USDA Natural Resources
Conservation Service

Ecological site R058AC618MT
Saline Overflow (SOv) RRU 58A-C 11-14" p.z.

Last updated: 6/14/2023
Accessed: 05/18/2024

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.

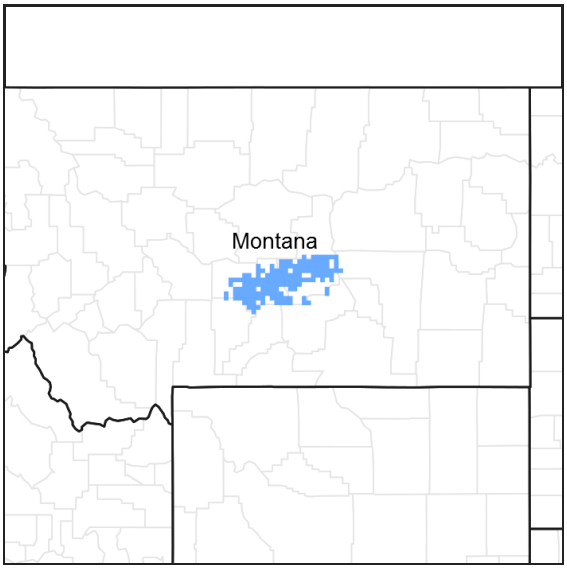


Figure 1. Mapped extent

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.

Similar sites

R058AC053MT	**Dense Clay (DC) RRU 58A-C 11-14" p.z.** The Dense Clay site will be more similar to a Saline Upland in that the production is much lower and the plant community is very sparse.
R058AC050MT	**Saline Upland (SU) RRU 58A-C 11-14" p.z.** The Saline Upland site may have similar plants, but is much sparser and low producing.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Sarcobatus vermiculatus* (2) *Krascheninnikovia lanata*
Herbaceous	(1) *Spartina gracilis* (2) *Sporobolus airoides*

Physiographic features

This ecological site occurs on overflow lands
where salt and/or alkali accumulations are apparent and salt-tolerant species dominate the plant community. It is

associated mainly with ephemeral streams (those that flow only in response to a precipitation event or snow melt, and the water table is lower than the channel bottom). This site can also occur around pond margins, particularly if the water recedes (e.g., drawdown zone).

Table 2. Representative physiographic features

Landforms	(1) Swale (2) Depression (3) Drainageway
Flooding frequency	None to rare
Ponding frequency	None
Elevation	686–1,372 m
Slope	0–4%
Ponding depth	0 cm
Water table depth	152 cm
Aspect	Aspect is not a significant factor

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)	356 mm

Influencing water features

Soil features

The soils associated with this ecological site are moderately to very strongly saline or sodic. Salt and/or sodium accumulations are apparent on the surface. Depth and texture are typically not determining factors. However, these soils are mainly over 20 inches deep. Surface textures are mainly silty clay loam and loam, but can also be silty clay, silt loam, sandy loam, clay loam, and clay. Permeability is variable, depending on surface texture and the amount of salt and/or sodium present. These sites are affected by additional moisture, mainly the result of surface run-in.

Table 4. Representative soil features

Surface texture	(1) Silty clay loam (2) Loam
Drainage class	Well drained
Soil depth	51–183 cm
Surface fragment cover <=3"	0–5%
Available water capacity (0-101.6cm)	20.32 cm
Electrical conductivity (0-101.6cm)	8 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	13
Soil reaction (1:1 water) (0-101.6cm)	7.9–9.6

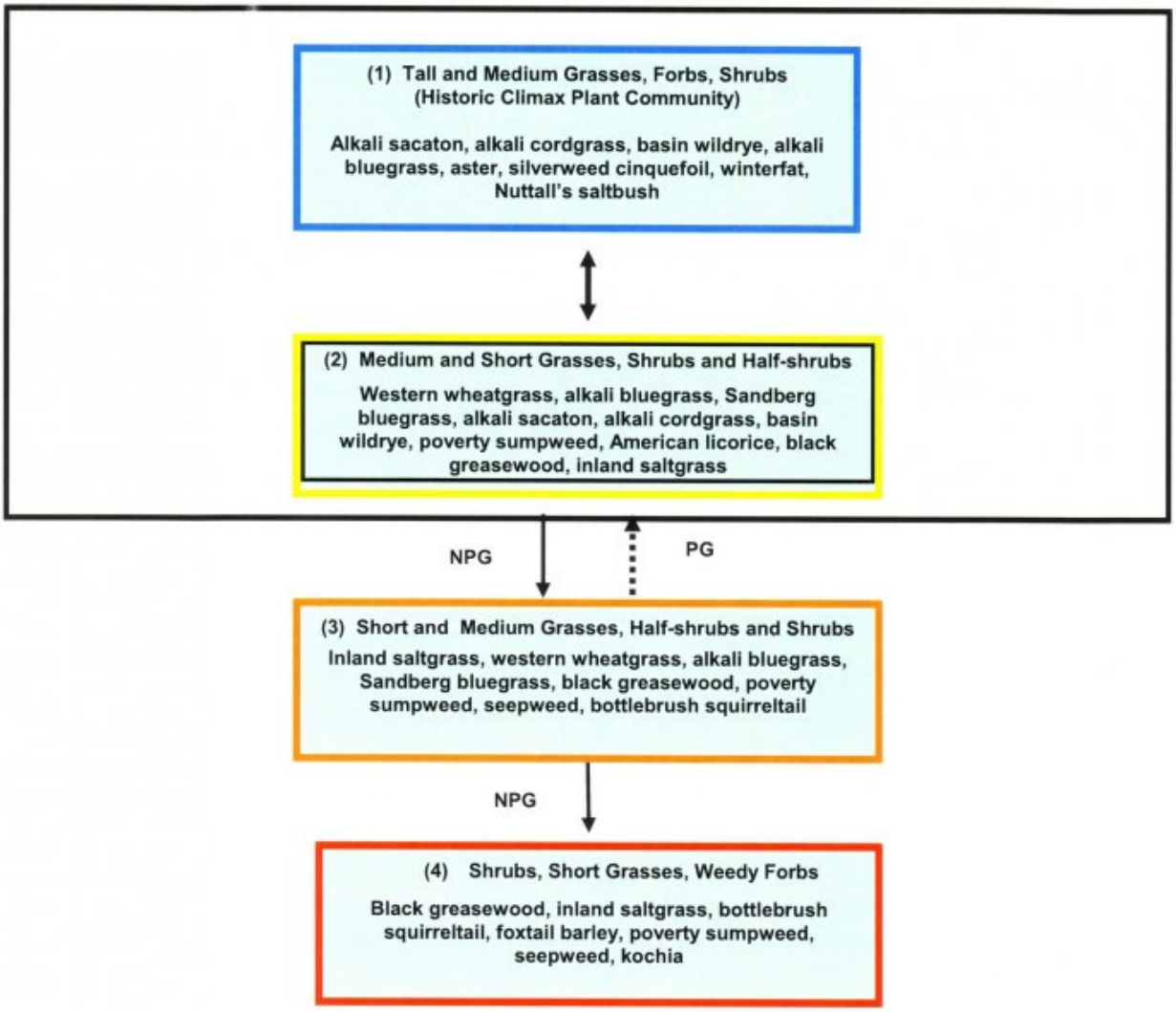
Ecological dynamics

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

State and transition model

MLRA: 58AC – Sedimentary Plains, Central
R058AC618MT

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
Tall and Medium Grasses/ Forbs/ Shrubs (HCPC)

Community 1.1
Tall and Medium Grasses/ Forbs/ Shrubs (HCPC)

The physical aspect of this site in the Historical Climax (HCPC) is that of a swale or depression grassland dominated by cool and warm-season grasses with scattered shrub cover. Approximately 70–80% of the annual

production is from grasses and sedges, 5–10% from forbs, and 15–20% is from shrubs and half-shrubs. The canopy cover of shrubs is 1 to 10%. Dominant species include basin wildrye, alkali cordgrass, alkali sacaton, Nuttall's alkaligrass, and alkali bluegrass. There are a few forbs that occur in smaller percentages. Shrubs such as Nuttall's saltbush, winterfat, and black greasewood can be common. This plant community is well adapted to the Northern Great Plains climatic conditions. The diversity in plant species and the presence of tall, deep-rooted perennial grasses allows for moderately high drought tolerance. Individual species can vary greatly in production depending on growing conditions (timing and amount of precipitation and temperature). Plants on this site have strong, healthy root systems that allow production to increase significantly with favorable precipitation. Abundant plant litter is available for soil building and moisture retention. Plant litter is properly distributed with very little movement off-site and natural plant mortality is very low. This site, because of the additional water typically available, provides a very good 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	1518	1612	1793
Shrub/Vine	239	263	280
Forb	143	157	168
Total	**1900**	**2032**	**2241**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	1-10%
Grass/grasslike foliar cover	60-80%
Forb foliar cover	1-5%
Non-vascular plants	0%
Biological crusts	0%
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	1-5%
Grass/grasslike basal cover	10-15%
Forb basal cover	1-4%
Non-vascular plants	0%
Biological crusts	0-1%
Litter	40-60%
Surface fragments >0.25" and <=3"	0-5%
Surface fragments >3"	0%
Bedrock	0%
Water	0%

Bare ground	5-15%

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	–	1-10%	–	–
>0.6 <= 1.4	–	–	60-80%	–
>1.4 <= 4	–	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

State 2
Medium and Short Grasses/ Shrubs and Half-shrubs

Community 2.1
Medium and Short Grasses/ Shrubs and Half-shrubs

This community is the result of shifts in climate and disturbances such as grazing, and is represented by an increase in black greasewood and short grasses such as inland saltgrass, western wheatgrass, Sandberg bluegrass and mat muhly. The medium and tall grasses such as basin wildrye, alkali cordgrass, alkali sacaton and Nuttall's alkaligrass will still be present, sometimes in relatively large amounts. The desirable shrubs such as Nuttall's saltbush and winterfat will be somewhat less prevalent. There may be an increase in some forbs such as poverty sumpweed and seepweed. Grass biomass production and litter become reduced on Community 2 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. This plant community provides for moderate soil stability.

State 3
Short and Medium Grasses/ Half-Shrubs and Shrubs

Community 3.1
Short and Medium Grasses/ Half-Shrubs and Shrubs

This is a disturbance induced community, with dominants including inland saltgrass, Sandberg bluegrass and mat muhly. Mid-seral species such as western wheatgrass will still be relatively abundant. The taller grasses (basin wildrye, alkali sacaton and alkali cordgrass) will still be present, but in much smaller amounts. Palatable forbs will be mostly absent. Bottlebrush squirreltail and foxtail barley often tend to become more abundant. Greasewood can become dominant in some situations, depending on factors such as fire history, historical use and management, and kinds and amount of salts present. Plant Community 3 is much less productive than Plant Communities 1 or 2, 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 will take additional inputs to move it towards a community similar in production and composition to that of Plant Community 1 or 2.

State 4
Shrubs/ Short Grasses/ Weedy Forbs

Community 4.1
Shrubs/ Short Grasses/ Weedy Forbs

This community is the result of continual adverse disturbances, and the community may deteriorate to one primarily composed of shrubs (greasewood) and short grasses (inland saltgrass, bottlebrush squirreltail). There will still be some of the mid-seral species such as western wheatgrass present. The taller grasses will occur only rarely, often underneath the shrub canopy. Weedy forbs (e.g., kochia) are likely to invade. Foxtail barley can be a common invader on this site. Plant community 4 has 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. This community has 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 this plant community towards 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**			1334–1681	
	alkali sacaton	SPAI	*Sporobolus airoides*	286–673	–
	alkali cordgrass	SPGR	*Spartina gracilis*	286–673	–
	basin wildrye	LECI4	*Leymus cinereus*	191–673	–
	western wheatgrass	PASM	*Pascopyrum smithii*	0–224	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–224	–
	Nuttall's alkaligrass	PUNU2	*Puccinellia nuttalliana*	0–112	–
2	**Native grasses**			0–224	
	Grass, perennial	2GP	*Grass, perennial*	0–112	–
	saltgrass	DISP	*Distichlis spicata*	0–112	–
	squirreltail	ELEL5	*Elymus elymoides*	0–112	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	0–112	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–112	–
3	**Native grasses**			0–1	
	foxtail barley	HOJU	*Hordeum jubatum*	0–1	–
Forb					
4	**Native forbs**			95–224	
	Forb, perennial	2FP	*Forb, perennial*	0–112	–
	silverweed cinquefoil	ARAN7	*Argentina anserina*	0–112	–
	aster	ASTER	*Aster*	0–112	–
	goosefoot	CHENO	*Chenopodium*	0–112	–
	American licorice	GLLE3	*Glycyrrhiza lepidota*	0–112	–
	povertyweed	IVAX	*Iva axillaris*	0–112	–
	blue lettuce	LATAP	*Lactuca tatarica var. pulchella*	0–112	–
	seepweed	SUAED	*Suaeda*	0–112	–
Shrub/Vine					
5	**Native shrubs and half-shrubs**			95–448	
	winterfat	KRLA2	*Krascheninnikovia lanata*	1–224	–
	prairie rose	ROAR3	*Rosa arkansana*	0–112	–
	greasewood	SAVE4	*Sarcobatus vermiculatus*	0–112	–
	silver buffaloberry	SHAR	*Shepherdia argentea*	0–112	–
	Shrub, broadleaf	2SB	*Shrub, broadleaf*	0–112	–
	Nuttall's saltbush	ATNU2	*Atriplex nuttallii*	19–112	–
6	**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 an abundance of high quality forage. This is often a preferred site for grazing by livestock due to the succulent forage, and animals tend to

congregate in these areas. In order to maintain the productivity of this site, stocking rates must be managed carefully on adjoining sites with less production to be sure livestock drift onto the Saline Overflow 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.

Grazing this site early when the upper part of the soil may be wet can sometimes cause compaction. Hummocking (frost heaving) is often a common feature of this site. The hummocking can be exacerbated if grazing impact becomes excessive.

Whenever Plant Community 2 (Medium and short grasses and shrubs) occurs, 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. Black greasewood can be very difficult to remove or reduce. 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 may be limited, due mainly because of the landscape position and potential for increased soil erosion from streamflow events.

Wildlife Interpretations:

The Saline Overflow ecological site provides important wildlife habitat diversity within a relatively uniform, semi-arid landscape. Supplemental ground water contributes additional wildlife habitat complexity to the landscape by allowing growth of taller shrubs and grasses than are available in adjacent ecological sites. These areas of taller, denser cover often allow many wildlife species to range farther into large blocks of upland habitat. Historically, large herds of bison and elk, along with mule deer and many species of breeding and migratory birds, small mammals and amphibians utilized this site. Today, the variety of shrubs and tall grasses serves as cover for many species and as nesting substrate for numerous birds. Invertebrate production on salt-affected soils feeds migratory and resident shorebirds including killdeer and solitary sandpipers. Continuous, season-long livestock grazing has replaced bison and often degrades habitat values on this site. The invasive Russian olive, a common invader, may encourage magpie nesting and result in increased predation on a wide variety of nesting birds.

Plant Community 1: Tall and Medium Grasses/ Forbs/ Shrubs (HCPC):
This community is home to a variety of insects (i.e. dragonflies, damsel flies) and other invertebrates such as spiders and midges. These provide food for numerous birds, amphibians and reptiles. Tiger salamanders are a common amphibian species. Representative ground-nesting birds include the common snipe and a variety of waterfowl. Killdeers may nest on areas of salty, open ground. Tall grasses and shrubs, such as greasewood, provide cover and nest sites for many birds ranging from pheasants to lark buntings. Sage grouse broods find insects and succulent forbs in this community. Representative non-game mammals include the meadow vole and raccoon. Mule deer and, to some extent, white-tailed deer, find fawning cover and travel corridors in this community.

Plant Community 2: Medium and Short Grasses/ Shrubs and Half-shrubs:
Insect populations are likely similar to the HCPC. Amphibian habitat is somewhat degraded by livestock trampling and a slight drying of the soil. Nesting bird habitat suffers from a decline in plant structural diversity and ground cover. Likewise, cover value declines as tall grasses are replaced by shorter species.

Plant Community 3: Short and Medium Grasses/ Half-shrubs and Shrubs:
The dominance of greasewood and short grasses results in a considerably reduced structural habitat diversity. Insects populations are much less varied, although individual species may be abundant at certain times. Nesting bird habitat is much less diverse compared to the HCPC. Lark buntings may utilize greasewood for nesting. Big game species still find some cover in the tall shrubs but cover value is considerably reduced with the loss of the

taller herbaceous layer.

Plant Community 4: Shrubs/ Short Grasses/ Weedy Forbs:
Overall wildlife habitat value is very low in this community reflecting a greatly simplified plant community dominated by a few species. Insect populations are highly variable and amphibians find a drier, much less suitable site compared to higher successional communities. Ground-nesting birds suffer heavy losses from nest predation. Invading Russian olive trees encourage magpie nesting, which results in heavy nest mortality among other bird species. Cover and nutritional value for big game species is very low following loss of desirable browse plants, forbs and tall grasses. Greasewood and silver buffaloberry provide some hiding cover for big game species and nest habitat for songbirds, such as Eastern kingbirds, and raptors, such as Swainson's hawks.

Hydrological functions

The soils associated with this ecological site are generally in Hydrologic Soil Group C. The infiltration rates for these soils will generally be moderate. The runoff potential for this site is low. Runoff curve numbers generally range from 64 to 89.

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

Supporting Data for Site Development:

NRCS Production & Composition Record for Native Grazing Lands (Range-417): 2

BLM Soil & Vegetation Inventory Method (SVIM) Data: 4

NRCS Range Condition Record (ECS-2): 5

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

Ecological Site Reference: NRCS 417 No.: Wheatland County 502

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

Other references

Site Documentation:

Authors:
Original: NRCS, 1983

Revised: Matthew J. Ricketts, Robert E. Leinard, Rhonda Sue Noggles, Peter O. Husby, 2003

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, Tony Rolfes, Loretta Metz
Contact for lead author	
Date	04/11/2005
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** No rills present in the reference state.

2. **Presence of water flow patterns:** Due to the soil surface being well covered and minimal slope there is no evidence of past or current soil deposition or erosion for this site.

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

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.

5. **Number of gullies and erosion associated with gullies:** Gully erosion may be evident in the reference state, but only following storms of greater intensity than “normal”.

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

7. **Amount of litter movement (describe size and distance expected to travel):** Because there is little bare ground, litter movement will be minimal at most. Because the site is dominated by the taller bunchgrasses and rhizomatous grasses, litter size will reflect the height and diameter of the reproductive culms and leaves of these grasses as well as the lesser dominate mid-size grasses.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil stability values of 4 to 5 under plant canopies, and 2-3 in the plant interspaces.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface structure is granular. Organic matter is 2-4%. 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 warm season perennial grasses with up to 15% woody species optimize infiltration and runoff.

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 the 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: Warm season, mid grasses > warm season, short grasses = tall shrubs > mid shrubs > cool season, short grasses > forbs.

Sub-dominant:

Other:

Additional:

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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 (>5-6 years).

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

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 1700 – 2000 #/acre. This would be the expected production for the reference state during average moisture years. 1800 pounds would be the expected production in a 12 inch average precipitation area.

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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:** inland saltgrass, alkali bluegrass, sandberg bluegrass, Kentucky bluegrass, foxtail barley, poverty sumpweed, seepweed, kochia, black greasewood, suaeda, dandelion, etc.

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17. **Perennial plant reproductive capability:** This is not impaired in the reference state. Except in extended periods of drought, plants are able to reproduce sexually or vegetatively.
