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ECOLOGICAL EVALUATION OF
THE POTENTIAL BIG DRAW RESEARCH NATURAL AREA
WITHIN THE THUNDER BASIN NATIONAL GRASSLAND,
CAMPBELL AND CROOK COUNTIES, WYOMING

Prepared for
Nebraska National Forest,
USDA Forest Service

By

George P. Jones

Wyoming Natural Diversity Database
The Nature Conservancy
1604 Grand Avenue
Laramie, Wyoming 82070

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INTRODUCTION

The potential Big Draw Research Natural Area (RNA) is located in the Little Missouri River Basin in northeastern Wyoming. The area includes rolling hills with broad, shallow draws supporting grasslands and sagebrush shrub-steppe. Deeper draws support stands of boxelder and chokecherry woodland. The potential RNA is in the Thunder Basin National Grassland and is used for livestock grazing.

In 1996, The Nature Conservancy entered a contract with the USDA Forest Service, Nebraska National Forest, to prepare ecological evaluations of areas in the Thunder Basin National Grassland and other national grasslands for use by the Forest Service in examining the suitability of the areas as research natural areas. The evaluation of the Big Draw area was done by the Wyoming Natural Diversity Database. This report presents the results of that evaluation.

Land Management Planning

In 1992, an interdisciplinary team from the Medicine Bow National Forest identified part of the Thunder Basin National Grassland that includes the potential Big Draw RNA as an area with unusual biological diversity characteristics (Byer 1992). In 1996, an interdisciplinary team from the Thunder Basin National Grassland selected the Big Draw area as a potential RNA for possible analysis during revision of the Land and Resource Management Plan. This ecological evaluation is intended to aid the Forest Service staff in that analysis.

OBJECTIVES

One of the primary objectives of research natural areas is to "...preserve a wide spectrum of pristine representative areas that typify important forest, shrubland, grassland, alpine, aquatic, geologic and similar natural situations..." (Forest Service Manual 4063.02).

The objectives of a Big Draw RNA would be to 1) maintain a reference area for (a) monitoring effects of resource management techniques and practices applied to similar ecosystems, (b) comparing results from manipulative research, and (c) determining range of natural variability; 2) protect elements of biological diversity; 3) provide a site for non-manipulative scientific research; and 4) provide on-site and extension educational opportunities.

PRINCIPAL DISTINGUISHING FEATURES

The principal distinguishing features of the potential Big Draw RNA are rolling hills and shallow draws with a mosaic of grassland and shrub-steppe vegetation types, and deeper draws with boxelder/chokecherry woodland.

LOCATION

The potential Big Draw RNA is located within the northern portion of the Thunder Basin National Grassland (Figure 1). The approximate center of the potential RNA is at latitude 44°44'25"N and longitude 105°06'00"W.

The potential RNA includes all or parts of the following sections: Township 55 North, Range 68 West (6th Principal Meridian), Section 19; Township 55 North, Range 69 West, Sections 13, 14, 23, 24, 25, 26.

Boundary (See Figure 2).

The proposed boundary of the potential RNA follows land ownership boundaries and a drainage divide. Starting at the southern end of the potential RNA at the northeastern corner of the NE1/4 SE1/4 Sec 26 (T55N, R69W), the boundary runs west ca. 0.9 mile (1.4 km) to a ridgeline in the NW1/4 SW1/4 Sec 26; thence along the ridgeline and roughly along a two-track road northeast ca. 1.1 mile (1.8 km) and northwest ca. 1.2 mile (1.9 km) to a point on the western section line of Sec 14 (T55N, R69W) ca. 0.1 mile (0.16 km) north of the southwestern corner of Sec 14; thence north along the western section line of Sec 14 (and the boundary between national grassland and private land) ca. 0.5 mile (0.8 km); thence east along the boundary between national grassland and private land ca. 0.5 mile (0.8 km); thence north along the boundary between national grassland and private land ca. 0.25 mile (0.4 km) to the quarter-section point on the northern section line of Sec 14; thence east ca. 0.5 mile (0.8 km) along the boundary between national grassland and private land to the northeastern corner of Sec 14; thence south ca. 0.5 mile (0.8 km) along the boundary between national grassland and private land to the quarter-section point on the eastern section line of Sec 14; thence along the boundary between national grassland and private land through the SW1/4 Sec 13 (T55N, R69W) east ca. 0.25 mile (0.4 km), south ca. 0.25 mile (0.4 km), east ca. 0.25 mile (0.4 km), and south ca. 0.25 mile (0.4 km) to the quarter-section point on the southern section line of Sec 13; thence east ca. 1 mile (1.6 km) along the boundary between national grassland and private land to the quarter-section point on the northern boundary of Sec 19 (T55N, R68W); thence south ca. 1 mile (1.6 km) along the boundary between national grassland and private land to the quarter-section point on the southern section line of Sec 19; thence west ca. 1 mile (1.6 km) along the

boundary between national grassland and private land to the quarter-section point on the northern section line of Sec 25 (T55N, R69W); thence south ca. 0.5 mile (0.8 km) along the boundary between national grassland and private land to the center of Sec 25; thence west ca. 0.5 mile (0.8 km) along the boundary between national grassland and private land to the quarter-section point on the western section line of Sec 25; thence south ca. 0.25 mile (0.4 km) along the boundary between national grassland and private land to the starting point.

Area

The total area of the potential Big Draw RNA is ca. 2662 acres (1078 ha).

Elevation

The elevation of the potential Big Draw RNA ranges from ca. 4050 feet (1234 m) in the eastern end to 4324 feet (1318 m) on the western boundary.

Access

The potential Big Draw RNA cannot be reached by vehicle on public roads; access by vehicle requires permission to cross private lands.

From the intersection of Wyoming Highway 59 with Campbell County Road 49 (the Heald Ranch Road) ca. 31 miles (50 km) north of Gillette, Wyoming, travel east on Road 49 ca. 12 miles (19 km) to the intersection with Campbell County Road 10 (the LA Ranch Road). To reach the potential RNA from the west, continue on Road 49 east ca. 1 mile (1.6 km) and north ca. 1 mile (1.6 km) to the end of the county road at the Heald Ranch, ca. 1.5 miles (2.4 km) southwest of the potential RNA's southwestern corner. Further travel requires permission to cross private land.

To reach the potential RNA from the east, continue from the intersection of Campbell County Roads 49 and 10, on Road 10, southeast ca. 3 miles (5 km) and northeast ca. 2 miles (3.2 km) to the Campbell-Crook County Line, where the road becomes Crook County Road 38; thence east on Road 38 ca. 7 miles (11 km) to the intersection with Crook County Road 68; thence north on Road 68 ca. 6.5 miles (10 km) to a point ca. 2 miles (3.2 km) northeast of the potential RNA's eastern end. Permission to cross private land is necessary to reach the potential RNA from this point.

Ecoregion

The potential Big Draw RNA lies within the Great Plains-Palouse Dry Steppe Province, Powder River Basin Section, Powder

River Basin-Breaks-Scoria Hills Subsection (331Gc) of the ecoregion classification of Bailey et al. (1994) (Freeouf 1996).

Maps

USDA Forest Service 1/2 inch = 1 mile scale map of the Thunder Basin National Grassland.

USDI Geological Survey 7.5 minute topographic Quadrangle Maps: Brislawn School, Wyo.; Bonnie Reservoir, Wyo.; and Bowman Hill, Wyo.

AREA BY COVER TYPES

The Vegetation

The potential Big Draw RNA contains the following plant associations from Johnston (1987). Synonyms are shown in Appendix 2.

Upland vegetation

The uplands are vegetated with grassland and sagebrush shrub-steppe. Throughout the RNA, the western wheatgrass/green needlegrass association is a major type on slopes and flats, and in swales and draws. Western wheatgrass dominates the dense herbaceous vegetation and green needlegrass contributes substantial cover (and often codominates). The exotic meadow brome (Bromus commutatus) is generally present in substantial amounts, and patches of several hundred square meters dominated by the brome are common in swales and draws. Wyoming big sagebrush often is present with canopy cover to 10%. In some swales and draws, Wyoming big sagebrush contributes canopy cover ca. 25% and the vegetation belongs to the big sagebrush/western wheatgrass association.

The blue grama/western wheatgrass association is a major type on southerly and westerly slopes throughout the area. Western wheatgrass and blue grama codominate the moderately dense vegetation, and green needlegrass, Sandberg bluegrass, and meadow brome are present in smaller amounts. Sparse Wyoming big sagebrush (canopy cover ca. 10%) is common.

Two minor associations occur on steep hills, primarily in the central and southwestern part of the potential RNA. The bluebunch wheatgrass/blue grama association includes moderately dense grassland in which those two species contribute the most cover, and other species (including western wheatgrass) are present in smaller amounts. Scattered Wyoming big sagebrush may be present. Stands of the little bluestem/threadleaf sedge association consist of sparse vegetation dominated by those two species, growing on rocky sites. Bluebunch wheatgrass and

prairie sandreed usually are present, and the vegetation may include yucca.

Riparian vegetation

Draws in the steeper hills of the central and southern parts of the potential RNA support stands of boxelder/chokecherry woodland (The Nature Conservancy 1997). This type typically occurs as a band of woody vegetation growing where the floor of the draw meets the adjacent slopes, but it may fill the bottom of the draw. In most stands, boxelder forms a patchy tree layer above a tall shrub layer of Columbian hawthorn, American plum, and chokecherry. Snowberry is present as a low shrub layer, and the herbaceous layer is dominated by Kentucky bluegrass (an exotic) and Sprengel's sedge. The stand growing on the north-facing slopes along the south side of Big Draw in NW1/4 Sec 25 (T55N, R69W) contains green ash in the tree overstory, although boxelder codominates in this stand.

The draws that do not support boxelder/chokecherry woodland are vegetated with the western wheatgrass/green needlegrass association.

Area by Type

Complexes of associations were mapped on a 1:24,000-scale topographic map using aerial photos and field reconnaissance, and the area of each complex in the potential RNA was estimated from the maps. The vegetation maps show complexes because delineating stands of individual communities was impossible. The plant community types from Johnston (1987) listed in Table 2 are cross-referenced to plant community types from Thilenius et al. (1995) and The Nature Conservancy (1997) in Appendix 2. The relative importance of each plant association within each complex is indicated in the legend for Figure 3 (M = major association, m = minor association).

Table 1. Areas of Kuchler Types (Kuchler 1966) in the potential Big Draw RNA. See Figure 2.

Cover Type	Acres	Hectares
Northern floodplain forest (89) (<u>Populus-Salix-Ulmus</u>)	44	18
Grama-needlegrass-wheatgrass (57) (<u>Bouteloua-Stipa-Agropyron</u>)	1309	530
Wheatgrass-needlegrass (59) (<u>Agropyron-Stipa</u>)	1047	424
Wheatgrass-needlegrass shrub steppe (50) (<u>Agropyron-Stipa-Artemisia</u>)	262	106

Table 2. Areas of plant associations (from Johnston [1987] unless otherwise noted) in the potential Big Draw RNA. See Figure 3. See synonyms in Appendix 2.

Plant association	Acres	Hectares
Boxelder/Chokecherry (The Nature Conservancy 1997)	44	18
Blue grama/Western wheatgrass	655	265
Little bluestem/Threadleaf sedge	314	127
Bluebunch wheatgrass/Blue grama	340	138
Western wheatgrass/Green needlegrass	1047	424
Big sagebrush/Western wheatgrass	262	106

PHYSICAL AND CLIMATIC CONDITIONS

Physical Setting

The potential Big Draw RNA is located at the eastern side of the Duck Creek Breaks in the Little Missouri River drainage. In the northern and eastern parts of the potential RNA, slopes are gentle and draws are broad and shallow. The central and southern

part of the area lie on the eastern slope of the Duck Creek Breaks; slopes there are steeper and the streams have cut narrow draws to ca. 50 feet (15 m) deep. Ephemeral streams flow east from the divide on the potential RNA's western boundary.

DESCRIPTION OF VALUES

Vegetation Types

See Table 1 for a list of the Kuchler (1964) vegetation types present in the potential Big Draw RNA and the estimated acreage of each, and Table 2 for a list of the plant associations present and the estimated acreage of each.

The potential Big Draw RNA is part of a larger area of the Thunder Basin National Grassland identified in 1992 by USDA Forest Service staff as possessing characteristics of biological diversity that make it worthy of special management (Byer et al. 1992). These characteristics include a mosaic of pine woodland, aspen woodland, woody draws, stands of tall grass, and a variety of grassland and shrub-steppe communities.

Flora

Threatened, Endangered, and Sensitive Plant Species

No federally listed Threatened or Endangered plant species, or species on the USDA Forest Service Region Two Sensitive Species List (Estill 1993), are known to occur in the potential Big Draw RNA.

Plant Species List

The following species were identified during field work in the potential Big Draw RNA.

Table 3. Vascular Plants of the potential Big Draw RNA. Nomenclature for scientific names is based on Dorn (1992). Family acronyms are based on Weber (1982). Family taxonomy follows Dorn (1992).

<u>Scientific Name</u>	<u>Common Name</u>	<u>Family</u>
	TREES	
<i>Acer negundo</i>	Boxelder	ACE
<i>Fraxinus pennsylvanica</i>	Green ash	OLE
	SHRUBS & DWARF SHRUBS	
<i>Artemisia tridentata</i> var. <i>wyomingensis</i>	Wyoming big sagebrush	AST
<i>Crataegus columbiana</i> var. <i>occidentalis</i>	Columbia hawthorn	ROS
<i>Prunus americana</i>	American plum	ROS
<i>Prunus virginiana</i>	Common chokecherry	ROS
<i>Ribes aureum</i>	Golden currant	GRS
<i>Ribes oxycanthoides</i> (?)	Missouri gooseberry	GRS
<i>Rosa</i> sp.	Rose	ROS
<i>Shepherdia argentea</i>	Silver buffaloberry	ELE
<i>Symphoricarpos</i> sp.	Snowberry	CPR
	GRAMINOIDS	
<i>Andropogon scoparius</i>	Little bluestem	POA
<i>Bouteloua gracilis</i>	Blue grama	POA
<i>Bromus japonicus</i>	Japanese brome	POA
<i>Bromus tectorum</i>	Cheatgrass	POA
<i>Calamovilfa longifolia</i>	Prairie sandreed	POA
<i>Carex sprengei</i>	Sprengel's sedge	CYP
<i>Elymus smithii</i>	Western wheatgrass	POA
<i>Poa pratensis</i>	Kentucky bluegrass	POA
<i>Poa secunda</i>	Sandberg bluegrass	POA
<i>Stipa viridula</i>	Green needlegrass	POA
	FORBS	
<i>Ratibida columnifera</i>	Prairie coneflower	AST

Fauna

Threatened, Endangered, and Sensitive Vertebrates

No federally listed Threatened, Endangered, or Candidate vertebrate species, or species on the USDA Forest Service Region Two Sensitive Species List (Estill 1993), are known to occur in the potential Big Draw RNA.

Animal Species List

Field work in the potential Big Draw RNA did not include identification of the animal species present.

Geology

The bedrock in the potential Big Draw RNA is the Tullock Member of the Paleocene-age Fort Union Formation (Love and Christiansen 1985). Shale predominates and sandstone is present in small areas. Alluvium from the surrounding uplands forms the substrate in the draws.

Lands

The potential Big Draw RNA is national grassland. The adjoining lands on the north, east, and south are private, and the adjoining land on the west is national grassland.

SUITABILITY FOR RESEARCH NATURAL AREA SELECTION

An area is suitable for designation as a research natural area according to how well it meets four criteria: quality, condition, viability, and defensibility (Andrews 1993). Each criterion is briefly defined below, and the information collected during field work that is pertinent to each criterion is described.

Quality: the degree to which the potential RNA represents the range in variability within the ecosystem types that it contains.

The three major associations in the potential Big Draw RNA - the western wheatgrass/green needlegrass association, the blue grama/western wheatgrass association, and the big sagebrush/western wheatgrass association -- grow on a variety of slopes and aspects and exhibit a broad range in the amount of the dominant species and the identity of the associated species present. Hence the potential RNA apparently represents the mosaic of these types as they occur in the region.

The bluebunch wheatgrass/blue grama association and the little bluestem/threadleaf sedge association occur as relatively small stands in the matrix of the three major plant associations,

which appears to be typical of the way these two types occur in the Cheyenne River Basin to the south (Thilenius et al. 1995) and probably in the Little Missouri Basin as well. Both types in the potential RNA exhibit a range in the amount of the dominant species and the identity of the associated species present, and so the area can be considered to represent these types well.

The woodland and shrubland stands of the boxelder/chokecherry vegetation type in the potential Big Draw RNA appear to represent, in vegetation structure and composition and in site characteristics, the vegetation described from the habitat type of the same name from southeastern Montana (Hansen et al. 1995) and the woody draws described for the northern Thunder Basin National Grassland by Byer et al. (1992). Two woodland stands in the south-central part of the area, on Big Draw and a tributary in NW1/4 Sec 25 (T55N, R69W) have overstories dominated by green ash. These small stands extend only for several hundred yards, and cannot be considered representative of the green ash/chokecherry association described from southeastern Montana and the western Dakotas (Hansen and Hoffman 1985).

Condition: the degree to which the potential RNA has been altered from presettlement conditions.

The potential RNA has been altered from its presettlement condition by the introduction of exotic species, the presence of structures such as roads and reservoirs, and changes in the ecological processes that shaped the area's ecosystems. These causes of change are interrelated and a complete discussion is impossible; the information here is largely restricted to observations made during field survey.

-- Exotic species

Two exotic plant species were noted in 1996 field work as major parts of the vegetation in the potential RNA. Meadow brome (Bromus commutatus), an annual or biennial grass, is widespread and codominates (with western wheatgrass) many patches covering up to several hundred square meters each in the western wheatgrass/green needlegrass vegetation growing in draws and swales. It also contributes substantial cover (and dominates patches) in the big sagebrush/western wheatgrass stands and is a common species in the blue grama/western wheatgrass vegetation. The second species, Kentucky bluegrass, also is widespread in the western wheatgrass/green needlegrass association and codominates much of the type with western wheatgrass in the draws. This exotic species also dominates much of the understory in the boxelder/chokecherry stands.

-- Structures (Figure 2)

Nine dams and reservoirs have been constructed in the draws of the potential RNA. Two-track roads run along the western boundary and cross the area in several places. Barbed-wire pasture fences cross the central part of the area from north to south and east to west, and cross the southwestern and northwestern corners of the area. Part of the eastern and southern boundaries are fenced. Three oil well drill holes are located in the central and south-central part of the potential RNA. Two windmills are located in the area, one on the northern boundary and the second in the eastern end. A petroleum pipeline crosses north-to-south through the center of the area.

-- Ecological processes

Grazing by large mammals was undoubtedly a major ecological factor influencing the composition of the vegetation in the Little Missouri River Basin before white settlement. Bison abounded in eastern Wyoming (Dorn 1986, Long 1965) but free-ranging bison were gone by the latter 19th century. Elk were present in the Cheyenne River Basin to the south and the Black Hills to the east (Long 1965, Dorn 1986) before white settlement, but probably were much less abundant on the plains than were bison (Long 1965) and hence had less influence on the ecosystems. Elk now inhabit parts of the Cheyenne River Basin to the south and the Black Hills to the east, but they probably are less common in the area of the potential RNA than they were during presettlement times. Pronghorn were abundant in eastern Wyoming in presettlement times (Long 1965) and still are common.

Domestic livestock (cattle and sheep) graze the potential RNA now and may influence the composition of the vegetation, but the extent to which domestic livestock have replaced bison and elk as an ecological factor is unclear. Limited areas with obvious signs of concentrated livestock use were noted during the 1996 field work only around reservoirs and stock tanks.

Black-tailed prairie dogs (Cynomys ludovicianus) exert a strong influence on the species composition and the processes in grassland ecosystems in the Great Plains (Coppock et al. 1983). The species occurs throughout eastern Wyoming (Clark and Stromberg 1987). The gently-rolling grasslands in the potential Big Draw RNA appear to provide suitable habitat for this species, so prairie dogs probably used the area at least intermittently before settlement.

Outbreaks of grasshoppers are a disturbance known to have large effects on the grasslands of the Great Plains (Knight 1994, Chapter 5). Although no information was encountered regarding grasshoppers in the potential Big Draw RNA or the immediate area, grasshopper outbreaks are known from northeastern Wyoming (Allred

1941) and undoubtedly affected the potential RNA. The effects that grasshopper control programs have had on the potential RNA are unknown.

Fires are known to have burned in northeastern Wyoming before white settlement (Dorn 1986), and although fire suppression is the general policy in the region, wildfires still burn there. No signs of fire were noted in the potential RNA during 1996 field work, and the degree to which fire suppression has affected the ecosystems of the potential Big Draw RNA is unclear.

Viability: the prospect for long-term maintenance of the ecosystem types in the area and the survival of their constituent species.

No immediate threats to the maintenance of the ecosystems or the survival of the constituent species in the potential RNA were noted during field work. Long-term maintenance of the ecosystems in a condition similar to presettlement condition will require that the ecological processes that shaped those ecosystems continue to exert an influence. Of those processes, the ones that managers are most likely to control are grazing by large mammals, burrowing and grazing by prairie dogs, and fire. The size of the potential RNA will complicate management of these processes: the area is too small to support populations of pronghorn, elk, and mule deer (and their predators), which will use the potential RNA as part of a larger range. Similarly, when considered as livestock range, the potential RNA must be viewed as part of a larger area.

The area may be large enough to support a black-tailed prairie dog town entirely within its boundary, should a town become established, although the prairie dogs likely would move onto adjacent lands outside the potential RNA. The proximity of private land would complicate management for prairie dogs. Allowing outbreaks of grasshoppers to exert an influence on the ecosystems of the potential RNA will also be a problem for managers: the area is too small to contain this ecological process, and allowing grasshoppers to affect a larger area may be impracticable.

Managers may be able to delineate burn units entirely within the potential RNA, but the area's topography may make it difficult to prevent fires near the potential RNA's northeastern boundary from spreading to adjacent lands. The presence of the annual brome grass will complicate the use of fire as a tool to maintain the ecosystems in the potential RNA, because the species may increase or decrease in abundance, depending on the season of burning (The Nature Conservancy 1989). Consequently, while fire may be necessary to maintain the grassland in a desirable

condition, it may also constitute a threat by promoting the increase of exotic plants.

Defensibility: the extent to which the area can be protected from extrinsic, anthropogenic factors that might worsen the condition of the area or threaten the viability of the ecosystems present.

No immediate threats to the ecosystems in the potential RNA were obvious during the 1996 field work. Although two-track roads provide ready travel routes throughout the potential RNA, the area is not accessible by public roads. The unfenced boundary will allow ready access by livestock using the pastures that include the potential RNA.

Degree to Which the Potential RNA Meets Criteria

The potential Big Draw RNA appears to represent the mosaic of grassland and shrub-steppe vegetation as it occurs in the region, with the western wheatgrass/green needlegrass association and the blue grama/western wheatgrass association providing a matrix for smaller stands of the big sagebrush/western wheatgrass, bluebunch wheatgrass/blue grama, and little bluestem/threadleaf sedge associations. The boxelder/chokecherry stands also appear to represent the woody draws of the region.

The condition of the grassland ecosystem in the potential RNA has been compromised, however, by exotic brome grass and Kentucky bluegrass, which contribute substantial cover to the grassland and codominate or dominate patches. The alteration of the major ecological processes that once affected the ecosystems in the region -- fire; grazing by large mammals, prairie dogs, and insects; and mammal burrowing -- certainly has had some effect on the condition of the potential RNA, but that effect is largely unknown.

The degree to which the dense exotic grasses threaten the viability of the western wheatgrass/green needlegrass vegetation and the big sagebrush/western wheatgrass vegetation, by suppressing reproduction of the native plants, is unclear. The viability of all of the types in the potential RNA will require that livestock continue to be managed to prevent repeated, excessive grazing; that wildlife (including prairie dogs) be allowed to use the area; and that a prescribed fire program can be implemented. The size of the area and the proximity of private lands will pose a problem for managers in implementing these ecological processes.

Although the gentle topography in the area and the unfenced boundary combine to make defensibility of the area difficult, it contains few obvious attractions (other than big game habitat) to

most potential users and is inaccessible by public roads. Hence defensibility may not be a concern.

IMPACTS AND POSSIBLE CONFLICTS

This section is limited to the conflicts obvious from field survey and from conversations with USDA Forest Service staff.

Mineral Resources

The petroleum pipeline bisecting the area appears to have little effect on the vegetation, but maintenance and repair of the pipeline might conflict with RNA management. The area, however, contains three drill holes and producing oil wells are present nearby, suggesting that conflicts may develop in the future. Controlled surface use regulations have been adopted for the area by the USDA Forest Service.

Grazing

The potential RNA is divided into pastures that are parts of five livestock grazing allotments: numbers 101, 103, 105, 109, and 117. Establishment of a research natural area might conflict with current livestock management, although large mammal grazing was an important ecological process in the grassland ecosystem before white settlement, so grazing *per se* should not be viewed as an unacceptable impact.

Timber

The potential RNA contains no timber stands with commercial value.

Watershed Values

The potential RNA contains the upper parts of the basins of several ephemeral streams flowing east and south, principally Horse Creek and Big Draw. Reservoirs in the area may have lengthened the season of flow on stretches of streams. Establishment of a research natural area might conflict with the use of equipment needed to maintain the dams on these reservoirs.

Recreation Values

The potential RNA contains no developed recreation areas. Recreational use apparently is limited to fall hunting. The lack of access to the area via public roads probably reduces recreational use.

Wildlife and Plant Values

Management of the area as a research natural area apparently would not conflict with the wildlife or plant values therein.

Transportation Values

The potential RNA contains no designated national grassland roads or trails. Use of the two-track roads within the area might conflict with RNA management, although the roads appear to receive little travel and probably are used only by grazing permittees and by hunters.

MANAGEMENT CONCERNS

Establishment of a Big Draw RNA might require a change in grazing management on five livestock grazing allotments, and conflict with maintenance and repair of the petroleum pipeline bisecting the area and the nine reservoirs in the area. Management to restore or maintain ecological processes would probably involve management of adjoining national grassland and private land.

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