

Ecological Site Description—Rangeland

Very Shallow (VS), 11–14" MAP

MLRA: 58AC – Sedimentary Plains, Central
R058AC058MT



1. Physiographic features:

- Landform:** ridge, shoulders of hills
- Elevation (feet):** 2250 - 4500
- Slope (percent):** 2–70
- Depth to Water Table (inches):** greater than 60
- Flooding:** none
- Ponding:** none
- Runoff Class:** low to medium
- Aspect:** all aspects, can be significant

2. Soils: These soils are typically less than 10 inches deep to hard rock or soft beds of decomposed siltstone, sandstone, or shale. Soils that characterize this ecological site can include deep fragmental soils. Few roots penetrate deeper than 10 inches. Surface textures are variable. Cracks in the bedrock may allow deeper root penetration and have taller grasses, shrubs, or stunted trees. These soils are very droughty, having a total available water capacity of 2 inches or less.

3. Associated sites: Mainly Shallow and Silty-Steep. It is also sometimes associated with Silty and Shallow Clay sites.

4. Similar sites: Gravel, Shallow.

The Gravel site differs mainly in depth or texture.

The Shallow site differs by having a deeper soil profile over the root restricting layer, and having significantly more production.

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 the Historical Climax (HCPC) is that of a sparse grassland that is typically dominated by medium and tall grasses and sedges with a scattered shrub cover. Approximately 60–70% of the annual production is from grasses and sedges, 1–5% from forbs, and 15–25% is from shrubs and half-shrubs. The canopy cover of shrubs is 0–15%.

Dominant species include **bluebunch wheatgrass**, **needleandthread**, **Indian ricegrass**, and short grasses and sedges (**Sandberg bluegrass**, **prairie junegrass**, **threadleaf sedge**). There are abundant forbs (**purple and white prairie clover**, **dotted gayfeather**) which occur in smaller percentages. Shrubs such as **skunkbush sumac** and **Wyoming big sagebrush** are common.

This plant community is well adapted to the Northern Great Plains climatic conditions. The diversity in plant species and the presence of tall, deep-rooted perennial grasses allows for moderately high drought tolerance, considering the limited available water holding capacity of the site. Individual species can vary greatly in production depending on growing conditions (timing and amount of precipitation and temperature). Plants on this site have strong, healthy root systems that allow production to increase significantly with favorable precipitation. 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/ Shrubs: This community occurs due to minor climate shifts or slight variations in soils and/or topography or disturbance, including non-prescribed grazing. Dominants include **needleandthread** and **threadleaf sedge**. Most of the taller and more palatable grasses (bluebunch wheatgrass, Indian ricegrass) will still be present but in smaller amounts. Shrubs such as **Wyoming big sagebrush** and **Rocky Mountain juniper** become more common. Palatable and nutritious forbs will begin to be

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replaced by less desirable and more aggressive species such as **hairy goldenaster, scurfpea species, and scarlet globemallow**.

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

Plant Community 3: Shrubs & Half-shrubs/ Sedges/ Short Grasses: This is a disturbance induced community, with dominants including **Rocky Mountain juniper, Wyoming big sagebrush, threadleaf sedge, perennial forbs, fringed sagewort, and blue grama**. Undesirable species such as **Fendler’s threeawn** become more abundant. There may still be remnant amounts of some of the late and mid-seral species such as bluebunch wheatgrass, Indian ricegrass, and needleandthread present, usually underneath the shrubs. Palatable forbs will be mostly absent. Low growing, mat-like forbs become common. **Crazyweed species** also tend to significantly increase.

Plant Community 4: Shrubs and Half-Shrubs / Short Grasses/ Annual Grasses and Forbs: This community is the result of continual adverse disturbances, and includes a shift to a community comprised primarily of shrubs such as **Wyoming big sagebrush, Rocky Mountain and creeping juniper. Fendler’s threeawn, threadleaf sedge, fringed sagewort, broom snakeweed, annuals (cheatgrass brome, six-weeks fescue), and weedy forbs (knapweeds, thistles)** become prevalent. There may still be remnant amounts of some of the mid-seral species such as and needleandthread present. The taller grasses will occur only occasionally and usually underneath the shrubs. Palatable forbs will be mostly absent.

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. These communities 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–5	0–T	0.25
Grasses/ sedges	3–10	20–30	18
Forbs	1–4	1–5	6
Shrubs	1–5	0–15	12
Litter	30–50		
Coarse fragments	15–25		
Bare ground	25–50		

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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					65–80%	455-560	488-600	520-640	552-680
Bluebunch wheatgrass	PSSP6	2	40-65		280-455	300-488	320-520	340-552	
Western or Thickspike wheatgrass	PASM ELLAL	14	0-15	15	0-105	0-112	0-120	0-128	
Prairie sandreed	CALO	5	0-15		0-105	0-112	0-120	0-128	
Needleandthread	HECOC8	10	5-15		35-105	38-112	40-120	42-128	
Indian ricegrass	ACHY	2	0-20		0-140	0-150	0-160	0-170	
Plains muhly *	MUCU3	3	0-5		-	0-38	0-40	0-42	
Threadleaf sedge	CAFI	12	0-10						
Needleleaf sedge	CADU6	16	T-2						
Blue grama	BOGR2	15	0–5}	10	T-70 No more than 35 for any one	T-75 No more than 38 for any one	T-80 No more than 40 for any one	T-85 No more than 42 for any one	
Prairie junegrass	KOMA	12	0–5}						
Sandberg bluegrass	POSE	12	0–5}						
Plains reedgrass	CAMO	16	0–5}						
Other native grasses	2GP		0–5}						
Fendler's or red threawn	ARPUF	11	0–T}						T
Forbs					5–15%				
Purple or White prairieclover	DAPU5	21	1–5}	15	35-105 No more than 35 for any one	38-112 No more than 38 for any one	40-120 No more than 40 for any one	42-128 No more than 42 for any one	
Prairie coneflower	RACO3	23	1–5}						
Dotted gayfeather	LIPU	21	1–5}						
Slimflower scurfpea spp.	PSAR	23	0-5}						
Hairy goldenaster	HEVI4	23	0-5}						
Scarlet globemallow	SPCO	20	0-5}						
American vetch	VIAM	18	0-5}						
Milkvetch spp.	ASTRA	24	0-5}						
Hood's phlox	PHHO	28	0-5}						
Stemless hymenoxys	HYAC	24	0-5}						
Stemmy goldenweed	HAMU	23	0-5}						
Buckwheat spp.	ERIOG	23	0-5}						
Western yarrow	ACMI2	19	0–5}						
Miners candle	CRBR	24	T-1}						
Penstemon spp.	PENST	28	0–5}						
Plains bahia	BAOP	20	0-5}						
Cutleaf goldenweed	HASP	23	0-5}						
Bastard toadflax	COUM	23	0-5}						
Douglas chaenactis	CHDO	24	0-5}						
Prairie thermopsis	THRH	20	0–5}						
Other native forbs	2FP		0–5}						
Twogrooved poisonvetch **	ASBI2	24	0–T}	T	0–T	0–T	0–T	0–T	
White point loco **	OXSE	24							
Larkspur spp. **	DELPH	24							
Death camas **	ZIGAD	32							
Trees, Shrubs and Half-shrubs					10–20%	70-140	75-150	80-160	85-170
Skunkbush sumac	RHTR	33	T-5}	20	7-140 No more than 35 for any one	8-150 No more than 38 for any one	8-160 No more than 40 for any one	9-170 No more than 42 for any one	
Wyoming big or silver sagebrush	ARTRW8/ ARCA13	37	T-5}						
Fringed sagewort	ARFR4	38	0–5}						
Yucca	YUGL	37	0-5}						
Rocky Mt. juniper	JUSC2	37	0-T}						
Creeping juniper	JUHO2	38	0-T}						
Prairie rose	ROAR3	38	0–5}						
Rubber rabbitbrush	ERNAN5	36	0–5}						
Other native shrubs	2SB		0–5}						
Broom snakeweed	GUSA2	37	0–T}						T
Plains pricklypear	OPPO	38	0–T}						
Total Annual Production (lbs./ac):				100%	700	750	800	850	700

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

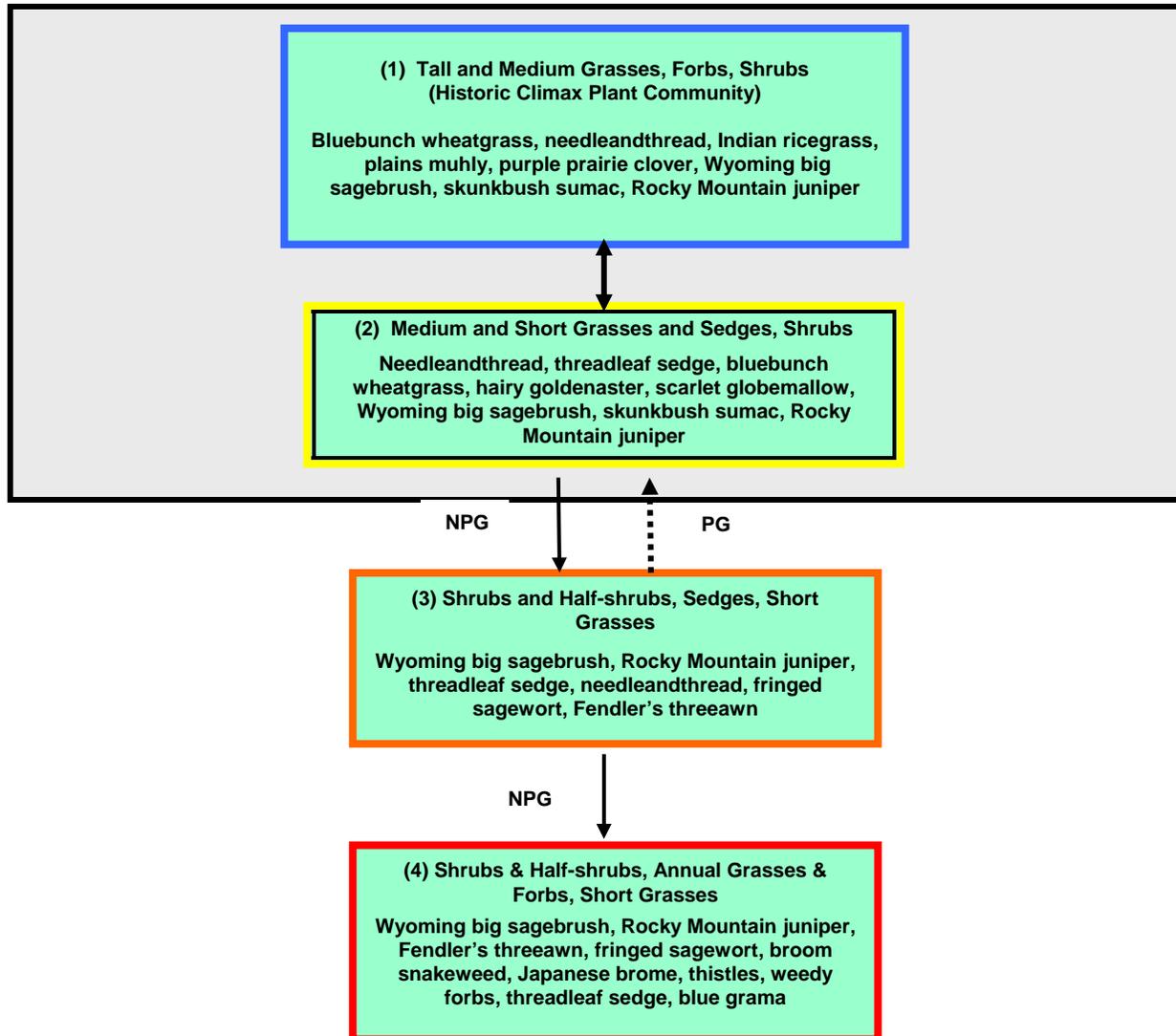
** These plants are poisonous to some grazing animals, during at least some portion of their life cycle.

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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.

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6. Livestock Grazing Interpretations: Managed livestock grazing is suitable on this site as it has the potential to produce a moderate amount of high quality forage. Forage production is limited by steep slopes and very shallow soils, and the potential for runoff, which reduces the effectiveness of the precipitation received for plant growth. The steeper slopes may 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 Communities 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 towards the potential community.

Plant Communities 3 or 4 have significantly reduced forage production (75–400 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. Often, when this site is in this condition, there is a significant amount of erosion pavement/bare ground present.

Communities 3 and 4 have lost many of the attributes of a healthy rangeland, including good infiltration, minimal erosion and runoff, nutrient cycling and energy use. Additional growing season rest is often necessary for re-establishment of the desired species and to restore the stability and health of the site.

Mechanical treatment to improve site health is not feasible due to the very shallow soils and steep slopes.

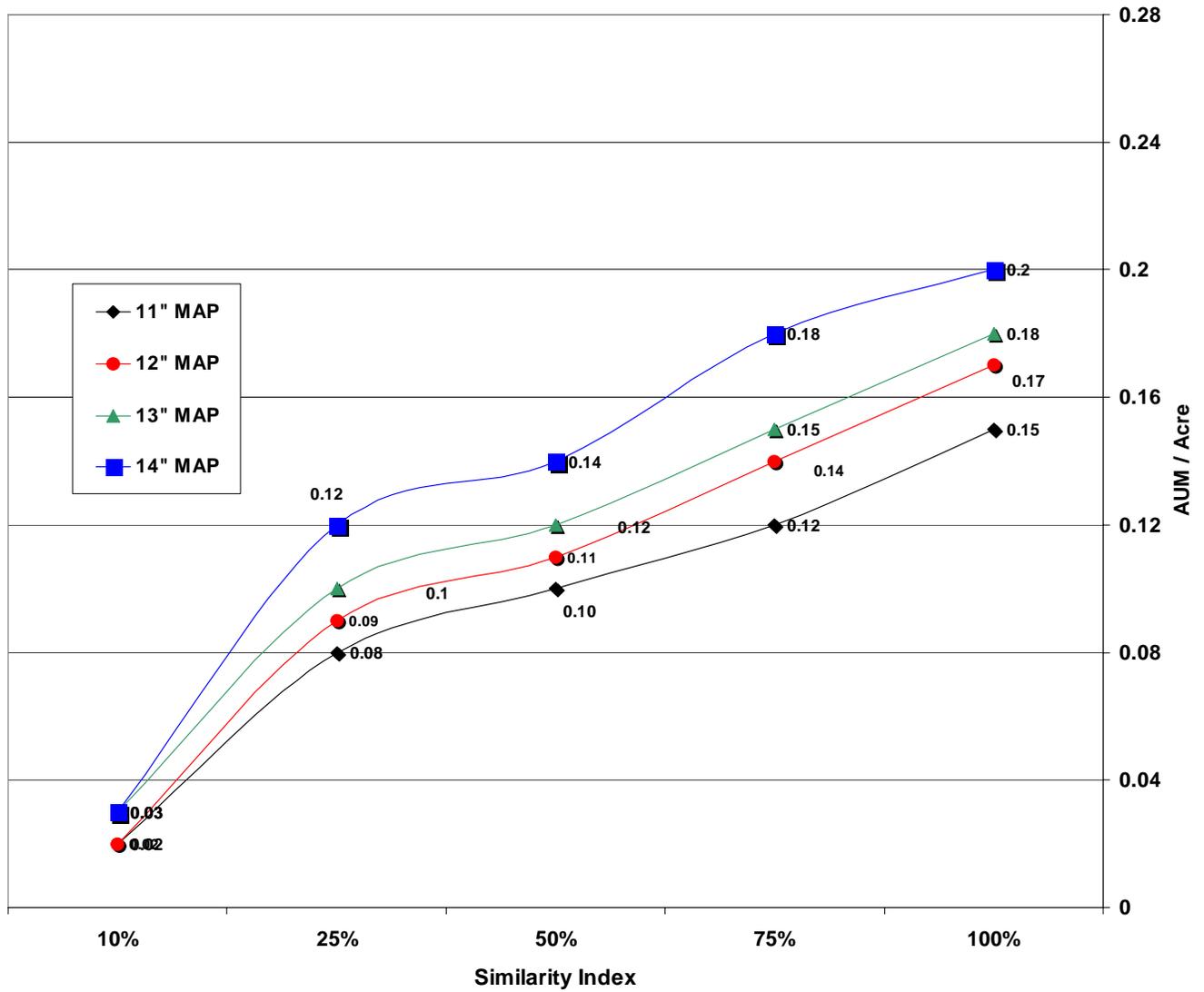
6a. Guide to Safe Stocking Rates: The following charts provide guidance for determining an initial safe stocking rate. Animal Unit Month (AUM) figures are based on averages of forage production from data collected for this site over several years. The characteristic plant communities and production values 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) Very Shallow 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, needleandthread, Indian ricegrass, plains muhly, purple prairie clover, Wyoming big sagebrush, skunkbush sumac, Rocky Mountain juniper</i> (S.I. > 75%)	13–14"	800-850	650-725 +	.18–.20	5.0-5.6	650-725 +	.18 –.20	5.0-5.6
	11–12"	700-750	550-625 +	.15– .17	5.9-6.7	550-650 +	.15 –.18	5.6-6.7
2. Medium and Short Grasses, Shrubs <i>Needleandthread, threadleaf sedge, bluebunch wheatgrass, hairy goldenaster, scarlet globemallow, Wyoming big sagebrush, skunkbush sumac, Rocky Mountain juniper</i> (S.I. 40–75%)	13–14"	560-635	450-550	.12– .15	6.7-8.1	475-575	.13–.16	6.4-7.7
	11–12"	490-550	400-475	.11–.13	7.7-9.2	425-500	.12–.14	7.3-8.6
3. Shrubs and Half-shrubs, Short Grasses and Sedges <i>Wyoming big sagebrush, Rocky Mountain juniper, threadleaf sedge, needleandthread, fringed sagewort, Fendler's threawn</i> (S.I. 20–40%)	13–14"	480-550	350-425	.10–.12	8.6-10.5	375-475	.10–.13	7.7-9.8
	11–12"	420-475	275-325	.08–.09	11.3-13.3	350-400	.10–.11	9.2-10.5
4. Shrubs & Half-shrubs, Annual Grasses & Forbs, Short Grasses <i>Wyoming big sagebrush, Rocky Mountain juniper, Fendler's threawn, fringed sagewort, broom snakeweed, Japanese brome, thistles, weedy forbs, threadleaf sedge, blue grama</i> (S.I. < 20%)	11–14"	280-425	75-125	.02–.03	29.3-48.8	100-200	.03–.05	18.3-36.6

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 Very Shallow ecological site, with its complex topography and vegetative structure, along with a tendency to occur in a mosaic with other ecological sites, often provides for a variety of habitat niches and cover types in an otherwise fairly uniform landscape. 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. Sites having steeper, rocky topography provide habitat for interesting songbird species such as rock wrens, canyon wrens and spotted towhees. Scattered junipers and pines host field sparrows and chipping sparrows. Mountain plovers and night hawks often nest on the pebbly, relatively bare ground surface.

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, rubber rabbitbrush and Wyoming big sagebrush are available. Small mammal diversity may be fairly high, reflecting the diversity of plants species and topography. Example species include the kangaroo rat, deer mouse, olive-backed pocket mouse and desert cottontail.

Plant Community 2: Medium and Short Grasses and Sedges/ 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 may be reduced if the larger shrubs, such as skunkbush sumac decline. Small mammal diversity declines with the loss of vegetative diversity and litter cover.

Plant Community 3: Shrubs and Half-shrubs/ Sedges/ Short Grasses: Insects may be abundant at the height of population cycles but species diversity is reduced significantly. Spring and seep habitat is very degraded which results in poor amphibian habitat. Sparse vegetation and increased bare ground may provide suitable habitat for a few species (i.e. night hawks) 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 and Half-shrubs/ Annual grasses and Forbs/ 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. Big sagebrush, Rocky Mountain and creeping juniper, and fringed sagewort provide some valuable big game winter forage. 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 A. The infiltration rates for these soils are highly variable, requiring an on-site evaluation. The runoff potential for this site is low to moderate, depending on slope and ground cover/health. Runoff curve numbers generally range from 54 to 73.

9. Site Documentation:

Authors: Original: NRCS, 1983

Revised: MJR, REL, RSN, POH, 2003

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Supporting Data for Site Development:

NRCS—Production & Composition Record for Native Grazing Lands (Range-417): 5
BLM—Soil & Vegetation Inventory Method (SVIM) Data: 3
NRCS—Range Condition Record (ECS-2): 10
NRCS—Range/Soil Correlation Observations & Soil 232 notes: 30
Ecological Site Reference: NRCS 417 No.: Golden Valley County 518

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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Very Shallow, 11–14" MAP
Sedimentary Plains, Central
Plant Community 1
HCPC



Very Shallow, 11–14" MAP
Sedimentary Plains, Central
Plant Community 1
HCPC



Very Shallow, 11–14" MAP
Sedimentary Plains, Central
Plant Community 1
HCPC
Golden Valley County

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**Very Shallow, 11–14" MAP,
Sedimentary Plains, Central
Plant Community 1**



**Very Shallow, 11–14" MAP,
Sedimentary Plains, Central
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Plant Community 1



Very Shallow, 11–14" MAP,
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Plant Community 2



Very Shallow, 11–14" MAP,
Sedimentary Plains, Central
Plant Community 2

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Very Shallow, 11–14" MAP,
Sedimentary Plains, Central
Plant Community 2
Sweetgrass County



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Sedimentary Plains, Central
Plant Community 2
Sweetgrass County



Very Shallow, 11–14" MAP,
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Plant Community 2