

Ecological Site Description—Rangeland

Shallow Clay, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East

MLRA: 60B – Pierre Shale Plains, East

R058AE199MT, R060BE577MT

Site Name: Shallow Clay (SwC), 10–14 inches Mean Annual Precipitation (MAP)**Site Number:** R058AE199MT, R060BE577MT

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 can occur on nearly level to very steep uplands. It often occurs in complex with other ecological sites, particularly in rougher terrain. This site occurs on all slopes and exposures and aspect sometimes becomes significant. Variations in plant community composition and production can result due to aspect. The amount of exposed rock outcrop tends to increase as slopes increase. Runoff and the potential for water erosion can be important features of this site.

Elevation (feet): 1,900–3,500**Landform:** sedimentary plain, hill, escarpment**Slope (percent):** 0–70**Depth to Water Table (inches):** greater than 60**Flooding:** none**Ponding:** none**Runoff Class:** medium to high**Aspect:** all, and can be 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° 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: Mainly Clayey, Clayey-Steep, and Shallow sites. Also Silty, Silty-Steep, Shale, Saline Upland, Claypan, Dense Clay, and shale outcrop.

5. Similar sites: Clayey, Shallow, Clayey-Steep.

Clayey sites have similar textures, but differ mainly by being over 20 inches to rock, and having significantly more production. The plant community can be similar because of the restrictive layers of clayey textures.

The Shallow site differs by having a different texture, and generally being over sandstone or loamy beds.

The Clayey-Steep Site is over 20 inches deep to root restricting materials, as well as occurring on slopes over 15%.

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6. Soils: These are clayey soils that are 10 to 20 inches deep to underlying beds of decomposed shale or nearly impervious clays. Few roots penetrate deeper than 20 inches.

Parent material (kind): alluvium and colluvium over residuum

Parent material (origin): semiconsolidated shale

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

Subsurface Fragments <=3" (% volume): 0–5

Subsurface Fragments > 3" (% volume): 0–5

Depth (inches): 10–20

Soil surface permeability (inches per hour): slow (0.06–0.2) to very slow (0.0015–0.06)

Available Water Holding Capacity to 20" (inches): 2–4

Drainage Class: well to somewhat excessively

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

Sodium Absorption Ratio (SAR): negligible

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	Lismas clay	LF
Big Horn	Midway silty clay loam	MVb
Carter (58A)	Yawdim silty clay loam	162D
Carter (60B)	Neldore clay	158D
Custer	Neldore silty clay	666C
Custer	Yawdim silty clay loam	604E
Dawson	Norbert clay	No
Fallon (58A)	Yawdim silty clay loam	162D
Fallon (60B)	Neldore clay	158D
Garfield	Yawdim silty clay loam	364D
Garfield	Neldore silty clay	79D
McCone	Yawdim silty clay	164
Musselshell	Neldore silty clay	62C, 62D
Musselshell	Yawdim silty clay loam	67D, 62D
Powder River	Midway silty clay loam	Mf
Prairie	Neldore silty clay	97
Prairie	Yawdim silty clay loam	139
Rosebud (58A)	Yawdim silty clay loam	211
Rosebud (60B)	Neldore silty clay	141
Treasure	Lismas clay	Lc

7. Plant Community and Species Composition: The physical aspect of this site is that of a gentle to steep sloping grassland with scattered shrubs and Rocky Mountain juniper on steeper slopes. Approximately 70–75% of the annual production is from grasses and sedges, 5–10% from forbs, and 5–15% is from shrubs and half-shrubs. The canopy cover of shrubs is 10–15%.

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, enclosures, 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) e)	(lbs./acre)	(lbs./acre)	(lbs./acre)						
Grasses and Sedges 70–75%					337	487	675	750	825						
Western on Thickspike wheatgrass	PASM ELLAL	14	20-30		90-135	130-195	180-270	200-300	220-330						
Green needlegrass	NAVI4	2	15-25		68-112	98-162	135-225	150-250	165-275						
Bluebunch wheatgrass *	PSSP6	2	15-50		68-225	98-325	135-450	150-500	165-550						
Plains muhly	MUCU3	3	5-15		22-68	32-98	45-135	50-150	55-165						
Sideoats grama	BOCU	3	1-5		4-22	6-32	9-45	10-50	11-55						
Little bluestem	ANSC10	1	0-10		0-45	0-65	0-90	0-100	0-110						
Montana wheatgrass	ELLAA	14	0-5		0-22	0-32	0-45	0-50	0-55						
Threadleaf sedge	CAFI	12	1-5)	10	4-45 No more than 22 for any one	6-65 No more than 32 for any one	9-90 No more than 45 for any one	10-100 No more than 50 for any one	11-110 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)												
Needleandthread	HECOC8	10	0-5)												
Plains reedgrass	CAMO	16	1-5)												
Buffalograss	BUDA	15	0-5)												
Indian ricegrass	ACHY	2	0-5)												
Other native grasses	2GP		1-5)												
Forbs 5–10%										45	65	90	100	110	
Black samson	ECAN2	21	1-5)	10	4-45 No more than 22 for any one	6-65 No more than 32 for any one	9-90 No more than 45 for any one	10-100 No more than 50 for any one	11-110 No more than 55 for any one						
Scurfpea spp.	PSORA2	23	0-5)												
Purple prairieclover	DAPU5	21	1-5)												
White prairieclover	DACA7	21	1-5)												
Hairy goldenaster	HEVI4	23	0-5)												
Prairie thermopsis	THRH	20	0-5)												
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)												
Eriogonum spp.	ERIOG	23	0-5)												
Biscuitroot spp.	LOMAT	24	0-5)												
Penstemon spp.	PENST	28	0-5)												
Scarlet globemallow	SPCO	20	0-5)												
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						
Death camas **	ZIGAD	32	0-T	T	T	T	T	T	T						
Shrubs and Half-shrubs 5–15%					68	98	135	150	165						
Winterfat	KRLA2	35	1-5	15	4-68 No more than 45 for any one	6-98 No more than 65 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						
Nuttall's saltbush	ATNU2	34	1-5												
Prairie rose	ROAR3	38	1-10)												
Silver sagebrush	ARCA13	36	0-10)												
Wyoming big sagebrush	ARTRW8	37	1-10)												
Green rabbitbrush	CHVI8	36	0-5)												
Fringed sagewort	ARFR4	38	1-5)												
Rubber rabbitbrush	ERNAN5	36	0-5)												
Greasewood	SAVE4	37	0-10)												
Skunkbush sumac	RHTR	33	1-10)												
Shadscale	ATCO		0-10)												
Other native shrubs	2SB		1-10)												
Shrubs and Half-shrubs 5–15%										68	98	135	150	165	
Broom snakeweed	GUSA2	37	0-T							T	T	T	T	T	T
Plains pricklypear	OPPO	38	0-T							T	T	T	T	T	T
Total Annual Production (lbs./acre)			100%		450	650	900	1000	1100						

* 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 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	1 – 2	0 – T	0.25
Grasses/sedges	5 – 15	20 – 40	24
Forbs	1 – 4	1 – 5	18
Shrubs	1 – 5	10 – 15	24
Litter	20 – 30		
Coarse fragments	0 – 4		
Bare ground	25 – 40		

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. The Historic Climax Plant Community is described as a reference to understand the original potential of this site, and is not considered to be the management goal for every acre of rangeland. The following descriptions should enable the landowner/ 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 only moderate 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 the Historic Climax Plant Community (HCPC).

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 and bluebunch wheatgrass**. These plants will be replaced by **western or thickspike wheatgrass, plains reedgrass, threadleaf sedge, blue grama, forbs, and Wyoming big sagebrush**. Continued deterioration results in increased amounts of **red threeawn, green and fringed sagewort, and rabbitbrush**.

Plants that are not a part of the reference community that are most likely to invade are **annual bromes, six-week fescue, false buffalograss, broom snakeweed, and thistles**.

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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 contains a high diversity of tall and medium height grasses (**green needlegrass, bluebunch wheatgrass, and western wheatgrass**), short grasses and sedges (**plains muhly, Sandberg bluegrass, prairie junegrass, threadleaf sedge and blue grama**), and shrubs (**winterfat and Nuttall's saltbush**). There are also abundant forbs, and half-shrubs which occur in small percentages.

These plant communities are well adapted to the Northern Great Plains climatic conditions. The diversity in plant species and the presence of tall, deep-rooted perennial grasses allows for moderately high drought tolerance, considering the limited available water holding capacity of the site. Individual species can vary greatly in production depending on growing conditions (timing and amount of precipitation and temperature). Plants on this site have strong, healthy root systems that allow production to increase significantly with favorable precipitation. Abundant plant litter is available for soil building and moisture retention. Plant litter is properly distributed with very little movement off-site and natural plant mortality is very low. This plant community provides for soil stability and a functioning hydrologic cycle.

Plant communities 1 and 2 will shift back and forth with variations in weather/climate, soils, slope, and aspect coupled with grazing use.

Plant Community 2: Medium and Short Grasses/ Medium Shrubs: Disturbances to the historical climax plant community result in a community where the taller, more palatable grasses and shrubs decline. The community will become dominated by species such as **western wheatgrass, Sandberg bluegrass, prairie junegrass, threadleaf sedge, Wyoming big sagebrush, 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: Medium and Short Grasses/ Shrubs and Half-shrubs: With continued heavy disturbance on Community 2, it tends to shift to one dominated by **Wyoming big sagebrush or greasewood, rabbitbrush, blue grama, and western wheatgrass**. This community tends to occur more in the Pierre shale areas of southeast Montana (MLRA 60B). In this community, greasewood may replace Wyoming big sagebrush, while the grass and forb component remain essentially the same.

Plant Community 4: Shrubs and Half-shrubs/ Short Grasses: Continued degradation usually results in a community that is dominated by shrubs such as **Wyoming big sagebrush or greasewood, rabbitbrush; short grasses such as blue grama and Sandberg bluegrass; along with fringed sagewort**.

As the Historic Climax or Potential plant community degrades, there is also a corresponding increase in the amount of bare ground. The typically granular surface of the soil often changes to a crusted surface, thus reducing infiltration and significantly altering the water and nutrient cycles.

Plant communities 3 and 4 are much less productive than Plant Community 1 or 2. The lack of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and high evapotranspiration, 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.

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These communities will respond positively to improved grazing management, but significant economic inputs and time would be required to move them toward a higher successional stage and a more productive plant community.

Plant Community 5: Shrubs and Half-shrubs/ Short Grasses/ Annual Grasses and Forbs: Continued disturbance results in a community with excessive bare ground. This community is also comprised mainly of shrubs such as **Wyoming big sagebrush, greasewood, or rubber rabbitbrush**. A major difference is that the understory becomes dominated by **annual grasses, annual forbs, and broom snakeweed**. **Fringed sagewort** will continue to be common, as will **blue grama**.

This community has extremely reduced productivity. Significant economic inputs and time would be required to move this plant community toward a higher successional stage and a more productive plant community.

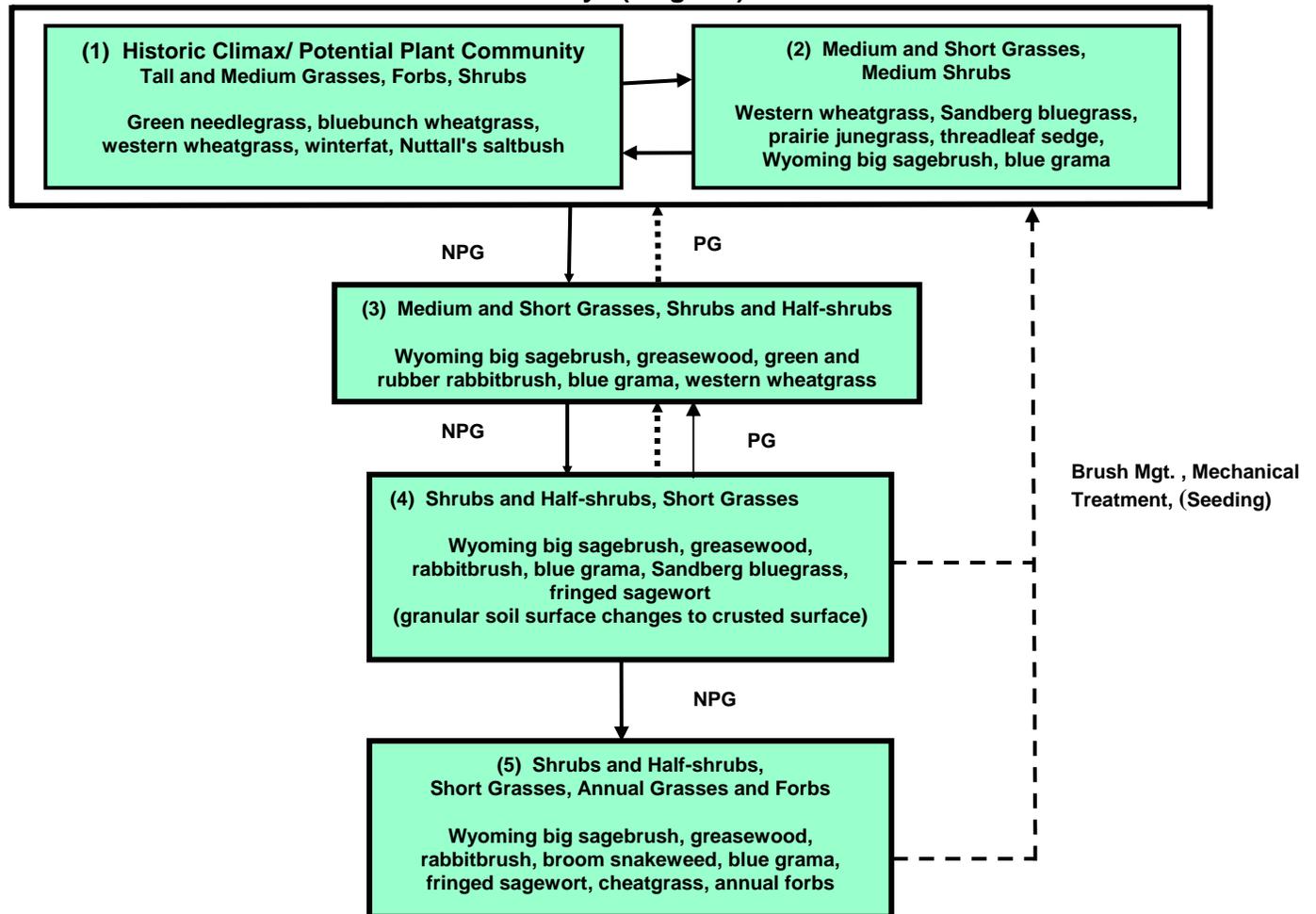
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10b. Plant Communities and Transitional Pathways (State and Transition Model): Transitions in plant community composition occur along a gradient that is not linear. Many processes are involved in the changes from one community to another. Changes in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

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.

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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: 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: MT0812

Growth Curve Description: Includes upland sites in the eastern sedimentary plains with soil limitations, 10–14" p.z., dominated by warm season grasses.

Totals for Each Month

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
0	0	5	15	25	35	15	5	0	0	0	0

Cumulative Totals by Month

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
0	0	5	20	45	80	95	100	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. This site has the potential to produce a moderate amount of high quality forage. Management objectives should include maintenance or improvement of the vegetation community. This is a droughty site and is very susceptible to disturbance. Recovery is limited, especially if any of the soil surface has been eroded off. Shorter grazing periods and adequate re-growth after grazing are recommended for plant recovery. Season long use of this site can be detrimental and will alter the plant community over time.

Management strategies designed to maintain or improve the plant cover and vigor apply best to plant communities that are near, or similar to potential composition (i.e., Plant Communities 1 and 2). When the dominant community types are similar to 3 and 4, additional rest is often necessary for re-establishment of the desired species and to restore the stability and health of the site. Once the communities have moved to either 4 or 5, they are difficult to restore to a community that is near potential (1 or 2), because of the landform associated with this site and its droughtiness.

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Plant Communities 1 and 2 are stable, productive, and healthy provided they receive proper management. 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.

Mechanical treatment and range seeding are generally not recommended on this ecological site because of the shallow soils and steeper slopes. Mechanical treatment may be considered when the site occurs on slopes less than 15%. Since this site often occurs as a component of several soil map units, it will often be included when a practice such as mechanical treatment is planned for a large area/ management unit. The response of this ecological site will be limited and should be considered in the planning process. An on-site evaluation should be done before the practice is to be applied.

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.

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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
1. Tall and Medium Grasses, Forbs, Shrubs (HCPC/PPC) <i>Green needlegrass, bluebunch wheatgrass, western wheatgrass, winterfat, Nuttall's saltbush</i> (S.I. >70%)	13–14"	1000 – 1100	850 – 950	.27–.30	3.3 – 3.7	900 – 1000	.28 – .32	3.1 – 3.6
	10–12"	450 – 900	400 – 750	.13–.24	4.2 – 7.7	400 – 800	.13 – .25	4.0 – 7.7
2. Medium and Short Grasses, Medium Shrubs <i>Western wheatgrass, prairie junegrass, Sandberg bluegrass, threadleaf sedge, Wyoming big sagebrush, blue grama</i> (S.I. 50–70%)	13–14"	850 – 950	650 – 800	.20–.25	4.0 – 5.0	650 – 850	.20 – .27	3.7 – 5.0
	10–12"	400 – 750	300 – 650	.09–.21	4.8 – 11.1	350 – 675	.11 – .21	4.8 – 9.1
3. Medium & Short Grasses, Shrubs and Half-shrubs <i>Blue grama, fringed sagewort, broom snakeweed, Wyoming big sagebrush, blue grama</i> (S.I. 45–60%)	10–14"	350 – 800	250 – 600	.08–.19	5.3 – 12.5	250 – 650	.08 – .21	4.8 – 12.5
4. Shrubs and Half-shrubs, Short Grasses <i>Wyoming big sagebrush, greasewood, rabbitbrush, Sandberg bluegrass, blue grama, fringed sagewort</i> (S.I. 30–50%)	10–14"	350 – 800	200 – 550	.06–.17	5.9 – 16.7	250 – 700	.08 – .22	4.5 – 12.5
5. Shrubs and Half-shrubs, Short Grasses, Annual Grasses and Forbs <i>Wyoming big sagebrush, greasewood, rabbitbrush, broom snakeweed, blue grama, and forbs</i> (S.I. <30%)	10–14"	250 – 550	100 – 300	.02–.07	14.3 – 50	150 – 400	.03 – .09	11.1 – 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
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 ^{1/}	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
Prairie junegrass	D	D	D	D	D	P	D	D
Plains muhly	D	D	D	D	D	D	D	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 ^{2/}	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. ^{3/}	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 Mtn. Juniper	N	N	N	N	U	N	N	N
Greasewood ^{4/}	N	N	N,E	N,E	D	U, T	U	D
Fringed sagewort	N	N	N	N	U	U	U	U
Yucca	N	N	N	N	D	D	D	D
Broom snakeweed ^{5/}	N	N	N	U	U	U	U	U
Plains pricklypear ^{6/}	N	N	N	N	U	U	U	U

^{1/} The awns and sharp seeds of needleandthread can harm livestock when dry.

^{2/} Not a native plant, but a common invader.

^{3/} Some species of milkvetch are poisonous.

^{4/} Can be toxic to sheep in spring if large quantities are ingested.

^{5/} 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.

^{6/} The spines can be injurious to livestock.

Ecological Site Description—Rangeland

Shallow Clay, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East

MLRA: 60B – Pierre Shale Plains, East

R058AE199MT, R060BE577MT

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): Complex topography and vegetative structure, along with the tendency to occur in a mosaic with other ecological sites, results in diverse wildlife habitat. The abundance and diversity of forbs and shrubs favor browsers and selective feeders like mule deer and pronghorn. Warm season grasses extend the availability of nutritious forage for grazers and mixed feeders including bison and elk. Large animal nutrition levels are relatively high yearlong because of the diversity of grasses, forbs and shrubs. The general area often provides thermal and escape cover for big game animals. Shrub availability on steep, south slopes, provides important winter range for mule deer and elk. The majority of small mammals are seedeaters such as deer mice, pocket mice and kangaroo rats. Abundant prey and perch sites (on rock outcrops and scattered junipers) attract a variety of raptors. Sites having steeper, rocky topography provide habitat for interesting songbird species such as rock wrens, canyon wrens and spotted towhees. Scattered junipers and pines host field, chipping and lark sparrows.

Plant Community 2: Medium and Short Grasses/ Medium Shrubs: A reduction in Nuttall's's saltbush and winterfat decreases winter nutrition for pronghorn and mule deer. Loss of warm season mid-grasses and green needlegrass shortens the green feed period for grazers such as bison and elk. Litter cover and residual grass declines which deprives ground-nesting birds of reproductive habitat. Small mammal and song bird populations decrease with loss of vegetative structural diversity.

Plant Community 3: Medium and Short Grasses/ Shrubs and Half-shrubs: Winter habitat for sage grouse, Brewer's sparrow and mule deer may improve with an increase in big sagebrush, although further reductions in litter and residual grass cover degrade ground-nesting bird habitat in general. The period of high nutrition for all grazers and mixed feeders is considerably shortened after loss of grass, forb, shrub and half-shrub availability. Dominance by greasewood may increase lark bunting use on relatively level topography. Small mammal species diversity is reduced with loss of vegetative structural diversity.

Plant Community 4: Shrubs and Half-shrubs/ Short Grasses: Loss of western wheatgrass further reduces habitat value for ground-nesting birds as well as forage value for grazers. Tall shrub cover may provide winter cover for pronghorn, mule deer and sage grouse. Summer feed value for grazers and mixed feeders is greatly reduced following loss of grass and forb diversity. Breeding bird use is similar to Plant Community 3 above.

Plant Community 5: Shrubs and Half-shrubs/ Short Grasses/ Annual Grasses and Forbs: In general, wildlife habitat value is low. Sagebrush cover may provide winter cover for sage grouse and mule deer. Forage value for grazers and mixed feeders is poor. Ground-nesting bird habitat is very poor. Common nighthawks may nest on the sparsely covered ground surface. Seed-eating small mammals, such as deer mice, may be relatively abundant after an increase in annual grasses and forbs.

Ecological Site Description—Rangeland

Shallow Clay, 10–14" MAP

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R058AE199MT, R060BE577MT

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
Two-grooved 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
Green sagewort	N	N	N	N	N	N	N	N
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 Mtn. Juniper	N	N	N	N	D	D	D	D
Greasewood	P	P	D	D	P	P	D	D
Plains pricklypear	N	N	N	N	N	N	N	N
Broom snakeweed	N	N	D	N	D	D	P	P
Yucca	N	N	N	N	N	N	N	N

14. Hydrology Data: The soils associated with this ecological site are generally in Hydrologic Soil Group D. The infiltration rates for these soils will normally be slow to very slow. The runoff potential for this site is moderate to high, depending on slope and ground cover/health. Runoff curve numbers generally range from 79 to 94.

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.

Ecological Site Description—Rangeland

Shallow Clay, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East
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R058AE199MT, R060BE577MT

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 big game and upland bird hunting. 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): 14
BLM–Soil & Vegetation Inventory Method (SVIM) Data: 12
NRCS–Range Condition Record (ECS-2): 22
NRCS–Range/Soil Correlation Observations & Soil 232 notes: 42

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

Shallow Clay, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East
MLRA: 60B – Pierre Shale Plains, East
R058AE199MT, R060BE577MT



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



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



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

Ecological Site Description—Rangeland

Shallow Clay, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East
MLRA: 60B – Pierre Shale Plains, East
R058AE199MT, R060BE577MT



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



Shallow Clay 10–14"
Sedimentary Plains, east
Plant Community 1



Shallow Clay 10–14"
Sedimentary Plains, east
Plant Community 2
Rosebud County

Ecological Site Description—Rangeland

Shallow Clay, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East
MLRA: 60B – Pierre Shale Plains, East
R058AE199MT, R060BE577MT



Shallow Clay 10–14"
Sedimentary Plains, east
Plant Community 2



Shallow Clay 10–14"
Sedimentary Plains, east
Plant Community 2



Shallow Clay 10–14"
Sedimentary Plains, east
Plant Community 2

Ecological Site Description—Rangeland

Shallow Clay, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East
MLRA: 60B – Pierre Shale Plains, East
R058AE199MT, R060BE577MT



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



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



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

Ecological Site Description—Rangeland

Shallow Clay, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East
MLRA: 60B – Pierre Shale Plains, East
R058AE199MT, R060BE577MT



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



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



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

Ecological Site Description—Rangeland

Shallow Clay, 10–14" MAP

MLRA: 58A – Sedimentary Plains, East
MLRA: 60B – Pierre Shale Plains, East
R058AE199MT, R060BE577MT



Shallow Clay 10–14"
Sedimentary Plains, east
Plant Community 5
Buffalograss