Ecological Site Description—Rangeland

Thin Breaks (TB), 11–14" MAP

MLRA: 58AC – Sedimentary Plains, Central
R058AC616MT

1. Physiographic features: This site is typically a complex of several ecological sites, primarily Shallow and Very Shallow. It occurs on steep to very steep slopes, usually in excess of 25 percent. Outcroppings of hard bedrock and soft sedimentary beds are major fe

Landform: Breaks, escarpment, bluff, ridge
Elevation (feet): 2250 - 4500
Slope (percent): mainly greater than 25
Depth to Water Table (inches): greater than 60
Runoff Class: High to Very High
Aspect: All, can be significant

2. Soils: The soils associated with this ecological site are highly variable. They will range from very shallow to deep, depending on landform and presence of ledges, etc. where pockets of deeper soils can accumulate. More detailed and specific information is available by using the ecological site description for the component of this site being investigated (e.g., Shallow).

Parent material (kind): Residuum, colluvium
Parent material (origin): Mixed, mainly sandstone and sedimentary beds
Surface textures: Varies, mainly sandy and loamy
Surface texture modifiers: gravelly, flaggy, stony
Depth (inches): Varies, mainly less than 40
Soil surface permeability (inches per hour): Varies, depending on surface texture
Available Water Capacity to 20" (inches): Varies, mainly less than 5
Drainage Class: Varies, mainly well to excessively
Reaction (pH) (1:1 water): Mainly neutral to moderately alkaline (6.6-8.4)

3. Associated sites: Shallow, Very Shallow, Silty-Steep, Sandy-Steep

4. Similar sites: None

5. Major Plant Community Types: The following are descriptions of several plant communities that may occupy this site:

Plant Community 1: Tall and Medium Grasses/ Forbs/ Shrubs: The physical aspect of this site in Historical Climax is that of mixed grass/ shrub land dominated by cool-season bunch grasses and a mixture of shrubs. Approximately 65-75% of the annual production is from grasses and sedges, 5-10% from forbs, and 15-30% is from trees, shrubs and half-shrubs. Canopy cover of shrubs is typically 10 to 35%. Ponderosa pine may occur on this site. The following are descriptions of several plant communities that may occupy this site:

It contains a high diversity of tall grasses (**bluebunch wheatgrass, prairie sandreed, Indian ricegrass, and green needlegrass**), short grasses and sedges (**threadleaf sedge, prairie junegrass, plains reedgrass, and sand dropseed**), and shrubs (**skunkbush sumac, winterfat, Wyoming big sagebrush, and Rocky Mountain juniper**). There are also abundant forbs, and half-shrubs which occur in small percentages. **Ponderosa pine or limber pine trees** are often a component of this plant community.

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Plant Community 2: Medium & Short Grasses/ Forbs/ Shrubs & Half-Shrubs: Slight disturbances and degradation to the HCPC will result in a plant community dominated by **needleandthread, western or thickspike wheatgrass, threadleaf sedge, prairie junegrass, blue grama, various forbs, Wyoming big sagebrush and fringed sagewort**. The tall, more palatable grasses (bluebunch wheatgrass, Indian ricegrass, green needlegrass, prairie sandreed) will be present in smaller percentages. The tree component, if present, may also increase.

Grass biomass production and litter become reduced on the site as the taller grasses disappear, increasing evaporation and reducing moisture retention. Additional open space in the community can result in undesirable invader species. This plant community provides for moderate soil stability.

Plant Community 3: Shrubs/ Short Grasses/ Annual Grasses/ Invasive Forbs: With continued heavy disturbance the site will become dominated by shrubs such as **big or silver sagebrush, fringed sagewort, rubber rabbitbrush, and Rocky Mountain juniper.** Short grasses and sedges increase, such as **threadleaf sedge, prairie junegrass, sand dropseed, and blue grama. Needleandthread and western or thickspike wheatgrass** will still be present in small amounts. Palatable shrubs and forbs will be mostly absent. **Red threeawn, annual grasses (cheatgrass and Japanese brome),** invasive forbs such as **curlycup gumweed, and broom snakeweed** begin to invade the site.

This plant community is less productive than Plant Community 1 or 2 (< 200 pounds per acre). The lack of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and high evapotranspiration, which gives short sod grasses and annuals a competitive advantage over the cool season tall and medium grasses. This community has lost many of the attributes of a healthy rangeland, including good infiltration, minimal erosion and runoff, nutrient cycling and energy flow.

There are severe limitations to using seeding and/or mechanical treatment on this site because of the very steep slopes, preponderance of shallow and very shallow soils, and amount of rock outcrop.

Plant Community 4: Shrubs/ Invader and Annual Grasses/Short Grasses: With continual heavy disturbance over several years the community will change to one dominated primarily by **big or silver sagebrush, fringed sagewort, rubber rabbitbrush, and Rocky Mountain juniper, red threeawn, fringed sagewort, annual grasses, invasive forbs, broom snakeweed and plains pricklypear.**

This community has extremely reduced productivity of perennial grasses (< 25 pounds per acre). Significant economic inputs and time would be required to move this plant community toward a higher successional stage and a more productive plant community.

5a. Cover and structure (Historic Climax Plant Community)

COVER TYPE	BASAL COVER (%)	CANOPY COVER (%)	AVERAGE HEIGHT (inches)
Cryptogams	T-3	0–T	0.25
Grasses/ sedges	3-12	20–50	18
Forbs	1–4	5–10	6
Shrubs	1-10	5–20	24
Trees	0–1	0-10	20 – 40 feet
Litter	30–60		
Coarse fragments	15-20		
Bare ground	30-60		

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5b. Major Plant Species Composition - Historical Climax Plant Community

Common Name	Plant Symbol	Plant Group	Percent Comp.	Group Max. %	Mean Annual Precipitation (inches)			
					11	12	13	14
					(lbs./acre)	(lbs./acre)	(lbs./acre)	(lbs./acre)
Grasses and Sedges				**65-75**	**370-430**	**422-488**	**475-548**	**526-608**
Bluebunch wheatgrass	PSSP6	2	30-70		171-399	195-455	219-511	243-567
Western or Thickspike wheatgrass	PASM ELLAL	14	15-25		85-142	98-162	110-182	122-202
Green needlegrass	NAVI4	2	0-5		0-28	0-32	0-36	0-40
Needleandthread	HECOC8	10	5-10		28-57	32-65	36-73	40-81
Prairie sandreed	CALO	5	0-15		0-85	0-98	0-110	0-122
Indian ricegrass	ACHY	2	0-5		0-28	0-32	0-36	0-40
Plains muhly	MUCU3	3	0-10		0-57	0-65	0-73	0-81
Threadleaf sedge	CAFI	12	0-5	10	0 – 57 No more than 28 for any one	0 – 65 No more than 32 for any one	0 – 73 No more than 36 for any one	0 – 81 No more than 40 for any one
Needleleaf sedge	CADU6	16	0-5					
Blue grama	BOGR2	15	0-5					
Prairie junegrass	KOMA	12	0-5					
Plains reedgrass	CALO	16	0-5					
Sand dropseed	SPCR	9	0-5					
Other native grasses	2GP		0-5					
Sandberg bluegrass	POSE	12	0-T	T	0-T	0-T	0-T	0-T
Red threeawn	ARPUL	11	0-T	T	0-T	0-T	0-T	0-T
Bottlebrush squirreltail	ELEL5	10	0-T					
Forbs				**5-10**	**28-57**	**32-65**	**36-73**	**40-81**
Purple prairieclover	DAPU5	21	1-5	10	0 – 57 No more than 28 for any one	0 – 65 No more than 32 for any one	0 – 73 No more than 36 for any one	0 – 81 No more than 40 for any one
White prairieclover	DACA7	21	1-5					
Dotted gayfeather	LIPU	21	1-5					
Eriogonum spp.	ERIOG	23	0-5					
Biscuitroot spp.	LOMAT	24	0-5					
Western yarrow	ACMI2	19	0-5					
Scurfpea spp.	PSORA	23	0-5					
Scarlet globemallow	SPCO	20	0-5					
American vetch	VIAM	18	0-5					
Miner's candle	CRBR	24	0-5					
Penstemon spp.	PENST	28	0-5					
Rush skeletonweed	LYJU	20	0-5					
Missouri goldenrod	SOMI2	19	0-5					
Bastard toadflax	COUM	20	0-5					
Green sagewort	ARDR4	19	0-5					
Hood's phlox	PHHO	28	0-5					
Other native forbs	2FP		0-5					
Curlycup gumweed	GRSC	23	0-T	T	T	T	T	T
Shrubs, Half-shrubs, Cacti, & Trees				**15-30**	**85-171**	**98-195**	**110-219**	**122-243**
Skunkbush sumac	RHTR	33	5-25	28-142	32-162	36-182	40-202	
Winterfat	KRLA2	35	0-5	30	28–171 No more than 57 for any one	32–195 No more than 65 for any one	36–219 No more than 73 for any one	40–243 No more than 81 for any one
Nuttall's saltbush	ATNU2	34	0-5					
Shadscale	ATCO	34	0-5					
Wyoming big sagebrush	ARTRW8	37	0-5					
Silver sagebrush	ARCA13	36	0-5					
Yucca	YUGL	37	0-5					
Creeping juniper	JUHO2	38	0-5					
Fringed sagewort	ARFR4	38	0-5					
Rubber rabbitbrush	ERNAN5	32	0-5					
Rocky Mountain juniper	JUOC2	37	0-10					
Ponderosa pine	PIPO	40	0-10					
Limber pine	PIFL	40	0-5					
Other native shrubs	2SB		0-5					
Broom snakeweed	GUSA2	37	0-T	T	0-T	0-T	0-T	0-T
Plains pricklypear	OPPO	38	0-T					
Total Annual Production (lbs./ac):			**100%**		**570**	**650**	**730**	**810**

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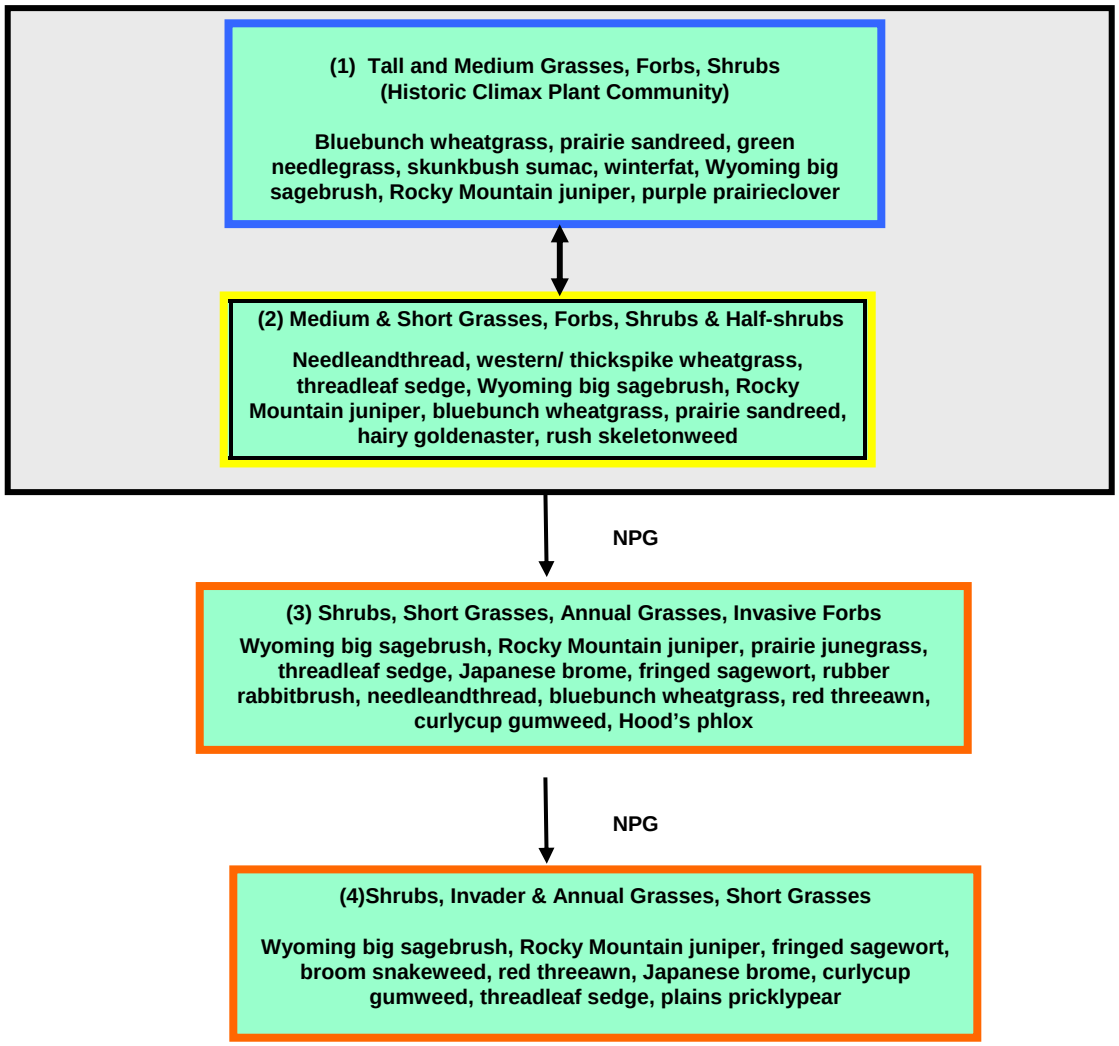
5c. Plant Communities and Transitional Pathways (diagram)



Smaller boxes within a larger box indicate that these communities will normally shift among themselves with slight variations in precipitation and other disturbances. Moving outside the larger box indicates the community has crossed a threshold (heavier line) and will require intensive treatment to return to Community 1 or 2. Dotted lines indicate a reduced probability for success. Yellow boxes indicate caution that the community may be in danger of crossing a threshold. Orange boxes represent communities that have crossed over thresholds from the HCPC and may be difficult to restore with grazing management alone. Red boxes represent communities that have severely shifted away from the HCPC and probably cannot be restored without mechanical inputs.

NOTE: Not all species present in the community are listed in this table. Species listed are representative of the plant functional groups that occur in the community.

PG = Prescribed Grazing: Use of a planned grazing strategy to balance animal forage demand with available forage resources. Timing, duration, and frequency of grazing are controlled and some type of grazing rotation is applied to allow for plant recovery following grazing.

NPG = Non-Prescribed Grazing: Grazing which has taken place that does not control the factors as listed above, or animal forage demand is higher than the available forage supply.

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6. Livestock Grazing Interpretations: Managed livestock grazing is suitable on this site as it has the potential to produce a limited amount of high quality forage. Forage production is limited by steep slopes and shallow soils, and the potential for runoff, which reduces the effectiveness of the precipitation received for plant growth. The steeper slopes and rock outcrop also limit livestock travel and result in poor grazing distribution, especially in areas away from water. Management objectives should include maintenance or improvement of the plant community. Shorter grazing periods and adequate re-growth after grazing are recommended for plant maintenance and recovery. Heavy stocking and season long use of this site can be detrimental and will alter the plant community composition and production over time.

Whenever Plant Community 2 (medium and short grasses) occurs, grazing management strategies need to be implemented to avoid further deterioration. This community is still stable, productive, and healthy provided it receives proper management. This community will respond fairly quickly to improved grazing management including increased growing season rest of key forage plants. Grazing management alone can usually move this community back to one more similar to potential if a good seed source of the taller grasses still exists.

Plant Communities 3 and 4 have significantly reduced forage production (< 150 lbs./acre). Once this site is occupied by either Plant Community 3 or 4, it will be more difficult to restore it to a community that resembles the potential with grazing management alone. Additional growing season rest is often necessary for re-establishment of the desired species and to restore the stability and health of the site.

The potential for using seeding and/or mechanical treatment to improve site health is not feasible due to steep slopes, shallow soils and the amount of exposed rock outcrop.

6a. Guide to Safe Stocking Rates: The following charts provide guidance for determining an initial safe stocking rate. Animal Unit Month (AUM) figures are based on averages of forage production from data collected for this site over several years. The characteristic plant communities and production values listed may not accurately reflect the productivity of a specific piece of land. These tables should not be used without on-site information collected to determine the average forage productivity of the site. Adjustments to stocking rates for each range unit must be made based on topography, slope, distance to livestock water, and other factors which effect livestock grazing behavior.

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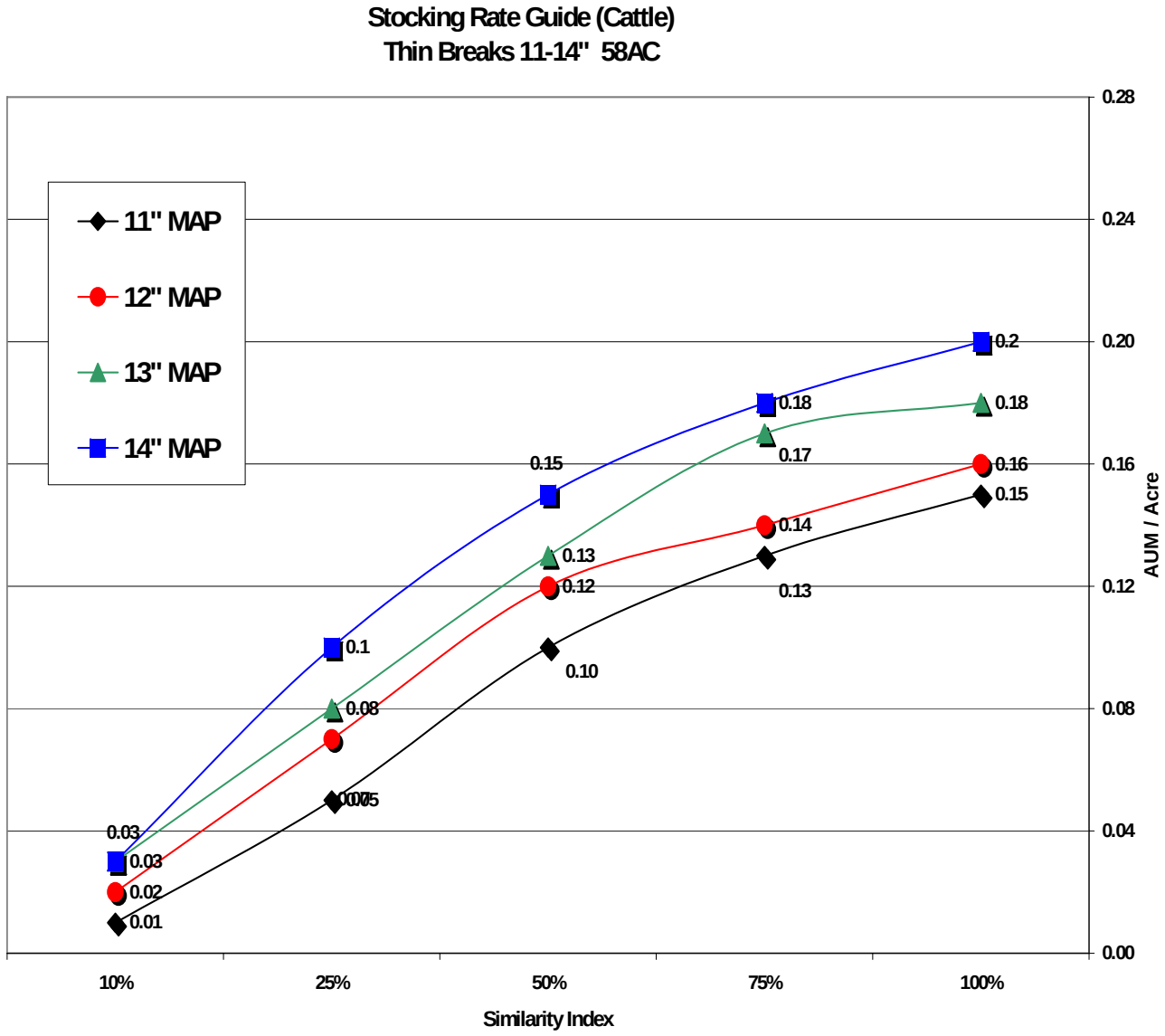

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6b. Stocking Rate Guide:

Major Plant Community Dominant Plant Species	MAP	Total Production (pounds/ac)	Cattle			Sheep		
			Forage Production	AUM/ac	Ac/AUM	Forage Production	AUM/ac	Ac/AUM
1. Tall and Medium Grasses, Forbs, Shrubs (HCPC) *Bluebunch wheatgrass, prairie sandreed, green needlegrass, skunkbush sumac, winterfat, Wyoming big sagebrush, Rocky Mountain juniper, purple prairieclover* **(S.I. > 75%)**	13-14"	730-810	625-725+	.17 -.20+	5.0-5.9	650-775+	.18-.21+	4.7-5.6
	11-12"	570-650	500-575+	.14 -.16+	6.4-7.3	525-625+	.14 -.17+	5.9-7.0
2. Medium & Short Grasses, Forbs, Shrubs & Half-shrubs *Needleandthread, western/ thickspike wheatgrass, threadleaf sedge, Wyoming big sagebrush, Rocky Mountain juniper, bluebunch wheatgrass, prairie sandreed, hairy goldenaster, rush skeletonweed* **(S.I. 40-75%)**	13-14"	400-690	250-600	.07 –.16	6.1-14.6	250-625	.07 –.17	5.9-14.6
	11-12"	325-550	200-475	.05 –.13	7.7-18.3	200-500	.05 –.14	7.3-18.3
3. Shrubs, Short Grasses, Annual Grasses, Invasive Forbs *Wyoming big sagebrush, Rocky Mountain juniper, prairie junegrass, threadleaf sedge, Japanese brome, fringed sagewort, rubber rabbitbrush, needleandthread, bluebunch wheatgrass, red threeawn, curlycup gumweed, Hood's phlox* **(S.I. 20-40%)**	13-14"	300-575	150-350	.04 –.10	10.5-24.4	175-400	.05 –.11	9.2-20.9
	11-12"	230-455	125-275	.03 –.08	13.3-29.3	150-325	.04 –.09	11.3-24.4
4. Shrubs, Invader & Annual Grasses, Short grasses *Wyoming big sagebrush, Rocky Mountain juniper, red threeawn, Japanese brome, curlycup gumweed, Hood's phlox, fringed sagewort, broom snakeweed, threadleaf sedge, plains pricklypear* **(S.I. <20%)**	11-14"	115-325	25-125	.01 –.03	29.3-146.4	50-125	.01 –.03	29.3-73.2

Stocking rates are calculated from average forage production values using a 25% Harvest Efficiency factor for preferred and desirable plants, and 10% Harvest Efficiency for less desirable species. AUM calculations are based on 915 pounds per animal unit month (AUM) for a 1,000-pound cow with calf up to 6 months. No adjustments have been made for site grazability factors, such as steep slopes, site inaccessibility, or distance to drinking water.

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7. Wildlife Interpretations:

The Thin Breaks ecological site, with its complex topography and vegetative structure, provides diverse habitat structure for a variety of wildlife species. Historically, mule deer, pronghorn, a variety of seed-eating small mammals and raptors were probably the most conspicuous wildlife species, as they still are. The general area provides thermal and escape cover for big game animals as well as a variety of other wildlife species. Shrub availability on steep, south slopes often provides important winter range for mule deer and elk. Abundant prey and perch sites (on rock outcrops and scattered trees) attract a variety of raptors. The steep, rocky topography provides habitat for interesting songbird species such as rock wrens, canyon wrens and white-throated swifts. Golden eagles and prairie falcons commonly hunt small mammals within this site. Scattered junipers and pines host field sparrows and chipping sparrows. The interface of sandy and shale geologic substrates often results in seeps forming on side-hills and toe slopes. These are an important water source for wildlife as well as a source of biodiversity.

Plant Community 1: Tall and Medium Grasses/ Forbs/ Shrubs (HCPC): The diversity of forbs, half-shrubs and shrubs provides feeding substrate for a variety of pollinating insects, which are prey for many birds, reptiles and small mammals. Springs and seeps are habitat for amphibians such as tiger salamanders. The short-horned lizard is a representative reptile. The diversity of plant species and life forms, in combination with topographic variation, provides high quality bird habitat. Lark sparrows, green-tailed towhees, mountain bluebirds and golden eagles are examples of birds using this community. Sharp-tailed grouse and sage grouse may use this community for lek sites on ridge tops and fairly level topography. The diversity of forbs and shrubs favors browsers and selective feeders such as mule deer and pronghorn. Large animal nutrition levels are relatively high yearlong because of plant species and life form diversity. Winter range value is often high for big game species when topographic diversity provides south exposures and browse plants such as skunkbush sumac and winterfat are available. Small mammal diversity may be fairly high. Example species include the kangaroo rat, deer mouse, olive-backed pocket mouse and desert cottontail.

Plant Community 2: Medium & Short Grasses/ Forbs/ Shrubs & Half-Shrubs: Insect diversity may decline with a partial loss of forb variety. The reduction of taller grasses and some desirable shrubs degrades habitat value for many birds, small mammals and big game. Potential increases in half-shrubs and shrubs may maintain big game winter range feeding value, although thermal cover is reduced. Small mammal species diversity declines with the reduction of vegetative diversity and litter cover.

Plant Community 3: Shrubs/ Short Grasses/ Annual Grasses/ Invasive Forbs: Insects may be abundant at the height of population cycles but species diversity is reduced significantly. Springs and seeps are very degraded which results in poor amphibian habitat. Sparse vegetation and increased bare ground may provide suitable habitat for a few species (i.e. horned larks) but the lack of complex vegetative structure and residual cover makes this community poor habitat in general for most ground-nesting birds and relatively poor big game habitat. Pronghorn and mule deer may forage in this type throughout the year. However, nutritional levels for big game are greatly reduced and are available for a much shorter period as compared to the HCPC.

Plant Community 4: Shrubs/ Invader and Annual Grasses/ Short Grasses: General wildlife habitat value is very poor in this community. Insect diversity and abundance is considerably reduced which decreases feeding opportunity for amphibians, birds and some small mammals. The lack of complex vegetative structural diversity, a shortened period of active plant growth and loss of ground cover make the habitat inhospitable for many birds and most small mammals. Wyoming big sagebrush and fringed sagewort provide some valuable big game winter forage, w here present. Thermal cover values are very limited with the loss of skunkbush sumac and other shrubs as well as herbaceous cover. Small mammal diversity is very low. The seed-eating deer mouse may be fairly well represented.

8. Hydrology Data:

The soils associated with this ecological site are generally in Hydrologic Soil Group D. The infiltration rates for these soils are variable, depending on surface texture. The runoff potential for this site is high to very high, depending on slope and ground cover/health. Runoff curve numbers generally range from 85 to 94.

9. Site Documentation:

Authors: Original: NRCS, 1983 Revised: MJR, REL, RSN, POH, 2003

Supporting Data for Site Development:

NRCS–Production & Composition Record for Native Grazing Lands (Range-417): 2

BLM–Soil & Vegetation Inventory Method (SVIM) Data: 8

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NRCS–Range Condition Record (ECS-2): 2

NRCS–Range/Soil Correlation Observations & Soil 232 notes: 5

Field Offices where this site occurs within the state:

Big Sandy	Columbus	Harlowton	Roundup
Big Timber	Crow Agency	Joliet	Stanford
Billings	Fort Belknap	Lewistown	White Sulphur Springs
Chinook	Hardin	Malta	Winnett

Site Approval: This site has been reviewed and approved for use:

Loretta J. Metz 10/22/2004
State Rangeland Management Specialist **Date**

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Thin Breaks, 11-14" MAP
Sedimentary Plains, Central
Plant Community 1
HCPC

Thin Breaks, 11-14" MAP
Sedimentary Plains, Central
Plant Community 1
Landscape

Thin Breaks, 11-14" MAP
Sedimentary Plains, Central
Plant Community 1
HCPC

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Thin Breaks, 11-14” MAP
Sedimentary Plains, Central
Plant Community 1
HCPC