SIGNATURE PAGE

for

RESEARCH NATURAL AREA ESTABLISHMENT RECORD

Kiowa Shortgrass Research Natural Area

Cibola National Forest

Union County, New Mexico

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

Prepared by _____ Date 5/26/92
William W. Dunmire, Public
Lands Coordinator,
The Nature Conservancy

Recommended by _____ Date 7/5/92
Alton Bryant, District Ranger,
Kiowa Ranger District

Recommended by _____ Date _____
C. Phil Smith, Forest Supervisor,
Cibola National Forest

Recommended by _____ Date _____
Larry Henson, Regional Forester,
Southwestern Region

Recommended by _____ Date _____
Hank Montrey, Station Director,
Rocky Mountain Forest and Range Experiment Station

TITLE PAGE

Establishment Record

for

Kiowa Shortgrass Research Natural Area

within

Cibola National Forest

Union County, New Mexico

INTRODUCTION

The Kiowa Shortgrass Research Natural Area (RNA) comprises 300 acres (121.4 hectares) of shortgrass prairie approximately 8 miles (12.9 km) northeast of Clayton in Union County in the northeast corner of New Mexico. The RNA is entirely on acquired National Forest System land in the Kiowa National Grassland which is managed by the Cibola National Forest.

These lands were settled originally under the Homestead laws, but lands within the RNA were never plowed. When land taxes became delinquent in the 1930s, the lands were purchased by the Federal Government under one of several Congressional Acts which authorized administration by the USDA Soil Conservation Service. On June 20, 1960, Acting Secretary of Agriculture True D. Morse issued an administrative order designating 22 land utilization projects, including these lands, as National Grasslands (FR 6-24-60).

The Cibola National Forest Land and Resource Management Plan of July 1985 prescribed that representative shortgrass prairie grasslands be evaluated on the Kiowa National Grassland for possible designation as a Research Natural Area "for the protection and study of natural vegetation". The evaluation study was conducted by The Nature Conservancy for the Forest Service in 1987 (Dunmire, 1987). All management units on the National Grassland were screened for potential representative grassland in advanced seral condition, and three sites were recommended for consideration by the Forest Service. The Southwestern Region RNA Task Force visited the several sites in 1988 and 1989 and recommended that a portion of Management Unit 46 be designated an RNA.

Land Management Planning

The need for representation of the grama shortgrass biotic community was identified in the Southwestern Regional Guide (USDA Forest Service, 1983) although this particular site was not identified. The Cibola National Forest Land and Resource Management Plan (USDA Forest Service, 1985) specifies that suitable candidate areas be studied for possible inclusion the RNA system within two years of plan approval and that one site of approximately 300 acres (121.4 hectares) containing representative shortgrass prairie grasslands be considered for possible RNA designation on the Kiowa National Grassland.

OBJECTIVES

The objective of the Kiowa Shortgrass RNA is to maintain the advanced seral stage of the blue grama/buffalo-grass (Bouteloua gracilis/Buchloe dactyloides) grassland and to allow for further advanced vegetational succession under natural ecological conditions. The RNA will be managed for the protection and study of native vegetation under these conditions.

JUSTIFICATION FOR ESTABLISHMENT OF AREA

This site was selected as a candidate RNA because it represents the best known example of a reasonably large tract of blue grama/buffalo-grass grassland in advanced seral condition anywhere on Federally owned lands in the southwestern United States. In New Mexico three RNAs administered by the U.S.Fish and Wildlife Service exist in potential shortgrass areas (Maxwell RNA, Gallinas RNA and Las Vegas RNA), but none of them include significant acreage of the blue grama/buffalo-grass type. In southern Colorado the Campo RNA on the Comanche National Grassland was established by the Forest Service in 1986 as representative of the blue grama/buffalo-grass type, but this RNA contains only 35 acres, and the plant community here does not exhibit natural ecological conditions. In northwest Texas the High Plains RNA of the Buffalo Lakes National Wildlife Refuge is considered to be in the shortgrass biome, but the annual rainfall is significantly higher here than on the candidate RNA. The High Plains RNA supports a high proportion of mid-grasses within the blue grama/buffalo-grass type and is not considered a duplication of the vegetative community found on the candidate RNA.

Other nearby rangelands in the Kiowa National Grassland are managed to promote development of grassland agriculture and for outdoor recreation, forage, water and wildlife values. As a complement to these management objectives, this single tract of land has great value for scientific research, benchmark comparisons and seed reserves. The seed resources and ecological perspective of this tract are precisely suited to further the goals of the Research Natural Area program.

PRINCIPAL DISTINGUISHING FEATURES

The entire site is nearly flat with no slopes exceeding 1 percent. The deep, well drained loam soils support an almost shrubless grassland, in many places with a relatively tight sod of pure blue grama and buffalo-grass with these species comprising nearly 90 percent of the cover and averaging over 80 percent of the cover throughout the RNA. Increaser and

other grass species make up a relatively small percent of the cover, while forb cover averages about 5 percent and exhibits relatively low diversity. The relative mix of plant species coupled with a low percentage of bare ground (about 10 percent) and virtual non-existence of "weedy" annuals indicates a late seral stage of vegetation very near its climax expression.

LOCATION

The Kiowa Shortgrass RNA is located on the Kiowa Ranger District of the Cibola National Forest (see Map 1). No other National Forest System lands are involved. The center of the RNA is at latitude 36°31'20" north and longitude 103°3'30" west. It is in surveyed country and consists of most of the east half of Section 2, T26N, R36E.

Boundary

The following boundary description for the Kiowa Shortgrass RNA is referenced to Map 2. East one-half of Section 2, Township Twenty-six (26) North, Range Thirty-six (36) East, NMPM. Excepting therefrom a twenty-acre parcel, lying in the west central part of the East ½ and more fully described as follows:

Beginning for reference at the Quarter Corner common to Sections 2 and 11, T26N, R36E.

Thence with the North-South Centerline of Section 2; in a northerly direction, 1,800 feet (548.6 m) to the TRUE POINT OF BEGINNING:

Thence, continuing in a Northerly direction, 1,320 feet (402.3 m) to a point on the North-South Centerline of Section 2.

Thence leaving said North-South Centerline; East, 660 feet (201.2 m) to a point.

Thence South, 1,320 feet (402.3 m) to a point.

Thence West, 660 feet (201.2 m) to the place of beginning and containing 20 acres (8.1 ha), to be the same, more or less.

Acreage

The RNA consists of a total of 300 acres (121.4 hectares).

Elevations

Elevations range from 4,775 feet (1,455 m) at the southeast corner of the RNA to 4,830 feet (1,472 m) at the northwest corner.

Access

To reach the area by vehicle, travel west from Clayton, New Mexico, on U. S. Highway 56/64 approximately 3 miles (4.8 km) to the junction of State Highway 18 leading north. Turn left on this route and proceed about 3.2 miles (5.1 km) to a county road on the right (leading east). Follow this road 4 miles (6.4 km) to the southeast corner of the RNA. Cross the fence on foot into the RNA from this point or anywhere from this road where it forms the south boundary or from the road leading north where it forms the east boundary.

AREA BY COVER TYPES

The entire RNA is comprised of a single cover type based on the Küchler Potential Natural Vegetation system (Küchler, 1964) as outlined in Table 1 and depicted on Map 3. The Society of American Foresters system (Eyre, 1980) does not cover grasslands.

Table 1. Estimated Areas of Cover Types in the Kiowa Shortgrass Research Natural Area.

Type	Society of American Foresters Cover Type	Küchler PNV Type	Surface Area Acres	Hectares
Shortgrass	(none)	K-58 Grama-Buffalo Grass	300	121.4

PHYSICAL AND CLIMATIC CONDITIONS

The Kiowa Shortgrass RNA is located on flat to gently rolling terrain characteristic of the High Plains region of eastern Colorado, eastern New Mexico and northwest Texas. The gravelly surface of the plains in the vicinity of the RNA readily absorbs rain and snowmelt, and erosion rates are generally low. There is virtually no evidence of surface erosion on the RNA.

The following weather station records taken by the office of the New Mexico State Climatologist in the town of Clayton from 1896 through 1987 are representative of conditions at the RNA. Clayton is 8 miles (12.9 km) southwest of the RNA.

Table 2. Climatic Records for Clayton, New Mexico
Elevation 4,970 feet (1,515 m); 1896-1987

Month	Mean Temperature °F	°C	Mean Precipitation inches	mm
January	33.4	0.8	0.27	6.9
February	36.8	2.7	0.36	9.1
March	42.0	5.6	0.67	17.0
April	51.2	10.7	1.25	31.8
May	60.0	15.6	2.43	61.7
June	69.3	20.7	1.88	47.8
July	73.6	23.1	2.62	66.5
August	72.5	22.5	2.24	56.9
September	65.3	18.5	1.63	41.4
October	54.8	12.7	1.15	29.2
November	42.6	5.9	0.50	12.7
December	35.1	1.7	0.38	9.7
Mean Annual	53.0	11.7	15.38	390.6
Maximum	105.0	40.5	37.62	955.5
date	7/30/34		1941	
Minimum	-21.0	-29.4	5.54	140.7
date	1/4/59		1936	

DESCRIPTION OF VALUES

Flora

No endangered, threatened or unique plant species are known to occur in the Kiowa Shortgrass RNA.

Except for a very narrow edge effect strip along the north, east and west boundaries of the RNA, the entire area is a blue grama (Bouteloua gracilis) grassland in good condition with blue grama/buffalo-grass (Bouteloua gracilis/Buchloe dactyloides) comprising about 85 percent of cover on average. The Bouteloua gracilis/Buchloe dactyloides ratio varies from 20 to 1 to 2 to 1, but buffalo-grass averages about 25 percent of the total grass cover throughout the area. Galleta (Hilaria jamesii) ranges from 0 to 12 percent ground cover; bottlebrush squirreltail (Sitanion hystrix), 0

to 8 percent; and sideoats grama (Bouteloua curtipendula), 0 to 5 percent, depending upon location in the RNA. Nowhere are other grasses even close to subdominant, but there are regular, infrequent occurrences of Aristida sp., hairy grama (Bouteloua hirsuta), ring muhly (Muhlenbergia torreyi), sand dropseed (Sporobolus cryptandus) and occasional annual grasses.

No trees occur here except for a single elm in the southeast corner, planted long ago. Shrubs and half-shrubs, limited to broom snakeweed (Gutierrezia sarothrae), plains pricklypear (Opuntia polycantha), and soapweed yucca (Yucca glauca), are scarce to infrequent, and the near-shrub, slender scurfpea (Psoralea tenuiflora), is nowhere common.

Overall forb cover averages about 5 percent, with prairie coneflower (Ratibida columnifera) reaching 10 percent in some parts of the area in 1987 following an unusually wet spring. Forb diversity is fairly low. Bare ground cover averaged about 10 percent in 1987.

The following plant list is representative of species identifiable in late summer and fall but doubtless omits some spring and early summer forbs. Plants were collected and/or identified by Dunmire during field trips on July 23, August 18 and September 29, 1987 and September 11, 1990. Nomenclature follows the authority of Martin and Hutchins (1980).

PLANT LIST
KIOWA NATIONAL GRASSLANDS, UNIT 46

Scientific Name	Common Name	Frequency
HALF-SHRUBS, SHRUBS AND TREES:		
Gutierrezia sarothrae	Broom snakeweed	C
Ipomoea leptophylla	Bush morning glory	R
Opuntia polyacantha	Plains pricklypear	I
Yucca glauca	Soapweed yucca	R
GRASSES AND GRASSLIKE PLANTS:		
Agropyron smithii	Western wheatgrass	I
Andropogon scoparius	Little bluestem	I
Aristida adscensionis	Six-weeks three-awn	C
Aristida longiseta	Red three-awn	I
Bouteloua curtipendula	Sideoats grama	C
Bouteloua gracilis	Blue grama	C
Bouteloua hirsuta	Hairy grama	I
Buchloe dactyloides	Buffalograss	C
Chloris verticillata	Windmill grass	R
Eragrostis sp.	Lovegrass	I
Hilaria jamesii	Galleta	C
Hordeum sp.	Barley	R
Muhlenbergia torreyi	Ring muhly	C
Panicum obtusum	Vine mesquite	I
Sitanion hystrix	Bottlebrush squirreltail	C
Sporobolus cryptandrus	Sand dropseed	I
FORBS:		
Asclepias latifolia	Broad-leaved milkweed	R
Asclepias pumila	Dwarf milkweed	I
Astragalus mollissimus	Woolly locoweed	I
Astragalus missouriensis	Missouri milkvetch	I
Bahia oppositifolia	Plains bahia	I
Chenopodium desiccatum	Goosefoot	I
Chenopodium leptophyllum	Goosefoot	I
Cirsium vulgare	Bull thistle	R
Conyza canadensis	Horseweed	I
Coryphantha vivipara var. vivipara	Pincushion cactus	R
Echinocereus viridiflorus var. viridiflorus	Green pitaya	C
Engelmannia pinnatifida	Englemann daisy	I
Erigeron nudiflorus	Sprawling fleabane	I

Scientific Name	Common Name	Frequency
Eriogonum annuum	Annual buckwheat	I
Erysimum asperum	Plains wallflower	I
Euphorbia marginata	Snow-on-the-mountain	R
Gaura sp.	Little primrose	R
Grindelia aphanactis	Curlycup gumweed	I
Haplopappus spinulosa ssp. australis	Spiny goldenweed	I
Helianthus annuus	Annual sunflower	R
Hoffmanseggia caudata	Rushpea	I
Hymenoxis scaposis var. lineraris	Bitterweed	I
Kuhnia chlorolepis	False boneset	I
Lepidium sp.	Peppergrass	I
Liatris punctata	Dotted gayfeather	I
Linum sp.	Flax	I
Melampodium leucanthum	Plains blackfoot	I
Mentzelia nuda	Stickleaf	I
Plantago purshii	Woolly Indian-wheat	C
Portulaca oleacea	Common purlane	R
Psoralea tenuiflora	Slender scurfpea	I
Ratibida columnifera	Prairie coneflower	C
Salsola kali	Russian Thistle	R
Senecio multicapitatus	Groundsel	I
Solanum eleagnifolium	Horse-nettle	I
Solanum rostratum	Buffalo bur	R
Thelesperma megapotamicum	Hopi-tea greenthread	I
Tragopogon sp.	Goatsbeard	R
Verbena wrightii	Green verbena	C
Vicia exigua	Slim vetch	R
Thelesperma megapotamicum	Hopi-tea greenthread	I
Tragopogon sp.	Goatsbeard	R
Verbena wrightii	Green verbena	C
Vicia exigua	Slim vetch	R

C = common; I = infrequent; R = rare

Fauna

The only rare or endangered animal species that is likely to infrequently occur on the RNA is the Mountain Plover (Charadrius montanus), a Federal Notice of Review species. This species is known to occur in this vicinity on other management units of the Kiowa National Grasslands, but it has not been specifically recorded on the RNA. Another bird species of interest, the Long-billed Curlew (Numenius americanus), has recently been observed on the RNA. This bird has been designated a Management Indicator Species for plains grasslands on the Cibola National Forest (USDA Forest Service, 1985).

Pronghorn (Antilocapra americana) are the only native ungulate species occurring on the area and have been observed recently. There is much evidence of Pocket Gopher activity (species unknown) throughout the area.

The best reference to birds potentially occurring on the RNA is a 1973 checklist for the Kiowa National Grassland (USDA Forest Service, 1973). Potential lists of other animal species can be derived from Forest Service RUN WILD III computer-stored data base (Lehmkuhl and Patton, 1982) and the RUN WILD revised vertebrate checklist (Lehmkuhl, Patton and Martin, 1983). Nomenclature for fauna in this report is according to the latter publication.

Geology

The geology of the immediate area is characterized by gently rolling uplands of Miocene gravel and sands of the Ogallala Formation that has existed with very little change since Pliocene time. This alluvium discontinuously mantles much older bedrocks which are not exposed in vicinity of the RNA. This area and the surrounding region is within the Raton Section of the Great Plains physiographic province (Chronic, 1987; New Mexico Geological Society, 1982).

Soils

The RNA exhibits deep well drained loams and silty clay loams, principally Mollisols produced by a mesic soil temperature regime in a ustic moisture regime. Four soil mapping units are included here (Maxwell et al., 1981), only two of which make up substantial acreage.

Sherm clay loam occurs on the north and south thirds of the unit. These are fine, mixed Torrertic Paleustolls formed in eolian and alluvial deposits.

The central third of the RNA consists of Grurrier loam which is comprised of fine, mixed Aridic Paleustolls formed in mixed alluvium that has weathered from High Plains sedimentary formations.

Lands

The Kiowa Shortgrass RNA is acquired National Forest System land. The RNA is bordered on the west, east and south by Kiowa National Grassland (National Forest System) lands and on the north by private land. Rights exist on the RNA for telephone, telegraph and pipeline rights-of-way. None of these developments are in place.

Cultural

No known cultural sites occur on the RNA.

Other

There is an active windmill and stocktank just outside the RNA to the west in the center of Section 2. The north, east and south boundaries follow existing public access roads, and this boundary is fenced.

IMPACTS AND POSSIBLE CONFLICTS

Mineral Resources

No known mineral resources occur in or adjacent to the RNA.

Grazing

The RNA has experienced a managed grazing system for the past 20 years or so. It has been part of Management Unit 46 which in recent years has been managed with Unit 52 in a three-pasture deferred system with grazing from June to December (e.g. from June to August 15 one year, August 15 to October 15 the next, and October 15 to December 31 the third year). In order to achieve the purposes of the RNA as a grassland maintained under natural ecological processes for scientific research and benchmark comparison with other grazed lands on the Kiowa National Grassland, it is proposed that grazing be terminated in the near future following establishment of the RNA. However, grazing may be employed as a management tool in the future, as called for in the Cibola National Forest Land and Resource Management Plan (as amended, May 29, 1990) The greatest potential conflict is with the current grazing permittee; however, arrangements will be made by the Forest to have another area on the Kiowa National Grassland made available in lieu of

the 300 acres (121.4 hectares) that will be withdrawn from grazing for the RNA.

Existing fences along the north, east and south boundaries of the RNA are in good condition. In order to exclude livestock, a fence needs to be constructed along the west boundary, approximately 1 1/4 mile (2.0 km) in length. Construction cost is estimated at $3,750.

Timber

The area contains no timber values.

Watershed Values

The gently sloping terrain is at the upper end of a watershed that drains to the south and east. The moderate watershed values of this land will be maintained or enhanced by establishment as an RNA and maintenance of grass cover.

Recreation Values

The RNA currently receives little or no recreation use, and RNA establishment poses no possible conflict.

Wildlife and Plant Values

This area is not known to provide suitable habitat for threatened or endangered plants or animals.

Special Management Area Values

RNA establishment will not impact any congressional mandates regarding the purpose and management of the Kiowa National Grassland.

Transportation Plans

No roads or trails are planned for the area.

MANAGEMENT PRESCRIPTION

The following management prescriptions for all candidate RNAs from the Cibola National Forest Plan pertain to the Kiowa Shortgrass RNA (USDA Forest Service, 1985).

> Allow vegetation manipulation only when necessary to preserve the vegetation for which the area is being studied.

Allow use by livestock as a tool to apply effects of grazing and animal impacts emulating previous herds of large ungulates (bison, elk and pronghorn). Maintain existing fences surrounding study areas.

Propose withdrawal from mineral entry.

Allow no new road or trail construction.

Prohibit all off-road vehicle travel.

Allow prescribed natural fires within the area unless they threaten persons or property outside the area or the uniqueness of the RNA.

Planned ignition fires will be considered in consultation with research objectives.

Limit suppression action to the use of hand tools and prohibit fire retardant chemicals unless necessary to protect life and property outside the area.

Prohibit new utility corridors.

Issue no special use permits.

A further prescription, not included in the Forest Plan, is that a vegetation monitoring program be instituted by the Regional Ecologist in order to determine the direction and degree of plant succession on the grassland.

Vegetation Management

Prescribed burning for the purpose of maintaining natural ecological conditions may be desirable in the distant future, but social factors must be carefully weighed, and prescribed burning in not contemplated as a management tool at this time.

Consideration of occasional, intensively managed livestock grazing to maintain ecologic conditions also may be desirable in the future, but is not contemplated at this time.

Upon establishment of the RNA a critical need will be to identify the parameters of vegetation condition that should be monitored on a regular basis in order to determine that the late seral stage of shortgrass prairie community is at least being maintained or that natural ecological succession is being advanced.

ADMINISTRATION RECORDS AND PROTECTION

Administration and protection of the Kiowa Shortgrass RNA will be the responsibility of the Cibola National Forest. The District Ranger, Kiowa Ranger District, Clayton, NM, has direct responsibility.

The Director of the Rocky Mountain Forest and Range Experiment Station will be responsible for any studies or research conducted in the RNA, and request to conduct research in the RNA should be referred to him. He, or his designee, will evaluate research proposals and will coordinate all studies and research in the area with the District Ranger. All plant and animal specimens collected in the course of research conducted in the RNA will be properly preserved and maintained within approved university or federal agency herbaria and museums.

Records for the Kiowa Shortgrass RNA will be maintained in the following offices:

Regional Forester, Southwestern Region, Albuquerque, NM
Rocky Mountain Station, Fort Collins, CO
Cibola National Forest, Albuquerque, NM
District Ranger, Kiowa Ranger District, Clayton, NM

The Albuquerque office of the Rocky Mountain Forest and Range Experiment Station will be responsible for maintaining the Kiowa Shortgrass RNA research data file and list of herbarium and species samples collected.

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BOUNDARY DESCRIPTION CERTIFICATION PAGE

I certify the enclosed boundary description of the Kiowa Shortgrass Research Natural Area was prepared under my direct supervision.

John D. Childers 4/15/91

Forest Land Supervisor Date

John D. Childers

Seal

United States
Department of
Agriculture

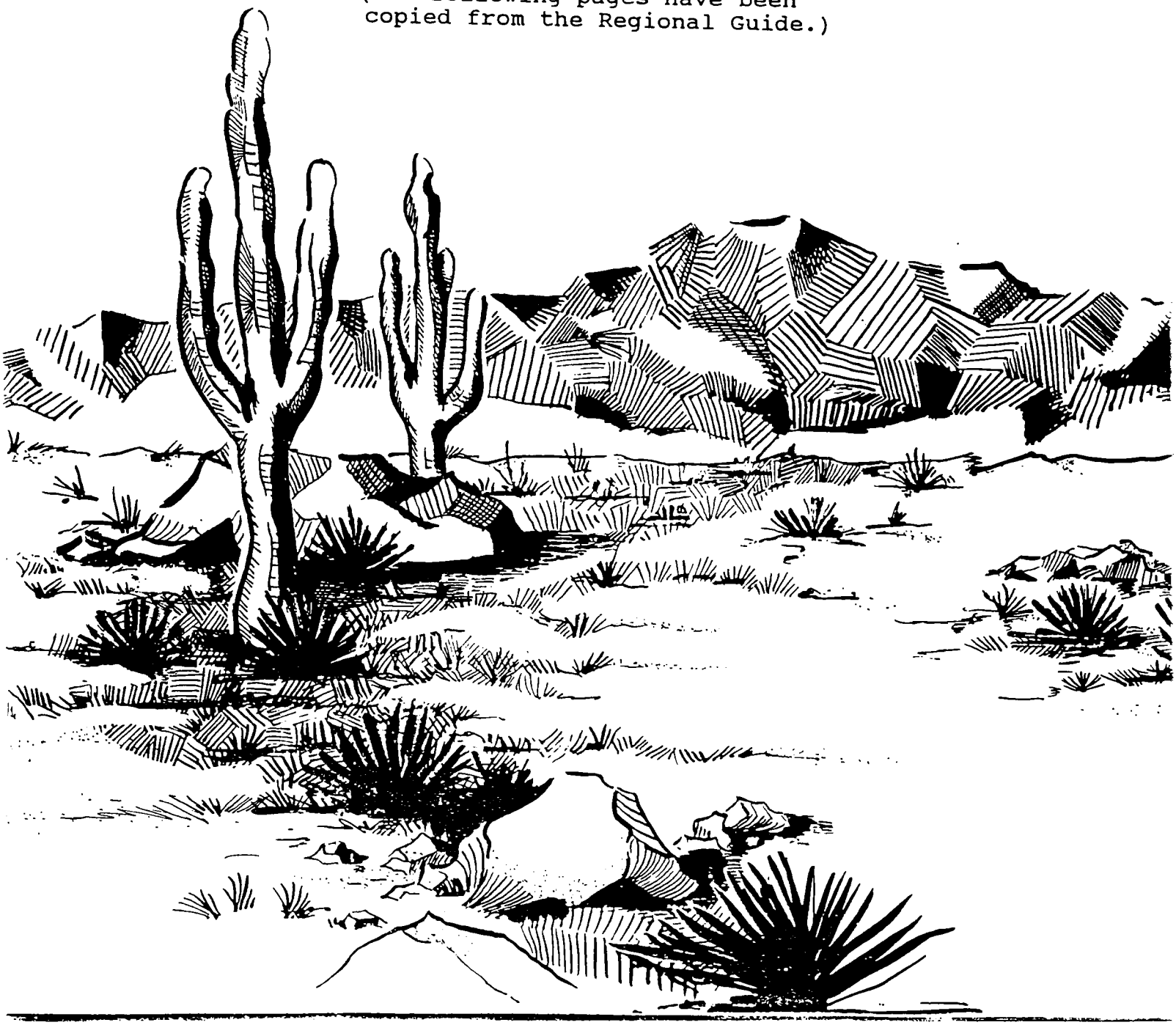
**Forest
Service**

Southwestern
Region

August 1983

Regional Guide for the Southwestern Region

Appendix A
(The following pages have been
copied from the Regional Guide.)



vegetative diversity, and aggravates flooding damage by increasing runoff and sedimentation. Riparian areas of major concern include those along tributaries of the Salt, Verde, Gila, San Francisco, Black, and Blue Rivers in Arizona and the Gila, San Francisco, and Pecos Rivers in New Mexico. Improving riparian areas must be coordinated with improving watershed conditions.

Research conducted by the Rocky Mountain Forest and Range Experiment Station focuses on identifying ecological riparian units and determining grazing and vegetation interrelationships in riparian areas. The regeneration capabilities of some predominant riparian trees is being investigated. Accelerated research is being planned through the Station's Arid Lands Research Program. In addition to traditional investigations of vegetation and wildlife habitat, information is needed about techniques for improving and enhancing the soil productivity and hydrologic function of riparian areas through physical structures and other measures.

Research Natural Areas

Current Situation. Research natural areas are designed to better preserve a representative array of all significant natural ecosystems and their inherent processes as baseline areas and to obtain information through scientific education and research about natural system components and processes and how these compare with representative manipulated ecosystems.

The Southwestern Region has 47 designated research natural areas, 14 of which are on National Forest System land. (See Table 2-9.)

Table 2-9

Research Natural Areas in the Southwestern Region

State	National Forest System		Total	
	Number	Acres	Number	Acres
Arizona	12	11,400	32	63,500
New Mexico	2	1,100	15	28,000
TOTAL, Region 3	14	12,500	47	91,500

Issues, Concerns, and/or Opportunities. Research natural areas and other areas, such as wilderness areas, national parks, national monuments, and wildlife refuges, protect substantial areas of the ecosystems of the Southwest. However, there are some ecosystems that are not represented, and it appears desirable to select 15 to 25 additional ecosystem representations where opportunities are available. (See Table 3-1 in Chapter 3.)

Other Special Areas

Current Situation. Other legislatively designated areas include the Rio Grande Wild and Scenic River, in the Carson National Forest; the North

(3) Maintain at least 60 percent of natural shrub and tree crown cover

c) Wildlife resources: Maintain at least 60 percent of natural shade over land surfaces

5. On a site-specific basis, identify riparian-dependent resources and develop action plans and programs to bring about conditions essential to supporting those dependent resources.

Research Natural Areas

Purposes served by research natural areas are identified in FSM 4063.

1. Identify, study, and designate sufficient areas to meet the representation requirements for terrestrial ecosystems in the Southwest by 1985. (See Table 3-1.) Strengthen the representation of New Mexico ecosystems in the research natural area system.

2. The size of a research natural area will normally not be less than 300 acres and not be greater than 1,200 acres. Establish smaller areas to protect special ecosystems and smaller or larger areas to ensure logical boundaries.

3. Establish areas on National Forest System lands that include appropriate opportunities in wildernesses. Emphasize establishment of areas where resource use is restricted by other designations, such as municipal watersheds and the Langmuir Research Area. Review new land acquisitions and lands released from other Federal agencies for research natural area designation. Examples are the Los Alamos Restricted Area and the Manzano Base Security Area in New Mexico.

4. Research natural areas on National Forest System lands of the Southwestern Region will be recognized, screened, and established in the following order of priority (listed in descending order).

   a) Priority will be given to candidate research natural areas where ecosystem representations:

      (1) Include typical, extensive, and important flora or fauna

      (2) Exhibit modal (typical representative) features of biota, soils, climate commonly found on National Forest System lands

      (3) Include biotic populations of special interest or concern

      (4) Exist in mosaics that represent more than one ecological component of a research natural area

      (5) Have an apparent level of scientific interest or management importance

Table 3-1

Representation Needs for Research Natural Areas in the Southwestern Region

Biotic Community Classification[1]	Forest Cover Type[5] and/or Potential Natural Vegetation[2]	Terrestrial Ecosystem Classification[3]	Comments	Possible Sites[4]
Desert				
154.11 Creosote bush-bursage	K-042	18: Aridic/hyperthermic-Franseria deltoidea	Minor opportunity for representation on National Forest System lands	Tonto
154.12 Paloverde-Mixed cacti	K-043	18: Aridic/thermic-Carnegia gigantea		Tonto
153.21 Creosote bush-Tarbush	K-044	13: Aridic/thermic-Flourensia cernua	Because of limited distribution, this ecosystem is best included with other ecosystems on represented areas	Coronado
153.22 Whitehorn	K-059	13: Aridic/thermic-Acacia vernicosa		Coronado and Lincoln
Steppe				
142.22 Sagebrush	K-038	1, 3: Xeric/mesic-Artemisia tridentata		Kaibab, Carson, and Santa Fe
143.12 Grama-tobosa	K-058	13, 17: Aridic/thermic-Hilaria mutica		Coronado, Lincoln, and Tonto
143.11 Scrub-grassland		15, 17: Ustic/mesic-Nolina microcarpa	The Research Ranch Research Natural Area includes this ecosystem	Coronado and Lincoln
142.11 Bluestem	K-069, K-070	4: Ustic/mesic-Andropogon gerardi	Includes representation on National Grasslands	Cibola
142.12 Grama "short grass"	K-065	4: Ustic/mesic-Buchloe dactyloides	Includes representation on National Grasslands	Cibola
142.12 Grama-galleta	K-053	8: Ustic/mesic-Hilaria jamesii		Apache-Sitgreaves, Coconino, Cibola, Prescott, and Tonto
152.13 Blackbrush	K-039	2: Aridic/mesic-Coleogyne ramosissima	Because of limited distribution, this ecosystem is best included with other ecosystems on represented areas	Kaibab

United States
Department of
Agriculture

Forest
Service

Southwestern
Region

July 1985

Cibola National Forest Land and Resource Management Plan

AS AMENDED

Appendix B
(The following pages have been
copied from the Forest Plan.)

MANAGEMENT PRESCRIPTIONS
APPLICABLE TO ALL AREAS
(continued)

	Decision Variables	Activities	Applicable Management Areas	Standards and Guidelines
				Managers; Navajo Medicine Men's Association; and with Land Grants, including but not limited to San Mateo, Cebolleta, Tajique, Torreon, Manzano and Chilili will be held followed by issue sessions. Prior to issue sessions, community contacts will be asked to submit to the Forest Service a list of appropriate information needed to participate effectively in the issue session. The Forest Service realizes that this information, many times, is technical, therefore, adequate time is needed between information dissemination and the actual issue session for community people to understand and use the data.
Research Natural Areas			2,4,5,8, 14,18	The following areas will be studied for possible designation as Research Natural Areas (RNAs): 1. Approximately 990 acres of the Bernalillo Watershed in Management Area 2

Amended 1-9-87

MANAGEMENT PRESCRIPTIONS
APPLICABLE TO ALL AREAS
(Continued)

Decision Variables	Activities	Applicable Analysis Areas	Standards and Guidelines
			has been designated for establishment as a Research Natural Area. 2. Approximately 882 acres in Little Water Canyon in Management Area 8 and 28 acres in Management Area 14 have been designated for establishment as a Research Natural Area. 3. Approximately 300 acres (Black Kettle) in Management Area 4 for the protection and study of the native vegetation. 4. Approximately 300 acres on Kiowa NG and 300 acres on Rita Blanca NG in Management Area 5 for the protection and study of native vegetation. Establishment of the Bernalillo Watershed and Little Water Canyon RNAs, and study of the other potential sites in Management Areas 2, 4, and 5 will be completed in Period 1. Once designated as a RNA, the following standards and guidelines will apply: Emphasize natural processes, protect natural features, and preserve examples of naturally occurring ecosystems in an unmodified condition for research and educational purposes.
080	C03		Allow vegetation manipulation only when necessary to preserve the vegetation for which the area is being studied. Emphasize diversity of vegetation species that can result in wildlife species diversity.
140			Allow use by livestock as a tool to apply effects of grazing and animal impact emulating previous herds of large ungulates (bison, elk, and proghorn). Maintain existing fence surrounding study areas.
270,280			Maintain mineral withdrawal on the Bernalillo Watershed. Permit mineral leasing, but exclude surface occupancy.
270	G02		Propose withdrawal of Research Natural Areas from mineral entry but not from mineral leasing.
160			Prohibit all firewood activities within the study areas.
480			Allow no new road construction. Allow no trail construction
010	A15		Allow nonmotorized dispersed recreation activities provided they do not modify the area or threaten or impair the research or educational value of the study areas.

MANAGEMENT PRESCRIPTIONS
APPLICABLE TO ALL AREAS
(Continued)

Decision Variables	Activities	Applicable Management Areas	Standards and Guidelines
			Prohibit recreation use if degradation results.
	A15		Require recreation users to pack out all their trash.
	A15		Prohibit all off-road vehicle travel within study areas.
			No open campfires will be permitted within the study areas. Only butane or gasoline stoves may be used for cooking purposes.
			Prohibit recreation signs or marking within the area.
350	P01		Allow prescribed natural fires within the study areas unless they threaten persons or property outside the area or the uniqueness of the potential RNA.
			Planned ignition fires will be considered in consultation with research objectives for the areas.
			Limit suppression action to the use of hand tools and prohibit fire retardant chemical unless necessary to protect life and property outside the study areas.
010	A03		The Visual Quality Objective for the study areas will be maintained at the inventoried classification.
420			Issue no special use permits within areas which would effect potential RNA status.
420			Prohibit new utility corridors.
230			Do not allow watershed treatment activities within the areas until studies and determination are completed.
			All other research activities will be approved on a case by case basis.
			Develop audio program(s) and brochures describing the national RNA program and the unique qualities of RNAs located on the Forest.
			Make contact with at least the appropriate State agencies, colleges and universities in New Mexico, Arizona, Colorado, Utah and Texas and advise them of the RNAs and their scientific opportunities.

Amended 1-9-87

United States Department of Agriculture

Forest Service

Southwestern Region

July 1985

Environmental Impact Statement for the Cibola National Forest Plan

Appendix C
(The following pages have been copied from the Forest EIS.)

La Mosca is another site which has reached its physical limits. The demand for space on the existing site could result in increased interference problems, although interference is not a serious problem currently. Expansion to La Mosca #2 would prevent problems currently associated with Sandia Crest.

The Forest currently receives approximately 200 requests annually for electronic sites. Of these, approximately 98 percent are approved. Projecting this approval figure through the planning period, some existing sites would have to be expanded and new sites added. Acreages available for electronic sites would have to be increased from the current 148 acres to more than 400.

Corridors

Corridors and rights-of-way for public utilities are located throughout the Forest and Grasslands. Table 26 displays the number of miles of corridors reserved for use by public utilities and Table 27 displays the total miles of linear rights-of-way currently being utilized by public utilities.

Table 26. Major Utility Corridors and Electronic Sites

Ranger District	Miles					Electronic Sites
	Electric	Gas & Oil	Telephone	Water	Rail Road	
Mt. Taylor	29.94	.3	1.1	0	0	3
Magdalena	0	0	6.4	0	0	2
Mountainair	3.4	6.61	0	0	0	2
Sandia	3.9	4.7	0	0	0	3
Black Kettle	0	0	0	0	1	0
Kiowa	4.2	0	0	0	1.5	0
Rita Blanca	2.98	0	0	0	.5	0

Table 27. Linear Rights-of-Way for Public Utilities - Miles

District	Electric	Gas & Oil	Telephone	Water	Rail Road
Mt. Taylor	88.24	11.54	21.81	0.99	0
Magdalena	87.87	--	27.91	5.11	0
Mountainair	9.95	7.85	10.66	1.36	0
Sandia	26.30	4.52	19.45	1.46	0
Black Kettle	6.00	32.39	21.37	2.65	1
Kiowa	54.68	6.98	35.06	0	1.5
Rita Blanca	16.78	7.87	20.29	0	0.5

Future Trends

Needs for major corridors for electrical transmission lines, gas and oil pipelines, and communication transmission lines is increasing over various portions of the Forest and Grasslands. For this reason most existing rights-of-way for major distribution lines and pipelines are classed as corridors and prospective users will be required to use these where technically and environmentally feasible. One window for potential corridors is established across the Zuni Mountains to meet needs identified in the Western Regional Corridor Study of 1980.

Special Area Designations

Research Natural Areas

Research Natural Areas (RNAs) are set aside to provide and protect natural diversity in all of its forms. The areas typify important forest, shrubland, and grassland, types having special or unique characteristics of scientific interest or importance. Research natural areas are established for nonmanipulative research, observation and study. The Forest and Grasslands currently do not have any established RNAs.

Several examples of important biotic types have been identified on the Forest and Grasslands. Potential areas will be managed to protect RNA values until establishment reports are completed and areas are either included in or dropped from RNA consideration. The potential areas are: Little Water Canyon (910 acres) and Bernalillo Watershed (990 acres). The potential for approximately 300 acres each on three National Grasslands will also be investigated.

Future Trends

Establishment of RNAs on the Forest and Grasslands will assist in meeting Regional and National targets.

Wild and Scenic Rivers

The Nation-wide Rivers Inventory completed by the National Park Service in January of 1982 included 105 miles of the Canadian River in New Mexico from Taylor Springs to Conchas Reservoir which has potential for a wild, scenic or recreational river designation. Approximately 13 miles are under Forest jurisdiction. A legislatively designated lead agency must be appointed in order to study the area for possible designation as a wild, scenic or recreational river.

The portion of the inventoried Canadian River within the Kiowa National Grassland is accessible by an unpaved road. Mills Canyon Campground with a PAOT of 40 is in the river corridor. The remains of an historic stage station and homestead are found near the existing campground. Opportunities exist for developing additional campground or picnic ground capacity and an interpretation program related to the stage station.

Current recreation activity in the river corridor is very light. The campground provided about 600 recreation visitor days of use in 1982. Hunting and some fishing activity also occurs in the area.

This portion of the river canyon does have an especially attractive setting and is in a relatively free flowing state. There is nothing in this portion of the inventoried river that would keep it from being eligible for the National Wild and Scenic Rivers system under Sections 1(b) and 2(b) of the Wild and Scenic Rivers Act. It probably could be classified as a scenic river area under Section 2(b) because of the limited access and largely undeveloped shoreline.

Future Trends

The Forest Service would not be the appropriate lead agency to pursue designation of a scenic river because of the limited portion within the Kiowa National Grassland. There is no public agency planning designation at this time. Use of the Mills Canyon campground area is light and will increase slowly.

PROTECTION

Protection is divided into four separate elements, Air, Fire, Insect and Disease and Law Enforcement.

Air

There are no Class I airsheds on the Forest.

The majority of air pollution affecting the Forest and Grasslands comes from sources located off these lands. These sources include the Albuquerque metropolitan area primarily, with lesser amounts of pollutants originating from rural roads and farming operations in the vicinity of the Grasslands. Some temporary and localized pollution results from wild and prescribed fires. Particulate emissions from wildfires have averaged 922,800,000 grams per year for the last period. Prescribed fire particulate emissions for 1977 were 147,000,000 grams.

In order to comply with State law, the Forest submits to the New Mexico State Environmental Improvement Division (EID) an annual application for all prescribed fire. Prior to actual burning, the State EID is contacted by telephone for its final approval to burn. Approval may be denied by the State if smoke dispersal conditions are not favorable.

Future Trends

Current Forest practices have only a minor, short-term effect on air quality. Continued growth and development of the Albuquerque metropolitan area will probably result in reduced air quality by the end of Period 5. The Forest will continue to cooperate with the State Environmental Improvement Division.

Fire

Fire management on the Forest is designed to provide a cost-effective program responding to land and resource goals. This program includes wildfire prevention,

Electronic Sites

All alternatives provide for continuation of the eleven existing electronic sites totaling 148 acres. In addition to these sites all alternatives provide for expansion of four sites totaling 79 acres and designation of four new sites totaling 195 acres. The sites are summarized in Table 76. Capilla Lookout and West Knoll are reserved for Forest Service use only. Cedro Peak is limited to Forest Service, local government agencies and AT&T.

Table 76. Existing and Proposed Electronic Sites

Ranger District	Site Name	Status	Acres
Mountainair	Capilla	Existing	40
	Capilla Lookout	Existing	1
	Gallinas Peak	Existing	5
	West Turkey Cone	Proposed	50
Mt. Taylor	La Mosca	Existing	5
	La Mosca #2	Expansion	33
	Micro Wave Ridge	Existing	40
	Micro Wave Ridge #2	Expansion	27
	Wingate Ridge	Existing	10
Sandia	Manzano Lookout	Proposed	50
	Mt. Washington	Proposed	45
	Cerro Pelon	Proposed	50
	Sandia Crest	Existing	21
	Sandia Crest #2	Expansion	6
	Cedro Peak	Existing	10
	Arroyo del Coyote	Existing	5
Magdalena	Davenport	Existing	10
	Davenport #2	Expansion	13
	West Knoll	Existing	1

Special Area Designations

Research Natural Areas

Research Natural Areas (RNAs) are designated by the Chief of the Forest Service upon approval of an establishment report prepared by the Forest.

All alternatives provide for preparation of an establishment report for: 1) 910 acres in Little Water Canyon (Mt. Taylor RD); 2) 990 acres in the Bernalillo Watershed (Sandia RD); and 3) one RNA on each of the three National Grasslands. The Grassland acreage is unknown at this time because potential areas have not been located.

Reductions in suitable timber, grazing lands and mineral accessibility to protect RNA's are not significant. Management requirements for proposed RNAs are displayed in Chapter 4 of the Plan.

Listed Potential Wild, Scenic and Recreational Rivers

All alternatives protect the characteristics of the Canadian River which led to its listing in the Nation-wide Rivers Inventory as a potential wild, scenic or recreational river. Since only 13 miles of the 105 miles of inventoried river are on the Kiowa National Grassland, a legislatively designated lead agency other than the Forest needs to be chosen to conduct the study. The management requirements for protecting this area are detailed in Chapter 4 of the Plan.

Public access is the most pressing problem on the Canadian River. Road and trail access is needed on both the north and south ends. The Proposed Action will attempt, through land exchange or scenic easement, to acquire the 8 miles in private ownership within the Kiowa National Grassland boundaries to assure access and protection of the river's unique qualities.

Leasing is permitted for oil and gas exploration and development but surface occupancy is prohibited.

USDA-FOREST SERVICE

PHOTOGRAPHIC RECORD

(See FSM 1643.52)

PHOTOGRAPHER	DATE SUBMITTED
William W. Dunmire	May 26, 1992
HEADQUARTERS UNIT	LOCATION

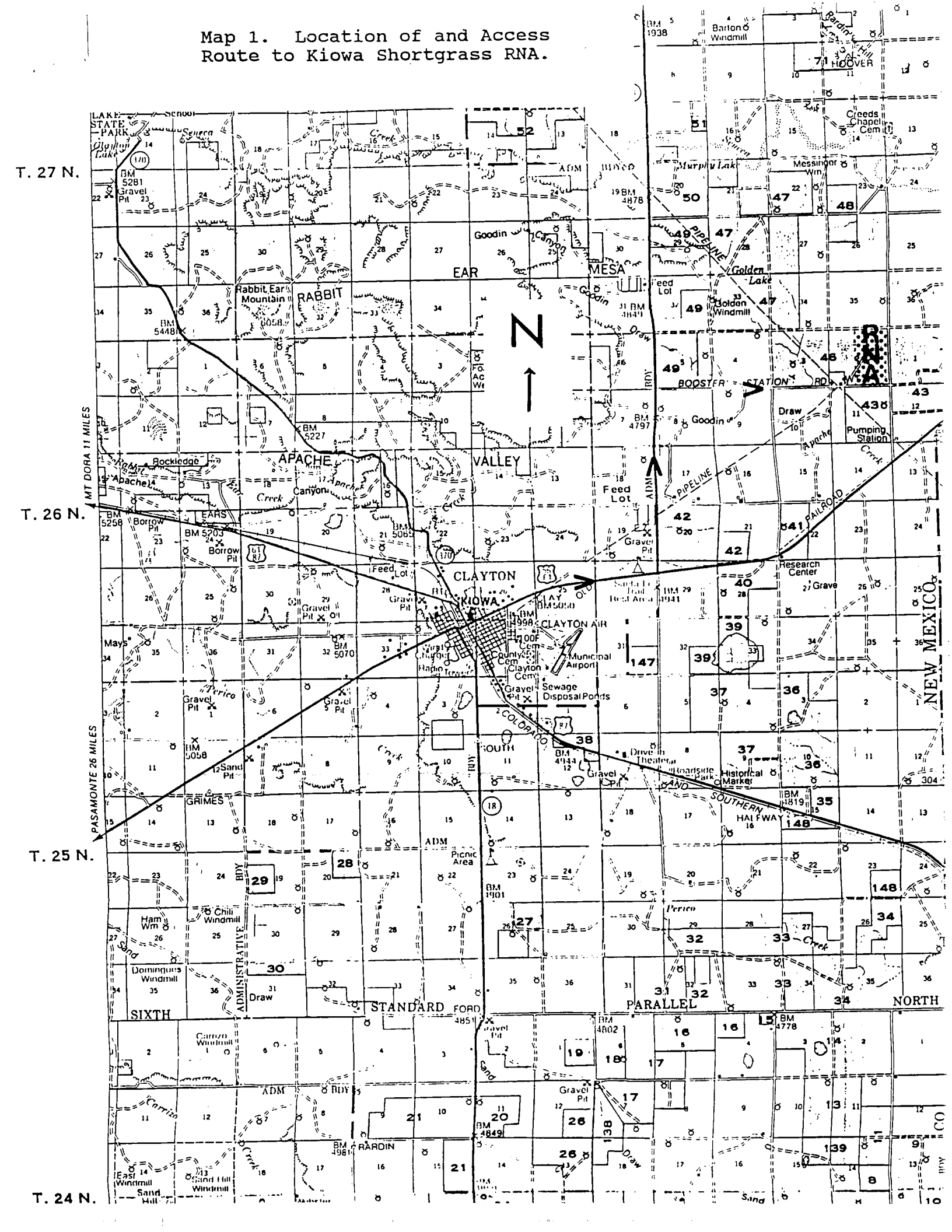
INITIAL DISTRIBUTION OF PRINTS AND FORM 1600-11

☐ WO ☐ RO ☐ DIV. ☐ FOREST ☐ DISTRICT ☐ PHOTOGRAPHER Date _____

INSTRUCTIONS: Submit to Washington Office in quadruplicate. Permanent numbers will be assigned and the forms will be distributed as follows: (1) Washington Office, (2) RO or Station, (3) Forest or Center and (4) Photographer.

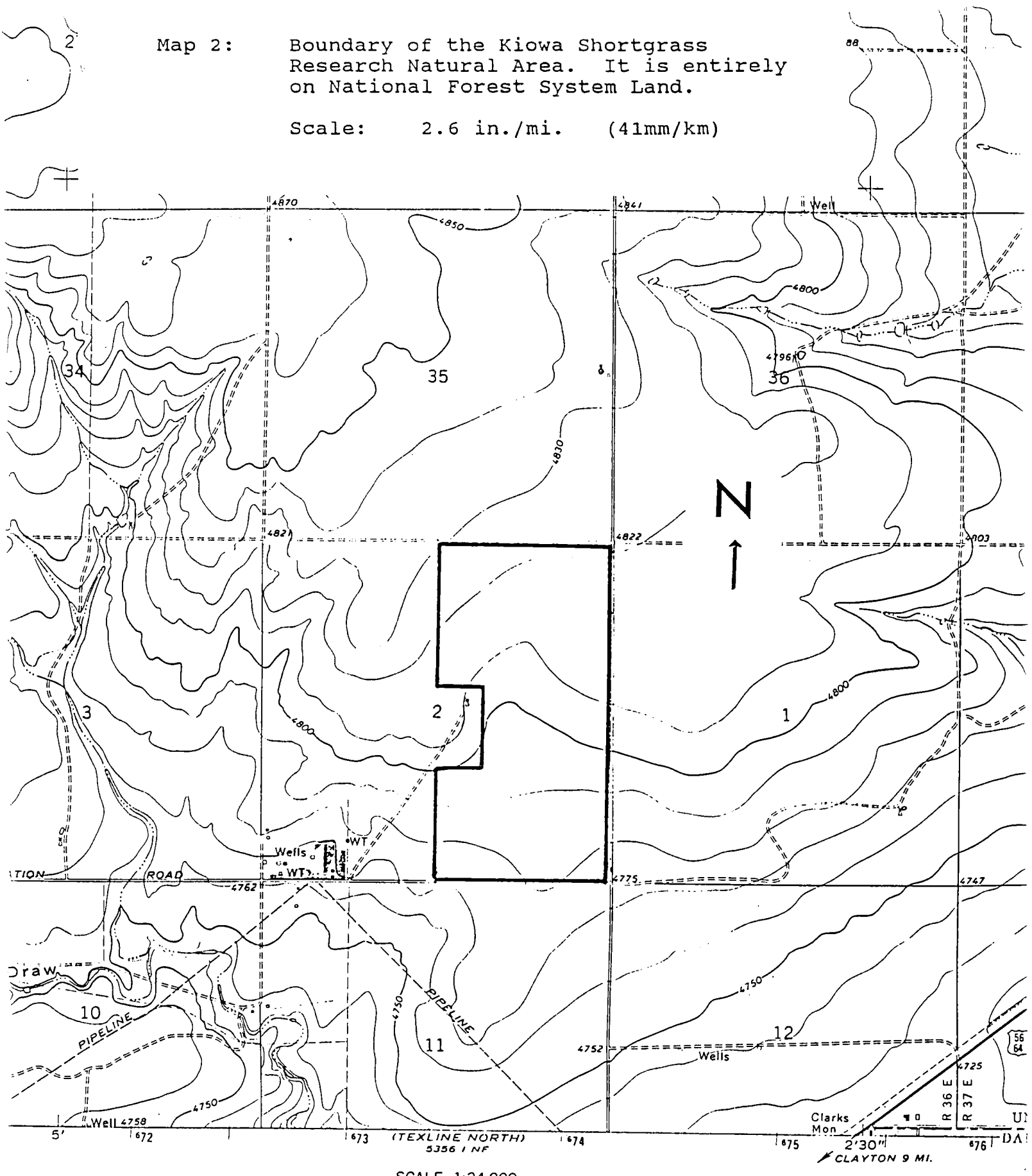
PHOTOGRAPH NUMBER		SELECTED FOR W.O. PHOTO LIBRARY	DATE OF EXPOSURE	LOCATION (State, Forest, District and County)	CONCISE DESCRIPTION OF VIEW	NEGATIVE (Show size and BW for black and white or C for color)
TEMP. (1)	PERMANENT (To be filled in by the WO) (2)	(3)	(4)	(5)	(6)	(7)
				ALL: New Mexico Cibola NF Kiowa Dist. Union Co.		ALL: 24x36mm color slides
1.			9-11-90		North from southeast corner of Kiowa Shortgrass RNA.	
2.			9-11-90		Northwest toward windmill, just west of RNA.	
3.			9-11-90		Northwest from southeast corner of Kiowa Shortgrass RNA.	
4.			8-18-87		Bouteloua gracilis and Ratibida Columnifera on Kiowa Shortgrass RNA.	
5.			9-11-90		Elms at Southeast corner of Kiowa Shortgrass RNA.	
6.			9-11-90		South along east boundary fence of Kiowa Shortgrass RNA.	

Map 1. Location of and Access Route to Kiowa Shortgrass RNA.



Map 2: Boundary of the Kiowa Shortgrass Research Natural Area. It is entirely on National Forest System Land.

Scale: 2.6 in./mi. (41mm/km)



SCALE 1:24 000

1 0 1 MILE

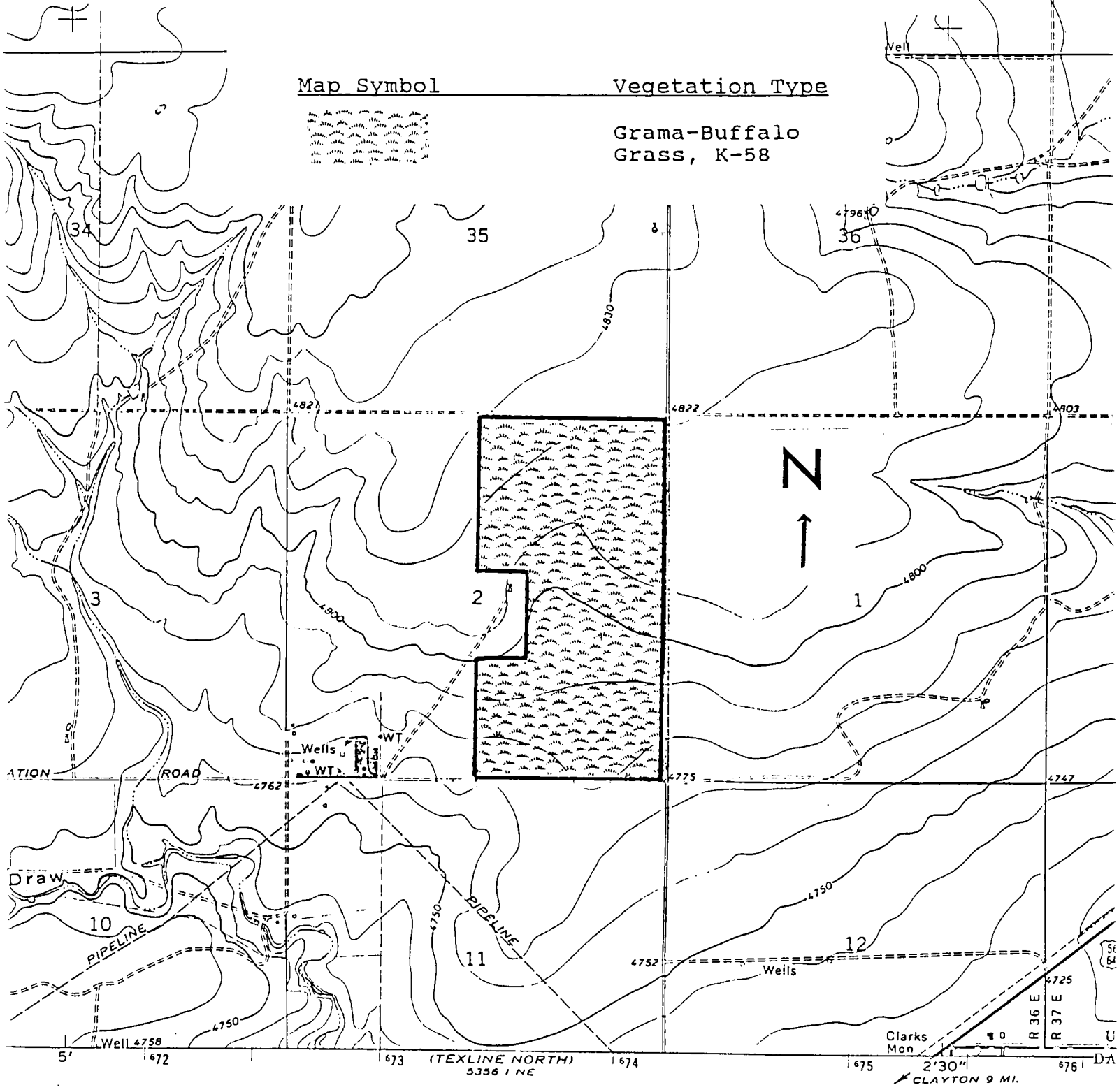
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929

Map 3: Distribution of vegetation types in the Kiowa Shortgrass Research Natural Area.



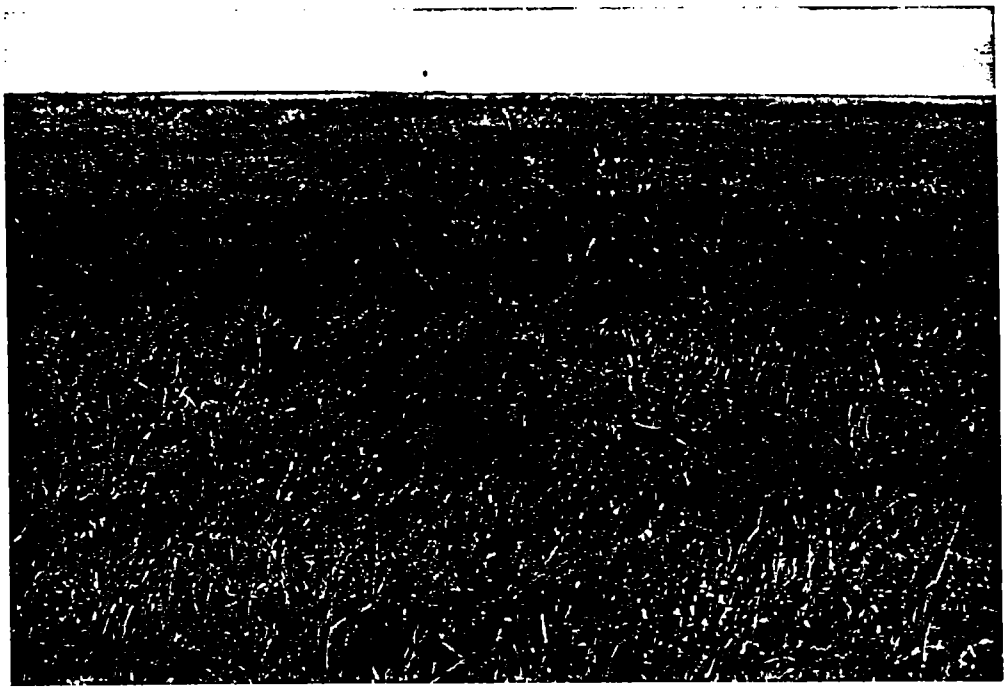


Photo 1. The entire Kiowa Shortgrass Research Natural Area Consists of a blue grama/buffalo-grass prairie in late seral condition.

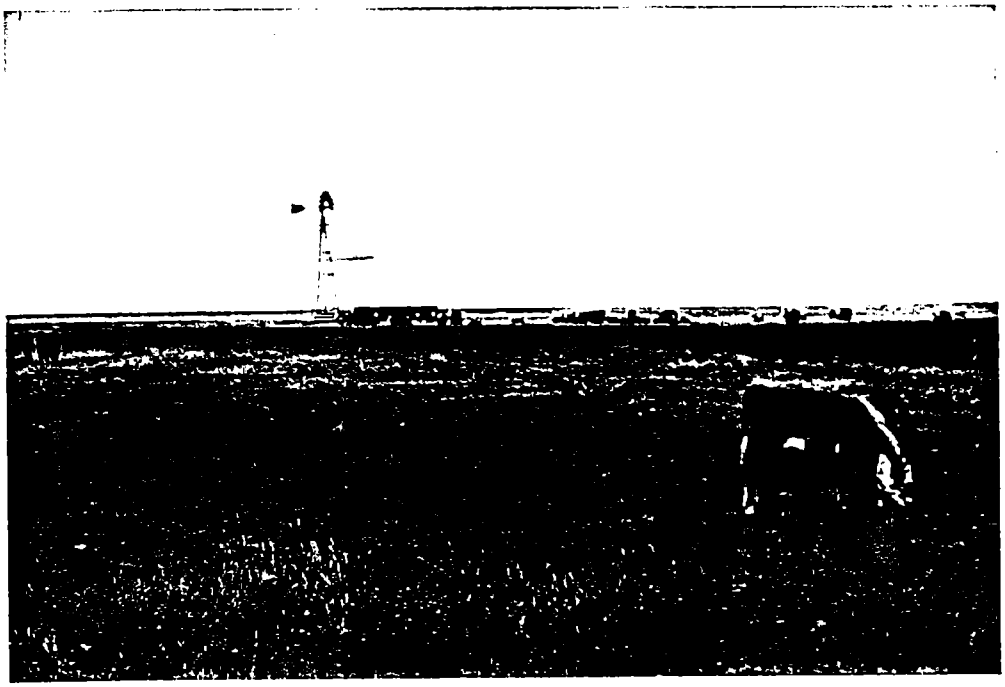


Photo 2. The boundary has been drawn to exclude an active windmill and stock tank.

Photo 3. The deep, well-drained loam soils support an almost shrubless grassland.

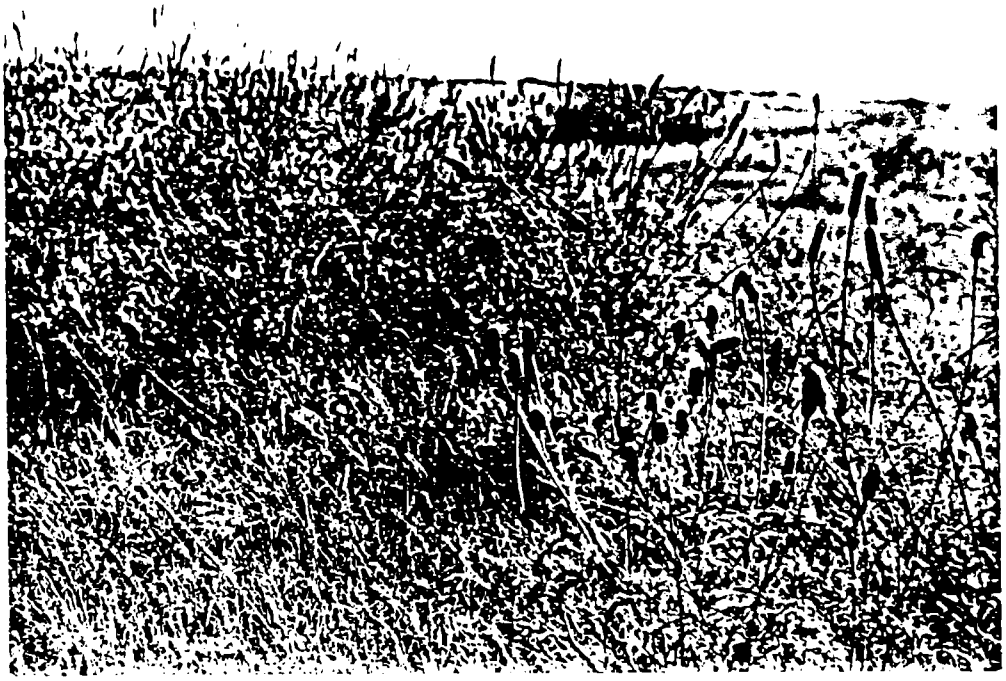


Photo 4. Prairie coneflower reaches 10 percent of the cover in some parts of the RNA, although total forb cover and diversity is rather low.

Photo 5. No trees occur here except for a few elms, planted long ago in the southeast corner.

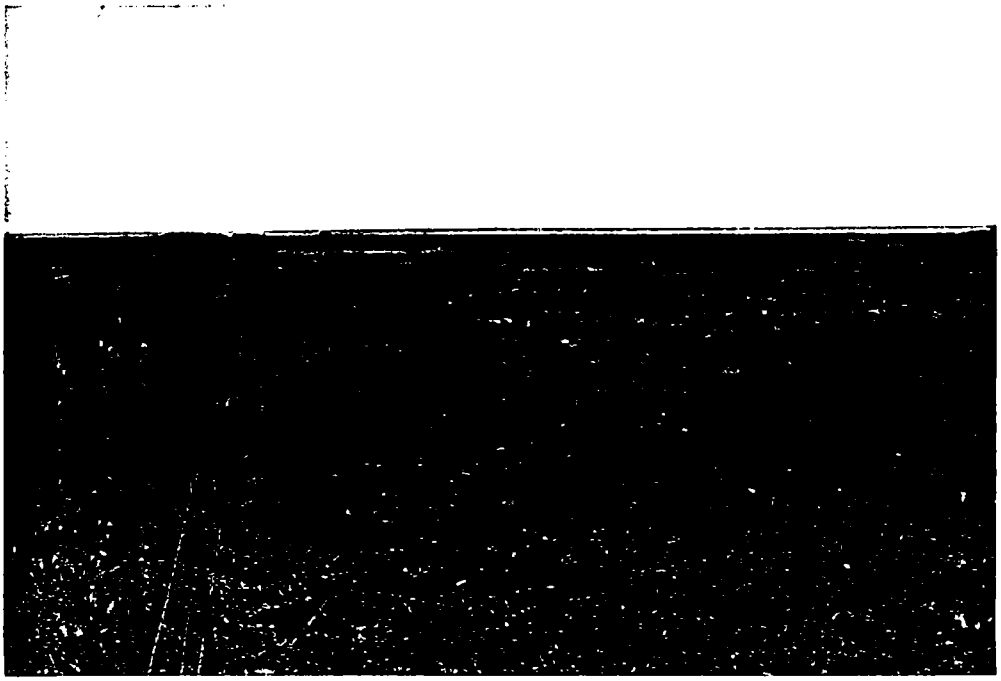


Photo 6. Existing fences along the north, east and south boundaries of the RNA are in good condition.

United States Department of Agriculture | Forest Service | Southwestern Region | 517 Gold Avenue SW. Albuquerque, NM 87102-0084

Reply to: 4060 Date: July 22, 1988

Roy Carson Range Staff
Alton Bryant

Subject: Field Review of Proposed Shortgrass Prairie Grassland Research Natural Area

To: Regional Natural Area Committee

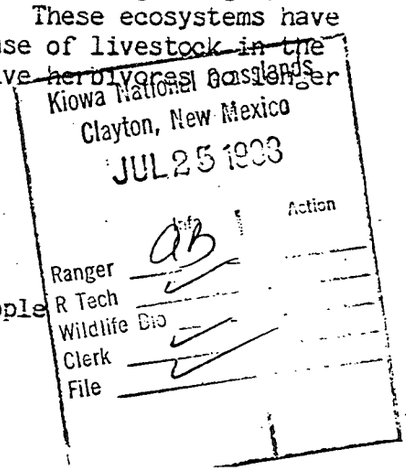
On July 18-19,1988, the Regional Research Natural Area (RNA) Task Group represented by Earl F. Aldon and Reggie Fletcher, along with Cibola National Forest representatives Leland Singer and Alton Bryant, visited the Rita Blanca and Kiowa National Grasslands to determine if identified tracts of shortgrass prairie qualify for inclusion into the RNA System. The Southwestern Region's 1983 RNA Progress Report indicated a shortgrass prairie representation was needed because of the importance and wide geographic distribution of this ecosystem.

A report prepared by Mr. Bill Dunmire of the New Mexico Nature Conservancy under the Challenge Cost Share Program evaluated the Kiowa and Rita Blanca National Grasslands for potential RNA sites. This report identified 4 sites as having RNA potential, Units 100, 19, 3, and 46.

160 A of 46 field never visited

The July field followup found Units 100 and 19 to be in successional stages too early, with insufficient current management, and sufficient past man-made disturbance to prevent their qualification as RNAs. With continued recovery of the grassland community and emphasis on late seral species, these Units may qualify for selection at some point in the future.

Section 2, T26N, R36E, the ~~west~~ east half of unit 46, is an excellent example of a blue grama-buffalo grass ecosystem with unusually high species diversity and only a minor inclusion of well-recovered old field dating from the dust bowl days. In order to fulfill research needs at desired levels, this area, if selected, would require modification of livestock use on approximately 300 acres to a slightly lighter utilization level and perhaps a less intensively managed system. This would allow further segregation of species into mini-communities, the process of which is now incomplete. The remaining 300 acres would be set aside without livestock use to serve as a baseline against which grazing systems in the shortgrass prairie communities would be measured. These ecosystems have evolved with grazing animals present and the continued use of livestock in the RNA's would help serve as replacement for the large native herbivores no longer present.



Portions of Unit 3 present an excellent example of the sand sage-blue grama ecosystem in late successional stages. The diversity in this unit is extraordinary. Utilization of available nutrients and moisture appear to be near maximum. Section 34 and the southern fourth of Section 27, T24N, R36E, provide the best representation of this community. Section 35 contains portions in earlier successional stages and is excluded from consideration. To fulfill research requirements at desired levels, approximately 200 acres of this pasture would be set aside without livestock use to serve as a baseline, with the remaining approximately 600 acres to be retained under the current management regime.

The above conditions for selection of portions of Unit 3 and Unit 46 as RNA's represent requirements to achieve a research potential that is optimally representative of research needs. The Task Group is available to work with the District Ranger and Forest Supervisor on selection of baseline areas, modification of management or any other contingencies that may arise.

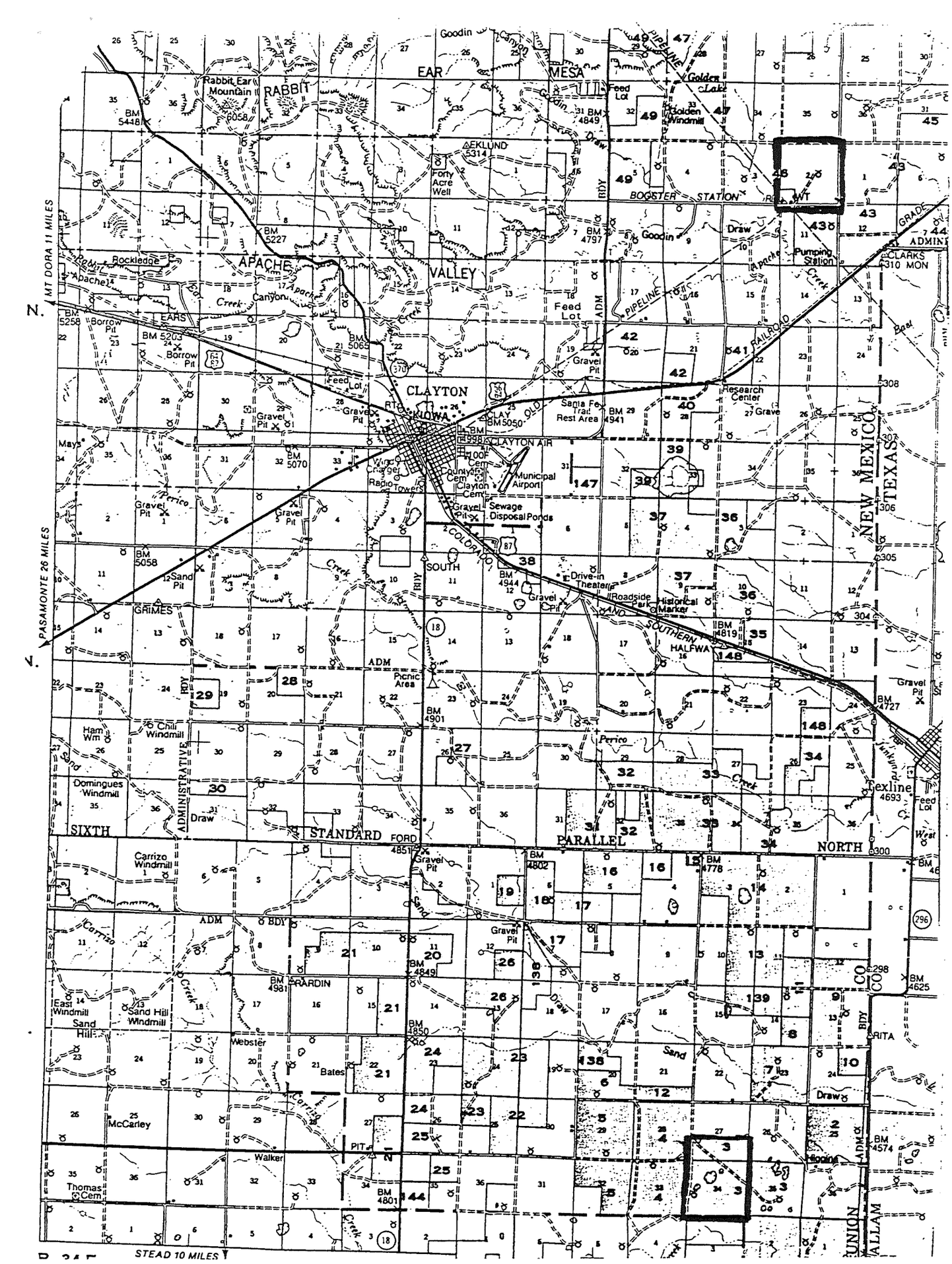
Therefore, the Task Group recommends the Cibola National Forest proceed with RNA designation as part of integrated resource management for the National Grasslands. Maps of the Units selected are enclosed.

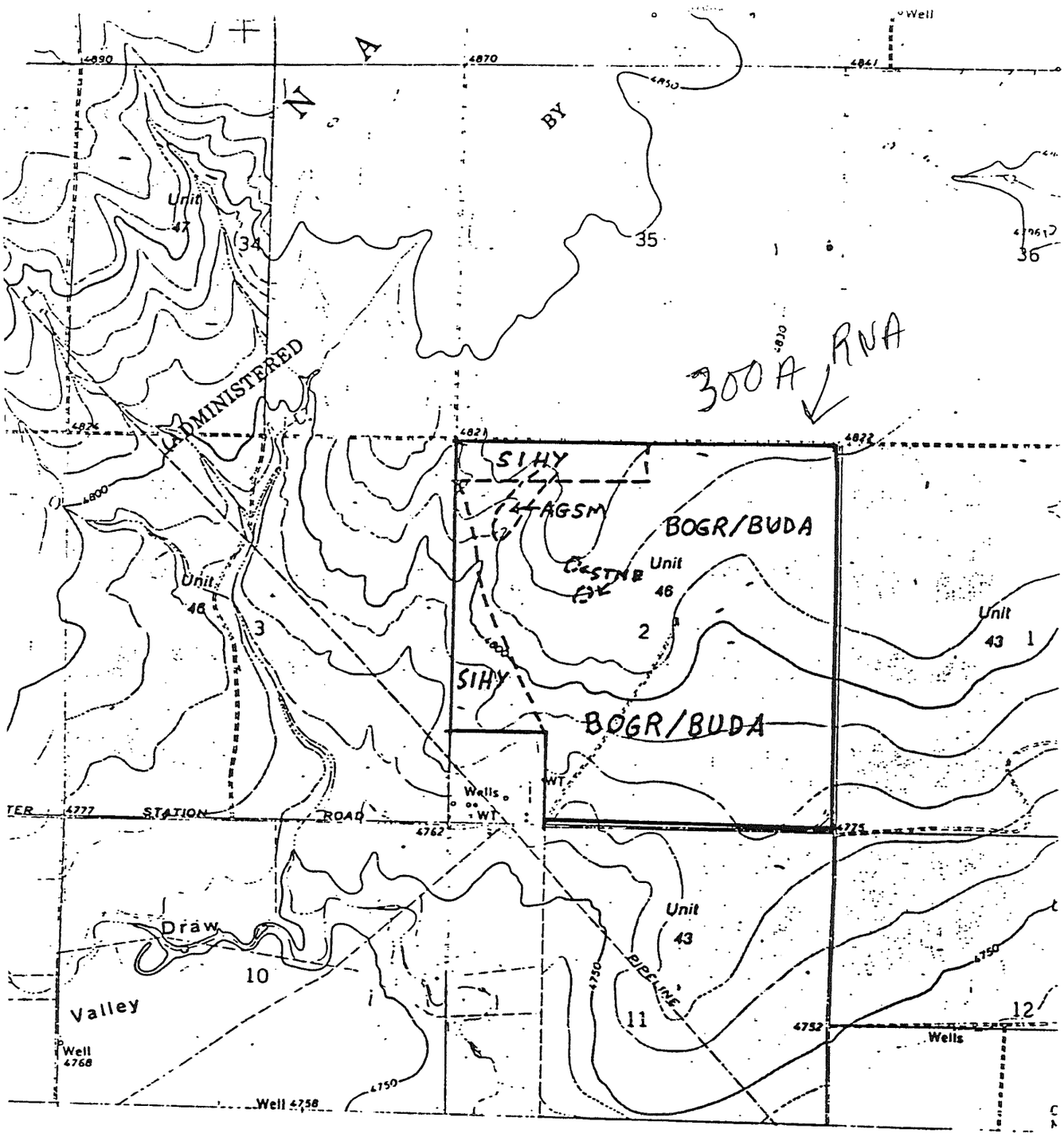
REGGIE FLETCHER
Regional Botanist

Enclosures (3)

cc:
Earl Aldon, Project Leader, RMS
DR, Kiowa National Grasslands ✓
FS, Cibola NF

JAS


EAR
MESA
RABBIT
Rabbit Ear Mountain
6058
BM 5448
Goodin Canyon
Goodin Draw
Feed Lot
Golden Lake
Golden Windmill
PIPELINE
EKLUND 5314
Forty Acre Well
BOOSTER STATION
WT
BM 4849
BM 4797
Goodin
Draw
Pumping Station
CLARKS 2310 MON
GRADE
ADMIN
APACHE
VALLEY
Rockledge
Apache
Apache Canyon
Apache Creek
EARS
BM 5258
Borrow Pit
BM 5203
BM 5065
Feed Lot
Gravel Pit
RAILROAD
CLAYTON
KIOWA
RTC
Santa Fe Trail Rest Area
BM 4941
Research Center
Grave
OLD
CLAY
BM 5050
BM 5070
BM 4998
CLAYTON AIR
Mays
Winger
Cemetery
Clayton Cem
Municipal Airport
Radio Towers
Perico
Sewage Disposal Ponds
NEW MEXICO
TEXAS
COLORADO
SOUTH
BM 4944
Drive-in Theater
Roadside Park
Historical Marker
SOUTHERN
HALFWAY
BM 4819
GRIMES
Sand Pit
ADM
Picnic Area
BM 4901
BM 4727
Ham Wm
Chili Windmill
Domingues Windmill
ADMINISTRATIVE
Draw
SIXTH
STANDARD
FORD
PARALLEL
NORTH
Texline
4693
Feed Lot
West
Carrizo Windmill
Carrizo Creek
Sand
BM 4802
BM 4778
Gravel Pit
BM 4851
ADM
BDY
BM 4849
BM 4981
GARDIN
East Windmill
Sand Hill Windmill
Sand Hill
Webster
Bates
BM 4850
Sand
Draw
CO
CO
BM 4625
RITA
McCarley
Walker
PIT
Thomas Cem
BM 4801
Hooper
BM 4574
UNION
ALLAM
MT DORA 11 MILES
PASAMONTE 26 MILES
STEAD 10 MILES

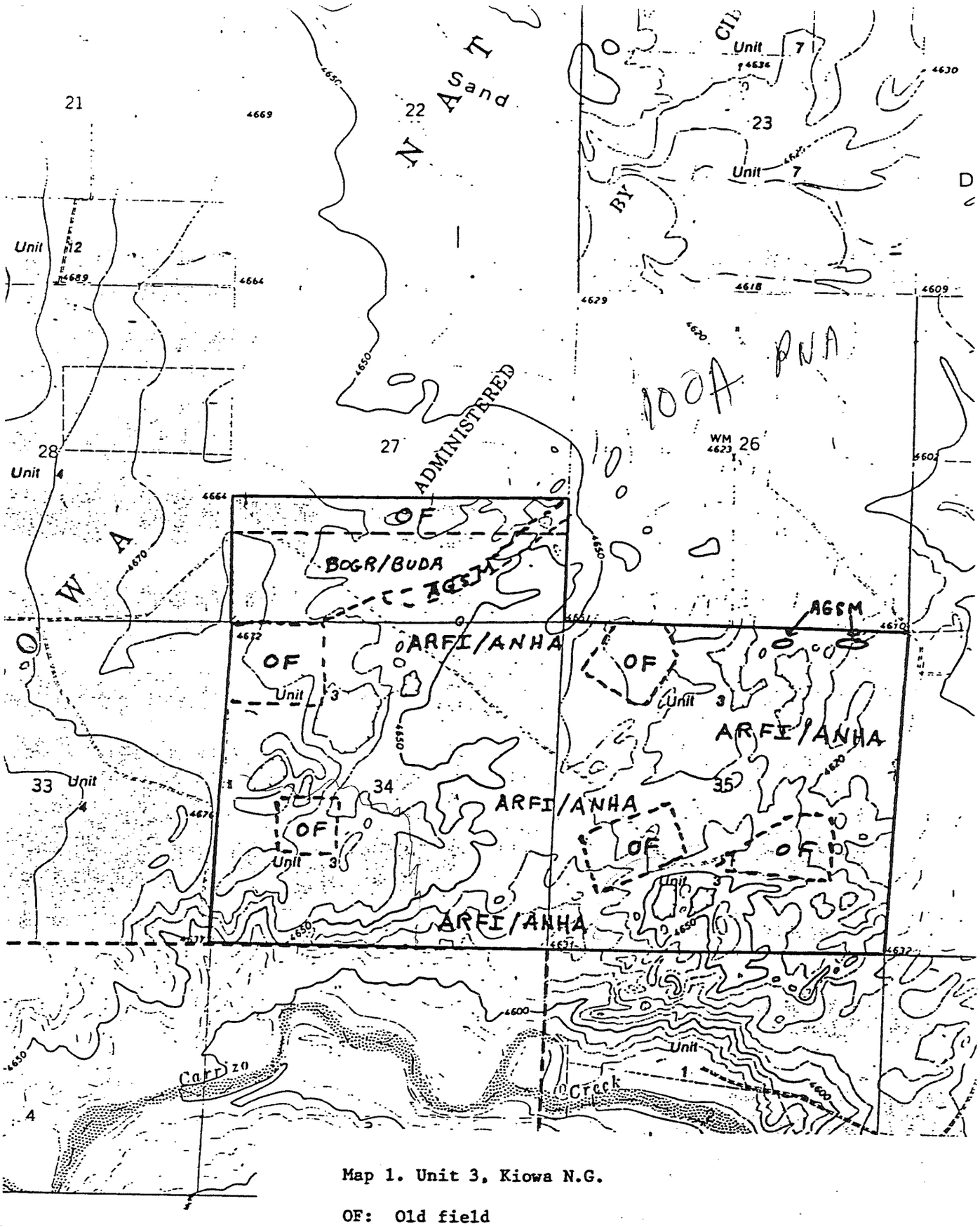


Billy Mont

Map 2: Unit 46, Sec. 2, Kiowa NG

AGSM: Agropyron smithii series
BOGR/BUDA: Bouteloua gracilis/Buchloe dactyloides p.a.
SIHY: Sitanion hystrix over 20 percent
STNE: Stipa neomexicana series

Scale: 1:24,000 Rardin Hill Quadrangle



Map 1. Unit 3, Kiowa N.G.

OF: Old field
AGSM: Agropyron smithii series
ARFI/ANHA: Artemisia filifolia/Andropogon hallii p.a.
BOGR/BUDA: Bouteloua gracilis/Buchloe dactyloides p.a.

United States Department of Agriculture | Forest Service | Southwestern Region | 517 Gold Avenue SW. Albuquerque, NM 87102-0084

Reply to: 4060 Date: July 22, 1988

Subject: Field Review of Proposed Shortgrass Prairie Grassland Research Natural Area

To: Regional Natural Area Committee

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Section 2, T26N, R36E, the west half of unit 46, is an excellent example of a blue grama-buffalo grass ecosystem with unusually high species diversity and only a minor inclusion of well-recovered old field dating from the dust bowl days. In order to fulfill research needs at desired levels, this area, if selected, would require modification of livestock use on approximately 300 acres to a slightly lighter utilization level and perhaps a less intensively managed system. This would allow further segregation of species into mini-communities, the process of which is now incomplete. The remaining 300 acres would be set aside without livestock use to serve as a baseline against which grazing systems in the shortgrass prairie communities would be measured. These ecosystems have evolved with grazing animals present and the continued use of livestock in the RNA's would help serve as replacement for the large native herbivores no longer present.

Portions of Unit 3 present an excellent example of the sand sage-blue grama ecosystem in late successional stages. The diversity in this unit is extraordinary. Utilization of available nutrients and moisture appear to be near maximum. Section 34 and the southern fourth of Section 27, T24N, R36E, provide the best representation of this community. Section 35 contains portions in earlier successional stages and is excluded from consideration. To fulfill research requirements at desired levels, approximately 200 acres of this pasture would be set aside without livestock use to serve as a baseline, with the remaining approximately 600 acres to be retained under the current management regime.

The above conditions for selection of portions of Unit 3 and Unit 46 as RNA's represent requirements to achieve a research potential that is optimally representative of research needs. The Task Group is available to work with the District Ranger and Forest Supervisor on selection of baseline areas, modification of management or any other contingencies that may arise.

Therefore, the Task Group recommends the Cibola National Forest proceed with RNA designation as part of integrated resource management for the National Grasslands. Maps of the Units selected are enclosed.

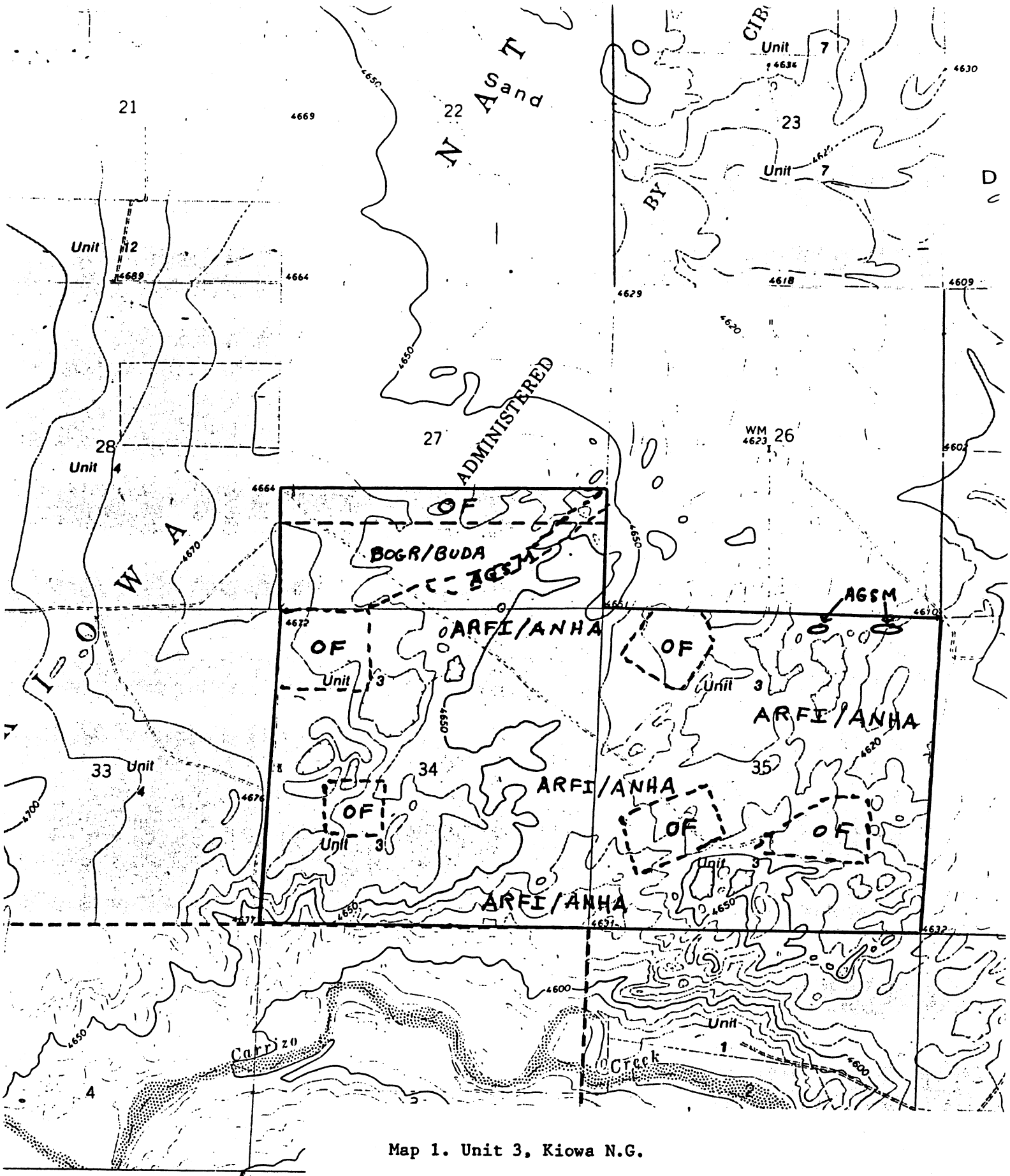
REGGIE A. FLETCHER

REGGIE FLETCHER
Regional Botanist

Enclosures (3)

cc:
Earl Alson, Project Leader, RNS
DR, Kiowa National Grasslands
FS, Cibola NF

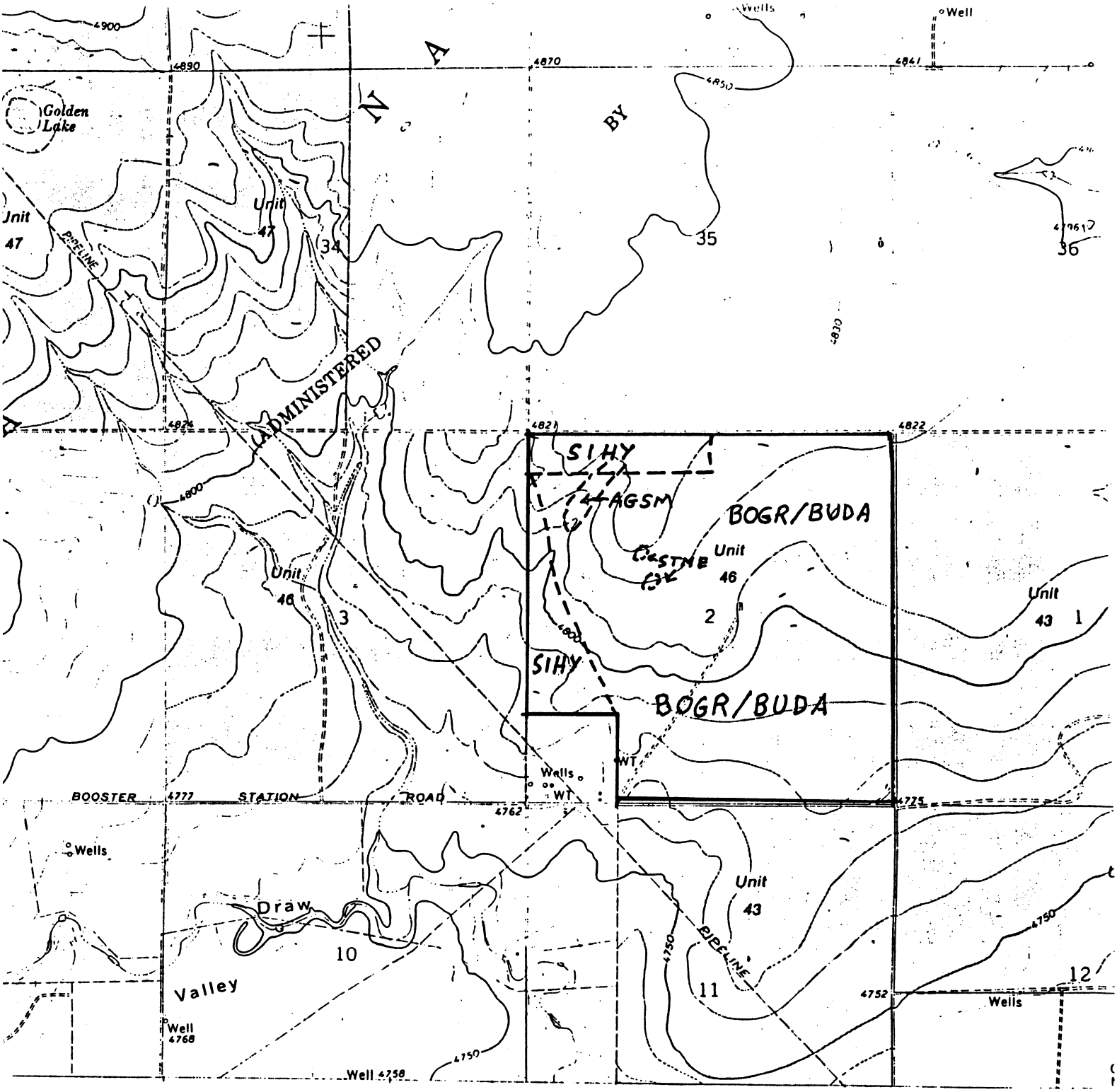
RFLETCHER:sg



Map 1. Unit 3, Kiowa N.G.

OF: Old field
AGSM: Agropyron smithii series
ARFI/ANHA: Artemisia filifolia/Andropogon hallii p.a.
BOGR/BUDA: Bouteloua gracilis/Buchloe dactyloides p.a.

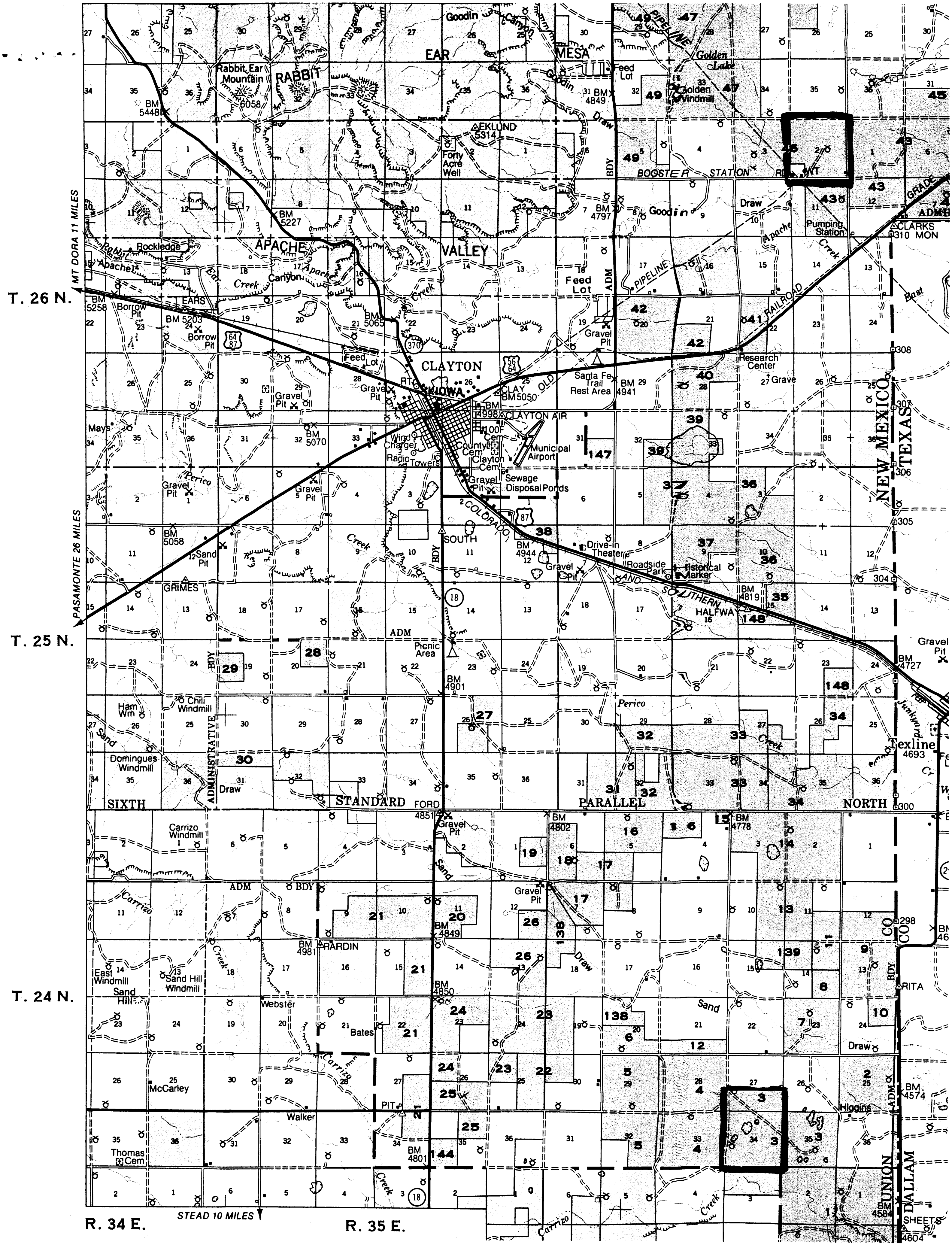
Scale: 1:24,000 Texline South Quadrangle



Map 2: Unit 46, Sec. 2, Kiowa NG

AGSM: Agropyron smithii series
BOGR/BUDA: Bouteloua gracilis/Buchloe dactyloides p.a.
SIHY: Sitanion hystrix over 20 percent
STNE: Stipa neomexicana series

Scale: 1:24,000 Rardin Hill Quadrangle


T. 26 N.
T. 25 N.
T. 24 N.
R. 34 E.
R. 35 E.
MT DORA 11 MILES
PASAMONTE 26 MILES
STEAD 10 MILES
CLAYTON
KIOWA
EAR
MESA
RABBIT
Rabbit Ear Mountain
APACHE
VALLEY
Goodin Canyon
Golden Lake
Golden Windmill
Feed Lot
EKLUND 5314
Forty Acre Well
BOOSTER STATION
PIPELINE
Pumping Station
CLARKS
Apache Creek
Rockledge
EARS
Borrow Pit
Gravel Pit
Santa Fe Trail Rest Area
Research Center
Grave
CLAYTON AIR
Municipal Airport
County Cem
Clayton Cem
Wind Charger
Radio Towers
Sewage Disposal Ponds
COLORADO AND SOUTHERN
RAILROAD
Drive-in Theater
Roadside Park
Historical Marker
HALFWAY
Sand Pit
GRIMES
Mays
Perico Creek
Picnic Area
ADMINISTRATIVE
Chili Windmill
Ham Wm
Domingues Windmill
SIXTH
STANDARD
PARALLEL
NORTH
FORD
Carrizo Windmill
Carrizo Creek
RARDIN
East Windmill
Sand Hill Windmill
Sand Hill
Webster
Bates
McCarley
Walker
Thomas Cem
Sand Draw
RITA
Higgins
Texline 4693
Junkyard
NEW MEXICO
TEXAS
UNION
DALLAM
SHEETS
Gravel Pit
BM 4727

2210 Analysis and Plans October 7, 1982

Trend Studies (Monitoring Range Use and Trends on Kiowa National Grasslands)
(Your ltr. 12/8/81)

Forest Supervisor, Cibola NF

Enclosed is Will Moir's report on monitoring range use and trends on the Kiowa National Grasslands. Prior to visiting Ranger Bryant in May 1982, Will checked out some of the monitoring systems proposed for implementing trend studies on some of the Savory pilot study grazing cells in Arizona and New Mexico (including the BIA cells adjoining the Bernalillo Watershed on the Cibola NF). Will felt that what he learned about these university-based monitoring systems were too time consuming and expensive for most purposes at Kiowa National Grasslands.

We are grateful to Earl Aldon, Rocky Mountain Forest and Range Experiment Station, Albuquerque, for informing and assisting Will on details and data processing for the CSA system in this report. Earl was most gracious and helpful in providing assistance and follow up. He informs us that the computer facilities and terminals are, or can be made, available to the Cibola when you are ready to collect, summarize, and interpret CSA data on a regular basis.

DON D. SEAMAN
Director of Range Management

Enclosures

cc: Earl Aldon (w/enc.)

MONITORING RANGE USE AND TRENDS ON KIOWA NATIONAL GRASSLANDS

Monitoring Range Use and Trends on Kiowa National Grasslands

Background

The Kiowa National Grasslands are one of the Southwest's highly important grazing resources. The Grasslands comprising 136,412 acres in northeastern New Mexico consist mostly of shortgrass prairie (Bouteloua gracilis-Buchloe dactyloides) and associated vegetation types of the southern Great Plains. There are about 150 grazing units of varying acreages and mixes of public and private land. Every unit presents essentially a unique combination of soil, topography, vegetation, history of past usage, management opportunities, and permittee goals.

The main criterion for utilizing these grassland resources is to maintain forage production in a fair or better range condition according to the biological and climatic restraints of each grazing unit. In other words, these pastures are generally regarded as long-term commodity production units, the basic commodity being the sustained soil-vegetation resource and the output measured as animal units. The animal units are generally, but not exclusively, domestic livestock (usually cattle), but on some units, wildlife (such as quail, antelope, burrowing owls, and other prairie fauna and avifauna) are also important.

Vegetation monitoring is a device whereby documentation of the success in achieving management goals can be provided (Figure 1). The livestock grazing objective is to provide a desired level of animal output while sustaining forage yields. The periodic measurement of vegetation, i.e. monitoring, documents the degree to which this is achieved.

At Kiowa, some new grazing management systems are being implemented. The extent to which sustained forage productivity is compatible with intensification of animal outputs remains to be explored. Manager action in fine-tuning these pasture management systems can be aided quantitatively by vegetation monitoring.

Monitoring cannot substitute for the judgment and professional sense of the resource manager. Rather, it complements these qualities. Most pastures at Kiowa can be visually judged by inspection. There is no need to overmonitor or to provide cookbook techniques to substitute for sound judgment. On the other hand, monitoring also proceeds from one administration to the next, and should provide an account of the history of pasture management that transcends, and can be more reliable than, mere memory or subjective recollection. Monitoring is the best way we know to determine trends and to relate these trends to both controlled (management) and uncontrolled (natural) causes.

Monitoring Criteria (See glossary for definitions of technical terms)

There are several criteria for determining the dimensions and effectiveness of a vegetation monitoring system (National Science Foundation 1977, Hawk et al. 1978, Moir and Lukens 1979, Mueller-Dumbois and Ellensberg 1974). Of course any vegetation monitoring system should yield an accurate description of vegetation according to whatever vegetation attributes (or state variables) are chosen. Important attributes include existing cover, frequency, floristics, dominance, production, vigor, and reproduction (Cain and Castro 1957, Phillips 1959).

Other monitoring criteria include:

-- Sensitivity to plant succession (trend)

-- Separation of real versus apparent effects

-- Measurements must be repeatable

-- Techniques require minimum of training and worker-to-worker calibration

-- Rapid and efficient

-- Dimensions of the sampling system geared to pasture management systems

Choice of Methods

No single method is "best" in meeting all criteria above. However, a wide variety of plant ecology measurement "tools" exist for creating a monitoring system in any vegetation type. In recent years improved monitoring techniques have been developed, while some older, traditional techniques still remain useful. Standard vegetation measurement techniques have been described by Brown (1954) Cain and Castro (1959), Phillips (1959), and Southern Forest Experiment Station (1959). More recent, powerful techniques applicable to monitoring have been described by the U.S. Forest Service (1981), Whittaker et al. (1979), Meents and Moir 1982. From the wealth of available techniques, three were applied at the Kiowa National Grasslands in late September 1981 and May 1982 by Alton Bryant, Jimmy Hall, and Will Moir. These were:

1. Parker 3-step method (Parker and Harris 1959)

2. Canopy coverage (Daubenmire 1959)

3. Community Structure Analysis (CSA, Pase 1981)

The three techniques were chosen because each meets many of the monitoring criteria. The Parker 3-step method is established, traditional, and widespread (Range Allotment Analysis Handbook, FSH 2209.21 R-3). Similarly the canopy coverage method enjoys widespread usage in western U.S. and especially in recent monitoring systems (e.g. Hawk et al. 1978, Moir and Lukens 1979, Meents and Moir 1982). The CSA method has been used and tested extensively in the Rio Puerco drainages and on grasslands near Albuquerque.

Attributes of vegetation that can be monitored by each of the above systems are shown in Table 1. Sample estimates are not comparable from one technique to another; that is, a population attribute such as vegetation cover will not be sampled to the same quantitative level and precision by each technique (cf Francis et al. 1972). More simply, results depend on the method.

We note in Table 1 that vegetation productivity, vigor, and reproduction are not directly measured by any of the three methods. (Some of these attributes can be indirectly inferred over time by cover, frequency, or density). Therefore, production-utilization measurements will also be required for more thorough analysis of range conditions at Kiowa National Grasslands.

Recommended Monitoring at Kiowa National Grassland

Table 1 summarizes my opinions and recommendations for general, ground-based vegetation monitoring. Both canopy coverage and CSA are about equally effective in describing vegetation composition and dominance. Since all methods are repeatable and precise, measurements over time at either canopy coverage or CSA permanent transect sites will give good documentation of range trends. When worker attributes are also considered, I find the CSA method most preferable and the Parker 3-step least preferable in overall performance (bottom scores of Table 1).

Important grazing systems should have, I believe, a minimum of two transects by whatever monitoring system. The transects can be located according to the manager's judgment. Criteria (See also §§ 42.2 in FSH 2209.21 R-3, 4/81 Amend 10) for locating transects include: Typicalness or representativeness of vegetation at the monitoring site, average condition of utilization and livestock impact, or areas sensitive (see terminology) to changes in management. In addition, it would be smart as well as statistically sound, to have a third monitoring transect at a control site. A control is a replicate of the same population (by whatever of the above criteria a manager chooses) where livestock effects on vegetation can be compared with climatic and other nonlivestock influences (insects, wildlife, fire, any other environmental fluctuation).

The frequency of monitoring resides also within the manager's judgment and opportunity. Every pasture should be monitored as soon as possible according to priorities. The very first monitoring documentation comprises the baseline against which subsequent intervals of trend (or no trend) are quantitively compared. Measurements in years following the baseline can be made whenever the manager needs to evaluate change or trend. At the very least a ten-year period following baseline is good policy (FSH 2209.21) for long term records of range condition and trend.

The season of monitoring is important. At Kiowa vegetation measurements are most accurate and informative during the season of developed blue grama inflorescences. This coincides with the warm season of maximum foliar expression, which is a preferred season for canopy coverage measurements (Daubenmire 1959). If necessary, supplemental measurements can be timed to cool season phenology or to timed movements of livestock from one paddock to another during the growing season.

Testing the CSA System at Kiowa National Grassland

Jimmy Hall, Alton Bryant, and I selected various types of vegetation to try out the CSA procedures. Data are given in the Appendix. A summary of the efficiency of this monitoring procedure is shown in Table 2. In essence, the more complex the vegetation (as measured by an index of diversity), the longer it takes to read a transect of 100 microsites. For simple, very homogeneous vegetation (Unit 35-36-37, a 6-paddock, 45-day, 94 cow rotation system during the growing season), a transect can be read by a crew of two in about 20-30 minutes. The more complex vegetation, a sandsage-big bluestem community

in Unit 3, takes a 2-person crew about 90-110 minutes per transect. There is clear relationship between diversity and measured time. However, most of the pasture grazing systems on the various Kiowa units have simple shortgrass vegetation of the diversity represented by Unit 35-36-37 (diversity index less than 1.0).

The question arose about measurements of density in the CSA method. In particular, mat-forming blue grama or buffalo grass sods are rather arbitrarily broken into "units" for density counts. What, then, does one buy by adding density to cover or frequency? I brought this question to Earl Aldon, one of the developers of the CSA method. After discussion with Earl, I decided that density measurements as described by the CSA instructions (Pase 1981) are indeed critical to the monitoring description. Most important is that density is critical to the forb documentation of the vegetation which would otherwise be undersampled in the small (5 x 10 cm) microplot frames. Rhizomatous forbs (as well as such grasses as western wheatgrass) are better estimated by counts of above-ground shoots than by either coverage or frequency.

The difficulty of resolving mat-forming grass "units" in density counts can be handled by worker-to-worker calibration and training (Pase 1981). It also might be of some range interpretative value to know when tight blue grama clumps (of low density) break up into loose, larger mats with dead interspaces and isolated living shoot units (high density).

Finally, the circular density plots (ten per transect) also yield a frequency measure. This frequency, F_{10}, can be compared with the frequency, F_{100}, obtained from the 5 x 10 cm microplots (100 per transect). This double-frequency sampling offers can be used to measure vegetation changes due to different grazing treatments (cf Frischknecht 1981).

I recommend, therefore, that density plots be an integral part of the CSA monitoring system as described by Pase (1981).

Canopy Coverage Transects

Canopy coverage as a vegetation monitoring technique was initiated in Units 1 and 3 in late September-early October 1981 (Moir 1981). Data are appended in this report.

Canopy coverage is a very effective method of vegetational analysis. However, its use requires somewhat more training and field time than either Parker 3-step or CSA (Table 2). For simple, homogeneous vegetation about 25-30 guadrat microplots are adequate for determining the essential dominance relationships in a plant community; about 40-50 microplots would comprise a minimal area for more complex communities. Since most pastures on the Kiowa have simple blue grama-buffalo grass ecosystems, both the canopy coverage and CSA methods are about equally effective. Since the latter is faster and easier, it seems preferred.

Parker 3-Step Transects

I recommend that existing Parker 3-step transects be a necessary and supplemental part of overall range monitoring where already established at Kiowa. Such easily read transects provide continuity with past documentation (although

vegetation information is less than that yielded by the other methods). Another reason for maintaining the Parker method is that range conservationists can use the data for their visual calibration of pasture condition by a method already familiar. Note, however, that any of the three methods serve to visually calibrate the range conservationist or manager. A major feature of good vegetation measurement and documentation systems is their calibrating function.

Other Attributes of Vegetation Monitoring

Each of the above techniques, properly performed, satisfies requirements indicated in Figure 1 and Table 1. Subsequent measurements when compared to baseline enable the range manager to interpret condition and trend. Supplemental production-utilization, vigor, and reproduction measurements are also usually required.

Repeatable results are obtained at transect sites when workers are trained to the procedures and calibrated with previous workers, for example, in determining what constitutes a "unit" in CSA density measurements. It is also important for repeatability that location effects be minimized. This is accomplished by precise location, using numbered metal stakes, of the transect line. In CSA the starting point is marked by a numbered stake and the direction of the transect indicated by a landmark feature recorded on photograph viewed from the stake. The other methods have a stake at both ends of each transect.

Plants not sampled in quadrat or Parker loop microplots are recorded for presence in the sample area. This enhances the floristic list, and gives the interpreter more complete information on condition, trend, and opportunity for vegetation management.

All methods utilize photography to supplement the transect data. Both detail and general photographs are recommended from fixed photopoints.

Specific Pastures

1. Unit 43-48, South Pasture

About 1,000 acres of level bottomland is dominated by galleta. This pasture can support many cattle but the limits are unknown. To get better utilization on galleta, the smaller patches of included blue grama must be essentially sacrificed since this grass is preferred by the cows and calves. Since the principal feed on this pasture is galleta, the management objective is to optimize cattle numbers through better galleta utilization. About 15-20 percent utilization was achieved when 200 cows and calves used this pasture from mid-May through August 1981 (3½ months).

What is the best number of cattle to graze here? I examined tillering and inflorescence production of galleta at several locations and concluded that 200 cows and calves had little effect on vigor and reproduction. Trend will clearly be blue grama $\longrightarrow$ galleta even if fewer animals grazed. But since the object is to obtain more use of the tough galleta, such trend is desirable and necessary.

Doubtless, still more cow-calf numbers could use this pasture in summer to the point of declining vigor and production of galleta. At 20 percent utilization, my hunch is that the range is yet understocked. Even the clipped galleta clumps showed enough photosynthetic excess to proceed with inflorescence production. Why not try 25-30 percent utilization on galleta and monitor for vigor and production over a few years?

Vigor can be simply monitored by a system of roving exclosures. Each exclosure (I recommend 2) is approximately 80 x 80 feet. Within each, about 10 randomized 3 x 3 feet microplots are located at season's end for galleta inflorescence counts. Microplots randomly occurring on blue grama mats are rejected. Thus, at season's end one simply compares vigor as galleta inflorescences per square yard from 20 plots inside and 20 plots outside the exclosures. The difference, if significant by a statistical t-test, forms a basis for interpretation. After two grazing years, the comparison is made and the exclosures relocated for another 2 years.

Production is monitored by standard PU studies (FSH 2209.21 R-3, Chap. 50). However, the above exclosures are substituted for the 5.4 foot diameter conical cages. Comparisons within and outside the exclosures will yield estimates of galleta utilization. The best time of measurement is early September for both forage utilization and vigor.

If vigor remains above 50 percent and utilization around 30 percent, the range can be considered "fully stocked." The rationale for this is that galleta produces inflorescences only when there is photosynthetic excess after root and foliar development have occurred following summer rains. If the grazed portion of the pasture is still producing 50 percent or more inflorescences as the ungrazed portions, those grasses, despite clipping, are still physiologically healthy. This 50-30 threshold is intended as guideline only and subject to fine-tuning according to such other variables as drought, economics, insects, etc.

One must be careful in managing this pasture to detect a slow drift in production decline after many years of livestock stressing (Gutierrez and Fey 1980). This results essentially from gradual but intensifying nutrient stress. Such a production system emphasizes livestock gains and removals from the ecosystem without nutrient and carbon imports. As soil reserves of nutrients decline via net meat exports over the decades, the grass production drifts downward. Regular monitoring at 2-year intervals by statistical design such as described above should detect this trend.

Nutrient inputs via manuring from organic sources at local feedlots provide an obvious way to counter the nutrient cycle imbalance.

2. Unit 35-36.

This is a complex grazing unit whose south six pastures comprise a deferred rotation grazing pattern with 94 cattle. Each of the six paddocks is of different size and vegetation composition. Cattle remain in each paddock 4-10 days during the growing season, the exact duration depending on paddock size.

The objective is to obtain through maximum cattle numbers a sufficient "herd effect" to completely utilize each paddock--from fenceline to fenceline--without clipping any grass in excess of its physiological threshold to complete its root and shoot development during the growing season. In language of the Savory School of grazing methodology, this would imply a stocking rate and duration of one clipping (or bite) per grass individual--no more, no less.

Unit 35-36 suffered soil loss and vegetation deterioration up to, and culminating with, the dust bowl era of the 1930's. Subsequent to creation of the National Grasslands much of this area was reseeded to side-oat grama and other grasses. The side oats variety (El Reno) is, unfortunately, relatively unpalatable. Nearly all grasses appear to be growing in low vigor. This is most evident in wind eroded sites, but also in paddocks 1, 3-4, 6, and 7 we can seed blue grama in varying sod bound mats.

This unit viewed as an entirety is a challenge to the manager. It is typical of shortgrass prairies of the southern Great Plains in general. Vegetation is of low productivity and of patchy mosaics within and between paddocks (cf Moir and Trilica 1976). The questions of this new management are: Can it be sustained, and does it optimize the harvestable grass commodity?

Two CSA monitoring transects were installed in order to measure vegetation changes (if any) under this intense, short duration grazing system. Transect 1 is nearly pure sideoats grama with infrequent included patches of blue grama; transect 2 is a patchy mix of blue grama-buffalo grass and minor galleta (Appendix). By studying subsequent measurements of cover, density, frequency, and importance against this baseline, the manager can draw inferences as to how this grazing system is affecting vegetation composition. Supplemental production-utilization (PU) studies will be required to make a more thorough evaluation of livestock impacts over time.

We must keep in mind the carbon and nutrient history of depletion in this grassland. The grasses are of low stature and vigor perhaps to large measure because of soil organic/nutrient losses (both from erosion and a past history of organic/nutrient exports in the form of net livestock harvests). It is quite possible, therefore, that the upper limit of livestock capacity relates more to vegetation production than composition. Intensification of grazing management in absence of any net import of nutrients to Unit 35-36 may simply result in gradual decline of productivity over the years (Gutierrez and Fey 1980). PU studies must critically supplement CSA monitoring as stated in the preceding paragraph.

Also, since CSA transects are easily measured in these low diversity paddocks (Table 2), several addition transects in some of the contrasting vegetations (for example, overflow depressions) or as replicate might be desirable. Given the possibilities and implications of this short-rotation grazing system, I recommend some additional transects for a more complete baseline.

3. Unit 133

Unit 133 is another livestock dense, short rotation grazing system within shortgrass prairie (blue grama-buffalo grass). The management, initiated in May 1982, involves about 165 yearlings rotated in a 7-paddock cell, the animals remaining 8 days in each paddock during the growing season (assumed to be 56 days). Each paddock is about 270 acres, more or less.

This unit (or cell) has been engineered into a precision herding system by means of central watering and paddocks radiating from the watering focus. As a whole, the unit seems far more homogeneous in its blue grama-buffalo grass composition than Unit 36-37.

We selected one paddock as representing the vegetation response over the entire unit. Present monitoring within this paddock consists of both Parker and CSA transects. The Parker 3-step monitoring has a 1-3-1 configuration. A single transect is "near" the watering focus, three transects are clustered at midway, and one transect is at the distal portion of the paddock. The five transects measured in May 1982 should produce interpretative documentation (Table 1) for baseline comparisons after several years of livestock rotation. (I foresee one difficulty in the field layout of this transect system. Each transect is itself in radial orientation to the water focus rather than perpendicular to the trailing of livestock. There is a tendency of cattle to walk along the transect rather than across it.)

The CSA transect is at the far portion of the same paddock as the Parker transects (and generally perpendicular to the 5th Parker transect). The most important grasses are blue grama and side-oats grama (Appendix). New Mexico feathergrass (Stipa neomexicana) is present (Importance = 0.0) as is Yucca glauca. Vegetation here is somewhat more diverse (index = 1.58) than normal for such shortgrass prairie ecosystems. The trend in diversity at this site can also be of interpretative value to the manager.

I recommend two more CSA transects in Unit 133 because this seems to be a pilot grazing system using short rotation, high intensity, precision herding techniques of widespread interest on the Great Plains. I suggest one of these additional transects be at the midway position in the same paddock (and perpendicular to the trailing of cattle to and from water) and the other a midway replicate in another paddock. With 3 CSA and 5 Parker transects, this grazing cell is, in my opinion, amply monitored for purposes of vegetation composition and trend.

PU harvests should take place as well as discussed above for Unit 35-36. It is worth repeating that continual net export of nutrient and carbon capital from the soil-vegetation reservoir of this grazing cell can lead to gradual productive decline without any necessary or attendant changes in vegetation composition or trend.

Summary

Some vegetation monitoring systems have been tried and installed on various pastures of the Kiowa National Grasslands. The most promising of these is the CSA system because of its simplicity and rapidity relative to the vegetational information returned. Complemented by PU studies and photography, this documentation of vegetation can provide a running account over the years of condition, trend, production, diversity, and indeed the overall "health" of the rangelands under management.

This report has not emphasized the number of transects required to adequately monitor the numerous pasture units on the Kiowa National Grasslands. On the

three units discussed, a minimum monitoring system has been suggested, but the overall dimension and configuration of ground-based vegetation monitoring yet remains to be decided according to the Ranger's professional judgment and resources.

The technology of range monitoring is available to the pasture manager. The measurement systems are handy, simple, and reliable. They yield good interpretative information, and can be useful to document the effects of good grazing practices as well as telling the manager when to back off or modify a practice that might not be sustainable.

Messrs. Bryant and Jimmy Hall are doing an excellent job in pasture management at Kiowa. With about 150 units to manage, they have their hands full. I hope these simple and fast monitoring techniques will help document the condition and improvement of pasture grazing systems under such capable hands.

W. H. Moir

W. H. MOIR
Ecologist
Range Management, R-3

VEGETATION MONITORING SYSTEMS EXAMINED AT KIOWA NATIONAL GRASSLANDS

TABLE 1

Scores range from least (0) to most (2) effective

ATTRIBUTE	TECHNIQUE		
	Parker	Canopy Coverage	CSA
	- - - - - - - - -	-Score - - - - - - - - -	
A. VEGETATION			
Coverage	0	2	1
Frequency	2	2	2
Density	0	0	1
Dominance	1	2	2
Floristics	0	2	2
Productivity	0	0	0
Vigor	0	0	0
Reproduction	0	0	0
(Vegetation Score)	3	8	8
B. WORKER			
Speed	2	1	1
Training Required	2	0	1
Repeatability	2	2	2
(Total Score)	9	11	12

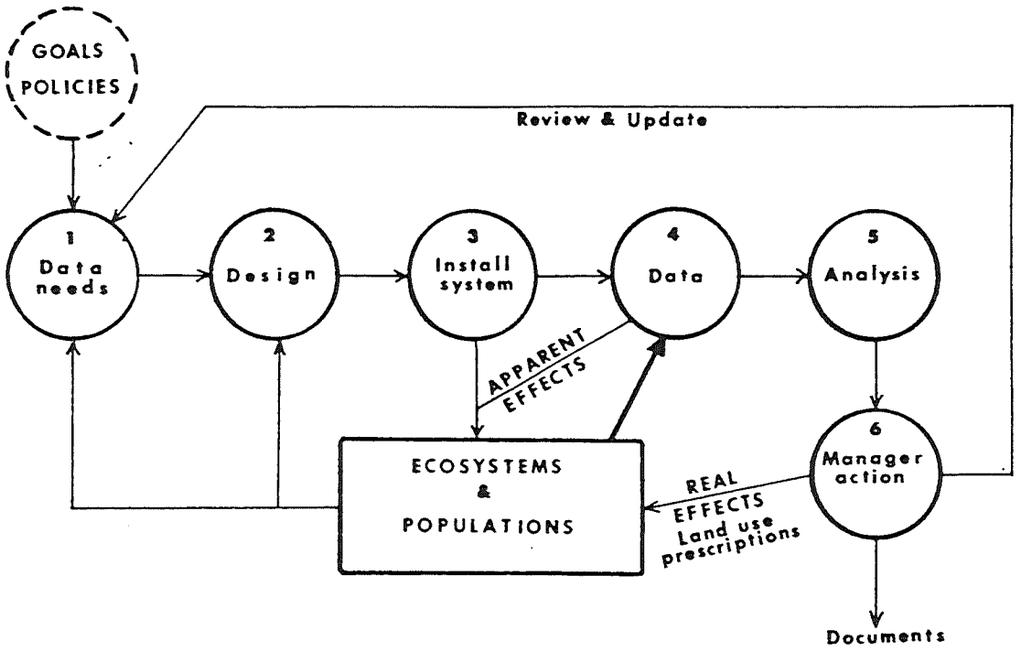


FIGURE 1. A generalized ground-based vegetation monitoring system applicable to the Kiowa National Grasslands.

TABLE 2

Effort (as time) required for a 2-person crew to measure CSA transects at various pastures, Kiowa National Grasslands

UNIT AND TRANSECT #	VEGETATION DIVERSITY	TIME (MINUTES)
36#1	.39	20
36#2	.94	30
133	1.58	30
1	1.77	90
3	2.00	110

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GLOSSARY OF VEGETATION MONITORING TERMS (AS USED IN THIS REPORT)

APPARENT EFFECTS. A detectable or significant change of any vegetation state variable caused by the act of monitoring. Common apparent effects include worker-to-worker differences (bias), mistakes in plant identification, plant mortality brought about by monitoring, trampling (which distorts cover), or changes in livestock grazing patterns (for example, attraction to stakes). Cf real effects.

CALIBRATION. A form of training in which field workers orient or adjust their estimates according to a fixed or pre-existing standard. For example, visual estimates of range condition are calibrated to measured vegetation along monitoring transects.

CELL. Any grazing unit subdivided into an inclusive set of mutually exclusive smaller pastures (see paddock) for purposes of livestock rotation. A kind of deferred pasture management system.

COMMODITY PRODUCTION. Production focused upon the output of material goods for which a market value can be assigned. Opp. amenity production. At Kiowa the production can be in such terms as AUM's, wildlife harvests, or pounds of forage/acre-year.

CONDITION. The status of existing vegetation (see vegetation).

COVER. Percentage of the horizontal surface beneath the vertical projection of the foliar portion (ignoring inflorescences) of plant canopies. The canopies are projected onto the horizontal plane using imaginary polygons which circumscribe the foliar mass ignoring small gaps in leaf and branch arrangement. Syn. canopy coverage, coverage.

DENSITY. Number of individuals per unit area. In CSA the area is a circle of fixed radius. Individuals include above-ground shoots of vegetatively spreading plants such as culms of western wheatgrass or genetically identical shoots of globemallow.

DIVERSITY. Any vegetation statistic which combines the number of plant species with the "evenness" of distribution of plant individuals among the different species.

DOMINANCE. 1. Any synthetic measure of a plant's influence on micro-environment relative to other plants. 2. Any evaluation that expresses the size or bulk of the shoots of each plant species in relation to space.

FLORISTICS. A list of the vascular plant species in an area.

FREQUENCY. The probability of sampling at least one individual of a plant species in a randomly placed quadrat of given area. Frequency is estimated by the proportion of quadrats in a transect that contain the species.

HOMOGENEOUS. Any pasture or portion thereof whose vegetation is visually uniform. This is a judgmental evaluation which limits the degree of admissible variation of vegetation state variables in an area.

IMPORTANCE. As used in CSA, a vegetation index combining cover, density, and frequency. Cf dominance.

LOCATION EFFECT. In vegetation sampling location effect is the contribution to variability resulting from differences in transect or quadrat location from one observation time to another. Location effect is one of the sources of variance of apparent effects (q.v.) in monitoring.

LONG TERM. Time span in order of decades or centuries. In monitoring, long term implies a measurement system operating and reliable over several human generations and numerous changes in management, monitoring, and administrative personnel. Opp short term.

MICROPLOT. A vegetation observational area not exceeding about 1 m^2 or one square yard; for example, a 2 x 5 dm (8 x 20") area of ground within a located quadrat frame. Cf quadrat.

MONITORING. A system of continuous or repeated measurements designed to reveal changes in biological or environmental variables.

PADDOCK. A segment of a grazing cell where livestock graze for only a limited period of time. Cf cell, pasture.

PASTURE. A grazing unit or rangeland without reference to the kind of grazing system used.

PLOT. A studied or measured area of vegetation.

QUADRAT. A very small (for example 2 x 5 dm in canopy coverage technique or 5 x 10 cm in CSA) area within a plot or along a transect where vegetation state variables are observed and recorded. Syn microplot.

QUADRAT FRAME. Tool for delineating quadrat areas.

RANGE. 1. Any land where herbivores feed, for example, antelope range. 2. Land whose vegetation consists predominantly of plants suitable for grazing or browsing. 3. Land on which animals graze whether or not suitability has been determined. 4. Land on which the capability for grazing or browsing of certain animals has been determined.

REAL EFFECTS. A significant or detectable change of any vegetation state variable that has a natural cause or is caused by man or his livestock but not by the act of measuring that variable. Cf apparent effect.

REPEATABLE. A measurement method giving the same result within specified limits of accuracy and precision when the method is repeated on an unchanged vegetation state variable. Noun repeatability.

SHORT TERM. Time span in the scale of years, but not decades or centuries. Cf long term.

STATE VARIABLES. Pertaining to vegetation, state variables (NSF 1977) include such measured attributes of existing vegetation as cover, density, frequency, vigor, productivity, diversity, and floristics. In systems ecology, a state variable is a condition or quanity of a component subsystem (black box) that fluctuates as result of input, output, and transformational processes. For example, grass cover (a state variable) can decrease as result of grasshopper feeding (a process).

SUCCESSION. Any significant change among the proportions of plant populations in a plant community. Syn trend.

SUSTAINED. A more or less uniform commodity production maintained over the long term.

TRANSECT. A straight line whose position in the landscape is fixed (by means of permanent stakes) and along which a systematic placement of microplots is employed for vegetation measurements.

TREND. See succession.

UNIT. As applied at Kiowa National Grassland, the juxtaposition of federal and private lands organized and managed as a grazing system.

VEGETATION. The assemblage of plants in an area.

VEGETATION RESPONSE. Succession initiated as result of change in a management prescription.

VIGOR. Any measure of the physiological condition of a range plant, such as inflorescence density or rate of leaf growth.

Addition in proofreading

SENSITIVE AREA. Any range plot or microplot where vegetation or soil succession is easily initiated by disturbance or management change, and where such disturbance is also very probable in the interval between measurements (Moir and Lukens 1979).

POTENTIAL RESEARCH NATURAL AREAS
KIOWA AND RITA BLANCA NATIONAL GRASSLANDS
CIBOLA NATIONAL FOREST

An Evaluation of Shortgrass Prairie Sites
on the National Grasslands in New Mexico, Texas and Oklahoma

Prepared for the USDA Forest Service
Cibola National Forest

by
The Nature Conservancy
New Mexico Field Office
William W. Dunmire, Investigator

November 1, 1987

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POTENTIAL RESEARCH NATURAL AREAS
KIOWA AND RITA BLANCA NATIONAL GRASSLANDS
CIBOLA NATIONAL FOREST

I. INTRODUCTION

The National Grasslands are a product of the dust bowl years of the 1930s. Prolonged drought, coupled with poor agricultural practices throughout much of the short and mid-grass prairies east of the Rocky Mountains, resulted in denuded landscapes and abandoned farmsteads. Purchase and rehabilitation of many of these grasslands were undertaken under various federal programs, and today national grasslands in a number of western states are part of the National Forest System.

The Kiowa National Grassland covers 136,505 acres near Clayton and Mills, New Mexico. The Rita Blanca National Grassland includes 77,463 acres in Texas and 15,860 acres in Oklahoma. Both grasslands are in a zone that averages 14 to 16 inches of annual precipitation, mostly occuring from April through September. Both represent classic shortgrass prairie. Within the two National Grasslands are nearly 300 different management units, averaging about one section (640 acres) in size, each managed to promote development of grassland agriculture and for outdoor recreation, forage, water and wildlife values.

The Cibola National Forest Land and Resource Management Plan, July 1985, states: "in order to meet RNA targets assigned to the forest and preserve specific vegetation types for further study, suitable candidate areas need to be studied for possible inclusion in the RNA system within two years. Proposed RNAs requiring study and preparation of an Establishment Report for approval by the Chief of the Forest Service are: 1. Little Water Canyon (910 acres); 2. Bernalillo Watershed (990 acres); 3. One area on each of the three national grasslands....The Kiowa and Rita Blanca National Grasslands may contain representative shortgrass prairie grasslands."

This report is intended to serve as the shortgrass prairie study called for in the Forest Plan. It is undertaken as part of a fiscal year 1987 Challenge Grant program proposal that The Nature Conservancy made to the Forest Service.

II. SCOPE OF PROJECT

A. Work Plan

This project is designed to include a literature search of publications pertaining to research on shortgrass prairie followed by field investigations on the various National Grasslands units. It was specified that this report will include:

1. Assessment and description all major units of the two grasslands for potential to meet representative needs for Research Natural Areas identified in the Southwestern Regional Guide (1983) including management indicator species.

2. Location of R-3 Sensitive and Federally listed plants and animals, if any, with community and relative abundance by location on all units inspected.

3. Detailed description of units that appear to be potential candidate RNAs. Description to include plant list, species composition, and relative condition of plant community (including projection of seral stage) and mapping of communities at 7-1/2" scale.

4. Photographs (35mm slides and colored prints) as appropriate to illustrate examples in the report.

5. At least one vouchered specimen, if available for collection, for each plant taxon mentioned in the report except those commonly known or commonly expected in the target community. Specimens to be provided to the Regional Botanist.

6. Recommendations for candidate RNAs, if any units appear to qualify,and listing of literature pertinent to shortgrass prairie.

B. Basic Assumptions

In consultation with the Southwestern Regional Ecologist and the Kiowa National Grasslands District Ranger, the following criteria were developed as guidelines for this project:

1. The objective is to identify the best examples of the shortgrass prairie ecosystem on the two National Grasslands. Those units that exhibit the most advanced shortgrass seral stage and have the highest potential for further advanced succession will be identified.

2. It is recognized that the national grasslands have no candidates that would meet the pristine quality criteria for Research Natural Areas (FSM 4063) to the letter. Potential candidate sites are those that come closest to the RNA criteria and have high potential for further recovery in the shortest length of time.

3. Sites that will lend themselves to long-term research programs, compatible with surrounding areas, are considered most desireable.

4. Only those units with a significant acreage that has never been plowed will be considered although a unit with some portion including a recovering old field will not automatically be excluded. (Virtually all abandoned fields now in the national grasslands were reseeded to a non-native strain of side-oats grama.)

5. Units exhibiting more than one habitat type are considered desireable.

6. Units that are known to have unacceptable management problems or units currently under high-intensity grazing management regimens will not be considered as top-ranking candidates.

III. METHOD

A. Literature Search

In addition to providing a general framework from which to evaluate the shortgrass sites, the purpose of the literature survey was to identify current thinking on the critical ecological components of native shortgrass prairie. Some conclusions based on the literature follow.

Although the existence of shortgrass prairie as a true climax community was once questioned (e.g. Clements, 1934), a growing body of historical evidence coupled with modern ecological concepts have led to the acceptance of shortgrass as a climax biome (Baker, 1984; Brown, 1984; Bruner, 1931; Larson, 1940).

Shortgrass vegetation in the southwest plains tends to be a rather homogeneous blue grama (Bouteloua gracilis) - buffalograss (Bouchloe dactyloides) grassland with a well-developed sod. Other major plant associations that have been described in the southwest shortgrass type include blue grama-galleta (Hilaria jamesii) and several associations in the western wheatgrass (Agropyron smithii) series (Baker, 1984; Donart et al, 1978; Johnson, 1987). Shortgrass in the southwest is characterized by a dominance of warm-season grasses (averaging 10 to 1 in biomass over cool-season grasses), an even mix of cool and warm-season forbs (averaging around 10 percent biomass) and a scarcity or absence of shrubs and trees (Sims et al 1978).

Complete recovery from abandoned old fields to shortgrass climax is a long process, probably requiring at least 100 years (Judd, 1974; Laurenroth and Milchunas, draft; Reichhardt, 1982). Plant succession in the prairies following inundation by dust during the drought years of the 1930s took a similar course to old field succession. In a typical sequence, annual grasses such as little barley (Hordeum pusillum) and six-week fescue (Festuca octoflora) come in after the earliest weedy forb stage. This is followed by a community of native perennials including sand dropseed (Sporobolus cryptandrus), western wheatgrass and false buffalograss (Munroa squarrosa). The mix of dominance later shifts to Aristida spp., bottlebrush squirreltail (Sitanion hystrix) and side-oats grama (Bouteloua curtipendula) as shortgrasses, principally buffalograss and blue grama, begin to take over. At the end of the succession, blue grama is a clear dominant, total plant cover is high, and species diversity is likely to be low (Weaver and Albertson, 1944).

The importance of bison as well as prairie dogs in the maintenance of the prehistoric shortgrass ecosystem is well documented (Hansen and Gold, 1977; Howden, 1966; and Krueger, 1986, among others). The long-term effect of domestic cattle as a replacement of the principal native ungulate in grassland ecology is yet debated, but differences in the trophic ecology and seasonal habits for the two species have been recorded (Peden et al,1974; Potter and Krenetsky, 1967; Schwartz et al 1976). Nonetheless, a good case can be made for accepting that under conditions of moderate, less than year-round grazing by cattle, late seral stages of shortgrass can be maintained and that the introduction of cattle had much less effect on community structure in the shortgrass province than in the other grassland biomes in the United States (Larson, 1940; Mack and Thompson, 1982).

The role of fire in shortgrass ecology is less well understood, although it is clear that fire was not as important as a maintainer of climax conditions here as in the mid and tallgrass prairies of the East (Axelrod, 1985; Wright, 1974; Wright and Bailey, 1980).

B. Preliminary Screening for Potential Sites

Since there are more than 250 units between the two national grasslands, it was clearly not feasible nor desireable to inspect each one firsthand. Fortunately, good records have been kept on range conditions of the units by way of individual maps for each unit that are updated periodically by USFS District staffers. Typically these range environmental analysis maps also indicate portions of the unit that have been plowed (old field) as well as the current status of dominant vegetation. By reviewing these maps it was possible to eliminate a great number of units that contained fewer than 200 acres of unplowed (native) grassland or were currently in a high-intensity grazing management system.

Two preliminary field trips to the grasslands were undertaken on May 7-8 and July 22-24. On both trips District Ranger Alton Bryant accompanied me to a number of units. Bryant has been assigned to the District for the past 13 years and has a wealth of knowledge on the vegetative makeup and recent management history of the various units, every one of which he has personally inspected over the years.

The first trip was to gain a general understanding of the existing range condition of the several vegetative communities and their seral stages exhibited on the National Grasslands. On the second trip field work concentrated on the more promising sites, since discussions with Bryant and the analysis of range maps enabled screening out of most of the units as unsuitable for further consideration. Voucher plant collections were made on both trips. Twenty-nine of the most promising units were inspected on foot during the field trips. Finally, 12 units were identified for further intensive study for final screening. These were units 3, 22, 44, 46, 49, 53, 54, 67, 100 and 127 on the Kiowa and 19 and 71 on the Rita Blanca.

C. Field Investigations

On Aug. 17-19, field investigations focused on the 12 highest potential units. This field trip was in company with plant ecologist Esteban Muldavin who was employed to assist on the project. Each of the 12 units was traversed on foot. Additional plant voucher specimens were collected. During these investigations, 8 of the 12 units were eliminated from the final list of potential RNA candidates, although several of these could merit further consideration in the future. A brief description of the eliminated units and why they are not included in the final list follows.

KIOWA NATIONAL GRASSLANDS

Unit 22:

This unit, comprising 476 acres with about 250 acres of native grassland, is approximately 11 miles south of Clayton. The configuration is L-shaped with two blocks of native grassland separated by a large chunk of recovering old field. The south native block of about 100 acres contains perhaps the purest Bouteloua gracilis grassland in the Kiowa with close to 90 percent Bouteloua gracilis cover. Other occasional to common grass species include Hilaria jamesii, Buchloe dactyloides and Sporobolus cryptandrus (none over 5 percent of cover) with lesser occurrences of Aristida sp. and Sitanion hystrix. Ratibida columnifera comprised nearly a third of the total ground cover, no doubt as a result of a very wet spring.

The northeast native block, approximately 150 acres, appears to be of a lower seral stage with more open soil, Bouteloua gracilis patchy rather than solid, Buchloe up to 5 percent cover and a higher incidence of increaser grasses such as Aristida sp., Hilaria jamesii and Bouteloua curtipendula.

During the field visit of July 22, 11 Long-billed curlews, a Management Indicator Species, were observed on this unit.

Unit 22 was rejected for the final cut because of the bad configuration of the two native grass blocks and the spill-over effects of the central old field with influences from it still extending well beyond the original limits of the plowed field. Portions of the north end of Unit 21 and the north end of Unit 5 (both in the same vicinity south of Clayton) also exhibited good examples of late seral Bouteloua gracilis native sod, but again, poor configuration of the native blocks ruled these units out.

Unit 44:

The unit consists of 569 acres about half of which are in native condition. It is located 10 miles northeast of Clayton just south of U.S. Highway 56-64. The south middle portion of the unit, east of the drainage, contains a Bouteloua gracilis/Buchloe dactyloides type in excellent condition with a blue grama-buffalograss mix of approximately 9

to 1. This type extends north to the boundary and east to an old field within the unit where incidence of buffalograss increases to nearly 40 percent in some areas and where patches of a second community, Bouteloua gracilis/Hilaria jamesii/Bouteloua curtipendula, appear. There are almost no shrubs on the unit and Opuntia polyacantha is infrequent.Other increaser grasses such as Sitanion hystrix and Aristida sp. are infrequent, and total forb cover is under 10 percent.

A drainage leading from a stock tank bisects the area north to south and provides habitat diversity with a dense stand of Agropyron smithii in the draw. West of the drainage, vegetation exhibits a lower seral stage with more open ground along with more forbs and a higher incidence of increasers such as Ratibida tagetes and Psoralea tenuiflora in a transition zone between the drainage and the old field at the west end of the unit.

Three units in the Clayton region of the Kiowa exhibit similar conditions of strong Bouteloua gracilis /Buchloe dactyloides sod formation in fairly large areas: Units 44, 46 and 49. This unit may be second to Unit 46 in priority rank for this type, but there are problems. The configuration of the native portion is awkward with a long peripheral boundary resulting in an undesireably high edge effect. Remnants of an old ditch or old road scar about 12 feet wide and 1 foot deep bisect the area from north to south. The greatest problem is the condition of adjacent lands. There are private lands on three sides (approximately 3 miles) and national grassland on one side (1.2 miles) with the U.S. highway a major barrier separating the next national grassland unit. There is a homestead adjacent to the southwest corner of the unit. Thus, all of the unit is contained by major roads or is adjacent to private lands. The single advantage over Unit 46 appears to be more variety in terrain aspect and slightly higher plant diversity.

A number of voucher specimens were collected for this unit, and more plant identification was done here than in other units that are not being recommended in the final list as RNA candidates. Therefore the plant list for Unit 44 is included here.

Plant List
Kiowa National Grasslands, unit 44

Latin Name	Common Name	*	Frequency
HALF-SHRUBS, SHRUBS AND TREES:			
Gutierrezia sarothrae	Broom snakeweed		R
Opuntia polyacantha	Plains pricklypear		I
Yucca glauca	Soapweed yucca		R
GRASSES AND GRASSLIKE PLANTS:			
Agropyron smithii	Western wheatgrass		I
Aristida spp.	Three-awn		I

Bouteloua curtipendula	Sideoats grama		C
Bouteloua gracilis	Blue grama		C
Bouteloua hirsuta	Hairy grama		I
Buchloe dactyloides	Buffalograss		C
Hilaria jamesii	Galleta		C
Muhlenbergia torreyi	Ring muhly		I
Sitanion hystrix	Bottlebrush squirreltail		I
Stipa comata	Needle and thread		I

FORBS:

Allium macropetalum	onion	V	I
Astragalus crassicarpus var. crassicarpus	Ground-plum	V	I
Astragalus missouriensis	Missouri milkvetch	V	C
Astragalus mollissimus	Woolly locoweed		I
Calylophus hartwegii		V	I
Cirsium sp.	Thistle		R
Chrysopsis horrida	Golden aster	V	I
Cymopterus montanus	Water-parsnip	V	I
Echinocereus viridiflorus var. viridiflorus	Green pitaya	V	R
Engelmannia pinnatifida	Engelmann daisy	V	I
Erigeron nudiflorus	Fleabane	V	I
Eriogonum annuum	Annual buckwheat		I
Erysimum asperum	Plains wallflower		I
Gilia rigidula spp. acerosa	Blue dogretch	V	I
Heterotheca	Telegraph plant	V	I
Hymenoxys acaulis var. acaulis	Nostem rubberweed	V	I
Hymenoxys acaulis var. arizonica	Nostem rubberweed	V	I
Linum sp.	Flax		R
Lithospermum incisum	Puccoon	V	C
Plantago sp.	Plantain		C
Psoralea tenuiflora	Slender scurfpea		C
Ratibida columnifera	Prairie coneflower		C
Ratibida tagetes	Prairie coneflower		I
Thelesperma megapotamicum	Hopi-tea greenthread		C
Verbena bipinnatifida	Dakota vervain		I

* Voucher specimen collected

C = common; I = infrequent; R = rare

Unit 49:

This unit is located approximately 6 miles northeast of Clayton and is divided into three subunits. The southern subunit includes about 520 ares, roughly half of which is native. The southeast portion of this unit contains patches of reasonably late seral Bouteloua gracilis/Buchloe dactyloides with a fairly high incidence (10 to 20 percent) of Hilaria jamesii. A large Agropyron smithii dominated swale and drainage add vegetational diversity interest, but the influence of several adjacent old fields with infiltration of Bouteloua curtipendula and Andropogon saccharoides along with many patches of Hilaria jamesii and Aristida would appear to rule out this subunit.

The eastern half of the middle subunit contains about 200 acres of native condition, exhibiting extremely well developed Bouteloua gracilis grassland with Buchloe at about 5 percent. Bouteloua curtipendula, Sitanion hystrix, Hilaria jamesii, and Sporobolus cryptandrus are all well-represented but nowhere dominant. Shrubs are virtually absent, and Psoralea tenuiflora occupies about 5 percent cover. The composition of forbs is similar to that found on Units 44 and 46 but the fenced east boundary results in the major drainage being outside the unit. That and the fact that this block is virtually all a uniform 2 percent southeast slope, places this unit in lower priority for candidate consideration than units 44 and 46.

Unit 53:

Within this 2,320 unit located 10 miles north of Clayton are some large chunks of native terrain with a variety of soil types, mostly sandy to sandy clay, and many plant associations, but there is very little good Bouteloua gracilis type that doesn't contain a high percentage of other species. Rarely does Bouteloua gracilis exceed 50 percent of the coverage. Shrubs are common throughout the area, principally Artemisia filifolia (2 to 10 percent cover); Yucca glauca (1 to 5 percent); Gutierrezia sarothrae an Ipomea leptophylla. This unit has very high diversity but is not a good example of shortgrass.

Unit 54:

This is another large unit of 2,080 acres (adjacent to Unit 53 above) with extensive areas of native vegetation. There are many 1 to 10 acre mosaics of Bouteloua gracilis/Buchloe dactyloides typically with a high representation of Buchloe, (up to 30 percent cover -- one of the highest buffalograss incidences on the Kiowa), but the unit is shrubby throughout with high complements of Gutierrezia, Grindelia and Psoralea. In the portions where shrubs are absent, there is a high incidence of increaser grasses including Aristida sp. and Sitanion hystrix, indicating that this unit represents a lower seral stage than is desirable.

Unit 67:

The unit contains 920 acres with about 600 acres native and is located 15 miles north of Clayton. A number of plant associations are represented, and overall diversity is extremely high. The country consists of mostly rolling sandy soil types with a number of rock outcrops and includes a draw with a few large cottonwoods and an occasional hackberry, but there appears to be no areas of classic Bouteloua gracilis habitat much over 10 acres in size. Wherever Bouteloua gracilis types occur, there is a high incidence of shrub cover, especially Gutierrezia (20-30 percent cover).

Unit 127:

This unit contains 800 acres with approximately 400 acres native and is located 7 miles northeast of Roy, NM. The unit contains some nearly pure patches of Bouteloua gracilis but is shrubby throughout with Gutierrezia sarothrae averaging more than 5 percent cover. The native portion is

mainly a Bouteloua gracilis/Hilaria jamesii association with Hilaria 10 to 15 percent cover. Buchloe is less than 5 percent cover throughout. This grassland is in fair to good condition but the numerous shrubs and more weedy forbs than preferable are a detraction as is a 4-foot wide man-made trench that diagonally bisects the native area. There is moderate plant diversity, but the unit is judged to be a low second in quality to Unit 100 among the various Canadian River-Roy units of the Kiowa.

RITA BLANCA NATIONAL GRASSLANDS

Unit 71:

The unit is comprised of 640 acres with about 300 acres in native condition. It is located 30 miles east of Texline, Texas. This unit exhibits some fairly large patches of Bouteloua gracilis/Buchloe dactyloides in good condition and has the added interest of a 30-foot deep drainage with a mix of almost pure Agropyron smithii and Carex sp. The north end of the native portion grades into dominant stands of Sitanion hystrix with a high incidence of Festuca octoflora and considerable bare ground. Shrubs are rare with only an occasional Yucca glauca. Unit 71 is considered to be the second-best candidate on the Rita Blanca, but Unit 19 far surpasses this unit in over-all range condition and lateness of seral stage.

Based on site visits to a number of other units, it should be noted that except for Units 19 and 71, the Rita Blanca National Grasslands examples appear to be in much poorer range condition and exhibit a lower seral stage than units occurring on the Kiowa.

IV. DESCRIPTION OF SITES WITH HIGHEST POTENTIAL

A final field trip was made over October 28 - November 1 to complete information gathering for the four units (Kiowa Units 3, 46 and 100 and Rita Blanca Unit 19) that were judged to have the greatest RNA potential. During this trip two existing shortgrass RNA's on public lands, the Campo RNA on the Commanche National Grasslands in Colorado and the High Plains RNA on the Buffalo Lakes National Wildlife Refuge in west Texas, were also visited. A brief description of these latter sites is found in Section VI.

A description of the four units with greatest RNA potential follows.

UNIT 3 - KIOWA NATIONAL GRASSLANDS

Approximately 13 miles southeast of Clayton, this unit contains 1,520 acres within T 24N, R 36E, Secs. 34, 35 and S 1/2 Sec. 27, most of which is unplowed, native terrain. There are several patches of once-plowed, now overgrown old fields, mostly about 40 acres in size, scattered through this unit (see map 1). The configuration is nearly rectangular with an extension of the west section of land northward approximately 1,500 feet. This unit is surrounded by other units of the national grassland on the west and southeast boundary (for 3 miles), state land on the southwest boundary (for 1 mile), and private land on the north and east boundaries (for 3.5 miles). An unpaved road exists on 1.3 miles of the west boundary; all other boundaries are unroaded. The entire boundary is fenced.

Management:

For the past 11 years, the unit has been managed as a three-pasture system with the entire unit rested from June through August. Unit 3 is managed as an entity with Units 7 and 8. Typically, 50 head of cattle will graze Unit 3 for 4 months out of the year.

Terrain:

The northwestern quarter of the unit is fairly flat with drainage toward the northeast. The southern part of the western half slopes to the south with slopes reaching 2 percent. The central and eastern parts of the unit are comprised of rolling sandhills, some up to 20 or 30 feet high.

Vegetation:

This unit is principally a sand-hills type with less than 100 acres of Bouteloua gracilis/Buchloe dactyloides plant association in the north portion of the west half. Buffalograss comprises about 5 percent of the cover in this blue grama association. Co-dominant grasses include Bouteloua curtipendula, Bouteloua hirsuta and Aristida sp., with Sporobolus cryptandrus and Eragrostis sessilispica occasionally found.

Shrubs make up 5 percent of the ground cover here, principally Artemisia filifolia with some Yucca glauca. Forb species comprise up to 10 percent of the groundcover and include a number of weedy types such as Plantago sp., Ambrosia artemisiifolia and Conyza canadensis. This fairly small acreage of blue grama association cannot be rated better than fair condition and is judged to be representative of mid-seral shortgrass.

Separating this BOGR/BUDA p.a. from the sandhills is a shallow drainage where Agropyron smithii becomes the dominant grass in a narrow swath. Near the northern boundary of the unit are several other swale patches of western wheatgrass codominated by side-oats and blue grama with few forbs and no shrubs. Little bluestem (Andropogon scoparius) is a patchy codominant of these swales.

The principal interest of this unit is the large extent of sandhills prairie in good condition. Much of the unit is highly representative of the Artemisia filifolia/Andropogon hallii plant association (Johnston, 1987). Shrubs comprise up to 25 percent of the total cover with Artemisia filifolia at 10 to 20 percent and Yucca glauca at 0 to 10 percent. Other shrubs are infrequent. Total grass cover ranges between 20 and 60 percent with Andropogon hallii co-dominant on the sandy hilltops and Andropogon scoparius co-dominant on the bottoms. Bouteloua curtipendula and is well represented throughout the sandhills type, and Bouteloua hirsuta, Bouteloua gracilis, Sporobolus cryptandrus and Stipa comata are occasional to common. Buchloe dactyloides, common in the blue grama association, rarely occurs in the sandy soil type.

Forb cover is 5 to 10 percent in the sandhills, and there is a high diversity of species. In late summer 1987 Eriogonum annuum, was the commonest forb species with cover averaging up to 5 percent.

The following plant list is not representative of the diversity on this unit due to the lateness in season during which plants could be identified. Plants were collected and/or identified by the author during site visits on July 22, Aug. 17 and Sept. 29, 1987.

Plant List
Kiowa National Grasslands, Unit 3

Latin Name	Common Name	*	Frequency
HALF-SHRUBS, SHRUBS AND TREES:			
Artemisia dracunculus	False tarragon		I
Artemisia filifolia	Sand sagebrush		C
Morus sp.	Mulberry		R
Opuntia polycantha	Plains pricklypear		I
Yucca glauca	Soapweed yucca		C

GRASSES AND GRASSLIKE PLANTS:

Andropogon hallii	Sand bluestem		C
Andropogon saccharoides	Silver beardgrass		
Andropogon scoparius	Little bluestem		C
Aristida purpurea	Purple three-awn	V	I
Aristida spp.	Three-awn		I
Bouteloua curtipendula	Sideoats grama		C
Bouteloua gracilis	Blue grama		C
Bouteloua hirsuta	Hairy grama		C
Buchloe dactyloides	Buffalograss		I
Carex sp.	Sedge		R
Cenchrus pauciflorus	Field sandbur		R
Chloris verticillata	Windmill grass		R
Eragrostis sessilispica	Lovegrass	V	I
Eragrostis sp.	Lovegrass	V	I
Lycurus phleoides	Wolftail		I
Muhlenbergia torreyi	Ring muhly		R
Munroa squarrosa	False buffalo-grass		I
Oryzopsis hymenoides	Indian rice grass		R
Paspalum stramineum	Millet	V	I
Sorghastrum nudans	Indian grass	V	
Sporobolus cryptandrus	Sand dropseed		C
Stipa comata	Needle and thread		I

FORBS:

Amaranthus sp.	Pigweed		R
Ambrosia artemisiifolia	Common ragweed		C
Artemesia campestris ssp. caudata	Sagebrush	V	R
Bahia oppositifolia	Plains bahia	V	I
Cirsium sp.	Thistle		I
Conyza canadensis	Horseweed		C
Cucurbita foetidissima	Buffalo gourd		R
Erigeron bellidiastrum var. robustus	Fleabane	V	C
Eriogonum annuum	Annual buckwheat	V	C
Helianthus petiolaris ssp. petiolaris	Prairie sunflower		I
Liatris punctata	Dotted gayfeather	V	R
Linum sp.	Flax		I
Machaeranthera tanecetifolia	Aster		C
Melampodium leucanthum	Plains blackfoot		I
Mentzelia nuda	Stickleaf		R
Oxybaphus albidus	White four-o'clock	V	I
Plantago sp.	Plantain		I
Psoralea tenuiflora	Slender scurfpea		C
Polanisia trachysperma	Clammyweed		R
Salsola kali	Russian thistle		R
Senecio multicapitatus	Groundsel		C
Solanum sp.	Nightshade		I
Thelesperma megapotamicum	Hopi-tea greenthread		R
Zinnia grandiflora	Rocky Mountain zinnia	V	I

* Voucher specimen collected

C = common; I = infrequent; R = rare

Wildlife:

Pocket gopher activity is high on the sandhills portion of this unit. The only other mammals observed were thirteen-lined ground squirrels and black-tailed jackrabbits. A presumed coyote den was noted on the unit.

Two Long-billed curlews, a Management Indicator Species, were observed on the ground in this unit during the July 22 visit. Other birds noted here during field trips include:

Red-tailed hawk	Western meadowlark
Swainson hawk	Brewer blackbird
Scaled quail	Vesper sparrow
Mourning dove	Cassin's sparrow
Horned lark	Clay-colored sparrow

Soil Type:

Soils in Unit 3 tend to be deep, well drained sandy loams produced by a mesic soil temperature regime in a ustic moisture regime. Most of the unit is classified within the Vingo-Dallam complex comprised of coarse loamy, mixed Aridic Paleustalfs formed in sandy eolian material. The sandhills are mostly Valent loamy sands made up of Ustic Torripsamments from eolian deposits, occurring mainly in the southern portion of the unit. There are several occurrences of Spurlock Series soils, both Spurlock loamy sand and Spurlock Plack Complex. These are coarse-loamy, carbonate Calciorthids with windblown sand on the surface (Maxwell et al., 1981). No correlation could be made between the soil mapping units above and vegetative cover. For example, both the BOGR/BUDA plant association in the northwest corner of the unit and the adjacent ARFI/ANHA plant association occur on the same mapping unit (Vingo-Dallam complex).

Developments:

A primitive road bisects the unit from the northwest corner diagonally south then turns north and exits the unit at the northeast corner. There is an active well and stock pond just outside the unit at the northeast corner, a windmill and pond near the western boundary fence and another windmill near the center of the east section of the unit. There are three fenced wildlife exclosures. One, about 1 acre, includes a mulberry tree and is just south of the windmill in the eastern section, while the other two, about 3/4 acres each, are near the west boundary windmill.

Summary:

Unit 3 probably represents a late seral stage of the sandhills Artemsia filifolia/Andropogon hallii association in more pristine condition than any other unit in either the Kiowa or Rita Blanca National Grasslands. The small portion of Bouteloua gracilis/Buchloe dactyloides type and the Agropyron smithii drainage add habitat diversity. The configuration of the unit is a plus as is the condition of the surrounding area which would lessen undesireable edge effects.

MANAGEMENT PLAN

Unit # 3-7-8

Photo Nos. ENQ 1 - 91 & 93

Prepared by: Charles Johnson & Doug Burger Date:

Approved by: J. P. Gordon Date: 1/3/78

Permittee(s) Carl Newton 5-23-78

1. Management Objectives:

Improve soil stability
Graze on a substained yield basis
Improve range condition

2. History of Land Use:

a. Acres Farmed: 652 b. Acres Native: 1601

c. Private Acres: 0 d. Govt. Acres: 2253

e. TOTAL ACRES: 2253

Remarks:

f. Past Management and Actual Use:

See next page. Use varied from a low of 145 AUM's to a high of 864 AUM'S in 1974. Some years rotation was used but not in others. No systematic system was in use until 1975.

YEAR	No. Permitted	Season	AUM'S
	SEE ACTUAL-USE RECORDS		

g. **Permittee Ranch Operation:**

Mr. Newlon has a farming/livestock/dairy operation. He usually milks a few cows, runs 150 to 175 cows and raises milo, corn, and hay. He has both irrigation and dry land.

3. Estimated Grazing Capacity:

a. Range Condition and Trend:

veg types?

	SPECIES	SOIL TYPE	ACRES	AUM'S	CONDITION	TREND
	Bogr-Buda-Bocu	Loamy	33		F	→
	Bogr-Bocu-Arfi	Loamy	22		F	→
	Bocu-Bogr-Arfi	Hardland	82		F	→
	ARIS-Bogr-Ansa	Hardland	30		P	→
U. 3	Bogr-ARIS	Sandy	50		F	→
	ARIS-Bogr-Arfi	Sandy	40		P	→
	ARIS-Bogr-Bocu	Sandy	32		P	→
	Bogr-Bocu	Sandy	30		F	→
	Bogr-Buda-Bocu	Sandy	50		F	→
	Bogr-Bocu-Arfi	Sandy	1151		F	→
	Spcr-Buda-Bocu	Hardland	12		P	→
	Spcr-Buda-Bocu	Sandy	78		P	→
	Bogr-Spcr-Buda	Hardland	15		F	→
U. 7	Spcr-Buda-Bocu	Loamy	80		P	→
	Bogr-Spcr-Buca	Sandy	80		F	→
	Bogr-Bocu-Arfi	Sandy	123		F	→
	Bogr-Spcr-Buda	Sandy	75		F	→
U. 8	Ertr	Loamy	117		F	↑
	Ertr	Sandy	153		F	↑
TOTALS			2253			

b. Estimated Capacity and recommended Season of Use:

Estimated capacity is 455 AUM'S. The recommended use is for 50 cattle with a season of 1/1 to 5/31 and 9/1 to 12/31. All three units will receive summer rest.

4. PLANNED MANAGEMENT SYSTEM

Management must be flexible in order to adapt to rainfall patterns and differences from one year to the next. In order to achieve as much flexibility as possible, the following principles will be incorporated into the management system.

a. The permittee will be allowed to move his cattle through all pastures early in the season, if he feels there are abundant weeds. Use will not be made of the grass at this time.

b. The permittee will be allowed to move his cattle within a week before until a week after the calendar date listed in the plan, as he sees fit. Moves before or after this period will be decided upon the ground with the Ranger.

c. Pastures designated for season long rest will be used as emergency feed, should severe drought conditons develop.

d. Other considerations --

e. Pastures as used in Rotation System:

PASTURE NAME	ACRES	AUM'S
Unit 3	1520	
Unit 7	463	
Unit 8	270	

f. Planned Grazing System: (see 2200-18 attached)

g. **Proper Use Criteria:** Use should not exceed 50% by weight on Blue grama or Sand lovegrass

5. Range Improvements and Development Program:

a. Current Structrual Improvements:

WATER WELLS

	IMP. NO.	LOCATION	GPM	HEAD	TOWER	DEPTH	DATE INSTALLED	OWNERSHIP	CONDITION
.3	0A4010	NW¼SW¼ Sec. 27 T24 R36	3 gal.	8' aer. 1950	Steel 1973	180'	1930	govt.	good
	0A4011	SE¼ S.35 T24 R36	2 gal.	8' aer. 1961	Steel 1973	200'	1930	govt.	well weak good
.7 & 8	004023	NW¼ S. 23 T24 R36	3 gal.	8' aer. 1964	Steel 1964	150'	1930	govt.	good

TANKS

	IMP. NO.	LOCATION	TYPE	SIZE	DATE CONSTRUCTED	CONDITION
	at well 0A4010	SW¼ S. 27 T24 R36	Steel rim tank	20'	1940	good needs dirt
.3	"	"	Pit at well	25'	1940	holds water good Poor
	at well 0A4011	SE¼ S. 35 T24 R36	2 steel rim tank	15'	1940	needs dirt around bottom Fair
	"	"	Pit	30'	1940	good shape
U.	at well 4023	NW¼ S. 23 T24 R36	Steel rim	20'	1940	needs dirt around bottom good
7 & 8	"	"	Pit	30'	1940	has been cleaned good

FENCES

IMP. NO.	LOCATION	LENGTH	NO. WIRES	TYPE POSTS	CONDITION
4008	Center Sec. 27	1½ miles	4	Cedar	Fair
OA4463	North Sec. 35	1 mile	4	Steel	Good
4008	East Sec. 35	1 mile	4	Cedar	Fair
RA4002	South Sec. 35	1 mile	4	Steel	Good
4008	South Sec. 34	1 mile	4	Pine	Poor
4009	West - Unit 3	1½ miles	3 & 4	Cedar	Poor to Fair
4024	North - Unit 8	3/4 mile	4	Cedar	Fair
4025	Sec. 23 & 14	1¼ mile	4	Cedar	Poor
4465	East - Unit 8	3/4 mile	4	Cedar	Fair
4021	N.-S½NW¼ S. 23	½ mile	4	Pine Cedar	Poor to Fair
4023	NE¼ Sec. 23	7/8 mile	4	Cedar	Fair
4022	S½ mile East U. 7	½ mile	4	Steel	Good
4022	N.4/10mile E. U.7	4/10 mile	4	Cedar	Fair
4022	South-Unit 7	1 mile	4	Steel	Good
4464	West - Unit 7	1 mile	4	Cedar	Poor

b. **Proposed Structural Improvements:**

Replace the rotation corral at Well #OA4010
Replace fence 4464
Replace fence 4025
Replace fence 4008 on south side of Section 34

c. Current Non-structural Improvements:

NONE

d. Proposed Non-structural Improvements:

NONE

e. Current Wildlife Improvements:

Unit 3 A) Exclosure at well #0A4011 (Existing plot 1-A)
B) One brush pile existing (needs maintenance)

Unit 7 A) None
Unit 8 A) None

f. Proposed Wildlife Improvements:

UNIT 7: 1) Complete an exclosure (need 198' fence) at sacrifice area.

2) Use trickle system off of windmill #4023 to irrigate seven trees.

3) Place two post piles in pasture.

*See "proposed wildlife improvements"

UNIT 3: 1) Existing Plot 1-A: place 1 post pile in SE corner of exclosure;
two nest cones in mulberry tree;
five post piles between existing plot 1-A and potential plot 2-B

2) Potential Plot 2-A: needs 308' fence;
plant 11 trees and use trickle irrigation system;
Nine post piles between existing plot 1-A & plot 2-A

3) Potential Plot 2-B: needs 1137' fence and 200' trickle irrigation to water 20 trees;
One post pile should be placed in each exclosure at ends opposite the windmill;

*See proposed wildlife improvements

6. Multiple Use Considerations:

USDA—FOREST SERVICE

GRAZING SYSTEM

MANAGEMENT UNIT ALLOCATIONS

REGION	FOREST
3	03-Cibola
DISTRICT	DATE PREPARED
07-Kiowa	

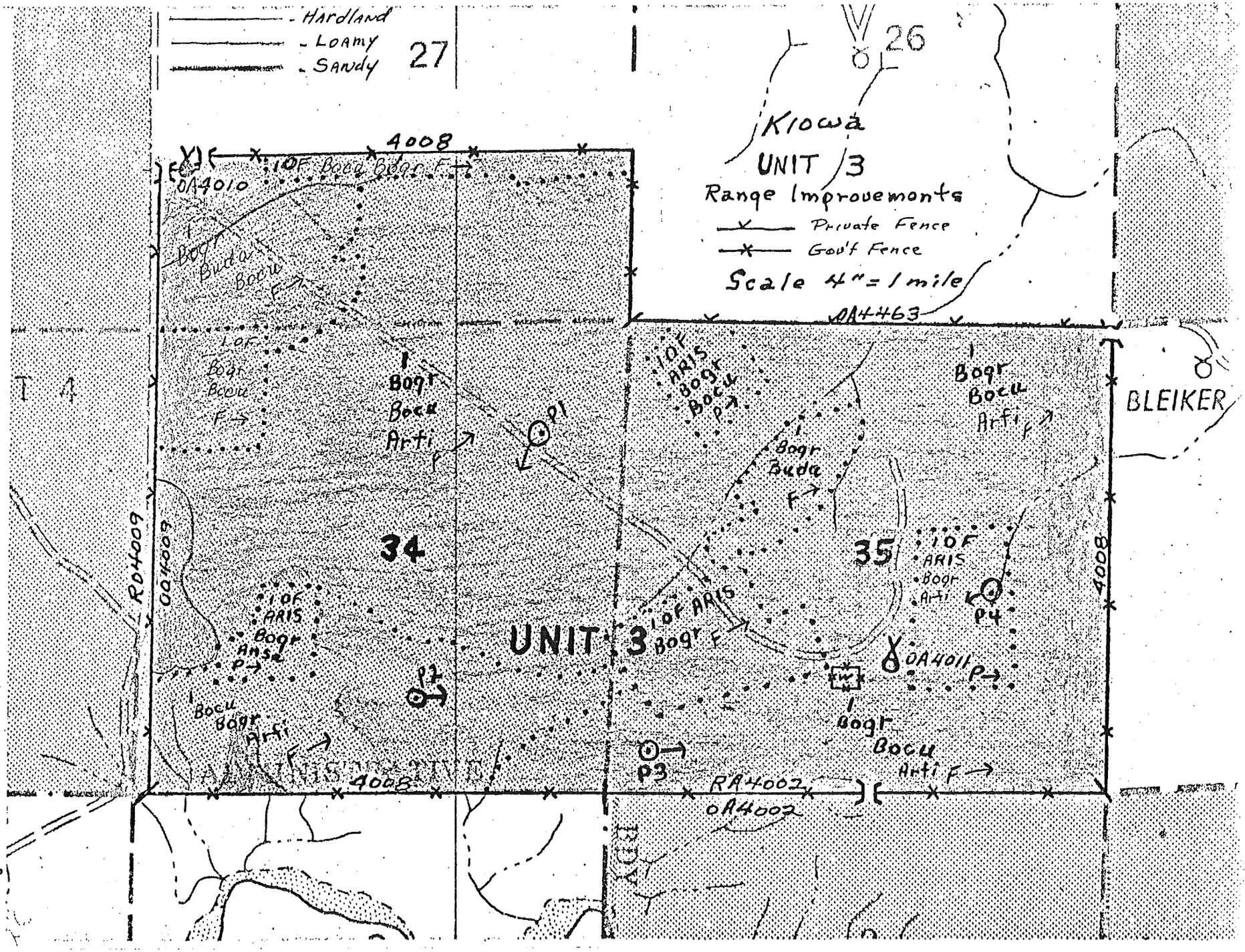
ALLOTMENT	PERMITTEE
Units 3, 7, 8	Carl Newlon

LEGEND: ▨ Graze

MANAGEMENT UNIT	MONTH												NOTES
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
First Year - 1978													
Unit 3	▨	▨	▨	▨	▨	▨							
Unit 7										▨	▨	▨	
Unit 8									▨	▨			
Second Year - 1979													
Unit 3			▨	▨	▨	▨			▨	▨	▨		
Unit 7	▨	▨	▨										
Unit 8												▨	
Third Year - 1980													
Unit 3									▨	▨	▨	▨	
Unit 7	▨	▨	▨	▨									
Unit 8				▨	▨	▨							
Fourth Year - 1981													
Unit 3	▨	▨	▨								▨	▨	
Unit 7				▨	▨	▨							
Unit 8									▨	▨			
Fifth Year - 1982													
Unit 3									▨	▨	▨	▨	
Unit 7	▨	▨	▨	▨									
Unit 8				▨	▨	▨							

REMARKS:

Unit 8 is sand lovegrass and should be grazed in either the spring or fall.


Hardland
Loamy
Sandy
27
26
Kiowa
UNIT 3
Range Improvements
Private Fence
Gov't Fence
Scale 4" = 1 mile
4008
OA4010
1 OF Bocu Bogr F
1 Bogr Buda Bocu F
1 OF Bogr Bocu F
1 Bogr Bocu Arti F
OA4463
1 OF ARIS Bogr Bocu P
1 Bogr Buda F
1 Bogr Bocu Arti F
BLEIKER
T 4
R04009
OA4009
34
35
UNIT 3
1 OF ARIS Bogr Ams P
1 Bocu Bogr Arti F
1 OF ARIS Bogr Arti
1 OF ARIS Bogr F
OA4011
1 Bogr Bocu Arti F
P1
P2
P3
P4
4008
RA4002
OA4002
4008
RIDGE

UNIT 46 - KIOWA NATIONAL GRASSLANDS

Unit 46 consists of two sections of land 7 miles northeast of Clayton. The survey and recommendation for potential RNA candidate was confined to the east section of the unit consisting of 600 acres within T2N, R36E, Sec. 2. The range environmental analysis map indicates that the east subunit is unplowed although there are spillover blow-in effects from an adjacent old field on the western section of this area (see map 2). The configuration is square except for 40 acres of private land in the southwest corner. The area is surrounded by other national grassland units on three sides (for 2.6 miles) with the northern boundary and southwest corner adjoining private lands (for 1.4 miles). Three miles of the outer perimeter boundaries are situated on unpaved, county-maintained roads. The entire boundary is fenced.

Management:

Unit 46 is managed with Unit 52 in a three-pasture deferred system with grazing from June to December (e.g. the eastern subunit under consideration here might be grazed June - Aug. 15 one year, Aug. 15 - Oct. 15 the next, and Oct. 15 - Dec. 31 the third year.) About 70 head of cattle are grazed. The unit has experienced a managed grazing system for the past 20 years or so.

Terrain:

The entire area is nearly flat with almost no slopes exceeding 1 percent. A minor drainage cuts across the northwest corner of the area originating on the private section to the north. Drainage throughout the subunit is from north to southwest or south.

Vegetation:

Except for spillover areas along the northwest and west boundaries of this subunit, the entire area is a Bouteloua gracilis grassland in good condition with blue grama-buffalograss comprising about 85 percent of cover on average. The Bouteloua gracilis/Buchloe dactyloides ratio varies from 20 to 1 to 2 to 1, but buffalograss averages about 25 percent of the total grass cover throughout most of the subunit. Hilaria jamesii ranges from 0 to 15 percent ground cover; Sitanion hystrix, 0 to 10 percent cover and Bouteloua curtipendula, 0 to 10 percent cover, depending on location in the unit. Nowhere are other grasses even close to subdominant in the main portion of the unit, but there are regular, infrequent occurrences of Aristida sp., Bouteloua hirsuta, Muhlenbergia torreyi, Sporobolus cryptandrus and occasional annual grasses.

In many places in the eastern two-thirds of the subunit, there is a relatively tight sod of pure blue grama-buffalograss with these species comprising nearly 90 percent of the cover, forbs around 2 percent, and bare ground under 10 percent. Side-oats grama is mostly limited to the western half of the subunit where it occurs in patches. Shrubs, limited to Gutierrezia sarothrae, Opuntia polyacantha and Yucca glauca, are scarce to infrequent, and the near-shrub, Psoralea tenuiflora, is nowhere common.

No trees occur on this unit. Overall forb cover averages about 5 percent with Ratibida columnifera reaching 10 percent in some parts of the area in 1987 following an unusually wet spring. Forb diversity is low to moderate. Bare ground cover averages about 10 percent in the subunit.

There are three small community types that differ from the above. An approximately 200-foot wide strip along the west end of the north boundary becomes almost 40 percent Sitanion hystrix with some Bouteloua gracilis and a number of weedy forb species such as Grindelia aphanactis, Salsola kali, and Eriogonum annuum indicating current recovery from former farming or heavy grazing land use. The west end of the subunit, up to 100 acres, also exhibits a lower seral stage with Sitanion hystrix at close to 20 percent of cover and Bouteloua curtipendula a subdominant. However, blue grama still consists of more than 50 percent of the grass cover here.

A second plant association dominated by Agropyron smithii occurs along the drainage that cuts across the northwest corner of the subunit. The wheatgrass grows in almost pure patches in the wetter portions of the drainage and is in places associated with Panicum obtusum.

Two small patches (1/2 acre) of Stipa neomexicana mixed with Bouteloua curtipendula and Andropogon scoparius are found approximately one-quarter mile west of the windmill adding additional habitat type diversity interest to the unit.

The following plant list is representative of late summer and fall species but omits most spring and early summer forbs since it was not recognized that Unit 46 would be a prime RNA candidate until the July field trip. Plants were collected and/or identified by the author on July 23, Aug. 18 and Sept. 29, 1987.

Plant List
Kiowa National Grasslands, Unit 46

Latin Name	Common Name	*	Frequency
HALF-SHRUBS, SHRUBS AND TREES:			
Gutierrezia sarothrae	Broom snakeweed		C
Ipomoea leptophylla	Bush morning glory		R
Opuntia polyacantha	Plains pricklypear		I
Yucca glauca	Soapweed yucca		R
GRASSES AND GRASSLIKE PLANTS:			
Agropyron smithii	Western wheatgrass		C
Andropogon scoparius	Little bluestem		I
Aristida longiseta	Red three-awn		I
Aristida sp.	Three-awn		I
Bouteloua curtipendula	Sideoats grama		C
Bouteloua gracilis	Blue grama		C
Bouteloua hirsuta	Hairy grama		I

Buchloe dactyloides	Buffalograss		C
Eragrostis sp.	Lovegrass		I
Hilaria jamesii	Galleta		C
Hordeum sp.	Barley		I
Muhlenbergia torreyi	Ring muhly		I
Panicum obtusum	Vine mesquite		I
Sitanion hystrix	Bottlebrush squirreltail		C
Sporobolus cryptandrus	Sand dropseed		I
Stipa neomexicana	New Mexico porcupine grass		I

FORBS:

Asclepias latifolia	Broad-leaved milkweed		I
Asclepias pumila	Dwarf milkweed		I
Astragalus mollissimus	Woolly locoweed		I
Astragalus sp.	Milkvetch		I
Chenopodium desiccatum	Goosefoot	V	I
Cirsium sp.	Thistle		I
Conyza canadensis	Horseweed	V	I
Echinocereus viridiflorus var. viridiflorus	Green pitaya		I
Eriogonum annuum	Annual buckwheat		I
Erysimum asperum	Plains wallflower		I
Euphorbia marginata	Snow-on-the-mountain		R
Gaura sp.	Little primrose		R
Grindelia aphanactis	Curlycup gumweed		I
Haplopappus spinulosa ssp. australis	Spiny goldenweed	V	I
Helianthus sp.	Sunflower		I
Heterotheca	Telegraph plant	V	I
Hoffmanseggia jamesii	Rushpea	V	I
Lepidium sp.	Peppergrass		I
Liatris punctata	Dotted gayfeather	V	I
Linum sp.	Flax		I
Melampodium leucanthum	Plains blackfoot	V	I
Mentzelia nuda	Stickleaf		I
Plantago sp.	Plantain		C
Psoralea tenuiflora	Slender scurfpea		I
Ratibida columnifera	Prairie coneflower		C
Salsola kali	Russian Thistle		R
Senecio multicapitatus	Groundsel		I
Solanum ssp.	Nightshade		I
Thelesperma megapotamicum	Hopi-tea greenthread		I
Tragopogon sp.	Goatsbeard		R
Verbena sp.	Vervain		C
Vicia exigua	Slim vetch		R

* Voucher specimen collected

C = Common; I = infrequent; R = rare

Wildlife:

An active black-tailed prairie dog town exists on Unit 43 just across the road south of the western section of this unit, and prairie dogs were observed to cross the road and feed on the southern portion of Unit 46 in

the western half. It is possible that a town eventually could become established on this unit. There is much evidence of pocket gopher activity throughout the subunit (a positive indicator for native rangeland), and 8 pronghorn were observed on the unit during the Aug. 18 visit. Thirteen-lined ground squirrels were the only other mammals observed.

Birds observed here include Long-billed curlew, a Management Indicator Species, Turkey vulture, Swainson hawk, Northern harrier, Horned lark, White-necked raven, Barn swallow, Western meadowlark, Lark bunting and Vesper sparrow.

Soil Type:

The east subunit of Unit 46 exhibits deep well drained loams and silty clay loams, principally Mollisols produced by a mesic soil temperature regime in a ustic moisture regime. The subunit includes 7 soil mapping units (Maxwell et al., 1981), four of which are discussed here, the others being on the periphery. Sherm clay loam occurs on the northeast and southwest quarters. These are fine, mixed Torrertic Paleustolls formed in eolian and alluvial deposits. In the east central part of the subunit the soil is Grurier loam comprised of fine mixed Aridic Paleustolls formed in mixed alluvium weathered from High Plains sedimentary formations. Spurlock loam is found on the west half of the subunit, course-loamy carbonatic Ustollic Calciothids formed in calcareous sediment from the Ogallala Formation. The drainage cutting across the northwest corner is underlain by Manzano loam, fine loamy mixed Cumulic Haplustolls.

Developments:

There is an active windmill and stock tank in the center of the subunit. A primitive road leads from the southwest corner of the subunit to the tank. Another road used to exist from the southwest corner to the northwest corner, but this road is now abandoned and the surface has revegetated.

Summary:

The east section of Unit 46 is judged to be the best representative of late seral stage of Bouteloua gracilis/Buchloe dactyloides shortgrass of all the units within the Clayton region of the Kiowa National Grasslands. In addition to dominance by Bouteloua gracilis throughout, it is characterized by low to moderate representation of Hilaria jamesii, moderate representation of Sitanion hysterix and a higher percentage of Buchloe dactyloides than the other three units under consideration here. Although there is less diversity in slope aspect and greater homogeneity in grass species makeup, there is more Bouteloua gracilis type in good condition than found in Units 44 or 49 and far more total acreage in good condition than in Units 21, 22, or 5, all of which are discussed previously in this report. The configuration of this unit is a strong plus with the probability of undesireable edge effects minimized both from its square shape and from adjacent national grasslands on three of the four boundaries.

ALLOTMENT MANAGEMENT PLAN
KIOWA NATIONAL GRASSLAND
UNIT 46-52

I. Introduction And History

Unit 46 contains two pastures and Unit 52 has one pasture making an allotment of three pastures. Past use, since 1954, has been for summer grazing. This has ranged from one pasture, season-long to both deferred and rest-rotation utilizing private land in the rotation system. Use has been by both yearlings and cow-calf herds.

The present permittee obtained use of all of Unit 46-52 in 1972 and began a rest-rotation system of grazing utilizing the three National Grassland pastures and three private pastures. Stocking appeared too heavy and was reduced in 1976. Ranger Bryant's 2230 letter of 12/6/78 explains what happened under this situation. A copy of the letter is attached and is considered a part of this allotment management plan.

The permittee took outside employment in 1978 and was forced to reduce his cow herd. He then applied for and was issued a grazing permit for 100 yearling with a season of 5/16 - 9/15 in Unit 46 and 15 cows with a season of 7/16 - 10/31 in Unit 52. It is interesting to note that the yearlings in Unit 46 gained 280 pounds during the four month grazing season of 1979.

II. Objectives

A. Maintain present range condition of native grass and improve condition of old fields.

B. Provide grazing for a high level of livestock production on a sustained - yield basis.

C. Utilize effective livestock management consistent with multiple use considerations for wildlife, watershed and soil protection.

III. Grazing Management

A. Carrying Capacities-the approved established carrying capacity is 390 AUM's. It is not known how this estimate was obtained. Based upon response of this allotment the past five years, 450 - 500 AUM's can be safely grazed utilizing a deferred - rotation grazing system.

B. Recommended Use-the recommended use is for 65-70 cows

with a season of 6/1 - 12/31. It should be understood by both the permittee and the Forest Service that future stocking depends on the response of the vegetation. Excess forage should be available for the permittee's use and a reduction should be agreeable to him if utilization studies indicate that a reduction is desirable.

C. Grazing System-See the attached 2200-18 for the grazing rotation schedule. This three-pasture deferred rotation system will provide for seasonal deferrment for each pasture two out of every three years. In years with abundant weed production, the cattle will be moved into each pasture for a short period to utilize the weeds. After the weed production has been utilized, the cattle will return to the planned grazing schedule as shown on 2200-18. Movement of cattle from pasture to pasture will depend upon reaching desired utilization of native grass. This judgement will be made by the permittee and the District Ranger.

D. Proper Use of the Pastures-The stocking rate will be checked with production-utilization studies. Correlation of this data with actual use and range trend will provide basic data for future stocking rates.

Each pasture will be considered properly used when about 50% of the current year's growth of major forage species has been utilized in key areas. A key area is defined as an area readily used by the grazing livestock.

A series of below-average production years may necessitate an adjustment in stocking to prevent forage deterioration. Excess forage (less than 50% utilization of major forage species in key areas), resulting from a series of above average productive years may be utilized during the winter months with additional cattle.

E. Distribution Practices-Livestock distribution will be aided by water developments, fences, salting and supplemental practices. Salting and supplemental feeding will be at least one-forth mile from water and located in areas where additional grazing is desired.

IV. Range Improvements

The only new improvement recommended is a dirt tank on the draw in the west pasture of Unit 46. The improvements currently in place are listed below.

Water Wells

IMP. #	GPM	HEAD	TOWER	DEPTH	CONDITION
4124	3	8'	steel	301'	good
4694	3	8'	pipe	210'	good
4145	3	8'	steel	?	good

Tanks

IMP#	TYPE	SIZE	CONDITION
4124	Steel storage	30' X 6'	good
4124	tub	10'	good
4124	pit.		good
4694	steel rim	20'	good
4694	pit		good
4145	steel rim	20'	good
4145	pit		good
4144	dirt		fair

Sheds

IMP #	CONDITION
4559	good

Fences

IMP #	TYPE	LENGTH	# WIRE	TYPE	CONDITION
OB4122	S/W Bd.	1 mile	4	steel	good
OA4122	S/E Bd.	3/4 mile	4	cedar	poor
4122	N/E Bd.	1 ½ mile	4	cedar	poor
4122	E Bd.	1 mile	4	cedar	poor
4122	W Bd.	½ Mile	4	cedar	fair
4121	N/W Bd.	½ mile	4	cedar	fair
4492	W Bd.	½ mile	4	cedar	fair
4123	Div.	3/4 mile	3	steel	fair
OA4492	Bd.	3/4 mile	5	steel	good
A4143	S Bd.	½ Mile	5	steel	good
4592	W Bd	¼ mile	5	steel	good
4497	S Bd	½ mile	5	steel	good
A4142	N Bd	1 mile	4	steel	good
B4142	N Bd	1 mile	4	steel	good
B4143	E Bd	½ mile	4	cedar	good
A4143	S Bd	½ mile	5	steel	good
A4143	E Bd	½ mile	4	steel	good
4497	S&W Bd	1 mile	4	cedar	poor

V. Other Management Considerations

Livestock counts will be scheduled as needed. Rotation plan and maintenance instructions will be shown annually in the permittee plan. Production-utilization studies will be conducted on an as needed basis.

No species of endangered or threatened plants or animal are known to occur on this allotment.

U ED STATES DEPARTMENT OF AGRICULT
FOREST SERVICE

Kiowa RD

REPLY TO: 2230 Permits

December 6, 1978

SUBJECT: Permit Reductions

TO: Forest Supervisor - Cibola N.F.

I have been concerned throughout my career with the relationship of the Forest Service and our permittees. I have yet to see the cooperation that I feel is desirable. Much too often we are in conflict. This usually results from our policies and regulations which the permittee doesn't understand and our lack of understanding of his needs, objectives, and responsibilities. It seems that one of our largest problems is proper stocking. We often seek to obtain needed reductions by talking of resource needs and fail to consider the economic needs of the permittee. Perhaps we could do a better job of achieving both needs by utilizing grazing systems and stocking designed for this purpose. This is hard to do but we stumbled on one here on the Kiowa National Grassland that did just that.

Billie Mock is a permittee in Unit 46-52. He worked with the Soil Conservation Service and the Forest Service in 1972 and developed a rotation grazing system involving three National Grassland pastures and three of his private pastures. He wintered the cattle on his River Ranch, a place with breaks for protection and vega grass. This protects the cattle from blizzards and reduces the need for protein supplement and hay. Two of the summer pastures were rested every year while three were grazed. The rotation schedule was as follows:

Year	River Ranch	Seneca	Unit 46 East	Estate	Unit 52	Unit 46 West
First	1/1-5/31	Rest	11/1-12/31	Rest	8/16-10/31	6/1-8/15
Second	1/1-5/31	11/1-12/31	Rest	8/16-10/31	6/1-8/15	Rest
Third	1/1-5/31	Rest	8/16-10/31	6/1-8/15	Rest	11/1-12/31
Fourth	1/1-5/31	8/16-10/31	6/1-8/15	Rest	11/1-12/31	Rest
Fifth	1/1-5/31	6/1-8/15	Rest	11/1-12/31	Rest	8/16-10/31

The summer and fall pastures receive complete rest two years out of five and receive late grazing two of the three years that they are grazed.

This operation supported 146 cattle from 1972 to 1975. Cattle condition, weaning weights, and range condition were not satisfactory. Mr. Mock reduced his stocking from 146 to 125 beginning in 1976. Following are the results:

1975	1976	1977
weaned 140 calves	weaned 120 calves	weaned 120 calves
calves weighed 390 lbs.	calves weighed 424 lbs.	calves weighed 456 lbs.

It should be pointed out that Mr. Mock culled his lower quality cows and always replaced a cow without calf with a pair. Moisture was comparable all three years. Profit was greater in 1976 and 1977 than it was in 1975. This resulted in savings from one less bull, 20 fewer cows, less interest, lower feed bills, and less grazing fees. This breaks down as follows: (all prices at 1975 levels)

20 fewer cows
X $250 per cow
$5000 less investment

1 less bull
X $500 per bull
$500 less investment

$5000 - cows
+ 500 - bull
$5500 - Total

$5500
X .10 interest
$550 per year savings

21 fewer cattle
X 7 mo. grazing
147 animal months

147 animal months
X $3 grazing fee
$441 per year saving

$25 per animal-winter feed
X 21 cattle
$525 less feed

$525 feed bill
+ 550 interest
+ 441 grazing fee
$1516 savings

The reduced stocking resulted in 20 fewer calves to sell each year. Figures for 1975, 1976, and 1977 follow:

1975	1976	1977
140 calves sold	120 calves sold	120 calves sold
X 390 lbs. each	X 424 lbs. each	X 456 lbs. each
54,600 pounds	50,880 pounds	54,720 pounds
X $.38 per pound	X $.38 per pound	X $.38 per pound
$20,748 received	$19,334 received	$20,794 received

It is apparent that even in 1976 benefits were greater with the reduced stocking. Income was $1562 greater in 1977 than in 1975 with the reduced stocking. There are savings in other areas that I do not know now to display. Items such as less trucking, less maintenance, less time, fewer vet bills, lower mileage, heavier cull cows, less depreciation, improved range condition, etc., provide yet more savings.

Mr. Mock is well pleased and glad to discuss proper stocking and its benefits with anyone. He gave me permission to cite this example and does not mind us using it throughout the region.

Now the bad news, economics of the cattle industry in this area make yearlings more profitable than mother cows. Mr. Mock switched to yearlings in 1978.

Alton R. Bryant
Kiowa District Ranger

ARBryant:jig

Unit 46-52

Recent Stocking

1988 — 100 Cows — 6/1 — 12/31

1987 — 90 Cows — 6/1 — 12/31

1986 — 90 Cows — 6/1 — 12/31

1985 — 80 Cows — 6/1 — 12/31

1984 — 75 Cows — 6/1 — 12/31

1983 — 80 Cows — 6/1 — 12/31

1982 — 68 Cows — 6/1 — 12/31

ST SERVICE

GRAZING SYSTEM
MANAGEMENT UNIT ALLOCATIONS

REGION: 03

FOREST: Cibola

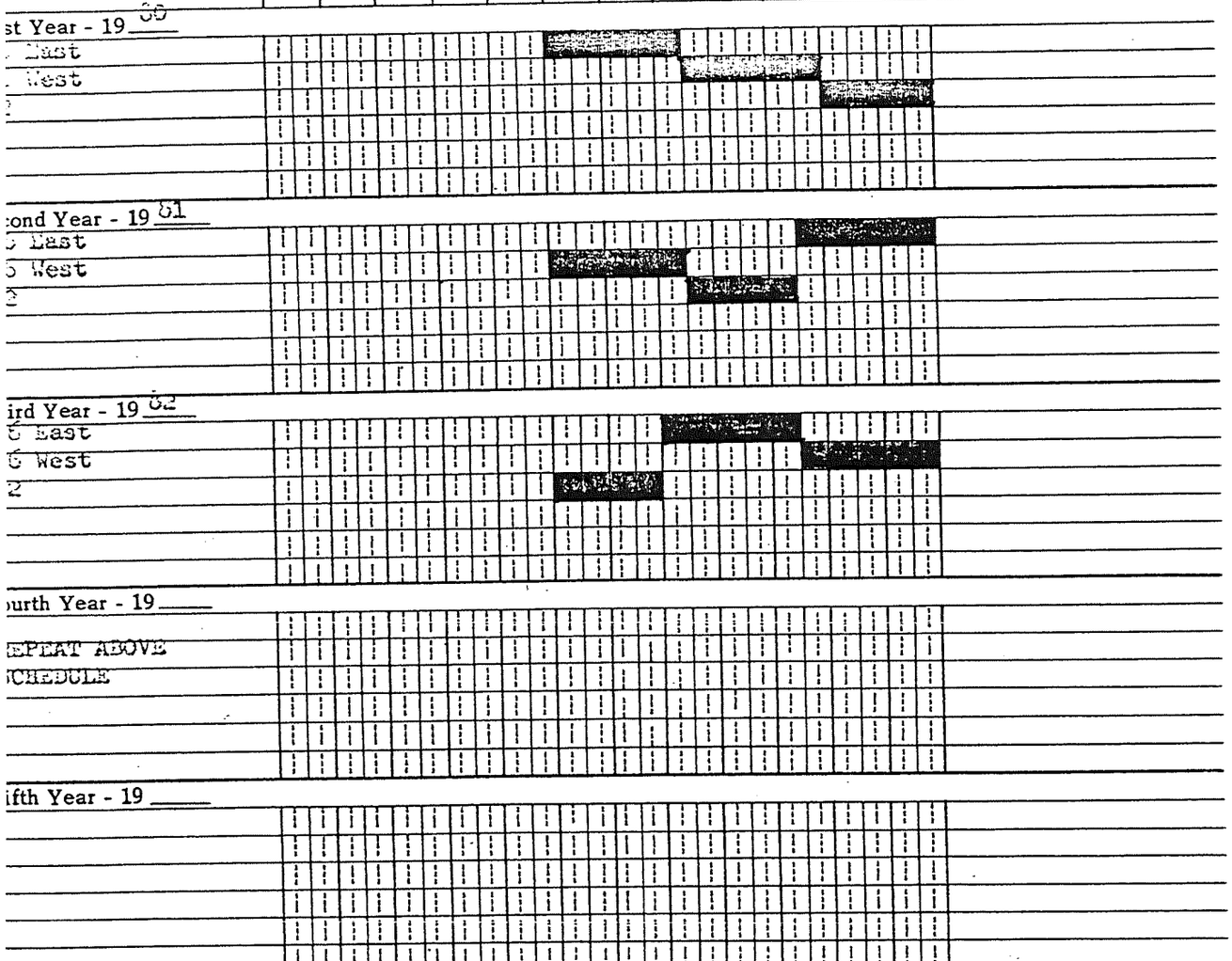
DISTRICT: Kiowa NG

DATE PREPARED: 4/5/80

OTMENT: Unit 46-52

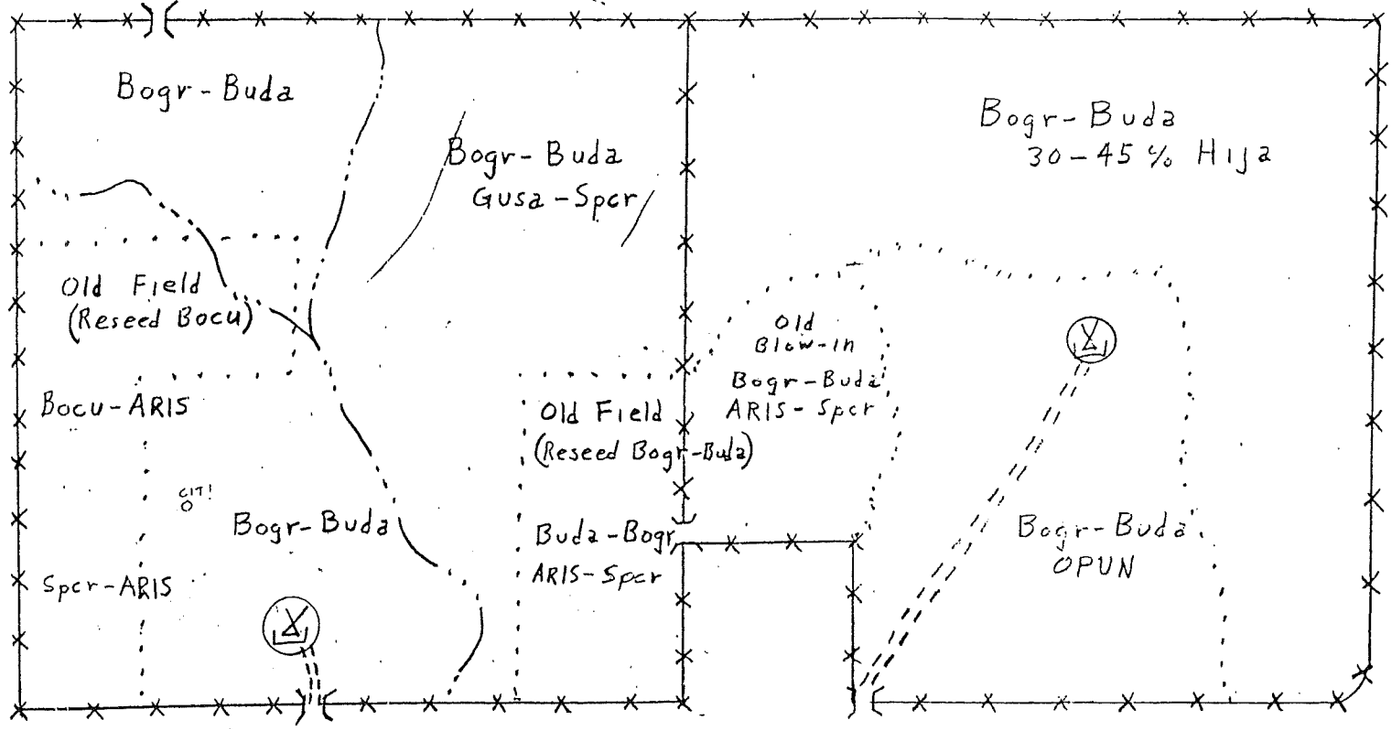
PERMITTEE: Billie R. Mock

GEND: ■ Graze



EMARKS:

ENQ 1 65
ENQ 1 110



Unit 46 - 1260 acres
Scale 4" = mile
private fence
gov't fence
mill & tank
gate
roads
veg. type bdry.

UNIT 100 - KIOWA NATIONAL GRASSLANDS

Unit 100 consists of four sections of land approximately 20 miles north of Roy, N.M. Only the western two sections were surveyed, and the evaluation focused mainly on the westernmost section (T23N, R25E, Sec. 17). Thus, the characterization here will pertain to the Section 17 subunit although most of the information will be applicable to Section 16 as well (see map 3).

Section 17 is surrounded on the northeast, east, southeast and south (2-mile boundary) by national grasslands. The western boundary (for 1 mile) adjoins state lands and the northern boundary (for 1 mile) leads to private land. Primitive administrative roads exist on the north and south boundaries of the subunit.

Management:

This unit has been under a managed grazing system for at least 20 years. For the past many years the unit has been grazed by yearling cattle during the summer only, i.e., from May to September.

Terrain:

This subunit is flat to gently rolling with slopes leading toward a major drainage, Sauz Creek, which cuts across the southern quarter of the subunit. Several minor north-south running drainages bisect the subunit, all of which empty into Sauz Creek.

In the dry season, Sauz Creek consists of a series of ponds, some exceeding 100 feet long and several feet deep, interconnected by dry arroyo. This drainage averages about 15 feet deep below the surrounding terrain, and the drainage bottom area averages about 100 feet wide.

Vegetation:

At least two major grassland types are represented here: Bouteloua gracilis/Hilaria jamesii/Buchloe dactyloides grassland on the upland area and a Bouteloua gracilis/Sporobolus airoides type within a few hundred yards on either side of the Sauz Creek drainage. Another type is the wetland vegetation found in and adjacent to the perennial open water in Sauz Creek.

The upland blue grama-galleta grassland type exhibits a very low proportion of buffalograss, less than 2 percent. Blue grama represents 70 to 80 percent, and galleta, 15 to 30 percent of the cover. The condition here in 1987 was excellent with the shortgrasses forming a tight sod and, typically, bare ground comprising less than 10 percent of the total cover in late summer. Very little Sitanion hystrix or Bouteloua curtipendula was observed anywhere on this upland type, and Aristida sp. is infrequent with large areas exhibiting no Aristida. Other minor grass components include Muhlenbergia torreyi and occasional patches of Agropyron smithii. Shrubs are scarce on the blue grama-galleta type with only an occasional broom snakeweed or plains prickly pear plant. Soapweed yucca and

winterfat are rarer still. No trees are found in the subunit. Forbs average about 4 percent of the ground cover and exhibit low to moderate diversity, and there are large areas of almost pure blue grama-galleta-buffalograss where forb cover is less than 2 percent. Plantago sp. is virtually absent. In 1987 the commonest forb throughout this type was Ratibida columnifera. Some patches of vegetation exist in the BOGR/HIJA type that indicate previous disturbance zones. These areas have more open soil and often include a composite of weedy species including Ambrosia artemisiifolia, Asclepias latifolia, Euphorbia marginata, and Ratibida tagetes, but these lower seral mosiacs do not make up a significant portion of the subunit.

Approaching the Sauz Creek drainage on either side, Sporobolus airoides becomes a subdominant grass at 5 to 20 percent of cover with Bouteloua gracilis, 60 to 70 percent, and Hilaria jamesii, 5 to 10 percent. This type has been mapped as BOGR/SPAI p.a. Aristida longiseta reaches 1 to 2 percent here, and Muhlenbergia torreyi is an infrequent component with Buchloe dactyloides remaining at under 2 percent. Bare ground remains less than 8 percent on average, and total forb cover averages around 5 percent. This vegetative type is virtually shrubless. Approaching Sauz Creek within 500 feet, bare ground increases to 12 percent or more, and more lower seral grasses such as Aristida sp. are present, probably a reflection of increased grazing pressure near the water. Close to Sauz Creek and in some of the side drainages Agropyron smithii appears, but nowhere is it a dominant grass.

Within the Sauz Creek drainage bottom and its edge slopes, the cover shifts to a mixture including Distichlis stricta, Bouteloua curtipendula, Sporobolus airoides, Trifolium sp. and Carex spp. Cattle trails run up and down the bottom and grazing impact is apparent. Some of the ponds have stands of Typha (cattails); others exhibit Scirpus (bulrush) or Sagittaria (arrowhead) along with sedges. No attempt was made to classify the riparian plant association.

There was an infestation of range caterpillar throughout the summer of 1987. Caterpillars mainly fed on galleta grass and selected forbs. In July, each clump of galleta averaged about 1 caterpillar per plant. Blue grama was much less affected by this infestation.

The following plant list is representative but certainly not inclusive of summer and fall species. Identifications and/or collections were made by the author during on-site visits on May 8, July 24, Aug. 19 and Sept. 28, 1987.

Plant List
Kiowa National Grasslands, Unit 100

Latin Name	Common Name	*	Frequency
HALF-SHRUBS, SHRUBS AND TREES:			
Erotia lanata	Winterfat	V	I
Gutierrezia sarothrae	Broom snakeweed		I
Opuntia polyacantha	Plains pricklypear		I
Yucca glauca	Soapweed yucca		R

GRASSES AND GRASSLIKE PLANTS:

Agropyron smithii	Western wheatgrass		I
Aristida	Three-awn		I
Aristida longiseta	Red three-awn		I
Bouteloua curtipendula	Side-oats grama		I
Bouteloua gracilis	Blue grama		C
Buchloe dactyloides	Buffalograss		I
Carex spp.	Sedge		I-W
Cenchrus pauciflorus	Field sandbur		R-W
Distichlis stricta	Desert saltgrass		I-W
Hilaria jamesii	Galleta		C
Hordeum sp.	Barley		I
Muhlenbergia torreyi	Ring muhly		I
Scirpus	Bulrush		C-W
Sitanion hystrix	Bottlebrush squirreltail		R
Sporobolus airodes	Alkali sacaton	V	C
Typha angustifolia	Narrow-leaved catttail		I-W

FORBS:

Ambrosia artemisiifolia	Common ragweed	V	C
Asclepias latifolia	Broad-leafed milkweed	V	I
Artemisia frigida	Fringed sagebrush		I
Astragalus mollissimus	Woolly locoweed		I
Astragalus spp.	Milkvetch		I
Cirsium sp.	Thistle		I
Cymopterus montanus	Water-parsnip		I
Echinocereus viridiflorus	Green pitaya		R
Epilobium	Willowweed		I-W
Erigeron spp.	Fleabane		I
Eriogonum sp.	Wild buckwheat		R
Euphorbia marginata	Snow-on-the-mountain		I
Gaura sp.	Little primrose		I
Lesquerella sp.	Bladderpod	V	I
Lithospermum incisum	Puccoon		R
Lygodesmia juncea	Skeletonplant	V	R
Machaeranthera tanecetifolia	Aster		I
Mentha sp.	Mint		I-W
Plantago sp.	Plantago		R
Ratibida columnifera	Prairie coneflower		I
Ratidiba tagetes	Prairie coneflower		C
Sagittaria latifolia	Wapato		I-W
Thelesperma megapotamicum	Hopi-tea greenthread	V	I
Tragopogon sp.	Goatsbeard		I
Trifolium sp.	Clover		I-W
Verbena ambrosifolia	Vervain	V	I
Verbena bipinnatifida	Dakota vervain		I
Vicia americana	American vetch		R
Xanthium strumarium	Cocklebur		I-W
Zinnia grandiflora	Rocky Mountain zinnia		I

* Voucher specimen collected
C = common; I = infrequent; R = rare; W = wetlands only

Wildlife:

This unit has the highest incidence of pocket gopher activity of any visited on either the Kiowa or Rita Blanca Grasslands. There are large areas here where pocket gopher disturbance exceeds 5 percent of the ground cover. Other mammals observed on the unit include pronghorn and thirteen-lined ground squirrel.

Most of the perennial ponds contain introduced green sunfish, presumed to have worked upstream during high water periods from where they were once introduced in Abbott Lake 2 miles downstream from the unit. No native fish are known to survive in these waters. Birds observed during the site visits include the following:

Mallard	Red-winged blackbird
Red-tailed hawk	Brewer blackbird
Killdeer	Lark bunting
Western kingbird	Savannah sparrow
Horned lark	Clay-colored sparrow
White-necked wren	Brewer sparrow
Rock wren	Western meadowlark

Soil Type:

Soils on the west section of Unit 100 are moderately deep, well drained silt loams and clay loams. The north half of this subunit is principally Colmar Association soil, comprised of fine silty, mixed, mesic Aridic Hapustolls. Upland soils north and south of the Sauz Creek drainage are La Bier silt loams made up of fine, mixed mesic Torrertic Argiustalls. Within the creek drainage and immediately adjacent flood plain are Vermejo silty clay loams, a fine mix of Ustic Torriorthents. Judging from areas with concentrations of soluable salts at the surface, some of these Vermejo Series soils are saline. (Anderson et al., 1982).

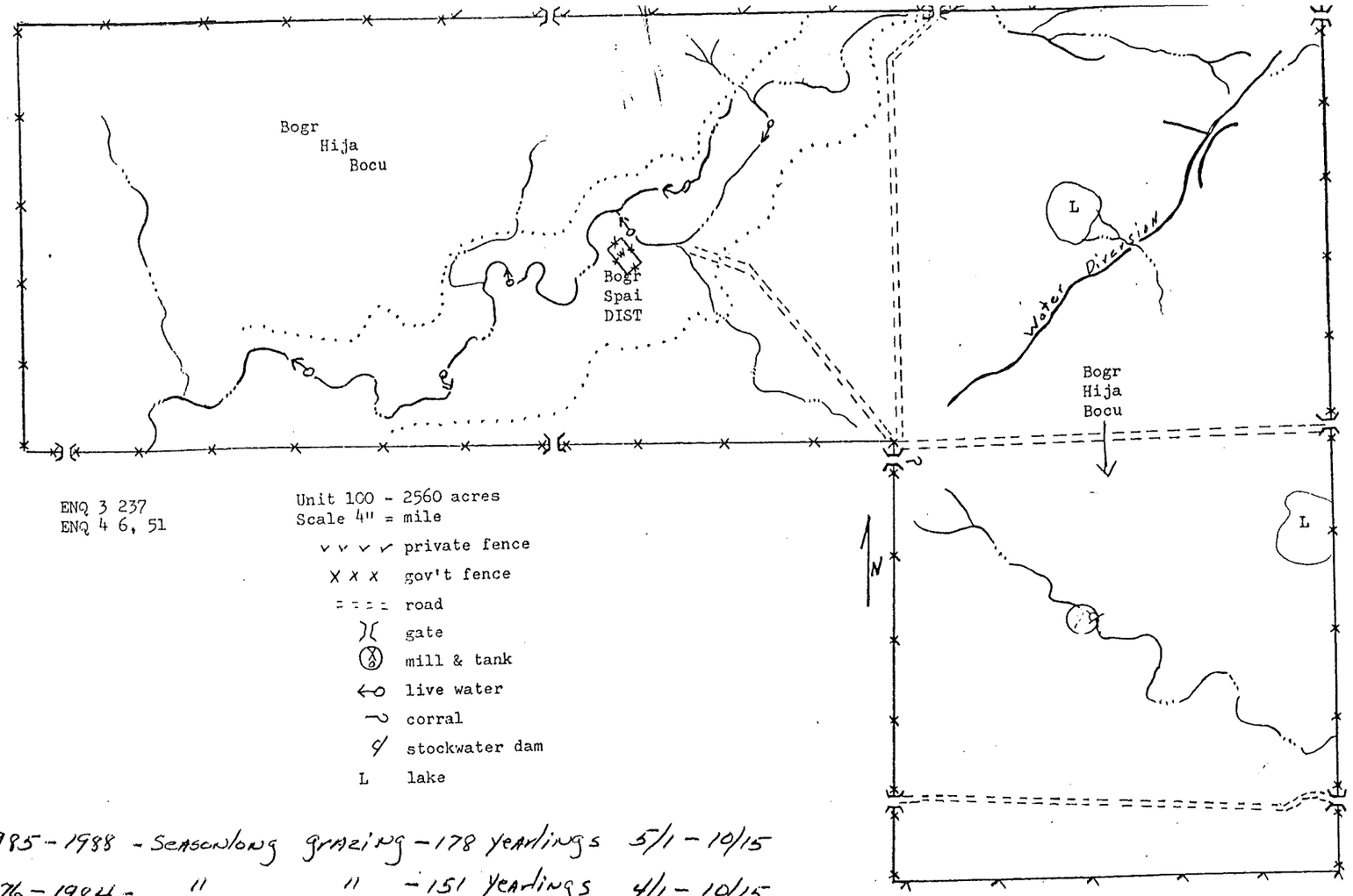
Developments:

A primitive two-track road parallels the north boundary fence and another crosses the unit from north to south along the western side. A third two-track road cuts across the southeast corner of the subunit. No other developments exist on this subunit.

Summary:

The western section of Unit 100 (as well as the next section to the east) exhibits a large acreage of close to if not the best range condition for blue grama type in late seral stage on the two national grasslands. Of the four candidate areas considered here, this one has the highest occurrence of Hilaria jamesii and the lowest of Buchloe dactyloides. It is also the lowest in percentage of shrub cover, and the scarcity of Sitanion hystrix, Bouteloua curtipendula and Aristida is notable. Because of the several plant associations represented and more variety in slope, there is moderately high diversity for shortgrass prairie. The major drainage with intermittent open water is a strong plus in adding habitat type diversity. The configuration of this subunit minimizes undesirable

edge effect, and there are no detracting developments either within or adjacent to the unit.



ENQ 3 237
ENQ 4 6, 51

Unit 100 - 2560 acres
Scale 4" = mile

- private fence
- gov't fence
- road
- gate
- mill & tank
- live water
- corral
- stockwater dam
- L lake

1985 - 1988 - Seasonlong grazing - 178 yearlings 5/1 - 10/15

1976 - 1984 - " " ~151 yearlings 4/1 - 10/15

prior to 197- " " - 154 yearlings 4/1 - 10/15

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Cibola NF

REPLY TO: 2620 Planning

March 21, 1980

SUBJECT: Unit 100 Fish Survey (8/79)

TO: District Ranger, Kiowa NG

Mr. Thorn, Fisheries Biologist for the State, identified the sample given to him last fall. The samples were taken from four different locations in the creek running through Unit 100 of the Mills Unit.

Species collected were:

Tadpole Shrimp

Fathead Minnow

Water Dog Salamander

Green Sunfish

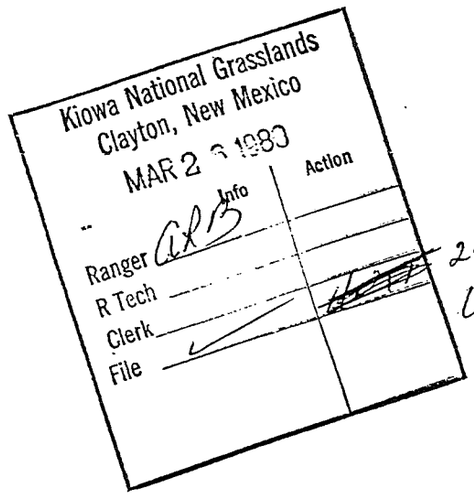
Crayfish

Snails

None of these species are on either the Federal or State threatened and endangered list. No special protective measures need to be incorporated into your management of this Unit.

If you have any further questions regarding this survey, contact Fritz Winter in the SO.

LAWRENCE C. SUTTON
Wildlife Staff Officer



UNIT 19 - RITA BLANCA NATIONAL GRASSLANDS

Unit 19 consists of 1,878 acres approximately 16 miles east-northeast of Texline, Texas, all of which is indicated as unplowed grassland on the district range map. The northern portion of this unit is in lower seral condition and a large portion of it was furrowed in the early days. The evaluation and recommendation here is focused on the south half of the unit south of the east-west fence line, an area which comprises approximately 900 acres (see map 4). The configuration of this subunit is approximately rectangular with the exculsion of an earthen stock tank that is fenced out on the east boundary. This area is surrounded by national grassland on the north and south (for 4 miles) and by private land on the east and west boundaries (for 2 miles). The entire boundary of the subunit is fenced.

Management:

For the past six years or so Unit 19 has been managed under a four-pasture year-round grazing system. The southern subunit, under consideration here, is divided into two pastures, each of which is grazed for approximately three months out of the year.

Terrain:

The area is gently to moderately rolling with one major drainage tributary heading on the western portion of the subunit and deeply bisecting the subunit west to east for nearly a mile. This drainage opens out and joins another tributary that heads above Government Spring on the northern half of Unit 19, then exits into the fenced earthern stock tank on the east boundary of the subunit. The land slopes west to east, and the drainage is nearly entirely contained within the unit, making it relatively free from potential adverse drainage problems from adjacent lands.

Vegetation:

This subunit is an example of blue grama grassland in fairly good condition with a moderate representation of buffalograss. Typical proportions of grasses comprising the ground cover are Bouteloua gracilis, 50 to 60 percent; Buchloe dactyloides, 15 to 20 percent; Sitanion hystrix, 10 to 15 percent and Aristida sp., 1 to 5 percent. Bouteloua curtipendula, Hilaria jamesii and Muhlenbergia torreyi are consistent but infrequent components, and occasional patches of Agropyron smithii exist on low ground throughout the subunit. Bare ground averages about 15 percent of the cover. The best examples of BOGR/BUDA p.a. with lower proportions of Sitanion hystrix and bare ground are found north and south of the drainage in the center of the subunit and in several areas in the eastern section.

Shrubs are nearly absent in the blue grama-buffalograss type with only a rare Yucca glauca and infrequent occurrence of Opuntia polyacantha. Semi-shrubs, including Ratibida columnifera and Psoralea tenuiflora, also are infrequent. Overall, forb cover is low, averaging well under 5 percent, and species diversity is low. Weedy forbs such as Euphorbia marginata, Salsola kali and Asclepias latifolia are mostly confined to disturbed areas adjacent to the road that bisects this subunit.

The southwest corner of the subunit appears to support a lower seral stage with a higher percentage of Sitanion hystrix (around 25 percent cover), more bare ground (20 to 30 percent), a higher proportion of buffalograss to blue grama (about 1 to 2) and Opuntia polyacantha approaching 2 percent of cover.

The black-tailed prairie dog town occupying about 100 acres in the northwestern corner of the subunit (and extending northward into the north half of Unit 19) displays vegetative conditions typical of dog towns in shortgrass prairie. The ratio of buffalograss to blue grama is close to 1 to 1, and weedy forbs including Asclepias latifolia, Euphorbia marginata, Physalis lobata and several composites which are not found in the undisturbed blue grama type are common in the town where there is much bare ground due to feeding and digging activities of the rodents.

An Agropyron smithii type occurs at the bottom of the east-west drainage in the center of the subunit. This could be classed as a Agropyron smithii/Bouteloua gracilis plant association, although the wheatgrass forms an almost pure stand where silty soils prevail in the broad ravine bottom. Patches of western wheatgrass also are found in the northeastern corner of the subunit above where the broad drainage empties into the earthen stock tank.

A very different habitat type occurs in the steep north-facing slopes between the deep central ravine and the limestone rimrock above the south side. Bouteloua curtipendula is the principal grass on the rocky soil here with Andropogon scoparius, Sporobolus cryptandus, Aristida sp. and Stipa sp. all well represented. Yucca glauca, rare elsewhere on the unit, is fairly common on these slopes, and Rhus trilobata grows in dense patches near the rimrock. Three netleaf hackberry trees are found at the head of this draw, the only trees growing on the subunit. There is a high diversity of forbs here with Eriogonum jamesii perhaps the commonest. (No effort was made to collect or identify the many different forb species from this habitat type; thus, most of them are not included in the Unit 19 plant list.) This slope is representative of the Bouteloua curtipendula /Andropogon scoparius plant association (BOCU/Schizachyrium scoparium described by Johnson, 1987).

Another major drainage leading to the fence exclosure around Government Spring exists in the northwest quarter of Unit 19 just outside the subunit proposed here for candidate consideration. The drainage supports an Agropyron smithii grass association, and on the sandstone rock outcrops around the spring, there is a concentration of Bouteloua curtipendula and a number of Rhus trilobata shrubs. The spring is rock encased, approximately 6' x 8', but is no longer in active use. Disturbance impact from past cattle operations around the spring is such that recovery would

take many years. Thus, it is not recommended here that the spring area be included within the candidate boundary, although a case could be made for including it.

The following plant list is representative of late summer and fall species but omits most spring and early summer forbs. Plants were field-identified and/or collected during on-site visits by the author on July 23, Aug. 18 and Sept. 30, 1987. It should be noted that this unit experienced an unusually dry late spring and summer in 1987, undoubtedly skewing downward the forb species list and total forb cover. There was almost no flowering of blue grama this year.

Plant List
Rita Blanca National Grasslands, Unit 19

Latin Name	Common Name	*	Frequency
HALF-SHRUBS, SHRUBS AND TREES:			
Celtis reticulata	Netleaf hackberry		R
Gutierrezia sarothrae	Broom snakeweed		R
Opuntia polyacantha	Plains pricklypear		I
Rhus trilobata	Skunkbush		I
Yucca glauca	Soapweed yucca		I
GRASSES AND GRASSLIKE PLANTS:			
Agropyron smithii	Western wheatgrass		I
Andropogon saccharoides	Silver beardgrass		R
Andropogon scoparius	Little bluestem		R
Aristida sp.	Three-awn		C
Aristida longiseta	Red three-awn		I
Bouteloua curtipendula	Sideoats grama		I
Bouteloua gracilis	Blue grama		C
Bromus tectorum	Downy chess		I
Buchloe dactyloides	Buffalograss		C
Festuca octoflora	Six-weeks fescue		I
Hilaria jamesii	Galleta		I
Muhlenbergia torreyi	Ring muhly		I
Sitanion hystrix	Bottlebrush squirreltail		C
Sporobolus cryptandrus	Sand dropseed		I
FORBS:			
Argemone sp.	Prickly Poppy		I
Asclepias latifolia	Broad-leaved milkweed		I
Aster tendleri	Fendler aster	V	I
Astragalus spp.	Milkvetch		I
Cirsium ochrocentrum	Santa Fe thistle	V	I
Cryptantha sp.	Hiddenflower		I
Echinocereus viridiflorus	Green pitaya		I
Eriogonum wrightii	wild buckwheat	V	I
Erysimum asperum	Plains wallflower		I

Euphorbia marginata	Snow-on-the-mountain	I
Liatris punctata	Dotted gayfeather	R
Linum sp.	Flax	I
Mentzelia nuda	Stickleaf	I
Physalis lobata	Groundcherry	I
Plantago sp.	Plantain	C
Psoralea tenuiflora	Slender scurfpea	I
Ratibida tagetes	Prairie coneflower	C
Salsola kali	Russian Thistle	I
Senecio multicapitatus	Groundsel	I
Thelesperma megapotamicum	Hopi-tea greeenthread	I
Verbena sp.	Vervain	R

* Voucher specimen collected C = common; I = infrequent; R = rare

Wildlife:

An active black-tailed prairie dog town exists in the northwest portion of this subunit and extends north across the fence line into the northwestern half of Unit 19. The town covers about 100 acres in the subunit (see map). Evidence of pocket gopher is low to moderate throughout the subunit. Pronghorn were observed here on Aug. 18 and Sept. 30, and there appears to be a fox den at the edge of the spring area just outside the subunit.

The most notable bird species observed was the mountain plover, a Federal Notice of Review species. A flock of 38 mountain plovers were on the subunit on Sept. 30. Other birds casually observed during field trips include:

Red-tailed hawk
Swainson hawk
Burrowing owl
Horned lark
White-necked raven
Western meadowlark
Vesper sparrow

Soil Type:

Upland soils on the 900-acre southern subunit of Unit 19 are characterized by deep, well drained, moderately permeable, calcareous loams. These are Mollisols produced by a mesic temperature regime in a ustic moisture regime. The steeper slopes on the flanks of the major drainage exhibit much shallower calcareous soils. This subunit includes 5 soil mapping units as described below (Ford and Fox, 1975). Most of the southern portion of the area is Conlen loam, made up of fine-loamy carbonatic Aridic Calciustolls. Northward on the east half the soils grade into Kerrick-Plack association which are fine-loamy, mixed Petrocalcic Calciustolls. Sunray loams, fine-loamy mixed Calciorthidic Paleustolls appear in the northwest portion of the area. Associated with the major drainage are two additional soil types: Plack loam, loamy mixed shallow Petrocalic Caliustolls and Berthoud loam, fine-loamy mixed Aridic Ustochrepts.

Except for the area around the drainage, little correlation between soil type and composition and condition of vegetation was discernible.

Developments:

A road parallel to the north-south fence line in the center of the unit bisects the subunit. A large earthen stock tank is fenced on the northeast corner of the subunit. The fenced area occupies about 40 acres and was not sampled in this study since it was assumed that it would be excluded from any RNA proposal. Two small fenced wildlife exclosures exist just outside the subunit to the north of the eastern section. Government Spring, windmill and tank are outside to the north in the center of the subunit, and another windmill and tank are outside on the southern boundary.

A system of furrows was plowed into the northwest portion of Unit 19 many years ago in an experimental program to improve moisture conditions and grass recovery. Evidence of the furrows still remains as a wavy, surficial expression, each about 18 inches and 2 to 3 inches deep, and an unnatural parallel configuration of vegetation density. The furrow zone occupies about 80 acres in the northwest corner of the subunit and includes much of the prairie dog town.

Summary:

The south half of Unit 19 is considered to be the best example of native Bouteloua gracilis/Buchloe dactyloides shortgrass in the Rita Blanca National Grasslands. It is characterized by low representation of Hilaria jamesii, moderate representation of Buchloe dactyloides and some Sitanion hystrix throughout but rarely is this seral grass dominant. The central drainage with an Agropyron smithii plant association at the bottom and a distinct Bouteloua curtipendula/Andropogon scoparius plant association adds an important measure of habitat type diversity to this candidate. Other positive features include the prairie dog town and the terrain in which control of the drainages are within the unit.

V. T & E AND MANAGEMENT INDICATOR SPECIES

A. T & E and R-3 Sensitive Species

Two animal species on the 1987 Southwestern Regional Sensitive Species List were observed during the grassland fieldwork. The Mountain plover (Charadrius montanus), which is also a Federal Notice of Review species, was seen only once on September 30, on Unit 19, Rita Blanca National Grasslands. A flock of 38 Mountain plovers were observed on the Bouteloua gracilis/Buchloe dactyloides uplands in the central portion of this unit, about one-quarter mile southwest of Government Spring. The other R-3 Sensitive Species, the Long-billed curlew (Numenius americanus) is also a Management Indicator Species and is covered under that section below.

No T & E or R-3 Sensitive Species listed plants were encountered during this study.

B. Management Indicator Species

The Environmental Impact Statement for the Cibola National Forest lists 11 management Indicator Species, only one of which was observed on the grasslands during the fieldwork. The Long-billed curlew is a fairly common summer resident throughout the shortgrass prairie from Canada to New Mexico. Long-billed curlews were observed on the ground on Kiowa NG Unit 3 (2 birds, July 22); Unit 22 (11 birds, July 22); Unit 44 (10 birds, July 22); and Unit 46 (1 bird, July 23). All observations were in association with the Bouteloua gracilis/Buchloe dactyloides type. No nesting activity was observed.

VI. SHORTGRASS RNA'S IN OTHER LOCATIONS

During the study a survey was made to determine the existence of shortgrass prairie types in protection management status (e.g. RNAs or national park lands units) in the states of Colorado, New Mexico and Texas. None are known to exist in New Mexico. Three Research Natural Areas administered by the USF&WS, Maxwell RNA (Maxwell NWR), Gallinas RNA (Las Vegas NWR), and Vegosa RNA (Las Vegas NWR), are in potential shortgrass areas but do not include significant acreage of the BOGR/BUDA type.

In Colorado, the Campo RNA on the Comanche National Grasslands was established in 1986 (Hendzel, 1987), and this site was visited on September 30, 1987. It is a 35-acre unit that has no known history of grazing. It is narrowly triangular in shape, bordered by a railroad on one boundary, a U.S. highway on another, and a high-maintenance county road on the third. The blue grama-buffalo grass type here, with a ratio of about ten to one, exhibits a high degree of senescence, more than 50 percent in much of the area. There is much exposed bare soil, averaging well over 15 percent. Soils here are somewhat sandy (although not to the degree found on Unit 3 of the Kiowa) and about a quarter of the RNA exhibits a Artemisia filifolia-Bouteloua gracilis-Bouteloua curtipendula plant association. At the time of my visit, weedy forbs, including Salsola kali, Ambrosia sp. and Conyza canadensis among others, were commonly found throughout the RNA. I believe it can be fairly concluded that the small size of this unit, its awkward configuration with attendant degrading edge effect and the lack of ungulate presence for many years, either domestic cattle or native pronghorn, have resulted in a plant community that would not be expected under more natural conditions.

In Texas the one shortgrass area known to be under protection is the High Plains RNA on the Buffalo Lakes National Wildlife Refuge approximately 30 miles southwest of Amarillo, Texas. I visited this area on October 1. For many years the RNA has been managed under a grazing regimen of an every-other-year grazing cycle with cattle on the unit for two weeks to one month on odd or even years. Annual precipitation here is 25 inches, close to double that of the Kiowa and Rita Blanca units. Range condition here is excellent (half the unit had been grazed two months prior to my visit) with blue grama-buffalo grass (the ratio averaging 2 to 1) forming a tight sod with exposed bare ground comprising less than 5 percent in most of the unit. The area is definitely shortgrass but approaches midgrass conditions throughout with midgrass species such as Eragrostis sp., Panicum sp., Sporobolus sp. and Bouteloua curtipendula well represented. The RNA exhibited a high diversity of forbs, including some commonly thought of as increasers (e.g. Conyza canadensis, Ambrosia sp. and several other composites). Shrubs here were scarce with occasional Yucca glauca. The High Plains RNA does not duplicate any of the four candidates recommended in this report.

VII. RECOMMENDATIONS

As described in Section IV, four units were judged to be highly suitable candidates for RNA status. Each has its own special merits as discussed in the summary statements for the units. Thus Unit 3 represents an outstanding sandhills grassland; Unit 46 is an excellent late seral blue grama-buffalograss example; Unit 100 exhibits the best example of late seral blue grama/galleta grassland; and Unit 19 on the Rita Blanca offers an extremely attractive complex of blue grama-buffalo grassland with high plant community and animal diversity.

Because of the widely varying positive attributes of the four units, a priority ranking is not proposed here. All four should be considered by the Cibola National Forest and the Regional RNA task force. Any or all would make splendid additions to the National Forest System's contribution to the Research Natural Area Program.

The lack of shortgrass prairie types in the High Plains currently managed for research and educational purposes provides additional impetus for having representative areas established on the Cibola National Forest grasslands. All of the four candidate Research Natural Areas under consideration here contain distinct plant associations judged to be in near climax condition, none of which are represented in the existing Research Natural Area system, either managed by the USFS or other public land agencies.

VIII. LITERATURE CITED AND OTHER SHORTGRASS PRAIRIE REFERENCES

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APPENDIX 1

Photographs 1-22. Additional site information, date and photographer is provided on the photographic Record Sheets (Form 1600-1) accompanying the original color slide submitted to the Cibola National Forest.

Photo 1. Unit 3, Kiowa NG. The northwest corner of the unit contains about 100 acres of mid-seral Bouteloua gracilis habitat type.

Photo 2. Unit 3, Kiowa NG. Most of the unit is representative of the Artemisia filifolia /Andropogon hallii plant association.

Photo 3. Unit 3, Kiowa NG. Sand bluestem (Andropogon hallii) reaches over 1 meter tall on many of the sandy hilltops.

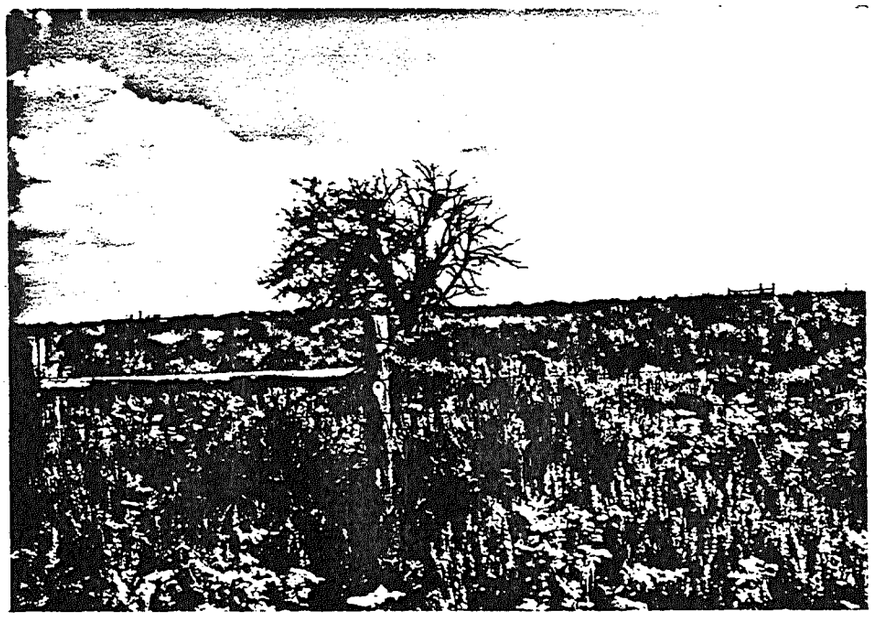


Photo 4. Unit 3, Kiowa NG. In the eastern section of the unit a 1-acre fenced wildlife exclosure includes a lone mulberry tree.

Photo 5. Unit 22, Kiowa NG. Blue grama is found in nearly pure stands in the south quarter. Prairie coneflower (Ratibida columnifera) was abundant in 1987 following an unusually wet spring.

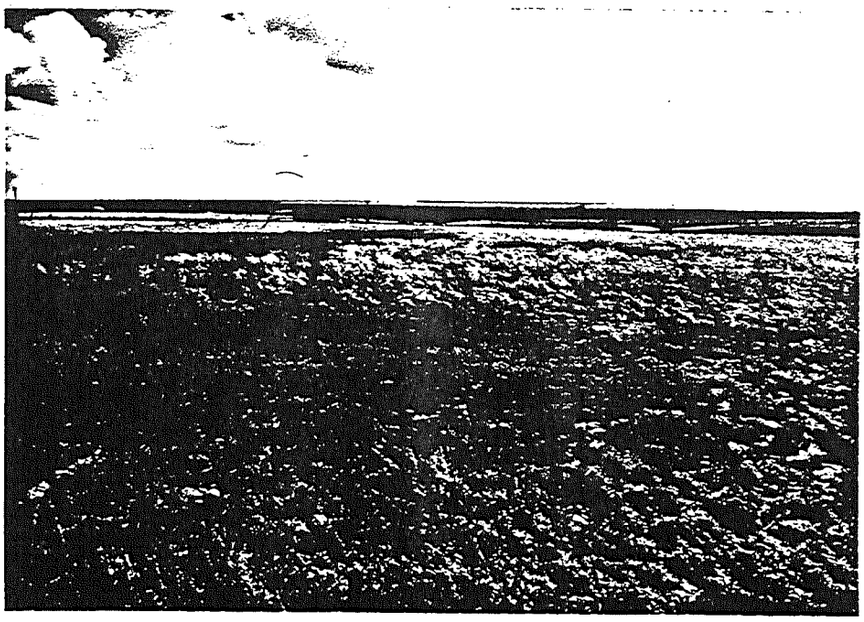


Photo 6. Unit 44, Kiowa NG. The south middle portion of the unit exhibits a blue grama-buffalograss type in excellent condition.

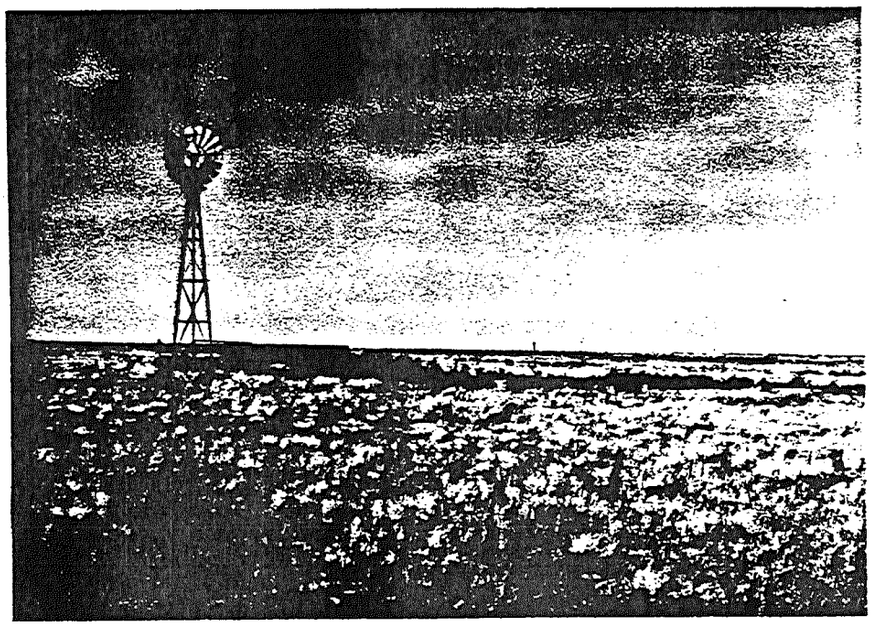


Photo 7. Unit 46, Kiowa NG. A windmill and stock tank are centered in the east section of this unit.

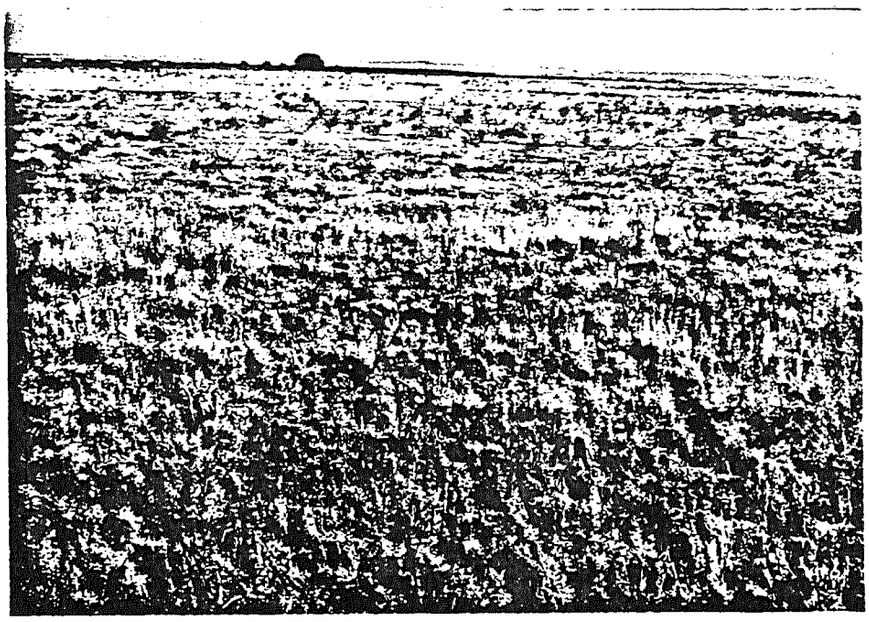


Photo 8. Unit 46, Kiowa NG. The entire area of the eastern half (Sec. 2) is a blue grama-buffalograss grassland in good condition with occasional patches of galleta and bottlebrush squirrel tail.

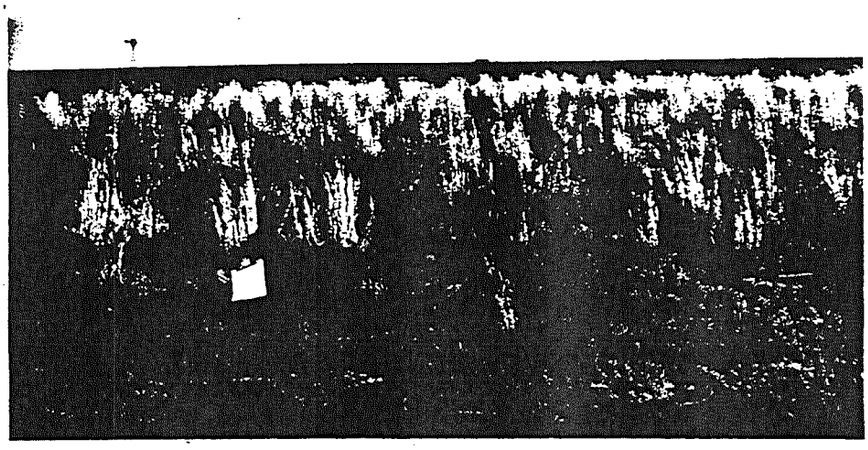


Photo 9. Unit 46, Kiowa NG. Two small patches of Stipa neomexicana grow on the calcareous soils on the western half of the subunit.

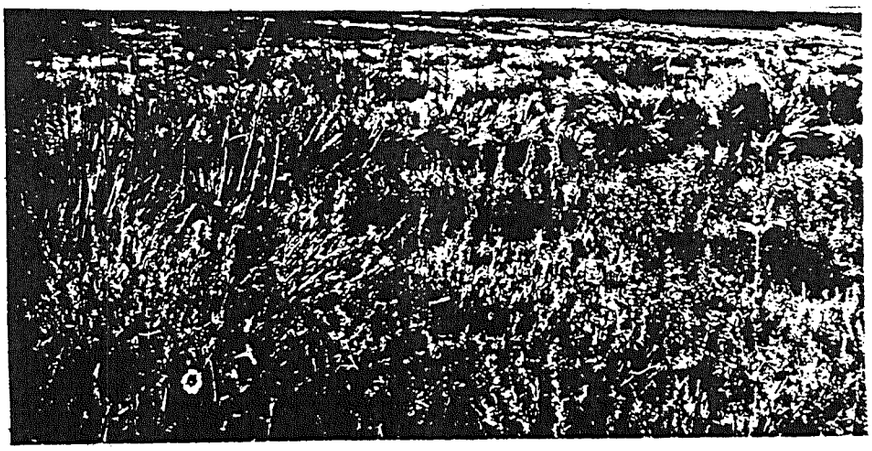


Photo 10. Unit 53, Kiowa NG. Most of the unit is characterized by shrubby cover growing on sandy to sandy clay soils. Bush morninglory, soapweed yucca, broom snakeweed and sand sagebrush are common.

Photo 11. Unit 54, Kiowa NG. Although there are many 1 to 10 acre mosaics of blue grama-buffalograss, the unit is shrubby throughout and has a high incidence of lower seral grasses.

Photo 12. Unit 67, Kiowa NG. This unit features a drainage with some large cottonwoods. Although habitat diversity is high on the unit, examples of blue grama shortgrass are only patchy.

Photo 13. Unit 100 Kiowa NG. The western half of the unit (Secs. 16 and 17) displays a blue grama-galleta habitat type in excellent condition.

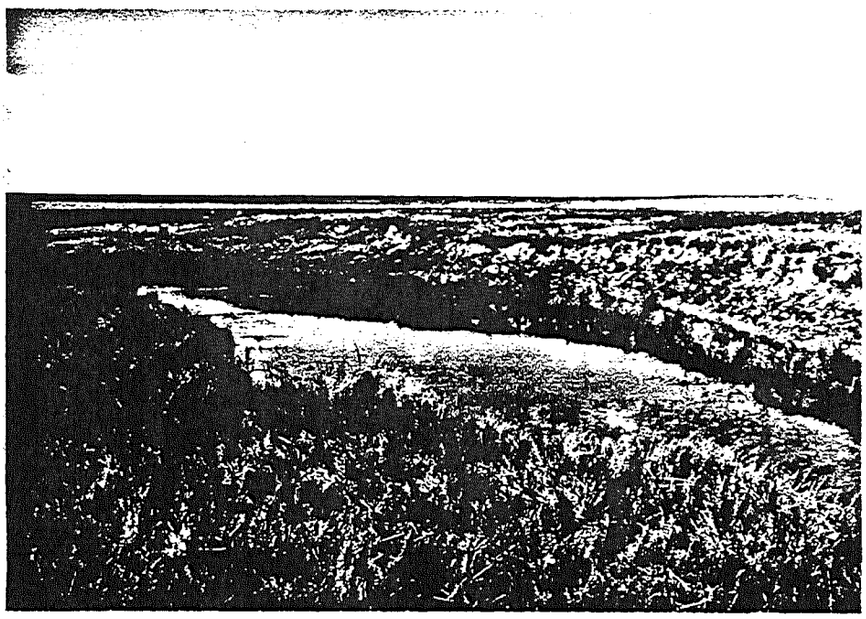


Photo 14. Unit 100, Kiowa NG. In the dry season Sauz Creek consists of a series of ponds lined with sedges and mid-grasses.

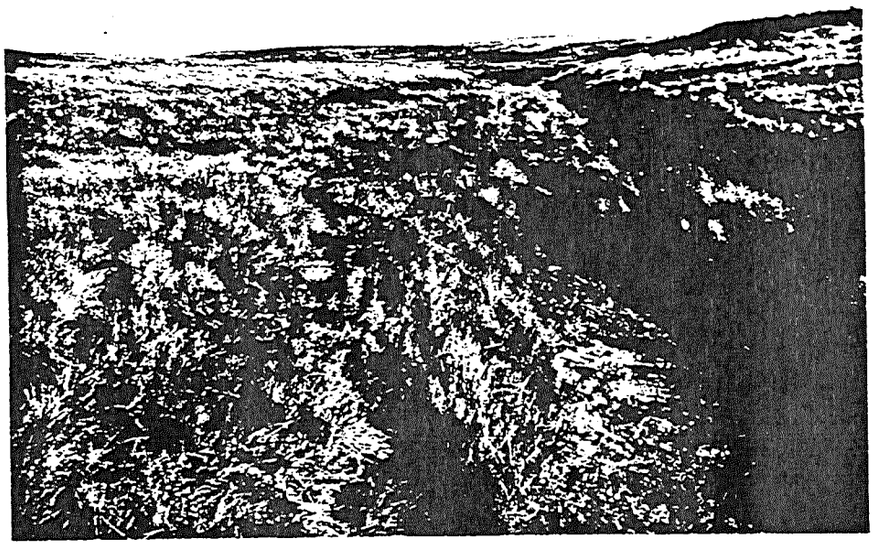


Photo 15. Unit 100, Kiowa NG. Within the Sauz Creek drainage the ponds are interconnected by a dry arroyo. Sedges and inland saltgrass (Distichlis stricta) make up most of the cover here.

Photo 16. Unit 100, Kiowa NG. On the upland adjacent to the drainage a Bouteloua gracilis/Sporobolus airoides p.a. is found.

Photo 17. Unit 127, Kiowa NG. Although this unit exhibits some nearly pure patches of blue grama-galleta type, shrubs, including broom snakeweed are numerous throughout.

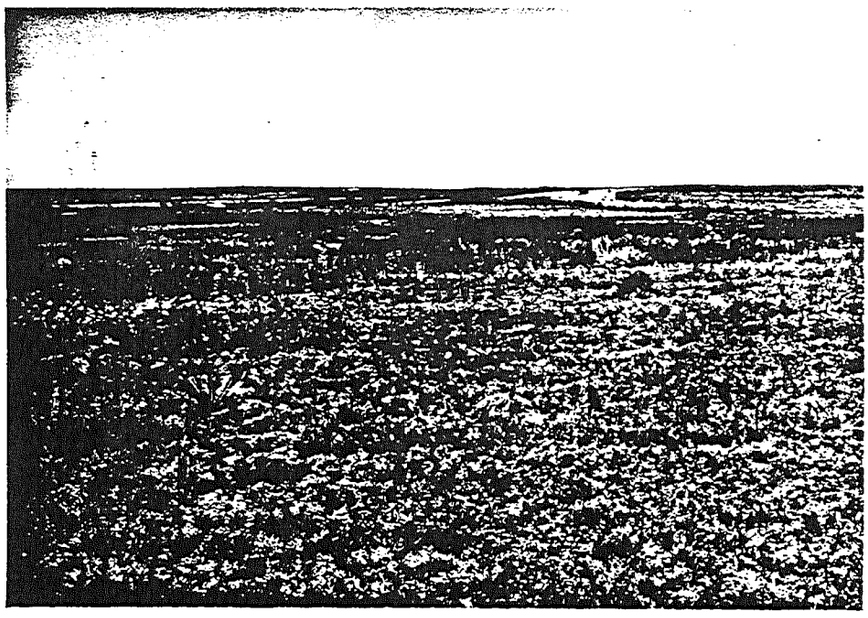


Photo 18. Campo RNA, Commache NG, Colorado. This 35-acre RNA, hemmed between highway and railroad, has a high occurrence of weedy forbs and bare ground in the shortgrass community.

Photo 19. Unit 19, Rita Blanca NG. The southern subunit is characterized by blue grama-buffalograss in good condition with a virtual absence of shrubs.

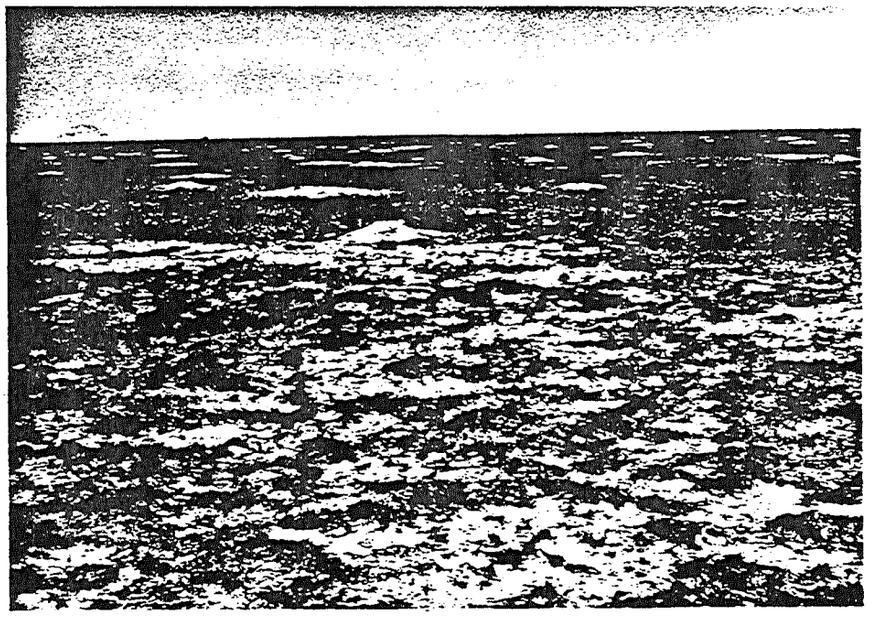


Photo 20. Unit 19, Rita Blanca NG. An active black-tailed prairie dog town occupies about 100 acres of the southern half of this unit.

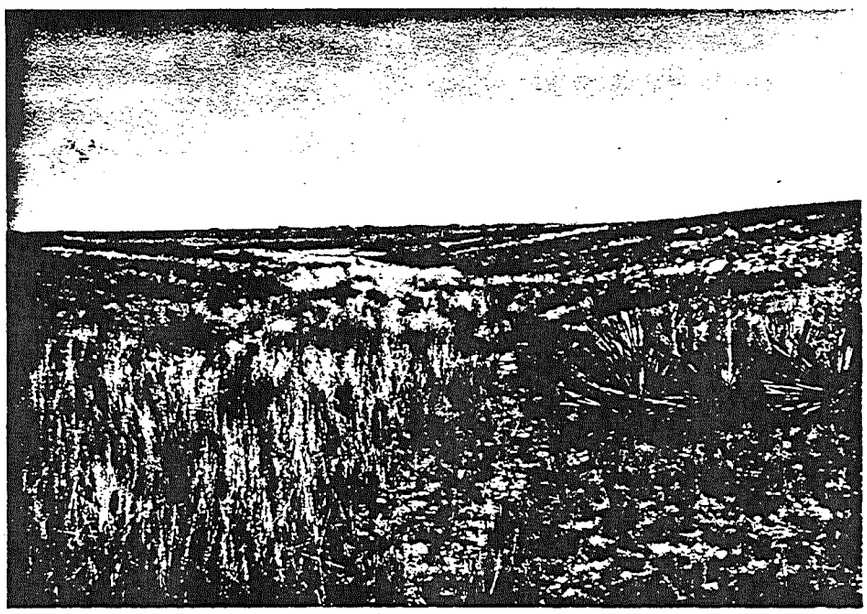
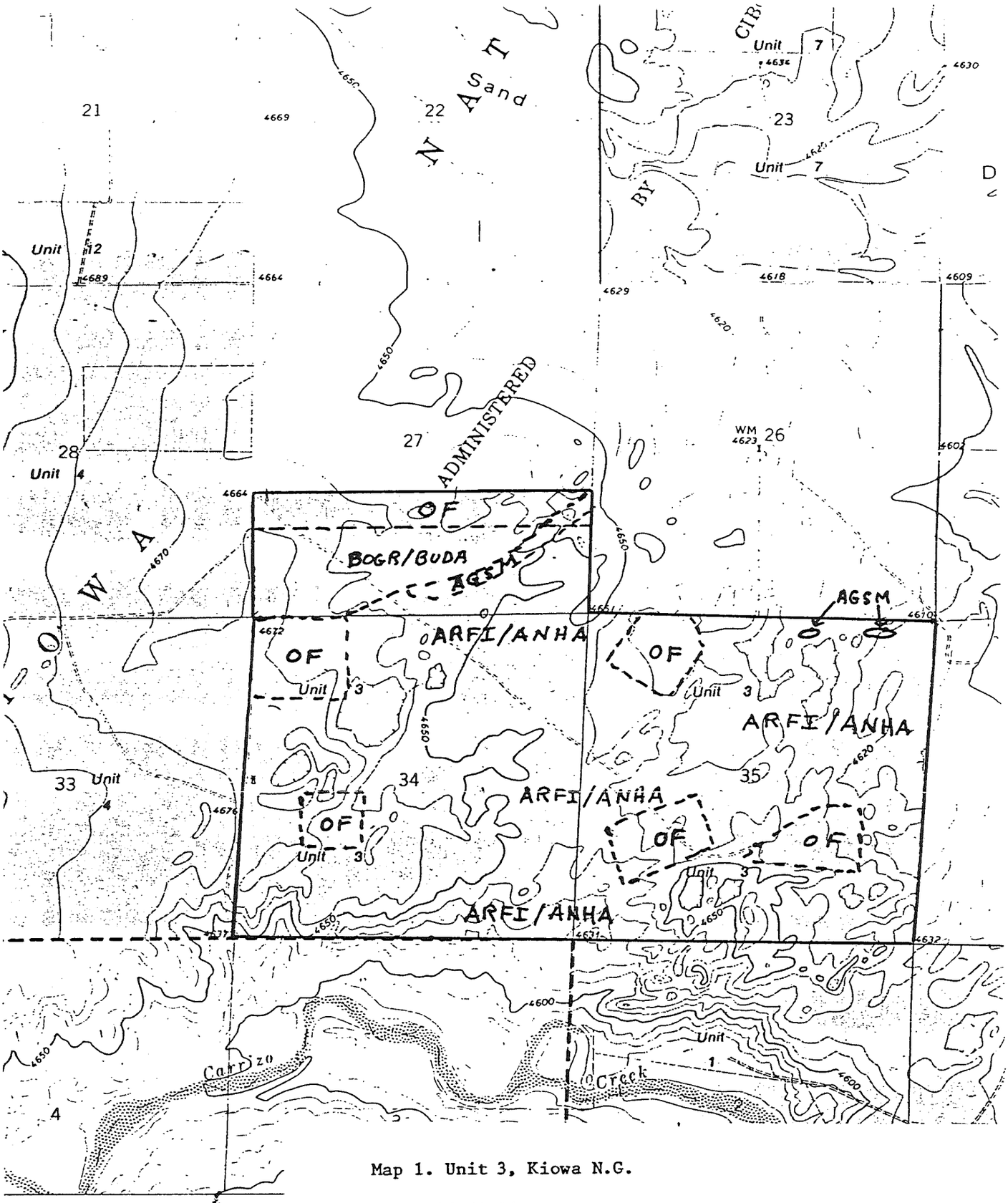


Photo 21. Unit 19, Rita Blanca NG. Western wheatgrass (Agropyron smithii) grows within the drainage that cut across the unit.

Photo 22. Unit 20, Rita Blanca NG. The steeper north-facing slope below the limestone rim of the major drainage supports a Bouteloua curtipendula/ Andropogon scoparius p.a. with a shrubby cover of Rhus trilobata.

APPENDIX 2

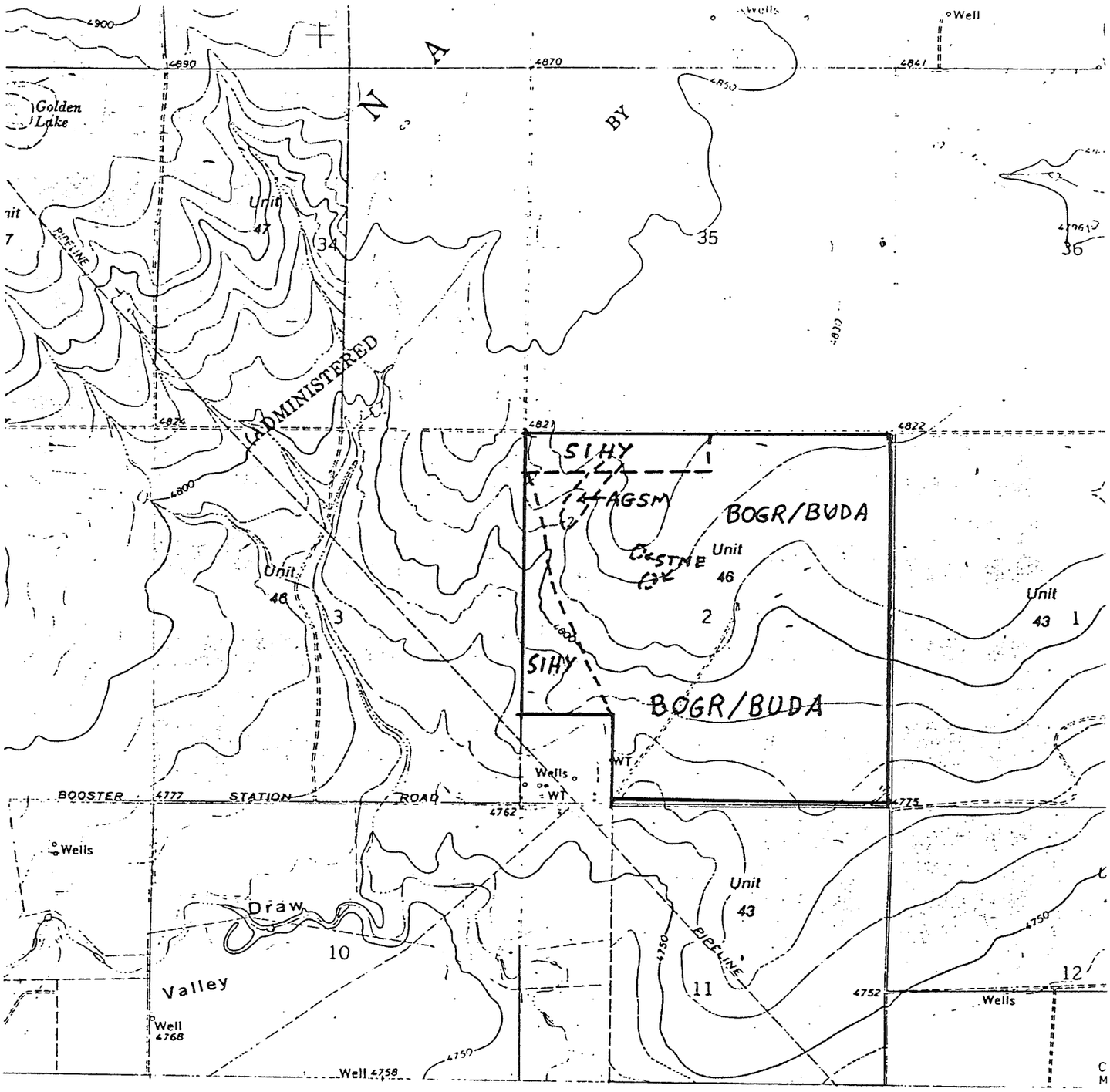
Maps 1-4. Maps delineate plant communities for the four units recommended as candidate Research Natural Areas.



Map 1. Unit 3, Kiowa N.G.

OF: Old field
AGSM: Agropyron smithii series
ARFI/ANHA: Artemisia filifolia/Andropogon hallii p.a.
BOGR/BUDA: Bouteloua gracilis/Buchloe dactyloides p.a.

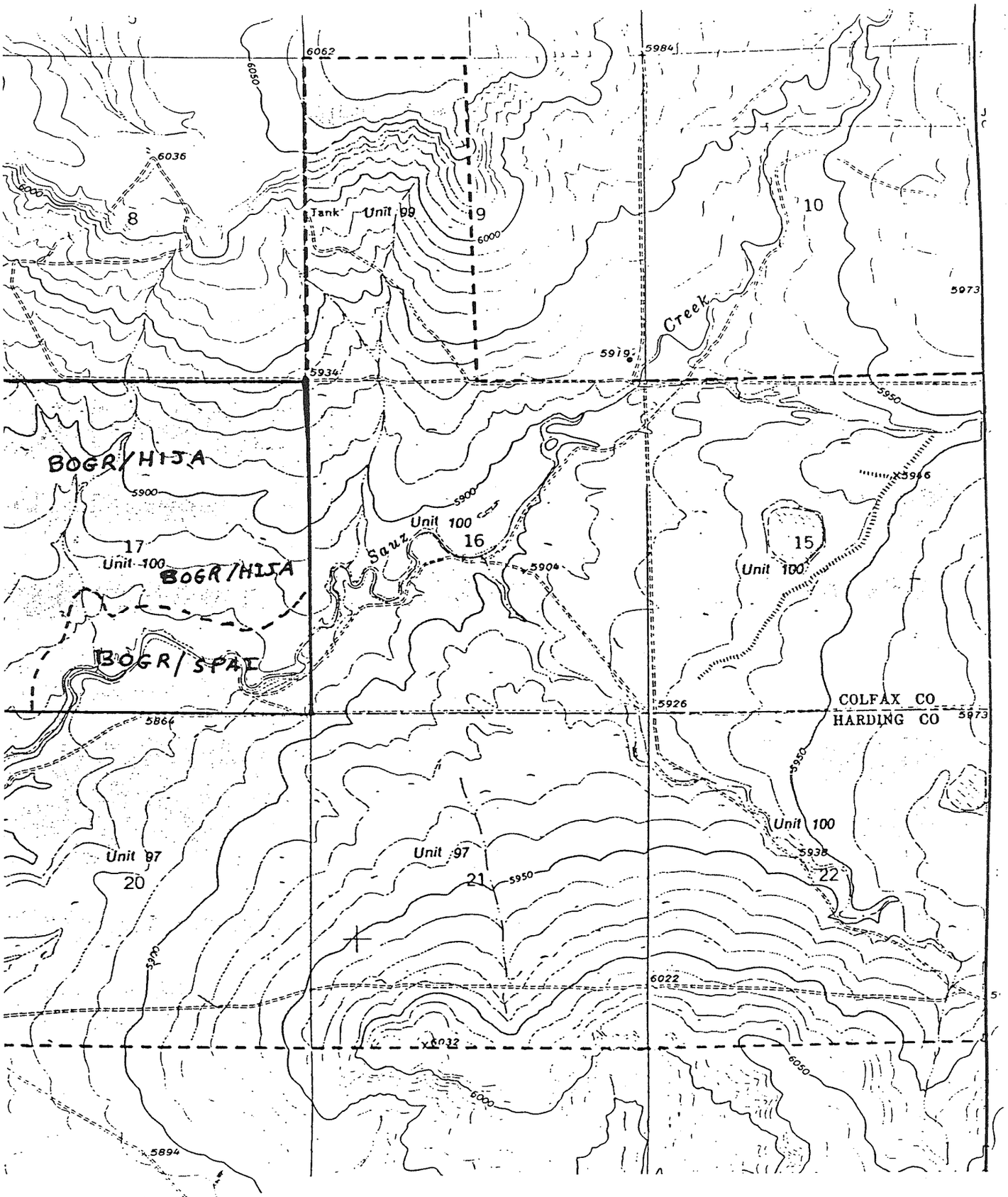
Scale: 1:24,000 Texline South Quadrangle



Map 2: Unit 46, Sec. 2, Kiowa NG

AGSM: Agropyron smithii series
BOGR/BUDA: Bouteloua gracilis/Buchloe dactyloides p.a.
SIHY: Sitanion hystrix over 20 percent
STNE: Stipa neomexicana series

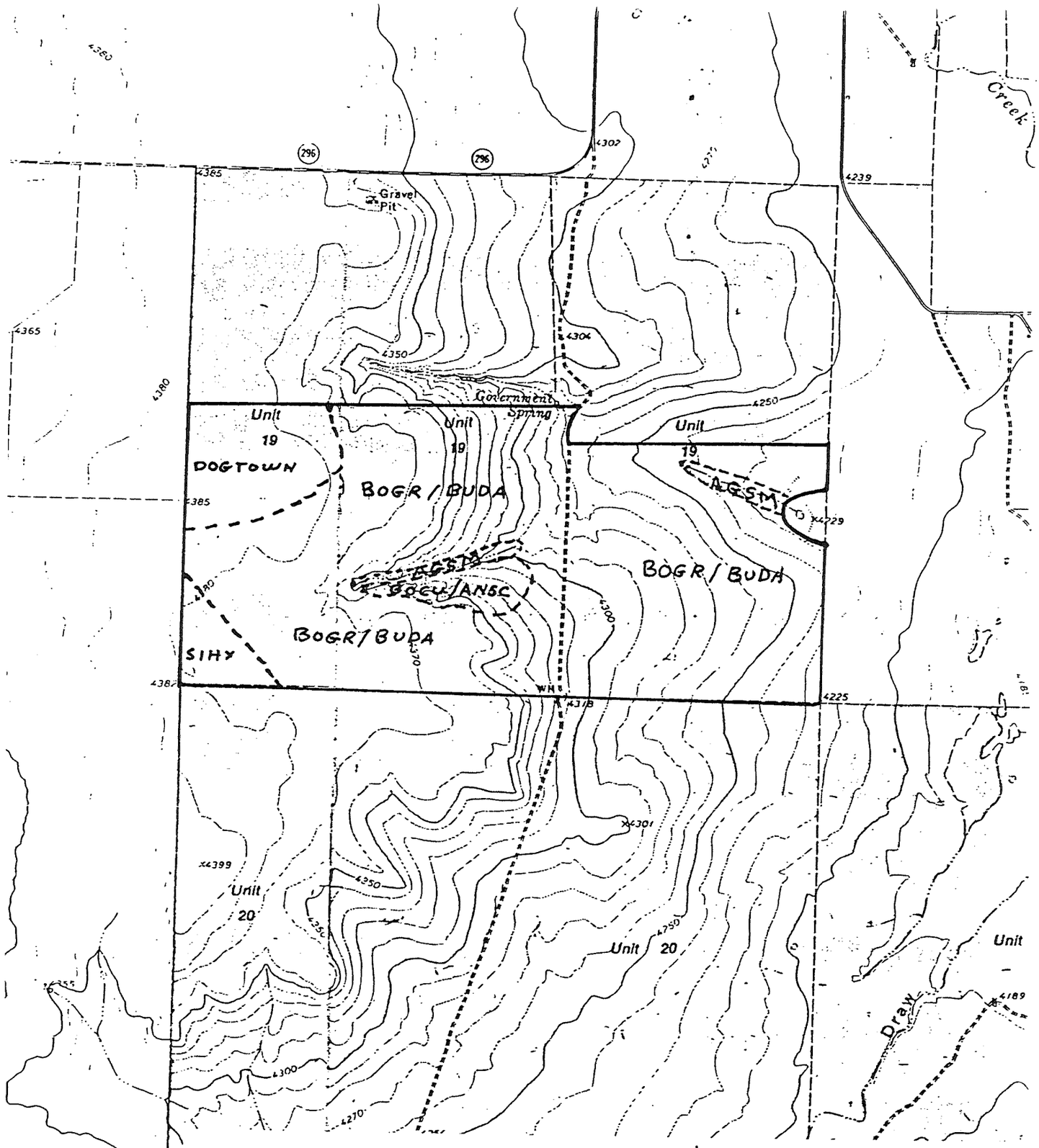
Scale: 1:24,000 Rardin Hill Quadrangle



Map 3: Unit 100, Sec 17, Kiowa N.G.

BOGR/HIJA: Bouteloua gracilis/Hilaria jamesii p.a.
BOGR/SPAI: Bouteloua gracilis/Sporobolus airoides p.a.

Scale: 1:24,000 Abbott Lake Quadrangle



Map 4: Unit 19, South half, Rita Blanca N.G.

AGSM: Agropyron smithii series
BOCU/ANSC: Bouteloua curtipendula/Andropogon scoparius p.a.
BOGR/BUDA: Bouteloua gracilis/Buchloe dactyloides p.a.
SIHY: Sitanion hystrix over 20 percent

Scale: 1:24,000 Buffalo Springs and Coldwater West Quadrangles

Unit 17