USDA Natural Resources Conservation Service

Ecological site R058AE008MT
Subirrigated (Sb) RRU 58A-E 10-14" p.z.

Accessed: 05/12/2025

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.

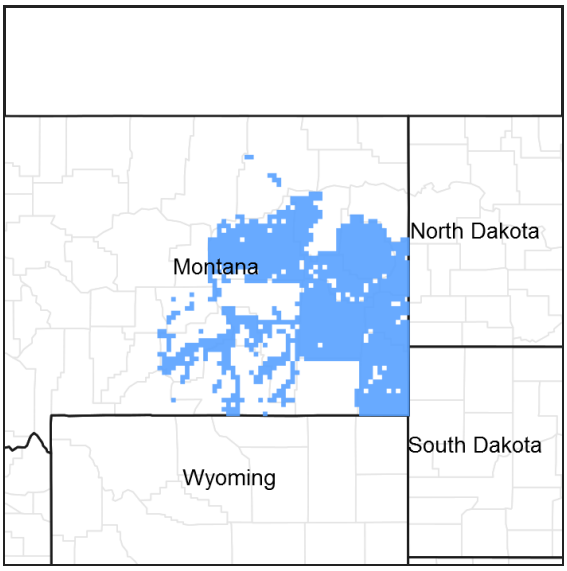


Figure 1. Mapped extent

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.**
R058AE002MT	**Clayey (Cy) RRU 58A-E 10-14" p.z.**
R058AE004MT	**Silty-Steep (SiStp) RRU 58A-E 10-14" p.z.**
R058AE005MT	**Clayey-Steep (CyStp) RRU 58A-E 10-14" p.z.**
R058AE007MT	**Overflow (Ov) RRU 58A-E 10-14" p.z.**
R058AE009MT	**Wet Meadow (WM) RRU 58A-E 10-14" p.z.**

Similar sites

R058AE009MT	**Wet Meadow (WM) RRU 58A-E 10-14" p.z.** The Wet Meadow site differs mainly by being wet at or near the surface for most of the growing season.
R058AE012MT	**Saline Lowland (SL) RRU 58A-E 10-14" p.z.** The Saline Lowland site differs mainly by being salf affected.
R058AE007MT	**Overflow (Ov) RRU 58A-E 10-14" p.z.** The Overflow site differs mainly by being associated with ephemeral streams and having no permanent water table.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on low terraces adjacent to flood plains of perennial or intermittant streams, near springs or seeps, or other areas that have a permanent water table close enough to the surface to influence plant composition and production. Typically, the water table will occur within 3 to 4 feet of the surface. Slopes are mainly 0 to 2 percent.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Terrace (3) Stream terrace
Flooding frequency	None to rare
Ponding frequency	None
Elevation	579–1,067 m
Slope	0–2%
Water table depth	61–122 cm
Aspect	Aspect is not a significant factor

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

Influencing water features

Soil features

These soils are non hydric. They are moderately deep to very deep with a water table. They generally are in the aquic moisture regime, or aquic intergrade. Textures vary and are not an important feature of this site. The driving feature is the presence of a water table within rooting depth of the plants.

Table 4. Representative soil features

Surface texture	(1) Loam (2) Clay loam (3) Sandy loam
Family particle size	(1) Loamy
Drainage class	Somewhat poorly drained
Permeability class	Moderate
Soil depth	102–152 cm
Available water capacity (0-101.6cm)	25.4–40.61 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)	6.6–8.4

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 the Historic Climax Plant Community (HCPC). This community is described 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 is considered resilient to disturbance as it has essentially no limitations for plant growth, except for the growing season. Changes may occur to the Historic Climax Plant Community due to management actions and/or climatic conditions, such as a drop in water table level due to prolonged drought conditions. Under continued adverse impacts, a moderate decline in vegetative vigor and composition will occur. Under favorable vegetative

management treatments, this site can 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 prairie cordgrass, switchgrass, fowl mannagrass, big bluestem, bluejoint and slimstem reedgrass, and Nebraska, woolly, and brevior sedges will occur. These plants will be replaced by a mixture of medium and short grasses, sedges, and rushes including western wheatgrass, meadow barley, mat muhly, clustered field sedge, and Baltic rush as well as several species of non-palatable forbs. Shrubs such as rose and snowberry may also occasionally increase in some situations.

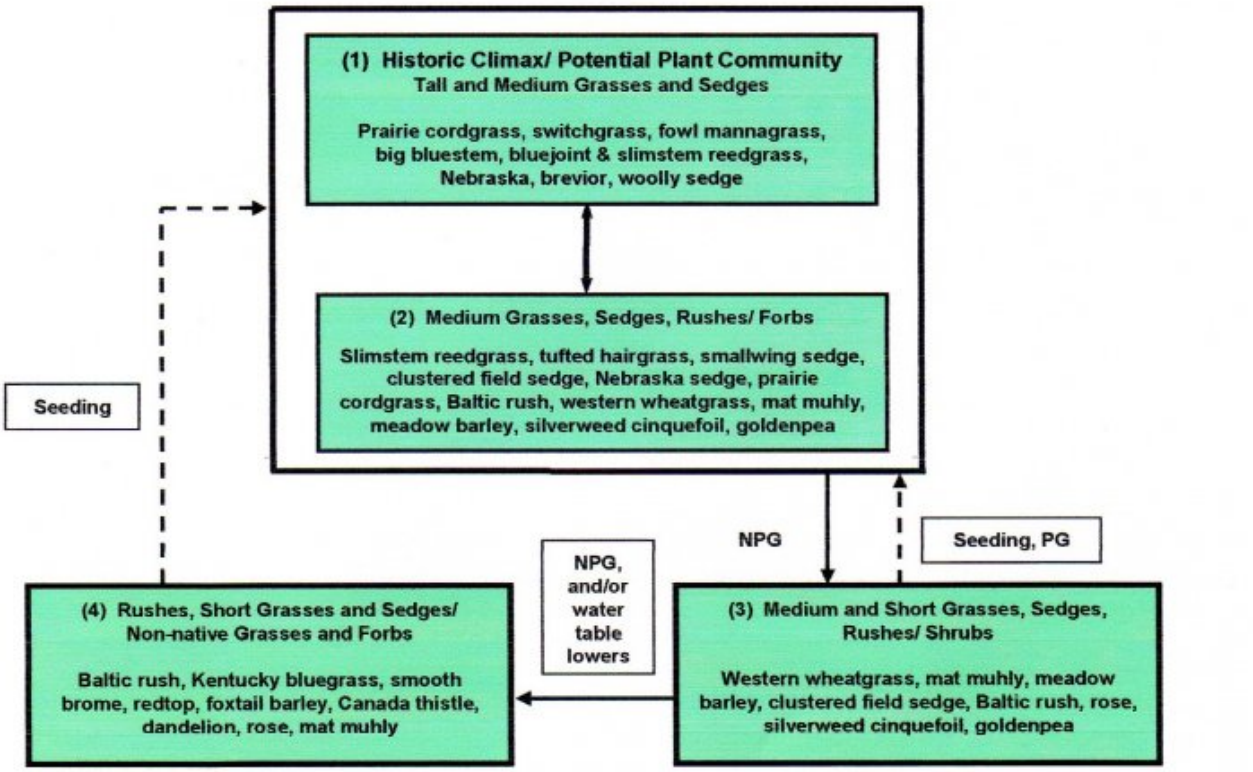
Continued deterioration results in an abundance of short grasses and short sedges, non-native grasses and forbs, and annuals. A lowering of the water table can also cause a significant change in the plant community. Plants that are not a part of the Historic Climax Plant Community that are most likely to invade are Kentucky, fowl, and Canada bluegrass, smooth brome, redtop, Canada thistle, dandelion, leafy spurge, sulfur cinquefoil, annuals, and other weedy species. Purple loosestrife is potentially a serious invader on this site.

Long-term non-use (>3 years) combined with the absence of fire will result in excessive litter and decadent plants.

State and transition model

MLRA: 58A – Sedimentary Plains, East
MLRA: 60B – Pierre Shale Plains, East
R058AE100MT, R060BE581MT

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 improve or change the plant community. Dashed lines returning to a state (within the heavy lines) indicates a reduced probability of success, and will usually require major economic inputs, or a more intensive grazing strategy.

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 and Sedges

Community 1.1
Plant Community 1: Tall and Medium Grasses and Sedges

This is the interpretive plant community and is considered to be the Historic Climax Plant Community (HCPC) for this site. This plant community contains a high diversity of tall and medium height, cool and warm season grasses and sedges (prairie cordgrass, switchgrass, fowl mannagrass, big bluestem, bluejoint reedgrass, slimstem reedgrass, Nebraska sedge, brevior sedge, and woolly sedge), and short grasses, sedges, and rushes (mat muhly, meadow barley, clustered field sedge, and Baltic rush). There are abundant forbs which occur in small percentages. This plant community is well adapted to the Northern Great Plains climatic conditions as well as the presence of a permanent water table. The diversity in plant species allows for drought tolerance. Individual species can vary greatly in production depending on growing conditions (timing and amount of precipitation, depth to the water table, and temperature). Plants on this site have strong, healthy root systems that allow production to

increase significantly with favorable moisture conditions. Abundant plant litter is available for soil building and moisture retention. Plant litter is properly distributed with very little movement off-site and natural plant mortality is very low. The presence of available water throughout the growing season provides a very 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	2858	3811	4764
Forb	336	448	560
Shrub/Vine	168	224	280
Total	**3362**	**4483**	**5604**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0-1%
Grass/grasslike foliar cover	55-70%
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	0-1%
Grass/grasslike basal cover	35-40%
Forb basal cover	1-3%
Non-vascular plants	0%
Biological crusts	0-1%
Litter	50-55%
Surface fragments >0.25" and <=3"	0-1%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0-1%

Table 8. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	–	–
>0.15 <= 0.3	–	0-1%	55-70%	–
>0.3 <= 0.6	–	–	–	1-5%
>0.6 <= 1.4	–	–	–	–
>1.4 <= 4	–	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

State 2
Plant Community 2: Medium Grasses, Sedges, and Rushes/ Forbs

Community 2.1
Plant Community 2: Medium Grasses, Sedges, and Rushes/ Forbs

With slight disturbances to the site, the HCPC/PPC will tend to change to a community dominated by medium grasses, sedges, rushes and forbs, such as slimstem reedgrass, tufted hairgrass, smallwing sedge, clustered field sedge, Baltic rush, western wheatgrass, mat muhly, and silverweed cinquefoil. Most of the taller, more palatable grasses and sedges (prairie cordgrass, fowl mannagrass, bluejoint reedgrass, Nebraska sedge) will be present in smaller percentages. Palatable and nutritious forbs will be replaced by less desirable and more aggressive species. Biomass production and litter become reduced on the site as the taller grasses and sedges 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: Medium and Short Grasses, Sedges & Rushes/ Shrubs

Community 3.1
Plant Community 3: Medium and Short Grasses, Sedges & Rushes/ Shrubs

With continued heavy disturbance to the site, it will become dominated by medium and short grasses, sedges, and rushes such as western wheatgrass, mat muhly, meadow barley, clustered field sedge, and Baltic rush. Most of the taller, more palatable grasses and sedges (prairie cordgrass, switchgrass, fowl mannagrass, big bluestem, bluejoint reedgrass, slimstem reedgrass, Nebraska sedge, brevior sedge, and woolly sedge) will occur only occasionally. There may be an increase in the amount of rose, snowberry, or other shrubs. Palatable and nutritious forbs will be replaced by less desirable and more aggressive species.

State 4
Plant Community 4: Rushes, Short Grasses & Sedges/ Non-native Grasses & Forbs

Community 4.1
Plant Community 4: Rushes, Short Grasses & Sedges/ Non-native Grasses & Forbs

Continued heavy disturbance to the site generally results in a community comprised mainly of short, less palatable grasses, sedges, and rushes such as Baltic rush, western wheatgrass, mat muhly, meadow barley, and clustered field sedge. Non-native species, such as Kentucky, fowl, or Canada bluegrass, smooth brome, redtop, Canada thistle, and dandelion become more abundant, especially if the water table has lowered. The taller grasses and sedges will occur only occasionally. Foxtail barley is a common invader on this site. Palatable forbs will be mostly absent. Shrubs will continue to be common if present in one of the previous communities. This plant community is less productive than Plant Community 1 or 2. The lack of litter and short plant heights result in higher soil

temperatures, poor water infiltration rates, and high evaporation thus eventually favoring species that are more adapted to drier conditions. This community has lost many of the attributes of a healthy rangeland, including good infiltration, minimal erosion and runoff, nutrient cycling and energy flow. This community 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. This site is often seeded to introduced species for hay or pasture because of its productivity potential and level landscape. Reed canarygrass and “Garrison” creeping foxtail, often along with a legume such as clover or alfalfa, are common components. This plant community is often as productive as the HCPC but is no longer managed as rangeland. This community can respond positively to improved grazing management but it will take additional inputs (reseeding) to move it towards a community similar in production and composition to that of Plant Community 1 or 2.

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, sedges, and rushes**			2858–4764	
	prairie cordgrass	SPPE	*Spartina pectinata*	504–1401	–
	switchgrass	PAVI2	*Panicum virgatum*	168–841	–
	bluejoint	CACA4	*Calamagrostis canadensis*	168–841	–
	Nebraska sedge	CANE2	*Carex nebrascensis*	168–841	–
	woolly sedge	CAPE42	*Carex pellita*	168–560	–
	big bluestem	ANGE	*Andropogon gerardii*	168–560	–
	slimstem reedgrass	CASTS5	*Calamagrostis stricta ssp. stricta*	168–560	–
	beardless wheatgrass	PSSPI	*Pseudoroegneria spicata ssp. inermis*	34–560	–
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	34–560	–
	fowl mannagrass	GLST	*Glyceria striata*	34–280	–
	meadow barley	HOBR2	*Hordeum brachyantherum*	34–280	–
	rush	JUNCU	*Juncus*	0–280	–
	knotted rush	JUNO2	*Juncus nodosus*	0–280	–
	poverty rush	JUTE	*Juncus tenuis*	0–280	–
	Torrey's rush	JUTO	*Juncus torreyi*	0–280	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	34–280	–
	western wheatgrass	PASM	*Pascopyrum smithii*	34–280	–
	Grass, perennial	2GP	*Grass, perennial*	34–280	–
	shortbeak sedge	CABR10	*Carex brevior*	34–280	–
	clustered field sedge	CAPR5	*Carex praegracilis*	34–280	–
	sedge	CAREX	*Carex*	0–280	–
	foxtail barley	HOJU	*Hordeum jubatum*	0–1	–
Forb					
2	**Native forbs**			336–560	
	Forb, perennial	2FP	*Forb, perennial*	34–56	–
	silverweed cinquefoil	ARAN7	*Argentina anserina*	34–56	–
	American licorice	GLLE3	*Glycyrrhiza lepidota*	34–56	–
	blue lettuce	LATAP	*Lactuca tatarica var. pulchella*	34–56	–
	wild mint	MEAR4	*Mentha arvensis*	34–56	–

	wild bergamot	MOFI	*Monarda fistulosa*	34–56	–
	slender cinquefoil	POGR9	*Potentilla gracilis*	34–56	–
	goldenrod	SOLID	*Solidago*	34–56	–
	alpine leafybract aster	SYFOF	*Symphyotrichum foliaceum var. foliaceum*	34–56	–
	prairie thermopsis	THRH	*Thermopsis rhombifolia*	34–56	–
Shrub/Vine					
3	**Native shrubs**			168–280	
	Shrub, broadleaf	2SB	*Shrub, broadleaf*	0–280	–
	rose	ROSA5	*Rosa*	0–280	–
	willow	SALIX	*Salix*	0–280	–
	common snowberry	SYAL	*Symphoricarpos albus*	0–280	–

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

Whenever Plant Community 2 (medium and short grasses and sedges) 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 since a good seed source
of the taller grasses should still exist.

Plant Communities 3 and 4 have severely reduced forage production, and contain a high percentage of non-palatable species. Once this site is occupied by these communities the presence of non-native grasses and undesirable plants will make it 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. Once established, plants such as Kentucky bluegrass, smooth brome, and Canada thistle are stable and very difficult to remove by grazing alone.

The potential for using mechanical treatment to improve site health can be limited, depending on the depth to the water table.

Wildlife Interpretations:

The subirrigated ecological site is important for enhancing biodiversity within an otherwise semi-arid environment. Although surface water is rarely present, the high water table allows growth of tall herbaceous and woody plants which provide habitat structure, food and cover for diverse wildlife species. The Historic Climax Plant Community was used historically by large herds of grazing ungulates, migrating shorebirds and waterfowl, flocks of sage grouse and many song bird species. Uncontrolled livestock grazing has greatly simplified this plant community in many areas. Livestock are attracted to the subirrigated site because of the availability of palatable, succulent forage when

upland vegetation is dry. Invasive plants, including Canada thistle, Kentucky bluegrass, redtop, and dandelion compete with native vegetation and degrade habitat for many wildlife species. Prescribed grazing strategies can maintain healthy wildlife habitat and promote vegetative productivity on this site. The proximity of uplands, subirrigated sites, riparian habitat and open water creates an exceptionally diverse habitat complex for a wide variety of wildlife.

Plant Community 1: Tall and Medium Grasses and Sedges (HCPC):

The mesic environment and abundance of forbs support diverse insect and invertebrate populations ranging from grasshoppers and spiders to dragonflies and pollinating bees. Amphibians, such as Woodhouse's toad, and reptiles, such as garter snakes, rely on this community for migration and over-wintering habitat. Amphibians can be considered a "keystone species" because of their value as indicators of environmental degradation. The HCPC supports a diverse bird population because of the mix of tall and medium grasses and sedges and abundant forbs. Northern harriers hunt over, and nest in, this community. Shorebirds such as the common snipe and upland sandpiper nest here. LeConte's sparrow and the savanna sparrow are examples of song bird species using this plant community. Sage grouse broods find abundant insect foods here and adults select succulent forbs. The predominance of grasses and sedges in the HCPC favors grazers and mixed feeders like bison, elk and pronghorn. Thermal and escape cover are limited because of the low shrub coverage. Small mammals, such as the meadow vole, are common and abundant.

Plant Community 2: Medium Grasses, Sedges & Rushes/ Forbs:

Loss of tall grasses and sedges along with a change in the forb component represents a decrease in habitat structural diversity. Insect populations may still be abundant but are less diverse. Amphibian habitat is degraded by a reduction in surface litter and moisture. Breeding bird populations are less diverse as habitat structure is simplified. Common snipes will still use this community for nesting and feeding. Sage grouse broods continue to select this habitat for critical insect foods during their fast growth period follow hatching. Small mammal populations may shift away from dominance by voles to seed-eaters like deer mice as ground cover decreases. Forage value for big game declines with the loss of a diverse mix of warm and cool season grasses.

Plant Community 3: Medium & Short Grasses, Sedges & Rushes/ Shrubs:

Insect populations decline in abundance and diversity with the loss of succulent forbs and increase in invasive weeds. Amphibians are negatively affected by a further loss of litter cover and drier ground surface. Bird species diversity declines as habitat structural complexity is lost. Some species characteristic of drier habitats may increase.

Plant Community 4: Rushes, Short Grasses & Sedges/ Non-native Grasses & Forbs:

This community has very limited value for all but a few wildlife species. Insect and other invertebrate populations are much less diverse compared to later successional stages. Amphibians are represented by fewer individuals and species. Leopard frogs are probably absent. Disturbance-tolerant breeding birds are more numerous, including the killdeer and, possibly, the piping plover (especially if the site is somewhat saline). Sage grouse may continue to seek insects and succulent forbs (i.e. dandelion) here but cover value is low and predators may take a heavy toll. Small mammal populations are less diverse, shifting to more seed-eating species compared to a predominance of herbaceous voles present in higher seral stages. Ungulate species will still find palatable forage (i.e. Kentucky bluegrass) but the forage diversity and length of green feed period have declined significantly. Big game cover value is almost non-existent and forage value is limited and shorter in duration.

Introduced Species: Tall, productive pasture grasses and alfalfa or clover provide excellent habitat for some wildlife species, although wildlife habitat diversity is lower as compared to the HCPC. When forbs are included in the mixture, insect populations may be abundant and diverse. Amphibians, such as Woodhouse's toad, may thrive although species diversity is probably lower compared to the HCPC because plant species and structural diversity is also lower. Some breeding birds, such as the bobolink, prefer tall, introduced grasses. Savanna sparrow are common and northern harriers and short-eared owls commonly hunt this habitat. Deer, elk and pronghorn seek out productive pasture and hayland. In fact wildlife use may be a problem for ranchers needing abundant forage and hay. Meadow voles are a common small mammal in this community.

Hydrological functions

The runoff potential for this site is low. Runoff curve numbers generally range
from 61 to 79. The soils associated with this ecological site are generally in Hydrologic Soil Group B. The infiltration rates for these soils will normally be moderate.

A drop in the water table elevation, such as a result of several years of drought conditions will result in a change in the plant community to more drought tolerant species (often non-native).

Good hydrologic conditions exist on rangelands if plant cover (grass, sedge, and litter) is greater than 70%. Fair conditions exist when cover is between 30 and 70%, and poor conditions exist when cover is less than 30%. Sites in high similarity to HCPC (Plant Communities 1 and 2) generally have enough plant cover and litter to optimize infiltration, minimize runoff and erosion, and have a good hydrologic condition. The deep root systems of the potential vegetation help maintain or increase infiltration rates and reduce runoff.

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

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 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): 1

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

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

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

Contributors

Bob Leinard
JVF, REL, RSN, MJR, SKW, SVF, POH

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
Contact for lead author	Tammy DeCock
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:** Rills should not be present.

---

2. **Presence of water flow patterns:** Barely observable.

---

3. **Number and height of erosional pedestals or terracettes:** Essentially non-existent.

---

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is 0-trace

---

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.

---

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 should typically be 6 with or without plant canopy.

---

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. Healthy, deep rooted native grasses enhance infiltration and reduce 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 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: sedges and rushes

    Sub-dominant: Warm season, tall-stature, rhizomatous grass = Cool season, tall-stature, rhizomatous grasses = shrubs ** > Warm season, mid-stature, bunch grasses

    Other: Minor components: Cool season, tall-stature, bunch grasses; Cool season, mid-stature, bunch grasses; Cool season, mid-stature, rhizomatous grasses; Warm season, tall-stature, rhizomatous grasses; forbs; shrubs **

    Additional: ** Due to the range of characteristics and site variability of the Subirrigated Ecological Site, shrubs may range from a Sub-dominate component (10-40%) to a Minor component (<10%)

---

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):** 4500 to 5000 #/acre (13 to 14 inch precip. Zone) 3000 to 4000+ #/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:** Purple loosestrife, Sulphur cinquefoil, common tansy, oxeye daisy, Leafy spurge, knapweeds, whitetop, Dalmatian toadflax, yellow toadflax, St. Johnswort, perennial pepperweed, Kentucky bluegrass, smooth brome, Russian olive, salt cedar, Reed canarygrass.

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