

# Ecological Site Description—Rangeland

Sandy (Sy), 11–14" MAP

MLRA: 58AC – Sedimentary Plains, Central  
R058AC042MT



## 1. Physiographic features:

- Landform:** sedimentary plain, alluvial fan, terrace
- Elevation (feet):** 2250 - 4500
- Slope (percent):** 0–15, mainly less than 8
- Depth to Water Table (inches):** greater than 60
- Flooding:** mainly none
- Ponding:** none
- Runoff Class:** mainly low
- Aspect:** not significant

**2. Soils:** These soils are coarse to fine sandy loams more than 20 inches deep. They are well drained, permeability is mostly moderate to moderately rapid, and effective rooting depth is greater than 20 inches. Available water holding capacity to 40 inches is mainly over 4 inches.

**3. Associated sites:** Silty and Sandy-Steep sites

**4. Similar sites:** Silty and Sandy-Steep.

The Silty site occupies similar landscape positions, differing mainly by texture.

The Sandy-Steep site differs mainly by being on steeper slopes (>15%).

**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 Historic Climax is that of a level to undulating grassland dominated by warm and cool-season grasses, with forbs and shrubs occurring in small percentages. Approximately 80 – 90% of the annual production is from grasses and sedges, 1 – 10% from forbs, and 1 – 5% is from shrubs and half-shrubs. Canopy cover of shrubs is 0 – 5%.

Dominant species include **bluebunch wheatgrass, prairie sandreed, Indian ricegrass, needleandthread, and plains muhly**, and short grasses and sedges (**sand dropseed, threadleaf sedge**). There are abundant forbs (**prairie clovers, dotted gayfeather**) which occur in smaller percentages. Shrubs and half-shrubs occur occasionally.

This plant community is well adapted to the Northern Great Plains climatic conditions. The diversity in plant species and presence of tall, deep-rooted perennial grasses allows for drought tolerance. Plants on this site have strong, healthy root systems that allow production to increase significantly with favorable moisture conditions. Abundant plant litter is available for soil building and moisture retention. Plant litter is properly distributed with very little movement off-site and natural plant mortality is very low. This plant community provides for soil stability and a functioning hydrologic cycle.

**Plant Community 2: Medium and Short Grasses and Sedges/ Half-shrubs:** This community occurs due to minor climate shifts or slight variations in soils and/or topography or disturbance, including non-prescribed grazing. Dominant species include **prairie sandreed and needleandthread. Western or thickspike wheatgrass, sand dropseed, threadleaf sedge and green and fringed sagewort** tend to become a slightly larger part of the plant community. The more palatable grasses (bluebunch wheatgrass, Indian ricegrass, plains muhly) will still be present but in smaller amounts. Palatable and nutritious forbs will be replaced by less desirable and more aggressive species. **Yucca** may become more common.

Grass biomass production and litter become reduced on Community 2 as the taller grasses become less prevalent, increasing evaporation and reducing moisture retention. Additional open space in the community can result in undesirable invader species. These plant communities provide for moderate soil stability.

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**Plant Community 3: Short and Medium Grasses and Sedges/ Half-shrubs:** This is a disturbance induced community, with dominant species including **needleandthread, western or thickspike wheatgrass, threadleaf sedge, sand dropseed and blue grama**. **Forbs** and **green and fringed sagewort** tend to make up a larger part of the plant community. There may still be remnant amounts of some of the late-seral species such as bluebunch wheatgrass or prairie sandreed present. Palatable forbs will be mostly absent. **Yucca** or other shrubs may increase.

**Plant Community 4: Short Sedges and Grasses/ Half-Shrubs/ Cactus/ Annual Grasses:** This community is the result of continual adverse disturbances. Dominants include **threadleaf sedge, blue grama**, and other short grasses. A remnant of the potential plant community may remain, especially needleandthread, but in much smaller proportions. Species that are un-palatable become more common, including **Fendler’s threawn, green and fringed sagewort, broom snakeweed, annual bromes, six-weeks fescue, and plains pricklypear**.

Plant Communities 3 and 4 are much less productive than Plant Communities 1 or 2, and have lost many of the attributes of a healthy rangeland. The loss of deep perennial root systems reduces total available moisture for plant growth. Reduction of plant litter will result in higher surface soil temperatures and increased evaporation losses. Annual species are often aggressive and competitive with seedlings of perennial plants. This community can respond positively to improved grazing management but it will take additional inputs to move it towards a community similar in production and composition to that of Plant Community 1 or 2.

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

COVER TYPE	BASAL COVER (%)	CANOPY COVER (%)	AVERAGE HEIGHT (inches)
Cryptogams	T–1	0–T	0.25 - .50
Grasses/ sedges	5–15	70–85	24
Forbs	1–4	1–5	12
Shrubs	1–4	0–10	24
Litter	50–70		
Coarse fragments	0–5		
Bare ground	10–20		

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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)	
<b>Grasses and Sedges</b>					<b>80-90%</b>	<b>1156-1300</b>	<b>1280-1440</b>	<b>1404-1580</b>	<b>1528-1719</b>
Bluebunch wheatgrass	PSSP6	2	10-50		145-722	160-800	175-878	191-955	
Western or Thickspike wheatgrass	PASM ELLAL	14	5-10	10	72-145	80-160	88-175	96-191	
Prairie sandreed	CALO	5	15-65		217-940	240-1040	263-1141	286-1242	
Needleandthread	HECOC8	10	10-20		145-289	160-320	175-331	191-382	
Indian ricegrass	ACHY	2	5-15		72-217	80-240	88-263	96-286	
Plains muhly *	MUCU3	3	5-10		-	80-160	88-175	96-191	
Threadleaf sedge	CAFI	12	0-5)	10	0-145 No more than 72 for any one	0-160 No more than 80 for any one	0-175 No more than 88 for any one	0-191 No more than 96 for any one	
Blue grama	BOGR2	15	0-5)						
Prairie junegrass	KOMA	12	0-5)						
Sandberg bluegrass	POSE	12	0-5)						
Sand dropseed	SPCR	9	0-5)						
Other native grasses	ZGP		0-5)						
Fendler's or red threeawn	ARPUF	11	0-T)	T	0-T	0-T	0-T	0-T	
<b>Forbs</b>					<b>1 – 10</b>	<b>14-145</b>	<b>16-160</b>	<b>18-175</b>	<b>19-191</b>
Purple prairieclover	DAPU5	21	1-5)	10	14-145 No more than 72 for any one	16-160 No more than 80 for any one	18-175 No more than 88 for any one	19-191 No more than 96 for any one	
White prairieclover	DACA7	21	1-5)						
Dotted gayfeather	LIPU	21	1-5)						
Scurfpea spp.	PSORA	23	0-5)						
Hairy goldenaster	CHVI0	23	0-5)						
Prairie thermopsis	THRH	20	0-5)						
American vetch	VIAM	18	0-5)						
Annual buckwheat	ERAN4	39	0-5)						
Milkvetch spp.	ASTRA	24	0-5)						
Hood's phlox	PHHO	28	0-5)						
Blue flax	LIPEL	28	0-5)						
Rockcress spp.	ARAB12	24	0-5)						
Green sagewort	ARDR4	19	0-5)						
Manyflowered aster	ASER3	19	0-5)						
Buckwheat spp.	ERIOG	24	0-5)						
Penstemon spp.	PENST	28	0-5)						
Bastard toadflax	COUM	23	0-5)						
Western yarrow	ACMI2	19	0-5)						
Biscuitroot spp.	LOMAT	24	0-5)						
Missouri goldenrod	SOMI2	19	0-5)						
Other native forbs	ZFP		0-5)						
Twogrooved poisonvetch **	ASBI2	24	0-T	0-T	0-T	0-T	0-T	0-T	
Crazyweed spp. **	OXYTR	24	0-T						
Larkspur spp. **	DELPH	24	0-T						
Death camas **	ZIGAD	32	0-T						
<b>Shrubs and Half-shrubs</b>					<b>1 – 5</b>	<b>14-72</b>	<b>16-80</b>	<b>18-88</b>	<b>19-96</b>
Skunkbush sumac	RHTR	33	0-5)	0-T	0-T	0-T	0-T	0-T	
Silver sagebrush	ARCA13	36	0-5)						
Prairie rose	ROAR3	38	0-5)						
Fringed sagewort	ARFR4	38	1-5)						
Creeping juniper	JUHO	38	0-5)						
Yucca	YUGL	37	0-5)						
Rubber rabbitbrush	ERNAN5	36	0-5)						
Other native shrubs	ZSB		0-5)						
Broom snakeweed	GUSA2	37	0-T						
Plains pricklypear	OPPO	38	0-T						
<b>Total Annual Production (lbs./ac):</b>			<b>100%</b>		<b>1445</b>	<b>1600</b>	<b>1755</b>	<b>1910</b>	

\*This species tends to occur mainly in the higher precipitation areas of the RRU.

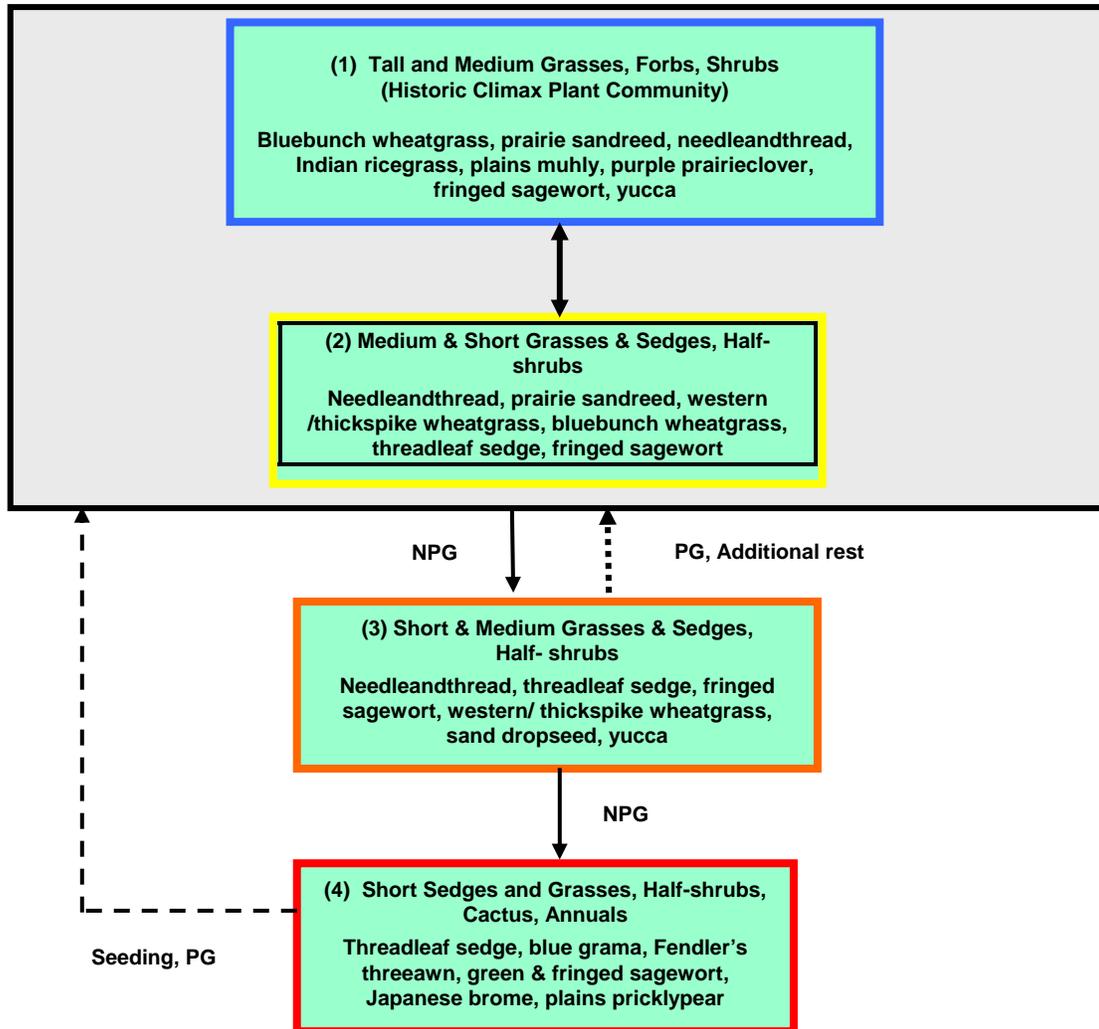
\*\* These plants are poisonous to some grazing animals during at least some portion of their life cycle.

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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.

Fire: Prescribed fire or non-prescribed wildfire.

Matted: > 50% cover

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**6. Livestock Grazing Interpretations:** Managed livestock grazing is suitable on this site as it has the potential to produce an abundance of high quality forage. This is often a preferred site for grazing by livestock, and animals tend to congregate in these areas. In order to maintain the productivity of this site, grazing must be managed carefully on adjoining sites with less production to be sure livestock drift onto the Sandy site is not excessive. 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 and sedges) 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 towards the potential community.

Plant Communities 3 and 4 have substantially reduced forage production, and a high percentage of aggressive, non-palatable species. Once these plant communities become established, it will be much more difficult to restore the site 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. Seeding may be necessary to restore desirable native perennial species.

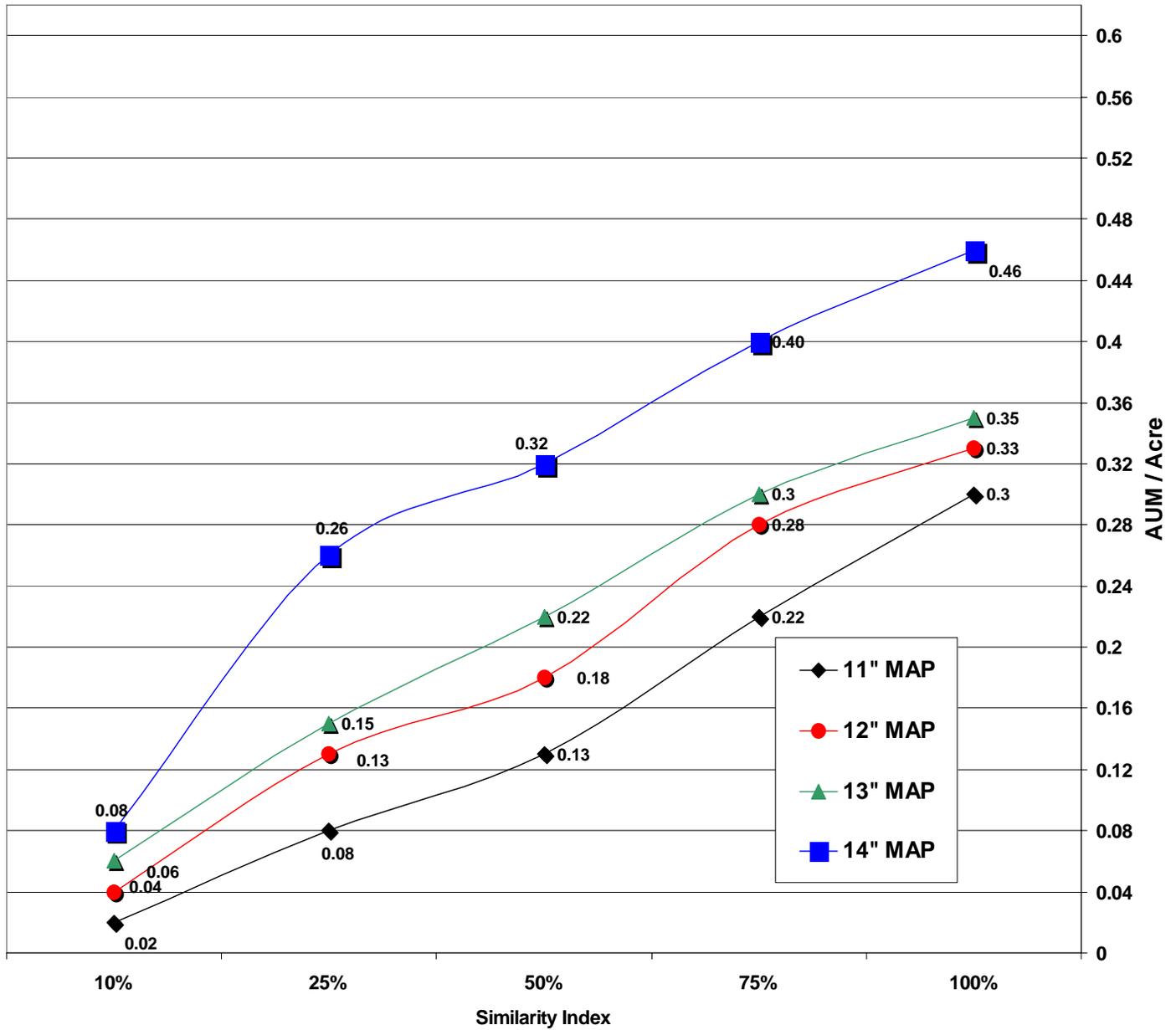
**6a. Guide to Safe Stocking Rates:** The following charts provide guidance for determining an initial safe stocking rate. Animal Unit Month (AUM) figures are based on averages of forage production from data collected for this site over several years. The characteristic plant communities and production 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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## Stocking Rate Guide (Cattle) Sandy 11 - 14", 58AC



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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) <i>Bluebunch wheatgrass, prairie sandreed, Indian ricegrass, needleandthread, plains muhly, fringed sagewort, yucca</i> (S.I. > 75%)	13-14"	1755-1910	1500-1700+	.14 -.46+	2.2 -2.4+	1400-1625 +	.38-.44+	2.3-2.6
	11-12"	1445-1600	1225-1450+	.33 -.40+	2.5 -3.0+	1150-1350 +	.31-.37+	2.7-3.2
2. Medium & Short Grasses & Sedges, Half-shrubs <i>Prairie sandreed, needleandthread, western or thickspike wheatgrass, bluebunch wheatgrass, threadleaf sedge, fringed sagewort</i> (S.I. 40-75%)	13-14"	965-1625	575-1450	.16 -.40	2.5 -6.4	525-1375	.14-.38	2.7-7.0
	11-12"	800-1360	475-1225	.13 -.33	3.0 -7.7	450-1150	.12-.31	3.2-8.1
3. Short & Medium Grasses & Sedges, Half-shrubs <i>Needleandthread, threadleaf sedge, western/ thickspike wheatgrass, sand dropseed, yucca, green &amp; fringed sagewort</i> (S.I. 20-40%)	13-14"	700-1335	350-950	.10 -.26	3.9 -10.5	350-800	.10-.22	4.6-10.5
	11-12"	575-1120	275-775	.08 -.21	4.7 -13.3	275-675	.08-.18	5.4-13.3
4. Short Sedges & Grasses, Half- shrubs, Cactus, Annuals <i>Threadleaf sedge, blue grama, Fendler's threeawn, green &amp; fringed sagewort, Japanese brome, plains pricklypear</i> (S.I. < 20%)	11-14"	290-765	75-275	.02 -.08	13.3- 48.8	100-350	.03-.10	10.5-36.6

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 Sandy ecological site occurs over large acreages on the Northern Great Plains except where it is fragmented by conversion to cropland, which is significant in many areas. Habitat fragmentation of this site has contributed to the decline of some “area sensitive” wildlife species, particularly such ground-nesting birds as the grasshopper sparrow. This site is home to a diverse native wildlife complex resulting from the varied habitat structure provided by a mixture of grasses, forbs, and shrubs. Historically, huge herds of migratory bison and pronghorn as well as large numbers of sharp-tailed grouse were probably the dominant “game” species in addition to a wide variety of ground-nesting songbirds, waterfowl and shorebirds, small mammals and mammalian predators. Grazing patterns, topographic diversity, extensive acreages, and interspersions with other ecological sites make this type very important to numerous wildlife species. Small mammal diversity and abundance is high which, in turn, supports a varied raptor population. Invasive plant species such as leafy spurge, Canada thistle and several knapweeds are contributing to a loss of biodiversity within this ecological site. Wildlife water requirements are provided by springs and seeps, intermittent and perennial streams, and in modern times, numerous artificial ponds and livestock pipelines. These areas are locally important for northern leopard frogs, tiger salamanders and a number of toad species, all of which feed on a variety of insects. Grazing, fire, drought cycles, and insect population fluctuations create a shifting mosaic of wildlife habitats across this site.

**Plant Community 1: Tall and Medium Grasses/ Forbs/ Shrubs (HCPC):** The diversity of plant species and life forms provides feeding substrate for a variety of beneficial pollinating insects. Numerous warm and cool water fish species inhabit the intermittent and perennial streams associated with this community. Northern pike, lake chub, carp, a variety of suckers and walleye are examples. Common reptile and amphibian species include tiger salamanders in ponds and stock tanks, Woodhouse’s toad, western chorus frogs, short-horned lizards, bull snake and rattlesnake, and three species of garter snakes. The diversity of grass stature and life forms, along with scattered shrubs and a variety of forbs, provides habitat for many bird species including the upland sandpiper, sharp-tailed grouse, loggerhead shrike, grasshopper and savanna sparrow, chestnut-collared longspur, and western meadowlark. This community is especially favorable for ground-nesting birds because of the abundant residual plant material and litter available for nesting, escape, and thermal cover. Diverse prey populations are available for raptors such as ferruginous and Swainson’s hawks. The predominance of grasses plus a diversity of forbs, shrubs and half-shrubs in this community favors grazers and mixed feeders such as bison, pronghorn and elk. Complex plant structural diversity and litter cover provide habitat for a wide array of small mammals (both seed eaters, i.e. deer mice and herbivores, i.e. voles and jackrabbits) and neotropical migratory birds.

**Plant Community 2: Medium and Short Grasses and Sedges/ Half-shrubs:** The partial loss of structural diversity makes this plant community somewhat less attractive to the variety of wildlife species using the HCPC. Insects still find a wide variety of plant species to utilize. A decrease in residual plant material and litter cover is usually associated with degradation of the HCPC, which makes this community less attractive for amphibians and ground-nesting birds. The reduction in Indian ricegrass decreases seed supplies for both birds and small mammals. Pronghorn make considerable use of this type because of forb and half-shrub availability in the generally open landscape.

**Plant Community 3: Short and Medium Grasses and Sedges / Half-shrubs:** Insect diversity is reduced and grasshopper infestations may increase because of better breeding conditions on the warmer, drier soil surface. Likewise, generally drier conditions reduce habitat value for amphibians. Ground-nesting birds are adversely affected by the loss of residual cover and surface litter. Small mammal diversity is reduced with the loss of varied habitat structure. The seed-eating deer mouse may increase and herbivores, such as voles, decrease.

**Plant Community 4: Short Sedges and Grasses/ Half-shrubs/ Cactus/ Annual Grasses:** Harmful insects, such as grasshoppers, can breed very successfully on the hot, dry soil surface. Habitat conditions for most wildlife species are very poor, reflecting the lack of structural diversity, residual cover and litter cover. Mountain plovers and horned larks may nest on the open soil surface.

**8. Hydrology Data:** The soils associated with this ecological site are generally in Hydrologic Soil Group B. The infiltration rates for these soils will normally be moderate to moderately rapid. The runoff potential for this site is low, depending on slope and ground cover/health. Runoff curve numbers generally range from 65 to 83.

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### 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): 5  
BLM–Soil & Vegetation Inventory Method (SVIM) Data: 2  
NRCS–Range Condition Record (ECS-2): 25  
NRCS–Range/Soil Correlation Observations & Soil 232 notes: 25  
Ecological Site Reference: NRCS 417 No.: Golden Valley County 520

#### 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  
State Rangeland Management Specialist

10/22/2004  
Date

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SECTION II  
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Sandy, 11-14" MAP,  
Sedimentary Plains, Central  
Plant Community 1  
HCPC  
Golden Valley County  
Bluebunch wheatgrass, prairie  
sandreed



Sandy, 11-14" MAP,  
Sedimentary Plains, Central  
Plant Community 1



Sandy, 11-14" MAP,  
Sedimentary Plains, Central  
Plant Community 1

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Sandy, 11-14" MAP,  
Sedimentary Plains, Central  
Plant Community 1  
HCPC  
Musselshell County  
Little bluestem, prairie sandreed,  
needleandthread



Sandy, 11-14" MAP,  
Sedimentary Plains, Central  
Plant Community 1  
Musselshell County



Sandy, 11-14" MAP,  
Sedimentary Plains, Central  
Plant Community 2  
Wheatland County  
Needleandthread, prairie sandreed

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Sandy, 11-14" MAP,  
Sedimentary Plains, Central  
Plant Community 2  
Wheatland County



Sandy, 11-14" MAP,  
Sedimentary Plains, Central  
Plant Community 2  
Musselshell County  
Needleandthread, western  
wheatgrass, prairie sandreed



Sandy, 11-14" MAP,  
Sedimentary Plains, Central  
Plant Community 2  
Musselshell County

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Plant Community 3  
Golden Valley County  
Needleandthread, threadleaf sedge,  
fringed sagewort



Sandy, 11-14" MAP,  
Sedimentary Plains, Central  
Plant Community 3  
Wheatland County