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ECOLOGICAL EVALUATION OF
THE POTENTIAL WILDLIFE DRAW RESEARCH NATURAL AREA
WITHIN THE THUNDER BASIN NATIONAL GRASSLAND,
WESTON COUNTY, 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 Wildlife Draw Research Natural Area (RNA) is located in the Cheyenne River Basin in northeastern Wyoming. The area includes rolling hills with several draws, supporting grasslands and sagebrush shrub-steppe. 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 Wildlife Draw area was done by the Wyoming Natural Diversity Database. This report presents the results of that evaluation.

Land Management Planning

In 1996, an interdisciplinary team from the Thunder Basin National Grassland selected the Wildlife 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 Wildlife 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 Wildlife Draw RNA are rolling hills and several draws containing

intermittent streams, supporting vegetation of grassland and sagebrush shrub-steppe.

LOCATION

The potential Wildlife Draw RNA is located within the Thunder Basin National Grassland (Figure 1). The approximate center of the potential RNA is at latitude 44°47'05"N and longitude 104°53'35"W.

The potential RNA includes the following sections: Township 44 North, Range 67 West (6th Principal Meridian), Section 15, W1/2 and Section 22, W1/2.

Boundary (See Figure 2).

The proposed boundary of the potential RNA follows section lines and a pasture boundary. Starting at the northwestern corner of Sec 15 (T44N, R67W), the boundary runs east 0.5 mile (0.8 km) to the quarter-section point on the northern section line of Sec 15; thence south 2 miles (3.2 km) to the quarter-section point on the southern section line of Sec 22 (T44N, R67W); thence west 0.5 mile (0.8 km) to the southwestern corner of Sec 22; thence north 2 miles (3.2 km) along a fenced pasture boundary to the starting point.

Area

The total area of the potential RNA is 640 acres (259 ha).

Elevation

The elevation of the potential Wildlife Draw RNA ranges from ca. 4440 feet (1798 m) along the eastern side to ca. 4630 feet (1874 m) on the southern end.

Access

The potential Wildlife Draw RNA may be reached via public roads. From the intersection of Weston County Road 56 (the Cellars Loop Road) ca. 30 miles (48 km) west of Newcastle, Wyoming, travel northwest ca. 1.25 miles (2 km) to the intersection with National Grassland Road #923; thence north and west on Road #923 to the intersection with National Grassland Road #924; thence north on Road #924 ca. 1 mile (1.6 km) to the southern section line of Section 22 (T44N, R67W). The southeastern corner of the potential RNA lies ca. 600 feet (183 m) west of that point.

Ecoregion

The potential Wildlife Draw RNA lies within the Great Plains-Palouse Dry Steppe Province, Powder River Basin Section, Southern Powder River Basin-Scoria Hills Subsection (331Gf) 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 Map: Wildlife Draw West, Wyo.

AREA BY COVER TYPES

The Vegetation

The potential Wildlife Draw RNA contains the following plant associations from Johnston (1987). Synonyms are shown in Appendix 4. Data from sample plots are shown in Appendix 3.

Upland vegetation

The potential RNA is vegetated entirely with grassland and sagebrush shrub-steppe. Needle-and-thread, blue grama, western wheatgrass, and threadleaf sedge are the most common herbaceous species, and Wyoming big sagebrush is widespread. Where sagebrush is dense (canopy cover 25% - 35%), the vegetation belongs to the big sagebrush/needle-and-thread association; where sagebrush is sparse or absent, the vegetation is primarily the needle-and-thread/blue grama association with small areas of the western wheatgrass/threadleaf sedge association. The exotic cheatgrass, or downy brome, codominates some areas of the sagebrush/needle-and-thread vegetation. In the southern half of the area, where slopes are mostly north and east, the sagebrush shrub-steppe association predominates in the vegetation mosaic. In the northern half of the area, with more southerly slopes, sagebrush is more restricted and the grass association predominates.

Riparian vegetation

The potential Wildlife Draw RNA contains no perennial streams. The three draws containing ephemeral streams support shrub-steppe vegetation of the silver sagebrush/western wheatgrass association, in which basin silver sagebrush forms a patchy shrub layer above a dense herbaceous layer of western

wheatgrass, green needlegrass, and (in many locations) the exotic meadow brome.

Area by Type

Complexes of communities 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 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 4. The vegetation maps show complexes because delineating stands of individual communities was impossible. 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 Wildlife Draw RNA. See Figure 2.

Cover Type	Acres	Hectares
Grama-needlegrass-wheatgrass (57) (<u>Bouteloua-Stipa-Agropyron</u>)	387	157
Wheatgrass-needlegrass shrub-steppe (50) (<u>Agropyron-Stipa-Artemisia</u>)	253	102

Table 2. Areas of plant associations (Johnston 1987) in the potential Wildlife Draw RNA. See Figure 3. See synonyms in Appendix 4.

Association	Acres	Hectares
Needle-and-thread/Blue grama	190	77
Big sagebrush/Needle-and-thread	253	102
Western wheatgrass/Threadleaf sedge	96	39
Silver sagebrush/Western wheatgrass	101	41

PHYSICAL AND CLIMATIC CONDITIONS

Physical Setting

The potential Wildlife Draw RNA is oriented north-south across the valley of the eastward-flowing, intermittent Wildlife Draw. Slopes in the southern half of the area face primarily south, and Wildlife Draw and a tributary draw are 30 feet to 40 feet (9 m to 12 m) deep. In the northern half of the area, on the north side of Wildlife Draw, slopes face primarily south and deep draws are absent.

DESCRIPTION OF VALUES

Vegetation Types

See Table 1 for a list of the Kuchler (1964) vegetation types present in the potential Wildlife 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.

Flora

Threatened, Endangered, and Sensitive Plant Species

No federally listed Threatened or Endangered plant species, or species on the USDA Forest Service Region 2 Sensitive Species List (Estill 1993), are known from the potential RNA.

Plant Species List

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

Table 3. Vascular Plants of the potential Wildlife 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>
	SHRUBS & DWARF SHRUBS	
<i>Artemisia cana</i> var. <i>cana</i>	Basin silver sagebrush	AST
<i>Artemisia tridentata</i> var. <i>wyomingensis</i>	Wyoming big sagebrush	AST
<i>Krascheninnikovia lanata</i>	Winterfat	CHN
<i>Rhus trilobata</i>	Skunkbush sumac	ANA

Table 3 (continued). Vascular Plants of the potential Wildlife Draw RNA.

<u>Scientific Name</u>	<u>Common Name</u>	<u>Family</u>
GRAMINOIDS		
<i>Bouteloua gracilis</i>	Blue grama	POA
<i>Bromus japonicus</i>	Japanese brome	POA
<i>Bromus tectorum</i>	Cheatgrass	POA
<i>Carex filifolia</i>	Threadleaf sedge	CYP
<i>Elymus elymoides</i>	Bottlebrush squirreltail	POA
<i>Elymus smithii</i>	Western wheatgrass	POA
<i>Elymus spicatus</i>	Bluebunch wheatgrass	POA
<i>Festuca octoflora</i>	Sixweeks fescue	POA
<i>Koeleria macrantha</i>	Prairie junegrass	POA
<i>Poa secunda</i>	Sandberg bluegrass	POA
<i>Stipa comata</i>	Needle-and-thread	POA
FORBS		
<i>Achillea millefolium</i>	Common yarrow	AST
<i>Alyssum desertorum</i>	Desert alyssum	BRA
<i>Artemisia frigida</i>	Fringed sagewort	AST
<i>Erigeron sp.</i>	Fleabane	AST
<i>Euphorbia glyptosperma</i>	Ridge-seeded spurge	EUP
<i>Filago arvensis</i>	Field cottonrose	AST
<i>Grindelia squarrosa</i>	Curleycup gumweed	AST
<i>Gutierrezia sarothrae</i>	Broom snakeweed	AST
<i>Hedeoma hispidum</i>	Rough pennyroal	LAM
<i>Opuntia polyacantha</i>	Plains pricklypear	CAC
<i>Penstemon sp.</i>	Beardtongue	SCR
<i>Polygonum sp.</i>	Knotweed	PLG
<i>Solidago sparsiflora</i>	Alcove goldenrod	AST
<i>Sphaeralcea coccinea</i>	Scarlet globemallow	MLV
<i>Tragopogon dubius</i>	Yellow salsify	AST
<i>Yucca glauca</i>	Soapwell, yucca	AGA

Fauna

Threatened, Endangered, and Sensitive Vertebrates

No federally listed Threatened or Endangered animal species, or animals on the USDA Forest Service Region 2 Sensitive Species List (Estill 1993), are known to occur in the potential Wildlife Draw RNA.

Animal Species List

The field work in the potential Wildlife Draw RNA did not include identification of the animal species present.

Geology

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

Lands

The potential RNA is national grassland. The adjoining lands on the north, east, south, and southwest are also national grassland, and the adjoining land on the northwest is state land.

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 mosaic of the needle-and-thread/blue grama association and the big sagebrush/needle-and-thread association exhibits a range in the amount of Wyoming big sagebrush present and in the amounts of the major understory species (needle-and-thread, blue grama, western wheatgrass, and threadleaf sedge). The potential RNA probably represents the mosaic of these two types reasonably well. The degree to which the area represents the variation in the western wheatgrass/threadleaf sedge association, which covers only a small area, is unclear. The occurrence of the silver sagebrush/western wheatgrass association in the draws probably is large enough and variable enough to represent the type adequately.

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, changes in the ecological processes that shaped the area's ecosystems, and, to a minor extent, the presence of roads. These causes of change are interrelated and a complete discussion is impossible; the information here is largely restricted to observations made during field survey. Locations of the plots referred to are shown on Figure 2 and data from those plots is shown in Appendix 3.

-- Exotic species

Four exotic species, cheatgrass or downy brome (Bromus tectorum), meadow brome (Bromus commutatus), yellow alyssum (Alyssum desertorum), and salsify (Tragopogon dubius), were noted during 1996 field work. The two annual forbs (alyssum and salsify) contribute little cover. The two brome grasses (both winter annuals or biennials) also are widespread and both codominate or dominate patches in the vegetation, cheatgrass in the uplands (primarily in swales) and meadow brome in the silver sagebrush/western wheatgrass type.

-- Structures (Figure 2)

The only human-built structure in the potential Wildlife Draw RNA is a two-track road running east-to-west across the northern part of the area. A barbed-wire fence runs along the area's western boundary.

-- Ecological processes

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

Domestic livestock 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. No areas with obvious heavy impacts from livestock grazing were noted during field work.

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 grassland in the northern half of the potential Wildlife Draw RNA appears 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 Wildlife 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 the Cheyenne River Basin before white settlement (Dorn 1986) and fires undoubtedly influenced the ecosystems in the potential RNA. Wildfires still burn in the Great Plains of eastern Wyoming, but fire suppression is the general policy in the region. The degree to which that policy has altered the ecosystems in the potential Wildlife 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 small size (640 acres, or 259 ha) and the long, narrow shape 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 is too small to support a black-tailed prairie dog town entirely within its boundary, should a town become established. 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.

While managers may be able to delineate burn units entirely within the potential RNA, those units will be small, and the area's shape and topography will make it difficult to prevent fires from spreading to adjacent lands. The presence of the annual brome grasses will complicate the use of fire as a tool to maintain the ecosystems in the potential RNA, because these species may increase or decrease in abundance, depending on the season of burning (The Nature Conservancy 1989). Consequently, while fire may promote the viability of some ecosystems in the potential RNA, it may also constitute a threat to the viability of others by promoting the increase in 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. Public roads provide ready access to the area, and the gentle topography in the northern part of the area would permit four-wheel-drive vehicles to travel there. Hence damaging vehicle use is a possibility, particularly during hunting seasons in the fall. No evidence was observed of damage from vehicles, though. The potential RNA boundary is unfenced except on the western side, so livestock using the pasture containing the area have access to it.

Degree to Which the Potential RNA Meets Criteria

The potential Wildlife Draw RNA seems to contain occurrences of the needle-and-thread/blue grama plant association and the big sagebrush/needle-and-thread association that adequately represent the mosaic of those two types in the region. The silver sagebrush/western wheatgrass association also appears to be adequately represented by the occurrence in the potential RNA. The degree to which the potential RNA represents the western wheatgrass/threadleaf sedge association, which is a minor type there, is unclear.

The condition of the ecosystems in the potential RNA has been compromised to some extent by the codominance or dominance of some areas by cheatgrass and meadow brome. 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 viability of the ecosystems in the potential RNA can probably be assured if livestock continue to be managed to prevent repeated, excessive grazing; if wildlife (including prairie dogs) are allowed to use the area; and if a prescribed fire program can be implemented. The size and shape of the area will pose a problem for managers in implementing these ecological processes.

Although the gentle topography in the northern half of the area, the accessibility via public roads, and the unfenced boundary all combine to make defensibility of the area difficult, it is isolated and contains no obvious attractions to most potential users. 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

Field work in 1996 revealed no impacts from mineral resources or potential conflicts between mineral resources and RNA management.

Grazing

The potential Wildlife Draw RNA is part of allotment #009 and is used for season-long grazing. 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 trees.

Watershed Values

The potential RNA contains only a small part of the drainage of an intermittent stream. There are no apparent conflicts with or impacts on watershed values.

Recreation Values

The potential RNA contains no developed recreation areas. Recreational use apparently is limited to fall hunting, and no conflicts with RNA designation or management are apparent.

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, but a two-track road in the potential RNA is shown on the National Grassland map.

MANAGEMENT CONCERNS

Establishment of a Wildlife Draw RNA might require a change in the current grazing management. Management to restore or maintain ecological processes in an RNA this small and in this location would probably involve management of adjoining national grassland and state land.

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