

Ecological site R058AE004MT Silty-Steep (SiStp) RRU 58A-E 10-14" 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.

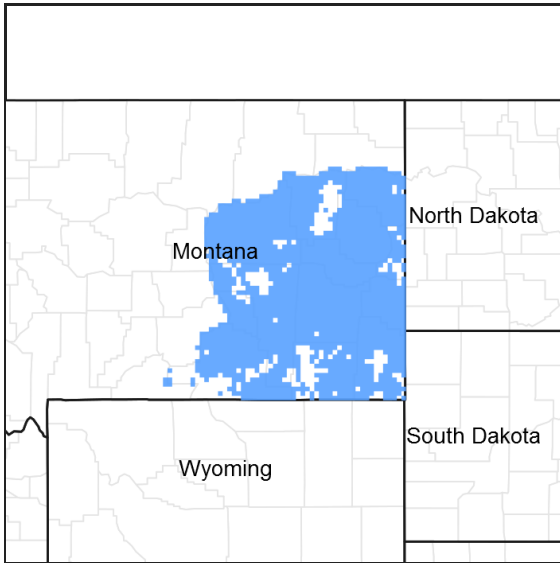


Figure 1. Mapped extent

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

R058AY001MT	Loamy (Lo) 10-14 P.Z.
R058AE019MT	Shallow (Sw) RRU 58A-E 10-14" p.z.

Similar sites

R058AE006MT	Sandy-Steep (SyStp) RRU 58A-E 10-14" p.z. The Clayey-Steep and Sandy-Steep sites occupy similar landscape positions, but will differ in textures.
R058AY001MT	Loamy (Lo) 10-14 P.Z. The Silty site differs by being mainly on slopes less than 15%.
R058AE191MT	Shallow to Gravel (SwGr) RRU 58A-E 10-14" p.z. The Shallow to Gravel site will have similar textures, but will be shallow (20 inches or less) to sandy gravel.
R058AE005MT	Clayey-Steep (CyStp) RRU 58A-E 10-14" p.z. The Clayey-Steep and Sandy-Steep sites occupy similar landscape positions, but will differ in textures.
R058AE019MT	Shallow (Sw) RRU 58A-E 10-14" p.z. The Shallow site may have similar textures, but will be shallow (20 inches or less) to bedrock or semi-consolidated sedimentary beds.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This ecological site occurs on moderately steep to steep hills and side slopes. Slopes are mainly between 15% and 45%. This site occurs on all exposures and aspect can be significant. Slight variations in plant community composition and production can result due to aspect. Runoff and potential for water erosion are important features of this site.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Plain (3) Ridge
Flooding frequency	None
Ponding frequency	None
Elevation	579–1,067 m
Slope	15–45%
Water table depth	152 cm

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.

Temperatures can be very extreme in this part of Montana. Summer daytime temperatures are typically quite warm, generally averaging in the mid to upper 80°s F for July and August. Summertime temperatures will typically reach in the 100°s F at some point during the summer, and can reach 90° F any month between May and September. Conversely, winter temperatures can be cold, averaging in the mid teens to mid 20°s F for December and January. There will typically be several days of below zero temperatures each winter. It is not uncommon for temperatures to reach 30–40° F below zero, or even colder, most any winter.

Spring can be windy throughout these MLRA's, 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.

MLRAs 58AE and 60BE have been divided into two distinct precipitation zones for the purpose of developing ecological site descriptions: 10–14" Mean Annual Precipitation (MAP) and 15–19" MAP.

10–14 inch zone:

The majority of the rangeland in these areas falls within the 11 to 13 inch 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 28 total inches in the 10-14 inch MAP (Yellowstone Valley). Heavy snowfall occurs infrequently, usually late in the winter or early spring. Snow cover is typically 1 to 3 inches.

The frost free (32° F.) season averages about 105 to 145 days each year in the uplands, to nearly 170 days along

the Yellowstone River Valley.

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)	145 days
Freeze-free period (average)	170 days
Precipitation total (average)	356 mm

Influencing water features

None

Soil features

These soils are loams, silt loams, and very fine sandy loams on moderately steep, steep, or hilly landscapes. They are over 20 inches deep to any root limiting feature.

Table 4. Representative soil features

Surface texture	(1) Loam (2) Silt loam (3) Very fine sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate
Soil depth	51–152 cm
Available water capacity (0-101.6cm)	12.7–25.4 cm
Calcium carbonate equivalent (0-101.6cm)	0–5%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	7.4–8.4

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 called the Historic Climax (HCPC).

This community is listed as a reference to understand the original potential of this site, and is not always considered to be the management goal for every acre of rangeland. The following descriptions should enable the landowner or manager to better understand which plant communities occupy their land, and assist with setting goals for vegetation management. It can also be useful to understand the environmental and economic values of each plant community.

This site has moderate resilience to disturbance as it has only moderate soil limitations for plant growth (slope). Changes may occur to the Historic Climax Plant Community due to management actions and/or climatic conditions.

Under continued adverse impacts, a moderate to extreme decline in vegetative vigor and composition will occur. Under favorable vegetative management, this site can more readily return to the Historic Climax Plant Community (HCPC).

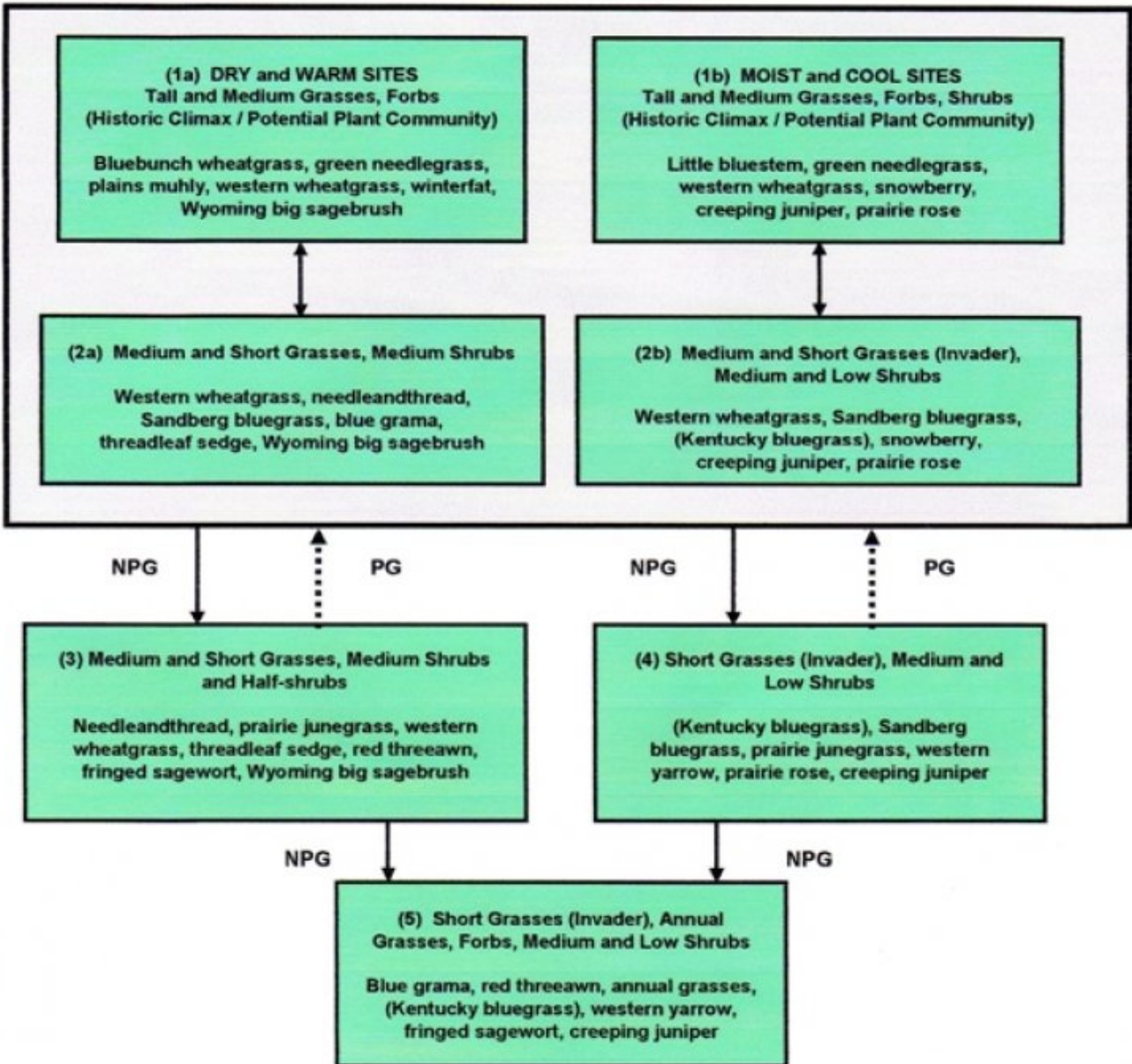
Continual adverse impacts to the site over a period of years results in a departure from the HCPC, with a decrease of the taller, more palatable species such as bluebunch wheatgrass, little bluestem, and plains muhly. These plants will be replaced over time by needleandthread, western or thickspike wheatgrass, sand dropseed, threadleaf sedge, blue grama, non-palatable forbs, and Wyoming big sagebrush. Kentucky bluegrass is a common invader onto this site on cooler slopes, and in higher precipitation zones.

Other plants that are not a part of the climax community that are most likely to invade are annual bromes, six-weeks fescue, false buffalograss, broom snakeweed, and thistles. Continued deterioration results in increased amounts of bottlebrush squirreltail, red threeawn, and fringed and green sagewort.

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

State and transition model

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.

Pr G = 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.

State 1

Plant Community 1a and 1b: Tall and Medium Grasses/ Forbs/ Shrubs

Community 1.1

Plant Community 1a and 1b: Tall and Medium Grasses/ Forbs/ Shrubs

These are the interpretive plant communities and are considered to be the Historic Climax Plant Community

(HCPC) for this site. Communities 1a and 1b differ mainly because of aspect, with the "moist" community being located on north and east aspects, while the "dry" community would be on the south and west. These plant communities contain a high diversity of tall and medium height, cool and warm season grasses (bluebunch wheatgrass, green needlegrass, little bluestem, western wheatgrass, and plains muhly) with a diverse mix of other grasses and sedges (needleandthread, threadleaf sedge, prairie junegrass, and Sandberg bluegrass). Several forbs, shrubs, and half-shrubs also occur on this site, but in relatively small percentages. Common shrubs are Wyoming big sagebrush, winterfat, snowberry, prairie rose, and creeping juniper. Trees such as Ponderosa pine and Rocky Mountain juniper occur occasionally. 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 site resilience to natural disturbances such as drought, fire, and insects. 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. High available water capacity provides a favorable soil-water-plant relationship. 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	673	1009	1345
Forb	135	202	269
Shrub/Vine	90	135	179
Total	898	1346	1793

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	5-10%
Grass/grasslike foliar cover	60-70%
Forb foliar cover	1-5%
Non-vascular plants	0%
Biological crusts	0-1%
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	1-3%
Grass/grasslike basal cover	5-15%
Forb basal cover	1-4%
Non-vascular plants	0%
Biological crusts	1-2%
Litter	40-48%
Surface fragments >0.25" and <=3"	0-4%

Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	20-25%

Table 8. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	–	–
>0.15 <= 0.3	–	–	–	–
>0.3 <= 0.6	–	5-10%	60-70%	1-5%
>0.6 <= 1.4	–	–	–	–
>1.4 <= 4	–	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

State 2

Plant Community 2a: Medium and Short Grasses/ Medium Shrubs

Community 2.1

Plant Community 2a: Medium and Short Grasses/ Medium Shrubs

With slight disturbance the HCPC/PPC will tend to change to a community dominated by medium and short grasses, such as western wheatgrass, needleandthread, Sandberg bluegrass, blue grama, and threadleaf sedge. The tall, more palatable grasses (bluebunch wheatgrass, green needlegrass) will be present in smaller percentages. There may be an increase in the amount of Wyoming big sagebrush. Palatable and nutritious forbs will be replaced by less desirable and more aggressive species. Implementing a prescribed grazing plan should bring this community back to a 1a.

State 3

Plant Community 2b: Medium and Short Grasses/ Invader Grasses/ Medium and Low Shrubs

Community 3.1

Plant Community 2b: Medium and Short Grasses/ Invader Grasses/ Medium and Low Shrubs

With slight disturbance, Community 1b (cool and moist slopes) will tend to change to a community similar to 2a, except Kentucky bluegrass may invade in significant amounts in higher moisture zones (13–14"). Creeping juniper, snowberry, and prairie rose also increase on the site. Implementing a prescribed grazing plan can often restore this community back to one similar to 1b. Grass biomass production and litter become reduced on Communities 2a and 2b as the taller grasses decrease in production, increasing evapotranspiration 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: Medium and Short Grasses/ Medium Shrubs and Half-shrubs

Community 4.1

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

With continued heavy disturbance Community 2a will become dominated by medium and short grasses, such as needleandthread, prairie junegrass, western wheatgrass, blue grama, Sandberg bluegrass, and threadleaf sedge. Wyoming big sagebrush and fringed sagewort increase. Red threeawn, Japanese brome, and other annuals and biennials may begin to occupy the site. The taller grasses will occur only occasionally. Palatable shrubs and forbs will be mostly absent.

State 5

Plant Community 4: Short Grasses /Invader Grasses /Medium and Low shrubs

Community 5.1

Plant Community 4: Short Grasses /Invader Grasses /Medium and Low shrubs

With continued heavy disturbance Community 2b will become dominated by short grasses such as Sandberg bluegrass, prairie junegrass, blue grama, and threadleaf sedge. Kentucky bluegrass may invade significantly onto the site in higher moisture zones (13–14") and creeping juniper and fringed sagewort increase. Western yarrow and other non-palatable forbs increase. The taller grasses will occur only occasionally. Palatable shrubs and forbs will be mostly absent. Plant communities 3 and 4 are less productive than Plant Communities 1, 2a, or 2b. The lack of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and high evaporation. This community has lost many of the attributes of a healthy rangeland, including good infiltration, minimal erosion and runoff, nutrient cycling and energy flow. These communities will respond positively to improved grazing management, but significant economic inputs and time would be required to move this plant community toward a higher successional stage and a more productive plant community. The presence of a large amount of Kentucky bluegrass would make this community more difficult to restore to one that resembles potential, as Kentucky bluegrass is a highly competitive species due to its rhizomatous root structure. The presence of Kentucky bluegrass substantially reduces the site's ability to withstand drought.

State 6

Plant Community 5: Short Grasses /Invader and Annual Grasses /Forbs, Medium and Low Shrubs

Community 6.1

Plant Community 5: Short Grasses /Invader and Annual Grasses /Forbs, Medium and Low Shrubs

Continued disturbance to Community 3 or 4 usually results in one that is dominated by blue grama, red threeawn, and annual grasses. Non-palatable forbs such as western yarrow become common. Kentucky bluegrass may invade significantly onto the site in higher moisture zones (13–14"). Shrubs such as fringed sagewort and creeping juniper become prevalent on the site. This plant community is significantly less productive than the HCPC and has lost many of the attributes of a healthy rangeland. The loss of deep perennial root systems reduces total available moisture for plant growth. Reduction of plant litter will result in higher surface soil temperatures and increased evaporation losses. Annual species are often aggressive and competitive with seedlings of perennial plants. This community can respond positively to improved grazing management but it may take additional inputs to move it towards a community similar in production and composition to that of Plant Communities 1 or 2. The presence of a large amount of Kentucky bluegrass would make this community more difficult to restore to one that resembles potential, as Kentucky bluegrass is a highly competitive species due to its rhizomatous root structure. The presence of Kentucky bluegrass substantially reduces the site's ability to withstand drought.

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			661–1166	
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	90–717	–

	little bluestem	SCSCS	<i>Schizachyrium scoparium var. scoparium</i>	135–538	–
	tufted wheatgrass	ELMA7	<i>Elymus macrourus</i>	90–269	–
	big bluestem	ANGE	<i>Andropogon gerardii</i>	90–269	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	45–269	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	90–269	–
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	45–179	–
	plains muhly	MUCU3	<i>Muhlenbergia cuspidata</i>	45–179	–
	green needlegrass	NAVI4	<i>Nassella viridula</i>	45–179	–
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	9–90	–
2	Native grasses and sedges			9–179	
	Grass, perennial	2GP	<i>Grass, perennial</i>	9–90	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	9–90	–
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	9–90	–
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	9–90	–
	plains reedgrass	CAMO	<i>Calamagrostis montanensis</i>	9–90	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	9–90	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	9–90	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	9–90	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	9–90	–
3	Native grasses			1–2	
	Fendler's threeawn	ARPUF	<i>Aristida purpurea var. fendleriana</i>	1–2	–
Forb					
4	Native forbs			135–269	
	Forb, perennial	2FP	<i>Forb, perennial</i>	9–90	–
	common yarrow	ACMI2	<i>Achillea millefolium</i>	9–90	–
	pussytoes	ANTEN	<i>Antennaria</i>	9–90	–
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	9–90	–
	aster	ASTER	<i>Aster</i>	9–90	–
	milkvetch	ASTRA	<i>Astragalus</i>	9–90	–
	purple prairie clover	DAPU5	<i>Dalea purpurea</i>	9–90	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	9–90	–
	buckwheat	ERIOG	<i>Eriogonum</i>	9–90	–
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	9–90	–
	dotted blazing star	LIPU	<i>Liatris punctata</i>	9–90	–
	desertparsley	LOMAT	<i>Lomatium</i>	9–90	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	9–90	–
	scurfpea	PSORA2	<i>Psoraleidium</i>	9–90	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	9–90	–
	Missouri goldenrod	SOMI2	<i>Solidago missouriensis</i>	9–90	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	9–90	–
	American vetch	VIAM	<i>Vicia americana</i>	9–90	–
5	Native forbs			1–2	

	twogrooved milkvetch	ASBI2	<i>Astragalus bisulcatus</i>	1-2	-
	larkspur	DELPH	<i>Delphinium</i>	1-2	-
	white locoweed	OXSE	<i>Oxytropis sericea</i>	1-2	-
	deathcamas	ZIGAD	<i>Zigadenus</i>	1-2	-
Shrub/Vine					
6	Native shrubs and half-shrubs			90-179	
	Shrub, broadleaf	2SB	<i>Shrub, broadleaf</i>	9-62	-
	silver sagebrush	ARCA13	<i>Artemisia cana</i>	9-62	-
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	9-62	-
	Wyoming big sagebrush	ARTRW8	<i>Artemisia tridentata ssp. wyomingensis</i>	9-62	-
	Nuttall's saltbush	ATNU2	<i>Atriplex nuttallii</i>	9-62	-
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	9-62	-
	rubber rabbitbrush	ERNAN5	<i>Ericameria nauseosa ssp. nauseosa var. nauseosa</i>	9-62	-
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	9-62	-
	rose	ROSA5	<i>Rosa</i>	9-62	-
	snowberry	SYMPH	<i>Symphoricarpos</i>	9-62	-
	soapweed yucca	YUGL	<i>Yucca glauca</i>	9-62	-
7	Native shrubs, half-shrubs, and trees			9-90	
	creeping juniper	JUHO2	<i>Juniperus horizontalis</i>	9-90	-
	Rocky Mountain juniper	JUSC2	<i>Juniperus scopulorum</i>	9-90	-
	ponderosa pine	PIPO	<i>Pinus ponderosa</i>	9-90	-
	chokecherry	PRVI	<i>Prunus virginiana</i>	9-90	-
	silver buffaloberry	SHAR	<i>Shepherdia argentea</i>	9-90	-
8	Native shrubs and half-shrubs			1-2	
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	1-2	-
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	1-2	-

Animal community

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. Forage production is somewhat limited by steep slopes and the potential for runoff, reducing the effectiveness of the precipitation received for plant growth. The steeper slopes may also limit livestock travel and result in poor grazing distribution, especially in areas away from water. 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. Non-prescribed grazing over a period of years will be detrimental to the site as it will alter the plant community composition and productivity.

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 it receives proper management. These communities will respond favorably to improved grazing management including increased growing season rest of key forage plants. Grazing management alone can usually restore these communities back towards the potential community.

Once this site is occupied by either Plant Community 3 or 4, it will be more difficult to restore it to a community that resembles the potential with grazing management alone. Additional growing season rest is often necessary for re-establishment of the desired species and to restore the stability and health of the site.

Plant Community 5 has extremely limited forage production (< 400 pounds per acre), and a high percentage of non-preferred species for cattle and sheep, (unless Kentucky bluegrass has invaded onto the site). Seeding may be necessary to restore desirable native perennial species. The potential for using seeding and mechanical treatment to improve site health is limited on this site due to steep slopes.

The presence of a large amount of Kentucky bluegrass would make this community more difficult to restore to one that resembles potential, as Kentucky bluegrass is a highly competitive species due to its rhizomatous root structure. The presence of Kentucky bluegrass substantially reduces the site's ability to withstand drought.

Wildlife Interpretations:

The Silty-Steep ecological site provides generally good habitat for deer because of the sloping topography and the diversity of forb and shrub production. It is generally fair habitat for antelope for the same landscape factors. It provides diverse habitat for many other prairie wildlife species. Some species of special emphasis, such as the mountain plover and swift fox, will use the habitat provided by this site for portions of their life cycle. The following is a description of habitat values for the different plant communities that may occupy the site:

Plant Community 1a and 1b: Tall and Medium Grasses/ Forbs/ Shrubs (HCPC):

The high proportion 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. Also, the combination of steep topography and complexity of aspect results in higher shrub density and diversity compared to a Silty ecological site. This provides winter feeding habitat (1a.) and thermal and escape cover (1b.) for mule deer. Large animal nutrition levels are relatively high year-long with the diversity of warm and cool season grasses, forbs and shrubs. 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 neotropical migratory birds. Diverse prey populations are available for raptors like ferruginous and red-tailed hawks. The diversity of grass and forb life forms and heights, along with scattered shrubs and trees, provides habitat for many bird species including the spotted towhee, field sparrow, western meadowlark, sharp-tailed grouse and loggerhead shrike. This community is well suited for ground-nesting birds because of the abundant residual plant material and litter available for nesting, escape and thermal cover.

Plant Community 2a: Medium and Short Grasses/ Medium Shrubs:

The partial loss of plant structural diversity makes this community somewhat less attractive to the variety of wildlife species using the HCPC. A decrease in residual plant material and litter cover reduces the habitat value for ground-nesting birds. Forb and shrub diversity and abundance favors selective feeders like mule deer.

Plant Community 2b: Medium and Short Grasses/ Invader Grasses / Medium and Low Shrubs:

The partial loss of plant structural diversity makes this community somewhat less attractive to the variety of wildlife species using the HCPC. A decrease in residual plant material and litter cover reduces habitat value for ground-nesting birds. Small mammal species composition shifts toward dominance of seed-eaters; mainly deer mice. Forb and shrub diversity and abundance favors selective feeders like mule deer. Kentucky bluegrass invasion provides succulent forage for ungulates early in the season.

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

The lack of litter cover and vegetative structural diversity results in poor habitat value for ground-nesting birds. Seed-eating small mammals, particularly deer mice may increase along with annual grasses and forbs. Forb and half-shrub production provides forage for mule deer and pronghorn.

Plant Community 4: Short Grasses (Invaders), Medium and Low Shrubs:

Wildlife habitat values are considerably reduced at this stage with loss of ground cover and structural diversity.

Snowberry provides some hiding cover for mule deer. Kentucky bluegrass provides succulent forage for ungulates, but for only a small portion of the growing season compared to the HPCP.

Plant Community 5: Short Grasses/ Invader and Annual Grasses / Forbs / Medium and Low Shrubs:

Wildlife habitat values are considerably reduced at this stage with loss of ground cover and structural diversity. Snowberry provides some hiding cover for mule deer. Kentucky bluegrass provides succulent forage for ungulates, but for only a small portion of the growing season compared to the HPCP.

Hydrological functions

The runoff potential for this site is high to very high, depending on slope and ground cover. Runoff curve numbers generally range from 77 to 92. The soils associated with this ecological site are generally in Hydrologic Soil Group C or D. The infiltration rates for these soils will normally be moderate to moderately 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 HPCP (Plant Communities 1 and 2) generally have enough plant cover and litter to optimize infiltration, minimize runoff and erosion, and have a good hydrologic condition. The deep root systems of the potential vegetation help maintain or increase infiltration rates and reduce runoff.

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

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).

Recreational uses

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.

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: $AUM/AC = [(2200-500)(0.25)]/915 \text{ lbs/month for one AU} = 0.46 \text{ AUM/AC}$
 $AC/AUM = (1.0 \text{ AU})/(0.46 \text{ AUM/AC}) = 2.2 \text{ AC/AUM}$

> 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): 4

BLM-Soil & Vegetation Inventory Method (SVIM) Data: 16

NRCS-Range Condition Record (ECS-2): 30

NRCS-Range/Soil Correlation Observations & Soil 232 notes: 5

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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)	T. DeCock;R Kilian
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Date	06/11/2014
Approved by	Jon Siddoway
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None.

2. **Presence of water flow patterns:** None on slopes less than 25%. On slopes 25 – 40% water flow patterns may be 2-3 feet long and 4 inches wide.

3. **Number and height of erosional pedestals or terracettes:** Pedestals up to 0.5 inch high are common. No terracettes.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is < 25%. Bare ground will occur as small areas less than 5 inches in diameter.

-
5. **Number of gullies and erosion associated with gullies:** Active gullies should not be present. Existing gullies should be "healed" with a good vegetative cover.
-
6. **Extent of wind scoured, blowouts and/or depositional areas:** None.
-
7. **Amount of litter movement (describe size and distance expected to travel):** Plant litter remains in place and is not moved by erosional forces on slopes less than 25%. Herbaceous litter may move up to 4 inches on slopes > 25%.
-
8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Surface Soil Aggregate Stability under plant canopy should typically be 5 or greater. Surface Soil Aggregate Stability not under plant canopy should typically be 5 or slightly less.
-
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Use soil survey series description.
-
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** High grass canopy and basal cover and small gaps between plants should reduce raindrop impact and slow overland flow, providing increased time for infiltration to occur. A combination of shallow and deep rooted species has a positive effect on infiltration.
-
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 or soil surface crusting should be evident.
-
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-stature, bunchgrasses > Warm season, mid-stature, bunchgrass
- Sub-dominant: Warm season, tall-stature, Rhizomatous grasses = Cool season, mid-stature, rhizomatous grasses > Warm season, mid-stature, rhizomatous grasses = forbs > shrubs and half shrubs = Cool season, short-stature bunch grasses and sedges
- Other: Minor Components: Warm season short-stature, rhizomatous grasses
- Additional: (Blue grama should be grouped with warm season, short-stature, rhizomatous grasses due to its growth form)
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very low.
-

14. **Average percent litter cover (%) and depth (in):** Litter cover is in contact with soil surface

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 1400 to 1600 #/acre (13 to 14 inch precip. Zone) 800 to 1200 #/ac (10 to 12 inch precip. Zone).

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:** Sulphur cinquefoil, common tansy, oxeye daisy, Leafy spurge, knapweeds, whitetop, Dalmatian toadflax, yellow toadflax, St. Johnswort, perennial pepperweed. Kentucky bluegrass and smooth brome can be invasive on the eastern boarder of Montana for these MLRAs.

17. **Perennial plant reproductive capability:** All species are capable of reproducing
