

Ecological Site Description—Rangeland

Dense Clay, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East
 MLRA: 60B – Pierre Shale Plains, East
 R058AE014MT, R060BE568MT

Site Name: Dense Clay (DC), 10–14 inches Mean Annual Precipitation (MAP)

Site Number: R058AE014MT, R060BE568MT

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: lake plains, sedimentary plains, fans, and 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: very high

Aspect: not significant

2. Climatic Features: MLRAs 58A and 60B are considered to have a continental climate 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° F)-days: 105–145

Freeze-free period (28° F)-days: 125–170

Mean annual precipitation (MAP): 10–14 inches

3. Influencing Water Features: None

4. Associated sites: Clayey, ClayPan, and Saline Upland.

5. Similar sites: Saline Upland, ClayPan, Shale.

The Saline Upland site differs by not having the very hard layer near the surface and by having a plant community of mainly salt tolerant species. In addition, the electroconductivities significantly limit, if not prohibit, the potential for any form of mechanical treatment or reseeding on the Saline Upland. Soils in the Saline Upland site generally are given a Capability Class rating of 7. (Soils in the Dense Clay site are generally Capability Class 6.)

The ClayPan site differs by generally having 2–8 inches of soil over the hard argillic layer, less bare ground, and higher production.

The Shale site differs by having soils that are usually shallow with very little soil profile evident.

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R058AE014MT, R060BE568MT

6. Soils: These are moderately deep to very deep nongranular clay soils that are strongly to very strongly alkaline near the surface. These soils typically are very hard to extremely hard when dry and very sticky when wet. They typically have a thin vesicular surface crust, which restricts water permeability. The subsoil is either massive, or has a very strong columnar structure. Permeability and root development are severely limited by the surface crust, hard subsoil, and alkalinity.

Parent material (kind): alluvium

Parent material (origin): semi-consolidated sedimentary bedrock, glaciolacustrine or glaciofluvial deposits

Surface textures: clay, silty clay, or silty clay loam

Depth (inches): greater than 40

Soil surface permeability (inches per hour): very slow (0.06–.0015)

Available Water Holding Capacity to 40" (inches): 5–7

Drainage Class: moderately well to well

Salinity/Electrical Conductivity (mmhos/cm): very slightly to slightly saline (2–8)

Sodium Absorption Ratio (SAR): 13–30

Reaction (pH) (1:1 water): moderately alkaline to very strongly alkaline (7.9–9.6)

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	Vananda clay	Va, Vc
Carter (60B)	Vanda silty clay loam	97A
Custer	Vanda silty clay	621B
Dawson	Vanda clay	Va
Fallon	Absher clay	168B
Garfield	Absher silty clay loam	21C
Garfield	Vanda silty clay	60B
McCone	Vanda clay	148
Musselshell	Vanda silty clay	25A
Powder River	Vananda clay	Va
Prairie	Vanda silty clay	96
Rosebud (60B)	Vanda silty clay	189
Treasure	Pierre clay	Pk

7. Plant Community and Species Composition: The physical aspect of this site is that of a very sparse grassland and shrubland that is typically dominated by cool season grasses and shrubs. Approximately 50–60% of the annual production is from grasses and sedges, 1–5% from forbs, and 20–35% is from shrubs and half-shrubs. The canopy cover of shrubs is 20–25%.

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)
Grasses and Sedges 50–60 %					210	300	420	480	540
Western or Thickspike wheatgrass	PASM ELLAL	14	30-40		105-140	150-200	210-280	240-320	270-360
Green needlegrass	NAVI4	2	1-10		4-35	5-50	7-70	8-80	9-90
Alkali bluegrass	POJU	2	1-5		4-18	5-25	7-35	8-40	9-45
Montana wheatgrass	ELLAL	14	0-10		0-35	0-50	0-70	0-80	0-90
Threadleaf sedge	CAFI	12	1-5}	10	4-35 No more than 18 for any one	5-50 No more than 25 for any one	7-70 No more than 35 for any one	8-80 No more than 40 for any one	9-90 No more than 45 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}						
Plains reedgrass	CAMO	16	1-5}						
Inland saltgrass *	DISP	15	0-5}						
Alkali sacaton	SPAI	1	1-5}						
Bottlebrush squirreltail	ELEL5	10	1-5}						
Other native grasses	2GP		1-5}						
Forbs 1–5 %					18	25	35	40	45
Prairie thermopsis	THRH	20	1-5}	5	4-18	5-25	7-35	8-40	9-45
Wild onion	ALLIU	32	1-5}						
Milkvetch spp.	ASTRA	24	1-5}						
Eriogonum spp.	ERIOG	23	1-5}						
Biscuitroot spp.	LOMAT	24	1-5}						
Western yarrow	ACMI2	19	1-5}						
Aster spp.	ASTER	19	1-5}						
Scarlet guara	GACO	23	1-5}						
Other native forbs	2FP		1-5}						
Shrubs and Half 20–35 %					122	175	245	280	315
Nuttall's saltbush	ATNU2	34	10-25	15	4-52 No more than 35 for any one	5-75 No more than 50 for any one	7-105 No more than 70 for any one	8-120 No more than 80 for any one	9-135 No more than 90 for any one
Wyoming big sagebrush	ARTRW8	37	1-5						
Fringed sagewort	ARFR4	38	1-5						
Winterfat	KRLA2	35	1-10}						
Greasewood *	SAVE4	37	0-10}						
Other native shrubs	2SB		1-10}						
Broom snakeweed	GUSA2	37	0-T	T	T	T	T	T	T
Plains pricklypear	OPPO	38	0-T						
Total Annual Production (lbs./acre)			100%		350	500	700	800	900

* Mainly occurs on soils having higher electroconductivity.

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 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.

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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	20 – 30	24
Forbs	1 – 2	T – 1	18
Shrubs	1 – 5	20 – 25	24
Litter	15 – 20		
Coarse fragments	0 – T		
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 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 moderately resilient to disturbance as it has moderate to high 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 decline in vegetative vigor and composition will occur. Under favorable vegetative management treatments, this site can more readily return to a community that resembles 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 **western and thickspike wheatgrasses, green needlegrass, and Nuttall's saltbush**. These plants will begin to be replaced by short grasses such as **Sandberg bluegrass and blue grama**. Continued deterioration results in a community dominated by **Wyoming big sagebrush, plains pricklypear, bottlebrush squirreltail, blue grama, and Sandberg bluegrass** with a corresponding increase in the amount of bare ground.

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

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 simple mix of tall and medium height cool season grasses (**western and thickspike wheatgrass and green needlegrass**). A few forbs occur in small percentages. Shrubs that occur on this site include **Nuttall's saltbush and Wyoming big sagebrush**.

This site is not highly productive. Large areas of bare ground between the plants are common. This site also occurs as a "pan" when in complex with better sites, usually Clayey or ClayPan.

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MLRA: 58A – Sedimentary Plains, East
MLRA: 60B – Pierre Shale Plains, East
R058AE014MT, R060BE568MT

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, considering the limitations 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 high soil stability and a functioning hydrologic cycle.

Plant Community 2: Medium Shrubs/ Medium and Short Grasses: Slight variations in the historical climax plant community result in a community where the western wheatgrass, green needlegrass and Nuttall's saltbush decreases in composition. Species that tend to dominate include **Wyoming big sagebrush** and short grasses such as **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/ Cacti/ Annual Grasses and Forbs: With continual heavy disturbance over several years, this site will experience a loss of topsoil and an increase of bare ground. Continued degradation in the plant community usually results in a community dominated by **Wyoming big sagebrush, plains pricklypear, and annual grasses and forbs**. **Bottlebrush squirreltail** is often a component of this community.

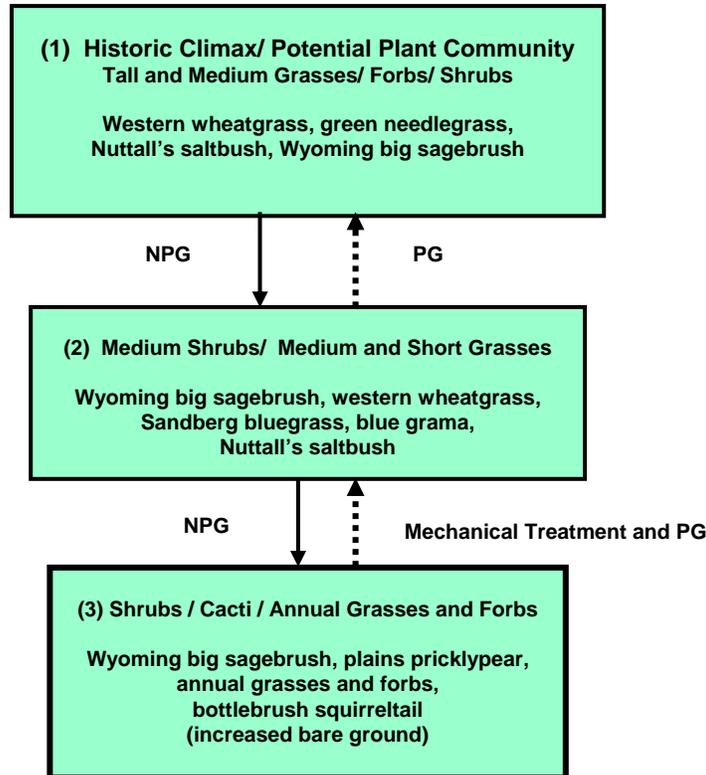
10b. Plant Communities and Transitional Pathways (State and Transition Model): Transitions in plant community composition occur along a gradient that is not linear. Many processes are involved in the changes from one community to another. Changes in climate, elevation, soils, landform, fire patterns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

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.

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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, 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

Growth Curve Number: MT0814

Growth Curve Description: Includes all low condition sites in eastern sedimentary plains sites including 10% or more shrubs.

Totals for Each Month

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
0	0	0	5	25	40	15	10	5	0	0	0

Cumulative Totals by Month

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
0	0	0	5	30	70	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 (shrubs and medium 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.

Plant Community 3 has severely reduced forage production (< 225 pounds per acre) and is comprised mostly of non-palatable species for livestock. Once this site is occupied by Plant Community 3, it will be more difficult to restore it to a community that resembles the potential with grazing management alone. Additional growing season rest in conjunction with mechanical treatment are often necessary for re-establishment of the desired species and to restore the stability and health of the site. The presence of sodium severely limits the potential for response to any treatments.

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MLRA: 60B – Pierre Shale Plains, East
R058AE014MT, R060BE568MT

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. 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 <i>Dominant Plant Species</i>	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, Wyoming big sagebrush</i> (S.I. >70%)	13–14"	800 – 900	650 – 750	.21 - .24	4.0–4.8	700 – 800	.22 - .25	4.0–4.5
	10–12"	350 – 700	275 – 550	.09 - .17	5.9–11.1	300 – 600	.09 - .19	5.3–11.1
2. Medium Shrubs/ Medium and Short Grasses <i>Wyoming big sagebrush, western wheatgrass, Sandberg bluegrass, blue grama, Nuttall's saltbush</i> (S.I. 50–70%)	13–14"	600 – 700	400 – 525	.13 - .17	5.9–7.8	450 – 600	.14 - .19	5.3–7.1
	10–12"	250 – 525	150 – 400	.05 - .13	7.8–20.0	200 – 450	.06 - .14	7.1–16.7
3. Shrubs/ Cacti/ Annual Grasses and Forbs <i>Wyoming big sagebrush, plains pricklypear, annual grasses and forbs, bottlebrush squirreltail</i> (S.I. < 45%)	10–14"	200 – 450	100 – 225	.02 - .05	20.0–50.0	150 – 350	.03 - .08	12.5–33.3

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.

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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
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
Tumblegrass	N	U	N	N	N	U	N	N
Cheatgrass ^{1/}	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. ^{2/}	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
Wyoming big sagebrush	N	N	N	N	P	D	D	P
Greasewood ^{3/}	N	N	N,E	N,E	D	U, T	U	D
Fringed sagewort	N	N	N	N	U	U	U	U
Broom snakeweed ^{4/}	N	N	N	U	U	U	U	U
Plains pricklypear ^{5/}	N	N	N	N	U	U	U	U

^{1/} Not a native plant, but a common invader.

^{2/} Some species of milkvetch are poisonous.

^{3/} Can be toxic to sheep in spring if large quantities are ingested.

^{4/} 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.

^{5/} The spines can be injurious to livestock.

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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 Shrubs/ Medium and Short Grasses: The reduction in tall grasses, Nuttall's 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/ Cacti/ Annual Grasses and Forbs: 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.

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MLRA: 60B – Pierre Shale Plains, East
R058AE014MT, R060BE568MT

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
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
Green sagewort	N	N	N	N	N	N	N	N
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 (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 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 Community 3) are generally considered to be in poor hydrologic condition as the majority of plant cover is from shallow-rooted species and shrubs.

Ecological Site Description—Rangeland

Dense Clay, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East
MLRA: 60B – Pierre Shale Plains, East
R058AE014MT, R060BE568MT

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 recreational opportunities for big game and upland bird hunting, and hiking. The forbs have flowers that appeal to photographers. This site provides valuable open space and visual aesthetics.

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): 3

BLM–Soil & Vegetation Inventory Method (SVIM) Data: 6

NRCS–Range Condition Record (ECS-2):

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

Dense Clay, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East
MLRA: 60B – Pierre Shale Plains, East
R058AE014MT, R060BE568MT



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



Dense Clay 10–14"
Sedimentary Plains, east
Plant Community 1
HCPC /PPC



Dense Clay 10–14"
Sedimentary Plains, east
Plant Community 1
HCPC /PPC
Cracks in Soil Surface

Ecological Site Description—Rangeland

Dense Clay, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East
MLRA: 60B – Pierre Shale Plains, East
R058AE014MT, R060BE568MT



Dense Clay 10–14"
Sedimentary Plains, east
Plant Community 2
Custer County



Dense Clay 10–14"
Sedimentary Plains, east
Plant Community 2
McCone County



Dense Clay 10–14"
Sedimentary Plains, east
Plant Community 2
Cracks in soil surface

Ecological Site Description—Rangeland

Dense Clay, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East
MLRA: 60B – Pierre Shale Plains, East
R058AE014MT, R060BE568MT



**Dense Clay 10–14"
Sedimentary Plains, east
Plant Community 3
McCone County**



**Dense Clay 10–14"
Sedimentary Plains, east
Plant Community 3
Custer County
Plains pricklypear cactus**



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

Ecological Site Description—Rangeland

Dense Clay, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East
MLRA: 60B – Pierre Shale Plains, East
R058AE014MT, R060BE568MT



**Dense Clay 10–14"
Sedimentary Plains, east
Plant Community 3
Carter County**



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



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

Ecological Site Description—Rangeland

Dense Clay, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East
MLRA: 60B – Pierre Shale Plains, East
R058AE014MT, R060BE568MT



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