USDA Natural Resources
Conservation Service

Ecological site R058AC040MT
Silty (Si) RRU 58A-C 11-14" p.z.

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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

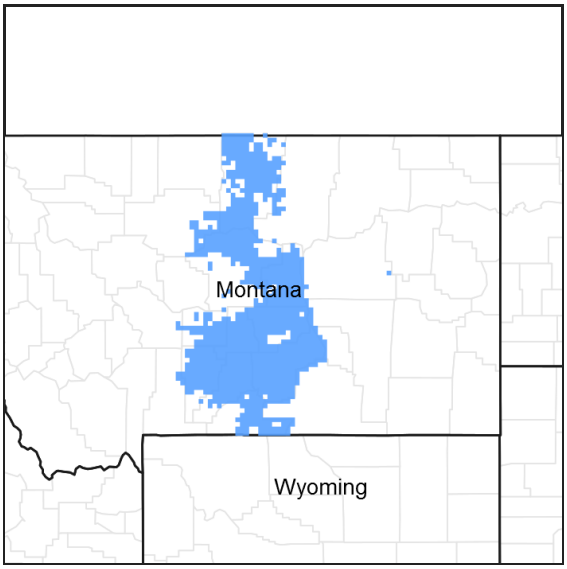


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Associated sites

R058AC041MT	**Clayey (Cy) RRU 58A-C 11-14" p.z.**
R058AC042MT	**Sandy (Sy) RRU 58A-C 11-14" p.z.**
R058AC045MT	**Overflow (Ov) RRU 58A-C 11-14" p.z.**
R058AC049MT	**Silty-Steep (SiStp) RRU 58A-C 11-14" p.z.**
R058AC054MT	**Claypan (Cp) RRU 58A-C 11-14" p.z.**
R058AC055MT	**Gravel (Gr) RRU 58A-C 11-14" p.z.**
R058AC057MT	**Shallow (Sw) RRU 58A-C 11-14" p.z.**
R058AC058MT	**Very Shallow (VSw) RRU 58A-C 11-14" p.z.**
R058AC059MT	**Shallow Clay (SwC) RRU 58A-C 11-14" p.z.**

Similar sites

R058AC041MT	**Clayey (Cy) RRU 58A-C 11-14" p.z.** The Clayey site occupies the same landscape positions; the primary difference is soil texture and plant community.

R058AC042MT	**Sandy (Sy) RRU 58A-C 11-14" p.z.** The Sandy sites occupy the same landscape positions; the primary difference is soil texture and plant community.
R058AC049MT	**Silty-Steep (SiStp) RRU 58A-C 11-14" p.z.** The Silty-Steep site differs mainly by being on slopes greater than 15% and having lower production.
R058AC057MT	**Shallow (Sw) RRU 58A-C 11-14" p.z.** The Shallow site differs by being 20 inches or less to a restrictive layer or bedrock and having significantly lower production and ground cover.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

Table 2. Representative physiographic features

Landforms	(1) Plain (2) Fan (3) Terrace
Flooding frequency	None
Ponding frequency	None
Elevation	686–1,372 m
Slope	0–15%
Water table depth	102 cm
Aspect	Aspect is not a significant factor

Climatic features

Major Land Resource Area (MLRA) 58A in Montana is 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. Temperatures can be very extreme in this part of Montana. Summer daytime temperatures are typically quite warm, generally averaging in the mid to lower 80º's F for July and August. Summertime temperatures will typically reach in the 100º's F at some point during the summer, and can reach 90º F any month between May and September. Conversely, winter temperatures can be cold, averaging in the low teens º F or less for December and January. There will typically be several days of below zero temperatures each winter. It is not uncommon for temperatures to reach 30–40º F below zero, or even colder, most any winter. Spring can be windy throughout this MLRA, with winds averaging over 10 mph about 15 percent of the time. Speeds of 50 mph or stronger can occasionally occur as a weather system crosses this part of Montana. The majority of the rangeland in MLRA 58AC is within the 11 to 14 inch Mean Annual Precipitation (MAP) range. During an average year, 70 to 75 percent of the annual precipitation falls between April and September, which are the primary growing season months. Snowfall is not heavy in the area, averaging 36 total inches in the Yellowstone Valley and about 39 inches throughout this MLRA. Heavy snowfall occurs infrequently, usually late in the winter or early spring. Snow cover is typically 1 to 3 inches. The frost-free (32º F) season averages about 90 to 125 days each year in the uplands, to about 135 days along the Yellowstone River Valley. The freeze-free (28o F) season averages about 110 to 155 days annually. For local climate station information, refer to http://www.wcc.nrcs.usda.gov/cgibin/state.pl?state=mt.

Table 3. Representative climatic features

Frost-free period (average)	135 days
Freeze-free period (average)	155 days
Precipitation total (average)	356 mm

Influencing water features

No influencing water features on this site.

Soil features

These soils are loams, silt loams, very fine sandy loams, or sandy clay loams more than 20 inches deep. They include soils that have two inches or more of one of these textures over a clayey (argillic) subsoil. There are no significant limitations to plant growth. Available Water Holding Capacity to a 40 inch soil depth averages 8 inches.

Table 4. Representative soil features

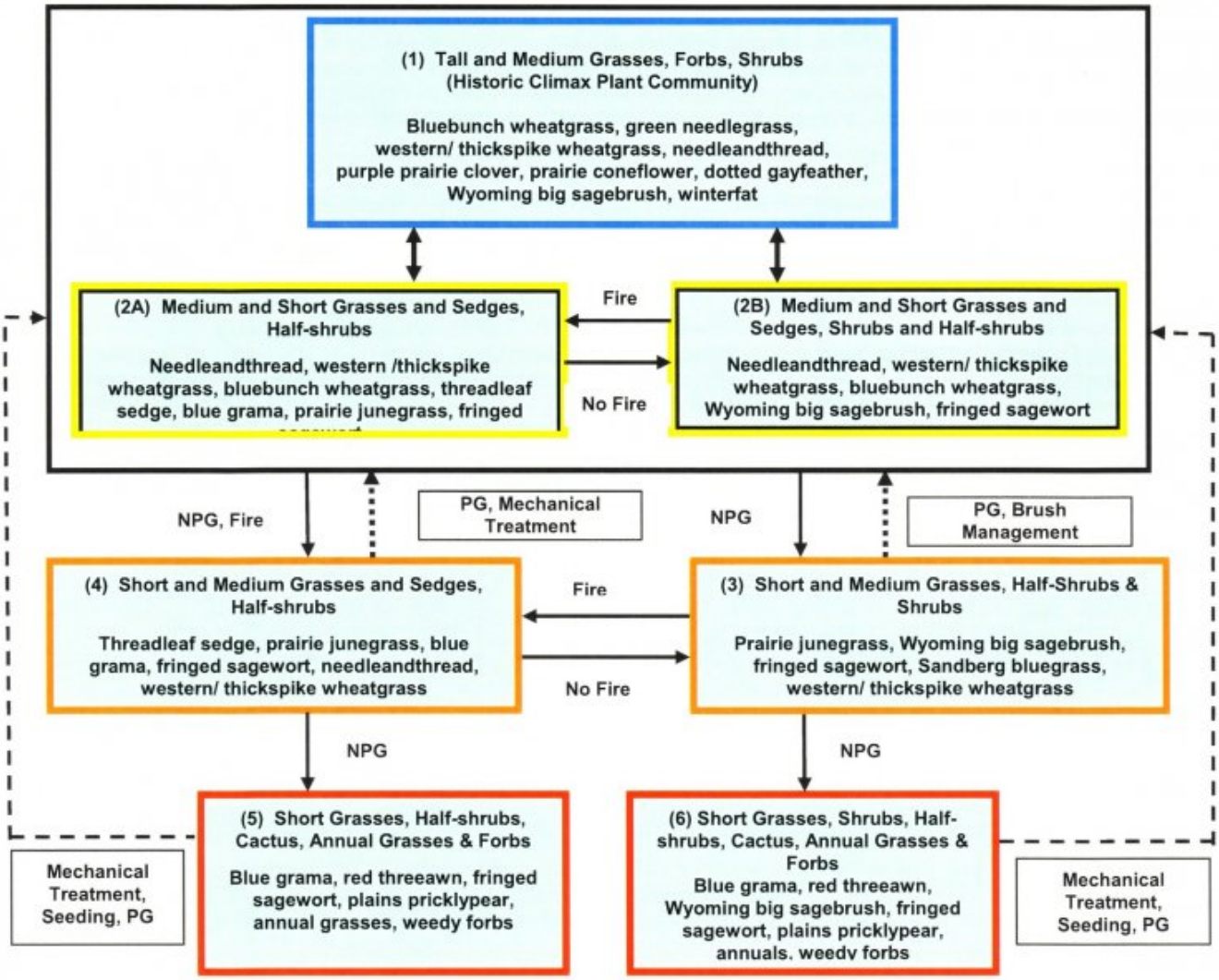
Surface texture	(1) Loam (2) Silt loam (3) Sandy clay loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderate
Soil depth	51–183 cm
Available water capacity (0-101.6cm)	12.7–22.86 cm

Ecological dynamics

State and transition model

MLRA: 58AC – Sedimentary Plains, Central
R058AC040MT

5c. Plant Communities and Transitional Pathways (diagram)



Smaller boxes within a larger box indicate that these communities will normally shift among themselves with slight variations in precipitation and other disturbances. Moving outside the larger box indicates the community has crossed a threshold (heavier line) and will require intensive treatment to return to Community 1 or 2. Dotted lines indicate a reduced probability for success. Yellow boxes indicate caution that the community may be in danger of crossing a threshold. Orange boxes represent communities that have crossed over thresholds from the HCPC and may be difficult to restore with grazing management alone. Red boxes represent communities that have severely shifted away from the HCPC and probably cannot be restored without mechanical inputs.

NOTE: Not all species present in the community are listed in this table. Species listed are representative of the plant functional groups that occur in the community.

PG = Prescribed Grazing: Use of a planned grazing strategy to balance animal forage demand with available forage resources. Timing, duration, and frequency of grazing are controlled and some type of grazing rotation is applied to allow for plant recovery following grazing.

NPG = Non-Prescribed Grazing: Grazing which has taken place that does not control the factors as listed above, or animal forage demand is higher than the available forage supply.

Fire: Prescribed fire or non-prescribed wildfire.

State 1
Plant Community 1: Tall and Medium Grasses/ Forbs/ Shrubs

Community 1.1
Plant Community 1: Tall and Medium Grasses/ Forbs/ Shrubs

The physical aspect of this site in the Historical Climax Plant Community (HCPC) is that of a level to undulating

grassland dominated by cool and warm season grasses, with forbs and shrubs occurring in smaller percentages. Approximately 75-80% of the annual production by weight is from grasses and sedges, 5–15% is from forbs, and 1–5% is from shrubs, half-shrubs, and cacti. Canopy cover of shrubs is typically 1-5%. Trees are not significant on this site. Dominant species include bluebunch wheatgrass, green needlegrass, western or thickspike wheatgrass, needleandthread, and short grasses such as Sandberg bluegrass and prairie junegrass. There are abundant forbs (purple and/or white prairie clover, prairie coneflower, dotted gayfeather) which occur in smaller percentages. Shrubs such as Wyoming big sagebrush and winterfat are common. This plant community is well adapted to the Northern Great Plains climatic conditions. The diversity in plant species and presence of tall, deep-rooted perennial grasses allows for drought tolerance. Plants on this site have strong, healthy root systems that allow production to increase significantly with favorable moisture conditions. 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.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1328	1530	1777
Forb	123	168	202
Shrub/Vine	34	84	101
Total	**1485**	**1782**	**2080**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0-10%
Grass/grasslike foliar cover	70-85%
Forb foliar cover	1-5%
Non-vascular plants	0%
Biological crusts	0-5%
Litter	0%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Table 7. Soil surface cover

Tree basal cover	0%
Shrub/vine/liana basal cover	1-4%
Grass/grasslike basal cover	5-15%
Forb basal cover	1-4%
Non-vascular plants	0%
Biological crusts	0-2%
Litter	50-70%
Surface fragments >0.25" and <=3"	0-5%
Surface fragments >3"	0%
Bedrock	0%
Water	0%

Bare ground	10-20%

Table 8. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	–	–
>0.15 <= 0.3	–	–	–	1-5%
>0.3 <= 0.6	–	0-10%	70-85%	–
>0.6 <= 1.4	–	–	–	–
>1.4 <= 4	–	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

State 2
Plant Community 2A: Medium and Short Grasses and Sedges/ Half-shrubs

Community 2.1
Plant Community 2A: Medium and Short Grasses and Sedges/ Half-shrubs

This community occurs mainly on soils in the fine silty family. Dominants include needleandthread, western or thickspike wheatgrass, threadleaf sedge, blue grama, and prairie junegrass. Bluebunch wheatgrass and green needlegrass will still be present but in smaller amounts. There may be an increase in the amount of fringed sagewort or other half-shrubs. Palatable and nutritious forbs will be replaced by less desirable and more aggressive species.

State 3
Plant Community 2B: Medium and Short Grasses and Sedges/ Shrubs and Half-shrubs

Community 3.1
Plant Community 2B: Medium and Short Grasses and Sedges/ Shrubs and Half-shrubs

This community occurs on soils in the fine silty family, and is similar to 2A, except that it will tend to have more shrubs. It is typically dominated by the same grasses, plus shrubs and half-shrubs including Wyoming big or silver sagebrush, and fringed sagewort. There is also sometimes an increase in the amount of cactus. Silver sagebrush tends to become more prevalent on old stream terraces that no longer flood, except very rarely. There will be some shifting of sagebrush between Communities 2A and 2B, depending on the occurrence and frequency of fire and which species of sagebrush is present. A lack of fire in Community 2A tends to favor Wyoming big sagebrush. The presence of fire in a big sagebrush stand will generally reduce the density of plants, making the community more similar to 2A. Fire will often increase the amount of silver sagebrush, however, as it will sprout from the roots after being burned. Grass biomass production and litter become reduced on Communities 2A and 2B as the taller grasses become less prevalent, increasing evaporation and reducing moisture retention. Additional open space in the community can result in undesirable invader species. These plant communities provide for moderate soil stability.

State 4
Plant Community 3: Short and Medium Grasses/ Half-shrubs and Shrubs

Community 4.1
Plant Community 3: Short and Medium Grasses/ Half-shrubs and Shrubs

This is a disturbance induced community, with dominants including Sandberg bluegrass, prairie junegrass, perennial

forbs, fringed sagewort, and silver or Wyoming big sagebrush. Remnant amounts of western or thickspike wheatgrass and needleandthread may be present. Tall grasses and palatable forbs will be mostly absent. The amount of Wyoming big sagebrush in this community can also be the result of lack of fire in Community 4. Periodic fire tends to reduce the amount of big sagebrush that is present. Silver sagebrush, however, will react just the opposite, as it will tend to increase after a fire due to root sprouting.

State 5
Plant Community 4: Short and Medium Grasses and Sedges/ Half-shrubs

Community 5.1
Plant Community 4: Short and Medium Grasses and Sedges/ Half-shrubs

This is a disturbance induced community, with dominants including threadleaf sedge, needleandthread, blue grama, and other short grasses. It is similar to Community 3, but having less of a shrub component. Plant Communities 3 and 4 are much less productive than Plant Communities 1, 2A, or 2B and have lost many of the attributes of a healthy rangeland. The loss of deep perennial root systems reduces total available moisture for plant growth. Reduction of plant litter will result in higher surface soil temperatures and increased evaporation losses. Annual species are often aggressive and competitive with seedlings of perennial plants. This community can respond positively to improved grazing management but it will take additional inputs to move it towards a community similar in production and composition to that of Plant Community 1, 2A, or 2B.

State 6
Plant Community 5: Short Grasses/ Half-shrubs/ Cactus/ Annual Grasses and Forbs

Community 6.1
Plant Community 5: Short Grasses/ Half-shrubs/ Cactus/ Annual Grasses and Forbs

This community is the result of continual adverse disturbances. Dominants include blue grama, Sandberg bluegrass, and prairie junegrass, half-shrubs such as fringed sagewort and broom snakeweed, plains pricklypear, and annuals such as cheatgrass, Japanese brome and six-weeks fescue. Red threeawn and non-native, weedy forbs are also likely to invade.

State 7
Plant Community 6: Short Grasses/ Shrubs and Half-shrubs/ Cactus/ Annual Grasses and Forbs

Community 7.1
Plant Community 6: Short Grasses/ Shrubs and Half-shrubs/ Cactus/ Annual Grasses and Forbs

This community is the result of continual adverse disturbances, and is similar to Community 5 but with more of a shrub component. Dominants include blue grama, Sandberg bluegrass, prairie junegrass, Wyoming big sagebrush, half-shrubs such as fringed sagewort and broom snakeweed, and plains pricklypear, and annuals such as cheatgrass, Japanese brome, six-weeks fescue, and weedy forbs (e.g., thistles). Plant communities 5 and 6 have extremely reduced production of native plants (< 600 lbs./acre). The lack of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and increased evaporation, which gives short sod grasses and annual invaders a competitive advantage over the cool season tall and medium grasses. These communities have lost many of the attributes of a healthy rangeland, including good infiltration, minimal erosion and runoff, nutrient cycling and energy flow. Significant economic inputs and time would be required to move these plant communities toward a higher successional stage and a more productive plant community.

Additional community tables

Table 9. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					

1	**Native grasses**			1037–1659	
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	446–1347	–
	green needlegrass	NAVI4	*Nassella viridula*	74–415	–
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	74–312	–
	western wheatgrass	PASM	*Pascopyrum smithii*	1–207	–
	tufted wheatgrass	ELMA7	*Elymus macrourus*	1–207	–
	plains muhly	MUCU3	*Muhlenbergia cuspidata*	1–123	–
2	**Native perennials**			1–207	
	Grass, perennial	2GP	*Grass, perennial*	1–104	–
	blue grama	BOGR2	*Bouteloua gracilis*	1–104	–
	needleleaf sedge	CADU6	*Carex duriuscula*	1–104	–
	threadleaf sedge	CAFI	*Carex filifolia*	1–104	–
	plains reedgrass	CAMO	*Calamagrostis montanensis*	1–104	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	1–104	–
	Sandberg bluegrass	POSE	*Poa secunda*	1–104	–
3	**Native perennials**			1–3	
	Fendler's threeawn	ARPUF	*Aristida purpurea var. fendleriana*	1–3	–
	Fendler threeawn	ARPUL	*Aristida purpurea var. longiseta*	1–3	–
Forb					
4	**Native forbs**			15–207	
	Forb, perennial	2FP	*Forb, perennial*	15–104	–
	onion	ALLIU	*Allium*	15–104	–
	pussytoes	ANTEN	*Antennaria*	15–104	–
	tarragon	ARDR4	*Artemisia dracunculus*	15–104	–
	aster	ASTER	*Aster*	15–104	–
	milkvetch	ASTRA	*Astragalus*	15–104	–
	white prairie clover	DACA7	*Dalea candida*	15–104	–
	purple prairie clover	DAPU5	*Dalea purpurea*	15–104	–
	scarlet beeblossom	GACO5	*Gaura coccinea*	15–104	–
	hairy false goldenaster	HEVI4	*Heterotheca villosa*	15–104	–
	dotted blazing star	LIPU	*Liatris punctata*	15–104	–
	desertparsley	LOMAT	*Lomatium*	15–104	–
	leafy wildparsley	MUDI	*Musineon divaricatum*	15–104	–
	silverleaf Indian breadroot	PEAR6	*Pediomelum argophyllum*	15–104	–
	large Indian breadroot	PEES	*Pediomelum esculentum*	15–104	–
	beardtongue	PENST	*Penstemon*	15–104	–
	spiny phlox	PHHO	*Phlox hoodii*	15–104	–
	bahia	PICRA3	*Picradeniopsis*	15–104	–
	upright prairie coneflower	RACO3	*Ratibida columnifera*	15–104	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	15–104	–

	prairie thermopsis	THRH	*Thermopsis rhombifolia*	15–104	–
	American vetch	VIAM	*Vicia americana*	15–104	–
5	**Native forbs (toxic properties)**			1–3	
	twogrooved milkvetch	ASBI2	*Astragalus bisulcatus*	1–3	–
	larkspur	DELPH	*Delphinium*	1–3	–
	white locoweed	OXSE	*Oxytropis sericea*	1–3	–
	deathcamas	ZIGAD	*Zigadenus*	1–3	–
Shrub/Vine					
6	**Native shrubs and half-shrubs**			15–104	
	Shrub, broadleaf	2SB	*Shrub, broadleaf*	1–104	–
	silver sagebrush	ARCA13	*Artemisia cana*	1–104	–
	prairie sagewort	ARFR4	*Artemisia frigida*	1–104	–
	Wyoming big sagebrush	ARTRW8	*Artemisia tridentata ssp. wyomingensis*	1–104	–
	rubber rabbitbrush	ERNAN5	*Ericameria nauseosa ssp. nauseosa var. nauseosa*	1–104	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	1–104	–
	prairie rose	ROAR3	*Rosa arkansana*	1–104	–
7	**Native shrubs and half-shrubs**			1–3	
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	1–3	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	1–3	–

Animal community

Livestock Grazing Interpretations:

Managed livestock grazing is suitable on this site as it has the potential to produce an abundance of high quality forage. This is often a preferred site for grazing by livestock, and animals tend to congregate in these areas. In order to maintain the productivity of this site, grazing must be managed carefully on adjoining sites with less production to be sure livestock drift onto the Silty site is not excessive. Management objectives should include maintenance or improvement of the plant community. Shorter grazing periods and adequate re-growth after grazing are recommended for plant maintenance and recovery. Heavy stocking and season-long use of this site can be detrimental and will alter the plant community composition and production over time. Whenever Plant Communities 2A or 2B (Medium and short grasses) occur, grazing management strategies need to be implemented to avoid further deterioration. These communities are still stable, productive, and healthy provided they receive proper management. These communities will respond fairly quickly to improved grazing management, including increased growing season rest of key forage plants. Grazing management alone can usually move these communities back towards the potential community. Plant Communities 3 and 4 have substantially reduced forage production, and a high percentage of aggressive, non-palatable species. Once these plant communities become established, it will be much more difficult to restore the site to a community that resembles the potential with grazing management alone. Additional growing season rest is often necessary for re-establishment of the desired species and to restore the stability and health of the site. Brush management and mechanical treatment are often needed to restore tall perennial grasses onto this site. Plant Communities 5 and 6 have extremely limited forage production (< 250 pounds per acre), and a high percentage of non-preferred species for cattle and sheep. Seeding may be necessary to restore desirable native perennial species.

Wildlife Interpretations:

The Silty ecological site occurs over large acreages on the Northern Great Plains except where it is fragmented by conversion to cropland, which is significant in many areas. Habitat fragmentation of this site has contributed to the decline of some “area sensitive” wildlife species, particularly such ground-nesting birds as the grasshopper sparrow. This site is home to a diverse native wildlife complex. Historically, huge herds of migratory bison and pronghorn as

well as large numbers of sharp-tailed grouse were probably the dominant “game” species in addition to a wide variety of ground-nesting songbirds, waterfowl and shorebirds, small mammals, and mammalian predators. Grazing patterns, topographic diversity, extensive acreages, and interspersion with other ecological sites make this type very important to numerous wildlife species. Small mammal diversity and abundance is high which, in turn, supports a varied raptor population. In the past, vast prairie dog towns provided habitat for such species as the black-footed ferret, burrowing owl, mountain plover, ferruginous hawk, and swift fox. Invasive plant species such as leafy spurge, Canada thistle, and several knapweeds contribute to a loss of biodiversity within this ecological site. Wildlife water requirements are provided by springs and seeps, intermittent and perennial streams, and, in modern times, numerous artificial ponds and livestock pipelines. These areas are locally important for northern leopard frogs, tiger salamanders and a number to toad species, all of which feed on a variety of insects. Grazing, fire, drought cycles and insect population fluctuations create a shifting mosaic of wildlife habitats across this site.

Plant Community 1: Tall Grasses/ Forbs/ Shrubs (HCPC):
The diversity of plant species and life forms provides feeding substrate for pollinating insects. Grasshopper and Morman cricket infestations occasionally consume the majority of the herbaceous vegetation, especially during drought years. A variety of warm and cool water fish species inhabit the intermittent and perennial streams associated with this community. Northern pike, lake chub, carp, a variety of suckers and walleye are examples. Common reptile and amphibian species include tiger salamanders in ponds and stock tanks, Woodhouse’s toad, western chorus frogs, short-horned lizards, bull snake and rattlesnake, and three species of garter snakes. The diversity of grass stature and life forms, along with scattered shrubs and a variety of forbs, provides habitat for many bird species including the upland sandpiper, sharp-tailed grouse, loggerhead shrike, grasshopper and savanna sparrow, chestnut-collared longspur and western meadowlark. This community is especially favorable for ground-nesting birds because of the abundant residual plant material and litter available for nesting, escape, and thermal cover. Diverse prey populations are available for raptors such as ferruginous and Swainson’s hawks. The predominance of grasses plus a diversity of forbs, shrubs and half-shrubs in this community favors grazers and mixed feeders such as bison, pronghorn and elk. Suitable thermal and escape cover for mule deer is limited because of low shrub cover. Complex plant structural diversity and litter cover provide habitat for a wide array of small mammals (both seed eaters, i.e. deer mice and herbivores, i.e. voles and jackrabbits) and neotropical migratory birds.

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

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

Plant Community 3: Short and Medium Grasses/ Half-shrubs and Shrubs:
Heavy stands of big sagebrush can provide winter cover and foraging habitat for mule deer, elk, pronghorn, and sage grouse. However, a decline in herbaceous cover and litter reduces overall wildlife species diversity and habitat value for ground-nesting birds. When this seral stage is dominated by forbs and fringed sagewort, it may provide lek sites for sage grouse and habitat for birds such as horned larks, McCown’s longspurs, mountain plovers, and long-billed curlews. Prairie dogs will have an easier time establishing and expanding towns in this community to the benefit of burrowing owls, mountain plovers, and black-footed ferrets.

Plant Community 4: Short and Medium Grasses and Sedges/ Half-shrubs:
Sparse vegetation and a greater percent cover of bare ground provides suitable habitat for mountain plovers, prairie dogs, horned larks and McCown’s longspurs. However, a lack of complex vegetation structure and residual cover makes this community poor habitat in general for most ground-nesting birds and relatively poor big game habitat. Pronghorn may forage in this community spring though fall.

Plant Community 5: Short Grasses/ Half-shrubs/ Cactus/ Annual Grasses and Forbs:
This community has low habitat value for most wildlife species except when it occurs in prairie dog towns. It may be important in providing lek sites for sage grouse when adjacent to sagebrush stands and provides forage for pronghorn seasonally.

Plant Community 6: Short Grasses/ Shrubs and Half-shrubs/ Cactus/ Annuals Grasses and Forbs:
When big sagebrush cover exceeds about 15 percent, this community may provide winter sage grouse habitat; nest cover for sage grouse is poor because of a lack of standing herbaceous material and surface litter. Lek sites for sage and sharp-tailed grouse may be available in this type. General wildlife habitat is of low value.

Hydrological functions

The runoff potential for this site is low to moderate, depending on slope and ground cover/health. Runoff curve numbers generally range from 78 to 90. The soils associated with this ecological site are generally in Hydrologic Soil Group C. The infiltration rates for these soils will normally be moderate to moderately rapid.

Other information

The following is an example of how to calculate the recommended stocking rate. This example does not use production estimates from this specific ecological site. You will need to adjust the annual production values and run the calculations using total annual production values from the ecological sites encountered on each individual ranch/pasture. Before making specific recommendations, an on-site evaluation must be made.

Example of total annual production amounts by type of year:
Favorable years = 2200 lbs/acre
Normal years = 1480 lbs/acre
Unfavorable years = 1200 lbs/acre

It is recommended that on slopes of 30% or less, stocking rate should be derived from the total annual production pounds minus 500 pounds for residual dry matter and 25% harvest efficiency. On slopes over 30%, stocking rate is derived from total annual production pounds minus 800 pounds for residual dry matter and 25% harvest efficiency. Refer to the NRCS National Range and Pasture Handbook for a list of Animal Unit Equivalents.

Sample Calculations using Favorable Year production amounts:

< 30% slopes: AUM/AC = [(2200-500)(0.25)]/915 lbs/month for one AU = 0.46 AUM/AC
AC/AUM = (1.0 AU)/(0.46AUM/AC) = 2.2 AC/AUM

> 30% slopes: AUM/AC = [(2200-800)(0.25)]/915 lbs/month for one AU = 0.38 AUM/AC
AC/AUM = (1.0 AU)/(0.38 AUM/AC) = 2.6 AC/AUM

NOTE: 915 lbs/month for one Animal Unit is used as the baseline for maintenance requirements. This equates to 30 lbs/day of air-dry forage (1200 lb cow at 2.5% of body weight).

Inventory data references

NRCS-Production & Composition Record for Native Grazing Lands (Range-417): 12

BLM-Soil & Vegetation Inventory Method (SVIM) Data: 3

NRCS-Range Condition Record (ECS-2): 10

NRCS-Range/Soil Correlation Observations & Soil 232 notes: 32

Ecological Site Reference: NRCS 417 No.: Wheatland County 513, Golden Valley County 523

Contributors

MJR, REL, RSN, POH
RSN

Approval

Kirt Walstad, 6/14/2023

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	Matt Ricketts, Loretta Metz
Contact for lead author	
Date	04/06/2005
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills should not be evident in the reference state.

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2. **Presence of water flow patterns:** Water flow patterns are generally not evident in the reference state. Following heavy thunderstorms, short (less than 2 feet), sinuous, discontinuous flow patterns may be apparent.

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3. **Number and height of erosional pedestals or terracettes:** These should not be evident in the reference state.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is less than 20% in the reference state. In HCPC, bare ground should not exceed 12%.

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5. **Number of gullies and erosion associated with gullies:** Gully erosion is not evident in the reference state.

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6. **Extent of wind scoured, blowouts and/or depositional areas:** These are not evident in the reference state.

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7. **Amount of litter movement (describe size and distance expected to travel):** Litter movement varies by size and depth of litter. In the reference state, litter should be coarse, anywhere from 1.5 inches up to 8 inches in length, and will not move more than a couple of inches from where it originated.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Stability values of 4-5 in plant interspaces. Stability values of 5-6 under plant canopies and at plant bases.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** The soil surface is moderate granular. Organic matter is 2-5%. The A-horizon is 4 to 8 inches thick.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Deep-rooted native perennial grasses optimize infiltration and runoff. Grasses should be spaced approximately 1-2 feet apart in the reference state.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** No compaction layer present in reference state.

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant: Cool season, mid-height, native perennial bunchgrasses > mid- and short- height native perennial bunchgrasses >> native shrubs > native perennial and annual forbs.

    Sub-dominant:

    Other:

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Plant mortality is very low; decadence is minimal except in prolonged periods of drought.

14. **Average percent litter cover (%) and depth (in):**

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 1325 – 1850 #/acre.

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** plains pricklypear, broom snakeweed, cheatgrass, Japanese brome, Wyoming big sagebrush, fringed sagewort, cudweed sagewort, blue grama (in excess of 300 pounds/acre, or canopy cover value >25%).

17. **Perennial plant reproductive capability:** This is not impaired in the reference state.