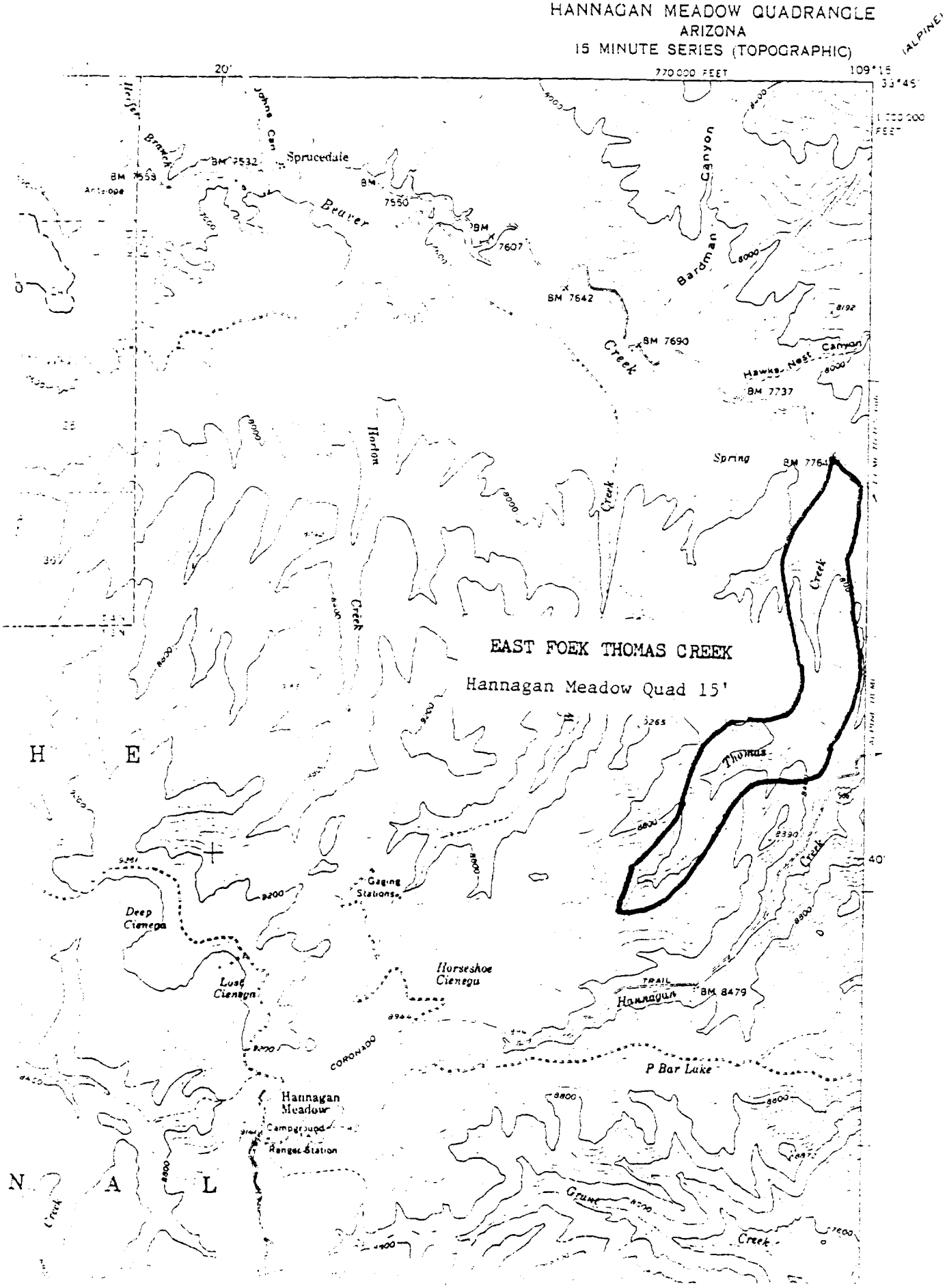
CURRENT USE: Limited camping

DANGERS TO INTEGRITY: Very great if area not made a Research Natural area or otherwise protected because it is likely to be loggen.

PUBLIC SENSITIVITY: Low

DATA SOURCE: W.H. Moir, Regional ecologist, USFS, Albuquerque, NM

KNOWLEDGEABLE PERSONS: W.H. Moir, USFS, Albuquerque, NM


HANNAGAN MEADOW QUADRANGLE
ARIZONA
15 MINUTE SERIES (TOPOGRAPHIC)
EAST FOEK THOMAS CREEK
Hannagan Meadow Quad 15'
Sprucedale
Beaver
Bardman Canyon
Creek
Hawks Nest Canyon
Spring
Horton
Thomas
Gaging Stations
Deep Cienega
Lost Cienega
Horseshoe Cienega
Hannagan
TRAIL
P Bar Lake
CORONADO
Hannagan Meadow
Campground
Ranger Station
BM 7532
BM 7553
BM 7550
BM 7607
BM 7642
BM 7690
BM 7737
BM 8479
H E
N A L

MOUNTAIN VIEW CMB 90

PRIORITY: 1-B

OTHER USE DESIGNATION: RNA

THEMES:

I. Landform Theme
E.1. Cold Spring

III. Terresterial Ecosystem Theme
153.2 Chihuahuan Desert Scrub
174.2 Southwestern Interior Arroyo-Playa Riparian, 174.26 Blue Palo Verde

LOCATION: Pima County, Arizona. Twenty-four miles (38.4 km) southeast of Tucson, the site is on the east side of State Route 83, immediately south of U.S. Route 80.

T16-17S R16E USGS Map: Rincon Valley 15', Empire Mountains 15'

SIZE: 8800 acres (356 ha)

OWNER/ADMINISTERING AGENCY: ASLD

NATURAL VALUES:

The average elevation of this relatively flat to undulating area is about 3,620 feet (1,103 m). The area is geologically characterized by Quaternary deposits of sand, silt, and gravel with some minor exposures of granite and Cretaceous shale, sandstone, and conglomerate that is locally metamorphosed (Wilson, et al., 1960).

It is in the vicinity of Mountain View that the Chihuahuan Desert and the Sonoran Desert meet. The vegetation of Mountain View is classified by Brown and Lowe

(1973) as a plains and desert grassland community; however, some plant species that are characteristic of the Arizona Upland Section (Lowe, 1964, p. 24) of the Sonoran Desert occur here as do some species and forms that are characteristic of the Chihuahuan Desert. The Mountain View area exhibits a transition between the creosote bush (Larrea tridentata) that occurs in the Sonoran Desert (with a tetraploid (4N) chromosome number) and the Chihuahuan Desert form (which is a diploid (2N)); the mariola (Parthenium incanum), a Chihuahuan Desert composite occurs along with the Sonoran Desert blue paloverde (Cercidium floridum); and there are other examples of this Chihuahuan-Sonoran Desert mix. In addition to those listed above, common plants of the area are: paper daisy (Psilostrophe cooperi), banana yucca (Yucca baccata), palmilla (Yucca elata), sotol (Dasylirion wheeleri), mormon tea (Ephedra spp.), mesquite (Prosopsis velutina), whitethorn (Acacia constricta), catclaw (Acacia greggii), wolfberry (Lycium spp.), turpentine bush (Aplopappus spp.), false mesquite (Calliandra sp.), chain-fruit cholla (Opuntia fulgida), staghorn cholla (Opuntia spp.), and rainbow cactus (Mammillaria spp.). A few of the grasses occurring at Mountain View are: blue grama (Bouteloua gracilis), sideoats grama (Bouteloua curtipendula), Rothrock grama (Bouteloua rothrockii), hairy grama (Bouteloua hirsuta),

three awn (Aristida spp.), and plains bristlegrass (Setaria macrostachya).

Some of the fauna likely to be found at Mountain View include; amphibians and reptiles: spadefoot toads (Scaphiopus spp.), true toads (Bufo spp.), a a variety of lizards (Holbrookia spp., Uta stansburiana, Phrynosoma, spp., and Cnemidophorus spp.), and several snakes (Heterodon nascius, Masticophis spp., Pituophis melanoleucus, Rhinocheilus lecontei, Hypsiglena torquata, and Crotalus spp.); mammals: several species of bats, rabbits (Lepus spp. and Spermophilus spp.), ground squirrels (Ammospermophilus spp. and Spermophilus spp.), kangaroo rat (Dipodomys spp.), pocket mice (Perognathus spp.), native rats and mice (Peromyscus spp.), skunks (Mephitis spp. and Spilogale putorius), bobcat (Lynx rufus), javelina (Tayassu tajacu) and deer (Odocoileus spp.).

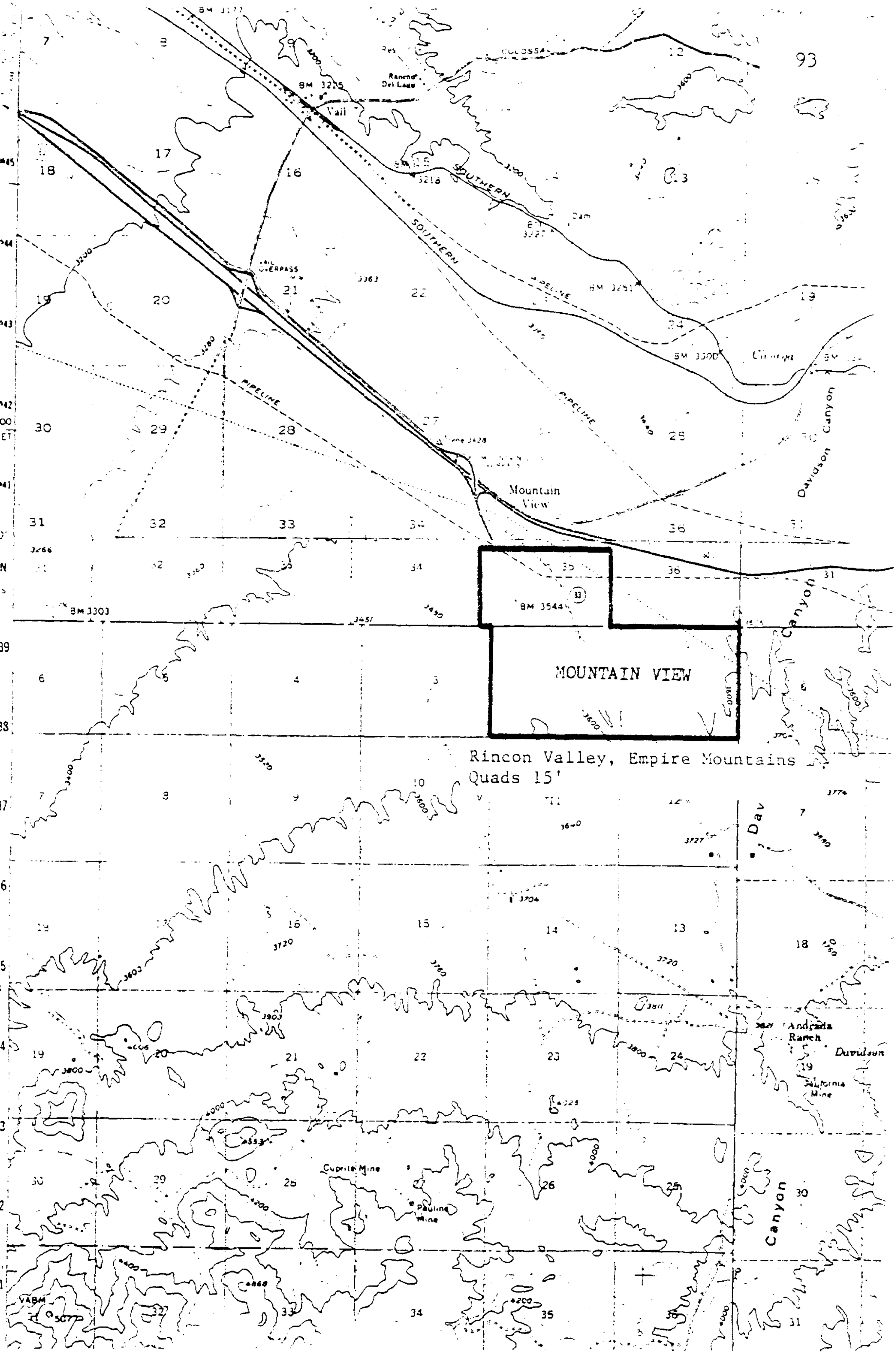
CURRENT USE: Cattle grazing, power line, gas line, and old Sonoita highway cross site

DANGERS TO INTEGRITY: Possibly high if not protected due to ORV potential.

PUBLIC SENSITIVITY: Moderate

DATA SOURCE: Smith, E.L. and F.L. Bender, 1974. Proposed Natural Areas: Mountain View report No. 75. Arizona Academy of Science.

KNOWLEDGEABLE PEOPLE: Director, Arizona State Parks, Phoenix, Arizona.



Rincon Valley, Empire Mountains Quads 15'

TABLE 10. Sites considered from Catron County, New Mexico, including Priority and page of Brief. Numbers preceding names locate sites on county maps, facing page.

Map Location Number	Site	Priority	Brief Page
1	Aldo Leopold	4	
2	Apache Mountain	5	
3	Blue Range (write-up in Arizona)	1-C	81
4	Centerfire Bog	1-B	97
5	Continental Divide	1-C	101
6	Datil	4	
7	Datil Well	5	
8	Devil's Creek	4	
9	Elk Mountain	4	
10	Frisco Box	4	
11	Horse Mountain	1-C	104
12	Hub	4	
13	Indian Creek	1-B	107
14	Kelly	5	
15	Little Turkey Creek	1-B	109
16	Lower Frisco	1-C	112
17	Madre Mountain	4	
18	Mesita Blanca-Eagle Peak	1-B	115
19	Mineral Creek	1-B	118
20	Mogollon Savanna	1-B	121
21	Nolan	4	
22	Saliz Mountains	1-B	123

TABLE 10. (continued)

Map Location Number	Site	Priority	Brief Page
23	San Francisco Hot Springs	4	
24	Snow Lake Site	1-C	127
25	Stone Canyon	4	
26	Taylor Creek	4	
27	Toriette Lake	5	
28	Tularosa Wetlands	4	
29	Wahoo Mountain	5	
30	Wall Lake	5	
31	Zuni Salt Lake	3	

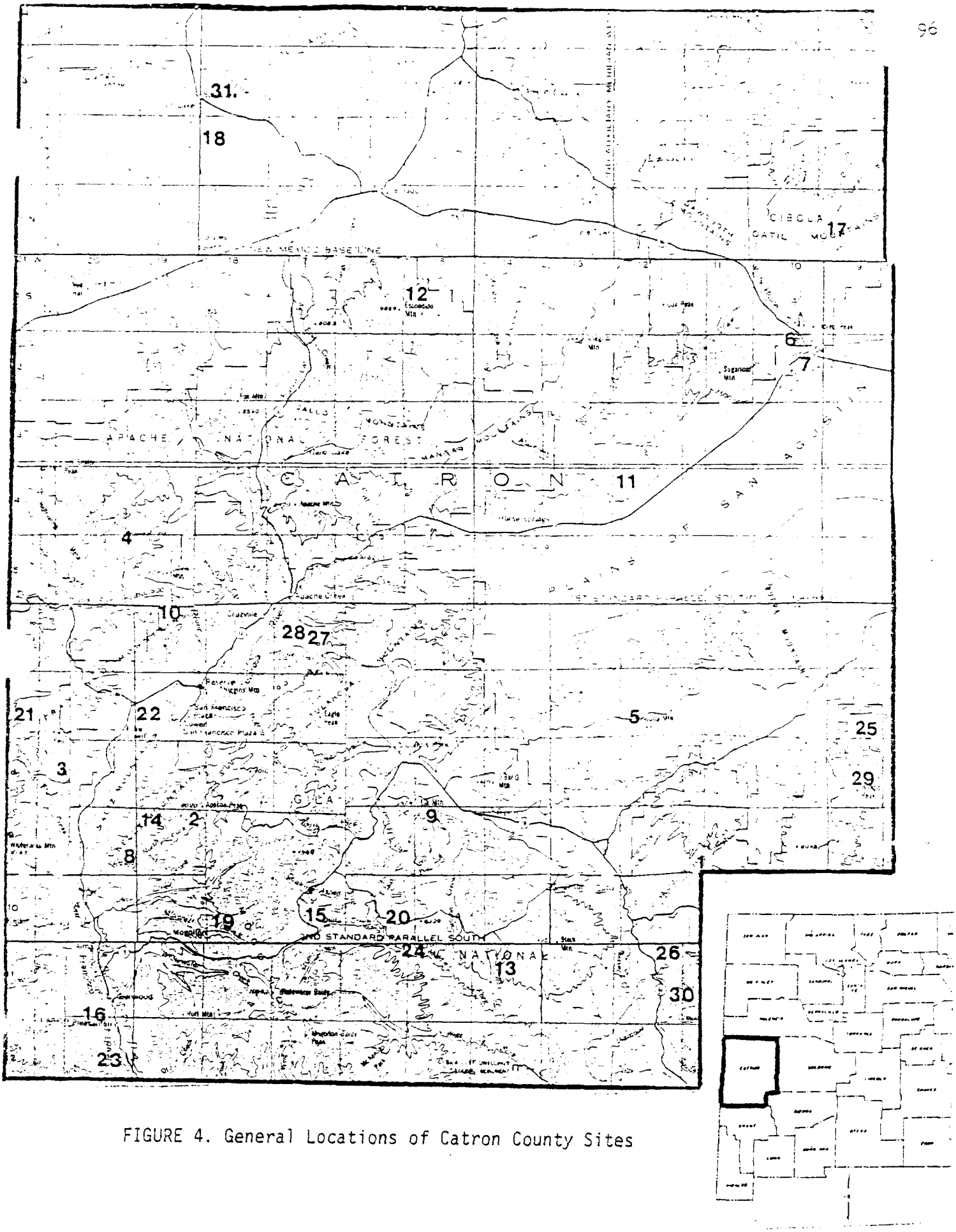


FIGURE 4. General Locations of Catron County Sites

CENTERFIRE BOG

PRIORITY: 1-B

OTHER USE DESIGNATION: UE-P

THEME:

III. Aquatic Ecosystem Theme

A. 2. Pond, 3. Marsh (Cienega), B. 2. Stream

SUBTHEME:

IV. Species of Special Concern Theme

B. Bird, 6. Mammal

LOCATION: Catron County, New Mexico. 10 miles (16 km) south of Red Hill.

T4-5S R19W USGS Map: Centerfire Bog 7.5'

SIZE: 900 acres (380 hectares) (deeded)

OWNER/ADMINISTERING AGENCY: Randolph Jenks

NATURAL VALUES:

Centerfire Bog is an outstanding mountain bog-cienega, a natural feature which has become very rare in the past century.

The bog is located at 7,100 feet (2,165 m) within a valley bordered by rolling hills on the west and low mountains on the east. The low-lying wetland portion is composed of Quaternary alluvium; the rolling hills are of Tertiary conglomerates, largely latite and andesite; and the eastern mountainous area is of Tertiary andesite and basaltic andesite.

The Centerfire Bog area contains five distinct communities.

The most important two are the lentic system of the pond and the marsh community above the pond. Of lesser importance is the lotic system found below the pond. The stream segment is nearly three miles (4.8 km) long. The pond itself contains submergent, floating, and emergent zones, with the principal species being cattail (Typha latifolia), bullrush (Scirpus valida), pondweed (Potomogeton spp.), and buckwheat (Fagopyrum sagittatum), with sedges (Carex spp.) surrounding the pond and in the marsh. Upstream form the pond is a quaking bog along with a few pools of quicksand. The upland plant community consists of a good cover of blue grama (Bouteloua gracilis) with a thin overstory of ponderosa pine (Pinus ponderosa) up to 20 inches (51 cm) in diameter. There are also a few scattered juniper (Juniperus monosperm), pinyon pine (Pinus edulis), and oak (Quercus spp.), giving the slopes a general look of a ponderosa pine savanna. The rolling hills to the west of the pond are dominated by sagebrush (Artemisis spp.) and blue grama grass.

Of the wildlife at Centerfire Bog, the avifauna is by far the most interesting and well studied. Endangered species of the bald eagle (Haliaetus leucocephalus) and peregrine falcon (Falco peregrinus anatum). Deer (Odocoileus hemionus) and wapiti (Cervus canadensis), pronghorn (Antilocapra americana), and whitetailed prairie-dog (Cynomys gunnisoni) have been seen in the area. The

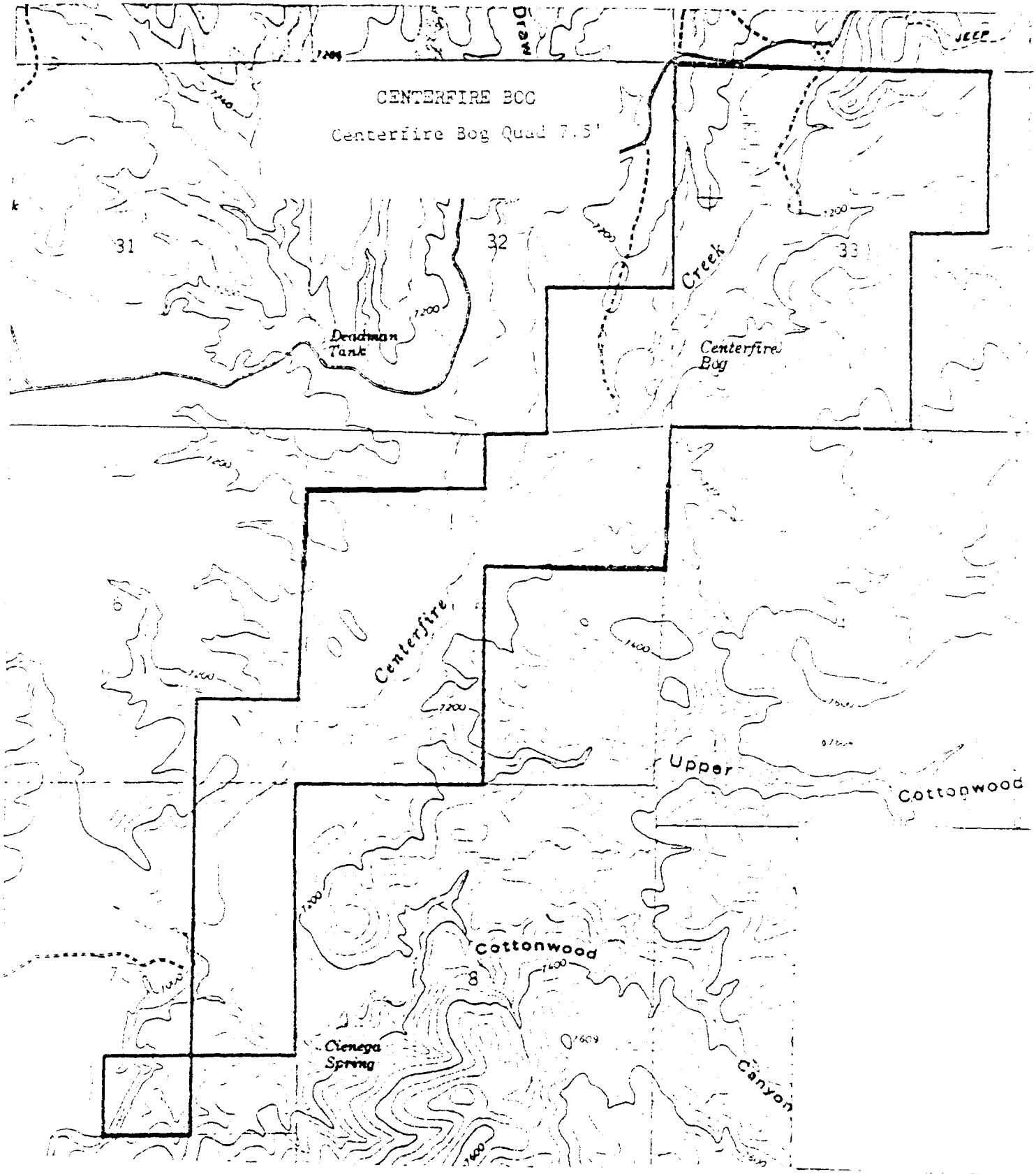
Meadow vole (Microtus pennsylvanicus) probably occurs here as a disjunt population, perhaps as a new subspecies.

CURRENT USE: Limited cattle grazing

DANGERS TO INTEGRITY: Any increase in grazing and visitor pressure could lead to deterioration of the site's natural qualities.

DATA SOURCE: Dick-Peddie, W.A. 1978. New Mexico Unique Wildlife Ecosystem Concept Plan. Natural Resources Department, Santa Fe, New Mexico.

KNOWLEDGEABLE PERSONS: Bill F. Issacs, Heritage Office, Natural Resources Department, Santa Fe, New Mexico.


CENTERFIRE BOG
Centerfire Bog Quad 7.5'
31
32
33
8
Deadman Tank
Centerfire Bog
Creek
Centerfire
Upper
Cottonwood
Cottonwood
Canyon
Cienega Spring
JEEP

CONTINENTAL DIVIDE

PRIORITY: 1-C

OTHER USE DESIGNATION: WSA

THEMES:

III. Terrestrial Ecosystem Theme

122.31 White Fir-Douglas Fir Series, 122.32 Douglas Fir-Limber Pine Series,
122.36 Ponderosa Pine Series,
122.37 Successional-disturbance (subclimax) Series,
122.4 Great Basin-Mogollon-Madrean-Chihuahuan Coniferous Woodland,
142.13 Grama Grass Series,
142.4 Rocky Mountain Montane Grassland.

LOCATION: Catron, New Mexico. 29 miles south of Datil, New Mexico.

T6-8S R12-13W USGS Map: Clifton 1:250,000

SIZE: 70,000 acres (28,329 hectares)

OWNER/ADMINISTERING AGENCY: BLM

NATURAL VALUES:

The dominant topographic feature is Pelona Montain which encompasses 50,000 acres and elevations ranging from 6,300 to 9,200 feet. Vegetation varies from rolling prairie to ponderosa pine and southwestern white pine through aspen and mixed conifer forest.

This site has one of the best combinations of Petran Montane Coniferous Forest; with stands of white fir (Abies concolor) - douglas fir (Pseudotsuga menziesii), douglas fir-southwestern white pine (Pinus strombiformis), ponderosa (Pinus ponderosa), and disturbance stands ot aspen (Populus tremuloides) and gambel oak (Quercus gambelii), which grades to Mogollon Conferous Woodland or Rocky Mountain Montane

Grassland dominated by arizona fescue (Festuca arizonica) or mountain muhly (Muhlenbergia montana). There are excellent scotones included on the site.

This site provides some of the finest antelope habitat in the southwest and serves as winter grounds for the bald eagle.

The oldest archaeological site indicating the cultivation of maize (corn) in the world is present within this site.

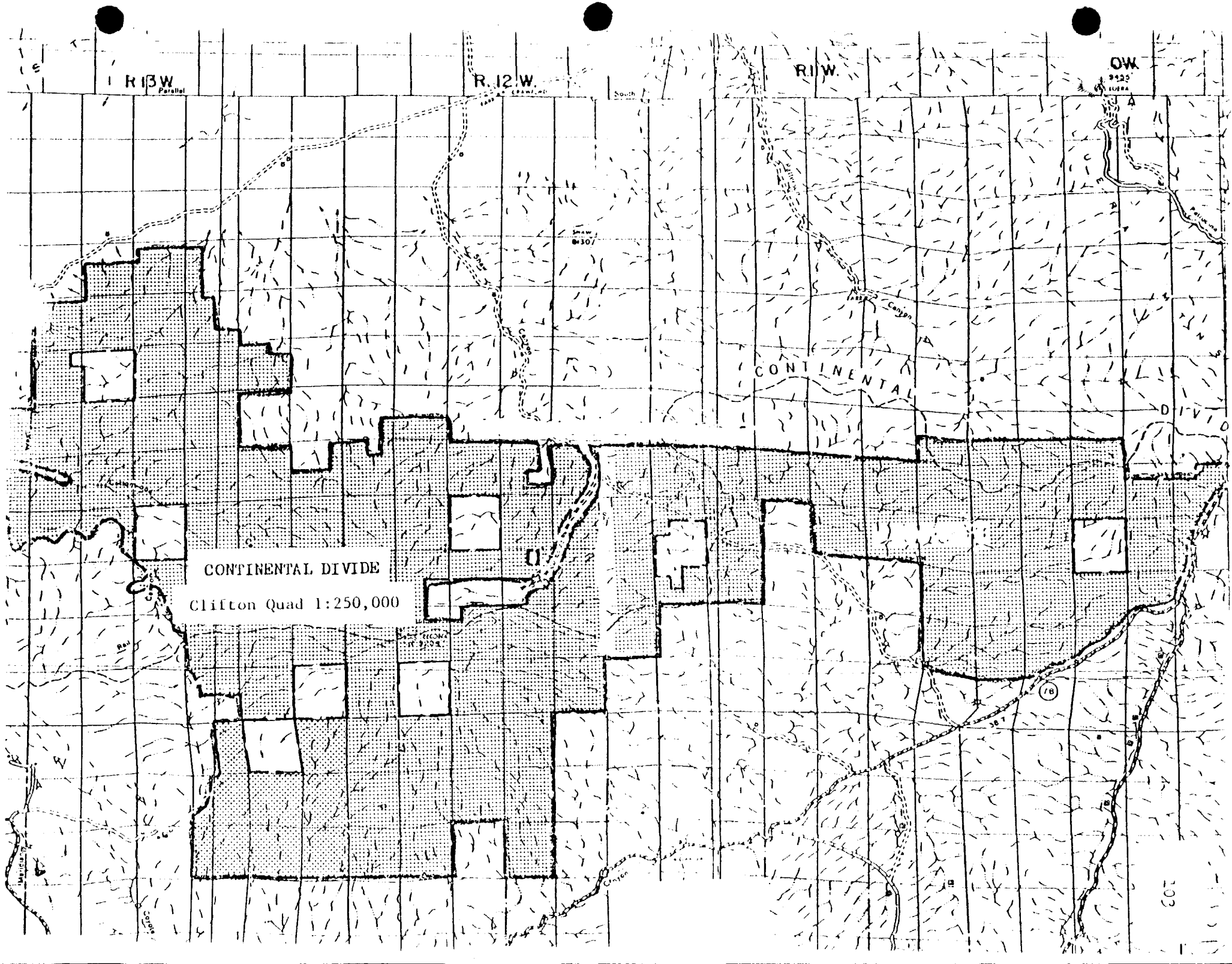
CURRENT USE: Some grazing and has been proposed as wilderness study area.

DANGERS TO INTEGRITY: Low if made a wilderness

PUBLIC SENSITIVITY: Low

DATA SOURCE: U.S. Deptment of Interior, BLM, 1980. New Mexico Wilderness-study area decisions. Santa Fe, New Mexico.

KNOWLEDGEABLE PERSONS: Arlen P. Kennedy, District Manager, Kent Carlton, Wilderness Specialist, Socorro District Ofice, Bureau of Land Management, Socorro, NM


R.13 W.
R.12 W.
R.11 W.
CONTINENTAL DIVIDE
Clifton Quad 1:250,000

HORSE MOUNTAIN

PRIORITY: 1-C

OTHER USE DESIGNATION: WSA

THEME:

III. Terrestrial Ecosystem Theme

122.34 Douglas Fir Series, 122.36 Ponderosa Pine Series,
122.37 Successional-Disturbance (subclimax) Series,
122.41 Colorado Pinyon Pine-Juniper Series,
133.31 Scrub Oak Series, 133.36 Mixed Evergreen Sclerophyll Series,
142.41 Thurber Fescue Series,
173.4 Rocky Mountain Stream (montane) Riparian,
174.1Southwestern Interior Stream (canyon) Riparian.

LOCATION: Catron, New Mexico. 18 miles southwest of Datil, New Mexico.

T3-4S R12-13W USGS Map: Clifton, St. Johns 1:250,000

SIZE: 5,000 acres (2023.5 hectares)

OWNER/ADMINISTERING AGENCY: BLM

NATURAL VALUES:

Horse mountain is an isolated mountain peak rising abrubtly out of the Plains or San Augustine. It is characterized by high vertical cliffs, steep and rocky slopes, deep canyon and heavy forest. Interspersed throughout the rugged landforms are small park-like meadows. Elevations vary from 6,7000 to 9,200 feet.

This site is a fine example from the central portion of the region, of the isolated range which includes two Forest series, a Woodland series, an Interior Chaparral series, and both montane and canyon riparian habitats. There are mature

stands of ponderosa pine (Pinus ponderosa) and douglas fir (Pseudotsuga menziesii).

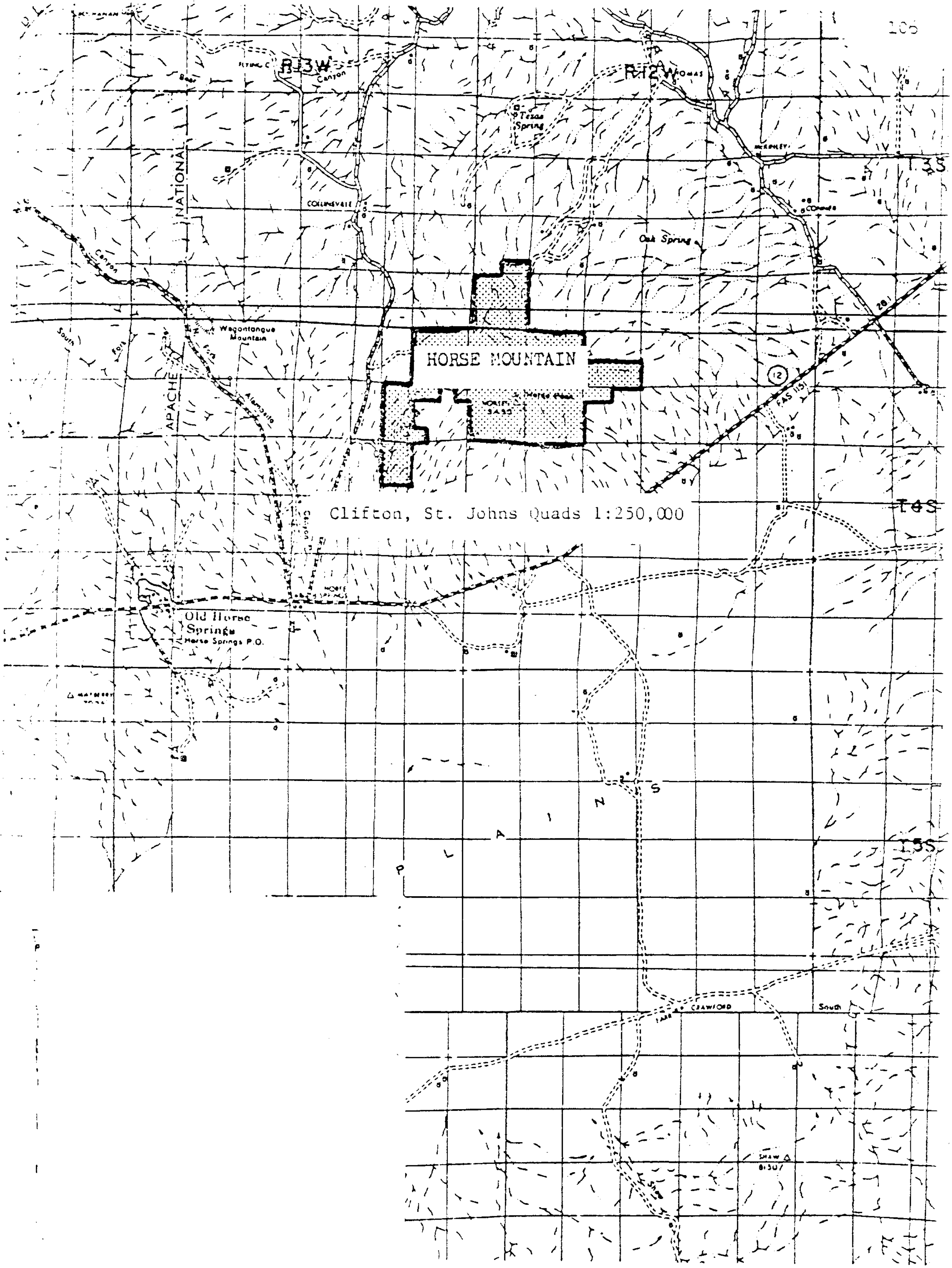
CURRENT USE: Limited grazing. Has been proposed as wilderness study area.

DANGERS TO INTEGRITY: Low if made a wilderness

PUBLIC SENSITIVITY: Low

DATA SOURCE: U.S. Department of Interior, BLM, 1980. New Mexico Wilderness-study area decisions. Santa Fe, New Mexico and BLM primitive area proposal.

KNOWLEDGEABLE PERSONS: Arlen P. Kennedy, District Manager, Kent Carlton, Wilderness Specialist, Socorro District Office, Bureau of Land Management, Socorro, NM.



Clifton, St. Johns Quads 1:250,000

INDIAN CREEK

PRIORITY: 1-B

OTHER USE DESIGNATION: HT

THEME:

III. Terrestrial Ecosystem Theme

173.42 Cottonwood Series

LOCATION: Catron, New Mexico. 17 miles west southwest of Beaverhead, New Mexico.

T11S R14W USGS Map: Woodland Park 7.5'

SIZE: 70 acres (28 hectares)

OWNER/ADMINISTERING AGENCY: USFS

NATURAL VALUES:

This site contains a "benchmark" stand of the Populus angustifolia/s/Poa pratensis riparian habitat type. This type has become scarce in the region. The site has more than 31 species of forbs including the narrow endemic Geranium lentum.

Surrounding ledges and cliffs support cliffbush (Jamesia americana) and cliff fendlerbush (Fendlera rupicola).

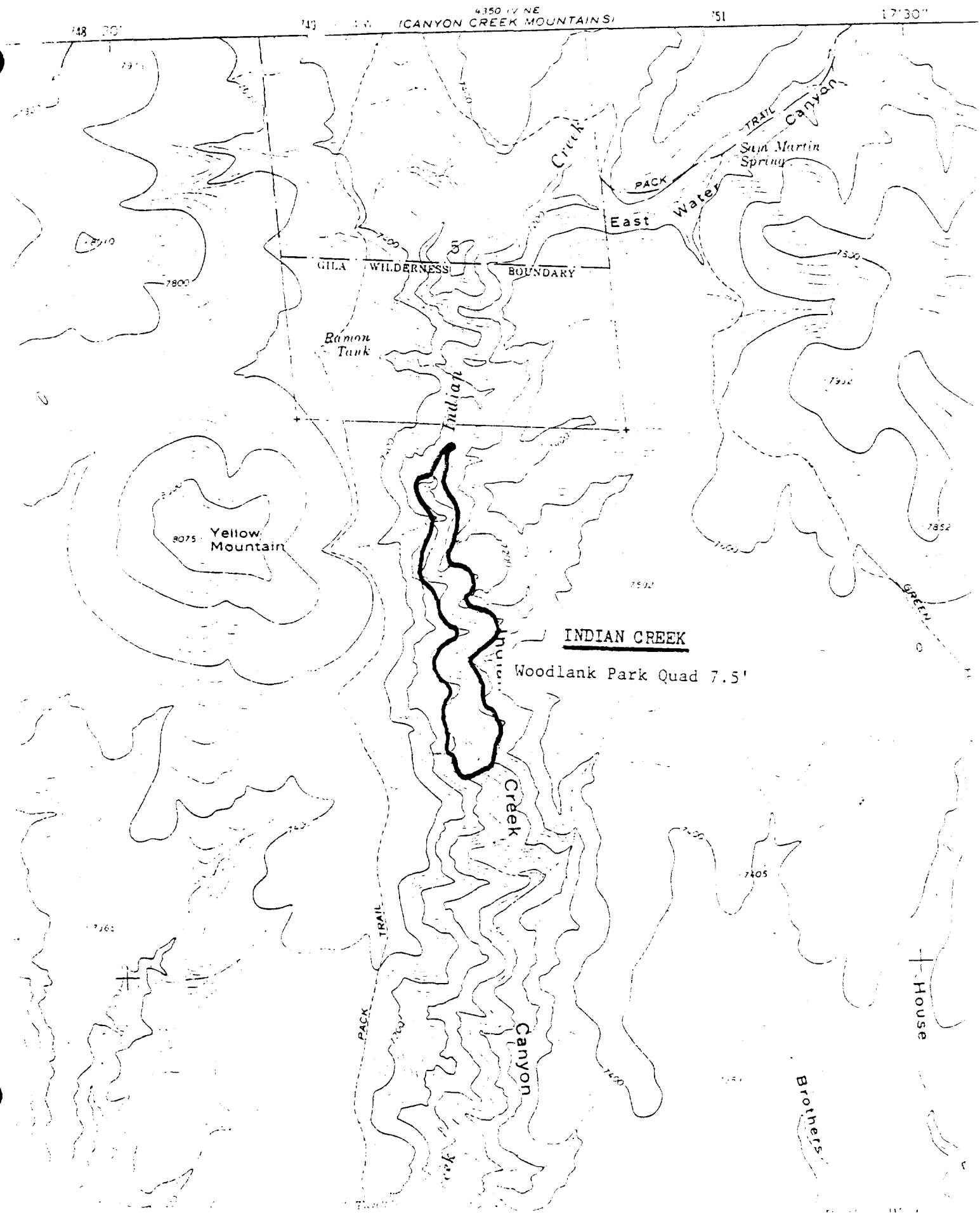
CURRENT USE: Limited grazing

DANGER TO INTEGRITY: Great unless protected from logging and grazing

PUBLIC SENSITIVITY: Moderate

DATA SOURCE: W.H. Moir, Regional Ecologist, USFS, Albuquerque, NM

KNOWLEDGEABLE PERSONS: W.H. Moir, USFS, Albuquerque, NM


4350 IV NE
(CANYON CREEK MOUNTAINS)
17'30"
East Water Creek
PACK TRAIL
Canyon
Sam Martin Spring
GILA WILDERNESS BOUNDARY
Ramon Tank
Indian Creek
Yellow Mountain
8075
INDIAN CREEK
Woodlank Park Quad 7.5'
Creek
PACK TRAIL
Canyon
House
Brothers

LITTLE TURKEY CREEK

PRIORITY: 1-B

OTHER USE DESIGNATION: HT

THEMES:

III. Terrestrial Ecosystem Theme

172.11 Blue Spruce Series

LOCATION: Catron, New Mexico. 1 mile south of Willow Creek, New Mexico.

T10S R17W USGS Map: Negrito Mt. 7.5

SIZE: 500 acres (203 hectares)

OWNER/ADMINISTERING AGENCY: USFS

NATURAL VALUES:

This site contains the ideal (benchmark) stand for the Picea pungens/MS/Poa pratenis riparian habitat type. This blue spruce-bluegrass type is in excellent condition which is rare in the region. Most such vegetation types have disappeared from a combination of grazing, logging, and camping.

There is also some of the Willow-Alder Series on this site. That is the beak willow (Salix bebbiana) and the thinleaf alder (Alnus tenuifolia). There are 3 species of sedge, one of which, (Carex media), is a new record. There are 45 species of forbs on the site.

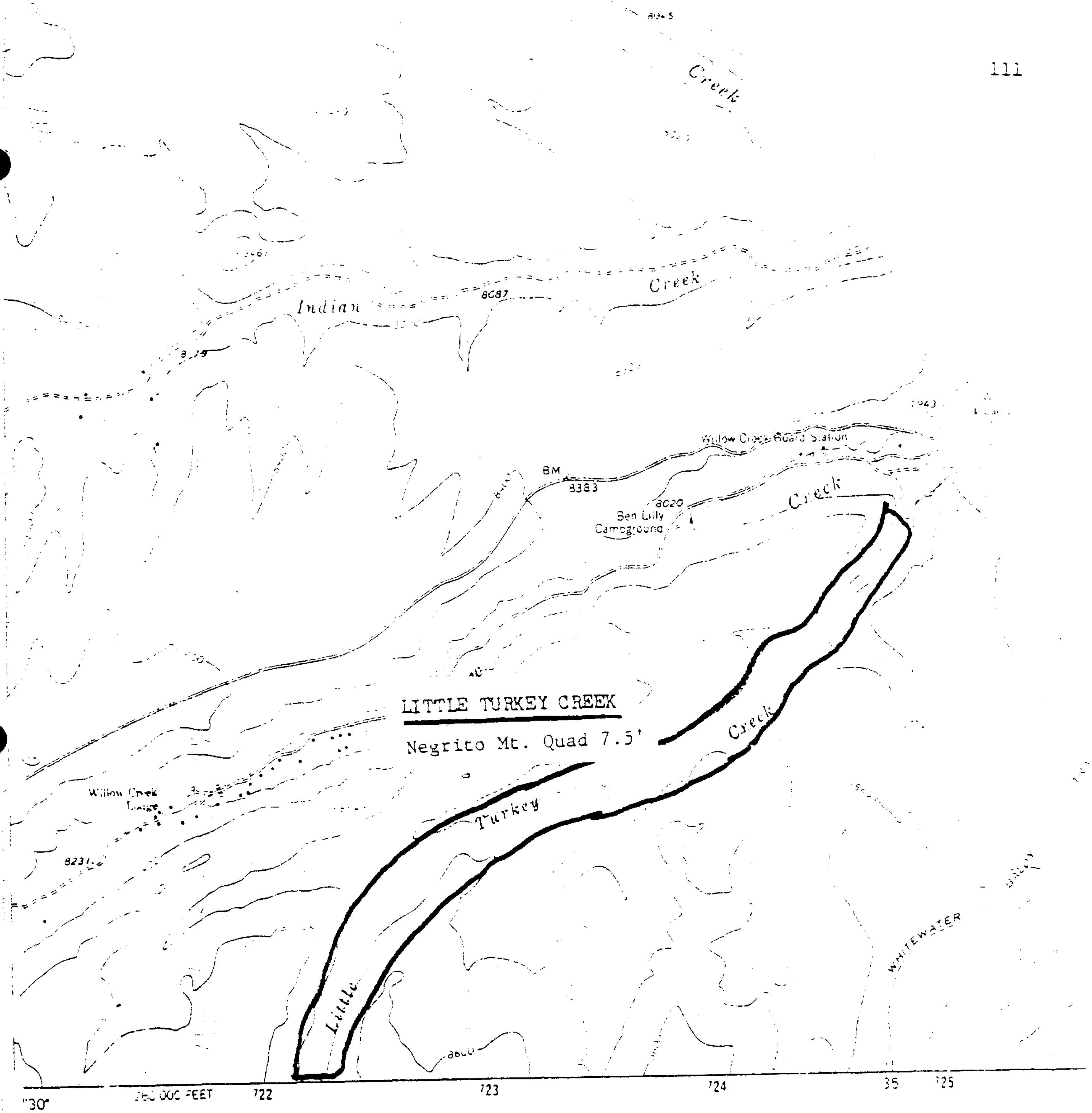
CURRENT USE: Limited cattle grazing and camping

DANGERS TO INTEGRITY: Considerable unless protected from extensive use.

PUBLIC SENSITIVITY: Moderate

DATA SOURCE: W.H. Moir, Regional Ecologist,USFS, Albuquerque, NM.

KNOWLEDGEABLE PERSONS: W.H. Moir, USFS, Albuquerque, NM.



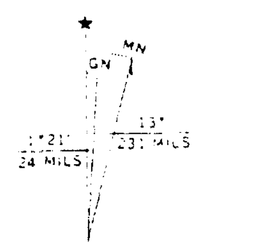
Mapped by the U.S. Forest Service
...ed and published by the Geological Survey

...ontrol by USGS, USC&GS, and USFS

Topography by photogrammetric methods from aerial
...hotographs ... 1958. Field checked by USGS 1963

...olyconic projection. 1927 North American datum
... New Mexico coordinate system, west zone
... Transverse Mercator grid ticks

Where ... have not been established ...



FOR SALE BY

LOWER FRISCO CMB 112

PRIORITY: 1-C

OTHER USE DESIGNATION: W

THEMES:

I. Landform Theme

A. Mountain, C. 2. Canyon Country

IV. Species of Special Concern Theme

B. 5. Bird, 6. Mammal

SUBTHEMES:

III. Terrestrial Ecosystem Theme

122.41 Colorado Pinyon Pine-Juniper Series,
143.1 Scrub-Grassland,
174.13 Cottonwood Series, 174.14 Sycamore Series.

LOCATION: Catron, New Mexico - Greenlee, Arizona. 10 miles southwest of Pleasanton, New Mexico.

T12-13S R20-23W USGS Map: Clifton 1:250,000

SIZE: 14,200 acres (6,750 hectares)

OWNER/ADMINISTERING AGENCY: USFS

NATURAL VALUES:

This area consists of the San Francisco River and its steep-sided river canyon. Elevation differences between the river bottom and ridgetop averages 1,300 feet in the western part of the area with near vertical clifs rising 500 to 1,000 feet above the river in the east. The steep sideslopes in the western part of the area are broken by numerous rock outcrops.

The normal flow in this narrow river bottom is usually no more than 15 to 30 feet wide and 2 feet deep. The canyon

bottom is dynamic as frequent high water and flooding change the river's character by altering gravel bars and the channel location. The river contains populations of catfish, bass, and other warm water fish species.

Vegetation in the river bottom consists of cottonwood, sycamore, seepwillow, and other riparian species. The canyon is sparsely covered with pinyon pine, juniper, yucca, century plant, grasses, and other arid and semi-arid species.

This area provides habitat for bighorn sheep, mule deer, whitetail deer, mountain lion, golden eagle, and a variety of waterfowl and birds. The area also receives winter use by bald eagles and peregrine falcon. The canyon has been used extensively by early man. Many Indian ruins and cliff dwellings are included within this proposed site.

CURRENT USE: Limited cattle grazing. A wilderness area.

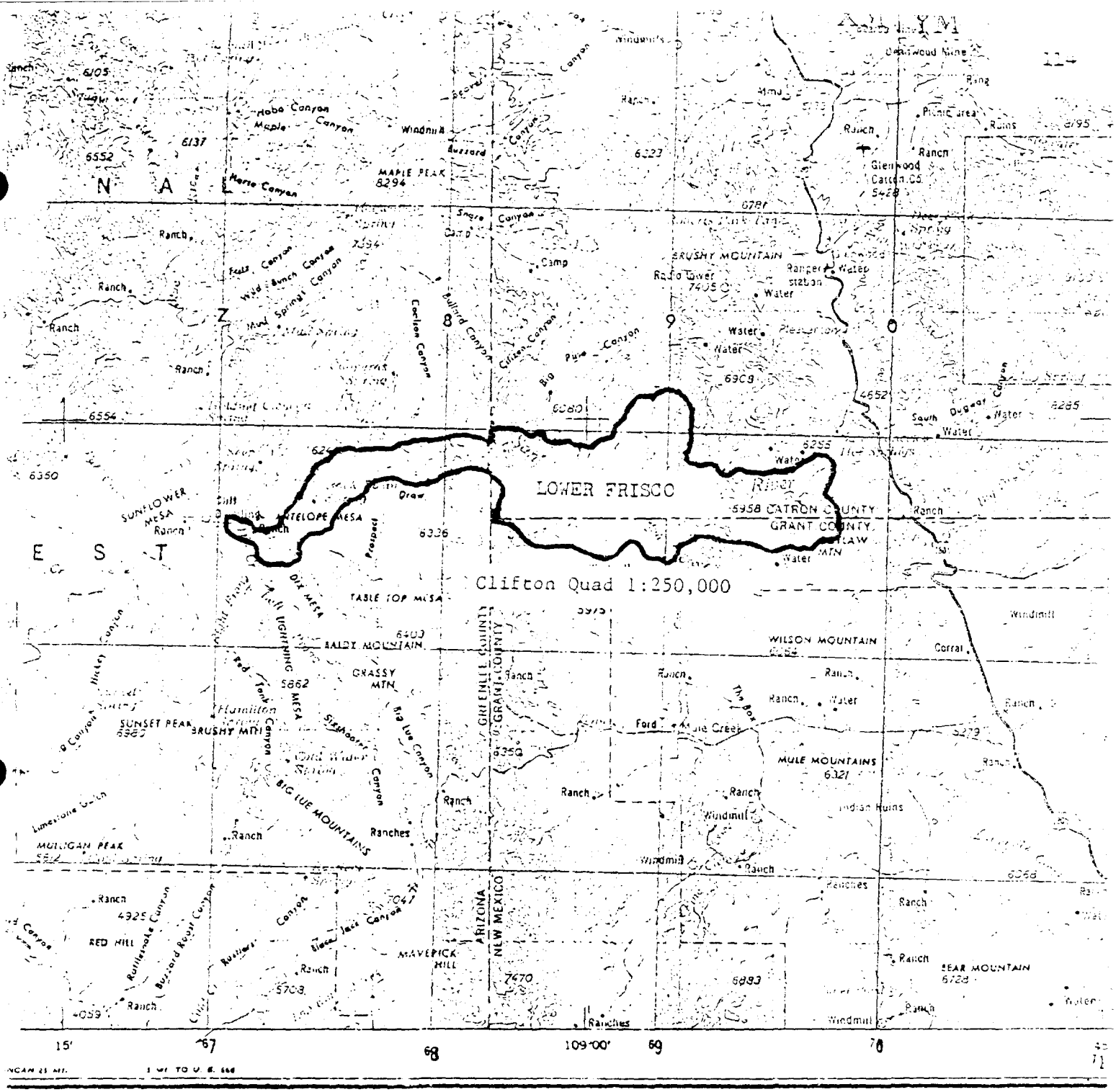
DANGERS TO INTEGRITY: None

PUBLIC SENSITIVITY: Low

DATA SOURCE:

KNOWLEDGEABLE PERSONS: Regional Forester USFS Region 3, 517 Gold SW, Albuquerque, NM.

REFERENCES: Hubbard, J.P. and B. Hayward. 1973. A biological survey of the San Francisco Valley (Greenlee County, Arizona and Catron County, New Mexico), with emphasis on habitats and vertebrates. A contracted study for the U.S. Forest Services, New Mexico.



Scale 1 250,000

5 0 5 10 15 20 Statute Miles

5 0 5 10 15 20 25 30 Kilometers

5 0 5 10 Nautical Miles

CONTOUR INTERVAL 200 FEET

WITH SUPPLEMENTARY CONTOURS AT 100 FOOT INTERVALS

TRANSVERSE MERCATOR PROJECTION

BLACK NUMBERED LINES INDICATE THE 10,000 METER UNIVERSAL TRANSVERSE MERCATOR GRID, ZONE 12

1970 MAGNETIC DECLINATION FROM TRUE NORTH VARIES FROM 11° 230 MILS EASTERLY FOR THE CENTER OF THE WEST EDGE TO 10½° 220 MILS EASTERLY FOR THE CENTER OF THE EAST EDGE

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MESITA BLANCA - EAGLE PEAK

PRIORITY: 1-C

OTHER USE DESIGNATION: WSA

THEMES:

I. Landform Theme

A. 3. Folded, D. 2. Individual Volcanic Mountain, 4. Lava Flow

SUBTHEME:

II. Paleonological-Archaeological Theme

LOCATION: Catron, New Mexico. 20 miles west of Quemado, New Mexico.

T1-3N R15-20W USGS Map: St. Johns 1:250,000

SIZE: 19,440 acres (+7,867 hectares)

OWNER/ADMINISTERING AGENCY: BLM

NATURAL VALUES:

This site is administered as two units by the BLM, hence the name Mesita Blanca-Eagle Peak. The site contains some of the best examples of cinder cones and flows found in the region. Two of the largest, Red Cone and Cerro Pomo are prominant topographic features. The landscape is relatively new. The canyons are not well developed and the lava flows are recent.

Both units contain significant archaeological sites. The eagle peak portion also contains paleontological sites.

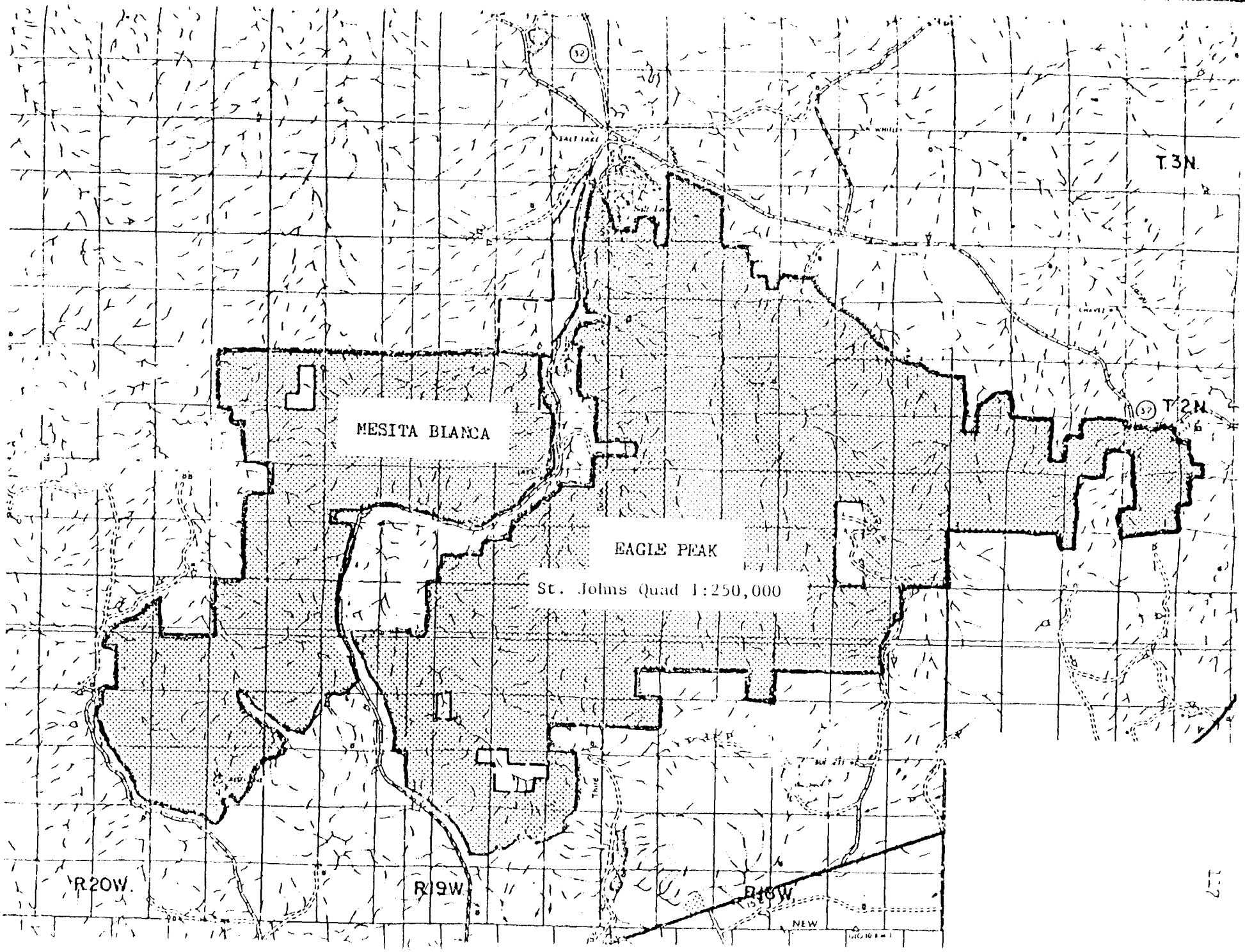
CURRENT USE: Cattle grazing. Has been proposed as Wilderness Sandy Area.

DANGERS TO INTEGRITY: None

PUBLIC SENSITIVITY: Low

DATA SOURCE: U.S. Deptment of Interior, BLM, 1980. New Mexico Wilderness-study area decisions. Santa Fe, NM

KNOWLEDGEABLE PERSONS: Arlen P. Kennedy, District Manager, Kent Carlton, Wilderness Specialist, Socorro District Office, Bureau of Land Management, Socorro, NM.


MESITA BIANCA
EAGLE PEAK
St. Johns Quad 1:250,000
T.3N.
T.2N.
R.20W.
R.19W.
R.18W.
NEW

MINERAL CREEK

PRIORITY: 1-B

OTHER USE DESIGNATION: HT

THEMES:

III. Terrestrial Ecosystem Theme

122.31 White Fir-Douglas Fir Series, 122.34 Douglas Fir Series,
172.11 Blue Spruce Series

LOCATION: Catron, New Mexico. 4 miles west of Willow Creek, New Mexico

T10S R18W USGS Map: Bear Wallow Mt. 7.5'

SIZE: 310 acres (126 hectares)

OWNER/ADMINISTERING AGENCY:

NATURAL VALUES:

This site contains an outstanding set of mature montane-riparian stands which constitute a continuum of montane-riparian vegetation. In addition these stands can be considered of benchmark quality for the following habitat types: Abies concolor-Pseudotsuga menziesii/L/Poa fendleriana; Pseudotsuga menziessi/Quercus hypoleocoides/MG; Pseudodoga menziesii/F/muhlenbergia virescens; Picea pungens/F/Fragaria vesca var. bracteata. The site is rich (60-70 species) in forbs.

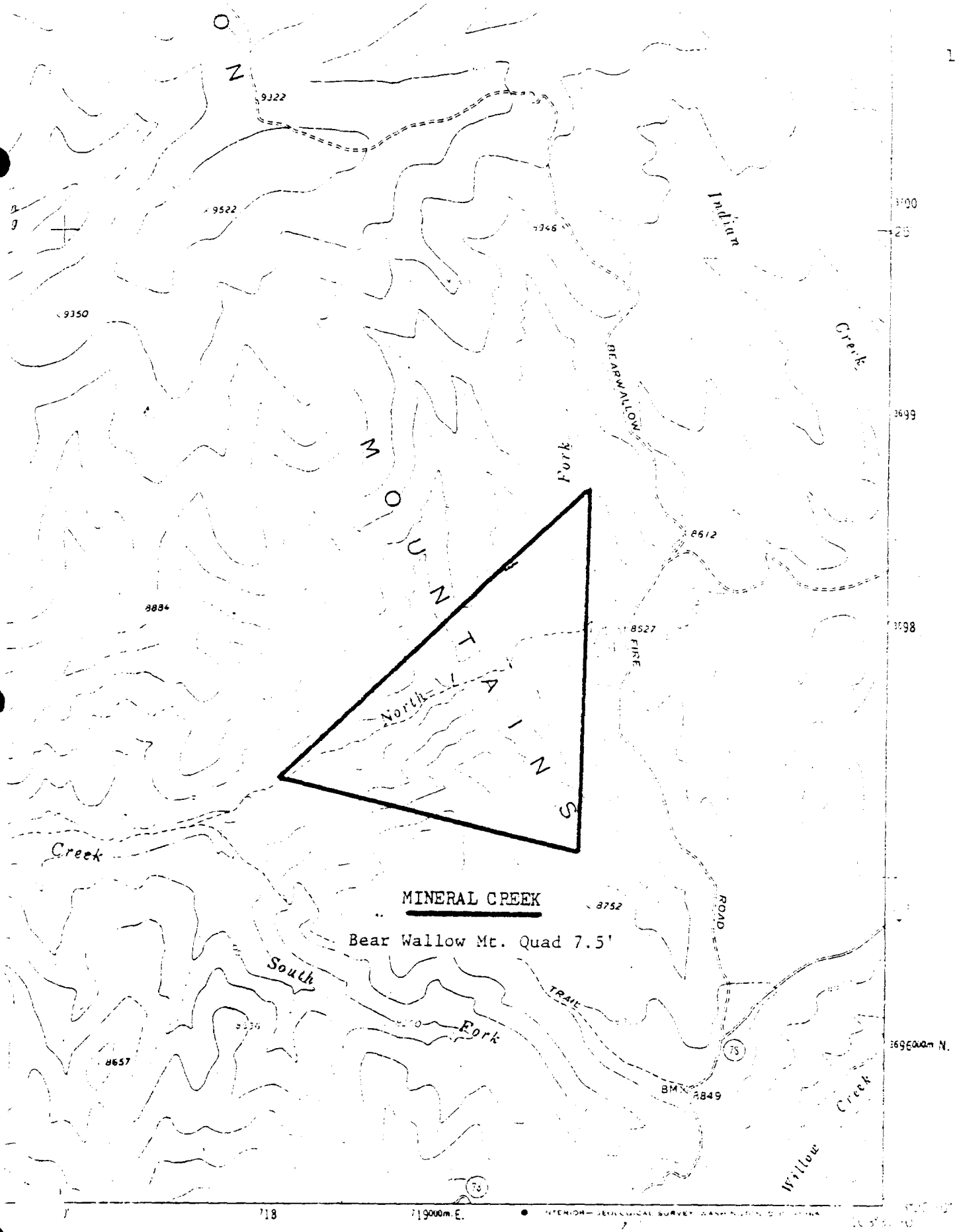
CURRENT USE: Limited cattle grazing

DANGERS TO INTEGRITY: Great unless protected from logging and extensive grazing.

PUBLIC SENSITIVITY: Low

DATA SOURCE: W.A. Moir, Regional Ecologist, USFS, Albuquerque, NM.

KNOWLEDGEABLE PERSONS: W.A. Moir, Regional Ecologist, USFS, Albuquerque, NM.



ROAD CLASSIFICATION

Light-duty — Unimproved dirt

State Route

MOGOLLON SAVANNA

PRIORITY: 1-B

OTHER USE DESIGNATION: HT

THEMES:

III. Terrestrial Ecosystem Theme

122.36 Ponderosa Pine Series,
142.11 Mixed Bluestem Series,
142.41 Fescue Series

LOCATION: Catron, New Mexico. 9 miles east of Willow Creek, New Mexico.

T10S R16W USGS Maps: Loco Mountain 7.5'

SIZE: 1,000 acres (405 hectares)

OWNER/ADMINISTERING AGENCY: USFS

NATURAL VALUES:

The site represents a disjunct pocket of Ponderosa Pine Savanna which is rare in the region. This phase which has big bluestem (Andropogon gerardii) as a co-dominant with Arizona fescue (Festuca arizonica) is even more scarce. This prairie and savanna site and the Saliz Mountains site would make excellent benchmark landmarks for permanent comparisons and has benchmark qualities for the Pinus ponderosa/MS/Andropogon gerardii habitat type.

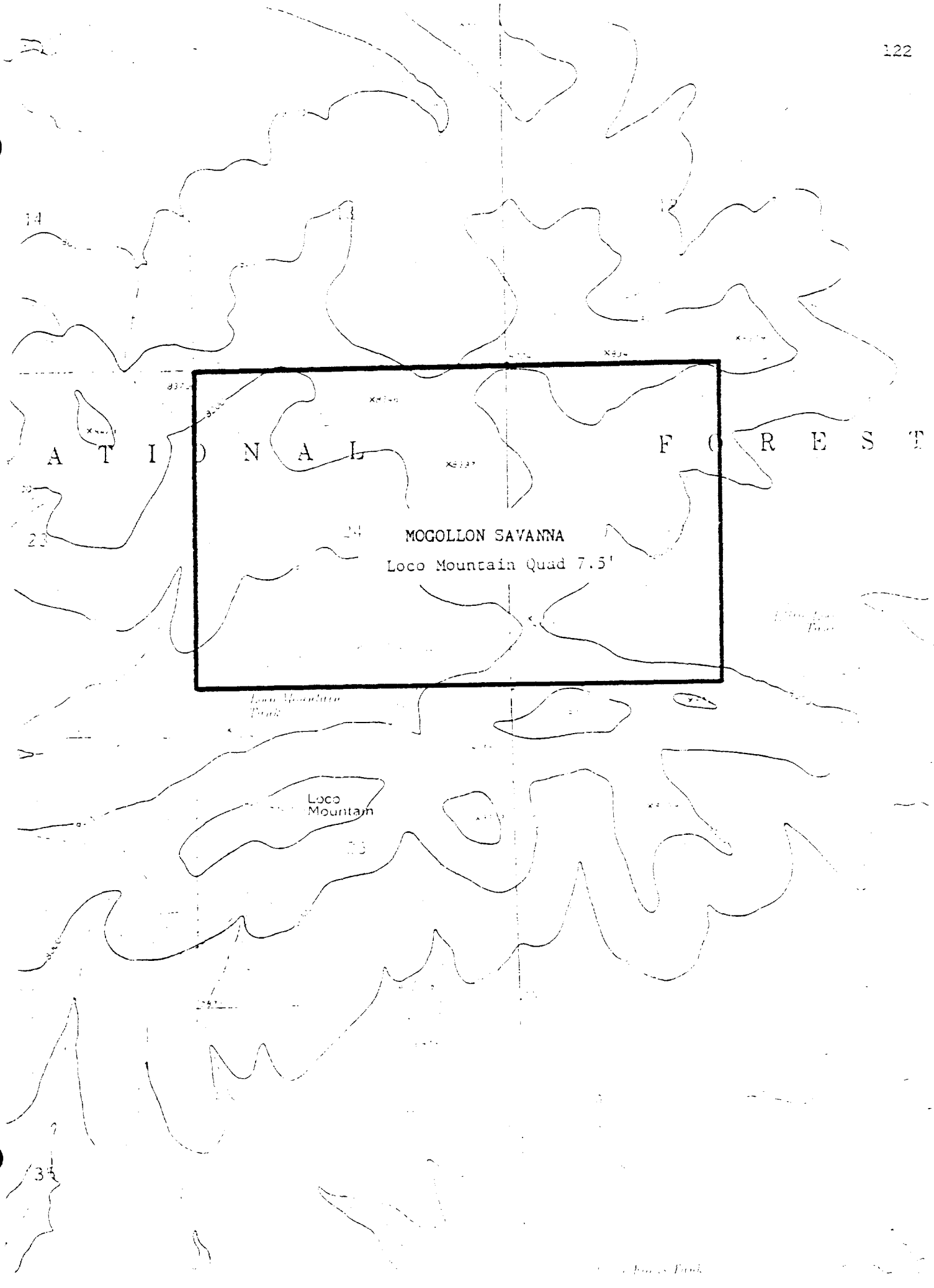
CURRENT USE: Limited cattle grazing

DANGERS TO INTEGRITY: Great unless grazing is terminated

PUBLIC SENSITIVITY: Low

DATA SOURCE: W.A. Moir, Regional Ecologist, USFS, Albuquerque, NM.

KNOWLEDGEABLE PERSONS: W.A. Moir, Regional Ecologist, USFS, Albuquerque, NM.


A T I O N A L F O R E S T
MOGOLLON SAVANNA
Loco Mountain Quad 7.5'
Loco Mountain
14
13
12
23
24
25
36
35

SALIZ MOUNTAINS

PRIORITY: 1-B

OTHER USE DESIGNATION: HT

THEMES:

III. Terrestrial Ecosystem Theme

122.36 Ponderosa Pine Series
122.363 Pinus ponderosa/MS/Bouteloua gracilis

LOCATION: Catron, New Mexico. 7 miles west southwest of Reserve, New Mexico.

T7S R19W USGS Map: Reserve 7.5'

SIZE: 320 acres (130 hectares)

OWNER/ADMINISTERING AGENCY: FS

NATURAL VALUES:

This site is a "benchmark" for the Pinus ponderosa/MS/Bouteloua gracilis habitat type. It represents a vegetation type which was once common in the region but which is now rare and becoming more so. There is little juniper in this savanna and it is not increasing. This savanna type is disappearing even in wilderness areas in part due to cattle grazing.

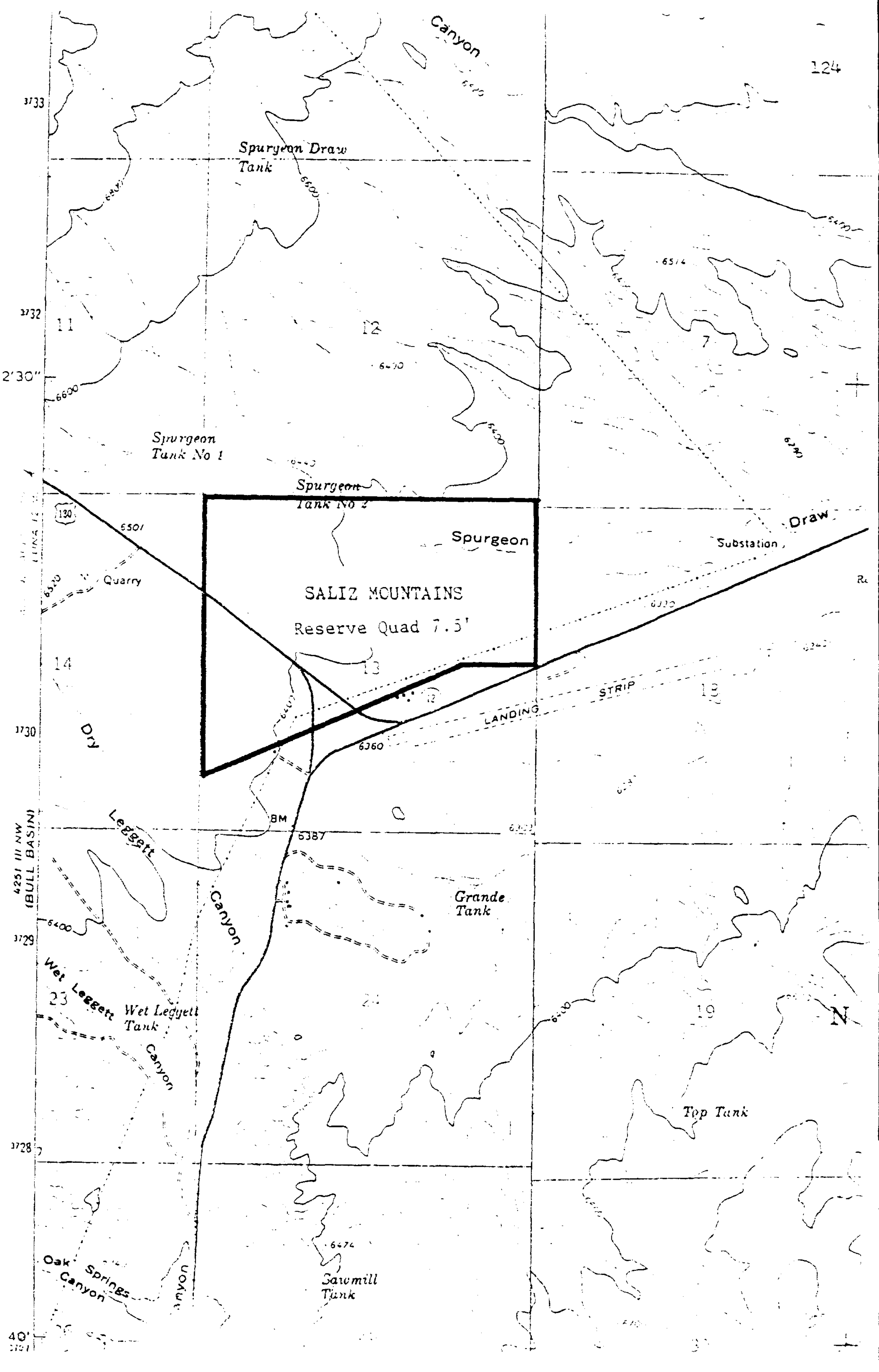
CURRENT USE: Limited cattle grazing

DANGERS TO INTEGRITY: Great unless grazing is terminated.

PUBLIC SENSITIVITY: Moderate

DATA SOURCE: W.H. Moir, Regional Ecologist, Albuquerque, NM.

KNOWLEDGEABLE PERSONS: W.H. Moir, Regional Ecologist, Albuquerque, NM



SALIZ MOUNTAINS
Reserve Quad 7.5'
Spurgeon Draw Tank
Spurgeon Tank No 1
Spurgeon Tank No 2
Spurgeon
Draw
Canyon
Substation
Quarry
LANDING STRIP
Dry
Leggett
Canyon
Grande Tank
Wet Leggett
Wet Leggett Tank
Canyon
Top Tank
Sawmill Tank
Oak Springs Canyon
BM 6387
4251 III NW (BULL BASIN)
42'30"
40'
3733
3732
3730
3729
3728
11
12
7
14
13
18
23
24
19
N
130

SNOW LAKE

PRIORITY: 1-C

OTHER USE DESIGNATION: HT

THEMES:

III. Terrestrial Ecosystem Theme

122.36 Ponderosa Pine Series
122.361 Pinus ponderosa/L/Festuca arizonica

LOCATION: Catron, New Mexico. 2 miles north northeast of Willow Creek, New Mexico.

T10S R17W USGS Map: Negrito Mt. 7.5'

SIZE: 950 acres (385 hectares)

OWNER/ADMINISTERING AGENCY: USFS

NATURAL VALUES:

This site supports mature stands of ponderosa pine with a heavy cover of arizona fescue underneath. This is classic turkey habitat and is now rare and extremely rare in good condition.

CURRENT USE: Light cattle grazing

DANGERS TO INTEGRITY: Great if not protected from logging and extensive grazing.

PUBLIC SENSITIVITY: Moderate

DATA SOURCE: W.H. Moir, Regional Ecologist, USFS, Albuquerque, NM.

KNOWLEDGEABLE PERSONS: W.H. Moir, Regional Ecologist, USFS, Albuquerque, NM.

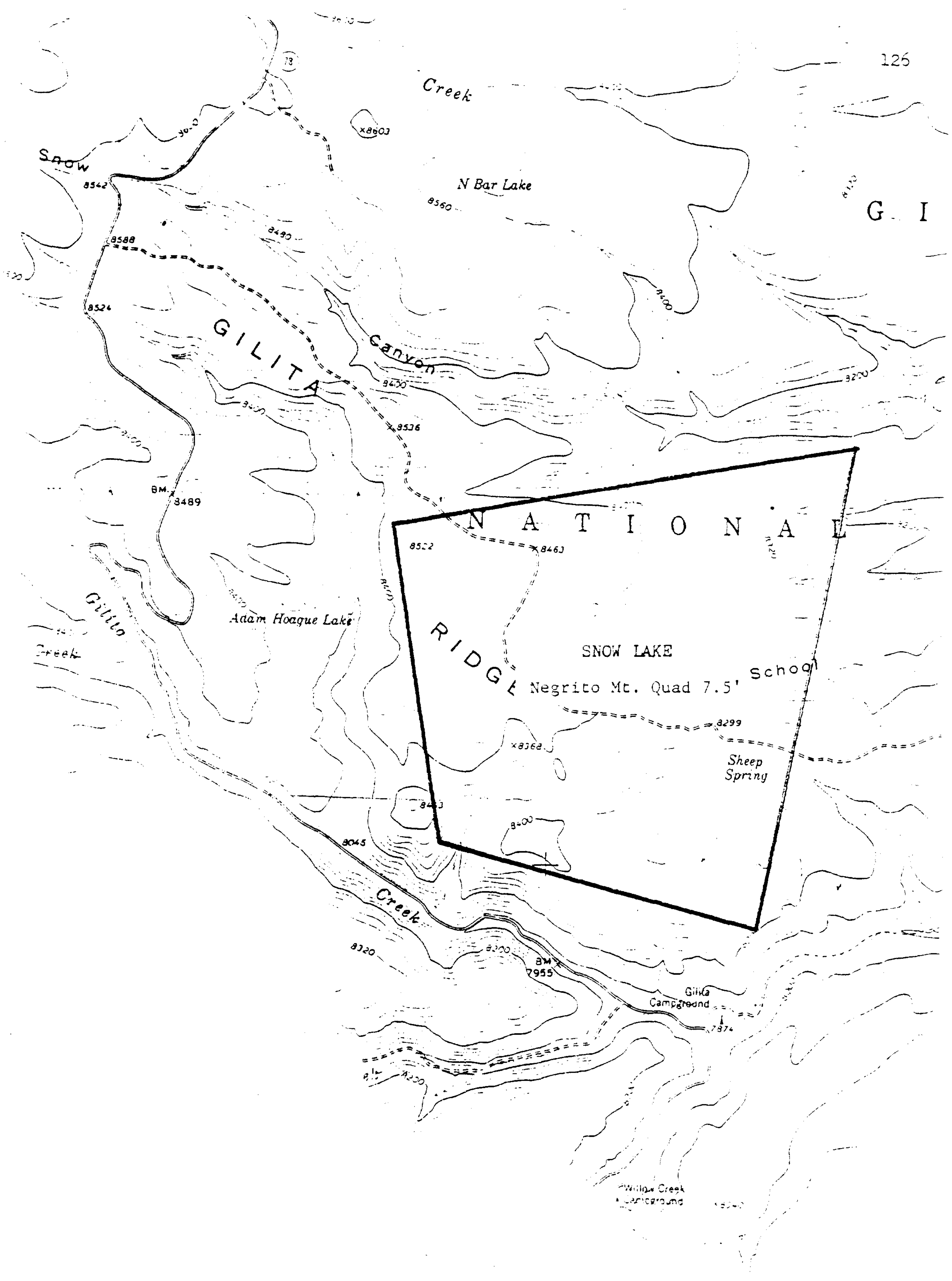

SNOW LAKE
Negrito Mt. Quad 7.5'
Creek
N Bar Lake
Snow
GILITA
Canyon
NATIONAL
RIDGE
School
Adam Hoague Lake
Gilita
Creek
Sheep
Spring
Creek
Gilita
Campground
BM
8489
BM
7955
8542
8588
8526
8560
8536
8522
8463
8299
8368
8045
8320
7874
x8603
G I

TABLE 11. Sites considered from Cibola County, New Mexico, including Priority and page Brief. Numbers preceding names locate sites on county map, facing page.

Map Location Number	Site	Priority	Brief Page
1	El Malpais	3	
2	Grants Lava Flow	3	
3	Grants Lava Ice Caves	1-C	129
4	Grants Lava Sink Hole Ponds	1-C	132
5	McCarty's Flow	3	
6	Mt. Taylor	3	
7	Petaca Pinta	4	
8	Rimrock Group	1-C	136
9	Shoemaker	4	
10	Water Canyon	5	

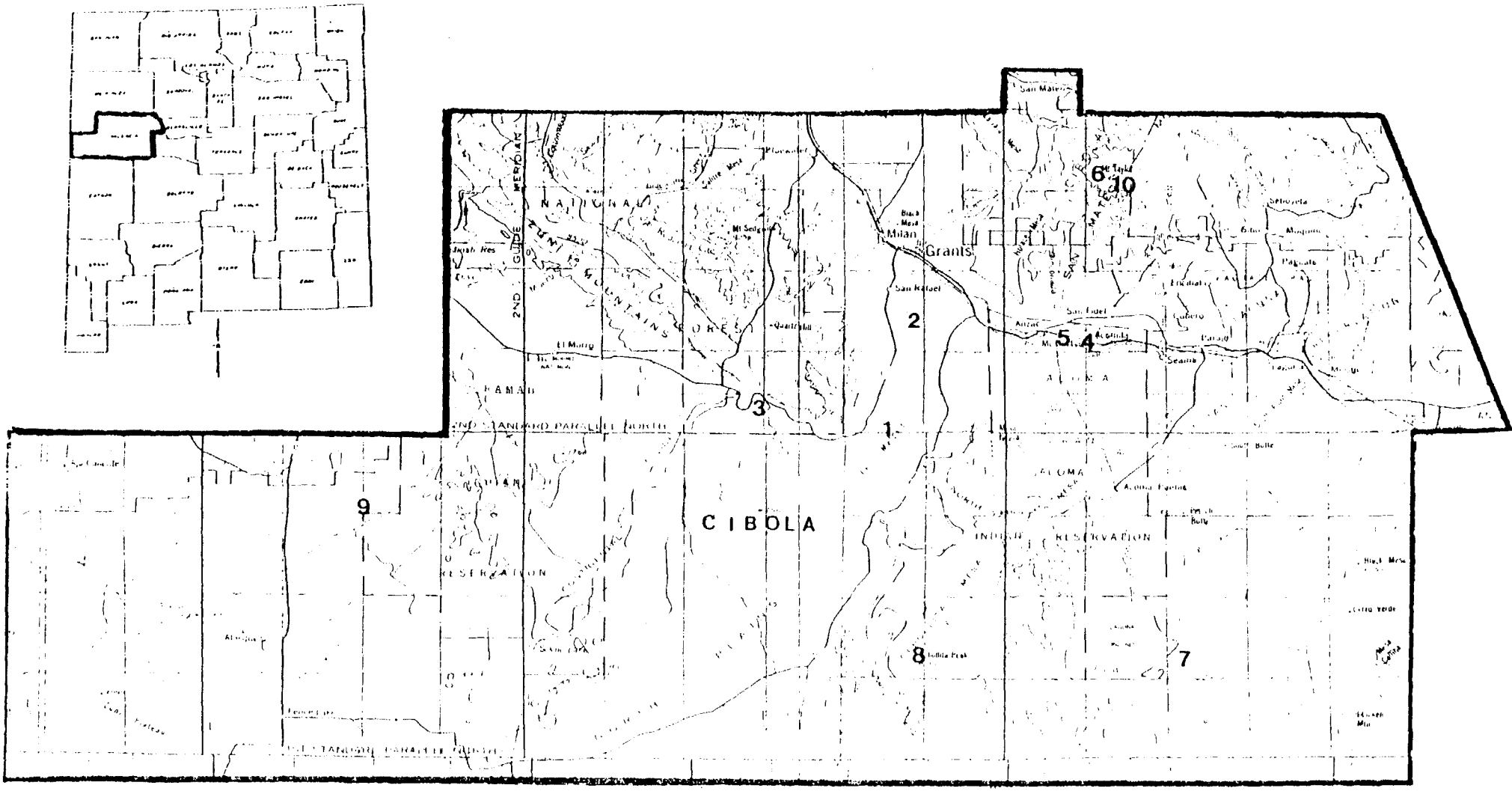


FIGURE 5. General Locations of Cibola County Sites

GRANTS LAVA ICE CAVES

PRIORITY: 1-C

OTHER USE DESIGNATION: UE-P

THEMES:

I. Landform Theme

D. 5. Local Feature, G. 1. Limestone cave and karst.

IV. Species of Special Concern Theme

A. 1. Grass-sedge, 5. Other.

LOCATION: Cibola, New Mexico. 15 miles east southeast of El Morro National Monument.

T9N R12W USGS Map: Ice Caves 7.5'

SIZE: 320 acres (130 hectares)

OWNER/ADMINISTERING AGENCY: Private

NATURAL VALUES:

The lava tube caves in this area are the largest and deepest in the region. The ice bodies originate from direct rainfall, seepage water, and especially from drifting snow collecting in the depth of the pits. The ice caves exhibit a unique sequence of biotic communities on a light-temperature gradient. Low to high. From the depths of the caves to their mouths which is on a vertical axis.

One moss found in these caves Homomallium incurvatum is found only here in the United States. Three ice algae species found in the caves have not been found anywhere else in the United States. Two have been reported from

antarctica and one species (Sphaerella lacustris) is found only here.

Ine one cave the biotic zone starting at the ice surface in the cave bottoms is composed of the yellow lichen Acarosporo evoluta. The next zone up begins with a bright orange lichen Gasparrium elegans var. brachyloba and soon joined by the moss Brachythecium collinum. The next belt up receives some rainfall and is called the mesic moss belt. It is composed of 6-8 different moss species. By the time you are over 30 vertical feet above the ice some shrubs are found. The first is the ninebark Physocarpus opulifolius.

Another nearby cave has an entireley different composition in its vertical biotic zonation. This includes not only different species of mosses but algae instead of lichens. Liverworts are important in this cave. The first shrub here is the current, Ribes inerme, and is joined by a different species of ninebark than the first cave, Physocarpus monogynus.

CURRENT USE: One open to public. Others use not known.

DANGERS TO INTEGRITY: Could be great if access not controller.

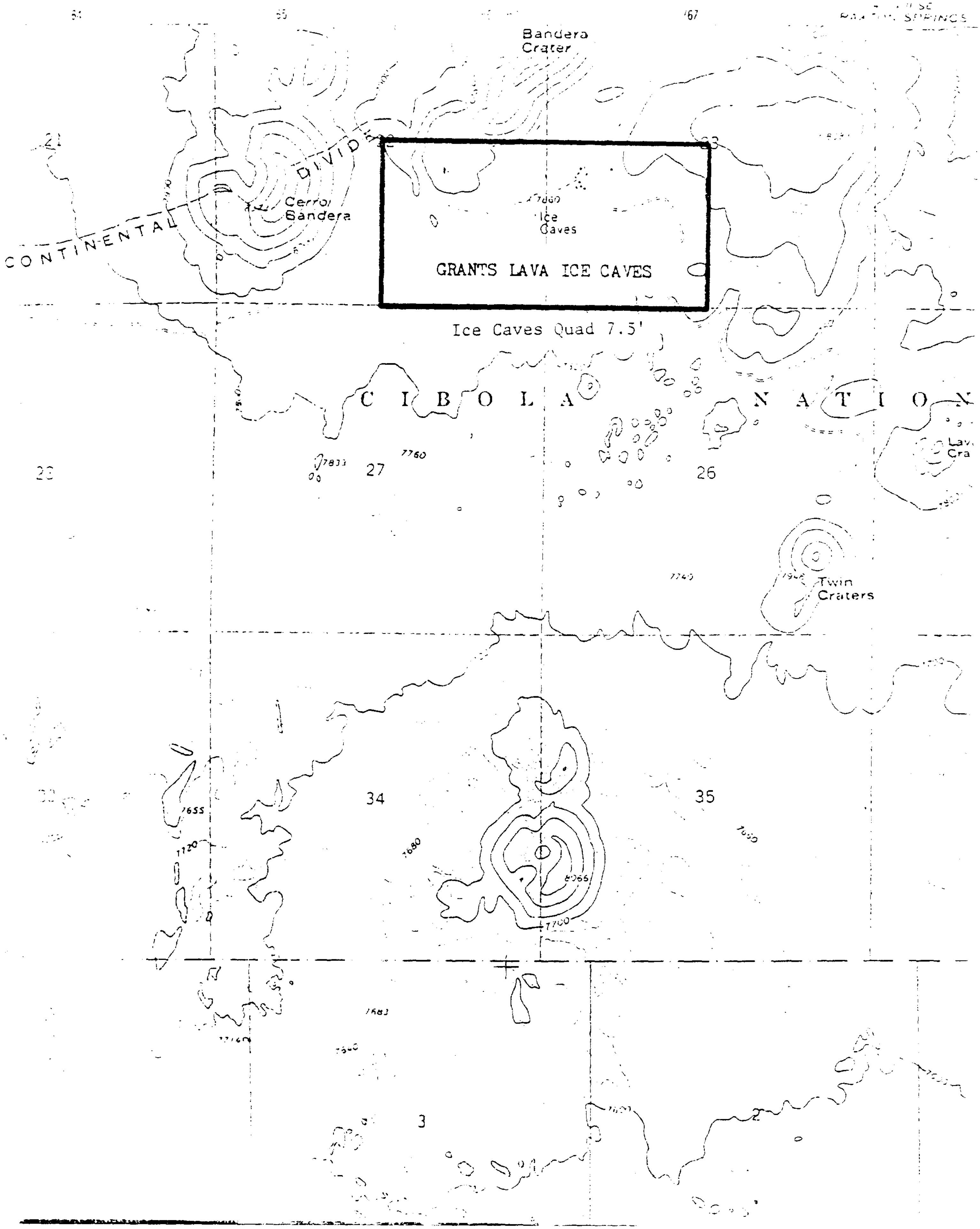
PUBLIC SENSITIVITY: Moderate

DATA SOURCE: New Mexico Heritage office files.

KNOWLEDGEABLE PERSONS: W.F. Isaacs, New Mexico Heritage Office, Department of Natural Resources, Santa Fe, NM.

REFERENCES:

Lindsey, A.A. 1951. Vegetation and habitats in a southwestern volcanic area. Ecol. Mono. 21:3 P. 227-253.


Bandera
Crater
Cerro
Bandera
CONTINENTAL DIVID
7660
Ice
Caves
GRANTS LAVA ICE CAVES
Ice Caves Quad 7.5'
C I B O L A
N A T I O N
21
27
26
7760
7833
Twin
Craters
34
35
7655
7720
7680
7700
7683
3

GRANTS LAVA SINK HOLE PONDS

PRIORITY: 2-C

OTHER USE DESIGNATION: None

THEMES:

I. Landform Theme

D. 5. Local Feature

III. Aquatic Ecosystem Theme

A. 2. Pond

IV. Species of Special Concern Theme

A. 5. Other, B. 2. Invertebrate

LOCATION: Cibola (Old Valencia), New Mexico. 10 miles southeast of Grants, New Mexico.

T10N R8-9W USGS Maps: Grants SE, McCartys 7.5'

SIZE: 500 acres (203 hectares)

OWNER/ADMINISTERING AGENCY: Private

NATURAL VALUES:

The sink hole ponds giving this site its name are found in tube cavern sink-holes of the Grants Lava Bed. They range from shaft-like pits, two feet across, to open ponds more than an acre in area. These ponds can be divided into "open sinkholes" with openings of 12 feet or more and "pits" with openings of less than 12 feet.

They present a complete sequence or plant succession not due to time of origin because they all were formed at the same time, but due to limits of light and low temperature which prevent subsequent stages from developing in a given pond. Seven pond vegetation successional stages

are found. These are beginning in small dark pit ponds: 1. Chlorella (algae) bloom, 2. Rock-crust blue-green algae, 3. Organic ooze stage, 4. Submerged aquatics, 5. Reed-marsh, 6. Temporary pond, 7. Shruby swale.

Only stages 1. and 2. occur in pit ponds. Stage 2. (Rock-crust blue green algae) is composed of 4 blue-green algae species. In stage 3. (organic ooze) the communities may be composed of 4 genera of diatoms, 7 r 8 species of blue-green algae, many species of green algae from 4 genera, and a red sulfur bacterium (Lamprocystis roseo-persicina).

A swimming crustacean, the copepod Scapholeberis mucronata, carries the euglenoid Colacium calvum on its carapace. This commensal pair is known in North America only from Ohio, Wisconsin and Lake Erie outside these ponds.

Successional stage 3. communities may have one or more of three submerged plants, stoneworts (Chara coutraia), Potamogeton pectinatus, and Rorippa nasturtium.

As the stages proceed in a more xeric direction the emergent vegetation (reeds, rushes, cattails) of stage 5, giveway to salt grass (Distichlis strica), foxtail barley (Hordeum jubatum), and alkali muhly (Muhlenbergia asperifolia) or the knotweed (Polygonum longistylum var omisum and the dock Rumex mexicanus. Finally a riparian community dominated by coyote willow (Salix exigua) and wild-olive (Forestiera neomexicana) on ponds at the end of

succession. Recently great amounts of salt cedar (Tamarix spp.) can be found in these terminal communities.

This site is unique to the region and possibly to the nation.

CURRENT USE: Occasional research

DANGERS TO INTEGRITY: Dangers could be considerable because some of the ponds are close to I-40 and under private ownership. Area should be put under some sort of protection.

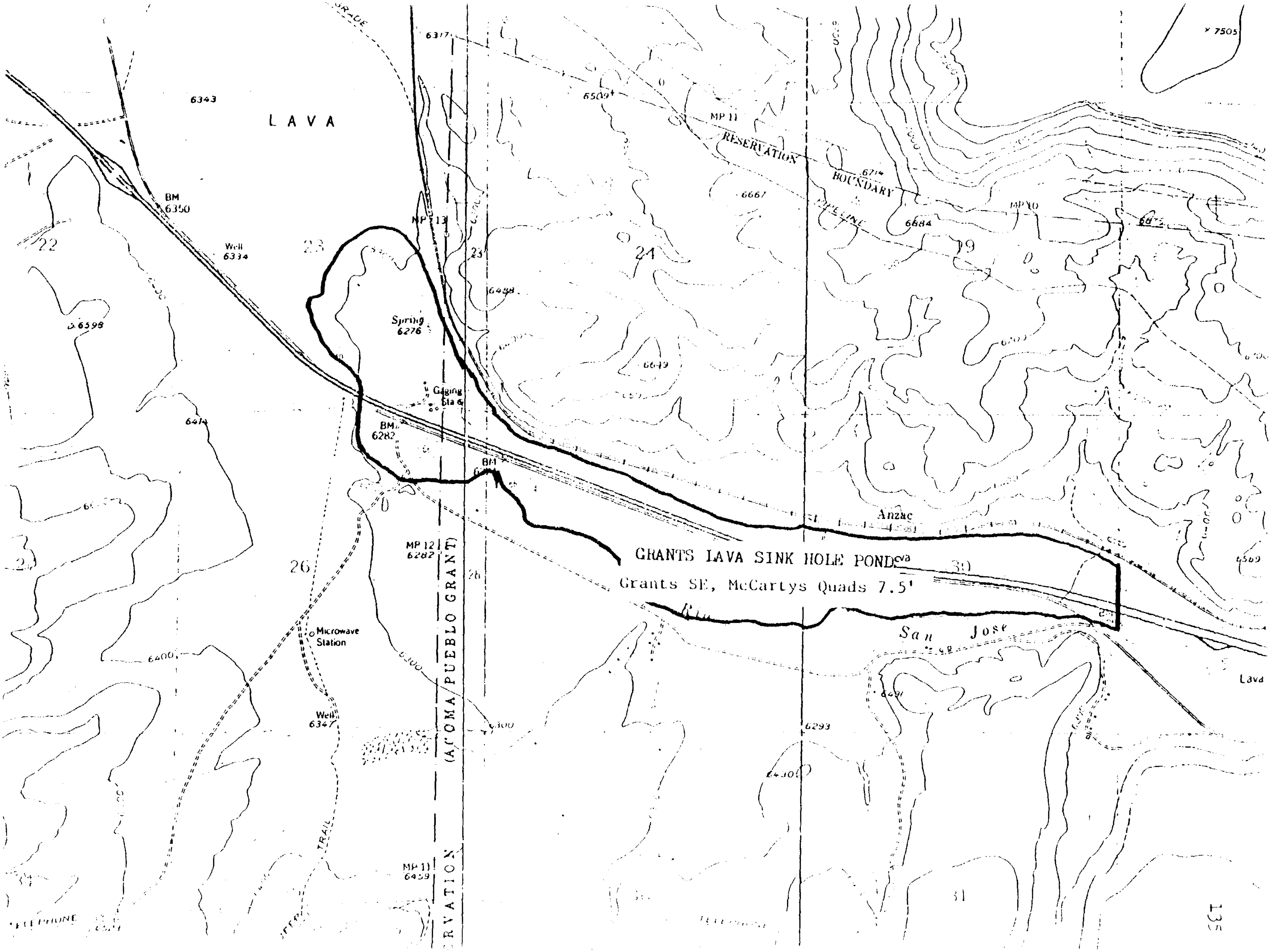
PUBLIC SENSITIVITY: Moderate

DATA SOURCE: New Mexico Heritage Office files.

KNOWLEDGEABLE PERSONS: W.F. Isaacs, New Mexico Heritage Office, Department of Natural Resources, Santa Fe, NM

REFERENCES:

Lindsey, A. A. 1951. Vegetation and Habitats in a southwestern volcanic area. Ecol. Mono. 21:3 P. 227-253.


GRANTS LAVA SINK HOLE PONDS
Grants SE, McCartys Quads 7.5'
LAVA
6343
BM 6350
Well 6334
Spring 6276
Gaging Sta
BM 6282
MP 13
MP 12 6282
MP 11 6459
MP 11
MP 10
RESERVATION BOUNDARY
PIPELINE
(ACOMA PUEBLO GRANT)
Microwave Station
Well 6347
TRAIL
TELEPHONE
Anzac
San Jose
Rio
Lava
22
23
24
25
26
19
30
31
6317
6509
6714
6667
6884
6488
6649
6598
6414
6400
6300
6293
6491
6569
7505

RIMROCK GROUP

PRIORITY: 1-C

OTHER USE DESIGNATION: WSA

THEMES:

I. Landform Theme
   A. Mountain
   I. Plain, Plateau, Mesa, Cuesta, and Hogback

SUBTHEMES:

III. Terrestrial Ecosystem Theme

122.34 Douglas Fir Series, 122.36 Ponderosa Pine Series, 122.37 Successional-Disturbance (subclimax) Series,
122.41 ColoradoPinyon Pine-Juniper Series,
142.13 Grama Grass Series.
174.1 Southwestern Interior Stream (Canyon) Riparian,
174.2 Southwestern Interior Arroyo-Playa Riparian

IV. Species of Special Concern Theme

B. 6. Mammal

LOCATION: Cibola, New Mexico. 20-30 miles southwest of Paraje, New Mexico.

T4-8N R9-11W USGS Maps: North Pasture, Sand Canyon, Laguna Hondo, Cebollita Peak 7.5'

SIZE: 60,450 acres (24,464 hectares)

OWNER/ADMINISTERING AGENCY: BLM

NATURAL VALUES:

This site is one of the most topographically diverse in the region. It contains four BLM administrative units, Rimrock, Little Rimrock, Sand Canyon, and Pinyon. Landforms include park-like valleys, rugged box canyons, immense sandstone cliffs, sandstone mesas, the rimrock of Cebollita Mesa, and the largest natural bridge in the region.

Elevations of the site range from 6,900 to 8,300 feet. A spring is present in the southern portion of the Sand Canyon unit.

The vegetation varies from blue grama (Bouteloua gracilis) grasslands, through Pinyon-Juniper Woodland, and ponderosa pine stands up to douglas fir at the higher elevations of the Rimrock unit. Riparian vegetation includes both canyon and arroyo species.

The topographic diversity and remoteness of the site results in good habitat for mountain lion, turkey, and many species of raptors.

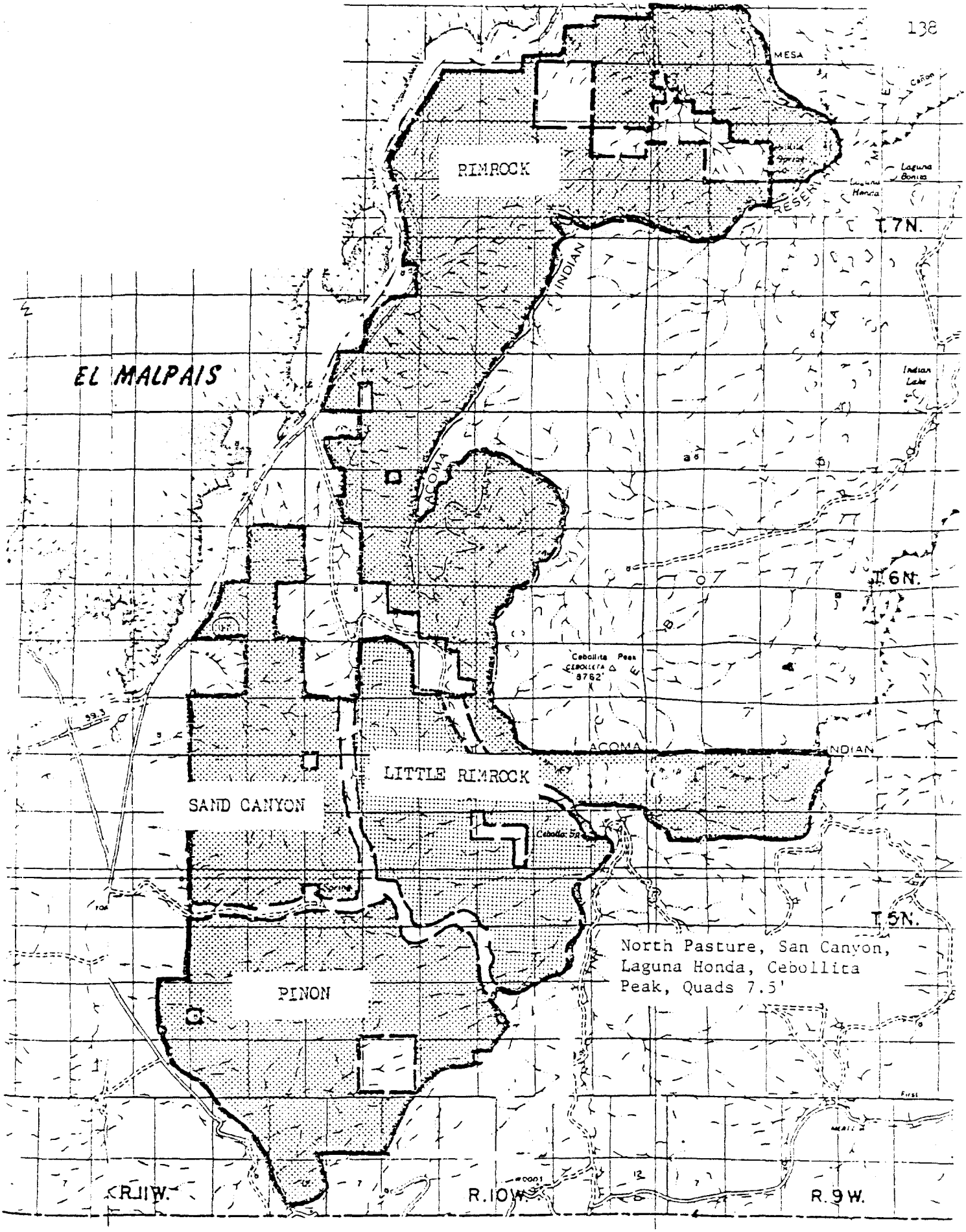
CURRENT USE: Limited cattle grazing

DANGERS TO INTEGRITY: None

PUBLIC SENSITIVITY: Moderate

DATA SOURCE: U.S. Department of Interior, BLM, 1980. New Mexico Wilderness-study area decisions. Santa Fe, New Mexico.

KNOWLEDGEABLE PERSONS: BLM Socorro District Office, Socorro, NM.



North Pasture, San Canyon, Laguna Honda, Cebollita Peak, Quads 7.5'

TABLE 12. Sites considered from Chaves County, New Mexico, including Priority and page of Brief. Numbers preceding names locate sites on county map, facing page.

Map Location Number	Site	Priority	Brief Page
1	Bitter Lake		
1a	BL-Bitter Lake	3	
1b	BL-Ink Pots	1-C	141
1c	BL-Lake St. Frances	3	
1d	BL-Salt Creek	3	
2	Bottomless Lakes	5	
3	Mathers	3	
4	Mescalero Escarpment	3	
5	Mescalero Sands	3	
6	Mescalero Sands Archaeological Site	1-C	143
7	North Dunes	5	
8	Prairie Chicken	5	
9	Sink Hole Group	3	
10	South Dunes	5	

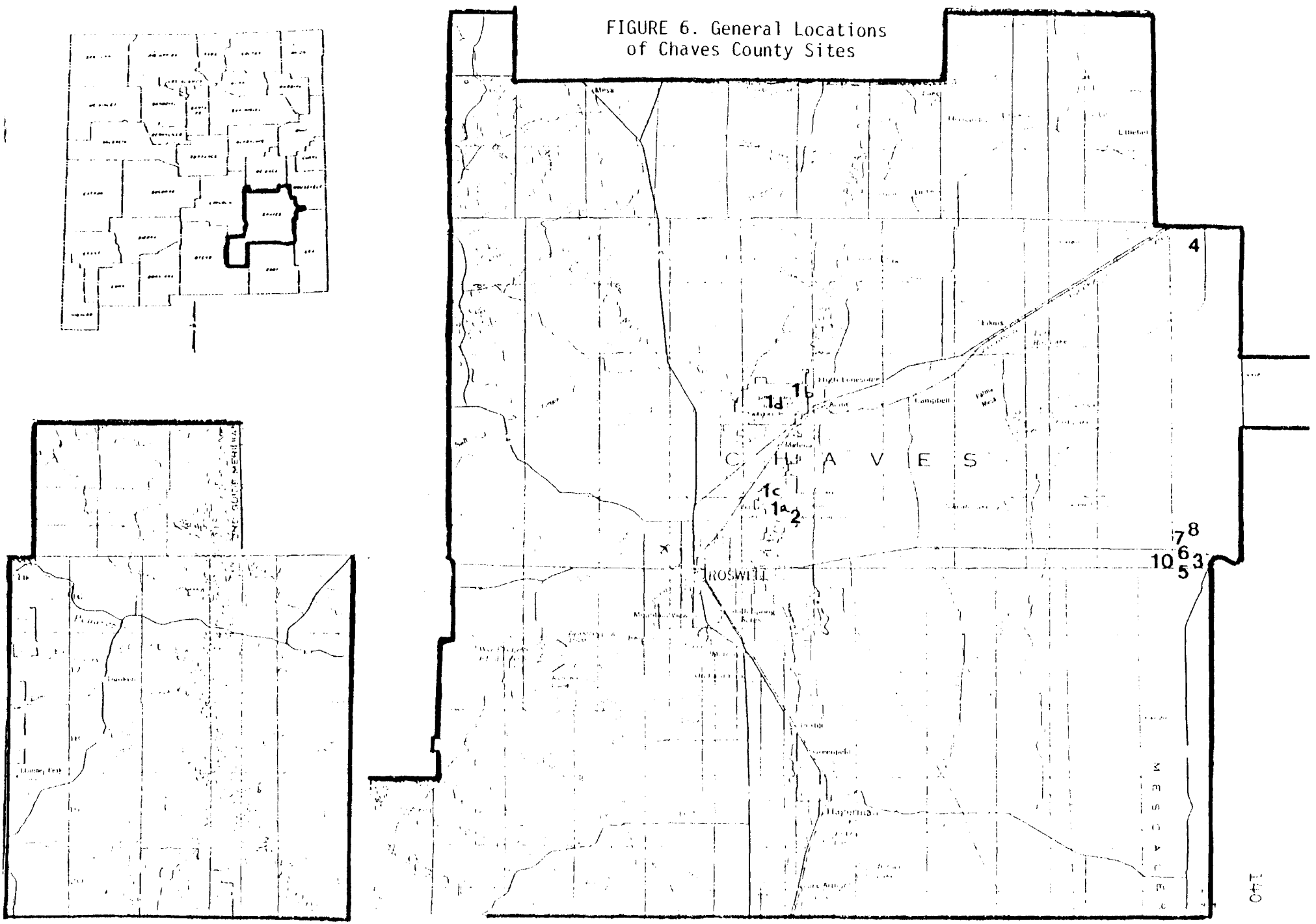


FIGURE 6. General Locations of Chaves County Sites

BITTER LAKES - INK POTS

PRIORITY: 1-C

OTHER USE DESIGNATION: RNA

THEMES:

I. Landform Theme

1. Limestone caves and karst

IV. Species of Special Concern Theme

A. 5. Algae, B. 2. Fish.

LOCATIONS: Chaves, New Mexico. 16 miles northeast of Roswell, New Mexico.

T8S R25E USGS Map: Melena 7.5'

SIZE: 2 acres (.8 hectares)

OWNER/ADMINISTERING AGENCY: FWS

NATURAL VALUES:

This site recommended because it is a classic example of sinkholes formed by dissolution and collapse of the gypsum dome substratum. In addition the sinkholes support the marine algae, Botophora oerstedii and the threatened fish species Gambusia nobilis.

The pots are spectacular vertical walled sinkholes.

CURRENT USE: In NWF Refuge

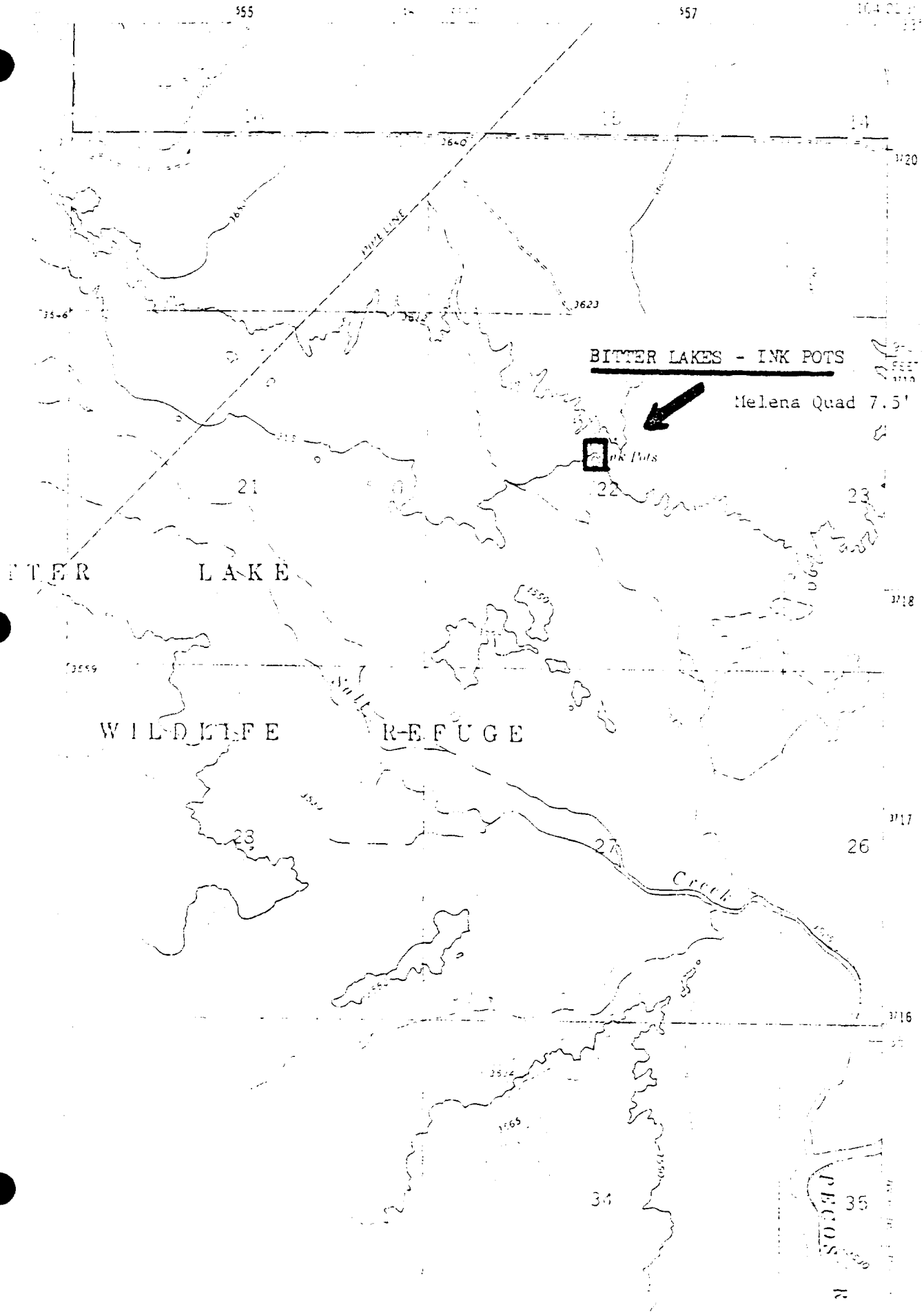
DANGER TO INTEGRITY: None

PUBLIC SENSITIVITY: Low

DATA SOURCE: Bitterlakes NWF refuge. RNA report. Roswell, NM.

KNOWLEDGEABLE PERSONS: Bitterlakes NWF refuge. RNA report. Roswell, NM.

MELENA QUADRANGLE
NEW MEXICO-CHAVES CO
7.5 MINUTE SERIES (TOPOGRAPHIC)



MESCALERO SANDS ARCHAEOLOGICAL SITE

PRIORITY: 1-C

OTHER USE DESIGNATION: NHR

THEME:

II. Paleontological-Archaeological Theme

B. Archaeological
1. Post Pleistocene

LOCATION: Chaves County, New Mexico. 41 miles east of Roswell, New Mexico.

T12S R30, 31E USGS Maps: Culp Ranch, Mescalero Point 7.5'

SIZE: 1,000 acres (404.7 hectares)

OWNER/ADMINISTERING AGENCY: BLM

NATURAL VALUES:

There are 33 archaeological sites in the area which appear to have been seasonal camp sites utilized, by aboriginals during the Querecho Phase of the Jornado Magollon (950-1100 A. D.), for the exploitation of natural foodstuffs. The area contains active sand dunes over alluvium and has had considerable aeolian activity since the beginning of the Altithermal Period. Because of this aeolian activity, there are represented here a variety of successional stages from active dunes to climax shinnery oak (Quercus havardii) and sand prairie.

In addition to the major occupation during 950-1100 A. D., it has been suggested that the Apache also used the area in more modern times, gathering what natural foodstuffs were available. These sites have the potential for providing

much needed data on seasonal camps and gathering sites. This types of information for this geographic region is almost non-existent in the archaeological literature.

All of the soils of the Mescalero Sands survey area fall into the Jalmar-Tivoli-Faskin association. Jalmar soil occur on gently undulating and hummocky landscapes. They have a thick surface layer of light brown to brown fine sand over a subsoil of red to reddish-brown sandy clay loam. This, in turn, is underlain by yellowish-red light sandy clay loam. A white fractured caliche layer is often present at depths between four and six feet.

Tivoli soils occupy those parts of the landscape in this association that are gently rolling and having dune-like topography. They have surface layers of loose, noncalcareous yellowish-brown fine sand over thick deposits of find sand.

Faskin soils occur on the nearly level to gently slopingg areas between the rolling and dune-like landscapes of the Tivoli soils and undulating and hummocky landscapes occupied by the Jalmar soils. These soils have a surface layer of brown noncalacreous fine sandy loam or loamy fine sand over a thick reddish-brown sandy clay loam subsoil that is typically noncalcareous in the upper part. A weak but distinct zone of lime accumulation commonly occurs between 40 and 60 inches in the form of small soft masses and coatings on the surface of the soil beds.

Also in this association are small areas of active duneland, Redona, Gomez, Ima, and Blakeney soils. Active duneland includes the barren or nearly barren sand dunes that are actively eroding. The redona soils have sandy loam surface layers, sandy clay loam subsoils and a strong lime zone at depths of 28 to 40 inches. The Gomez soils have a loamy fine sand surface, fine sandy loam subsoils, and a strong lime zone at depths of 22 to 40 inches. The Ima soils are deep sandy loam soils in depressions and drainage. The Blakeney soils are shallow sand loam soils underlain by fractured indurated caliche.

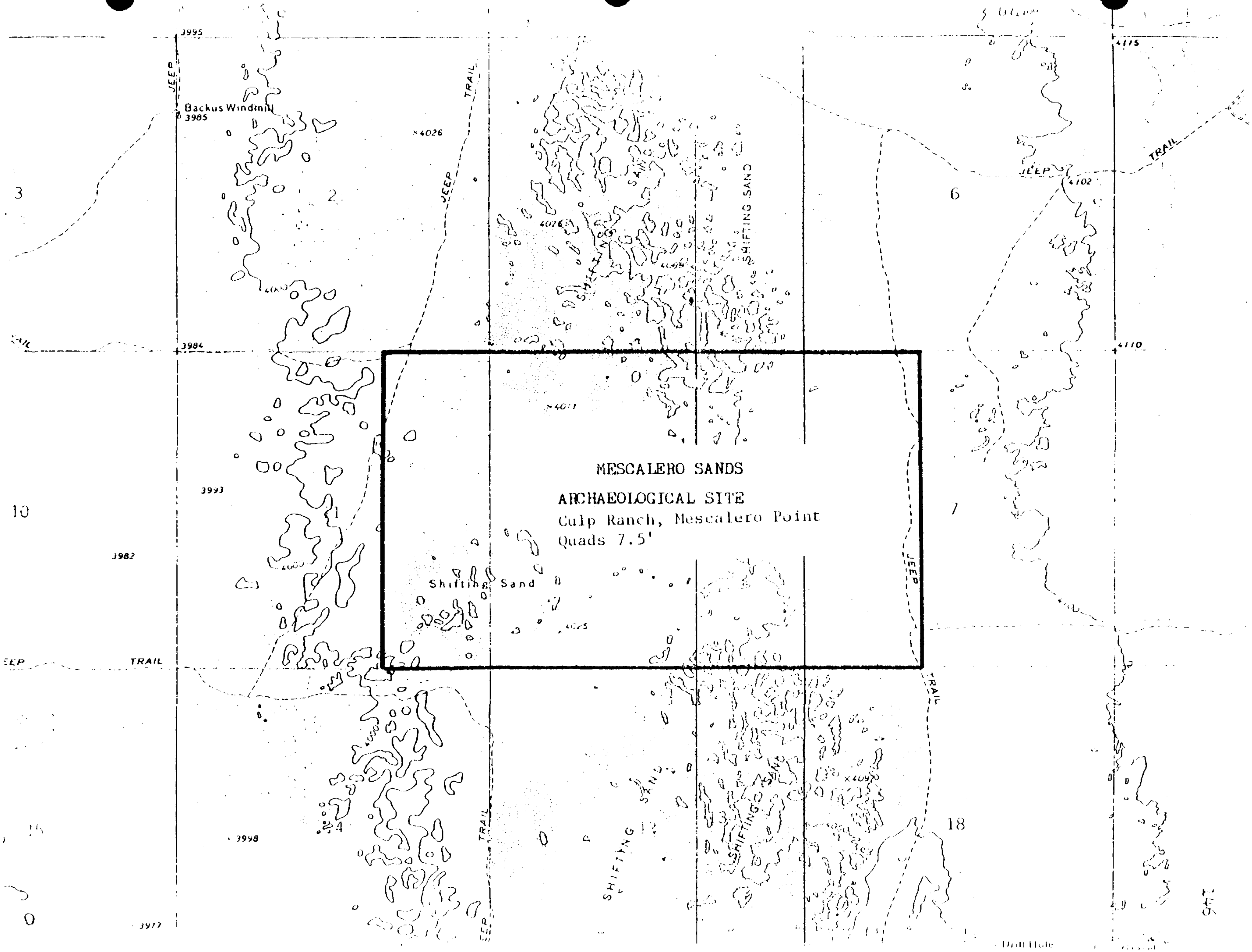
CURRENT USE: Limited grazing

DANGERS TO INTEGRITY: Small if BLM can protect from artifact hunters.

PUBLIC SENSITIVITY: High

DATA SOURCE: BLM NHR Report, Roswell District Office, Roswell, NM.

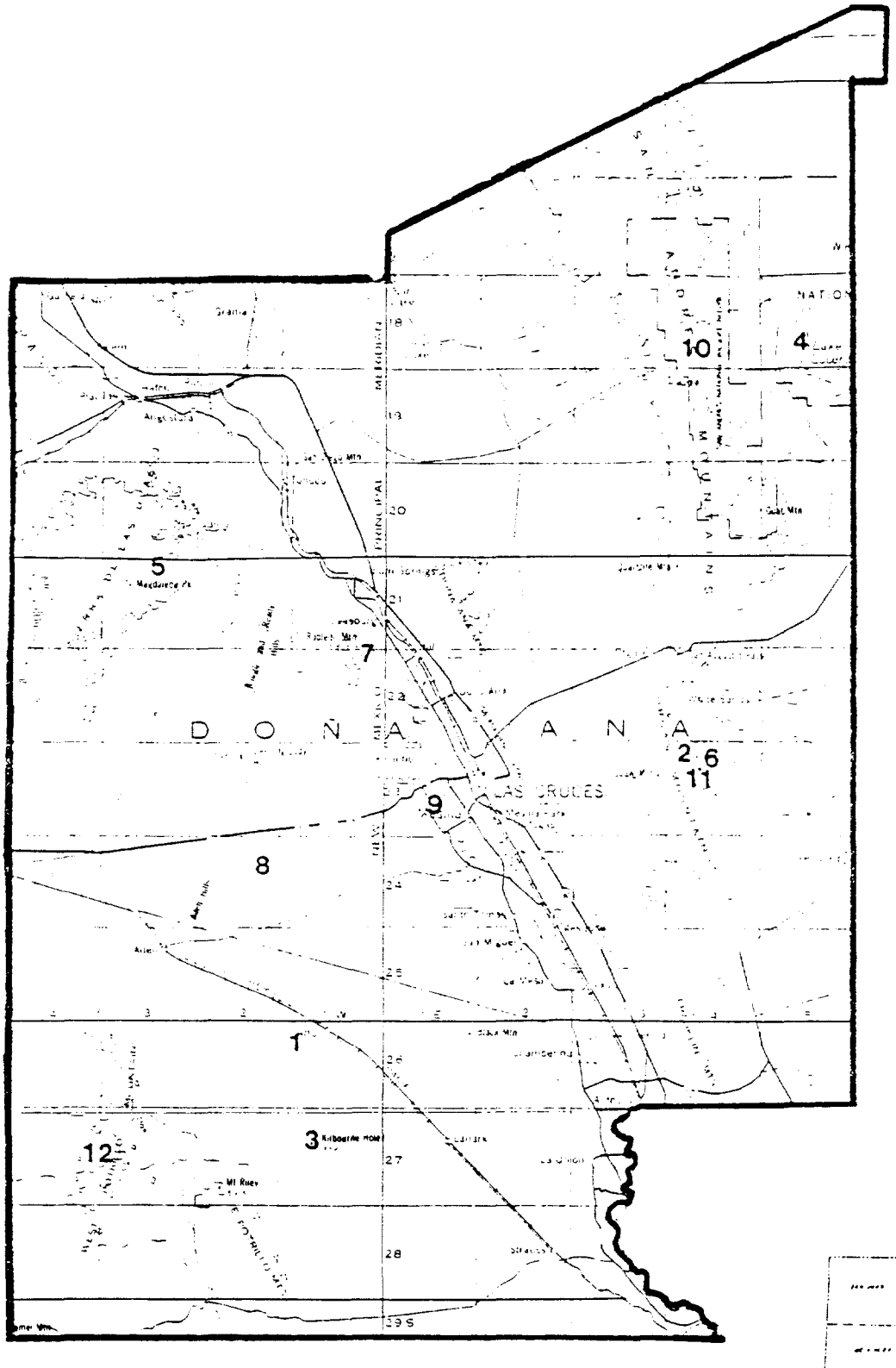
KNOWLEDGEABLE PERSONS: James H. O'Connor, District Manager, Buz Hummel, Wilderness Specialist, Roswell District Office, Bureau of Land Management, Roswell, New Mexico.



MESCALERO SANDS
ARCHAEOLOGICAL SITE
Culp Ranch, Mescalero Point
Quads 7.5'
Backus Windmill
3995
3985
3984
3993
3982
3998
3977
4026
4076
4025
4102
4110
4115
JEEP
TRAIL
JEEP TRAIL
Shifting Sand
SHIFTING SAND
3
2
6
10
1
7
18

TABLE 13. Sites considered from Dona Ana County, New Mexico, including Priority and page of Brief. Numbers preceding names locate sites on county map, facing page.

Map Location Number	Site	Priority	Brief Page
1	Aden Lava Flow	1-C	149
2	Dripping Springs	2-B	151
3	Killbourne Hole	3	
4	Lake Lucero	1-C	154
5	Las Uvas Mountains	5	
6	Organ Mountains	2-C	156
7	Robledo Mountains	5	
8	Rodrick	5	
9	Sage	5	
10	San Andreas	1-C	159
11	Soledad Rock Gardens	5	
12	West Potrillo Mountains	2-C	163



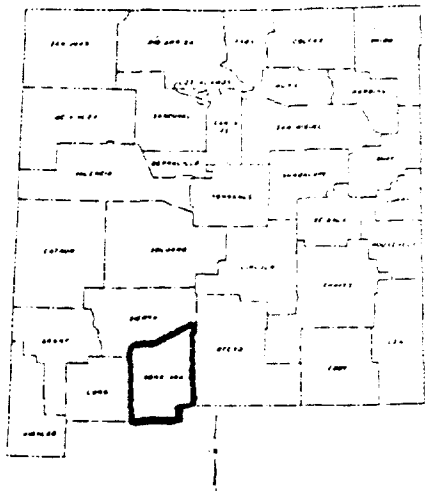


FIGURE 7. General Locations of Dona Ana County Sites

ADEN LAVA FLOW

PRIORITY: 1-C

OTHER USE DESIGNATION: A portin is in RNA.

THEMES:

I. Landform Theme

D. 4. Lava flow - crater

LOCATION: Dona Ana, New Mexico. 25 miles southwest of Las Cruces, New Mexico.

T25-27S R1-2W, 1E USGS Maps: Aden, Afton, Mt. Riley, Noria 15'

SIZE: 24,725 acres (10,011 hectares)

OWNER/ADMINISTERING AGENCY: BLM

NATURAL VALUES:

This is a classic example of a restricted lava flow which consists of a basaltic pressure ridge, sinks, spatter cones and other typical lava flow depressions.

The vegetation of the site consists of scattered cresotebush (Larrea tridentata) and grass with some minor arroyo dominants such as brickellia (Brickellia spp.).

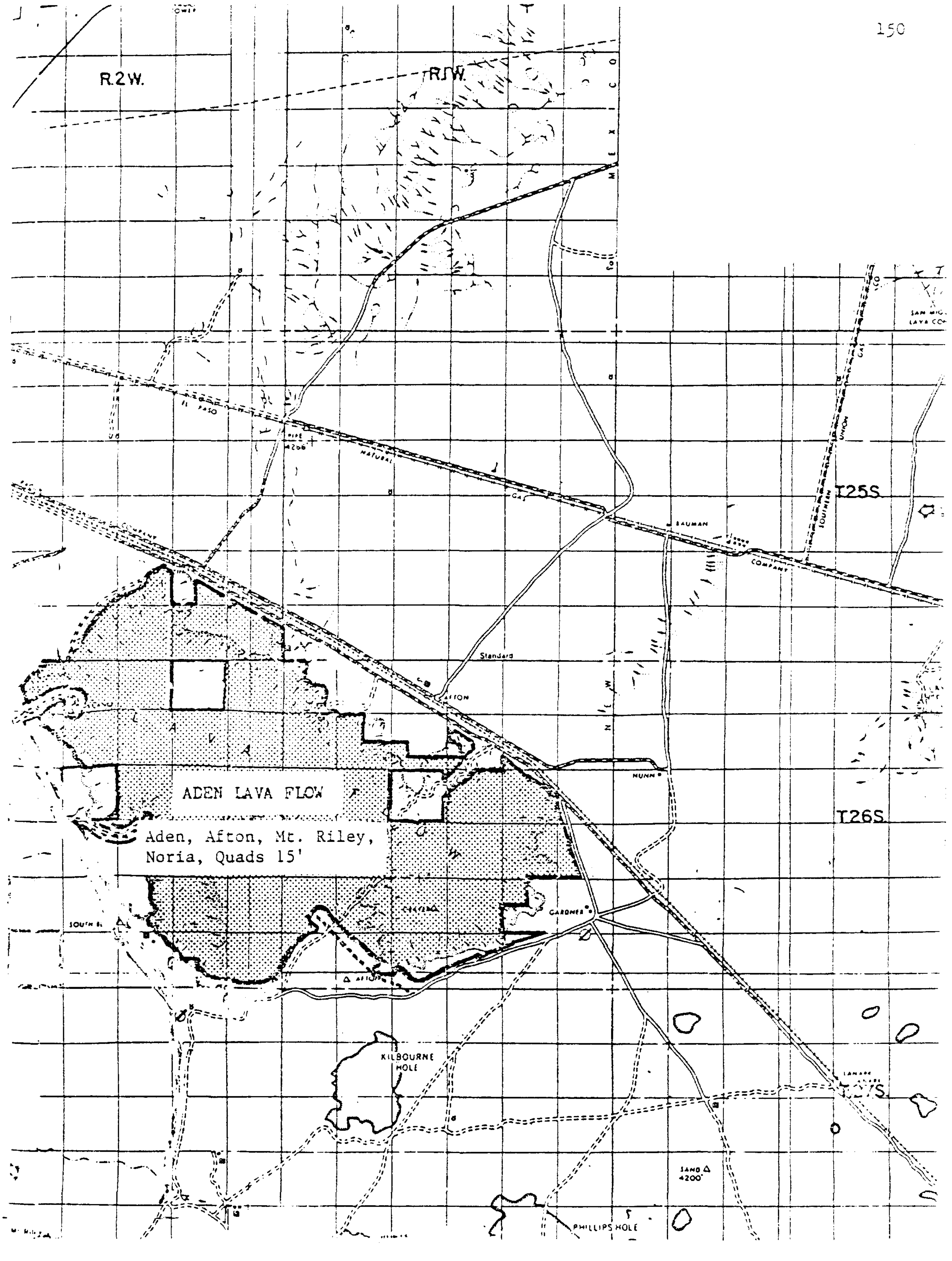
CURRENT USE: Limited cattle grazing

DANGERS TO INTEGRITY: None

PUBLIC SENSITIVITY: Low

DATA SOURCE: U.S. Department of Interior, BLM, 1980. New Mexico Wilderness-study area decisions. Santa Fe, NM BLM RNA reports. Las Cruces District Office, Las Cruces, NM

KNOWLEDGEABLE PERSONS: BLM Las Cruces, District Office, Las Cruces, NM


R.2W.
R.1W.
M E X I C O
EL PASO
NATURAL
GAS
COMPANY
SOUTHERN UNION GAS
BAUMAN
T25S
Standard
AFTON
NUNN
T26S
L A V A
ADEN LAVA FLOW
Aden, Afton, Mt. Riley,
Noria, Quads 15'
GARDNER
AFTON
KILBOURNE
HOLE
SAND △
4200'
PHILLIPS HOLE
T27S

DRIPPING SPRINGS

PRIORITY: 2-B

OTHER USE DESIGNATION: UE-P

THEMES:

I. Landform Theme

E. 1. Cold Spring

IV. Species of Special Concern Theme

A. 2. Forb, 3. Shrub B. 4. Reptile, 5. Bird.

LOCATION: Dona Ana, New Mexico. 15 miles east of Las Cruces, New Mexico.

T23S R4E USGS Maps: Organ Peak 7.5'

SIZE: 280 acres (121 hectares)

OWNER/ADMINISTERING AGENCY: Private Cox

NATURAL VALUES:

This site represents a very rare type for the xeric southern portion of the region. It has a perennial water source and runoff which supports canyon type riparian vegetation such as chokecherry Prunus virginiana, hackberry (Celtis reticulata). Apache-plume (Fallugia paradoxa). The oasis nature of the site located in a rocky canyon of a relatively xeric mountain range supports a number of narrow endemic plant species which are on the federally threatened list. These are Aletes filifolius, Perityle cernua, Rosa stellata, and Oenothera organensis. The site also supports uncommon animals which are either federally endangered or on the New Mexico rare list. These are the birds Zone-tailed Hawk, Apolomado Falcon, Peregrine Falcon, Baird's Sparrow,

McCown's Longsfur, Blue-throated Humingbird, and Bell's Vireo. Two snakes Trans-pecos Rat Snake (Elaphe subocularis) and Lyre Snake (Trimorphodon biscutatus vilkinsoni) are found in the vicinity.

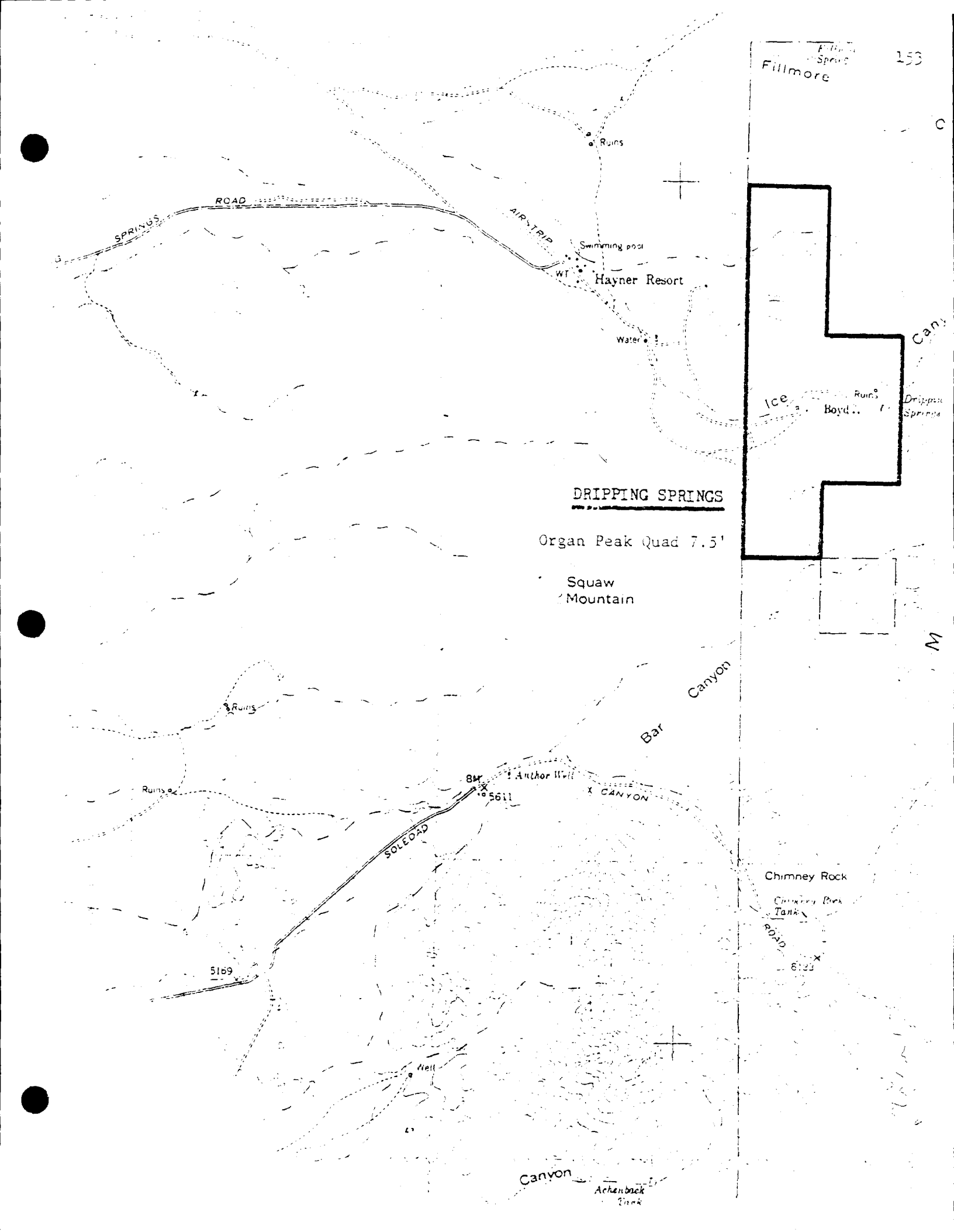
CURRENT USE: Limited recreation

DANGERS TO INTEGRITY: Considerable unless set aside

PUBLIC SENSITIVITY: Moderate

DATA SOURCE: Dick-Peddie, W.A. 1978. New Mexico Unique Wildlife Ecosystem Concept Plan. Natural Resources Department, Santa Fe, New Mexico. Site Visit-W.A. Dick-Peddie.

KNOWLEDGEABLE PERSONS: W.F. Isaacs, Heritage Office, New Mexico Department of Natural Resources, Santa Fe, NM


153
Fillmore
Ruins
SPRINGS
ROAD
AIR STRIP
Swimming pool
WT
Hayner Resort
Water
Ice
Ruins
Boyd
Dripping Springs
DRIPPING SPRINGS
Organ Peak Quad 7.5'
Squaw Mountain
Bar
Canyon
Ruins
Ruins
Anchor Well
5611
CANYON
SOLEDAD
Chimney Rock
Tank
ROAD
5169
Well
Canyon
Achenbach
Tank

LAKE LUCERO

PRIORITY: 1-C

OTHER USE DESIGNATION: NM, RNA

THEME:

I. Landform Theme

J. 6. Shoreline, 7. Unusual mineral occurrence.

LOCATION: Dona Ana, New Mexico. 31 miles southwest of Alamogordo, New Mexico.

T18-19S R5E USGS Maps: Point of Sands 2 15'; Lake Lucero 7.5

SIZE: 19,000 acres (7,695 hectares)

OWNER/ADMINISTERING AGENCY: NPS

NATURAL VALUES:

This is one of the most unusual dry lake beds in the United States. The bed contains hundreds of acres of huge exposed gypsum crystals which are the source of the white sands of the White Sands National Monument to the east. This site is equal in uniqueness and rarity to that of the monument.

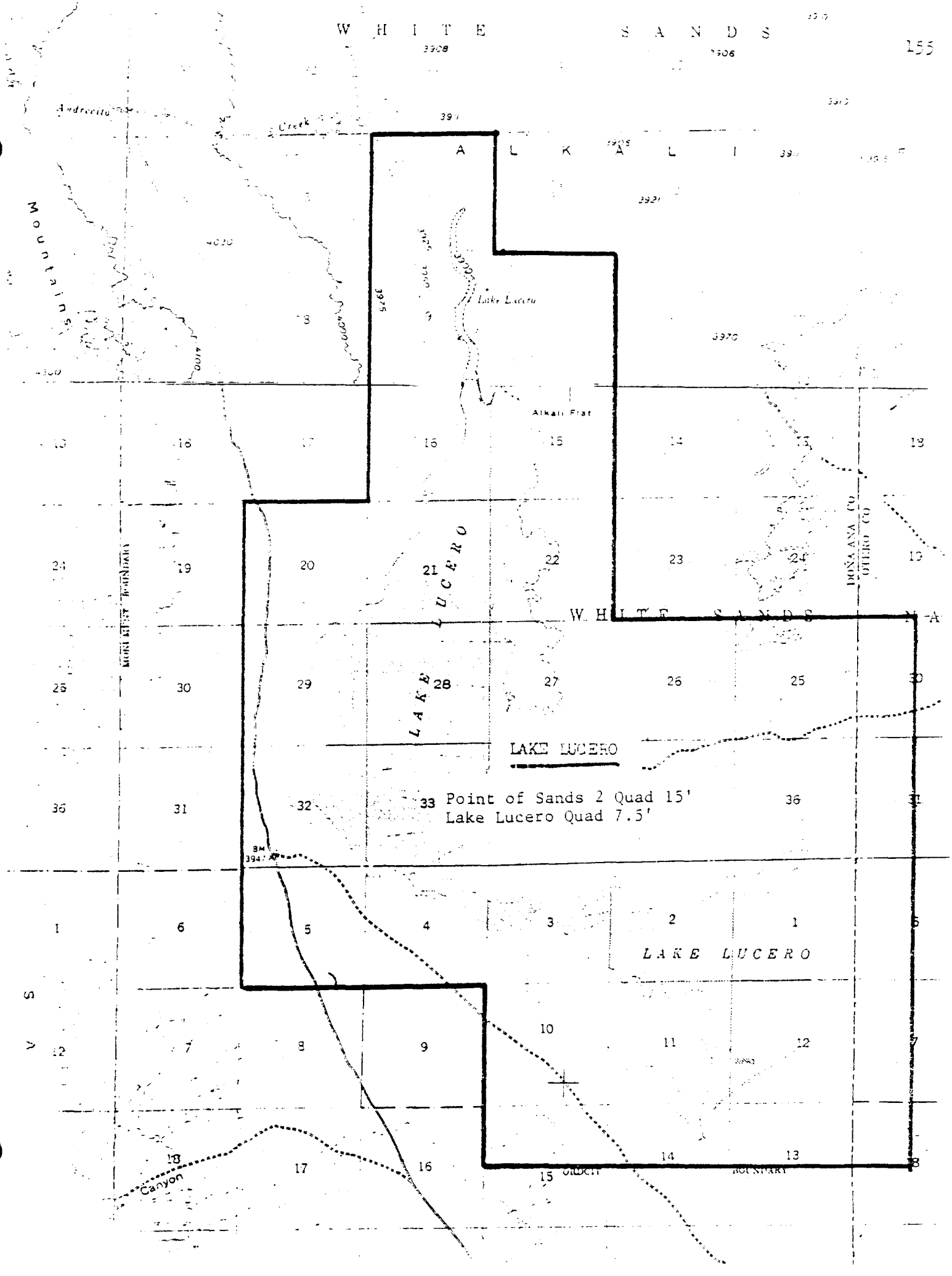
CURRENT USE: None

DANGERS TO INTEGRITY: None. Controlled by White Sands Missile Range.

PUBLIC SENSITIVITY: Moderate

DATA SOURCE: White Sands National Monument Personnel.

KNOWLEDGEABLE PERSONS: Superintendent, White Sands National Monument, White Sands, NM


WHITE SANDS
Mountains
Alkali Flat
LAKE LUCERO
LAKE LUCERO
Point of Sands 2 Quad 15'
Lake Lucero Quad 7.5'
LAKE LUCERO
WHITE SANDS
DOÑA ANA CO
OTERO CO
Canyon

ORGAN MOUNTAINS

PRIORITY: 2-C

OTHER USE DESIGNATION: Portion NRT

THEMES:

I. Landform Theme

A. 1. Fault-block, 2. Folded

IV. Species of Special Concern Theme

A. 2. Forb

SUBTHEME:

III. Terrestrial Ecosystem Theme

122.36 Ponderosa Pine Series,
122.41 Colorado Pinyon Pine-Juniper Series,
133.31 Scrub Oak Series,
143.13 Grama Grass-Rosette Scrub Series,
174.15 Hackberry Series.

LOCATION: Dona Ana, New Mexico. 15 miles east of Las Cruces, New Mexico.

T22S R3-4E USGS Maps: Organ Peak NW, Organ, Tortugas Mountain, Organ Peak 7.5'

SIZE: 7,200 acres (+2,913 hectares)

OWNER/ADMINISTERING AGENCY: BLM

NATURAL VALUES:

This site contains the northern portion of the Organ Mountains and bordering bajadas. The mountains are characterized by rugged rock outcrops and massive jagged vertical intrusions. Elevation ranges from 5,000-9,012 feet.

There are many narrow endemic plant species. Two of

the most rare are Perityle cernua and Silene plankii. Both on threatened list.

The range with its vertical intrusions is unique to the region.

The range is remote enough to contain nesting habit for eagle, prairie falcon, and redtailed hawk.

The vegetation ranges from Grama Grass-Rosette Scrub Series up through Scrub Oak and Colorado Pinyon Pine Juniper Series to Ponderosa Pine Series.

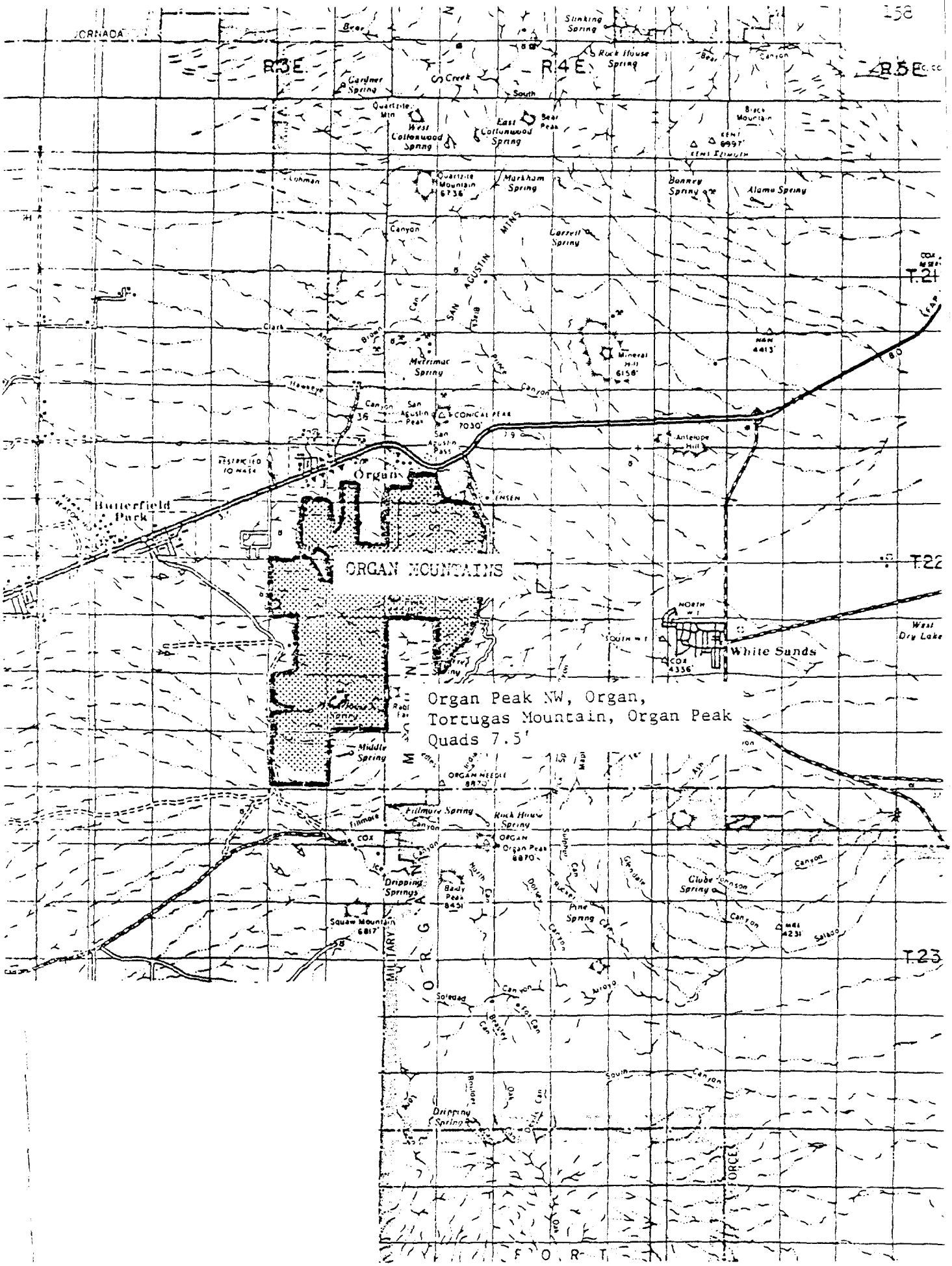
CURRENT USE: Mountain climbing, limited cattle grazing

DANGERS TO INTEGRITY: Not great

PUBLIC SENSITIVITY: Low

DATA SOURCE: BLM Recreation plan, Las Cruces District Office, Las Cruces, New Mexico. New Mexico Heritage files, Natural Resources Department, Santa Fe, New Mexico. Site Visit-W.A. Dick-Peddie.

KNOWLEDGEABLE PERSONS: W.F. Isaacs, Heritage Office, New Mexico Department of Natural Resources, Santa Fe, New Mexico.


R3E
R4E
R5E
T.21
T.22
T.23
ORGAN MOUNTAINS
Organ
Butterfield Park
White Sands
Organ Peak NW, Organ,
Tortugas Mountain, Organ Peak
Quads 7.5'
MILITARY
FORT

SAN ANDRES

PRIORITY: 1-C

OTHER USE DESIGNATION: NWLR

THEME:
IV. Species of Special Concern Theme

A. 2. Forb, 3. Shrub, B. 6. Mammal

SUBTHEMES:

I. Landform Theme

A. 1. Fault-block, 3. Folded
E. 1. Cold Spring, 4. Perrenial Stream Segment

III. Terrestrial Ecosystem Theme

122.36 Ponderosa Pine Series,
122.41 Colorado Pinyon Pine-Juniper Series,
123.32 Encinal (Oak) Series,
133.31 Scrub Oak Series,
143.11 Scrub-Blue Grama Series, 143.12 Black Grama-Scrub Series, 143.13 Grama Grass-Rosette Scrub Series,
174.1 Southwestern Interior Stream (canyon) Riparian.

LOCATION: Dona Ana, New Mexico. 20 miles northeast of Las Cruces, New Mexico.

T9-21S R2-5E USGS Maps: Lake Lucero SW, Bear Peak, Organ 7.5'

SIZE: 57,215 acres (23,155 hectares)

OWNER/ADMINISTERING AGENCY: FWS

NATURAL VALUES:

This site has many plants which are uncommon in other mountain ranges in New Mexico, such as shrubs Mortonia scabrella, Fendlerella, and Bernardia. There is also an impressive list of rare threatened and endangered species.

Plants of the area are invariably calaiphiles and thus differ from those of the northern Organ Mountains which is

composed of a massive quartz-monconite upthrust. For example, Perityle staurophylla, which occurs throughout the refuge on suitably protected cliff faces, stops abruptly near Quartzite Mountain and does not occur on the altered limestones further south. Further, plants here have strong affinites with the Guadalupe Mountains, probably because of the shared highly gypseous character of the limestones in the two ranges.

Following are some of the rare, threatened, and narrow endemic plants found on this site: Polygala rinulicola var mescalerorum, Pensteman alamosensis, Thelypodium vernale, Astragalus castetteri, Perityle staurophylla, Pediocactus papynaccuthus, Euphorbia autisphyliticia, Philadelphus mearnsii, Salvia summa, Ostrya knowltonii, Pinavopappus parvus, Lobelia cardinalis ssp graminea, Coryphantha sneedii, Peniocereus greggii, Juniperus ashii, Choisya dumosa.

The site has perennial water from springs such as rope springs with excellent examples of Southwestern Interior Stream (canyon) Riparian vegetation. In addition the vegetation goes from Scrub Grassland up through Interior Chaparral and Woodland to Ponderosa Pine.

The site includes a federal refuge for big horn sheep.

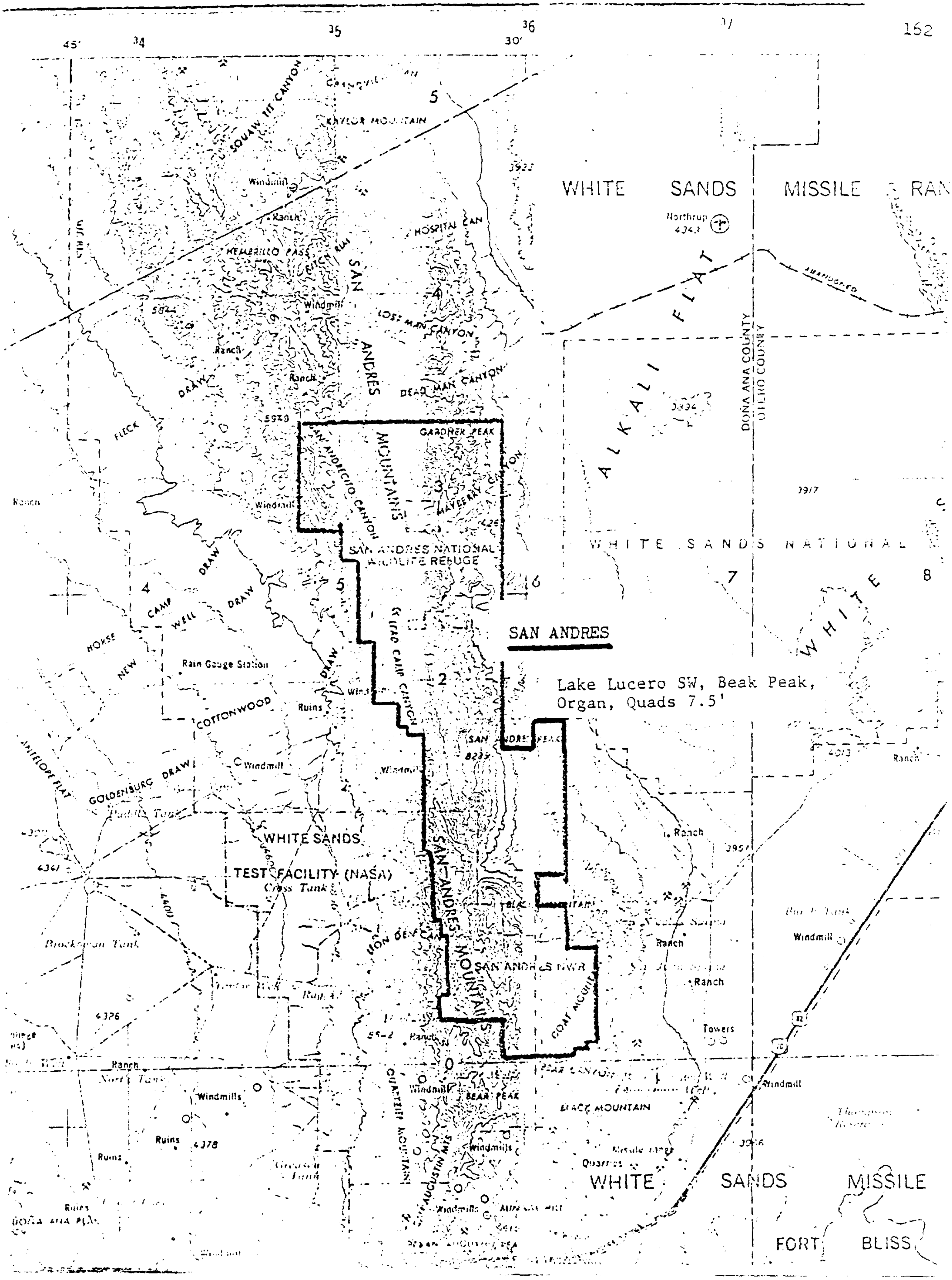
CURRENT USE: Wildlife Refuge, limited cattle grazing.

DANGERS TO INTEGRITY: If remove from White Sands Missile Range security. The area could be threatened by heavy recreational use.

PUBLIC SENSITIVITY: High

DATA SOURCE: BLM report by Jeff Jarvis. Plant survey by T. Todsen, NMSU.

KNOWLEDGEABLE PERSONS: Site visit-W.A. Dick-Peddie, T.K. Todsen, NMSU, Las Cruces, NM. BLM Las Cruces District Office, Las Cruces, NM.


WHITE SANDS MISSILE RAN
Northrup 4343
ALKALI FLAT
DOÑA ANA COUNTY
OTERO COUNTY
WHITE SANDS NATIONAL
WHITE
SAN ANDRES
Lake Lucero SW, Beak Peak, Organ, Quads 7.5'
SQUAW TIT CANYON
KAYLOR MOUNTAIN
Windmill
Ranch
HOSPITAL CAN
HEMBRILLO PASS
SAN ANDRES
LOST MAN CANYON
DEAD MAN CANYON
GARDNER PEAK
MOUNTAINS
SAN ANDRECITO CANYON
MAYBERRY CANYON
SAN ANDRES NATIONAL WILDLIFE REFUGE
FLECK DRAW
HORSE CAMP DRAW
NEW WELL DRAW
Rain Gauge Station
Ruins
COTTONWOOD
ANTELOPE FLAT
GOLDENBURG DRAW
WHITE SANDS TEST FACILITY (NASA)
Cross Tank
SAN ANDRES MOUNTAINS
SAN ANDRES NWR
GOAT MOUNTAIN
Towers
BEAR PEAK
BLACK MOUNTAIN
Windmills
Quarries
WHITE SANDS MISSILE
FORT BLISS
ORGAN MTS

WEST POTRILLO MOUNTAINS

PRIORITY: 2-C

OTHER USE DESIGNATION: WSA

THEMES:

I. Landform Theme

D. 2. Individual Volcanic Mountain

SUBTHEMES:

III. Terrestrial Ecosystem Theme

122.42 Juniper Series,
143.12 Black Grama-Scrub Series, 143.13 Grama Grass-Rosette Scrub Series,
153.2 Chihuahuan Desertscrub.

LOCATION: Dona Ana, New Mexico. 40 miles southwest of Las Cruces, New Mexico.

T26-28S R3-4W USGS Maps: Mt. Riley 15', Aden 15'

SIZE: 80,000 acres (32,376 hectares)

OWNER/ADMINISTERING AGENCY: BLM

NATURAL VALUES:

This site contains the west Potrillo Mountains and portions of the surrounding bajadas and alluvial-filled desert basin. The north-south trending mountains are a series of low volcanic cinder cones. The most striking characteristic of this site is a field of numerous cinder cones over a 144 square mile area.

Possibly due to the scarcity and/or inaccessability of water resulting in low grazing pressure, this site has excellent examples of Scrub Grassland. There are particularly fine examples of the Grama Grass-Rosette Scrub

Series which warrent "benchmark" status for the series.

CURRENT USE: Limited cattle grazing

DANGERS TO INTEGRITY: Small if grazing pressure remains low.

PUBLIC SENSITIVITY: Low

DATA SOURCE: US Department of Interior, BLM. 1980. New Mexico Wilderness-study area decisions. Santa Fe, NM.

KNOWLEDGEABLE PERSONS: BLM Las Cruces District Office, Las Cruces, NM.

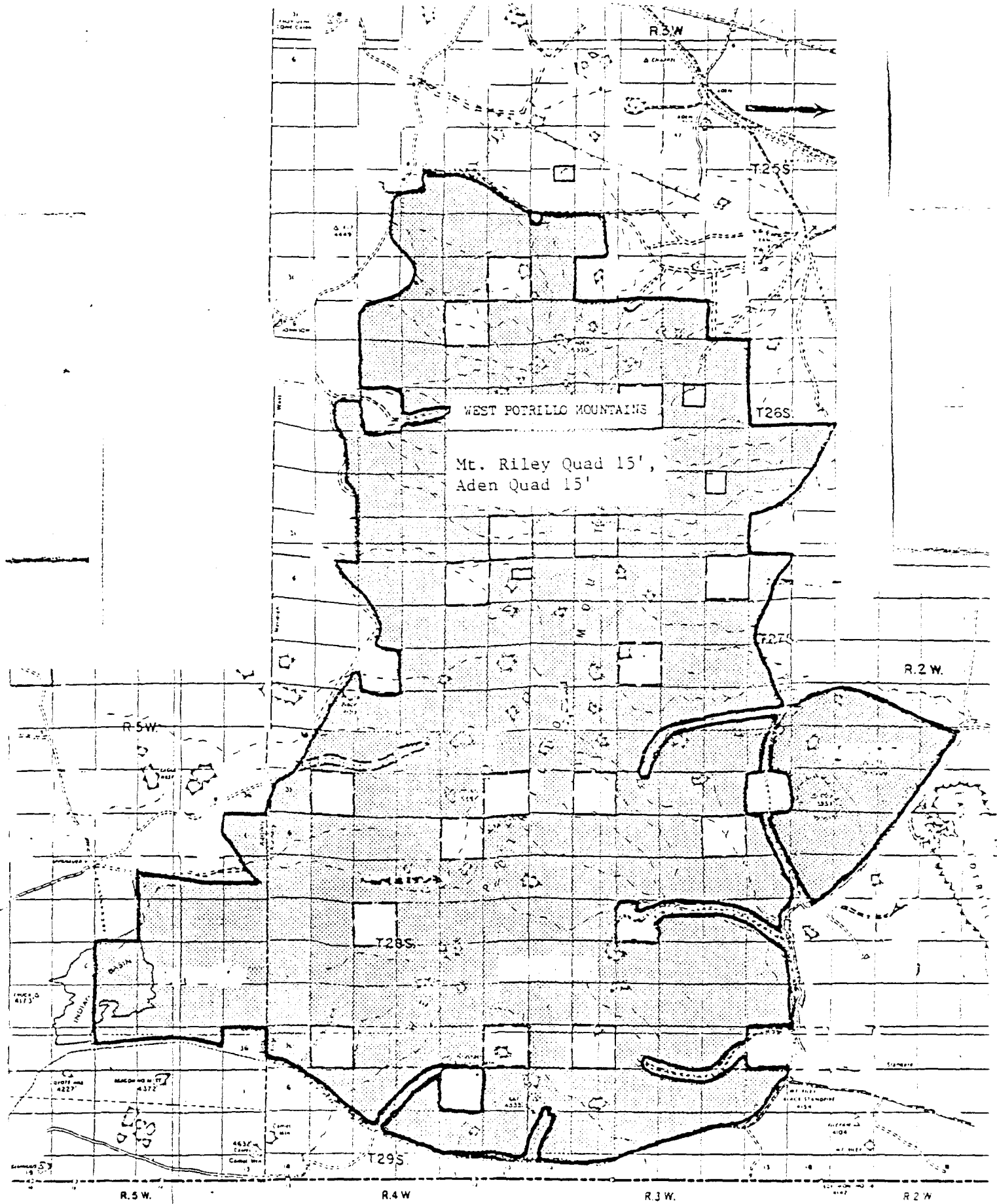
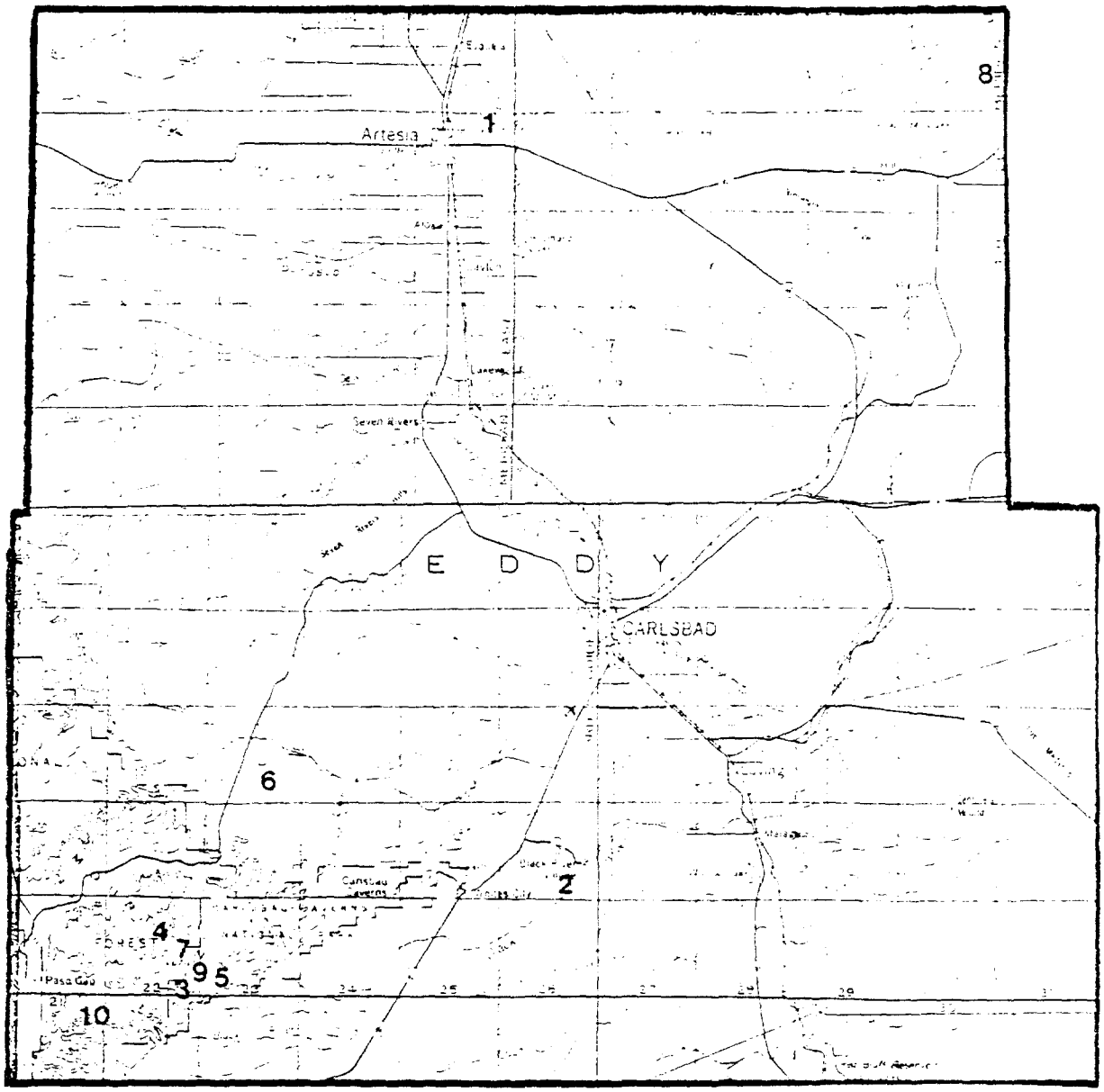

R.3W.
T.25S.
WEST POTRILLO MOUNTAINS
T.26S.
Mt. Riley Quad 15',
Aden Quad 15'
T.27S.
R.2W.
R.5W.
T.28S.
T.29S.
R.5 W.
R.4 W
R.3 W.
R.2 W
M E X I C O

TABLE 14. Sites considered from Eddy County, New Mexico, including Priority and page of Brief. Numbers preceding names locate sites on county map, facing page.

Map Location Number	Site	Priority	Brief Page
1	Artesia	5	
2	Blue Spring	1-B	168
3	Cottonwood Cave	3	
4	Dark Canyon	5	
5	Guadalupe Escarpment - Carlsbad Caverns Group	1-C	173
6	Last Chance Canyon	5	
7	McKittrick Hill Caves	3	
8	Mescalero Ridge	5	
9	Slaughter Canyon	4	
10	South Guadalupe Mountain	4	



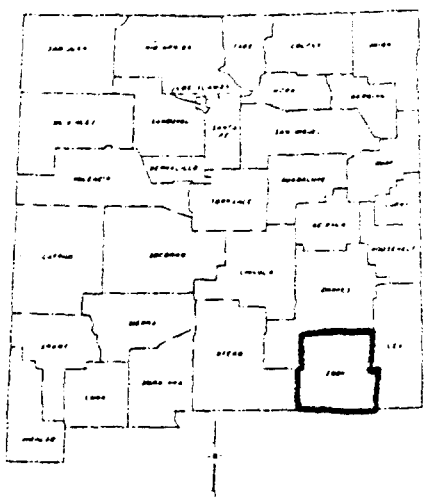


FIGURE 8. General Locations of Eddy County Sites

BLUE SPRING

PRIORITY: 1-B

OTHER USE DESIGNATION: None

THEME:

IV. Species of Special Concern Theme

B. 1. Invertebrate, 2. Fish, 3. Amphibian, 4. Reptile

SUBTHEME:

III. Aquatic Ecosystem Theme

B. 2. Stream Community

III. Terrestrial Ecosystem Theme

174.12 Ash-Walnut Series, 174.14 Sycamore Series, 174.15 Hackberry Series, 174.16 Cottonwood-Willow Series, 174.17 Successional-Disturbance Series.

LOCATION: Eddy, New Mexico. 1.5 miles southwest of Black River Village, New Mexico.

T24S R 26 E USGS Map: Carlsbad Caverns E 15'

SIZE: 1,920 acres (777 hectares)

OWNER/ADMINISTERING AGENCY: Private. Warren and Ceil Bounds. Mineral rights are owned by outside party.

NATURAL VALUES:

Blue Spring emerges from a limestone source as a full-blown stream which extends for three to four miles (five to seven kilometers) where it joins the Black River. The spring is located in an arroyo with low sloping banks approximately 100 to 200 feet (30 to 60 meters) wide. The width varies greatly along the course of the stream. Downstream from the source there are numerous additional springs and marsh areas. Before the stream reaches the

Black River it flows through the valley bottom which is several hundred yards (meters) wide. At the junction with the Black River, Blue Spring stream cascades some 98 feet (30 meters) in a series of step falls into the Black River Canyon, which is some 33 to 50 feet (10 to 15 meters) deep and equally wide.

Four habitat types typify the Blue Sring area. The arroyo banks and upland portion are primarily cresotebush-mimosa (Larrea-Mimosa) with some scattered mesquite (Prosopis) and ratany (Krameria). In a few isolated sections along the stream are groves of Cottonwood Populus deltoides) with or without Texas walnut (Juglans microcarpa) and netleaf hackberry (Celtis reticulata). There is considerable variation in the understory of these cottonwood groves. The bottom of the arroyo can be divided into two zones, a wetland/aquatic and a mesic bottomland. The bottomland portion is sub-irrigated from the stream and supports a habitat type comprised of Goodding willow (Salix gooddingii), seepweeds (Baccharis spp.) and snakeweed (Gutierrezia ssp.). Available data is too incomplete to describe the aquatic community.

The riparian growth along upper Blue Spring run consists of willows (Salix gooddingii), salt cedar (Tamarix chinensis), seep-willow (Baccharis salicina), and various forbs and graminoids. Nearby are hackberries, while in marshy areas are cattails (Typha latifolia), a coarse sedge (Cladium jamicense), and various of the above plants.

Slopes support various shrub species, including tarbush (Flourensia cernua), creosote-bush (Larrea tridentata), barberry (Mahonia trifoliata), small leaf sumac (Rhus microphaylla), acacia (Acacia cf. greggii), Microrhamnus, mesquite (Prosopis glandulos), tornillo (Prosopis pubescens), various forbs, cacti, and gramnoids. As the flood-plain broadens out there are cottonwoods (Populus wislizenii), walnut (Juglans microcarpa), and more hackberries and tornillos. At the juncture of the run and the Black River occur rather well-developed riparian woodlands of cottonwoods, willows, walnuts, and hackberries, with the latter two species assuming fairly large size for their species, i.e., walnuts up to 50 feet (15 meters) tall and hackberries up to 35 feet (11 meters) tall.

Fauna on the site center on the aquatic environment. Fish iincluding the federally endangered Pecos gambusia (Gambusia nobilis) and the state-endangered Mexico tetra (Astyanax mexicanus), and roundnose minnow (Dionda eiscopa). In addition, this limestone spring type of habitat is extremely limited in extent in New Mexico. Reptiles include race runner (Cnemidophorus cf. inornatus) and coachwhip (Masticophis flagellum). The site contains many rare, narrow endemic, and threatened or endangered animal species. The endangered fish, pecos gambusia (Gambusia nobilis) is found here. The following rare and uncommon species are: Fish, Gray Redhorse (Moxostoma congestum); Mexican Tetra (Astynax mexicanus); Roundnose Minnow (Dionda episcopa),

Greenthroat Darter (Etheostoma lepidum); Amphibians, Blanchard's Cricket Frog, (Acris crepitan blanchardi); Reptiles, Pecos Ribbon Snake (Thamnophis proximus diabolicus); (Blotched) Plain bellied water snake (Natrix Erythrogaster transversa); Texas Slider Turtle NMII (Chrysemys cocinna texana).

CURRENT USE: Limited cattle grazing. Nearby oil and gas activity.

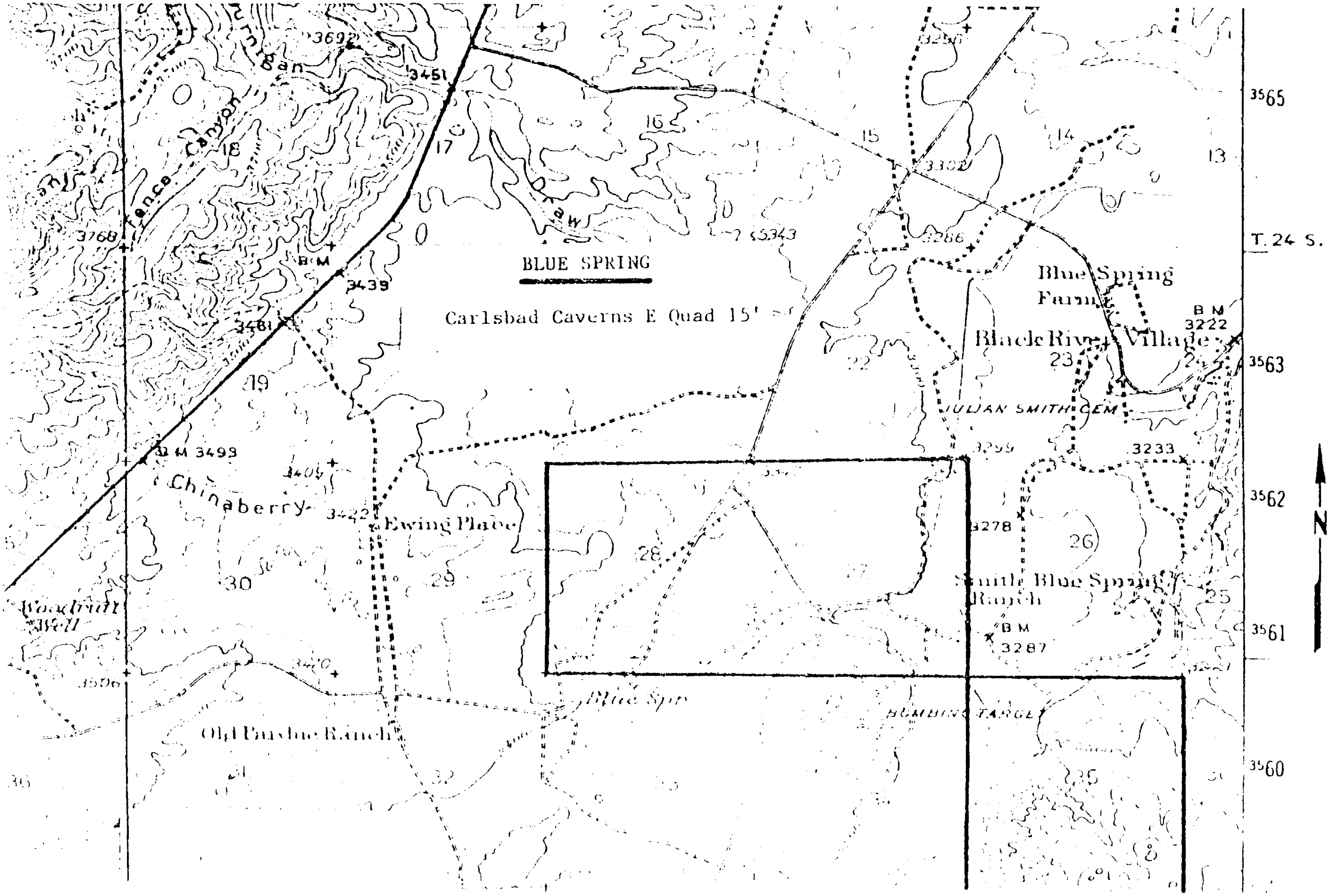
DANGERS TO INTEGRITY: Possible alteration of ground or surface water use; there is also indication of an oil and/or gas pipeline being constructed in the immediate vicinity that could seriously affect the spring area. The land owner has indicated a strong interest in selling to a conservation agency.

PUBLIC SENSITIVITY: Moderate to high.

DATA SOURCE: A biological reconaissance of Blue Spring, Eddy County, New Mexico, NMGF.

KNOWLEDGEABLE PERSONS: Dr. John Hubbard, New Mexico Game and Fish, Santa Fe, NM. Bill F. Isaacs, New Mexico Heritage Office, Dept. of Natural Resources, Santa Fe, NM. Henry Zeller, Silver City, NM.

REFERENCES: Hubbard, J.P. 1977b. A biological reconnaissance of Blue Spring, Eddy County, New Mexico. April 1977.


BLUE SPRING
Carlsbad Caverns E Quad 15'
Blue Spring Farm
Black River Village
JULIAN SMITH CEM
Smith Blue Spring Ranch
Ewing Place
Chinaberry
Old Purdue Ranch
BOMBING TARGET
Fence Canyon
T. 24 S.
B M 3222
B M 3287
B M 3493
3439
3481
3451
3692
3768
3422
3233
3278
3286
3302
3343
16
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N

GUADALUPE ESCARPMENT - CARLSBAD CAVERNS GROUP

PRIORITY: 1-C

OTHER USE DESIGNATION: Part WSA-BLM, Part W-USFS, Part W-NSP

THEMES:

I. Landform Theme

A. 3. Folded, B. 2. Dissected Bolson, E. 1. Cold Spring,
H. 1. Limestone Cave and Karst, J. 5. Reef

III. Terrestrial Ecosystem Theme

122.41 Colorado Pinyon Pine-Juniper Series,
143.11 Srub-Blue Grama Series, 143.12 Black Grama-Scrub Series, 143.13 Grama Grass-Rosette Scrub Series,
174.1 Southwestern Interior Stream (canyon) Riparian.

SUBTHEMES:

IV. Species of Special Concern Theme

B. 6. Mammal

LOCATION: Eddy, New Mexico. 11 miles west of Waite City, New Mexico.

T24-26S R21-25E USGS Map: Carlsbad 1:250,000

SIZE: 50,700 acres (20,531 hectares)

OWNER/ADMINISTERING AGENCY: Part BLM, Part USFS, Part NPS

NATURAL VALUES:

This is a large area with complicated administration. The various sub-sets are given separate treatments in the event that only portions of this recommendation are subsequently considered.

This group is as follows (also see map):

Carlsbad Caverns Complex
- Carlsbad Caverns - NPS - W
- Mudgetts - BLM - WSA
- Fawn Valley - BLM - WSA
- Lechuguilla Canyon - BLM - WSA

Guadalupe Escarpment Complex
- Guadalupe Escarpment - USFS - WSA
- Lonesome Ridge - BLM - WSA
- Devil's Den Canyon - BLM - WSA
- McKittrick Canyon - BLM - WSA

This group also includes Slaughter Canyon Caves (NPS), Farrell Springs (USFS), and Cottonwood Cave (NNL).

CARLSBARD CAVERNS: (see description under Guadalupe Escarpment)

MUDGETTS:

These areas were located on the northern border of Carlsbad Caverns National Park. They contain undulating limestone hills cut by five major drainages. The western end of the area contains a meander of the Serpentine Bends portion of Dark Canyon, a major drainage of the Guadalupe Mountains. The sheer limestone cliffs rise over 600 feet above the canyon to an altitude of 4,800 feet. The majority of the vegetation is typical of the Chihuahuan Desert plant community with mixed desert shrubs and trees in the bottom of Dark Canyon.

FAWN VALLEY:

This unit is located along the north boundary of

Carlsbad Caverns National Park (CCNP). Fawn Valley's most predominant land features are the sheer, layered limestone cliffs and steep, rugged hillsides.

Vertical relief reaches 850 feet. Soils are very thin and rocky, and vegetation consists of numerous species of cactus, yucca and mixed desert shrubs or grasses of the Chihuahuan Desert, with scattered pinyons and junipers.

LECHUGUILLA CANYON:

Lechuguilla Canyon was selected for intensive inventory because it is contiguous with designated wilderness in Carlsbad Caverns National Park (CCNP). The area's south boundary is also adjacent to a portion of the park being restudied for possible wilderness designation. (The National Park Service has been mandated by Congress, in Public Law 93-625, Section (401)(2), to restudy areas in CCNP for possible addition to the Wilderness Preservation System these areas consist of all lands not presently designated as wilderness in the Park).

The most predominant topographic feature in the unit is Dark Canyon, which is one of the major drainages of the Guadalupe Mountains. The northern part of Unit 803 starts at the bottom of Dark Canyon and extends south to the CCNP boundary.

Because of the rugged topography in this unit, it

has not been substantially impacted by man's activities. Vegetation within the area ranges from the typical Chihuahuan Desert plant communities on the limestone hills to larger desert shrubs and trees in the bottom of Dark Canyon.

GUADALUPE ESCARPMENT:

This area contains steep and very rugged canyon lands with elevations ranging from 4,800 feet to over 7,400 feet. It is some of the wildest and most spectacular country remaining undeveloped in New Mexico.

The area contains portions of the Capitan Barrier Reef, perhaps the best exposed and most significant fossil reef in the world. Numerous limestone caves are found within this area.

Varied plant communities are found. A blending of Great Plains and Rocky Mountain flora occur, and the area includes the northern and southern limits of many plants. Vegetation in the higher elevations is primarily pinyon-juniper, brush, and scattered ponderosa pine. The canyon bottoms, however, support vegetation unique to this portion of New Mexico. Chinkapin oak, maple, walnut, cherry, and Texas madrone are found in association with juniper, cholla, and mimosa.

The area supports a large heard of desert mule deer and many species of smaller animals. Located within this area is a nesting site for the endangered Peregrine falcon.

LONESOME RIDGE:

For the purpose of the intensive inventory and further reference, areas NM-060-801 and 814 have been combined and will be reported as one unit. Both area 801 (Lonesome Ridge) and 814 (Calamity Cove) share a common east-west boundary and are not separated by any manmade structures or geographic features. The two units are physically similar in nature.

Lonesome Ridge and Calamity Cove are located on the Texas border two air miles west of Carlsbad Caverns National Park. The northern boundary of this unit is contiguous with a proposed wilderness tudy area in Lincoln National Forest. The most prominent features of this unit is the cliff face of the Guadalupe Escarpment which is an uplifted Permian age limestone reef. The topography of the area is very rugged, grading from the 1,700 foot escarpment, with its deep canyons, to the lower talus slopes and desert floor. Vegetation rangesfrom maple in the canyon bottoms to shrubs on the talus slopes, with trees on the ridge tops.

DEVIL'S DEN CANYON:

Devil's Den Canyon is located 45 air miles southwest of Carlsbard, New Mexico, adjacent to the southwest corner of Lincoln National Forest. The unit is contiguous to the U.S. Forest Service area, Guadalupe Escarpment, which is

recommended for a wilderness study area designation by the U.S. Forest Service.

The Devil's Den Canyon inventory unit consists primarily of the mouth and Central portion of the canyon and surrounding cliffs. Devil's Den Canyon is rugged and narrow. Vertical relief is 750-1,000 feet. The surrounding cliffs are steep and characterized by a series of horizontally layered limestone bedrock.

MCKITTRICK CANYON:

McKittrick Canyon is located 45 air miles outhwest of Carlsbad, New Mexico, adjacent to the southwest corner of the Lincoln National Forest. The unit is contiguous to the U.S.s Forest Service Guadalupe Escarpment, which is recommended for a WSA Wilderness study area designation by the U.S. Forest Service.

The McKittrick Canyon inventory unit consists of a 3/4 mile portion of the West Guadalupe Rim. The unit forms the backside of North McKittrick Canyon which is in the Lincoln National Forest. The West Rim rises 1,400 feet above the bottom land and is characterized by a series of horizontally layered limestone bedrock. At the lower elevations, vegetation is primarily juniper woodland and grasses. Grasses and cacti become predominant as the elevation increases.

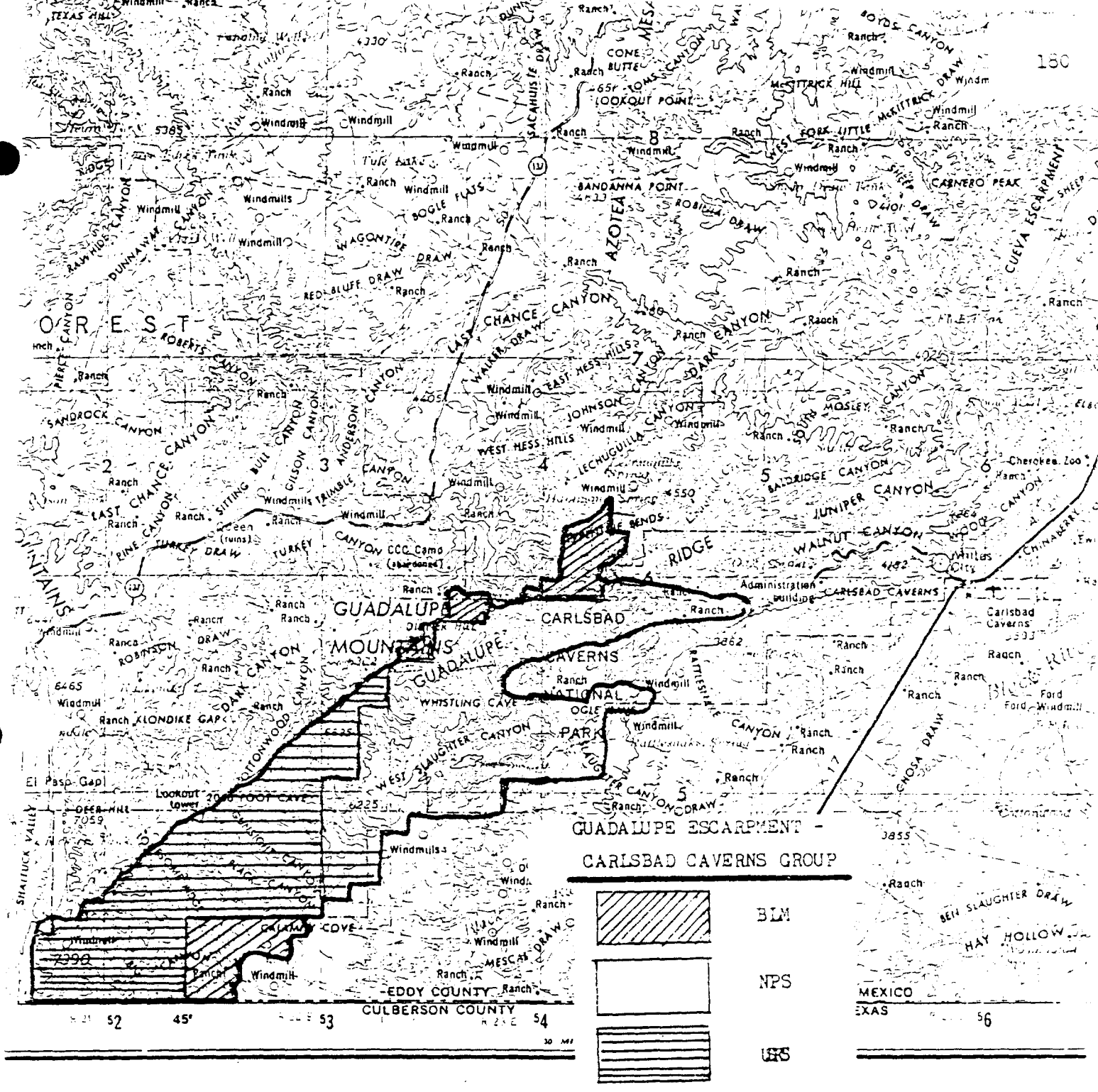
CURRENT USE: Portions grazed, portions research, and portions recreation.

DANGERS TO INTEGRITY: Small if all is designated wilderness.

PUBLIC SENSITIVITY: Moderate

DATA SOURCE: U.S. Department of Interior, BLM. 1980. New Mexico Wilderness-study area decisions, Santa Fe, NM.

KNOWLEDGEABLE PERSONS: BLM Roswell District Office, Roswell, NM.


GUADALUPE ESCARPMENT - CARLSBAD CAVERNS GROUP
BLM
NPS
USFS
GUADALUPE MOUNTAINS
CARLSBAD CAVERNS NATIONAL PARK
EDDY COUNTY
CULBERSON COUNTY
NEW MEXICO
TEXAS
Carlsbad Quad 1:250,000
20 Statute Miles
30 Kilometres
LOCATION DIAGRAM
ARIZONA
NEW MEXICO
TEXAS
SONORA
CHIHUAHUA
MEXICO
UNITED STATES
NI 12-6
NI 13-4
NI 13-5
NI 13-6
NI 14-4
NI 12-9
NI 13-7
NI 13-8
NI 13-9
NI 14-7
NI 12-12
NI 13-10
NI 13-11
NI 13-12
NI 14-10
NH 12-3
NH 13-1
NH 13-2
NH 13-3
NI 14-1
NH 13-5
NH 13-6
NH 14-4

IA 22092

TABLE 15. Sites considered from Grant County, New Mexico, including Priority and page of Brief. Numbers preceding names locate sites on county map, facing page.

Map Location Number	Site	Priority	Brief Page
1	Aldo Leopold-Gila	4	
2	Blue Creek (write-up Hidalgo)	4	
3	Brannon Park	4	
4	Buckhorn Marsh	2-B	183
5	City of Rocks	5	
6	Gila Box	4	
7	Gila Hot Springs No.1	2-C	187
8	Gila Riparian	5	
9	Gila River-Middle Box-Redrock	1-C	189
10	Gila River Bird Area	4	
11	Gila River Sycamore Stands	1-B	196
12	Heart Bar	5	
13	Hell Hole	4	
14	Redrock	5	

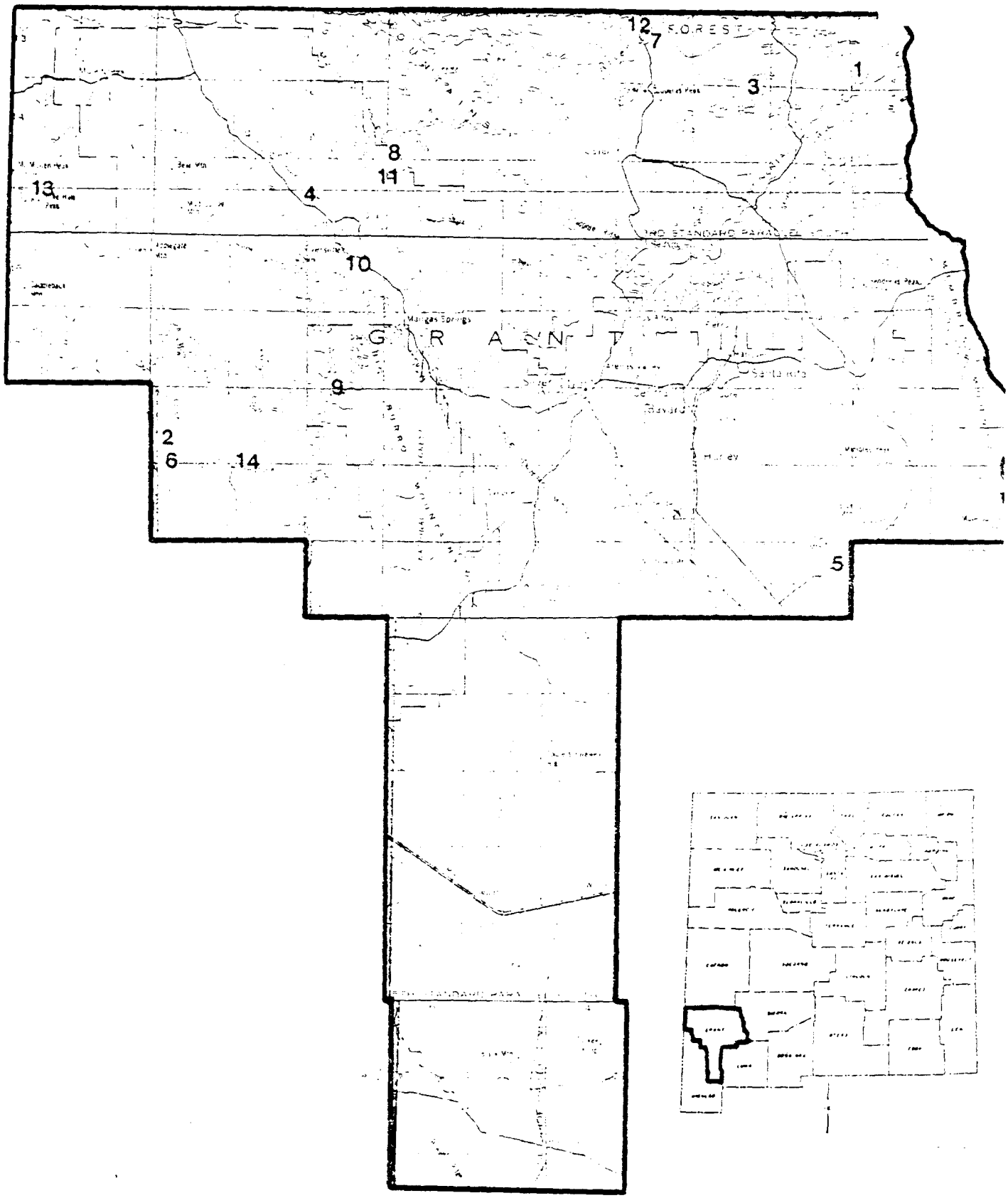


FIGURE 9. General Locations of Grant County Sites

BUCKHORN MARSH

PRIORITY: 2-B

OTHER USE DESIGNATION: UE-P

THEMES:

III. Aquatic Ecosystem Theme

A. 3. Marsh

III. Terrestrial Ecosystem Theme
174.12 Ash-Walnut Series, 174.13 Cottonwood Series,
174.2 Southwestern Interior Arroyo-Playa Riparian

IV. Species of Special Concern Theme

B. 5. Bird

LOCATION: Grant, New Mexico. 1 mile southeast of Buckhorn, New Mexico.

T15S R18W USGS Maps: Buckhorn 7.5'

SIZE: 50 acres (20 hectares)

OWNER/ADMINISTERING AGENCY:

NATURAL VALUES:

The area surrounding the marsh is riparian woodland dominated by freemont cottonwood (populus fremontii), goodding willos (Salix gooddingii), Arizona walnut (Juglans major) and velvet ash (Fraxinus velutina). Understory trees and shrubs include coffee berry (Rhamnus californica), seep willow (Baccharis emoryi), alligator juniper (Juniperus deppeana), Salis irrorata, desert willow (Chilopsis linearis), cane cactus (Opuntia spinosior), mesquite (Prosopis glandulos), skunkbush (Rhus aromatica), irrigation

willow, (Salix exigua), soaptree (Yucca elata), rabbit brush (Chrysothamnus nauseosus), western mugwort (Artemisia ludoviciana) and snakeweed (Gutierrezia sarothae).

The herbs are sparse due to overgrazing and few grasses are represented. A sacaton swale exists on the northeast side of the marsh but has been nearly destroeyd by cattle. Some desert salt grass exists in sandy sites along the creek and an unidentified, flat bladed grass occurs in the swamp areas above the marsh (Phleum). Characteristic weeds are tansy mustard (Descurainia richardsonii), tumbleweed (Salsola iranica), and locoweed (Astragalus sp.). The marsh contains cattail (Typha latifolia), goodding willow, rushes (Juncus spp.) and spikerush (Eleocharis sp.). Three fungi of note are oyster mushroom (Pleurotus ostreatus) (on cottonwoods), the morel (Morclella crassipes) and an Inocybe in the lacera group (seen on moist soil). Locally, it is an important site for shore birds and particularly so in the migration season. Mourning Cloak butterflies (Nymphalis antiopa) were abundant on 4-1-79.

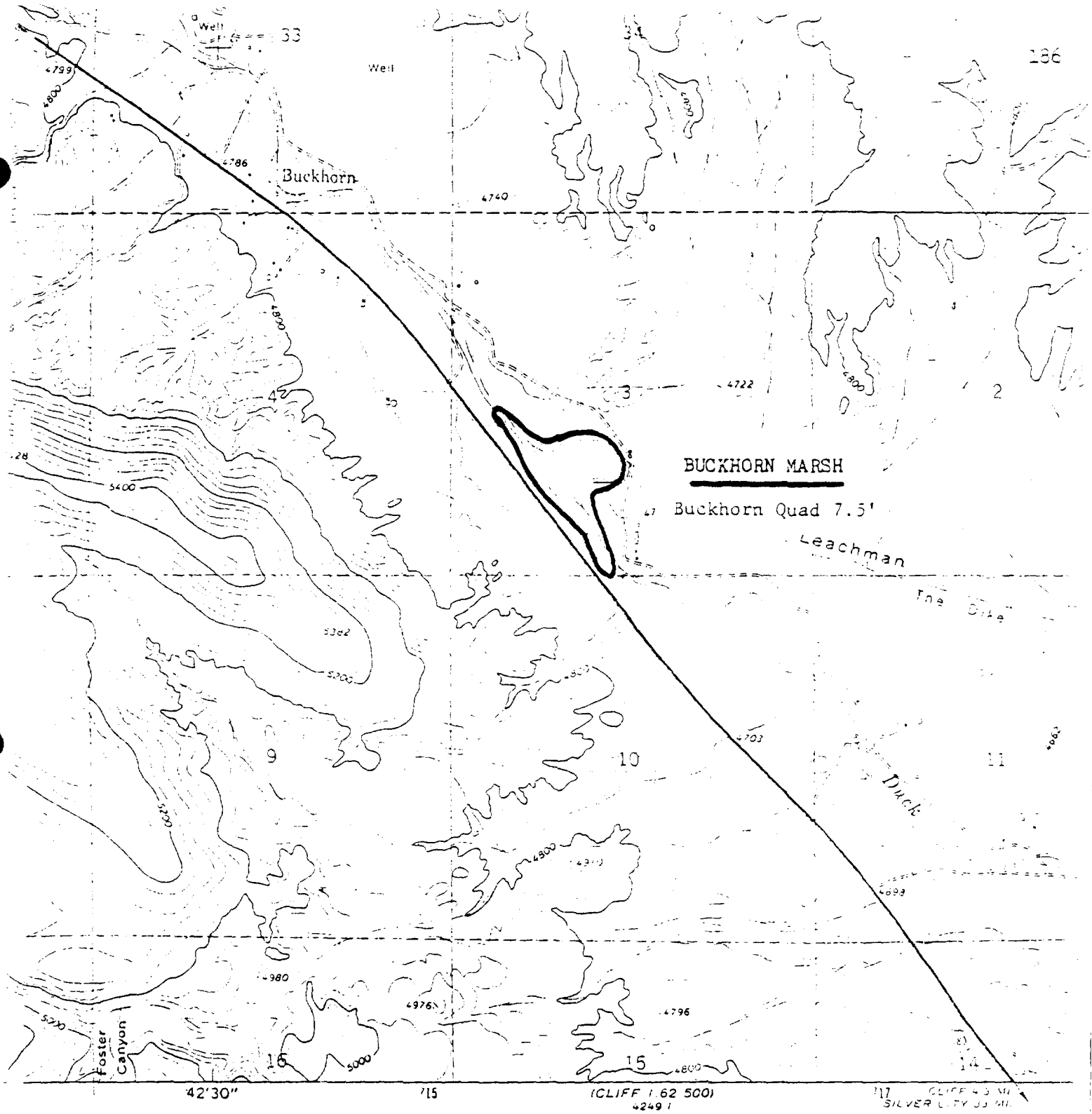
CURRENT USE: Heavy grazing

DANGERS TO INTEGRITY: Continued heavy grazing will result in no reproduction for trees and greatly reduce grass cover. Nearby building coupled with drainage could further harm the site.

PUBLIC SENSITIVITY: Low

DATA SOURCE: Dick-Peddie, W.A. 1978. New Mexico Unique-Wildlife Ecosystem Concept Plan. Natural Resources Department, Santa Fe, New Mexico.

KNOWLEDGEABLE PERSONS: Bill F. Isaacs, New Mexico Heritage Office, Dept. of Natural Resources, Santa Fe, NM.



GILA HOT SPRINGS

PRIORITY: 2-C

OTHER USE DESIGNATION: None

THEME

I. Landform Theme

E. 2. Thermal spring

LOCATION: Grant, New Mexico. 4 miles southeast of Gila Cliff Dwelling National Monument Headquarters.

T13S R13W USGS Map: Gila Hot Springs

SIZE: 182 acres (+73 hectares)

OWNER/ADMINISTERING AGENCY: USFS

NATURAL VALUES:

This site has a spring thermal discharge temperature of 140°F from rhyolite. The following biota are found in and around spring: Buteogallus antaracinus, Haliaeetus leucocephalus, and champion vine (Vitis arizonica). This type of feature is uncommon in the region.

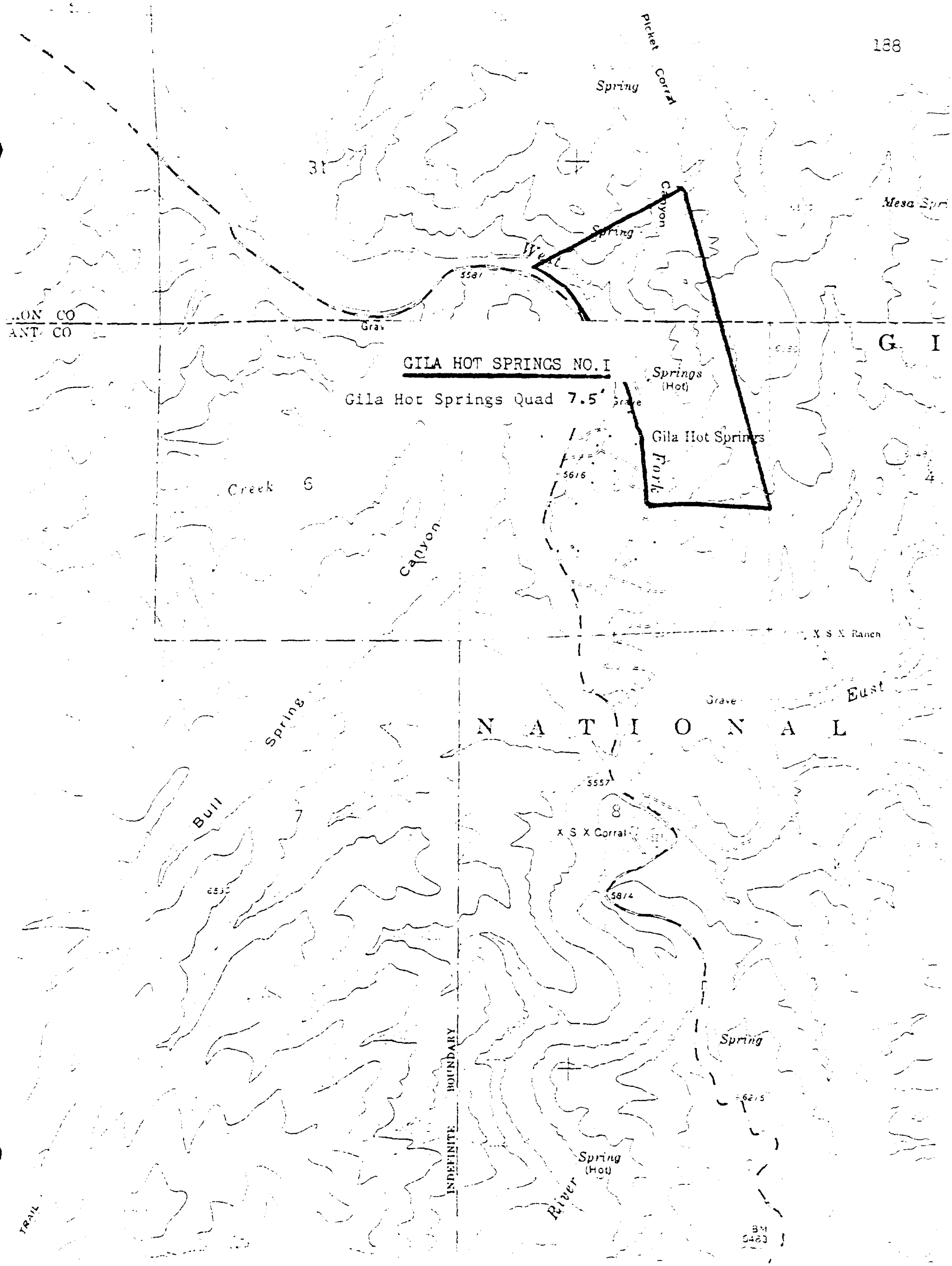
CURRENT USE: None

DANGERS TO INTEGRITY: Always great for small point source sites if unprotected.

PUBLIC SENSITIVITY: Moderate

DATA SOURCE: New Mexico Heritage Files, Department of Natural Resource, Santa Fe, NM.

KNOWLEDGEABLE PERSONS: W.F. Isaacs, New Mexico Heritage Office, Department of Natural Resources, Santa Fe, New Mexico.



GILA HOT SPRINGS NO.I

Gila Hot Springs Quad 7.5'

GILA RIVER-MIDDLE BOX-REDROCK

PRIORITY: 1-C (part B)

OTHER USE DESIGNATION: WSA-N (part)

THEMES:

I. Landform Theme

C. 2. Canyon Country, E. 4. Perennial Stream Segment

III. Terrestrial Ecosystem Theme

123.31 Chihuahua Pine-Mexican Pinyon Series
173.42 Cottonwood Series
174.11 Alder-Boxelder Series, 174.12 Ash-Walnut Series, 174.13 Cottonwood Series, 174.14 Sycamore Series, 174.15 Hackberry Series, 174.22 Burro-brush Series
174.31 Cottonwood Series

III. Aquatic Ecosystem Theme

B. 3. River

IV. Species of Special Concern Theme

A. 2. Forb, 3. Shrub, 4. Tree

B. 2. Fish, 4. Reptile, 5. Bird 6. Mammal

LOCATION: Grant, New Mexico. 6 miles northeast of Redrock, New Mexico.

T16-18S R17-18W USGS Maps: Cliff 15', Redrock 15'

SIZE: 14,080 acres (5,700 hectares)

OWNER/ADMINISTERING AGENCY: BLM, USFS

NATURAL VALUES:

The Gila River traverses the Big Burro Mountains at this site; thus the geology is relatively complex. On the northern side of the Big Burro Mountains the river passes through a canyon cut into tertiary deposits of rhyolite flows and welded tuffs with fine-

grained andesites and latite porphyry. Within the canyon there is Quaternary alluvium and bolsom deposits up to 100 feet (30 meters) thick, forming the actual river bed, except for the first 1.5 miles (1 km) which is free of three deposits. The southern half of the Big Burro Mountains is traversed by many faults, running perpendicular to the river. This river section is the most geologically complex stretch. The main canyon is cut into Precambrian granite and other Precambrian metamorphic rocks. Numerous other small intrusions are found on either side of the canyon along this section. The last few miles of the river before reaching Redrock are located in Quaternary Age Gila Conglomerate with terrace gravels, alluvium and bolsom deposits forming the stream channel itself.

The riparian communities of the area include cottonwoodd, cottonwood-willow, and seepwillow. In the Gila Valley, the fremont cottonwood (Populus fremontii) is the primary tree of the floodplain; however, lands controlled by the Forest Service along the river are generally too steep to form ideal habitat for extensive cottonwood forests, and in the past those few suitable areas have been largely denuded of this type of woodland. Isolated trees and small to fairly large patches remain but no truly mature cottonwood forest of any size no exists on this site.

Freemont cottonwood-dominated stands extend

upstream along the Gila to Turkey Creek. Not far beyond this point Fremont cottonwood is replaced by the narrow-leaved cottonwood (Populus angustifolia) which is the dominant tree of the upper Gila.

Probably the best cottonwoods remaining in the study area are at and near the confluence of Mogollon Creek and the Gila River. These groves have considerable wildlife potential but at present they are subjected to such frequent human distrubance (including shooting) that they have been largely abandoned by some of the rare birds. Many of the larger cottonwoods near this point are on privately held lands within the National Forest boundary. Some of the stands downstream from the Forest boundary are among the finest remaining in the Gila Valley.

Presently as widespread as the cottonwood is the willow (Salix gooddingii) (considered a variety of Salix nigra by some authors). This tree, sometimes 30 to 40 feet (9 to 12 meters) in height, often grows in a distinct, though rather narrow belt, between the river and seepwillow (Baccharis) thickets if any and the cottonwoods.

The seepwillow (Baccharis glutinosa) is one of the most characteristic plants to the Gila's riparian zone. It forms dense stands which, in places line the river banks for considerable distances. The seepwillow zone may vary from a

think fringe to an impressive belt 60 or more feet (18 meters) wide.

The plants are evergreen and commonly attain heights of approximately seven or eight feet (two meters). Growing densely and extending to the water's edge, these plants provide important channels that permit shy animals of various kinds to approach the river for drinking, bathing or feeding purposes. They are of considerable importance in terms of cover. As nest sites they are used extensively by yellow-breasted chats, cardinals, Bell's vireos, blue grosbeaks and other species. During the migration seasons and in water they provide shelter (and some food) for large numers of birds.

These plants are ecologically important in controlling erosion along the river too. Undoubtedly their presence permits the establishments of cottonwoods (and perhaps, rarely, sycamores (Platanus wrightii)) by retarding water flow in certain places.

Vegetation is the semi-riparian zone varies considerably according to topography, slope direction and other factors. In the southern sections either hackberry (Celtis reticulata) or mesquite (Prosopis glandulosa) tends to be dominant. The two may occur along or together, with or without a varying admixture of walnut (Juglans major), soap-berry (Sapindus drummondii), buckthorn, oaks (usually Quercus emoryi and Quercus grisea),

junipers (largely Juniperus monosperma) and occasionally cottonwoods or sycamores.

Characteristic shrubs include the desert olive (Forestiera neomexicana), sumacs (Rhus microphylla and Rhus trilobata), scrub oak (Quercus turbinella), Apache plume (Fallugia paradoxa), waferash (Ptelea angustifolia), mulbery (Morus microphylla), service-berry (Amelanchier utahensis), gooseberry (Ribes aureum) and false indigo (Amorpha fruticosa). In places large and impressive grape vines (Vitis arizonica) cover the lower trunks and branches of trees. Poison ivy (Rhus radicans) occurs locally.

Evergreen oaks, especially Emory's oak (Quercus emoryi) form frequent patches of cover along slopes and in broader side canyons that drain into the Gila. These oaks may be mixed with junipers or other trees, or they may exist as relatively pure stands. Pines occur as scattered trees, small pure stands, or with other trees. Pinyon pine (Pinus edulis) dominates, but Mexican pinyon (Pinus cembroides) occurs on open sites, and ponderosa pine (Pinus ponderosa) approaches the water in places. Pinus leiophylla var. chihuahuana, a rare tree north of the Gila, usually occurs well back from the river. Generally, the taller pines are restricted to the more mesic sites in the side canyons. On the more open slopes, and constituting a separate environment from the evergreen woodland and the canyons, is a desert scrub association. Low mesquite and tnickets of

catclaw (Acacia greggii) are characteristic, but other shrubs such as Aloysia wrightii, ocotillo (Fouquieria splendens), sotol (Dasylirion wheeleri), and semi-shrubby species of wild buckwheat (Eriogonum spp) may be common on some slopes.

CURRENT USE: Grazing, outdoor recreation and hunting.

DANGERS TO INTEGRITY: One of the Hooker Dam sites has been proposed to be built in the vicinity; if it is constructed the surface water supply could be seriously affected, and consequently the vegetation and wildlife impaired.

The continual use of the area for cattle grazing is seriously limiting the reproduction of the cottonwoods and sycamore trees. If this trend continues unchecked, the floral composition will be destroyed and the area lost as a unique wildlife ecosystem. The misuse of firearms, particularly the indiscriminant shooting of birds, seriously disrupts the breeding of many species. There is also the potential danger of reducing breeding sites for the birds by removing dead trees to be used as firewood.

PUBLIC SENSITIVITY: Moderate

DATA SOURCE: New Mexico Heritage files, Department of Natural Resources, Santa Fe, NM.

KNOWLEDGEABLE PERSONS: Mr. William Baltosser, Biology Dept., New Mexico State University, Las Cruces, NM. Dr. John Hubbard, New Mexico Game and Fish, Santa Fe, NM. Dr. Dale Zimmerman, Western New Mexico University, Silver City, NM. Mr. Ralph Fisher, Jr., Silver City, NM. Ms. Myra McCormich, Silver City, NM.

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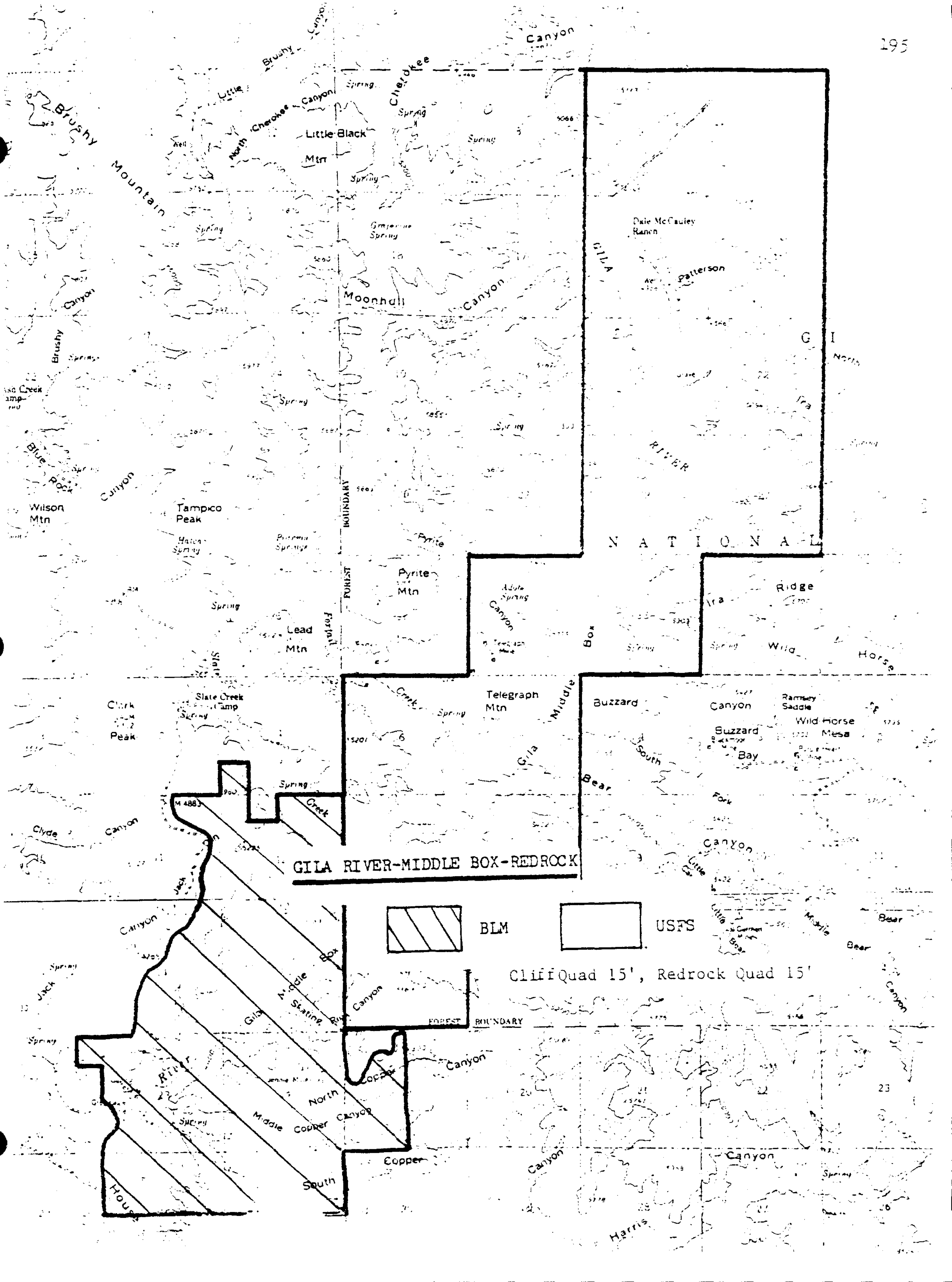
Zimmerman, D.A. 1970. Birds and bird habitats on National Forest lands in the Gila River Valley, southwestern New Mexico. Unpubl. Field study report. Department of Biological Sciences, Western New Mexico University, Silver City.


GILA RIVER-MIDDLE BOX-REDROCK
BLM
USFS
Cliff Quad 15', Redrock Quad 15'
Brushy Mountain
Little Black Mtn
Moonhull Canyon
Dale McCauley Ranch
Patterson
Wilson Mtn
Tampico Peak
Pyrite Mtn
Lead Mtn
Telegraph Mtn
Clark Peak
Slate Creek Camp
Buzzard Canyon
Buzzard Bay
Ramsey Saddle
Wild Horse Mesa
Ira Ridge
GILA NATIONAL
RIVER
FOREST BOUNDARY
Gila River
Middle Box
Clyde Canyon
Jack Canyon
Copper Canyon
Harris

GILA RIVER SYCAMORE STANDS

PRIORITY: 1-B

OTHER USE DESIGNATION: UE-P

THEME:

III. Terrestrial Ecosystem Theme

174.13 Cottonwood Series, 174.14 Sycamore Series, 174.15 Hackberry Series, 174.32 Mesquite Series

IV. Species of Special Concern Theme

B. 2. Fish, 3. Reptile, 5. Bird

LOCATION: Grant County, New Mexico. 5 miles northwest of Cliff.

T14-15S R 16-17 W USGS Maps: Canteen Canyon 7.5; Canyon Hill 7.5

SIZE: 600+ acres (240+ hectares)

OWNER/ADMINISTERING AGENCY: William Buhler, William Shelly, Worthington Shelly, Hollis Martin, Otho Woodrow, and Alice Rowland and son.

NATURAL VALUES:

General Description:

This site is highlighted by two outstanding features. First, the area contains what may prove to be the best sycamore stand in New Mexico; secondly, the area contains one of the richest avifauna in the state. Approximately 55% of the bird species found in the state occur at or around this site.

Mogollon Canyon joins with the Gila River at the edge of the mountains to form a broad Y-shaped canyon-floodplain. Most of the area appears to be subjected to periodic floods,

since the soil surfaces are typically sandyclay with a mixture of various sized rocks.

Sycamore (Platanus wrightii) is the dominant tree with cottonwood (Populus fremontii) and grey oak (Quercus grisea) as subdominants. Together they typically form small stands rather than a gallery forest. Consequently, the open spaces between the trees are covered to a varying degree by grasses and other herbaceous and vine plants.

Further up Mogollon Canyon the trees do come closer together, approaching a gallery forest situation. Upstream on the Gila two floodplain communities become apparent. The principal one is the sycamore-cottonwood type near the river channel and a mesquite (Prosopis glandulosa) dominant type up on the deeper sand and drier sites of the old floodplains forming a near monotone. Within the mesquite type are a few scattered junipers (Juniperus monosperma, J. deppeana).

Further up Turkey Creek the sycamores start to form a riparian community with a nearly closed canopy. This tributary supports several species found nowhere else in the site, for example, southwestern white pine (Pinus strobiformis), and alligator bark juniper (Juniperus deppeana).

The canyon sides of the Gila and Turkey Creek are very steep with loose rock and numerous cliffs. This area is vegetated by a scattering of one-seed juniper (Juniperus monosperma), sotol (Dasylirion wheeleri), Opuntia spp.,

beargrass (Nolina microcarpa), and century plant (Agave palmeri).

CURRENT USE: Cattle grazing, camping and fishing

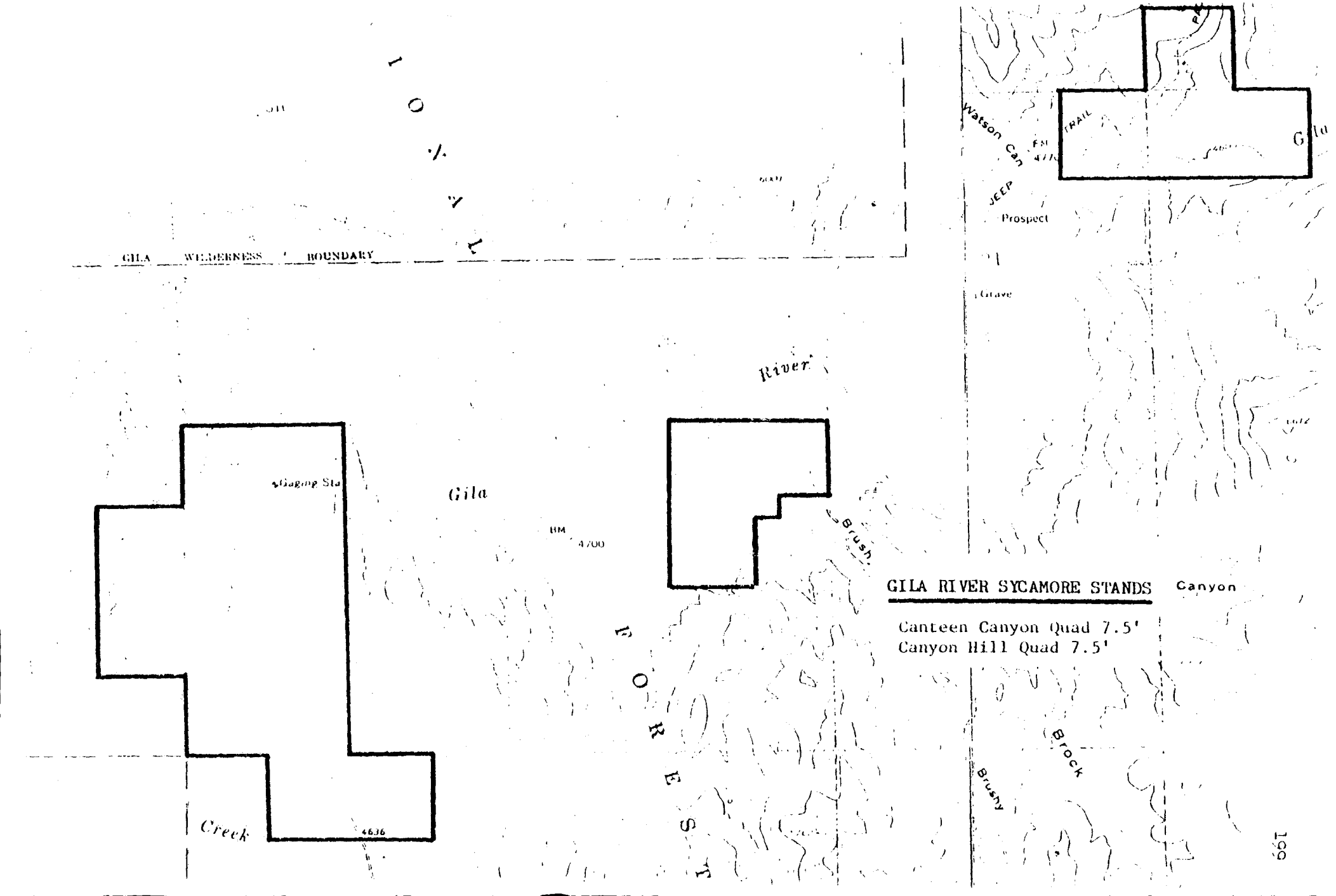
DANGERS TO INTEGRITY: One of the Hooker Dam sites has been proposed to be fuilt in the vicinity; if it is constructed the surface water supply could be seriously affected, and consequently the vegetation and wilddlife impaired.

The continual use of the area for cattle grazing is seriously limiting the reproduction of the cottonwoods and sycamore trees. If this trend continues unchecked, the floral composition will be destroyed and the area lost as a unique wildlife ecosystem. The misuse of firearms, particuarly the indiscriminant shooting of birds, seriously disrupts the breeding of many species. There is also the potential danger of reducing breeding sites for the avifauna by removing dead trees to be used as firewood.

PUBLIC SENSITIVITY: Moderate

DATA SOURCE: New Mexico Unique Wildlife Ecosystem Concept Plan.

KNOWLEDGEABLE PERSONS: Mr. William Baltosser, Biology Dept., New Mexico State University, Las Cruces, NM. Dr. John Hubbard, New Mexico Game and Fish, Santa Fe, NM. Dr. Dale Zimmerman, Western New Mexico University, Silver City, NM. Mr. Ralph Fisher, Jr., Silver City, NM. Ms. Myra McCormick, Silver City, NM.



GILA RIVER SYCAMORE STANDS Canyon

Canteen Canyon Quad 7.5'
Canyon Hill Quad 7.5'