

## Ecological Site Description—Rangeland

ClayPan, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East  
MLRA: 60B – Pierre Shale Plains, East  
R058AE013MT, R060BE565MT

**Site Name:** ClayPan (CP), 10–14 inches Mean Annual Precipitation (MAP)

**Site Number:** R058AE013MT, R060BE565MT

**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):** 1,900–3,000  
**Landform:** plains, fans, terraces  
**Slope (percent):** 0–15, but are mainly less than 8  
**Depth to Water Table (inches):** greater than 60  
**Flooding:** none  
**Ponding:** none  
**Runoff Class:** high to very 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>0</sup> F)-days:** 105–145  
**Freeze-free period (28<sup>0</sup> F)-days:** 125–170  
**Mean annual precipitation (MAP):** 10–14 inches

**3. Influencing Water Features:** None

**4. Associated sites:** Mainly Dense Clay, Clayey, Silty, and Saline Upland. Occasionally Sandy, Shallow, and Shallow Clay sites have been mapped in association with the ClayPan.

**5. Similar sites:** Saline Upland, Dense Clay, and Shale.

The Saline Upland site differs by being affected by soluble salts (i.e., electroconductivity will be higher), resulting in a plant community having mainly salt tolerant plants.

The Dense Clay site has nongranular heavy clays that have a very thin surface layer.

The Shale site soils are usually shallow with very little soil development evident. This site is extremely sparse and low producing.

# Ecological Site Description—Rangeland

ClayPan, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East  
MLRA: 60B – Pierre Shale Plains, East  
R058AE013MT, R060BE565MT

**6. Soils:** These soils are over 20 inches deep and have a surface texture that can vary from fine sandy loam to clay loam. Within 2–8 inches of the surface is a hard to extremely hard clayey argillic horizon having strong columnar or prismatic structure. Salt and lime accumulations are often evident in the lower part of the B horizon. Root penetration is restricted by the argillic horizon, with the roots becoming flattened and tending to follow cracking in the subsoil.

**Parent material (kind):** alluvium, residuum (there are localized areas of glacial lacustrine deposits)

**Parent material (origin):** mixed sedimentary rock

**Surface textures:** fine sandy loam, loam, silt loam, clay loam, very fine sandy loam

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

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

**Available Water Holding Capacity to 40" (inches):** 5–8

**Drainage Class:** well

**Salinity/Electrical Conductivity (mmhos/cm):** non-saline to slightly saline (0–8) above the ClayPan

**Sodium Absorption Ratio (SAR):** mainly  $\leq 13$  above the ClayPan layer

**Reaction (pH) (1:1 water):** mainly neutral to slightly alkaline (6.6–8.4) above the ClayPan

**6a. Representative Soils:** Soil map unit components which characterize this site in various counties: (See MT-165, Soil Interpretive Rating Report).

COUNTIES	TYPICAL SOILS	MAP UNIT
Big Horn	Gilt Edge silty clay loam	Gc, Gd
Carter	Archin fine sandy loam	75A, 75C
Carter	Gerdrum clay loam	65A, 65C
Custer	Archin loam	19c
Custer	Gerdrum silty clay loam	421A, 421C
Fallon	Archin fine sandy loam	75A, 75C
Fallon	Gerdrum clay loam	65A, 65C
Garfield	Gerdrum clay loam	558C, 556D, 291B, 53C
Garfield	Archin loam	86C
McCone	Gerdrum clay loam	68, 69
McCone	Rominell loam	120, 121
Musselshell	Gerdrum loam	23A, 23C
Powder River	Gilt Edge silt loam	Gd, Ge
Prairie	Gerdrum silty clay loam	60, 61
Rosebud	Gerdrum clay loam	88, 89
Treasure	Gilt Edge clay loam	Ga, Gb

**7. Plant Community and Species Composition:** The physical aspect of this site is that of a moderately sparse grassland and shrubland that is dominated by cool season grasses with shrubs distributed throughout. Approximately 70–80% of the annual production is from grasses and sedges, 1–5% from forbs, and 2–10% is from shrubs and half-shrubs. The canopy cover of shrubs is 2 to 10%.

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>.

# Ecological Site Description—Rangeland

ClayPan, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East  
MLRA: 60B – Pierre Shale Plains, East  
R058AE013MT, R060BE565MT

## 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 70–80 %</b>					<b>400</b>	<b>560</b>	<b>720</b>	<b>800</b>	<b>880</b>
Western or Thickspike wheatgrass	PASM ELLAL	14	20-35		100-175	140-245	180-315	200-350	220-385
Green needlegrass	NAVI4	2	10-20		50-100	70-140	90-180	100-200	110-220
Alkali sacaton	SPAI	1	5-10		25-50	35-70	45-90	50-100	55-110
Montana wheatgrass	ELLAA	14	5-10		25-50	35-70	45-90	50-100	55-110
Needleandthread	HECOC8	10	5-10		25-50	35-70	45-90	50-100	55-110
Bluebunch wheatgrass*	PSSP6	2	0-5		0-25	0-35	0-45	0-50	0-55
Threadleaf sedge	CAFI	12	1-5}	15	5-75 No more than 25 for any one	7-105 No more than 35 for any one	9-135 No more than 45 for any one	10-150 No more than 50 for any one	11-165 No more than 55 for any one
Needleleaf sedge	CADU6	16	0-5}						
Blue grama	BOGR2	15	1-5}						
Prairie junegrass	KOMA	12	1-5}						
Sandberg bluegrass	POSE	12	1-5}						
Plains reedgrass	CAMO	16	0-5}						
Buffalograss	BUDA	15	0-5}						
Sand dropseed	SPCR	9	0-5}						
Bottlebrush squirreltail	ELEL5	10	0-5}						
Inland saltgrass	DISP	15	1-5}						
Other native grasses	2GP		1-5}						
Tumblegrass	SCPA	11	0-T	T	T	T	T	T	
Red threeawn	ARLUL	11	0-T	T	T	T	T	T	
<b>Forbs 1–5 %</b>					<b>25</b>	<b>35</b>	<b>45</b>	<b>50</b>	<b>55</b>
Scurfpea spp.	PSORA	23	0-5}	5	5-25	7-35	9-45	10-50	11-55
Purple prairieclover	DAPU5	21	1-5}						
White prairieclover	DACA7	21	1-5}						
Prairie coneflower	RACO3	23	1-5}						
American vetch	VIAM	18	1-5}						
Wild onion	ALLIU	32	1-5}						
Milkvetch spp.	ASTRA	24	1-5}						
Hood's phlox	PHHO	28	0-5}						
Scarlet globemallow	SPCO	20	0-5}						
Erigeron spp.	ERST	28	0-5}						
Other native forbs	2FP		1-5}						
<b>Shrubs and Half-shrubs 5–15 %</b>					<b>75</b>	<b>105</b>	<b>135</b>	<b>150</b>	<b>165</b>
Winterfat	KRLA2	35	1-5	5	5-25	7-35	9-45	10-50	11-55
Nuttall's saltbush	ATNU2	34	1-5	5	5-25	7-35	9-45	10-50	11-55
Silver sagebrush	ARCA13	36	0-10}	15	5-75 No more than 50 for any one	7-105 No more than 70 for any one	9-135 No more than 90 for any one	10-150 No more than 100 for any one	11-165 No more than 110 for any one
Greasewood	SAVE4	37	1-10}						
Wyoming big sagebrush	ARTRW8	37	1-10}						
Fringed sagewort	ARFR4	38	1-10}						
Other native shrubs	2SB		1-10}						
Plains pricklypear	OPPO	38	0-T	T	T	T	T	T	
<b>Total Annual Production (lbs./acre)</b>			<b>100%</b>		<b>500</b>	<b>700</b>	<b>900</b>	<b>1000</b>	<b>1100</b>

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

**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.

# Ecological Site Description—Rangeland

ClayPan, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East  
MLRA: 60B – Pierre Shale Plains, East  
R058AE013MT, R060BE565MT

**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 accessibility 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	T – 1	0 – T	0.25
Grasses/sedges	5 – 10	30 – 50	24
Forbs	1 – 5	5 – 10	18
Shrubs	1 – 5	2 – 10	24
Litter	5 – 10		
Coarse fragments	0 – 4		
Bare ground	40 – 60		

**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 given 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 has moderate to low resilience to disturbance as it has severe soil limitations for plant growth and a high percentage of bare ground. Changes may occur to the Historic Climax Plant Community due to management actions and/or climatic conditions. Under continued adverse impacts, a moderate decline in vegetative vigor and composition will occur. Under favorable vegetative management treatments, this site can more readily return to one resembling the Historic Climax Plant Community.

Disturbances to this site will result in the decrease of the more palatable species such as **western wheatgrass, green needlegrass, Nuttall's saltbush, and winterfat**. These plants will be replaced by **needleandthread, Sandberg bluegrass, blue grama, and Wyoming big sagebrush**. Continued deterioration results in a plant community including, greasewood/sagebrush, blue grama, and plains pricklypear. **Greasewood and inland saltgrass** can become more dominant when this site is in MLRA 60B.

Plants that are not a part of the climax community that are most likely to invade are **annual bromes and forbs**.

**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 contains a variety of medium cool season grasses (**western wheatgrass, green needlegrass**), and shrubs that include **Nuttall's saltbush, winterfat, silver sagebrush, and Wyoming big sagebrush**.

## Ecological Site Description—Rangeland

ClayPan, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East  
MLRA: 60B – Pierre Shale Plains, East  
R058AE013MT, R060BE565MT

This plant community is well adapted to the Northern Great Plains climatic conditions. The diversity in plant species and the presence of 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. A moderate amount of 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 Shrubs / Medium and Short Grasses:** This community occurs with disturbances to the historical climax plant community but generally having less diversity of shrubs. **Wyoming big sagebrush** often becomes the dominant shrub. Other species that tend to dominate include **western wheatgrass, needleandthread, Sandberg bluegrass, and blue grama.**

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/ Cacti:** Continued degradation in the plant community usually results in a community dominated by species such as **Wyoming big sagebrush, greasewood, blue grama, and plains pricklypear.** There may still be remnant amounts of species such as western wheat grass and needleandthread. This community tends to have a higher salt content and an increase in bareground (often as "pans").

**Plant Community 4: Short Grasses/ Cacti/ Annual Grasses and Forbs:** Continued degradation in the plant community usually results in a community dominated by **plains pricklypear, blue grama/ buffalograss sod, annual bromes and forbs, and inland saltgrass.** This community may be associated with **prairie dog towns.**

Plant communities 3 and 4 are less productive than Plant Communities 1 or 2. The lack of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and high evaporation, which gives short grasses, shrubs, and annuals a competitive advantage over the 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.

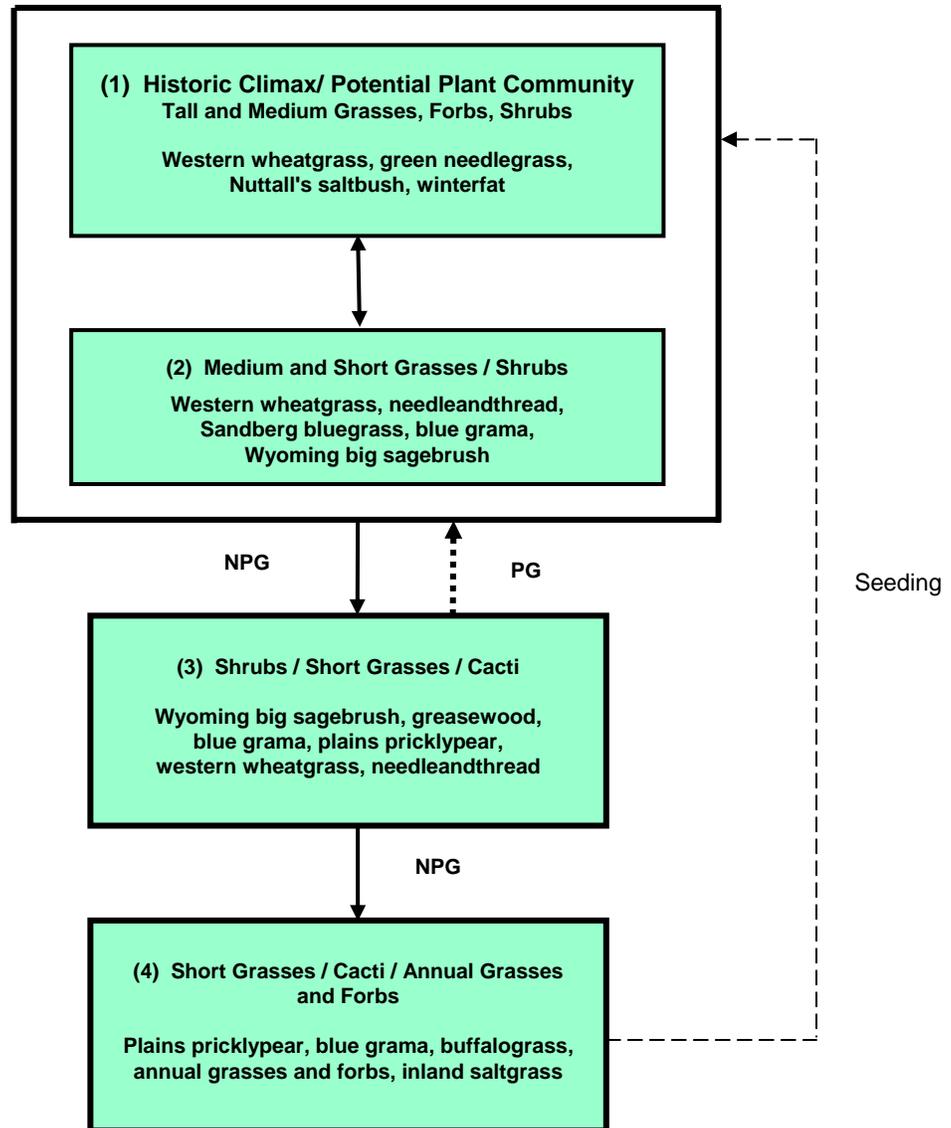
**10b. Plant Communities and Transitional Pathways (State and Transition Model):** Transitions in plant community composition occur along a gradient that is not linear. Many processes are involved in the changes from one community to another. Changes in climate, elevation, soils, landform, fire patterns 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.

# Ecological Site Description—Rangeland

ClayPan, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East  
MLRA: 60B – Pierre Shale Plains, East  
R058AE013MT, R060BE565MT

## 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.

# Ecological Site Description—Rangeland

ClayPan, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East  
MLRA: 60B – Pierre Shale Plains, East  
R058AE013MT, R060BE565MT

**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: MT0811**

Growth Curve Description: Includes all eastern sedimentary plains sites in the 10–14" p.z. with droughty upland soils, having mainly cool season plants.

**Totals for Each Month**

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
0	0	5	25	35	30	5	0	0	0	0	0

**Cumulative Totals by Month**

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
0	0	5	30	65	95	100	0	0	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 moderate amount of high quality forage. 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 occurs (medium and short grasses), 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.

Once this site is occupied by 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 and 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. The response to these treatments is limited by the presence of sodium.

**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.

Calculations used to determine an 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.

# Ecological Site Description—Rangeland

ClayPan, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East  
MLRA: 60B – Pierre Shale Plains, East  
R058AE013MT, R060BE565MT

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.

### 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
1. Tall and Medium Grasses, Forbs, Shrubs (HCPC/PPC)  <i>Western wheatgrass, green needlegrass, Nuttall's saltbush, winterfat</i>  (S.I. >70%)	13–14"	1000 – 1100	850 – 950	.27 - .30	3.3 – 3.7	900 - 1000	.28 - .32	3.3–3.6
	10–12"	500 - 900	400 – 750	.13 - .24	4.2 – 7.7	450 – 800	.15 - .25	4.0–6.7
2. Medium and Short Grasses/ Shrubs  <i>Western wheatgrass, needleandthread, Sandberg bluegrass, blue grama, Wyoming big sagebrush</i>  (S.I. >45–70%)	13–14"	800 – 900	550 – 700	.17 - .22	4.5 – 5.9	650 – 800	.21 - .25	5.3–9.1
	10–12"	400 - 700	300 – 550	.09 - .17	5.9– 11.1	350 – 600	.11 - .19	5.3–12.5
3. Shrubs / Short Grasses / Cacti  <i>Wyoming big sagebrush greasewood, blue grama, plains pricklypear, western wheatgrass, needleandthread</i>  (S.I. < 45%)	10–14"	350 – 750	200 – 500	.06 - .16	6.2– 16.7	250 – 600	.08 - .19	12.5–33.3
4. Short grasses / Cacti / Annual Grasses and Forbs  <i>Plains pricklypear, blue grama, buffalograss, annual grasses and forbs, inland saltgrass</i>  (S.I. < 45%)	10–14"	250 – 550	150 – 300	.03 - .07	14.3–33.3	150 - 350	.03 - .08	33.3–100

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

ClayPan, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East  
MLRA: 60B – Pierre Shale Plains, East  
R058AE013MT, R060BE565MT

## 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; Spring (SP) = April, May, June;  
Summer (SU) = July, Aug., Sept.; 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
Bluebunch wheatgrass	P	D	P	P	D	D	D	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
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
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
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
Winterfat	P	P	P	P	P	D	D	P
Nuttall's saltbush	P	P	P	P	P	P	P	P
Silver sagebrush	D	D	D	D	D	D	D	D
Wyoming big sagebrush	N	N	N	N	P	D	D	P
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> 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

ClayPan, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East  
MLRA: 60B – Pierre Shale Plains, East  
R058AE013MT, R060BE565MT

**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 and Medium Grasses/ Forbs/ Shrubs (HCPC or PPC):** The prevalence of Nuttall's saltbush, winterfat and Wyoming big sagebrush favors mixed feeders like the pronghorn. Nutritious early to mid-season forage is also available for grass feeders, including bison and elk. Sage grouse may use this open habitat for lek sites and feeding on sagebrush. Small mammal species composition will be dominated by seed-eaters, particularly deer mice. Brewer's sparrows and mountain plovers are examples of breeding bird species potentially using this community spring-fall. Relatively low amounts of litter and residual grass cover limit use by a number of ground-nesting bird species.

**Plant Community 2: Medium and Short Grasses/ Medium Shrubs:** The reduction in decreaser grasses, saltbush and winterfat reduces habitat value for pronghorn and other ungulates, as well as seed-eating small mammals. An increase in big sagebrush cover may improve winter and nesting habitat for sage grouse and spring-fall habitat for Brewer's sparrows and sage thrashers, but the decrease in litter and residual grass cover generally reduces nesting habitat quality for ground-nesting birds.

**Plant Community 3: Shrubs/ Short Grasses/ Cacti:** Sagebrush specialists, including pronghorn, sage grouse and Brewer's sparrow may use this community seasonally; pronghorn during winter, sage grouse during winter and the nesting season, and Brewer's sparrow spring through fall migration. Seed-eating small mammals, especially deer mice, may thrive on annual forb seed production. The community has relatively low value for most wildlife species considering the lack of vegetative structural diversity, residual grass carry-over and litter cover.

**Plant Community 4: Short Grasses/ Cacti / Annual Grasses and Forbs:** Wildlife habitat values are very limited in this community with the loss of plant species and structural diversity. Deer mice may make use of seed production from annual grasses and forbs.

# Ecological Site Description—Rangeland

ClayPan, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East  
MLRA: 60B – Pierre Shale Plains, East  
R058AE013MT, R060BE565MT

## 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
Silver sagebrush	D	D	P	D	P	P	D	P
Wyoming big sagebrush	P	P	P	P	P	P	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 very high depending on slope and ground cover/health. Runoff curve numbers generally range from 84 to 93. The soils associated with this ecological site are generally in Hydrologic Soil Group D. The infiltration rates for these soils will normally be very slow.

Good hydrologic conditions exist on rangelands if plant cover 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 and 2) 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.

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

## Ecological Site Description—Rangeland

ClayPan, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East  
MLRA: 60B – Pierre Shale Plains, East  
R058AE013MT, R060BE565MT

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, 198      Revised: JVF, REL, RSN, MJR, SKW, SVF, POH, 2003

**Supporting Data for Site Development:**

NRCS–Production & Composition Record for Native Grazing Lands (Range-417): 3  
BLM–Soil & Vegetation Inventory Method (SVIM) Data: 6  
NRCS–Range Condition Record (ECS-2): 15  
NRCS–Range/Soil Correlation Observations & Soil 232 notes: 38

**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**

## Ecological Site Description—Rangeland

ClayPan, 10–14" MAP

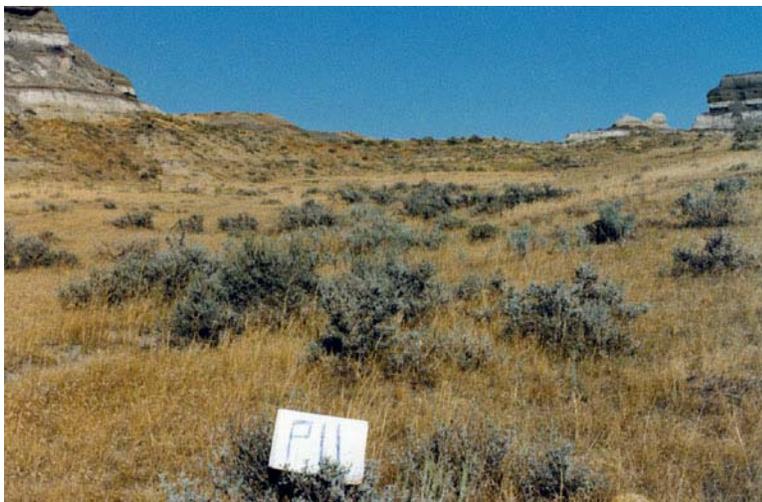
MLRA: 58A – Sedimentary Plains, East  
MLRA: 60B – Pierre Shale Plains, East  
R058AE013MT, R060BE565MT



ClayPan 10–14"  
Sedimentary Plains, east  
Plant Community 1  
HCPC /PPC  
Custer County



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



ClayPan 10–14"  
Sedimentary Plains, east  
Plant Community 1  
HCPC /PPC  
Custer County

## Ecological Site Description—Rangeland

ClayPan, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East  
MLRA: 60B – Pierre Shale Plains, East  
R058AE013MT, R060BE565MT



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



**ClayPan 10–14"  
Sedimentary Plains, east  
Plant Community 2  
Prairie County**



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

## Ecological Site Description—Rangeland

ClayPan, 10–14" MAP

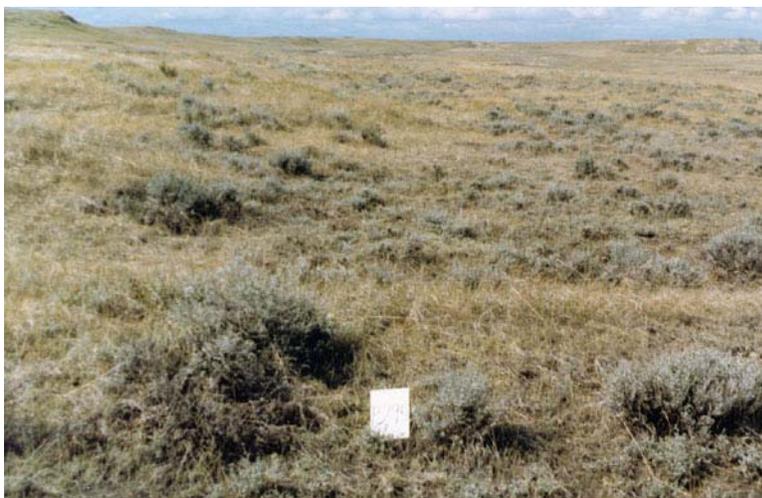
MLRA: 58A – Sedimentary Plains, East  
MLRA: 60B – Pierre Shale Plains, East  
R058AE013MT, R060BE565MT



**ClayPan 10–14"**  
**Sedimentary Plains, east**  
**Plant Community 2**  
**Custer County**



**ClayPan 10–14"**  
**Sedimentary Plains, east**  
**Plant Community 3**  
**Custer County**  
**Wyoming big sagebrush**



**ClayPan 10–14"**  
**Sedimentary Plains, east**  
**Plant Community 3**  
**Fallon County**

## Ecological Site Description—Rangeland

ClayPan, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East  
MLRA: 60B – Pierre Shale Plains, East  
R058AE013MT, R060BE565MT



**ClayPan 10–14"**  
**Sedimentary Plains, east**  
**Plant Community 3**  
**Prairie County**



**ClayPan 10–14"**  
**Sedimentary Plains, east**  
**Plant Community 3**  
**Carter County**  
**Blue grama sod**



**ClayPan 10–14"**  
**Sedimentary Plains, east**  
**Plant Community 3**  
**Carter County**  
**Blue grama / Plains pricklypear**

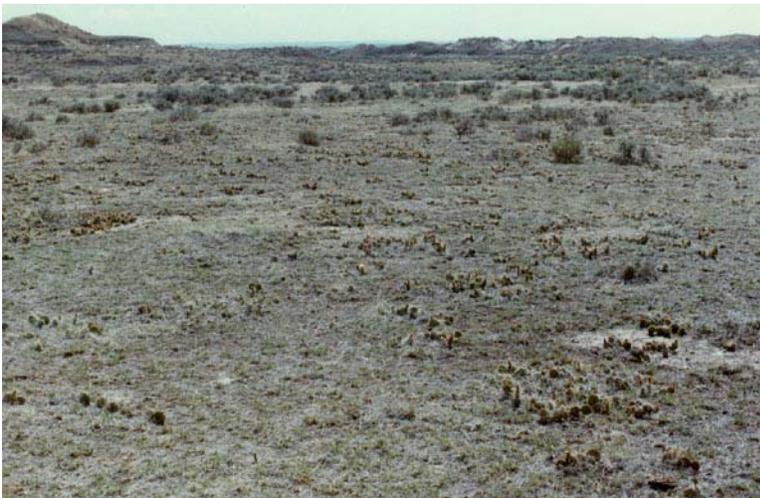
## Ecological Site Description—Rangeland

ClayPan, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East  
MLRA: 60B – Pierre Shale Plains, East  
R058AE013MT, R060BE565MT



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



**ClayPan 10–14"**  
**Sedimentary Plains, east**  
**Plant Community 4**  
**Rosebud County**