USDA Natural Resources
Conservation Service

Ecological site R058AE007MT
Overflow (Ov) RRU 58A-E 10-14" p.z.

Accessed: 05/04/2024

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.

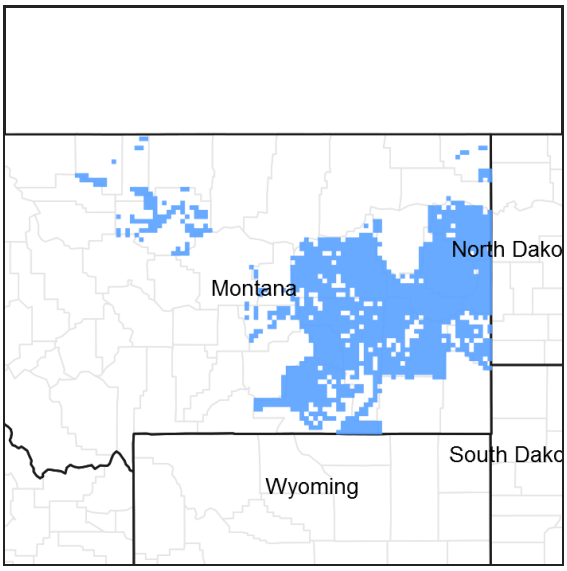


Figure 1. Mapped extent

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.

Associated sites

R058AY001MT	**Loamy (Lo) 10-14 P.Z.**
R058AE002MT	**Clayey (Cy) RRU 58A-E 10-14" p.z.**
R058AE003MT	**Sandy (Sy) 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.**
R058AE006MT	**Sandy-Steep (SyStp) RRU 58A-E 10-14" p.z.**
R058AE008MT	**Subirrigated (Sb) RRU 58A-E 10-14" p.z.**
R058AE009MT	**Wet Meadow (WM) RRU 58A-E 10-14" p.z.**
R058AE018MT	**Sands (Sa) RRU 58A-E 10-14" p.z.**

Similar sites

R058AE012MT	**Saline Lowland (SL) RRU 58A-E 10-14" p.z.** The Saline Lowland site differs mainly by being salt affected.
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.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This ecological site occurs in concave positions, such as swales, where it receives extra moisture from run in from adjacent areas. The streams associated with this site are ephemeral (i.e., flow only in response to a precipitation event or from snow melt).

Table 2. Representative physiographic features

Landforms	(1) Swale (2) Drainageway
Flooding frequency	Rare
Ponding frequency	None
Elevation	579–1,067 m
Slope	0–5%
Water table depth	152 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

This site is associated with ephemeral stream systems. Ephemeral strams flow less than 30 consecutive days. The bottom of the channel is above the water table at all times.

Soil features

The soils associated with this site are moderately deep to very deep. Textures vary since these soils typically result from water deposition. Permeability is mainly moderate, but will vary because of the different textures that can occur.

Table 4. Representative soil features

Surface texture	(1) Loam (2) Clay loam (3) Sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate
Soil depth	102–152 cm
Available water capacity (0-101.6cm)	15.24–25.4 cm
Calcium carbonate equivalent (0-101.6cm)	5–10%
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 given 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 highly resilient to disturbance as it has essentially no limitations for plant growth, except for

growing season. Changes may occur to the Historic Climax Plant Community due to management actions and/or climatic conditions, such as prolonged drought. Under continued adverse impacts, a moderate decline in vegetative vigor and composition will occur. Under favorable vegetative management treatments the 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 green needlegrass, big bluestem, little bluestem, and switchgrass. Prairie sandreed will be common on sites that are predominately sandy textured. These plants will be replaced by a mixture of medium and short grasses, including needleandthread, western wheatgrass, prairie junegrass, Sandberg bluegrass, buffalograss, and blue grama as well as several species of non-palatable forbs. Shrubs such as Wood's rose and snowberry also increase.

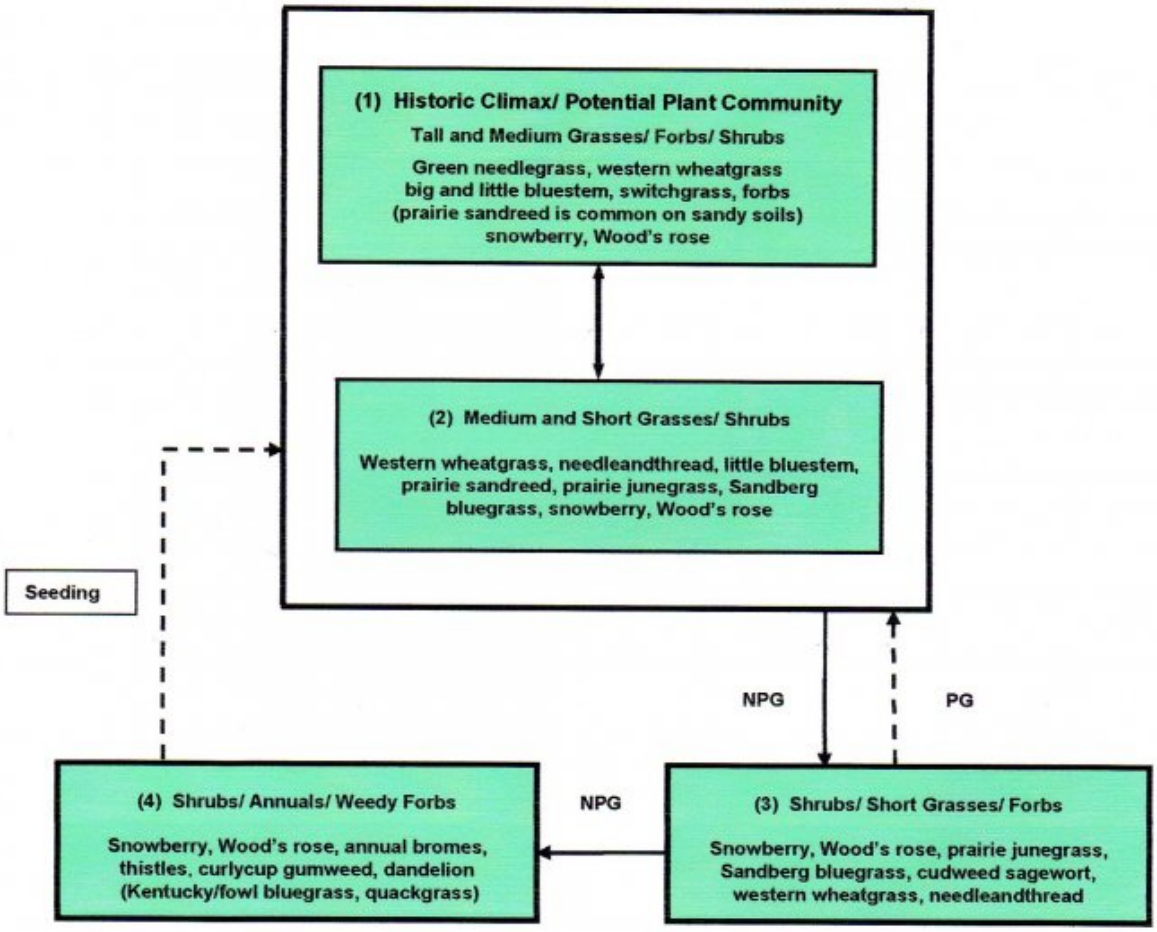
Continued deterioration results in an abundance of short grasses and forbs, and annuals. Plants that are not a part of the Historic Climax Plant Community that are most likely to invade include quackgrass, Kentucky and fowl bluegrass, foxtail barley, annual bromes, other annual grasses, curlycup gumweed, cocklebur, thistles, dandelion, leafy spurge, annual forbs, and other weedy species.

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
R058AE007MT, R060BE570MT

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 4: Shrubs/ Annuals/ Weedy Forbs

Community 1.1
Plant Community 4: Shrubs/ Annuals/ Weedy Forbs

As continued heavy disturbance continues, the plant community deteriorates to one dominated by dense patches of shrubs such as snowberry and rose, along with annual bromes, other annual grasses (e.g., tumblegrass), weedy forbs such as thistles, cudweed sagewort, and curlycup gumweed. Non-native species such as Kentucky and fowl bluegrass and quackgrass often invade this site. 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 2
Plant Community 3: Shrubs/ Short Grasses/ Forbs

Community 2.1
Plant Community 3: Shrubs/ Short Grasses/ Forbs

With continued heavy disturbance the site will become dominated by shrubs, short grasses, and unpalatable forbs such as snowberry, rose, prairie junegrass, Sandberg bluegrass, blue grama, buffalograss, and cudweed sagewort. The taller grasses will occur only occasionally. Palatable forbs will be mostly absent. 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 higher 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 are usually required to move this plant community toward a higher successional stage and a more productive plant community.

State 3
Plant Community 2: Medium and Short Grasses/ Medium Shrubs

Community 3.1
Plant Community 2: Medium and Short Grasses/ Medium Shrubs

With slight disturbance, the HCPC/PPC will tend to change to a community dominated by medium and short grasses such as western wheatgrass, needleandthread, prairie junegrass, Sandberg bluegrass, blue grama, and buffalograss. Most of the taller, more palatable grasses (green needlegrass, big bluestem, prairie sandreed, little bluestem, and switchgrass) will be present in smaller percentages. There may be an increase in the amount of snowberry, rose or other shrubs. 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 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 4
Plant Community 1: Tall and Medium Grasses/ Forbs/ Shrubs

Community 4.1
Plant Community 1: Tall and Medium Grasses/ Forbs/ Shrubs

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 (green needlegrass, big bluestem, prairie sandreed, little bluestem, western wheatgrass, switchgrass, and needleandthread), and short grasses (Sandberg bluegrass, prairie junegrass). There are abundant forbs which occur in smaller percentages. Shrubs such as snowberry and rose are common. Less common are shrubs such as chokecherry, silver buffaloberry, and currant. This plant community is well adapted to the Northern Great Plains climatic conditions. The diversity in plant species and presence of tall, deep rooted perennial grasses allows for drought tolerance. Individual species can vary greatly in production depending on growing conditions (timing and amount of precipitation and runoff events, 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 location of this site in the landscape plus the influence of extra water in the early part of 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	1261	2102	2942
Shrub/Vine	252	420	588
Forb	168	280	392
Total	**1681**	**2802**	**3922**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	5-10%
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	1-5%
Grass/grasslike basal cover	30-40%
Forb basal cover	1-3%
Non-vascular plants	0%
Biological crusts	0-1%
Litter	50-60%
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	–	–	–	1-5%
>0.3 <= 0.6	–	5-10%	55-70%	–
>0.6 <= 1.4	–	–	–	–
>1.4 <= 4	–	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Additional community tables

Table 9. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Native grasses**			1244–2550	
	big bluestem	ANGE	*Andropogon gerardii*	252–981	–
	prairie sandreed	CALO	*Calamovilfa longifolia*	0–785	–
	green needlegrass	NAVI4	*Nassella viridula*	84–588	–
	western wheatgrass	PASM	*Pascopyrum smithii*	84–588	–
	switchgrass	PAVI2	*Panicum virgatum*	84–392	–
	Canada wildrye	ELCA4	*Elymus canadensis*	17–392	–
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	17–392	–
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	84–392	–
	little bluestem	SCSCS	*Schizachyrium scoparium var. scoparium*	17–392	–
	prairie cordgrass	SPPE	*Spartina pectinata*	17–196	–
	beardless wheatgrass	PSSPI	*Pseudoroegneria spicata ssp. inermis*	0–196	–
2	**Native grasses, sedges, and rushes**			17–392	
	Grass, perennial	2GP	*Grass, perennial*	17–196	–
	blue grama	BOGR2	*Bouteloua gracilis*	17–196	–
	sedge	CAREX	*Carex*	17–196	–
	rush	JUNCU	*Juncus*	17–196	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	17–196	–
	Sandberg bluegrass	POSE	*Poa secunda*	17–196	–
Forb					
3	**Native forbs**			168–392	
	Forb, perennial	2FP	*Forb, perennial*	17–196	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	17–196	–
	American licorice	GLLE3	*Glycyrrhiza lepidota*	17–196	–
	Maximilian sunflower	HEMA2	*Helianthus maximiliani*	17–196	–
	stiff sunflower	HEPA19	*Helianthus pauciflorus*	17–196	–

	wild bergamot	MOFI	*Monarda fistulosa*	17–196	–
	scurfpea	PSORA2	*Psoralidium*	17–196	–
	upright prairie coneflower	RACO3	*Ratibida columnifera*	17–196	–
	Canada goldenrod	SOCA6	*Solidago canadensis*	17–196	–
	Missouri goldenrod	SOMI2	*Solidago missouriensis*	17–196	–
Shrub/Vine					
4	**Native shrubs and half-shrubs**			252–588	
	Shrub, broadleaf	2SB	*Shrub, broadleaf*	17–196	–
	silver sagebrush	ARCA13	*Artemisia cana*	17–196	–
	chokecherry	PRVI	*Prunus virginiana*	17–196	–
	golden currant	RIAU	*Ribes aureum*	17–196	–
	Woods' rose	ROWO	*Rosa woodsii*	17–196	–
	silver buffaloberry	SHAR	*Shepherdia argentea*	17–196	–
	common snowberry	SYAL	*Symphoricarpos albus*	17–196	–

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 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. 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, it will be significantly more difficult to restore it to a community that resembles the potential with grazing management alone. Snowberry and/or rose often develop dense thickets that are stable and can be very difficult to remove or reduce.

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:

This ecological site is a “hotspot” of biodiversity as a result of extra moisture availability in ephemeral drainageways. The run-in moisture provides more wildlife habitat complexity because of greater plant species and structural diversity compared to surrounding semi-arid uplands. The linear, meandering drainage pattern common to this site connects a wide variety of upland types and provides secure travel corridors for big game and many

other wildlife species as they move between required seasonal habitats. Moisture availability and resulting habitat structural diversity provide for the food, cover and nesting needs of resident and transitory neotropical migratory birds. Invasive plant species are common on this site under non-use as well as season-long livestock and big game grazing. Canada thistle, leafy spurge, houndstongue and burdock are often found here. Prescribed grazing strategies can keep native vegetation more competitive with these invasive weeds. Wildlife habitat diversity is often degraded on this site under season-long grazing strategies because livestock are attracted to the green forage, particularly during the dry season. Seeps and springs common in association with this site provide drinking water for many wildlife species as well as habitat for less common invertebrates, reptiles and amphibians, birds and small mammals.

The following is a description of habitat values for the different plant communities that may occupy the site:

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

This moist site supports a variety of grasses and succulent forbs which provide feeding substrate for many pollinating insects and other invertebrates. The insect food source, in combination with available moisture and habitat complexity, supports amphibians and reptiles such as Woodhouses's toad and the common garter snake. Amphibians can be considered a "keystone species" because of their susceptibility to environmental degradation and resulting indicator value. The combination of tall and medium grasses, forbs and shrub patches provides high value nesting and escape cover for many breeding bird species. Gray catbirds, brown thrashers and spotted towhees rely on chokecherry, silver buffaloberry and rose/snowberry patches. Northern harriers hunt over, and nest within, low shrub and mesic grassland habitats. Sage grouse broods depend on invertebrate foods and succulent forbs available in overflow areas and associated springs and seeps. Sharp-tailed grouse use shrub patches for winter cover and feeding. Habitat complexity extra moisture provide habitat for a variety of small mammals including herbivorous meadow voles and seed-eating western harvest mice. The diversity of grasses, forbs and shrubs supports grazers and mixed feeders such as bison and elk as well as selective feeders such as mule deer and white-tailed deer.

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

Invertebrate abundance and species diversity declines with the reduction in forbs, which reduces the attractiveness of this site to a variety of insectivorous wildlife species. Amphibian and reptile habitat value declines with the reduction in ground cover and invertebrate diversity. Breeding bird habitat value declines along with plant species diversity. Sage grouse still find critical foods in the form of succulent forbs (i.e. dandelion and salsify), and insects. Cover value for small mammals and big game declines with the loss of taller grasses and forbs, although the potential increase in snowberry and rose compensates somewhat. An increase in invasive weeds often simplifies habitat structure even more.

Plant Community 3: Shrubs/ Short Grasses/ Forbs:

Long-term continuous grazing simplifies the plant community significantly so the site provides fewer wildlife habitat niches as compared to Plant Communities 1 and 2, above. Insect populations are less diverse and productive. Ground level temperature rises and soil moisture levels decrease with loss of litter cover to the detriment of amphibian and reptile populations. Breeding and migratory birds find less cover and food resources; species favoring drier sites may increase although bird species diversity decreases significantly. Sage grouse broods still find some succulent forbs (dandelions, salsify) but sharp-tailed grouse winter habitat is all but eliminated. Small mammal diversity declines and big game species suffer loss of cover, food and travel corridor quality. Springs and seeps may partially dry up as less water is stored in the soil following loss of ground cover.

Plant Community 4: Shrubs/ Annuals/ Weedy Forbs:

Wildlife habitat quality is very low in this greatly simplified community characterized by annual grasses, Kentucky bluegrass, dense patches of low shrubs and invasive weeds. Insect populations (grasshoppers) may be abundant in some years but no longer represent
a reliable, diverse food resource for insectivorous wildlife. Amphibian habitat quality is very low as the site has dried out significantly. Reptiles are now represented by dry site tolerant species. Bird habitat is suitable for only a handful of species such as horned larks and longspurs. Big game find little cover and food in this potential travel corridor. Small mammal diversity is very low. Deer mice and pocket gophers may be fairly abundant.

Hydrological functions

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

Good hydrologic conditions exist on rangelands if plant cover (grass, forb, and shrub, 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 Communities 3 and 4) are generally considered to be in poor hydrologic condition and are susceptible to excessive erosion from stream overflow.

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).

Contributors

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Rangeland health reference sheet

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

Author(s)/participant(s)	T. DeCock;R Kilian
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 < 5%.

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):** Little to no plant litter movement. 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 under plant canopy should typically be 5 or greater. Surface Soil Aggregate

Stability not under plant canopy should typically be 5 or slightly less.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Use soil survey series description.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** High grass canopy and basal cover and small gaps between plants should reduce raindrop impact and slow overland flow, providing increased time for infiltration to occur. A combination of shallow and deep rooted species has a positive effect on infiltration.

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** No compaction layer or soil surface crusting should be evident

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

    Dominant: Cool season, mid-stature, bunch grasses

    Sub-dominant: Cool season, mid-stature, rhizomatous grasses > warm season, tall-stature, rhizomatous grasses = shrubs and half shrubs = cool season sedges and rushes = forbs

    Other: Minor components: Warm season, mid stature, bunch grasses, Warm season, short-stature, rhizomatous grasses; cool season, short-stature, bunch grasses

    Additional: (Blue grama should be grouped with warm season, short-stature, rhizomatous grasses due to its growth form)

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very low.

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

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 3000 to 3500 #/acre (13 to 14 inch precip. Zone) 1500 to 2500 #/ac (10 to 12 inch precip. Zone).

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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:** Sulphur cinquefoil, common tansy, oxeye daisy, Leafy spurge, knapweeds, whitetop, Dalmatian toadflax, yellow toadflax, St. Johnswort, perennial pepperweed, Reed canarygrass. Kentucky bluegrass, smooth brome, and Canada thistle can be invasive. Overflow sites along streams and rivers are susceptible to invasion by Russian olive

and salt cedar.

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