USDA Natural Resources
Conservation Service

Ecological site R058AC616MT
Thin Breaks (TB) RRU 58A-C 11-14" p.z.

Last updated: 6/14/2023
Accessed: 05/11/2025

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.

Associated sites

R058AC049MT	**Silty-Steep (SiStp) 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.**

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site is typically a complex of
several ecological sites, primarily Shallow and Very Shallow.
It occurs on steep to very steep slopes, usually in excess of 25 percent. Outcroppings of hard bedrock and soft sedimentary beds are major features. Slope aspect can be any direction and can be significant.

Table 2. Representative physiographic features

Landforms	(1) Escarpment (2) Bluff (3) Ridge
Elevation	2,250–4,500 ft
Slope	25%
Water table depth	60 in
Aspect	E, S, W

Climatic features

Major Land Resource Area (MLRA) 58AC 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 upper 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 mid teens to mid 20º'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 30–40º 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 28 total inches in the 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 (32º 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)	135 days
Freeze-free period (average)	155 days
Precipitation total (average)	14 in

Influencing water features

Soil features

The soils associated with this ecological site are highly variable. They will range from very shallow to deep, depending on landform and presence of ledges, etc. where pockets of deeper soils can accumulate. More detailed and specific information is available by using the ecological site description for the component of this site being investigated (e.g., Shallow).

Table 4. Representative soil features

Surface texture	(1) Gravelly sand (2) Flaggy loam
Drainage class	Well drained to excessively drained
Soil depth	10–40 in
Surface fragment cover <=3"	15–20%
Available water capacity (0-40in)	0–5 in
Soil reaction (1:1 water) (0-40in)	6.6–8.4

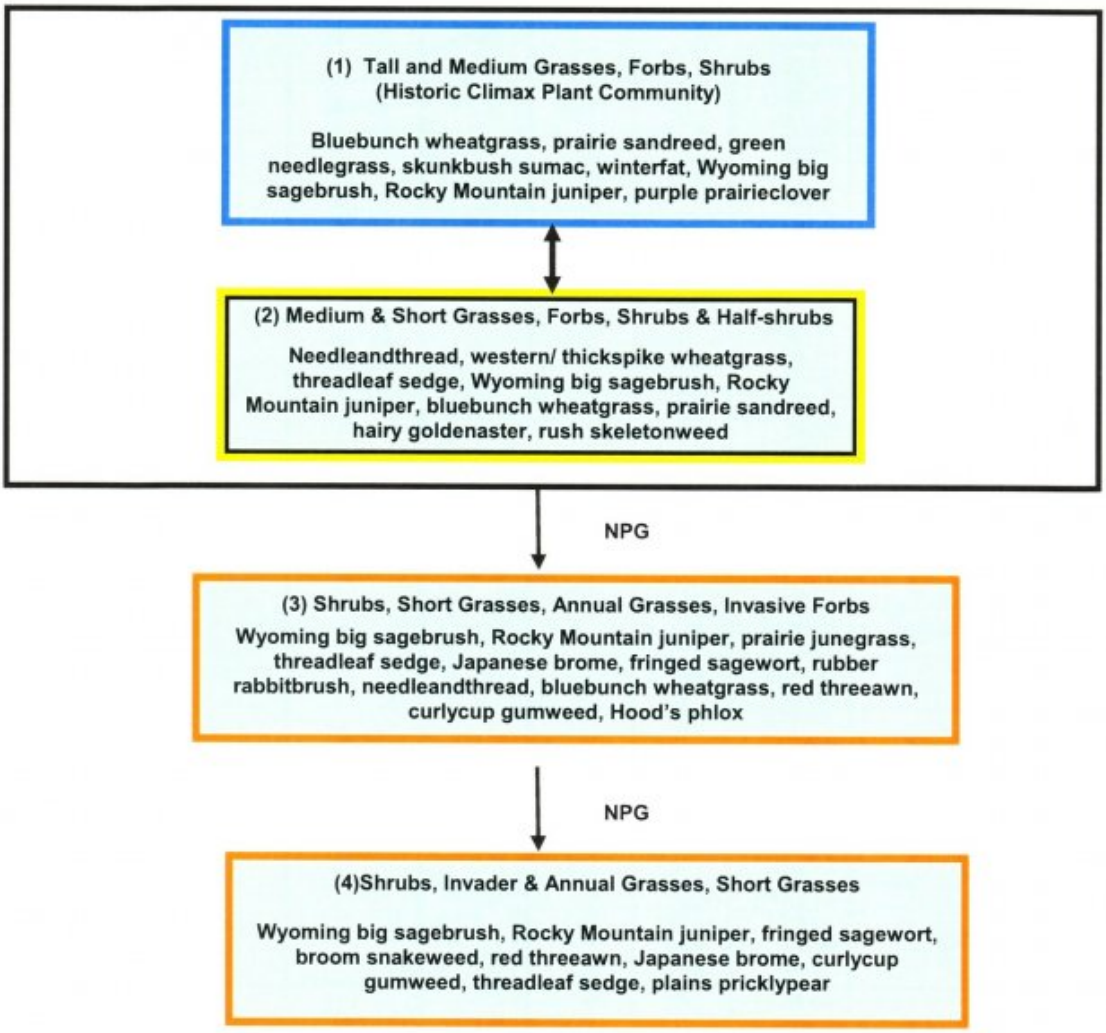
Ecological dynamics

The following are descriptions of several plant communities that may occupy this site:

State and transition model

MLRA: 58AC – Sedimentary Plains, Central
R058AC616MT

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.

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 Historical Climax is that of mixed grass/ shrub land dominated by cool-season bunch grasses and a mixture of shrubs. Approximately 65-75% of the annual production is from grasses and

sedges, 5-10% from forbs, and 15-30% is from trees, shrubs and half-shrubs. Canopy cover of shrubs is typically 10 to 35%. Ponderosa pine may occur on this site. The following are descriptions of several plant communities that may occupy this site: It contains a high diversity of tall grasses (bluebunch wheatgrass, prairie sandreed, Indian ricegrass, and green needlegrass), short grasses and sedges (threadleaf sedge, prairie junegrass, plains reedgrass, and sand dropseed), and shrubs (skunkbush sumac, winterfat, Wyoming big sagebrush, and Rocky Mountain juniper). There are also abundant forbs, and half-shrubs which occur in small percentages. Ponderosa pine or limber pine trees are often a component of this plant community.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	400	480	570
Shrub/Vine	130	160	180
Forb	40	50	60
Total	**570**	**690**	**810**

Table 6. Ground cover

Tree foliar cover	0-10%
Shrub/vine/liana foliar cover	5-20%
Grass/grasslike foliar cover	20-50%
Forb foliar cover	5-10%
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	0-1%
Shrub/vine/liana basal cover	1-10%
Grass/grasslike basal cover	3-12%
Forb basal cover	1-4%
Non-vascular plants	0%
Biological crusts	1-3%
Litter	30-60%
Surface fragments >0.25" and <=3"	15-20%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	30-60%

Table 8. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	–	–	–	5-10%
>0.5 <= 1	–	–	–	–
>1 <= 2	–	5-20%	20-50%	–
>2 <= 4.5	–	–	–	–
>4.5 <= 13	–	–	–	–
>13 <= 40	0-10%	–	–	–
>40 <= 80	–	–	–	–
>80 <= 120	–	–	–	–
>120	–	–	–	–

State 2
Plant Community 2: Medium and Short Grasses/ Forbs/ Shrubs and Half-Shrubs

Community 2.1
Plant Community 2: Medium and Short Grasses/ Forbs/ Shrubs and Half-Shrubs

Slight disturbances and degradation to the HCPC will result in a plant community dominated by needleandthread, western or thickspike wheatgrass, threadleaf sedge, prairie junegrass, blue grama, various forbs, Wyoming big sagebrush and fringed sagewort. The tall, more palatable grasses (bluebunch wheatgrass, Indian ricegrass, green needlegrass, prairie sandreed) will be present in smaller percentages. The tree component, if present, may also increase. 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.

State 3
Plant Community 3: Shrubs/ Short Grasses/ Annual Grasses/ Invasive Forbs

Community 3.1
Plant Community 3: Shrubs/ Short Grasses/ Annual Grasses/ Invasive Forbs

With continued heavy disturbance the site will become dominated by shrubs such as big or silver sagebrush, fringed sagewort, rubber rabbitbrush, and Rocky Mountain juniper. Short grasses and sedges increase, such as threadleaf sedge, prairie junegrass, sand dropseed, and blue grama. Needleandthread and western or thickspike wheatgrass will still be present in small amounts. Palatable shrubs and forbs will be mostly absent. Red threeawn, annual grasses (cheatgrass and Japanese brome), invasive forbs such as curlycup gumweed, and broom snakeweed begin to invade the site. This plant community is less productive than Plant Community 1 or 2 (< 200 pounds per acre). The lack of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and high evapotranspiration, which gives short sod grasses and annuals 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. There are severe limitations to using seeding and/or mechanical treatment on this site because of the very steep slopes, preponderance of shallow and very shallow soils, and amount of rock outcrop.

State 4
Plant Community 4: Shrubs/ Invader and Annual Grasses/ Short Grasses

Community 4.1
Plant Community 4: Shrubs/ Invader and Annual Grasses/ Short Grasses

With continual heavy disturbance over several years the community will change to one dominated primarily by big or silver sagebrush, fringed sagewort, rubber rabbitbrush, and Rocky Mountain juniper, red threeawn, fringed

sagewort, annual grasses, invasive forbs, broom snakeweed and plains pricklypear. This community has extremely reduced productivity of perennial grasses (< 25 pounds per acre). Significant economic inputs and time would be required to move this plant community 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 (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Native grasses**			370–527	
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	171–567	–
	tufted wheatgrass	ELMA7	*Elymus macrourus*	85–202	–
	western wheatgrass	PASM	*Pascopyrum smithii*	85–202	–
	prairie sandreed	CALO	*Calamovilfa longifolia*	0–122	–
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	28–81	–
	plains muhly	MUCU3	*Muhlenbergia cuspidata*	0–81	–
	green needlegrass	NAVI4	*Nassella viridula*	0–40	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	0–40	–
2	**Native grasses and sedges**			0–81	
	Grass, perennial	2GP	*Grass, perennial*	0–40	–
	blue grama	BOGR2	*Bouteloua gracilis*	0–40	–
	needleleaf sedge	CADU6	*Carex duriuscula*	0–40	–
	threadleaf sedge	CAFI	*Carex filifolia*	0–40	–
	plains reedgrass	CAMO	*Calamagrostis montanensis*	0–40	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–40	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–40	–
3	**Native grasses**			0–1	
	Sandberg bluegrass	POSE	*Poa secunda*	0–1	–
4	**Native grasses**			0–1	
	Fendler threeawn	ARPUL	*Aristida purpurea var. longiseta*	0–1	–
	squirreltail	ELEL5	*Elymus elymoides*	0–1	–
Forb					
5	**Native forbs**			28–81	
	Forb, perennial	2FP	*Forb, perennial*	0–40	–
	common yarrow	ACMI2	*Achillea millefolium*	0–40	–
	tarragon	ARDR4	*Artemisia dracunculus*	0–40	–
	bastard toadflax	COUM	*Comandra umbellata*	0–40	–
	miner's candle	CRVI4	*Cryptantha virgata*	0–40	–
	white prairie clover	DACA7	*Dalea candida*	0–40	–
	purple prairie clover	DAPU5	*Dalea purpurea*	0–40	–
	buckwheat	ERIOG	*Eriogonum*	0–40	–
	dotted blazing star	LIPU	*Liatris punctata*	0–40	–
	desertparsley	LOMAT	*Lomatium*	0–40	–
	rush skeletonplant	LYJU	*Lygodesmia juncea*	0–40	–

	beardtongue	PENST	*Penstemon*	0–40	–
	spiny phlox	PHHO	*Phlox hoodii*	0–40	–
	scurfpea	PSORA2	*Psoralidium*	0–40	–
	Missouri goldenrod	SOMI2	*Solidago missouriensis*	0–40	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	0–40	–
	American vetch	VIAM	*Vicia americana*	0–40	–
6	**Native forbs**			1–2	
	curlycup gumweed	GRSQS2	*Grindelia squarrosa var. squarrosa*	1–2	–
Shrub/Vine					
7	**Native shrubs, half-shrubs and trees**			85–243	
	skunkbush sumac	RHTR	*Rhus trilobata*	28–202	–
	soapweed yucca	YUGL	*Yucca glauca*	28–81	–
	Shrub, broadleaf	2SB	*Shrub, broadleaf*	28–81	–
	silver sagebrush	ARCA13	*Artemisia cana*	28–81	–
	prairie sagewort	ARFR4	*Artemisia frigida*	28–81	–
	Wyoming big sagebrush	ARTRW8	*Artemisia tridentata ssp. wyomingensis*	28–81	–
	shadscale saltbush	ATCO	*Atriplex confertifolia*	28–81	–
	Nuttall's saltbush	ATNU2	*Atriplex nuttallii*	28–81	–
	rubber rabbitbrush	ERNAN5	*Ericameria nauseosa ssp. nauseosa var. nauseosa*	28–81	–
	creeping juniper	JUHO2	*Juniperus horizontalis*	28–81	–
	Rocky Mountain juniper	JUSC2	*Juniperus scopulorum*	28–81	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	28–81	–
	limber pine	PIFL2	*Pinus flexilis*	28–81	–
	ponderosa pine	PIPO	*Pinus ponderosa*	28–81	–
8	**Native shrubs and half-shrubs**			0–1	
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	0–1	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	0–1	–

Animal community

Livestock Grazing Interpretations:

Managed livestock grazing is suitable on this site as it has the potential to produce a limited amount of high quality forage. Forage production is limited by steep slopes and shallow soils, and the potential for runoff, which reduces the effectiveness of the precipitation received for plant growth. The steeper slopes and rock outcrop 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. Heavy stocking and season long use of this site can be detrimental and will alter the plant community composition and production over time.

Whenever Plant Community 2 (medium and short grasses) occurs, grazing management strategies need to be implemented to avoid further deterioration. This community is still stable, productive, and healthy provided it receives proper management. This community will respond fairly quickly to improved grazing management including increased growing season rest of key forage plants. Grazing management alone can usually move this community back to one more similar to potential if a good seed source of the taller grasses still exists.

Plant Communities 3 and 4 have significantly reduced forage production (< 150 lbs./acre). 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.

The potential for using seeding and/or mechanical treatment to improve site health is not feasible due to steep slopes, shallow soils and the amount of exposed rock outcrop.

Wildlife Interpretations:

The Thin Breaks ecological site, with its complex topography and vegetative structure, provides diverse habitat structure for a variety of wildlife species. Historically, mule deer, pronghorn, a variety of seed-eating small mammals and raptors were probably the most conspicuous wildlife species, as they still are. The general area provides thermal and escape cover for big game animals as well as a variety of other wildlife species. Shrub availability on steep, south slopes often provides important winter range for mule deer and elk. Abundant prey and perch sites (on rock outcrops and scattered trees) attract a variety of raptors. The steep, rocky topography provides habitat for interesting songbird species such as rock wrens, canyon wrens and white-throated swifts. Golden eagles and prairie falcons commonly hunt small mammals within this site. Scattered junipers and pines host field sparrows and chipping sparrows. The interface of sandy and shale geologic substrates often results in seeps forming on side-hills and toe slopes. These are an important water source for wildlife as well as a source of biodiversity.

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

The diversity of forbs, half-shrubs and shrubs provides feeding substrate for a variety of pollinating insects, which are prey for many birds, reptiles and small mammals. Springs and seeps are habitat for amphibians such as tiger salamanders. The short-horned lizard is a representative reptile. The diversity of plant species and life forms, in combination with topographic variation, provides high quality bird habitat. Lark sparrows, green-tailed towhees, mountain bluebirds and golden eagles are examples of birds using this community. Sharp-tailed grouse and sage grouse may use this community for lek sites on ridge tops and fairly level topography. The diversity of forbs and shrubs favors browsers and selective feeders such as mule deer and pronghorn. Large animal nutrition levels are relatively high yearlong because of plant species and life form diversity. Winter range value is often high for big game species when topographic diversity provides south exposures and browse plants such as skunkbush sumac and winterfat are available. Small mammal diversity may be fairly high. Example species include the kangaroo rat, deer mouse, olive-backed pocket mouse and desert cottontail.

Plant Community 2: Medium & Short Grasses/ Forbs/ Shrubs & Half-Shrubs:

Insect diversity may decline with a partial loss of forb variety. The reduction of taller grasses and some desirable shrubs degrades habitat value for many birds, small mammals and big game. Potential increases in half-shrubs and shrubs may maintain big game winter range feeding value, although thermal cover is reduced. Small mammal species diversity declines with the reduction of vegetative diversity and litter cover.

Plant Community 3: Shrubs/ Short Grasses/ Annual Grasses/ Invasive Forbs:

Insects may be abundant at the height of population cycles but species diversity is reduced significantly. Springs and seeps are very degraded which results in poor amphibian habitat. Sparse vegetation and increased bare ground may provide suitable habitat for a few species (i.e. horned larks) but the lack of complex vegetative structure and residual cover makes this community poor habitat in general for most ground-nesting birds and relatively poor big game habitat. Pronghorn and mule deer may forage in this type throughout the year. However, nutritional levels for big game are greatly reduced and are available for a much shorter period as compared to the HCPC.

Plant Community 4: Shrubs/ Invader and Annual Grasses/ Short Grasses:

General wildlife habitat value is very poor in this community. Insect diversity and abundance is considerably reduced which decreases feeding opportunity for amphibians, birds and some small mammals. The lack of complex vegetative structural diversity, a shortened period of active plant growth and loss of ground cover make the habitat inhospitable for many birds and most small mammals. Wyoming big sagebrush and fringed sagewort provide some valuable big game winter forage, w here present. Thermal cover values are very limited with the loss of skunkbush sumac and other shrubs as well as herbaceous cover. Small mammal diversity is very low. The seed-eating deer

mouse may be fairly well represented.

Hydrological functions

The soils associated with this ecological site are generally in Hydrologic Soil Group D. The infiltration rates for these soils are variable, depending on surface texture. The runoff potential for this site is high to very high, depending on slope and ground cover/health. Runoff curve numbers generally range from 85 to 94.

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): 2

BLM-Soil & Vegetation Inventory Method (SVIM) Data: 8

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

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

Other references

Field Offices where this site occurs within the state:

Big Sandy
Big Timber
Billings
Chinook
Columbus

Crow Agency
Fort Belknap
Hardin
Harlowton
Joliet
Lewistown
Malta
Roundup
Stanford
White Sulphur Springs
Winnett

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)	Loretta Metz
Contact for lead author	
Date	04/23/2005
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Because all slopes on this site exceed 25% and bare ground is 30-60%, rills are present. They are generally < 3.0 inches deep, < 4.0 inches wide, and < 20.0 feet long.

---

2. **Presence of water flow patterns:** Will generally be rare on this site, but with the steeper slopes (>35%), and 15-30% bare ground, there may be areas which show accumulations of litter due to water movement, especially after severe storms.

---

3. **Number and height of erosional pedestals or terracettes:** Wind and water erosion occurs, and there may be some plants with pedestals up to 0.5 inches in height. Terracettes are generally not present, but where they do occur, they are a natural geological feature.

---

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is between 30-60%.

---

5. **Number of gullies and erosion associated with gullies:** Gully erosion is possible, but has not been quantified for this site.

---

6. **Extent of wind scoured, blowouts and/or depositional areas:** Wind scoured areas are uncommon, but may be evident.

---

7. **Amount of litter movement (describe size and distance expected to travel):** Litter movement will be minimal on the gradual slopes, however on the steeper slopes there will be evidence of litter movement (i.e. debris dams) which may travel greater than 10 feet on steeper slopes.

---

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Stability values of 2-3 in plant interspaces. Stability values of 3-4 under plant canopies and at plant bases.

---

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Organic matter in the A-horizon is between 0.5–1.5%. A-horizon is 1-2 inches thick. Surface structure should be moderate or strong granular to subangular blocky.

---

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Bunchgrasses and shrubs/trees dominate this site. Perennial herbaceous plants are spaced 2-4 feet apart. Shrub species are spaced 4-16 feet apart. Trees are sparse. Areas of bare soil will have a higher potential for runoff and poorer infiltration rates. Larger areas with exposed rock will increase runoff on this site and may induce erosion below those areas.

---

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None.

---

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 >> native shrubs > warm season, short-height perennial grasses > 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 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):** 570 – 810 #/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:** big sagebrush, silver sagebrush, rubber rabbitbrush, Rocky Mountain juniper, threadleaf sedge, blue grama, broom snakeweed, fringed sagewort, plains pricklypear, cheatgrass, Japanese brome, red threeawn.

---

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