USDA Natural Resources
Conservation Service

# Ecological site R046XS104MT
# Silty (Si) RRU 46-S 13-19 PZ

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## General information

**Provisional**. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

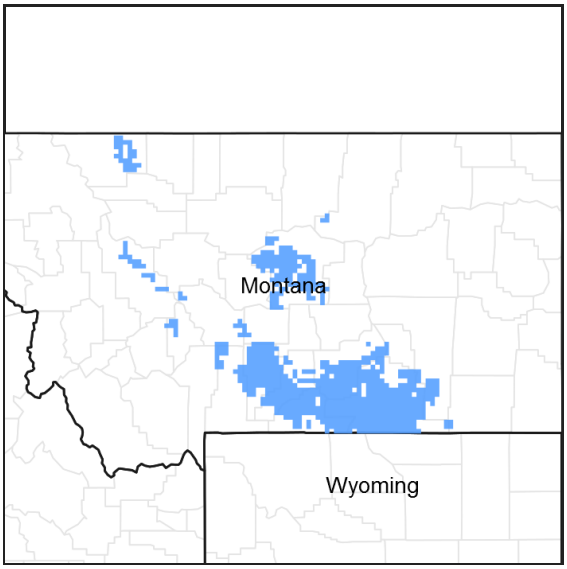



**Figure 1. Mapped extent**

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

## Associated sites

| | |
|---|---|
| R046XS105MT | **Clayey (Cy) RRU 46-S 13-19 PZ** |
| R046XS106MT | **Sandy (Sy) RRU 46-S 15-19 PZ** |
| R046XS109MT | **Overflow (Ov) RRU 46-S 13-19 PZ** |
| R046XS113MT | **Shallow to Gravel (SwGr) RRU 46-S 13-19 PZ** |
| R046XS114MT | **Shallow (Sw) RRU 46-S 13-19 PZ** |
| R046XS115MT | **Very Shallow (VSw) RRU 46-S 13-19 PZ** |
| R046XS116MT | **Gravelly (Gr) RRU 46-S 13-19 PZ** |
| R046XS619MT | **Shallow Clay (SwC) RRU 46-S 13-16 PZ** |

## Similar sites

| | |
|---|---|
| R046XS105MT | **Clayey (Cy) RRU 46-S 13-19 PZ**<br>The Clayey site occupies the same landscape positions; the primary difference is soil texture and plant community. |

| | |
|---|---|
| R046XS113MT | **Shallow to Gravel (SwGr) RRU 46-S 13-19 PZ**<br>The Shallow to Gravel site differs by being 20 inches or less to a restrictive layer or bedrock and having significantly lower production and ground cover. |
| R046XS114MT | **Shallow (Sw) RRU 46-S 13-19 PZ**<br>The Shallow site differs by being 20 inches or less to a restrictive layer or bedrock and having significantly lower production and ground cover. |
| R046XS106MT | **Sandy (Sy) RRU 46-S 15-19 PZ**<br>The Sandy site occupies the same landscape positions; the primary difference is soil texture and plant community. |

**Table 1. Dominant plant species**

| | |
|---|---|
| Tree | Not specified |
| Shrub | Not specified |
| Herbaceous | (1) *Pseudoroegneria spicata*<br>(2) *Festuca idahoensis* |

## Physiographic features

This ecological site occurs on plains, fans, and terraces. Slope ranges between and 15%, but is mainly less than 8%.

**Table 2. Representative physiographic features**

| | |
|---|---|
| Landforms | (1) Plain<br>(2) Fan<br>(3) Terrace |
| Flooding duration | Long (7 to 30 days) |
| Ponding frequency | None |
| Slope | 0–15% |
| Water table depth | 40 in |
| Aspect | Aspect is not a significant factor |

## Climatic features

See Climatic Data Sheet for more details (Section II of the Field Office Technical Guide) or reference the following climatic web site: http://www.wrcc.sage.dri.edu/ .

**Table 3. Representative climatic features**

| | |
|---|---|
| Frost-free period (characteristic range) | 49-96 days |
| Freeze-free period (characteristic range) | 105-122 days |
| Precipitation total (characteristic range) | 14-18 in |
| Frost-free period (actual range) | 47-99 days |
| Freeze-free period (actual range) | 104-125 days |
| Precipitation total (actual range) | 13-18 in |
| Frost-free period (average) | 76 days |
| Freeze-free period (average) | 114 days |
| Precipitation total (average) | 16 in |

## Climate stations used

- (1) JOLIET [USC00244506], Joliet, MT
- (2) COLUMBUS [USC00241938], Columbus, MT
- (3) BIG TIMBER [USC00240780], Big Timber, MT
- (4) MELVILLE 4 W [USC00245603], Big Timber, MT
- (5) MARTINSDALE 3 NNW [USC00245387], Martinsdale, MT
- (6) NYE 2 [USC00246190], Fishtail, MT

## Influencing water features

No influencing water features.

## Soil features

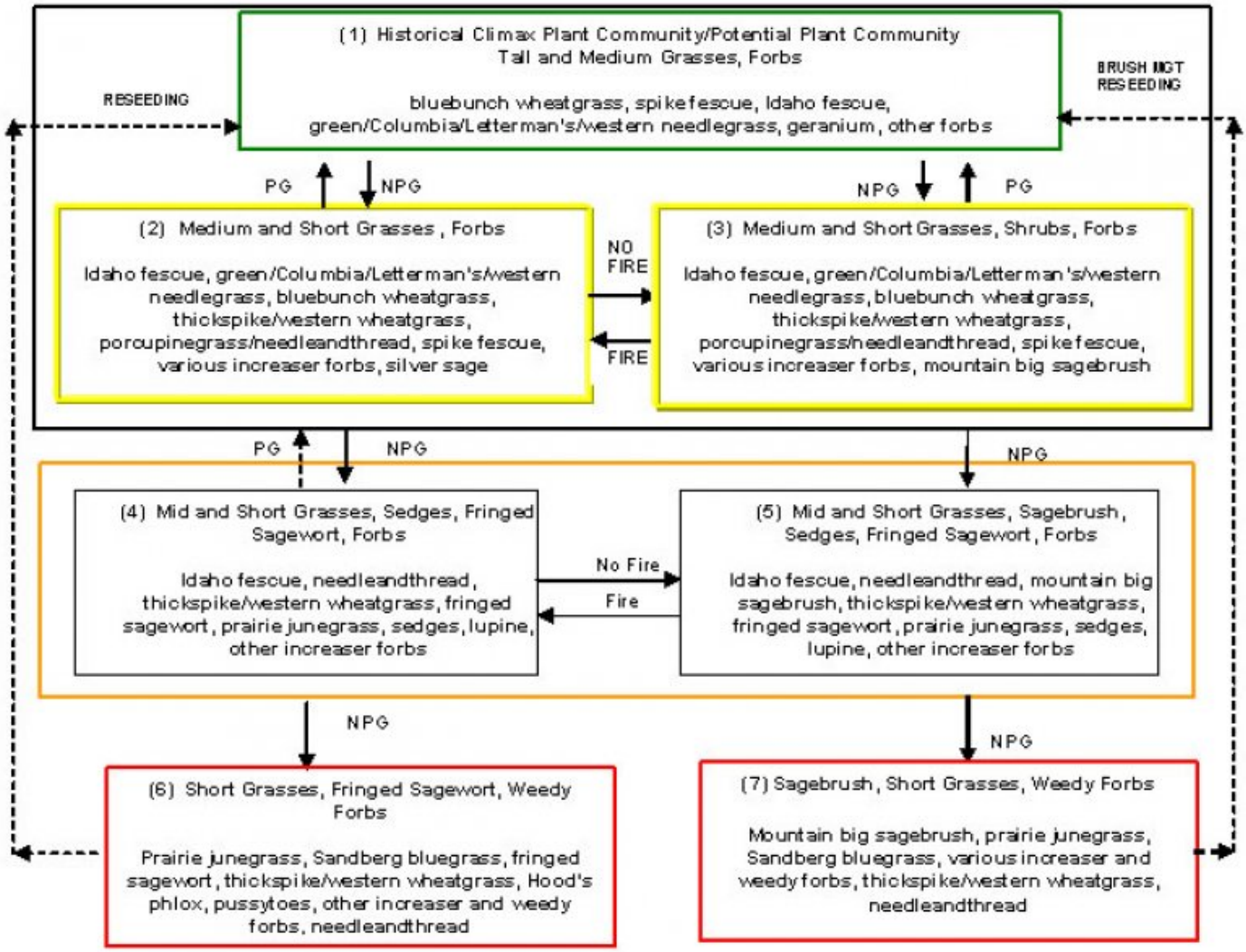
These soils are loams, silt loams, very fine sandy loams, or sandy clay loams more than 20 inches deep. They include soils that have two inches or more of one of these textures over a clayey (argillic) subsoil. There are no significant limitations to plant growth. Available Water Holding Capacity to a 40 inch depth is mostly about 8 inches.

**Table 4. Representative soil features**

| | |
|---|---|
| Surface texture | (1) Loam<br>(2) Silt loam<br>(3) Very fine sandy loam |
| Family particle size | (1) Clayey |
| Available water capacity (0-40in) | 8 in |

## Ecological dynamics

## State and transition model




NOTE: Kentucky and Canada bluegrass can become a part of any plant community in this ecological site, depending on factors such as site history, circumstances, and the opportunity for these plants to establish. Generally, the percent composition of these will increase as the ecological condition degrades until they will become dominant or co-dominant with mountain big sagebrush.

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.

Fire: Prescribed fire or non-prescribed wildfire.

**Figure 8. State and Transition Model**

## State 1
## Sagebrush, Short Grasses, Weedy Forbs

## Community 1.1
## Sagebrush, Short Grasses, Weedy Forbs

Further deterioration of community 5 due to non-prescribed grazing, or other disturbance leads to a plant

community dominated by mountain big sagebrush and the short grasses such as those listed for community 6, and weedy forbs (e.g., thistles). Plant communities 6 and 7 have extremely reduced production of desirable native plants. The lack of litter and short plant heights result in higher soil surface temperatures, poor water infiltration rates, and increased evaporation, which gives short sod grasses and invader species a competitive advantage over the cool season tall and medium grasses. These communities have lost most of the attributes of a healthy rangeland, including good infiltration, minimal runoff and erosion, nutrient cycling and energy flow. Significant economic inputs and time would be required to move these plant communities toward a higher successional stage and a more productive plant community. Often, seeding and/or mechanical treatment practices are needed, along with extended rest and prescribed grazing management to restore this community.

## State 2
## Tall and Medium Grasses, Forbs

### Community 2.1
### Tall and Medium Grasses, Forbs

This is the interpretive plant community and is considered to be the Historic Climax Plant Community for this site. This plant community contains a high diversity of tall and medium height, cool season grasses (bluebunch wheatgrass, spike fescue, Idaho fescue, and tall needlegrasses), and short grasses (Cusick and Sandberg bluegrass, spike oatgrass, and prairie junegrass). There are abundant forbs (geranium, prairie clovers) which occur in smaller percentages. Shrubs such as mountain big sagebrush can also occur on this site. This plant community is well adapted to the Northern Rocky Mountain foothills climatic conditions. 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, and temperature). This plant community is well suited to managed livestock grazing and provides diverse habitat for many wildlife species. These plants have strong, healthy root systems that allow production to increase significantly with favorable moisture conditions. This plant community provides for soil stability and a properly functioning hydrologic cycle. 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 soils associated with this site provide a very favorable soil-water-plant relationship.

**Table 5. Annual production by plant type**

| Plant Type | Low (Lb/Acre) | Representative Value (Lb/Acre) | High (Lb/Acre) |
|---|---|---|---|
| Grass/Grasslike | 1406 | 1688 | 1939 |
| Forb | 281 | 394 | 517 |
| Shrub/Vine | 188 | 225 | 258 |
| **Total** | **1875** | **2307** | **2714** |

**Table 6. Ground cover**

| | |
|---|---|
| Tree foliar cover | 0% |
| Shrub/vine/liana foliar cover | 0-10% |
| Grass/grasslike foliar cover | 70-85% |
| Forb foliar cover | 1-5% |
| Non-vascular plants | 0-5% |
| 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 | 15-20% |
| Forb basal cover | 1-5% |
| Non-vascular plants | 0-2% |
| Biological crusts | 0% |
| Litter | 60-70% |
| Surface fragments >0.25" and <=3" | 0% |
| Surface fragments >3" | 0-1% |
| Bedrock | 0% |
| Water | 0% |
| Bare ground | 0-5% |

## State 3
## Medium and Short Grasses, Forbs

### Community 3.1
### Medium and Short Grasses, Forbs

Early stages of degradation, including non-prescribed grazing, will tend to change the HCPC to a community dominated by medium and short grasses such as Idaho fescue, needleandthread, thickspike / western wheatgrass, Cusick and Sandberg bluegrass, spike oatgrass, and prairie junegrass,. Most of the taller, more palatable grasses (bluebunch wheatgrass, spike fescue, tall needlegrass) will still be present but in smaller amounts. Palatable and nutritious forbs will be replaced by less desirable and more aggressive species.

## State 4
## Medium and Short Grasses, Shrubs, Forbs

### Community 4.1
### Medium and Short Grasses, Shrubs, Forbs

Slight degradation in the historical climax plant community when it occurs on soils in the fine silty or clayey family results in a plant community similar to #2, except that it will tend to have more shrubs. It is typically dominated by the same grasses, plus shrubs including mountain big or mountain silver sagebrush. There is also sometimes an increase in the amount of increaser forbs. There can be some shifting of sagebrush between communities 2 and 3, depending on the occurance and frequency of fire and which species of sagebrush is present. A lack of fire on community 2 may tend to favor the big sagebrush somewhat. The presence of fire in a big sagebrush stand will tend to reduce the amount of this sagebrush, making the community more similar to 2. Fire often increases the amount of silver sagebrush since it will tend to sprout from its roots after a burn. Biomass production and litter become reduced on the site as the taller grasses are replaced by shorter ones, increasing evapotranspiration and reducing moisture retention. Some of the natural ecological processes will be altered. Increased bare ground in these communities (2 & 3) can result in undesirable invader species. These plant communities provide for moderate soil stability.

## State 5
## Medium and Short Grasses, Sedges, Fringed Sagewort, Forbs

### Community 5.1
### Medium and Short Grasses, Sedges, Fringed Sagewort, Forbs

As continued heavy disturbance continues, plant community 2 deteriorates to one primarily composed of a mid and short grasses such as Idaho fescue, needleandthread, thickspike/western wheatgrass, prairie junegrass, sedges, lupine, and other increaser forbs. Taller late seral grasses will occur only occasionally. Fringed sagewort often becomes a significant component. Palatable forbs will be mostly absent.

## State 6
## Medium and Short Grasses, Sedges, Fringed Sagewort, Sagebrush, Forbs

### Community 6.1
### Medium and Short Grasses, Sedges, Fringed Sagewort, Sagebrush, Forbs

With continued heavy disturbance on community 3, the site will become dominated by similar species as listed for community 4, plus shrubs such as silver or mountain big sagebrush. The amount of big sagebrush in this community can be the result of a lack of fire on community 4. Periodic fire tends to reduce the amount of big sagebrush that is present. Silver sagebrush will react the opposite to fire, since it is a root sprouter after it's been burned. Thus, if silver sagebrush is present in the community, it will tend to increase with fire. Plant communities 4 and 5 are the result of long-term, heavy, continuous grazing and/or annual, early spring seasonal grazing. Repeated spring grazing depletes stored carbohydrates, resulting in weakening and eventual death of the cool season tall and medium grasses. These plant communities can occur throughout the pasture, on spot grazed areas, and near water sources where season-long grazing patterns occur. Communities 4 and 5 will respond positively to improved grazing management, but significant economic inputs and time are usually required to move these plant communities toward a higher successional stage and a more productive plant community. Additionally, the chances for success are significantly reduced. These last 2 plant communities are less productive than Plant Communities #1, #2, or #3. The lack of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and high evapotranspiration, thus eventually favoring species that are more adapted to drier conditions. These communities have lost many of the attributes of a healthy rangeland, including good infiltration, minimal erosion and runoff, nutrient cycling and energy flow.

## State 7
## Short Grasses, Fringed Sagewort, Weedy Forbs

### Community 7.1
### Short Grasses, Fringed Sagewort, Weedy Forbs

If community 4 continues to deteriorate further due to non-prescribed grazing or other disturbance, it becomes dominated by short grasses such as prairie junegrass and Sandberg bluegrass, half shrubs such as fringed sagewort and weedy forbs. Mid seral grasses such as thickspike/western wheatgrass and needleandthread tend to still be relatively common in this community.

## Additional community tables

**Table 8. Community 2.1 plant community composition**

| Group | Common Name | Symbol | Scientific Name | Annual Production (Lb/Acre) | Foliar Cover (%) |
|---|---|---|---|---|---|
| **Shrub/Vine** | | | | | |
| 0 | **Shrubs and Half-shrubs** | | | 188–258 | |
| | Shrub, broadleaf | 2SB | *Shrub, broadleaf* | 0–129 | – |
| | silver sagebrush | ARCAV2 | *Artemisia cana ssp. viscidula* | 0–129 | – |
| | prairie sagewort | ARFR4 | *Artemisia frigida* | 0–129 | – |
| | mountain big sagebrush | ARTRV | *Artemisia tridentata ssp. vaseyana* | 0–129 | – |
| **Grass/Grasslike** | | | | | |
| 0 | **Grasses and Sedges** | | | 1406–1939 | |
| | bluebunch wheatgrass | PSSP6 | *Pseudoroegneria spicata* | 750–1810 | – |

| | | | | | |
|---|---|---|---|---|---|
| | spike fescue | LEKI2 | *Leucopoa kingii* | 0–1034 | – |
| | Idaho fescue | FEID | *Festuca idahoensis* | 94–388 | – |
| | porcupinegrass | HESP11 | *Hesperostipa spartea* | 0–258 | – |
| | plains muhly | MUCU3 | *Muhlenbergia cuspidata* | 94–258 | – |
| | needle and thread | HECOC8 | *Hesperostipa comata ssp. comata* | 0–212 | – |
| | prairie Junegrass | KOMA | *Koeleria macrantha* | 94–129 | – |
| | Grass, perennial | 2GP | *Grass, perennial* | 94–129 | – |
| | western wheatgrass | PASM | *Pascopyrum smithii* | 47–129 | – |
| | Cusick's bluegrass | POCU3 | *Poa cusickii* | 0–129 | – |
| | Sandberg bluegrass | POSE | *Poa secunda* | 94–129 | – |
| | mountain brome | BRMA4 | *Bromus marginatus* | 0–129 | – |
| | needleleaf sedge | CADU6 | *Carex duriuscula* | 94–129 | – |
| | threadleaf sedge | CAFI | *Carex filifolia* | 94–129 | – |
| | plains reedgrass | CAMO | *Calamagrostis montanensis* | 94–129 | – |
| | poverty oatgrass | DASP2 | *Danthonia spicata* | 94–129 | – |
| | thickspike wheatgrass | ELLAL | *Elymus lanceolatus ssp. lanceolatus* | 47–129 | – |
| | slender wheatgrass | ELTRS | *Elymus trachycaulus ssp. subsecundus* | 0–129 | – |
| | slender wheatgrass | ELTRT | *Elymus trachycaulus ssp. trachycaulus* | 0–129 | – |
| | green needlegrass | NAVI4 | *Nassella viridula* | 24–65 | – |
| | Letterman's needlegrass | ACLE9 | *Achnatherum lettermanii* | 24–65 | – |
| | Columbia needlegrass | ACNEN2 | *Achnatherum nelsonii ssp. nelsonii* | 24–65 | – |
| | western needlegrass | ACOCO | *Achnatherum occidentale ssp. occidentale* | 24–65 | – |
| | purple threeawn | ARPU9 | *Aristida purpurea* | 0–1 | – |
| | Fendler's threeawn | ARPUF | *Aristida purpurea var. fendleriana* | 0–1 | – |
| **Forb** | | | | | |
| 0 | **Forbs** | | | 281–517 | |
| | leafy wildparsley | MUDI | *Musineon divaricatum* | 0–129 | – |
| | beardtongue | PENST | *Penstemon* | 0–129 | – |
| | spiny phlox | PHHO | *Phlox hoodii* | 0–129 | – |
| | scurfpea | PSORA2 | *Psoralidium* | 0–129 | – |
| | cutleaf anemone | PUPAM | *Pulsatilla patens ssp. multifida* | 0–129 | – |
| | upright prairie coneflower | RACO3 | *Ratibida columnifera* | 19–129 | – |
| | prairie thermopsis | THRH | *Thermopsis rhombifolia* | 0–129 | – |
| | American vetch | VIAM | *Vicia americana* | 0–129 | – |
| | Forb, perennial | 2FP | *Forb, perennial* | 0–129 | – |
| | western yarrow | ACMIO | *Achillea millefolium var. occidentalis* | 0–129 | – |
| | pale agoseris | AGGL | *Agoseris glauca* | 0–129 | – |
| | onion | ALLIU | *Allium* | 0–129 | – |
| | pussytoes | ANTEN | *Antennaria* | 0–129 | – |
| | white sagebrush | ARLU | *Artemisia ludoviciana* | 0–129 | – |
| | aster | ASTER | *Aster* | 0–129 | – |

| | | | | | |
|---|---|---|---|---|---|
| | Bonneville shootingstar | DOCO | *Dodecatheon conjugens* | 0–129 | – |
| | yellow fritillary | FRPU2 | *Fritillaria pudica* | 0–129 | – |
| | blanketflower | GAAR | *Gaillardia aristata* | 0–129 | – |
| | old man's whiskers | GETR | *Geum triflorum* | 0–129 | – |
| | sticky purple geranium | GEVI2 | *Geranium viscosissimum* | 19–129 | – |
| | western stoneseed | LIRU4 | *Lithospermum ruderale* | 0–129 | – |
| | desertparsley | LOMAT | *Lomatium* | 0–129 | – |
| | milkvetch | ASTRA | *Astragalus* | 0–129 | – |
| | balsamroot | BALSA | *Balsamorhiza* | 0–129 | – |
| | prairie clover | DALEA | *Dalea* | 19–129 | – |
| | lupine | LUPIN | *Lupinus* | 0–1 | – |
| | larkspur | DELPH | *Delphinium* | 0–1 | – |
| | deathcamas | ZIGAD | *Zigadenus* | 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, and animals tend to congregate in these areas. In order to maintain the productivity of the Silty site, grazing on adjoining sites with less production must be managed carefully to be sure utilization on this 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.

Whenever Plant Communities 2 or 3 (Medium and short grasses) occur, grazing management strategies need to be implemented to avoid further deterioration. These communities are still stable, productive, and healthy provided 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 4 and 5 have substantially reduced forage production, and a high percentage of aggressive, non-palatable species. Once these plant communities become established, it is much more difficult to restore the site 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. Brush management and mechanical treatment are often needed to restore the tall perennial grasses onto this site.

Plant Communities 6 and 7 have extremely limited forage production (< 250 pounds per acre), and a high percentage of non-preferred species for cattle and sheep. Seeding, along with brush management or mechanical treatment, may be necessary to restore desirable native perennial species.

Calculating Safe Stocking Rates: Proper stocking rates should be incorporated into a grazing management strategy that protects the resource, maintains or improves rangeland health, and is consistent with management objectives. Safe stocking rates will be based on useable forage production, and should consider ecological condition and trend of the site, and past grazing use history.

Calculations used to determine a safe stocking rate are based on the amount of useable forage available, taking into account the harvest efficiency of the animal and the grazing strategy to be implemented. Average annual production must be measured or estimated to properly assess useable forage production and stocking rates.

Stocking rates are calculated from average forage production values using a 25% Harvest Efficiency factor for preferred and desirable plants, and 10% Harvest Efficiency for less desirable species. AUM calculations are based on 790 pounds per animal unit month (AUM) for a 1,000-pound cow with calf up to 4 months. No adjustments have been made for site grazability factors, such as steep slopes, site inaccessibility, or distance to drinking water.

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 AU! M/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).

Wildlife Interpretations: The Silty ecological site occurs over large acreages on the Northern Rocky Mountain foothills except where it is fragmented by conversion to cropland, which is significant in many areas. Habitat fragmentation of this site has contributed to the decline of some “area sensitive” wildlife species, particularly such ground-nesting birds
as the grasshopper sparrow. This site is home to a diverse native wildlife complex. Historically, huge herds of migratory bison and pronghorn as well as large numbers of sharp-tailed grouse were probably the dominant “game” species in addition to a wide variety of ground-nesting songbirds, waterfowl and shorebirds, small mammals, and mammalian predators. Grazing patterns, topographic diversity, extensive acreages, and interspersion with other ecological sites make this type very important to numerous wildlife species. Small mammal diversity and abundance is high which, in turn, supports a varied raptor population. In the past, vast prairie dog towns provided habitat for such species as the black-footed ferret, burrowing owl, mountain plover, ferruginous hawk, and swift fox. Invasive plant species such as leafy spurge, Canada thistle, and several knapweeds contribute to a loss of biodiversity within this ecological site. Wildlife water requirements are provided by springs and seeps, intermittent and perennial streams, and, in modern times, numerous artificial ponds and livestock pipelines. These areas are locally important for northern leopard frogs, tiger salamanders and a number to toad species, all of which feed on a variety of insects. Grazing, fire, drought cycles and insect population fluctuations create a shifting mosaic of wildlife habitats across this site.

Plant Community 1: Tall and Medium Grasses, Forbs (HCPC): The diversity of plant species and life forms provides feeding substrate for pollinating insects. Grasshopper and Morman cricket infestations occasionally consume the majority of the herbaceous vegetation, especially during drought years. A variety of warm and cool water fish species inhabit the intermittent and perennial streams associated with this community. Northern pike, lake chub, carp, a variety of suckers and walleye are examples. Common reptile and amphibian species include tiger salamanders in ponds and stock tanks, Woodhouse’s toad, western chorus frogs, short-horned lizards, bull snake and rattlesnake, and three species of garter snakes. The diversity of grass stature and life forms, along with scattered shrubs and a variety of forbs, provides habitat for many bird species including the upland sandpiper, sharp-tailed grouse, loggerhead shrike, grasshopper and savanna sparrow, chestnut-collared longspur and western meadowlark. This community is especially favorable for ground-nesting birds because of the abundant residual plant material and litter available for nesting, escape, and thermal cover. Diverse prey populations are available for raptors such as ferruginous and Swainson’s hawks. The predominance of grasses plus a diversity of forbs, shrubs and half-shrubs in this community favors grazers and mixed feeders such as bison, pronghorn and elk. Suitable

thermal and escape cover for mule deer is limited because of low shrub cover. Complex plant structural diversity and litter cover provide habitat for a wide array of small mammals (both seed eaters, i.e. deer mice and herbivores, i.e. voles and jackrabbits) and neotropical migratory birds.

Plant Community 2: Medium and Short Grasses, Forbs: The partial loss of structural diversity makes this plant community somewhat less attractive to the variety of wildlife species using the HCPC. A decrease in residual plant material and litter cover is usually associated with degradation of the HCPC, which makes this community less attractive for ground-nesting birds. Pronghorn make considerable use of this type because of forb and half-shrub availability in the generally open landscape.

Plant Community 3: Medium and Short Grasses, Shrubs, Forbs: Wyoming big sagebrush, with canopy cover of 15-30%, and an understory of grasses and forbs, is excellent nesting, winter, brood-rearing, and foraging habitat for sage grouse. Other obligate sagebrush-grassland species, notably Brewer's sparrow, also benefit from an increase in sagebrush cover. When residual grass and litter cover decrease in this community, ground nesting bird habitat values decline. This community often provides important winter range for mule deer and pronghorn. The sagebrush crowns break up hard crusted snow and provide about 15% protein and 40-60% digestibility for ungulates.

Plant Community 4: Short and Medium Grasses, Sageworts, Shrubs: Heavy stands of big sagebrush can provide winter cover and foraging habitat for mule deer, elk, pronghorn, and sage grouse. However, a decline in herbaceous cover and litter reduces overall wildlife species diversity and habitat value for ground-nesting birds. When this seral stage is dominated by forbs and fringed sagewort, it may provide lek sites for sage grouse and habitat for birds such as horned larks, McCown's longspurs, mountain plovers, and long-billed curlews. Prairie dogs will have an easier time establishing and expanding towns in this community to the benefit of burrowing owls, mountain plovers, and black-footed ferrets.

Plant Community 5: Medium and Short Grasses, Sedges, Fringed Sagewort, Sagebrush, Forbs: Sparse vegetation and a greater percent cover of bare ground provides suitable habitat for mountain plovers, prairie dogs, horned larks and McCown's longspurs. However, a lack of complex vegetation structure and residual cover makes this community poor habitat in general for most ground-nesting birds and relatively poor big game habitat. Pronghorn may forage in this community spring though fall.

Plant Community 6: Short Grasses, Fringed Sagewort, Weedy Forbs: This community has low habitat value for most wildlife species except when it occurs in prairie dog towns. It may be important in providing lek sites for sage grouse when adjacent to sagebrush stands and provides forage for pronghorn seasonally.

Plant Community 7: Sagebrush, Short Grasses, Weedy Forbs: When big sagebrush cover exceeds about 15 percent, this community may provide winter sage grouse habitat; nest cover for sage grouse is poor because of a lack of standing herbaceous material and surface litter. Lek sites for sage and sharp-tailed grouse may be available in this type. General wildlife habitat is of low value.

## Hydrological functions

The runoff potential for this site is low to moderate, depending on slope and ground cover/health. Runoff curve numbers generally range from 78 to 90. The soils associated with this ecological site are generally in Hydrologic Soil Group C. The infiltration rates for these soils will normally be moderate to moderately rapid.

## Inventory data references

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

BLM?Soil & Vegetation Inventory Method (SVIM) Data: ___

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

NRCS?Range/Soil Correlation Observations & Soil 232 notes: ___

Ecological Site Reference: NRCS 417 No.:

## Contributors

BL-G, MJR, REL, POH
Matt Ricketts
NRCS

## Approval

Kirt Walstad, 7/19/2023

## 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) | G. Petersen, K. Walstad |
| Contact for lead author | grant.petersen@usda.gov |
| Date | 03/01/2020 |
| Approved by | Kirt Walstad |
| Approval date | |
| Composition (Indicators 10 and 12) based on | Annual Production |

## Indicators

1. **Number and extent of rills:** Rills are not present in the reference condition.

2. **Presence of water flow patterns:** Water flow patterns are not present in the reference condition.

3. **Number and height of erosional pedestals or terracettes:** Pedestals are not evident in the reference condition.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is low (0-5 percent).

5. **Number of gullies and erosion associated with gullies:** Gullies are not present in the reference condition.

6. **Extent of wind scoured, blowouts and/or depositional areas:** Wind scoured, or depositional areas are not evident in the reference condition.

7. **Amount of litter movement (describe size and distance expected to travel):** Litter movement is not evident in the reference condition.

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** The average soil stability rating is 5-6 under plant canopies and plant interspaces. The A horizon is 8-10 inches thick.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil Structure at the surface is typically strong to medium fine granular. A Horizon should be 8-10 inches thick with color, when wet, typically ranging in Value of 3 or less and Chroma of 3 or less. Local geology may affect color in which it is important to reference the Official Series Description (OSD) for characteristic range. https://soilseries.sc.egov.usda.gov/osdname.aspx

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Infiltration of the Loamy ecological site is moderate, and the site is well drained. An even distribution of mid stature grasses (70-75%) of site production, cool season shortgrass (15-20%) along with a mix of rhizomatous grasses (5-10%), forbs (5-10%), and shrubs (0-1%).

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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):** A compaction layer is not present in the reference condition. Soil profile may contain an abrupt transition to an Argillic horizon which can be misinterpreted as compaction, however, the soil structure will be fine to medium subangular blocky, where a compaction layer will be platy or structureless (massive).

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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: Mid-statured, cool season, perennial bunchgrasses (Primarily bluebunch wheatgrass, green needlegrass, spike fescue)

    Sub-dominant: shortgrass grasses/grasslikes (needle and thread, Idaho Fescue, plains muhly) > rhizomatous grass (thickspike) > forbs >> Shrubs

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Mortality in herbaceous species is not evident. Species with bunch growth forms may have some natural mortality in centers is 3% or less.

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14. **Average percent litter cover (%) and depth ( in):** Total litter cover ranges from 55 to 65%. Most litter is irregularly distributed on the soil surface and is not at a measurable depth.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Average annual production is 2375. Low: 2125 High 2575. Production varies based on effective precipitation and natural variability of soil properties for this ecological site.

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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:** Potential invasive (including noxious) species (native and non-native). Invasive species on this ecological site include (but not limited to) Kentucky bluegrass, Timothy, smooth brome, sulphur cinquefoil, houndstongue, white top, Canada thistle, dandelion, annual brome spp., spotted knapweed, yellow salisify, leafy spurge, crested wheatgrass, etc.
    Native species such as fringed sagewort, Rocky Mountain juniper, Douglas fir, limber pine, lupine, broom snakeweed, Sandberg's bluegrass, etc. when their populations are significant enough to affect ecological function, indicate site condition departure

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17. **Perennial plant reproductive capability:** In the reference condition, all plants are vigorous enough for reproduction either by seed or rhizomes in order to balance natural mortality with species recruitment.

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