

## Ecological Site Description—Rangeland

Clayey, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East  
MLRA: 60B – Pierre Shale Plains, East  
R058AE002MT, R060BE566MT

**Site Name:** Clayey (Cy), 10–14 inches Mean Annual Precipitation (MAP)

**Site Number:** R058AE002MT, R060BE566MT

**Major Land Resource Areas:** 58A – Northern Rolling High Plains, North Part  
60B – Pierre Shale Plains, North Part

**Rangeland Resource Units:** 58AE – Sedimentary Plains, East  
60BE – Pierre Shale Plains, East

**1. Physiographic Features:** This ecological site occurs on nearly level to strongly sloping sedimentary plains, terraces and fans. The slopes range from 0–15%, but are mainly less than 8%. This site occurs on all exposures. Aspect is not significant.

**Elevation (feet):** 1,900–3,500  
**Landform:** sedimentary plain, fan, terrace  
**Slope (percent):** 0–15, but mainly less than 8  
**Depth to Water Table (inches):** greater than 60  
**Flooding:** none  
**Ponding:** none  
**Runoff Class:** medium to high  
**Aspect:** not significant

**2. Climatic Features:** MLRAs 58A and 60B are considered to have a continental climate characterized by cold winters, hot summers, low humidity, light rainfall, and much sunshine. Extremes in temperature are typical. The climate is the result of this MLRA's location in the geographic center of North America. There are few natural barriers on the northern Great Plains and the winds move freely across the plains and account for rapid changes in temperature. Seasonal precipitation is often limiting for plant growth. Annual fluctuations in species composition and total production are typical depending on the amount and timing of rainfall. See Climatic Data Sheet MLRA 58A, east and 60B, for more details (Section II of the NRCS Field Office Technical Guide). For local climate station information, refer to <http://www.wcc.nrcs.usda.gov>.

**Frost-free period (32<sup>o</sup> F)-days:** 105–145  
**Freeze-free period (28<sup>o</sup> F)-days:** 125–170  
**Mean annual precipitation (inches):** 10–14

**3. Influencing Water Features:** None

**4. Associated sites:** Other ecological sites that occur in association on the landscape are mainly Clayey-Steep, Shallow Clay, Silty, and Claypan.

**5. Similar sites:** Clayey-Steep, Claypan, and Silty.

The Clayey-Steep differs mainly by being on slopes greater than 15% and having lower production.

The Claypan site differs mainly by having a thinner surface over a hard argillic horizon, being sodium affected, and having lower production.

The Silty site differs mainly by soil texture.

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**6. Soils:** These soils are typically clay loam, silty clay loam, silty clay, sandy clay, sandy clay loam, and clays that are more than 20 inches deep. There are no significant limitations to plant growth.

**Parent material (kind):** alluvium lacustrine

**Parent material (origin):** shale

**Surface textures:** clay loams, silty clay loams, silty clays, sandy clays, or clays

**Depth (inches):** greater than 20

**Soil surface permeability (inches per hour):** moderate(2.0–0.6) to very slow (0.60–.0015)

**Available Water Holding Capacity to 40" (inches):** 5–7.5

**Drainage Class:** well

**Salinity/Electrical Conductivity (mmhos/cm):** non- to very slightly saline (0–4)

**Sodium Absorption Ratio (SAR):** 0–4

**Reaction (pH) (1:1 water):** neutral to moderately alkaline (6.6–8.4)

**6a. Representative Soils:** Listed below are soils and map units which characterize this site in various counties. (Reference MT-165, Soil Interpretive Rating Report).

COUNTIES	TYPICAL SOILS	MAP UNIT
Big Horn	Nunn silty clay loam	Nm
Big Horn	Grail clay loam	Gr
Carter	Ethridge silty clay loam	66C, 626C
Custer	Ethridge silty clay loam	39A, 39C
Custer	Kobase silty clay loam	53A, 53C
Dawson	Marias silty clay	Ma, Mb, Mc
Fallon	Ethridge silty clay loam	85A, 85C
Fallon	Kobase silty clay loam	78C
Garfield	Ethridge silty clay loam	47B, 47C
Garfield	Kobase silty clay loam	66B, 66C
McCone	Hoffmanville silty clay	96
McCone	Ethridge silty clay loam	58,59
Musselshell	Ethridge clay loam	51A, 51B
Musselshell	Kobase silty clay loam	40B,40C
Powder River	Keiser silty clay loam	Kc, Ke, Kf
Powder River	Thurlow silty clay loam	Th, Tm, To
Prairie	Ethridge silty clay loam	48,49
Prairie	Kobar silty clay loam	73, 74
Rosebud	Lonna silty clay loam	126,127
Rosebud	Kobar silty clay	113, 114
Treasure	Kobar clay loam	Hp

**7. Plant Community and Species Composition:** The physical aspect of this site in Historical Climax is that of a level to undulating grassland dominated by cool season grasses, with forbs and shrubs occurring in smaller percentages. Approximately 65–80% of the annual production is from grasses and sedges, 5–10% from forbs, and 5–10% is from shrubs and half-shrubs. Canopy cover of shrubs is typically 1 to 5%.

TABLE 7a.—Major Plant Species Composition, lists plant species composition and production by dry weight for the Historic Climax (HCPC) or Potential Plant Community (PPC) for this site. The Historic Climax or Potential Plant community has been determined by the study of rangeland relict areas, exclosures, or areas protected from excessive grazing. Total annual production has been derived from several data sources, and has been adjusted to represent a typical annual moisture cycle for the site. Reference for plant species names and symbols: USDA–NRCS PLANTS Database at <http://plants.usda.gov>.

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## 7a. Major Plant Species Composition – Historic Climax/Potential Plant Community

Common Name	Plant Symbol	Plant Group	Percent Comp.	Group Max. %	Mean Annual Precipitation (MAP) (inches)				
					10	11	12	13	14
					(lbs./acre)	(lbs./acre)	(lbs./acre)	(lbs./acre)	(lbs./acre)
<b>Grasses and Sedges 65–80%</b>					<b>560</b>	<b>800</b>	<b>1040</b>	<b>1280</b>	<b>1600</b>
Green needlegrass	NAVI	2	20-30		140-210	200-300	260-390	320-480	400-600
Western wheatgrass	PASM	14	15-25		105-175	150-250	195-325	240-400	300-500
Thickspike wheatgrass	ELLAL	14	5-10		35-70	50-100	65-130	80-160	100-200
Bluebunch wheatgrass *	PSSP6	2	5-40		35-280	50-400	65-520	80-640	100-800
Plains muhly	MUCU3	3	0-5		0-35	0-50	0-65	0-80	0-100
Montana wheatgrass	ELLAA	14	0-5		0-35	0-50	0-65	0-80	0-100
Threadleaf sedge	CAFI	12	1-5)	10	7-70 No more Than 35 for Any one	10-100 No more Than 50 for Any one	13-130 No more Than 65 for Any one	16-160 No more Than 80 for Any one	20-200 No more Than 100 for Any one
Needleleaf sedge	CADU6	16	1-5)						
Blue grama	BOGR2	15	1-5)						
Prairie junegrass	KOMA	12	1-5)						
Sandberg bluegrass	POSE	12	1-5)						
Needleandthread	HECOC8	10	0-5)						
Plains reedgrass	CAMO	16	1-5)						
Buffalograss	BUDA	15	1-5)						
Alkali sacaton	SPAI	1	0-5)						
Other native grasses	2GP		1-5)						
Tumblegrass	SCPA	11	1-T	T	T	T	T	T	T
<b>Forbs 5–10 %</b>					<b>70</b>	<b>100</b>	<b>130</b>	<b>160</b>	<b>200</b>
Black samson	ECAN2	21	1-5)	10	7-70 No more Than 35 for Any one	10-100 No more Than 50 for Any one	13-130 No more Than 65 for Any one	16-160 No more Than 80 for Any one	20-200 No more Than 100 for Any one
Scurfpea spp.	PSORA2	23	1-5)						
Purple prairieclover	DAPU5	21	0-5)						
White prairieclover	DACA7	21	0-5)						
Prairie coneflower	RACO3	23	1-5)						
Dotted gayfeather	LIPU	21	1-5)						
American vetch	VIAM	18	1-5)						
Wild onion	ALLIU	32	1-5)						
Milkvetch spp.	ASTRA	24	1-5)						
Hoods phlox	PHHO	28	0-5)						
Wild parsley	MUDI	24	0-5)						
Green sagewort	ARDR4	19	1-5)						
Scarlet globemallow	SPCO	20	1-5)						
Pussytoes spp.	ANTEN	20	0-5)						
Other native forbs	2FP		1-5)						
Two- grooved poisonvetch	ASBI2	24	0-T	T	T	T	T	T	T
White point loco **	OXSE	24	0-T						
Larkspur spp. **	DELPH	24	0-T						
Death camas **	ZIGAD	32	0-T						
<b>Shrubs and Half-shrubs 5–10 %</b>					<b>70</b>	<b>100</b>	<b>130</b>	<b>160</b>	<b>200</b>
Winterfat	KRLA2	35	1-5)	10	7-70 No more Than 35 for Any one	10-100 No more Than 50 for Any one	13-130 No more Than 65 for Any one	16-160 No more Than 80 for Any one	20-200 No more Than 100 for Any one
Nuttall's saltbush	ATNU2	34	1-5)						
Silver sagebrush	ARCA13	36	0-5)						
Green rabbitbrush	CHVI8	36	0-5)						
Rubber rabbitbrush	ERNAN5	36	0-5)						
Wyoming big sagebrush	ARTRW8	37	1-5)						
Fringed sagewort	ARFR4	38	1-5)						
Greasewood	SAVE4	37	0-5)						
Other native shrubs	2SB		1-5)						
Broom snakeweed	GUSA2	37	1-T						
Plains pricklypear	OPPO	38	1-T						
<b>Total Annual Production (lbs./acre)</b>			<b>100%</b>		<b>700</b>	<b>1000</b>	<b>1300</b>	<b>1600</b>	<b>2000</b>

\* The percentage of this species tends to increase in the western part of this range resource unit.

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

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**7b. Plant Group Descriptions:** Plant functional groups are based on: season of growth, growth form, stature, type of root system, and ecological response to disturbance. Refer to Field Office Technical Guide (FOTG) Section II for a complete description of plant groups.

**8. Total Annual Production:** Total annual production is a measurement of the total aboveground production (dry weight) of all major plant species that occur on the site during a single growth year, regardless of preference to grazing animals. This information is listed at the bottom of TABLE 7a.—Major Plant Species Composition. Average production values are listed for each incremental inch of precipitation for the site.

**9. Cover and structure:** The following table shows the approximate amounts of basal cover, canopy cover, and plant heights for this site in the Historic Climax or Potential Plant Community.

COVER TYPE	BASAL COVER (%)	CANOPY COVER (%)	AVERAGE HEIGHT (inches)
Cryptogams	1 – 2	T – 2	0.25
Grasses/sedges	5 – 15	55 – 85	24
Forbs	1 – 4	5 – 10	18
Shrubs	T – 2	1 – 5	24
Litter	35 – 60		
Coarse fragments	0 – 4		
Bare ground	5 – 15		

**10. Ecological Dynamics:** This site developed under Northern Great Plains climatic conditions, which included the natural influence of large herbivores and occasional fire. The plant community upon which interpretations are primarily based is the Historic Climax Plant Community (HCPC) or Potential Plant Community. This community is described as a reference to understand the original potential of this site, and is not always considered to be the management goal for every acre of rangeland. The following descriptions should enable the landowner or manager to better understand which plant communities occupy their land, and assist with setting goals for vegetation management. It can also be useful to understand the environmental and economic values of each plant community.

This site is considered highly resilient to disturbance as it has only minor soil limitations for plant growth. Changes may occur to the Historic Climax Plant Community due to management actions and/or climatic conditions. Under continued adverse impacts, a moderate to extreme decline in vegetative vigor and composition will occur. Under favorable vegetative management treatments, this site can more readily return to a community resembling the Historic Climax Plant Community.

Continual adverse impacts to the site over a period of years results in a departure from the HCPC, with a decrease of the taller, more palatable species such as **green needlegrass, bluebunch wheatgrass, and western wheatgrass**. These plants will be replaced by **Sandberg bluegrass, blue grama, buffalograss**, several species of non-palatable forbs, and **Wyoming big and silver sagebrush**. **Greasewood** may replace Wyoming big sagebrush in MLRA 60B, Pierre Shales. Continued deterioration results in mats of **short grasses, annual grasses and forbs, and cactus**.

Plants that are not a part of the climax community that are most likely to invade are **cheatgrass and Japanese brome, annual and biennial forbs, and broom snakeweed**.

Long-term non-use (>3 years) combined with the absence of fire will result in excessive litter and decadent plants in the bunchgrass communities at higher precipitation zones, 12–14 inches.

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**10a. Major Plant Community Types:** Following are descriptions of several plant communities that may occupy this site.

**Plant Community 1: Tall and Medium Grasses/ Forbs/ Shrubs:** This is the interpretive plant community and is considered to be the Historic Climax Plant Community (HCPC) or Potential Plant Community (PPC) for this site. This plant community is dominated by tall and medium cool season grasses (**green needlegrass, bluebunch wheatgrass, and western wheatgrass**) and a diverse group of short grasses and sedges (**Sandberg bluegrass, prairie junegrass, blue grama, and buffalograss**). An abundance of forbs, shrubs, and half-shrubs in small percentages, including **dotted gayfeather, winterfat, Nuttall's saltbush, and silver or Wyoming big sagebrush**.

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 high drought tolerance. 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 high soil stability and a functioning hydrologic cycle.

**Plant Community 2a: Medium and Short Grasses/ Medium Shrubs:** Slight variations in the historical climax plant community result in a community where western wheatgrass increases slightly, green needlegrass decreases slightly, and short grasses and forbs may increase. Species that tend to dominate include **western wheatgrass, green needlegrass, Sandberg bluegrass, Wyoming big sagebrush, blue grama, and buffalograss**. The blue grama and buffalograss will be scattered throughout this community.

**Plant Community 2b: Medium and Short Grasses and Sedges:** Slight variation in the historical climax plant community can also occur which results in a plant community that is typically dominated by cool and warm season medium and short grasses and sedges. This plant community is similar to 2a except there is no shrub component. This community is dominated by **western wheatgrass, green needlegrass, Sandberg bluegrass, blue grama, and buffalograss**. This community often results from fire on Communities 1 or 2a.

Grass biomass production and litter become reduced on Plant Communities 2a and 2b 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: Short Grasses/ Shrubs and Half-shrubs:** With continued heavy disturbance on community 2a, it tends to shift to one dominated by short grasses (**blue grama, buffalograss, and Sandberg bluegrass**), native perennial forbs, **fringed sagewort, and Wyoming big sagebrush**. Blue grama and buffalograss tend to occur more in thick mats, with greater than 50% canopy cover. **Plains pricklypear and broom snakeweed** may become more common. Green needlegrass is reduced to a minor component, if present at all.

**Plant Community 4: Short Grasses/ Half-shrubs/ Biennial and Annual Forbs:** With continued heavy disturbance on community 2b, it tends to shift to one dominated by species such as **blue grama and buffalograss** (in thick mats greater than 50% cover), **Sandberg bluegrass, fringed sagewort, curlycup gumweed, plains pricklypear, broom snakeweed, and annual bromes and forbs**.

Plant Communities 3 and 4 are much less productive than Plant Communities 1, 2a, or 2b, 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 may take additional inputs, such as brush management, mechanical treatment, combined with prescribed grazing to move it towards a community similar in production and composition to that of Plant Community 1, 2a, or 2b.

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**Plant Community 5: Short Grasses/ Annuals/ Cacti:** Further disturbance and deterioration of Community 3 or 4 leads to a plant community that has excessive loss of topsoil and an increase of bare ground. The community will change to one dominated primarily by **plains pricklypear, Japanese brome, cheatgrass, and blue grama/buffalograss**. The blue grama and buffalograss tend to become matted.

This plant community has extremely reduced productivity (< 300 lbs./acre), and low species diversity. The lack of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and high evaporation, which gives blue grama 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. Significant economic inputs and time would be required to move this plant community toward a higher successional stage and a more productive plant community. The most practical way to restore this community is through mechanical treatment and/or seeding.

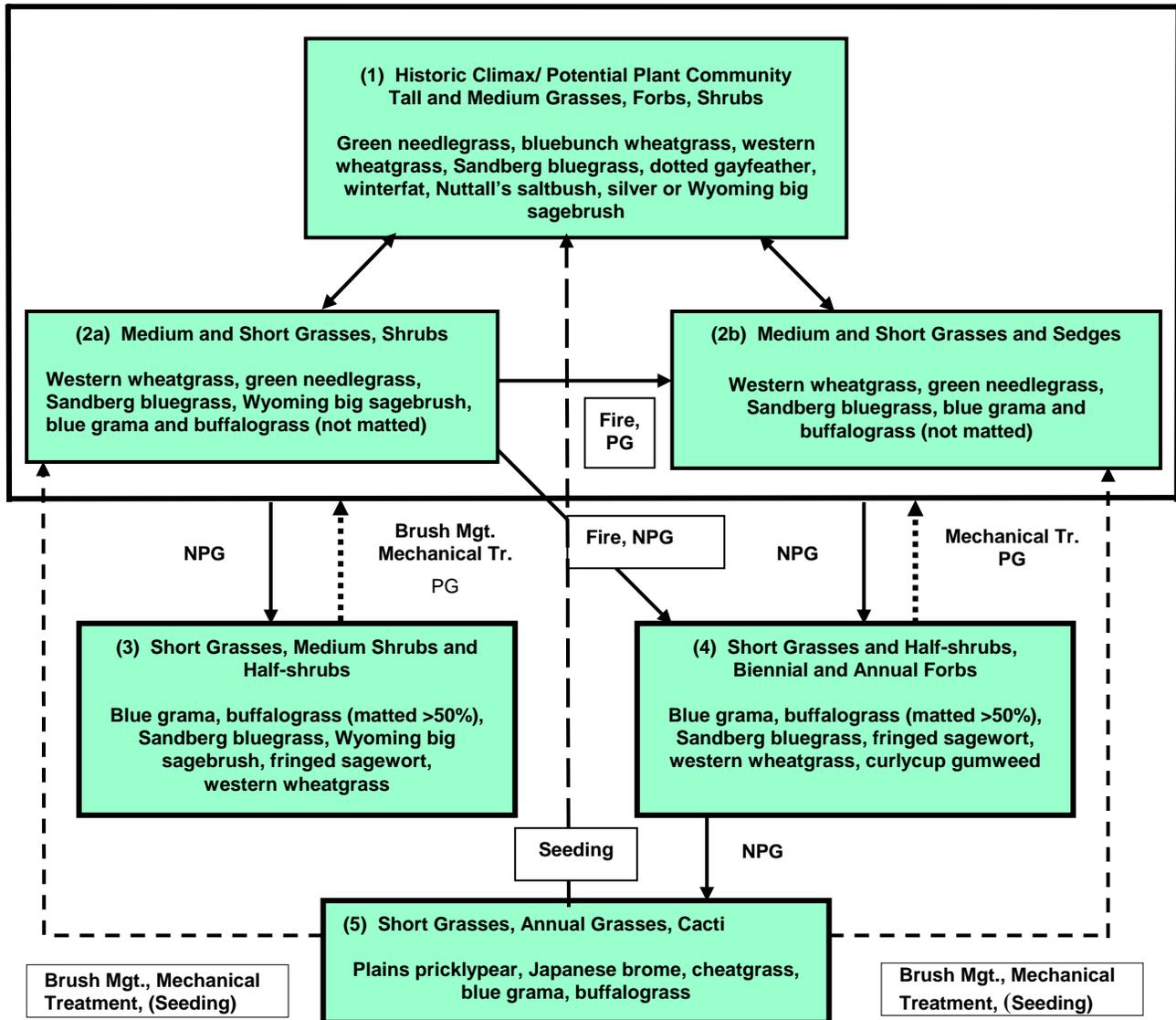
**10b. Plant Communities and Transitional Pathways (State and Transition Model):** Transitions in plant community composition occur along a gradient that is not linear. Many processes are involved in the changes from one community to another. Changes in climate, elevation, soils, landform, fire patterns and frequency, and grazing all play a role in determining which of the plant communities will be expressed. The following model outlines some of the various plant communities that may occur on this site and provides a diagram of the relationship between plant community and type of use or disturbance.

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## 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.

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: Non-prescribed wildfire.

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**11. Plant Growth Curves:** Growth of native cool-season plants begins in April and continues to the end of June. Native warm-season plants begin growth about mid May and continue to about the end of August. Green up of cool-season plants can occur in September through October when adequate soil moisture is present. The following tables show the approximate percentage of total growth by month that is expected to occur in various plant communities on this site for a "typical" moisture year.

**Growth Curve Number: MT0808**

Growth Curve Description: Includes all sedimentary plains sites with deep, loamy or silty textured upland soils and cool season grasses.

**Totals for Each Month**

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
0	0	0	25	30	30	5	5	5	0	0	0

**Cumulative Totals by Month**

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
0	0	0	25	55	85	90	95	100	0	0	0

**Growth Curve Number: MT0813**

Growth Curve Description: Includes all low condition sites in eastern sedimentary plains sites, dominated by short grasses.

**Totals for Each Month**

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
0	0	0	25	25	25	10	10	5	0	0	0

**Cumulative Totals by Month**

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
0	0	0	25	50	75	85	95	100	0	0	0

**12. Livestock Grazing Interpretations:** Managed livestock grazing is suitable on this site as it has the potential to produce a high amount of high quality forage. This is often a preferred site for grazing by livestock, and animals tend to congregate in these areas due to the flat slopes and high forage quality. In order to maintain the productivity of this site, stocking rates must be managed carefully on adjoining sites with less production to be sure livestock drift onto the Clayey 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 2a or 2b occurs (medium and short grasses), grazing management strategies need to be implemented to avoid further deterioration. These communities are still stable, productive, and healthy provided they receive 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 these communities back towards the potential community.

Communities 3, 4, and 5 have lost many of the attributes of a healthy rangeland, including good infiltration, minimal erosion and runoff, nutrient cycling and energy use. Once this site is occupied by these communities it will be more difficult to restore it to a community that resembles the potential with grazing management alone. Additional growing season rest combined with accelerated practices (e.g. range seeding, chiseling) are often necessary for re-establishment of the desired species and to restore the stability and health of the site.

**12a. Calculating Safe Stocking Rates:** Proper stocking rates should be incorporated into a grazing management strategy that protects the resource, maintains or improves rangeland health, and is consistent with management objectives. Safe stocking rates will be based on useable forage production, and should consider ecological condition and trend of the site, and past grazing use history.

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Calculations used to determine a safe stocking rate are based on the amount of useable forage available, taking into account the harvest efficiency of the animal and the grazing strategy to be implemented. Average annual production must be measured or estimated to properly assess useable forage production and stocking rates.

**12b. Guide to Safe Stocking Rates:** The following charts provide a guide for determining an 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, hence this table should not be used without on-site information as to current 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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## 12c. 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
<b>1. Tall and Medium Grasses, Forbs, Shrubs (HCPC/PPC)</b>  <i>Green needlegrass, bluebunch wheatgrass, western wheatgrass, dotted gayfeather, winterfat, Nuttall's saltbush</i>  (S.I. >70%)	13–14"	1600 – 2000	1300–1700+	.40–.55+	1.8 – 2.5	1450–1800+	.45–.57+	1.7–2.2
	10–12"	700 – 1300	600–1100+	.20–.35+	2.9 – 5.0	650–1150+	.21–.36+	2.8–4.8
<b>2a. Medium and Short Grasses, Shrubs</b>  <i>Western wheatgrass, Sandberg bluegrass, Wyoming big sagebrush, blue grama</i>  (S.I. 50–70%)	13–14"	1350 – 1700	850 – 1350	.27 - .42	2.4 – 3.7	1050–1550	.33–.50	2.0–3.0
	10–12"	600 – 1100	400 – 900	.13 - .28	3.6 – 7.7	500–1000	.16–.32	3.1–6.3
<b>2b. Medium and Short Grasses and Sedges</b>  <i>Western wheatgrass, Sandberg bluegrass, blue grama, threadleaf sedge, buffalograss</i>  (S.I. 50–70%)	13–14"	1350 – 1700	1000 –1450	.32 - .45	2.2 – 3.1	1050–0550	.33–.50	2.0–3.0
	10–12"	600 – 1100	450 – 950	.14 - .30	3.3 – 7.1	500–1000	.16–.32	3.1–6.3
<b>3. Short Grasses, Shrubs and Half-shrubs</b>  <i>Blue grama, fringed sagewort, broom snakeweed, Wyoming big sagebrush, western wheatgrass</i>  (S.I. 30–50%)	10–14"	500 – 1000	250 – 650	.08 - .20	5.0 - 12.5	350–800	.11–.25	4.0–9.1
<b>4. Short Grasses, Half-shrubs, Biennials and Annuals</b>  <i>Blue grama, Sandberg bluegrass, fringed sagewort, broom snakeweed, curlycup gumweed</i>  (S.I. 25–45%)	10–14"	200 – 600	100 – 400	.03 - .11	9.1– 33.3	140–480	.04–.13	7.8–25.0
<b>5. Short Grasses, Annuals, Cacti</b>  <i>Blue grama, broom snakeweed, cheatgrass, plains pricklypear, red threawn</i>  (S.I. < 25%)	10–14"	200 – 600	60 – 300	.01 - .07	14.3 – 100.0	80–360	.02–.08	12.5–50.0

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 790 pounds per animal unit month (AUM) for a 1,000-pound cow with calf up to 4 months. No adjustments have been made for site grazability factors, such as steep slopes, site inaccessibility, or distance to drinking water.

# Ecological Site Description—Rangeland

Clayey, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East

MLRA: 60B – Pierre Shale Plains, East

R058AE002MT, R060BE566MT

## 12d. Plant Forage Preferences for Cattle and Sheep

**Legend:** P=Preferred D=Desirable U=Undesirable E=Emergency  
N=Nonconsumed T=Toxic Blank=Unknown or no data

Winter (W) = Jan., Feb., March;  
Summer (SU) = July, Aug., Sept.;

Spring (SP) = April, May, June;  
Fall (F) = Oct., Nov., Dec.

PLANT NAME	Cattle				Sheep			
	W	SP	SU	F	W	SP	SU	F
Green needlegrass	P	P	P	P	P	P	P	P
Western wheatgrass	P	D	D	P	D	D	D	D
Thickspike wheatgrass	P	P	P	P	P	P	P	P
Little bluestem	P	P	P	P	U	D	D	U
Bluebunch wheatgrass	P	D	P	P	D	D	D	D
Sideoats grama	P	P	P	P	D	D	P	D
Needleandthread <sup>1/</sup>	D	D	D	D,T	D	D	D	D
Sandberg bluegrass	D	D	D	D	D	D	D	D
Threadleaf and Needleleaf sedge	D	P	P	D	D	P	P	D
Montana wheatgrass	P	P	P	P	P	P	P	P
Prairie junegrass	D	D	D	D	D	P	D	D
Plains muhly	D	D	D	D	D	D	D	D
Alkali sacaton	D	D	U	D	D	D	U	D
Blue grama	D	D	D	D	D	P	P	D
Plains reedgrass	D	D	D	D	U	U	U	U
Buffalograss	D	D	D	D	D	D	D	D
Red threeawn	N	U	N	N	N	U	N	N
Tumblegrass	N	U	N	N	N	U	N	N
Cheatgrass <sup>2/</sup>	U	D	N	N	U	P	U	U
Black samson	N	D	D	D	D	P	P	D
Prairieclover spp.	N	D	D	D	D	D	D	D
Dotted gayfeather	N	P	P	P	D	P	D	D
Milkvetch spp. <sup>3/</sup>	N	D,T	D,T	D,T	D,T	P,T	D,T	D,T
American vetch	N	P	P	D	N	P	P	D
Prairie coneflower	N	D	D	D	D	D	D	D
Wild onion	N	P	P	N	N	P	P	N
Hood's phlox	N	N	N	N	U	U	U	U
Pussytoes spp.	N	N	N	N	U	U	U	U
Wild parsley	N	D	D	U	N	D	D	U
Green sagewort	N	N	N	N	N	N	N	N
Scarlet globemallow	N	D	D	D	N	D	D	D
Two-grooved poisonvetch	N	T	T	T	N	T	T	T
White point loco	N	T	T	T	T,N	T,N	T,N	T,N
Low larkspur	N	N,T	N,T	N	N	D,T	D,T	N
Death camas	N	T	T	N	N	T	T	N
Winterfat	P	P	P	P	P	D	D	P
Nuttall's saltbush	P	P	P	P	P	P	P	P
Prairie rose	N	N	N	N	D	D	D	D
Silver sagebrush	D	D	D	D	D	D	D	D
Green and Rubber rabbitbrush	U	U	U	U	U	U	U	U
Wyoming big sagebrush	N	N	N	N	P	D	D	P
Rocky Mountain juniper	N	N	N	N	U	N	N	N
Greasewood <sup>4/</sup>	N	N	N,E	N,E	D	U, T	U	D
Fringed sagewort	N	N	N	N	U	U	U	U
Broom snakeweed <sup>5/</sup>	N	N	N	U	U	U	U	U
Plains pricklypear <sup>6/</sup>	N	N	N	N	U	U	U	U

<sup>1/</sup> The awns and sharp seeds of needleandthread can harm livestock when dry.

<sup>2/</sup> Not a native plant, but a common invader.

<sup>3/</sup> Some species of milkvetch are poisonous.

<sup>4/</sup> Greasewood can be toxic to sheep in spring if large quantities are ingested.

<sup>5/</sup> Broom snakeweed can be poisonous, but this is not usually a problem in Montana because plants die back in winter and do not have green leaves in early spring.

<sup>6/</sup> The spines can be injurious to livestock.

## Ecological Site Description—Rangeland

Clayey, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East  
MLRA: 60B – Pierre Shale Plains, East  
R058AE002MT, R060BE566MT

**13. Wildlife Interpretations:** The following is a description of habitat values for the different plant communities that may occupy the site:

**Plant Community 1: Tall Grasses/Forbs/Shrubs (HCPC or PPC):** The predominance of grasses plus high diversity of forbs, shrubs and half-shrubs in this community favors grazers and mixed feeders such as bison, pronghorn and elk. Suitable thermal and escape cover for mule deer is limited because of low shrub cover. Large animal nutrition levels are relatively high year-long with the diversity of grasses, sedges, forbs and shrubs. When this plant community is adjacent to large blocks of sagebrush-grassland, it can provide quality sage grouse lek sites and brood habitat. The complex plant structural diversity provides habitat for a wide array of small mammals and neotropical migratory birds. Diverse prey populations are available for raptors such as ferruginous and Swainson's hawks. The mix 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, Baird's, grasshopper and savanna sparrow, chestnut-collared longspur and western meadowlark. This community is especially favorable for ground-nesting birds because of the abundant residual spring cover and litter cover available for nesting, escape and thermal cover.

**Plant Community 2a: Medium and Short Grasses/ Medium Shrubs:** Wyoming big sagebrush, with canopy cover of 15–30%, and an understory of grasses and forbs, is excellent nesting, winter, brood-rearing and foraging habitat for sage grouse. Other obligate sagebrush-grassland species, notably Brewer's sparrow, also benefit from an increase in sagebrush cover. Baird's and grasshopper sparrows, on the other hand, will decrease as shrub cover becomes denser. When residual grass and litter cover decrease in this community, ground nesting bird habitat values decline. This community often provides important winter range for mule deer and pronghorn. The sagebrush crowns break up hard crusted snow and provide about 15% protein and 40–60% digestibility for ungulates.

**Plant Community 2b: Medium and Short Grasses/ Forbs:** The partial loss of structural diversity makes this plant community somewhat less attractive to the diversity of wildlife species using the HCPC. A decrease in residual plant material and litter cover is usually associated with degradation of the HCPC, which makes this community less attractive for ground-nesting birds. Pronghorn make considerable use of this type because of forb availability in the generally open landscape.

**Plant Community 3: Short Grasses/ Shrubs and Half-shrubs:** This community may represent important sage grouse winter habitat when big sagebrush makes up over 20% canopy cover. However, nesting habitat quality for all ground-nesting birds declines significantly as residual grass cover and mid-grasses disappear. Succulent forbs such as salsify, dandelion, curlycup gumweed and prickly lettuce are selected by sage grouse broods. Sage grouse will use openings as lek sites. Brewer's sparrow will benefit from an increase in big sagebrush cover.

**Plant Community 4: Short Grasses/ Half-shrubs/ Biennial and Annual Forbs:** This community has relatively low habitat value for most wildlife species except when it occurs in prairie dog towns. It may provide lek sites for sage grouse when it is found adjacent to stands of big sagebrush and is used by foraging pronghorn seasonally. Mountain plovers and horned larks may nest in this community.

**Plant Community 5: Short Grasses/ Annuals/ Cacti:** This community has very low wildlife habitat value because of the lack of plant species diversity and complex vegetative structure. Pronghorn forage on forbs and shrubs.

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## 13a. Plant Preferences for Antelope and Deer:

**Legend:** P=Preferred D=Desirable U=Undesirable E=Emergency  
N=Nonconsumed T=Toxic Blank=Unknown or no data

Winter (W) = Jan., Feb., March; Spring (SP) = April, May, June;  
Summer (SU) = July, Aug., Sept.; Fall (F) = Oct., Nov., Dec.

PLANT NAME	Antelope				Deer			
	W	SP	SU	F	W	SP	SU	F
Perennial grasses	P	P	P	P	D	P,D	D	D
Red threeawn	N	N	N	N	N	N	N	N
Annual grasses	N	P,D	N	D	N	P,D	N	D
Sedges	D	P	P	P	D	P	P	P
Black samson	P	P	P	P	D	D	D	D
Prairieclover spp.	P	P	P	P	P	P	P	P
Dotted gayfeather	D	P	D	D	D	P	P	P
Milkvetch spp.	D	P	P	D	D	D	D	D
Scurfpea spp.	N	D	D	D	D	D	D	D
Hairy goldenaster	E	E	E	E	E	E	E	E
Goldenrod spp.	D	P	P	P	D	D	D	D
American licorice	P	P	D	D	D	P	D	D
Prairie coneflower	D	P	P	D	D	P	D	D
American vetch	P	P	P	P	D	P	P	P
Hood's phlox	U	U	U	U	U	U	U	U
Wild parsley	U	D	U	U	U	D	U	U
Green sagewort	N	N	N	N	N	N	N	N
Scarlet globemallow	D	D	D	D	D	D	D	D
Twogrooved poisonvetch	N, T	N, T	N, T	N, T	N, T	N, T	N, T	N, T
White point loco	N, T	N, T	N, T	N, T	N, T	N, T	N, T	N, T
Death camas	N, T	N, T	N, T	N, T	N, T	N, T	N, T	N, T
Larkspur spp.	N, T	N, T	N, T	N, T	N, T	N, T	N, T	N, T
Winterfat	P	P	P	P	P	P	P	P
Nuttall's saltbush	P	P	P	P	D	P	P	D
Prairie rose	U	U	U	U	E	D	E	E
Silver sagebrush	D	D	P	D	P	P	D	P
Wyoming big sagebrush	P	P	P	P	P	P	D	D
Rabbitbrush spp.	D	D	D	D	D	D	D	D
Rocky Mountain juniper	N	N	N	N	D	D	D	D
Greasewood	P	P	D	D	P	P	D	D
Fringed sagewort	D	U	U	D	D	U	U	D
Plains pricklypear	N	N	N	N	N	N	N	N
Broom snakeweed	N	N	D	N	D	D	P	P

**14. Hydrology Data:** The runoff potential for this site is low to moderate, depending on slope and ground cover/health. Runoff curve numbers generally range from 78 to 90. The soils associated with this ecological site are generally in Hydrologic Soil Group C. Soils have a slow infiltration rate when thoroughly wetted and consist chiefly of soils with moderately fine to fine textures.

Good hydrologic conditions exist on rangelands if plant cover (grass, litter, and brush canopy) is greater than 70%. Fair conditions exist when cover is between 30 and 70%, and poor conditions exist when cover is less than 30%. Sites in high similarity to HCPC (Plant Communities 1, 2a and 2b) generally have enough plant cover and litter to optimize infiltration, minimize runoff and erosion, and have a good hydrologic condition. The deep root systems of the potential vegetation help maintain or increase infiltration rates and reduce runoff.

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Sites in low similarity (Plant Communities 3, 4, and 5) are generally considered to be in poor hydrologic condition as the majority of plant cover is from shallow-rooted species such as blue grama and annual grasses.

Erosion is minor for sites in high similarity. Rills and gullies should not be present. Water flow patterns, if present, will be barely observable. Plant pedestals are essentially non-existent. Plant litter remains in place and is not moved by erosion. Soil surfaces should not be compacted or crusted. Plant cover and litter helps retain soil moisture for use by the plants. Maintaining a healthy stand of perennial vegetation will optimize the amount of precipitation that is received. (Reference: Engineering Field Manual, Chapter 2 and Montana Supplement 4).

**15. Recreation and Natural Beauty:** This site provides some recreational opportunities for hiking, horseback riding, big game and upland bird hunting. The forbs have flowers that appeal to photographers. This site provides valuable open space and visual aesthetics. Caution should be used during wet weather periods.

**16. Wood Products:** None

**17. Site Documentation:**

**Authors:** Original: REL, AJN, 1983      Revised: JVF, REL, RSN, MJR, SKW, SVF, POH, 2003

**Supporting Data for Site Development:**

- NRCS–Production & Composition Record for Native Grazing Lands (Range-417): 13
- BLM–Soil & Vegetation Inventory Method (SVIM) Data: 6
- NRCS–Range Condition Record (ECS-2): 302
- NRCS–Range/Soil Correlation Observations & Soil 232 notes: 46

**Field Offices where this site occurs within the state:**

Baker	Ekalaka	Hysham	Sidney
Billings	Forsyth	Jordan	Terry
Broadus	Glendive	Miles City	Wibaux
Circle	Hardin	Roundup	

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

Rhonda Sue Noggles  
**State Rangeland Management Specialist**

06/30/03  
**Date**

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**Clayey 10–14"**  
**Sedimentary Plains, east**  
**Plant Community 1**  
**HCPC /PPC**  
**Green needlegrass**



**Clayey 10–14"**  
**Sedimentary Plains, east**  
**Plant Community 1**  
**HCPC /PPC**  
**Prairie County**



**Clayey 10–14"**  
**Sedimentary Plains, east**  
**Plant Community 1**  
**HCPC /PPC**

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**Clayey 10–14"**  
**Sedimentary Plains, east**  
**Plant Community 1**  
**HCPC /PPC**  
**Rosebud County**



**Clayey 10–14"**  
**Sedimentary Plains, east**  
**Plant Community 1**  
**HCPC /PPC**  
**Carter County**



**Clayey 10–14"**  
**Sedimentary Plains, east**  
**Plant Community 2a**  
**Wyoming big sagebrush**

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**Clayey 10–14"**  
**Sedimentary Plains, east**  
**Plant Community 2a**  
**Carter County**



**Clayey 10–14"**  
**Sedimentary Plains, east**  
**Plant Community 2a**  
**Powder River County**



**Clayey 10–14"**  
**Sedimentary Plains, east**  
**Plant Community 2a**

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**Clayey 10-14"  
Sedimentary Plains, east  
Plant Community 2b  
Rosebud County**



**Clayey 10-14"  
Sedimentary Plains, east  
Plant Community 2b  
Carter County**



**Clayey 10-14"  
Sedimentary Plains, east  
Plant Community 3  
Carter County**

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**Clayey 10–14"**  
**Sedimentary Plains, east**  
**Plant Community 3**  
**Blue grama, buffalograss**



**Clayey 10–14"**  
**Sedimentary Plains, east**  
**Plant Community 3**



**Clayey 10–14"**  
**Sedimentary Plains, east**  
**Plant Community 3**  
**Blue grama**

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**Clayey 10–14"**  
**Sedimentary Plains, east**  
**Plant Community 4**  
**Carter County**



**Clayey 10–14"**  
**Sedimentary Plains, east**  
**Plant Community 4**  
**Carter County**  
**Matted blue grama**



**Clayey 10–14"**  
**Sedimentary Plains, east**  
**Plant Community 5**

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**Clayey 10–14"  
Sedimentary Plains, east  
Plant Community 5**



**Clayey 10–14"  
Sedimentary Plains, east  
Plant Community 5  
Prairie County  
Plains pricklypear**



**Clayey 10–14"  
Sedimentary Plains, east  
Plant Community 5  
Carter County**

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**Clayey 10-14"  
Sedimentary Plains, east  
Plant Community 5  
Plains pricklypear**