USDA Natural Resources Conservation Service

Ecological site EX043B23B150
Sandy (Sy) Absaroka Upper Foothills

Last updated: 4/30/2024
Accessed: 05/10/2025

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.

MLRA notes

Major Land Resource Area (MLRA): 043B–Central Rocky Mountains

Major Land Resource Unit (MLRA) 43B: Central Rocky Mountains

43B – Central Rocky Mountains – The Central Rocky Mountains extends from northern Montana to southern extent of Wyoming and from Idaho to central Wyoming. The southern extent of 43B is comprised of a combination of metamorphic, igneous, and sedimentary mountains and foothills. Climatic changes across this extent are broad and create several unique breaks in the landscape.

Further information regarding MLRAs, refer to: United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.
Available electronically at: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_053624#handbook.

LRU notes

Land Resource Unit (LRU) 43B23B: Absaroka Upper Foothills

Based on the shifts in geology, precipitation patterns and other climatic factors, as well as elevations and vegetation, the Absaroka Range was divided into LRU 23. Further division of this LRU is necessary due to the gradient moving from the foothills to the summit, as well as aspect shifts (north/east face versus south/west face). Subset B is set for the higher elevations within the foothills, with 15 to 19 inches of precipitation. To verify or identify Subset B (the referenced subset for this ecological site), refer to the Wyoming LRU matrix key contained within the Ecological Site Key.

This particular LRU/Subset occurs along the eastern foothills of the Absaroka Range. This LRU starts north of Clark, WY and runs to the Thermopolis, WY area. Once the foothills cross into the Northern Beartooth Range, the climatic patterns and elevational changes shifts the plant community and allows for a break in LRU's near the Montana state line. As the LRU follows to the south and then tracks east to the intersection of the Absaroka Range and the Owl Creek Range, the face changes aspect and geology creating a shift in plant dynamics and a break in the LRU.

The extent of soils currently correlated to this ecological site does not fit within the digitized boundary. Many of the noted soils are provisional and will be reviewed and corrected in mapping update projects. Other map units are correlated as small inclusions within other MLRA’s/LRU’s based on elevation, landform, and biological references.

Moisture Regime: Typic Ustic
Temperature Regime: Frigid
Dominant Cover: Rangeland – Sagebrush Steppe (major species is Mountain Big Sagebrush)
Representative Value (RV) Effective Precipitation: 15-19 inches (381 – 483 mm)

RV Frost-Free Days: 37 - 80 days

Classification relationships

Relationship to Other Established Classification Systems:

National Vegetation Classification System (NVC):
2 Shrub & Herb Vegetation Class
2.B Temperate & Boreal Grassland & Shrubland Subclass
2.B.2 Temperate Grassland & Shrubland Formation
2.B.2.Na Western North American Grassland & Shrubland Division Division
M048 Central Rocky Mountain Montane-Foothill Grassland & Shrubland Macrogroup
G273 Central Rocky Mountain Lower Montane, Foothill & Valley Grassland Group

Ecoregions (EPA):
Level I: 10 North American Deserts Level II: 10.1 Cold Deserts
Level III: 10.1.18 Wyoming Basin
Level IV: 10.1.18.b Big Horn Basin and
10.1.18.d Foothills and Low Mountains

Ecological site concept

• Site receives no additional water.
• Slope is < 30%
• Soils are:
o Textures range from loamy sand to very fine sandy loam in top 4” (10 cm) of mineral soil surface
o Clay content is ≤18% in top 4” (10 cm) of mineral soil surface
o All subsurface horizons in the particle size control section have a weighted average of <18% clay. (The particle size control section is the segment of the profile from either the start of an argillic horizon for 50 cm’s or from 25-100 cm’s).
o Moderately deep to very deep (20-80+ in. (50-200+ cm))
o <3% stone and boulder cover and 20% or less cobble and gravel cover
o Not skeletal (<35% rock fragments) within 20” (50 cm) of mineral soil surface
o None to Slightly effervescent throughout top 20” (50 cm) of mineral soil surface
o Non-saline, sodic, or saline-sodic

The Sandy ecological site concept is based on minimal (none to slight) influence from salts, carbonates, gypsum or other chemistry within the top 20 inches (50 cm) of the mineral soil surface. The main soil characteristic is a moderately deep to very deep soil that is coarse textured with less than 18% clay throughout the soil profile; the dominant soil textural classes are loamy sand to sandy loam in the subsurface. The plant community transitions from sandy to loamy as the control section increases above 18% clays with increased rhizomatous wheatgrasses, additional forb species, and increased ground cover.

The sandy site can be found in several different catenas throughout the basin. In an escarpment catena it occurs with shallow and very shallow soils. Hillslope catenas have sandy and loamy occurring in a complex mosaic pattern where the geology is controlled by inter-bedded sandstone and shale; or in areas where the parent material is alluvial. Locations controlled by primarily sandstone bedrock, sandy sites can be found in structural-controlled stable areas adjacent to sandstone rock outcrop.

Associated sites

R043BY322WY	**Loamy (Ly) 15-19” Foothills and Mountains East Precipitation Zone** Loamy
R043BY366WY	**Shallow Sandy (SwSy) 15-19” Foothills and Mountains East Precipitation Zone** Shallow Sandy
R043BY308WY	**Coarse Upland (CU) 15-19” Foothills and Mountains East Precipitation Zone** Coarse Upland

Similar sites

R032XY350WY	**Sandy (Sy) 10-14" East Precipitation Zone** Sandy 10-14” Foothills and Basins East P.Z., has lower production.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia tridentata ssp. vaseyana*
Herbaceous	(1) *Achnatherum nelsonii* (2) *Bromus marginatus*

Legacy ID

R043BX650WY

Physiographic features

This site occurs on nearly level to 30% slopes.

Table 2. Representative physiographic features

Landforms	(1) Foothills > Hill (2) Foothills > Alluvial fan (3) Foothills > Ridge (4) Foothills > Stream terrace
Runoff class	Negligible to medium
Elevation	6,000–9,000 ft
Slope	0–30%
Aspect	Aspect is not a significant factor

Climatic features

Annual precipitation and modeled relative effective annual precipitation ranges from 15 to 19 inches (381 – 483 mm). The normal precipitation pattern shows peaks in June tapering into September. This amounts to about 50% of the mean annual precipitation. Average snowfall is about 150 inches annually. Wide fluctuations may occur in yearly precipitation and result in more dry years than those with more than normal precipitation.

Because of the varied topography, the wind will vary considerably for different parts of the area. The wind is usually much lighter at the lower elevations and in the valleys as compared with the higher terrain. The average winter wind velocity is 8.5 mph while the summer wind velocity averages 7.5 mph. Winds during storms and on ridges may exceed 45 mph.

Temperatures show a wide range between summer and winter and between daily maximums and minimums, due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air outbreaks from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may occur in winter and bring rapid rises in temperature. High winds are generally blocked by high mountains but occur in conjunction with thunderstorms, which are common in late summer. Growth of native cool-season plants begins about May 1 to May 15 and continues until about October 15.

For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at http://www.wcc.nrcs.usda.gov/. Historically, “Crandall Creek" was the representative weather stations within this subset. However, "Sunshine 3NE" is the only available weather station within a close proximity in location and characteristics for this subset. The following graphs and charts are a collective sample representing the averaged normals and 30-year annual rainfall data for the selected weather stations from 1981 to 2010.

Table 3. Representative climatic features

Frost-free period (characteristic range)	40 days
Freeze-free period (characteristic range)	84 days
Precipitation total (characteristic range)	14 in
Frost-free period (actual range)	40 days
Freeze-free period (actual range)	84 days
Precipitation total (actual range)	14 in
Frost-free period (average)	40 days
Freeze-free period (average)	84 days
Precipitation total (average)	14 in

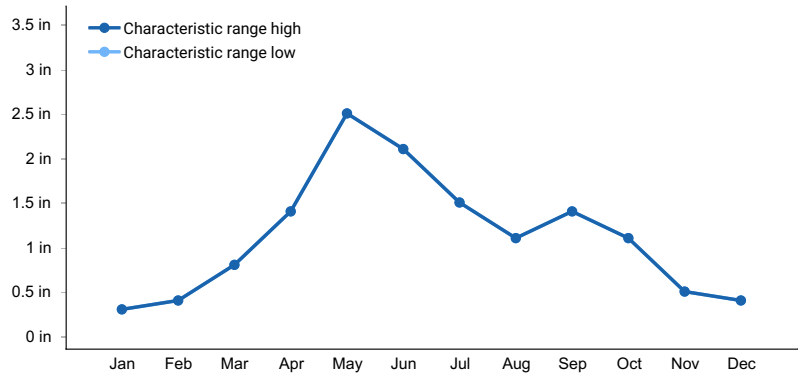


Figure 1. Monthly precipitation range

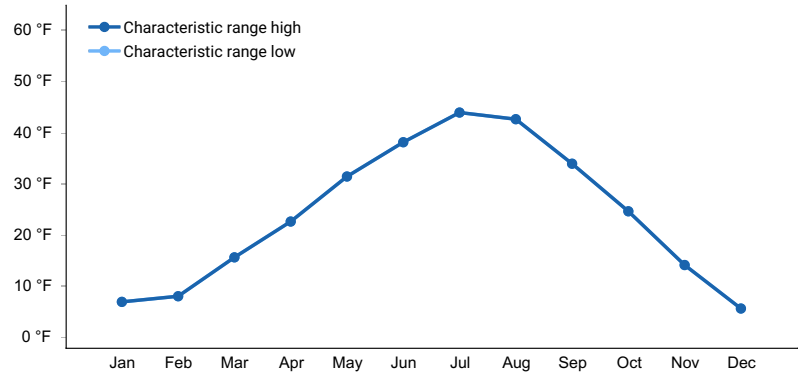


Figure 2. Monthly minimum temperature range

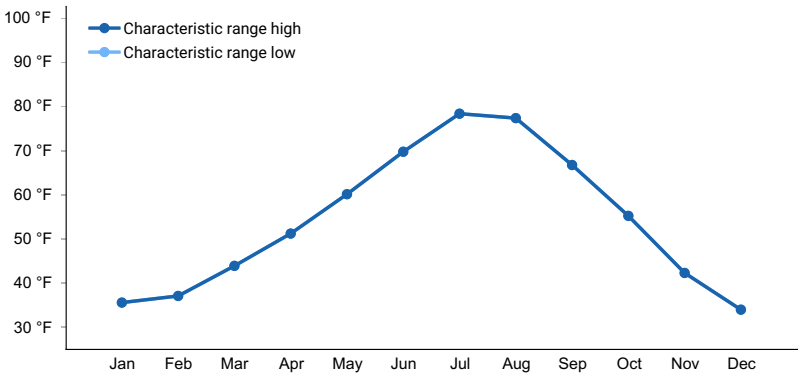


Figure 3. Monthly maximum temperature range

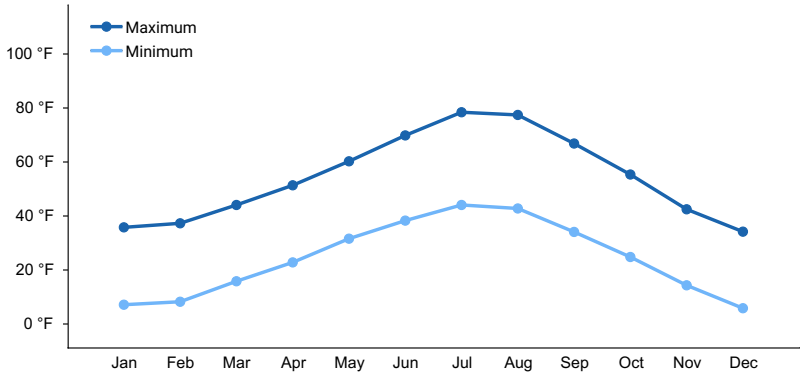


Figure 4. Monthly average minimum and maximum temperature

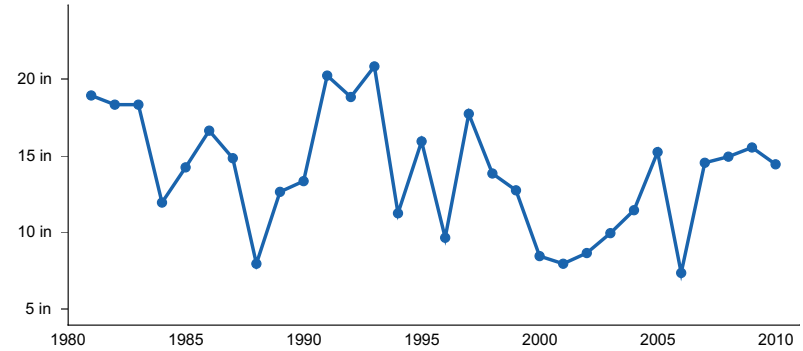


Figure 5. Annual precipitation pattern

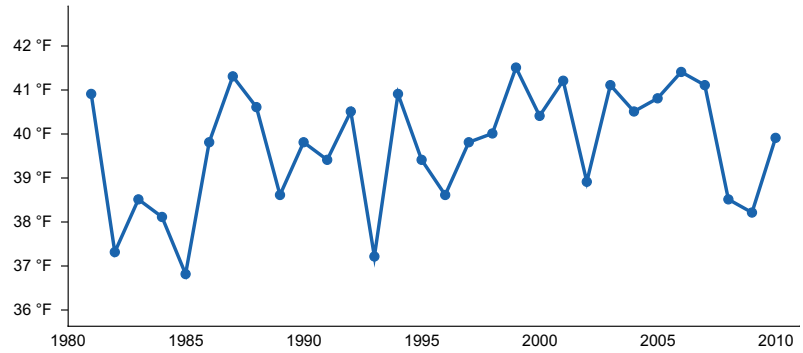


Figure 6. Annual average temperature pattern

Climate stations used

- (1) SUNSHINE 3NE [USC00488758], Meeteetse, WY

Influencing water features

The characteristics of these upland soils have no influence from ground water (water table below 60 inches (150 cm)) and have minimal influence from surface water/overland flow. There may be isolated features that are affected by snow pack that persists longer than surrounding areas due to position on the landform (shaded/protected pockets).

Soil features

The soils of this site are deep to moderately deep (greater than 20”to bedrock), well drained and rapidly permeable. The surface soil is at least 3 to 6 “thick (depending on texture and permeability of the subsoil) and will include the following soil textures: fine sandy loam, sandy loam or loamy very fine sand. Coarser topsoils may be included if underlain by finer textured subsoils.

Table 4. Representative soil features

Parent material	(1) Alluvium–sandstone (2) Eolian deposits (3) Residuum
Surface texture	(1) Fine sandy loam (2) Sandy loam
Family particle size	(1) Coarse-loamy
Drainage class	Well drained to excessively drained
Permeability class	Moderately rapid to rapid
Soil depth	20–60 in
Available water capacity (0-40in)	2–6.1 in
Calcium carbonate equivalent (0-40in)	0–5%
Electrical conductivity (0-40in)	0–4 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5
Soil reaction (1:1 water) (0-40in)	6.6–8.4

Ecological dynamics

Ecological Dynamics of the Site:
Potential vegetation on this site is dominated by mid cool-season perennial grasses. Other significant vegetation includes big sagebrush, and a variety of forbs. The expected potential composition for this site is about 70% grasses, 20% forbs and 10% woody plants. The composition and production will vary naturally due to historical use, fluctuating precipitation and fire frequency.

As this site deteriorates species such as bluegrasses, rhizomatous wheatgrasses and big sagebrush will increase. Cool season grasses, such as Columbia needlegrass and mountain brome, will decrease in frequency and production. As conditions continue to deteriorate annuals such as cheatgrass will invade.

Big sagebrush and/or juniper may become dominant on areas with an absence of fire. Wildfires are actively controlled in recent times and as a result old decadent stands of big sagebrush persist. Where junipers naturally occur, this site can become almost entirely covered with juniper. Limber pine may be present on this site but will rarely turn into a dominant species. Chemical and mechanical controls have replaced the historic role of fire on this site. Recently, prescribed burning has regained some popularity.

The big sagebrush component may not be as resilient once it has been removed or severely reduced, if a vigorous stand of grass exists and is maintained. The exception to this is where the herbaceous component is severely degraded at the time of treatment, growing conditions are unfavorable after treatment, and/or recovery of herbaceous species are inadequate.

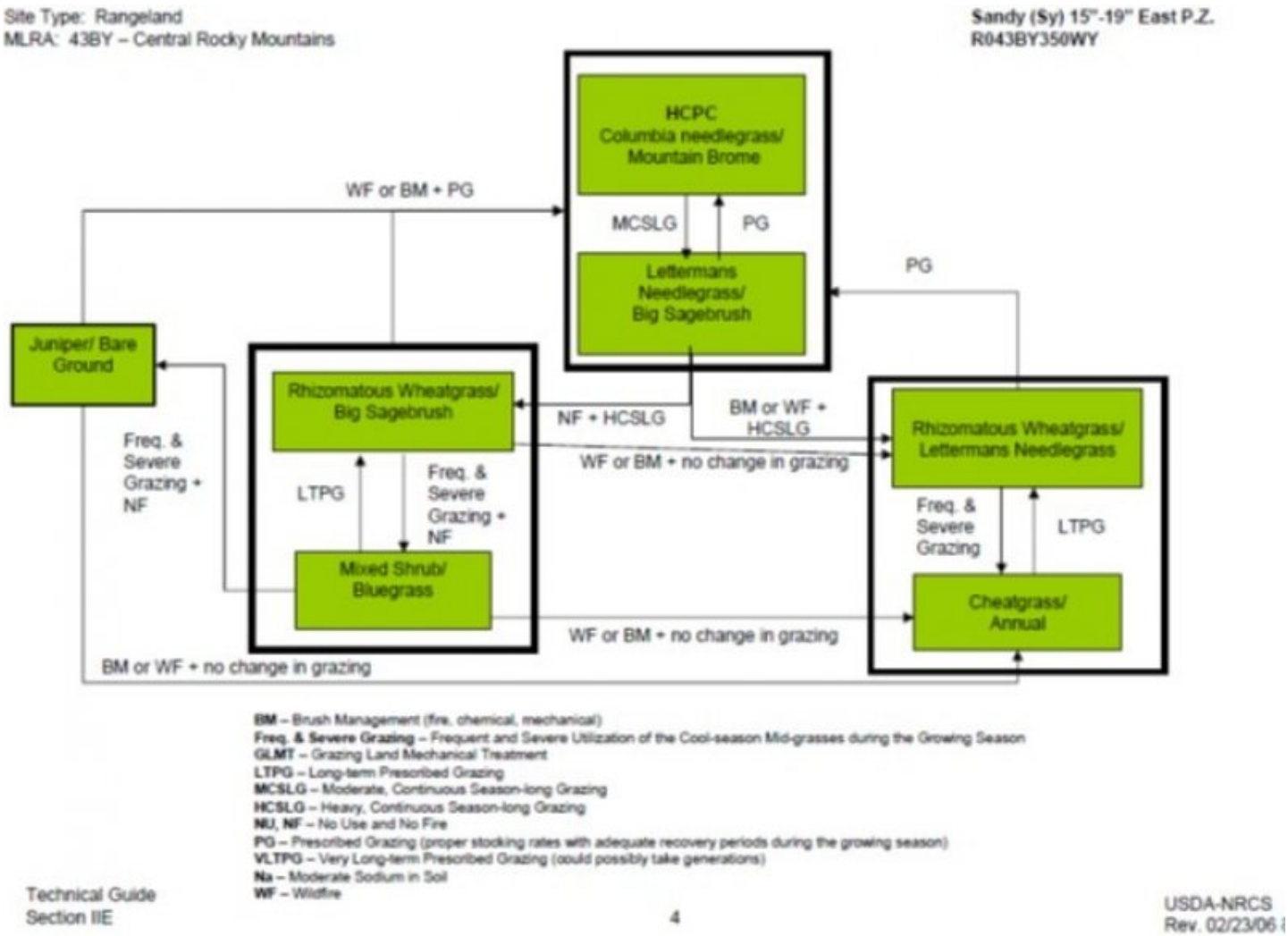
The Historic Climax Plant Community (description follows the plant community diagram) has been determined by study of rangeland relic areas, or areas protected from excessive disturbance. Trends in plant communities going from heavily grazed areas to lightly grazed areas, seasonal use pastures, and historical accounts have also been used.

The following is a State and Transition Model Diagram that illustrates the common plant communities (states) that can occur on the site and the transitions between these communities. The ecological processes will be discussed in more detail in the plant community narratives following the diagram.

Plant Community Narratives

Following are the narratives for each of the described plant communities. These plant communities may not represent every possibility, but they probably are the most prevalent and repeatable plant communities. The plant composition tables shown above have been developed from the best available knowledge at the time of this revision. As more data is collected, some of these plant communities may be revised or removed, and new ones may be added. None of these plant communities should necessarily be thought of as “Desired Plant Communities”. According to the USDA NRCS National Range and Pasture Handbook, Desired Plant Communities (DPC’s) will be determined by the decision-makers and will meet minimum quality criteria established by the NRCS. The main purpose for including any description of a plant community here is to capture the current knowledge and experience at the time of this revision.

State and transition model



State 1
Columbia Needlegrass, Mountain Brome Plant Community

Community 1.1
Columbia Needlegrass, Mountain Brome Plant Community

The interpretive plant community for this site is the Historic Climax Plant Community. This state evolved with grazing by large herbivores and periodic fires. Potential vegetation is about 70% grasses or grass-like plants, 20% forbs, and 10% woody plants. The cyclical nature of the fire regime in this community prevents big sagebrush and/or juniper from being the dominant landscape. This plant community can be found on areas that are properly managed with grazing and/or prescribed burning. Cool season midgrasses dominate the state. The major grasses include Columbia needlegrass, mountain brome, rhizomatous wheatgrass, and prairie junegrass. Big sagebrush is a conspicuous element of this state, occurring in a mosaic pattern, and makes up 5 to 10% of the annual production. A variety of forbs also occurs in this state and plant diversity is high (see Plant Composition Table). Annual production ranges from 1100 to 1600 pounds depending on climatic conditions. This plant community is extremely

stable and well adapted to the Central Rocky Mountains climatic conditions. The diversity in plant species allows for high drought tolerance. This is a sustainable plant community (site/soil stability, watershed function, and biologic integrity). Transitions or pathways leading to other plant communities are as follows: • Moderate, continuous season-long grazing will convert the plant community to the Lettermans Needlegrass/Big Sagebrush Plant Community.

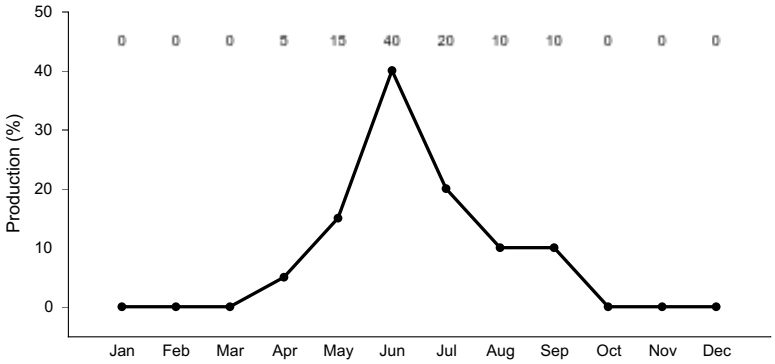


Figure 8. Plant community growth curve (percent production by month). WY0601, 15-19E all upland sites.

State 2
Letterman's Needlegrass/Big Sagebrush Plant Community

Community 2.1
Letterman's Needlegrass/Big Sagebrush Plant Community

Historically, this plant community evolved under grazing by large ungulates and a low fire frequency. Currently, this site is normally found under a moderate, season-long grazing regime and will be exacerbated by prolonged drought conditions. In addition, the fire regime for this site has been modified and extended periods without fire is now common. Shrubs are important components of this plant community. Cool-season grasses make up the majority of the understory with the balance made up of miscellaneous forbs. Dominant grasses include Letterman's needlegrass, rhizomatous wheatgrass, needleandthread, prairie junegrass, and of less frequency Columbia needlegrass and mountain brome. Grasses of secondary importance include bluebunch wheatgrass, nodding brome, slender wheatgrass, bluegrasses, pumpelly brome, and upland sedges. Forbs commonly found in this plant community include asters, phlox, hawksbeard, buckwheat, pussytoes, lupine, paintbrush, agoseris, fringed sagewort, and larkspurs. Sagebrush can make up 15% to 20% of the total annual production and to a less extent juniper and limber pine will be included. When compared to the Historical Climax Plant Community, big sagebrush and/or juniper and limber pine, Letterman's needlegrass, rhizomatous wheatgrasses, and bluegrasses have increased. Columbia needlegrass and mountain brome have decreased, often occurring only where protected from grazing by the sagebrush canopy. Some weedy species such as cheatgrass may have invaded the site but are in small patches. This state produces between 900 and 1400 pounds annually, depending on the growing conditions. This plant community is resistant to change. The herbaceous species present are well adapted to grazing; however, species composition can be altered through long-term overgrazing. The herbaceous component is mostly intact and plant vigor and replacement capabilities are sufficient. Water flow patterns and litter movement may be occurring but only on steeper slopes. Incidence of pedestalling is minimal. Soils are mostly stable and the surface shows minimum soil loss. Wind scouring and deposition areas are few. The watershed is functioning and the biotic community is intact. Transitions or pathways leading to other plant communities are as follows: • Prescribed grazing will convert this plant community to the HCPC. The probability of this occurring is high especially if rotational grazing along with short deferred grazing is implemented as part of the prescribed method of use. In addition, the removal of fire suppression will allow a somewhat natural fire regime to reoccur to more easily transition between this plant community and the HCPC. A prescribed fire treatment can be useful to hasten this transition if desired. • Heavy, continuous, season-long grazing plus no fires will convert the plant community to the Rhizomatous Wheatgrass/Big Sagebrush Plant Community. The probability of this occurring is high. This is especially evident on areas where drought or heavy browsing does not adversely impact the shrub stand. • Heavy, continuous, season-long grazing plus wildfire or brush management will convert the plant community to a Rhizomatous Wheatgrass/Lettermans Needlegrass Plant Community. The probability for this is high especially on areas where the shrubs have been heavily browsed or removed by natural or human causes. Drought can also exacerbate this transition.

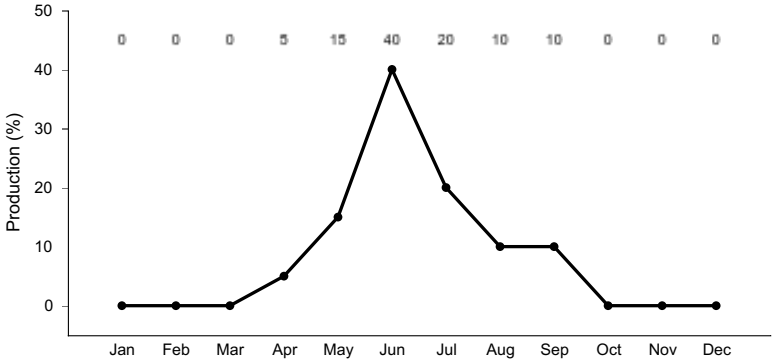


Figure 9. Plant community growth curve (percent production by month). WY0601, 15-19E all upland sites.

State 3
Rhizomatous Wheatgrass/Big Sagebrush Plant Community

Community 3.1
Rhizomatous Wheatgrass/Big Sagebrush Plant Community

This plant community currently is found under heavy continuous season-long grazing by livestock and protection from fire. Big sagebrush is a significant component of this plant community. Cool-season grasses make up the majority of the understory, but some of the preferred grasses have been reduced or are absent. Dominant grasses include rhizomatous wheatgrass, needleandthread, prairie junegrass, bluegrasses and of less frequency Columbia needlegrass, and mountain brome. Grasses of secondary importance include slender wheatgrass, nodding brome, bluebunch wheatgrass, and upland sedges. Forbs commonly found in this plant community include asters, phlox, hawksbeard, buckwheat, pussytoes, lupine, paintbrush, agoseris, fringed sagewort, and larkspurs. Big sagebrush and juniper can make up to 30% of the total annual production. When compared to the Historic Climax Plant Community, big sagebrush, juniper, limber pine, bluegrasses, prairie junegrass, and rhizomatous wheatgrasses have increased. Most of the preferred grasses have been reduced and some are absent. Some annuals, such as cheatgrass, have invaded the site, but are not yet abundant. Annual production ranges from 700 to 1200 pounds. This plant community is resistant to change as the shrubs become more abundant. These areas may actually be more resistant to fire as less fine fuels are available and the bare ground between the shrubs is increased. The herbaceous component is not as diverse and plant vigor and species regeneration capabilities of some cool-season perennials are deficient. The removal of grazing does not seem to affect the plant composition or structure of the plant community. Soil erosion is accelerated because of increased bare ground. Water flow patterns and pedestalling is more noticeable. Infiltration is reduced and runoff is increased. Rill channels may be noticeable in the interspaces on steeper areas and gullies may be establishing where rills have concentrated down slope. Transitions or pathways leading to other plant communities are as follows: • Prescribed grazing plus brush management or wildfire will convert this plant community to near HCPC. If prescribed fire is used as a means to reduce or remove the shrubs, sufficient fine fuels will need to be present. This may require deferment from grazing prior to treatment. Post management is critical to ensure success. This can range from two or more years of rest to partial growing season deferment, depending on the condition of the understory at the time of treatment and the growing conditions following treatment. Seeding will be required regardless of the brush treatment to reestablish the major cool-season grasses. • Frequent and Severe Grazing plus no fires will convert the plant community to the Mixed Shrub/bluegrass Plant Community. The probability of this occurring is high and is especially evident on areas where drought or heavy browsing does not adversely impact the shrub stand. • Brush management or Wildfire with no change in grazing management will convert this plant community to the Rhizomatous Wheatgrass/Lettermans Needlegrass Plant Community. • No fire plus frequent and severe season-long grazing will convert the plant community to the Juniper/*Bare Ground* Plant Community. This will occur where growing conditions are more favorable for juniper than for big sagebrush.

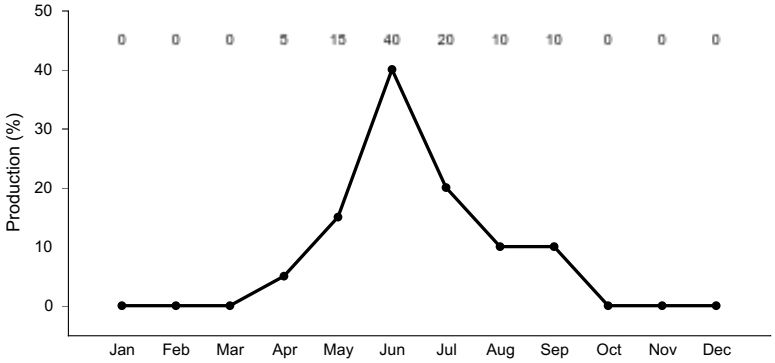


Figure 10. Plant community growth curve (percent production by month). WY0601, 15-19E all upland sites.

State 4
Mixed Shrub/Bluegrass Plant Community

Community 4.1
Mixed Shrub/Bluegrass Plant Community

This plant community is the result of frequent and severe grazing and protection from fire. Big sagebrush and juniper are the dominant shrubs of this plant community, but other shrubs and limber pine will occur and the total production will exceed 30%. The under story has been significantly altered and the preferred cool season grasses have been eliminated or greatly reduced. The dominant grasses are Sandberg, mutton, big, and Canby bluegrasses and upland sedges. Weedy annual species such as cheatgrass, povertyweed, gumweed, and stickseed occupy the site. Big sagebrush and juniper are the dominant shrubs. Noxious weeds such as Canada thistle and/or leafy spurge may invade the site if a seed source is available. When compared with the HCPC the annual production is less, as the major cool-season grasses are significantly reduced or absent, but the shrub production has increased significantly and compensates for some of the decline in the herbaceous production. The interspaces between plants have expanded leaving the amount of bare ground more prevalent and more soil surface exposed to erosive elements. Annual production ranges from 600 to 1000 pounds. This plant community is resistant to change as the stand becomes more decadent. These areas may actually be more resistant to fire as less fine fuels are available and the bare ground between the shrubs is increased. The herbaceous component is not as diverse and plant vigor and species regeneration capabilities of cool-season perennials are deficient. The removal of grazing does not seem to affect the plant composition or structure of the plant community. Soil erosion is accelerated because of increased bare ground. Water flow patterns and pedestalling are obvious. Infiltration is reduced and runoff is increased. Rill channels may be noticeable in the interspaces and gullies may be establishing where rills have concentrated down slope. Transitions or pathways leading to other plant communities are as follows: • Prescribed grazing plus brush management or wildfire will eventually convert this plant community to near HCPC. If prescribed fire is used as a means to reduce or remove the shrubs, sufficient fine fuels will need to be present. This may require deferment from grazing prior to treatment. Post management is critical to ensure success. This can range from two or more years of rest to partial growing season deferment, depending on the condition of the understory at the time of treatment and the growing conditions following treatment. Seeding will often be required regardless of the brush treatment to reestablish the major cool-season grasses. • Long-term prescribed grazing will convert this plant community to the Rhizomatous Wheatgrass/ Big Sagebrush Plant Community. This may take years and if conditions are right. • Brush management or Wildfire with no change in grazing management will convert this plant community to the Cheatgrass/Annual Plant Community. • No fire plus frequent and severe grazing will convert the plant community to the Juniper/*Bare Ground* Plant Community. This will occur where growing conditions are more favorable for juniper than for big sagebrush.

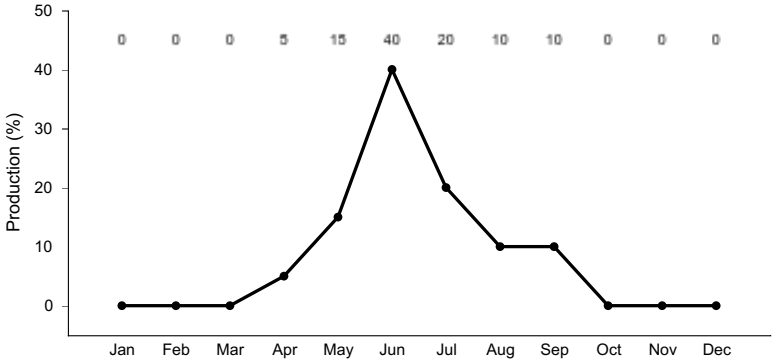


Figure 11. Plant community growth curve (percent production by month). WY0601, 15-19E all upland sites.

State 5
Juniper/Bare Ground Plant Community

Community 5.1
Juniper/Bare Ground Plant Community

This plant community is the result of frequent and severe grazing and protection from fire. This is likely only where conditions are more conducive for juniper. Juniper is the dominant shrub of this plant community, but limber pine can also be a component. The under story has been significantly altered and the preferred cool season grasses have been eliminated or greatly reduced. The dominant grasses are the bluegrasses such as Sandberg, mutton, big, and Canby. Weedy annual species such as cheatgrass, povertyweed, gumweed, and stickseed occupy the site. Juniper is the dominant shrub. Noxious weeds such as Canada thistle and/or leafy spurge may invade the site if a seed source is available. When compared with the HCPC the annual production is less, as the major cool-season grasses are reduced, but the shrub and tree production has increased significantly and compensates for some of the decline in the herbaceous production. The interspaces between plants have expanded leaving the amount of bare ground more prevalent and more soil surface exposed to erosive elements. Annual production ranges from 500 to 900 pounds. This plant community is resistant to change as the stand becomes more decadent. These areas may actually be more resistant to fire as less fine fuels are available and the bare ground between the shrubs is increased. The herbaceous component is not as diverse and plant vigor and species regeneration capabilities of cool-season perennials are deficient. The removal of grazing does not seem to affect the plant composition or structure of the plant community. Soil erosion is accelerated because of increased bare ground. Water flow patterns and pedestalling are obvious. Infiltration is reduced and runoff is increased. Rill channels are noticeable in the interspaces and gullies may be establishing where rills have concentrated down slope. Transitions or pathways leading to other plant communities are as follows: • Prescribed grazing plus either wildfire or brush management will convert this plant community to near HCPC. If prescribed fire is used as a means to reduce or remove the shrubs, sufficient fine fuels will need to be present. This may require deferment from grazing prior to treatment. Post management is critical to ensure success. This can range from two or more years of rest to partial growing season deferment, depending on the condition of the understory at the time of treatment and the growing conditions following treatment. Seeding will be required regardless of the brush treatment to reestablish the major cool-season grasses. • Brush management or Wildfire with no change in grazing management will convert this plant community to the Cheatgrass/Annual Plant Community.

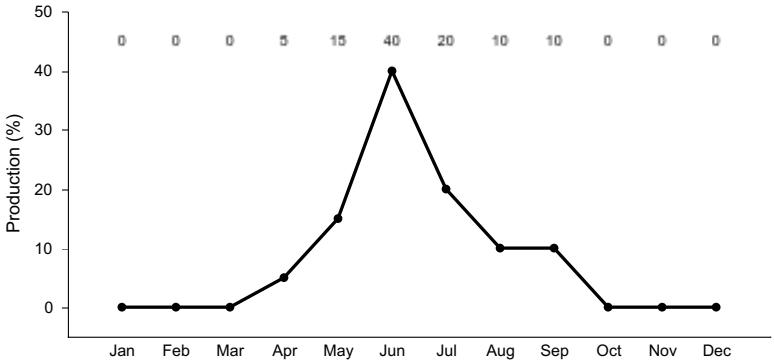


Figure 12. Plant community growth curve (percent production by month).

WY0601, 15-19E all upland sites.

State 6
Rhizomatous Wheatgrass/Letterman's Needlegrass Plant Community

Community 6.1
Rhizomatous Wheatgrass/Letterman's Needlegrass Plant Community

This plant community currently is found under heavy continuous season-long grazing by livestock and is perpetuated by either brush management or a wildfire, which removes shrubs from this plant community. Some of the major cool-season bunchgrasses associated with this ecological site have been reduced and some may have been removed. Dominant grasses include rhizomatous wheatgrasses, Letterman's needlegrass, needleandthread, bluegrasses, prairie junegrass, nodding brome, and slender wheatgrass, and of less frequency Columbia needlegrass, and mountain brome. Forbs commonly found in this plant community include asters, phlox, hawksbeard, buckwheat, pussytoes, lupine, paintbrush, agoseris, and larkspurs. When compared to the Historical Climax Plant Community, rhizomatous wheatgrass, Letterman's needlegrass, needleandthread, prairie junegrass, and bluegrasses have increased. Columbia needlegrass, mountain brome, and big sagebrush, have decreased or been removed. Production of the preferred cool-season grasses has been reduced. Cheatgrass can be common and in large patches, but mostly invaded areas are relatively small. Annual production ranges from 900 to 1300 pounds. This plant community is resistant to change as the herbaceous species present are well adapted to grazing. However, species composition can be altered through long-term overgrazing. The herbaceous component is mostly intact, but some cool-season bunchgrasses associated with the site have been reduced or removed. Plant vigor and replacement capabilities are sufficient for some species but not all. Water flow patterns and litter movement is occurring but only on steeper slopes. Incidence of pedestalling is moderate to slight. Soils are mostly stable and the surface shows minimum soil loss. The watershed is functioning and the biotic community is partially intact. Transitions or pathways leading to other plant communities are as follows: • Prescribed grazing will convert this plant community to near HCPC. Reestablishing the big sagebrush may be difficult and may take many years. Seeding may be required to reestablish any of the lost major bunchgrasses. • Frequent and severe grazing will convert this plant community to a Cheatgrass/Annual Plant Community.

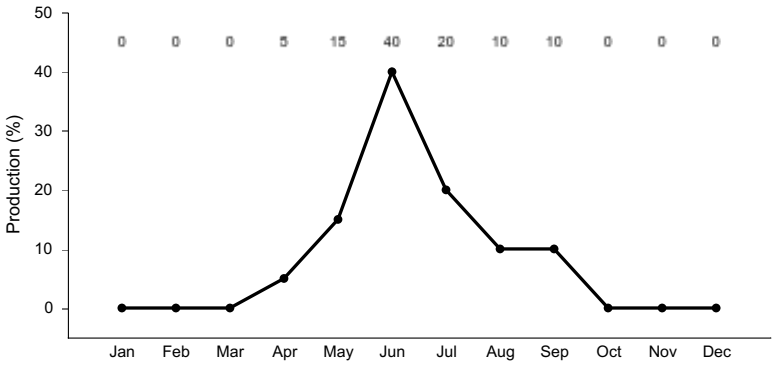


Figure 13. Plant community growth curve (percent production by month). WY0601, 15-19E all upland sites.

State 7
Cheatgrass/Annual Plant Community

Community 7.1
Cheatgrass/Annual Plant Community

This plant community evolved under frequent and severe grazing and the shrub component has been removed by heavy browsing, wildfire or human means. Weedy annuals and bluegrasses are the most dominant plants and occupy any open bare ground areas. The interspaces between plants have expanded leaving the amount of bare ground more prevalent and more soil surface exposed to erosive elements. Compared to the HCPC, weedy annual species and bluegrasses are widespread and virtually all of the major cool-season mid-grasses are absent or severely decreased. Big sagebrush has also been removed. The dominant grasses are the bluegrass such as Sandberg, mutton, big, and Canby. Weedy annual species such as cheatgrass, povertyweed, gumweed, and stickseed occupy the site. Noxious weeds have usually invaded the site if a seed source is available. Annual

production ranges from 350 to 650 pounds. This plant community is relatively stable and resistant to overgrazing. Annuals and bluegrasses are effectively competing against the establishment of perennial cool-season grasses. Plant diversity is greatly altered and the herbaceous component is not intact. Recruitment of the major perennial grasses is not occurring and the replacement potential is absent. The biotic integrity is missing. The soils are unstable and not protected from excessive erosion. Rill channels and maybe even gullies may be present on site and adjacent areas are impacted by excessive runoff. Water flow patterns and pedestalling are obvious. The watershed is not functioning. Transitions or pathways leading to other plant communities are as follows: • Long Term Prescribed Grazing will convert this plant community to the Rhizomatous Wheatgrass/Lettermans Needlegrass plant community.

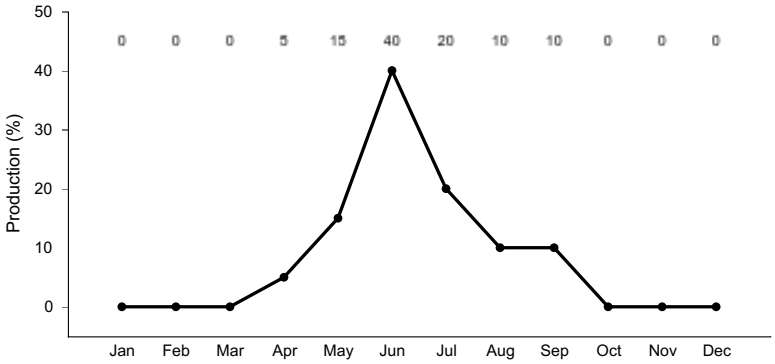


Figure 14. Plant community growth curve (percent production by month). WY0601, 15-19E all upland sites.

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1				473–675	
	Columbia needlegrass	ACNE9	*Achnatherum nelsonii*	473–675	–
2				68–203	
	mountain brome	BRMA4	*Bromus marginatus*	68–203	–
3				0–135	
	western wheatgrass	PASM	*Pascopyrum smithii*	0–135	–
4				0–135	
	Letterman's needlegrass	ACLE9	*Achnatherum lettermanii*	0–135	–
5				0–135	
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–135	–
6				68–203	
	Grass, perennial	2GP	*Grass, perennial*	0–68	–
	nodding brome	BRAN	*Bromus anomalus*	0–68	–
	Pumpelly's brome	BRINP5	*Bromus inermis ssp. pumpellianus var. pumpellianus*	0–68	–
	sedge	CAREX	*Carex*	0–68	–
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	0–68	–
	needle and thread	HECO26	*Hesperostipa comata*	0–68	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–68	–
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	0–68	–

Forb					
7				135–270	
	Forb, perennial	2FP	*Forb, perennial*	0–68	–
	yarrow	ACHIL	*Achillea*	0–68	–
	textile onion	ALTE	*Allium textile*	0–68	–
	rosy pussytoes	ANRO2	*Antennaria rosea*	0–68	–
	Franklin's sandwort	ARFR	*Arenaria franklinii*	0–68	–
	prairie sagewort	ARFR4	*Artemisia frigida*	0–68	–
	Missouri milkvetch	ASMI10	*Astragalus missouriensis*	0–68	–
	Indian paintbrush	CASTI2	*Castilleja*	0–68	–
	field chickweed	CEAR4	*Cerastium arvense*	0–68	–
	larkspur	DELPH	*Delphinium*	0–68	–
	parsnipflower buckwheat	ERHE2	*Eriogonum heracleoides*	0–68	–
	fleabane	ERIGE2	*Erigeron*	0–68	–
	aster	EUCEP2	*Eucephalus*	0–68	–
	lupine	LUPIN	*Lupinus*	0–68	–
	phlox	PHLOX	*Phlox*	0–68	–
	deathcamas	ZIGAD	*Zigadenus*	0–68	–
Shrub/Vine					
8				0–135	
	big sagebrush	ARTR2	*Artemisia tridentata*	0–135	–
9				0–68	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–68	–
	Rocky Mountain juniper	JUSC2	*Juniperus scopulorum*	0–68	–
	limber pine	PIFL2	*Pinus flexilis*	0–68	–

Animal community

Animal Community – Wildlife Interpretations

Columbia Needlegrass/Mountain Brome Plant Community (HCPC): The predominance of grasses in this plant community favors grazers and mixed-feeders, such as deer, bison, elk, and antelope. Suitable thermal and escape cover for deer may be limited due to the low quantities of woody plants. However, topographical variations could provide some escape cover. Due to the location of these sites on the foot slopes of mountains they are valuable for elk and deer winter ranges. When found adjacent to sagebrush dominated states, this plant community may provide brood rearing/foraging areas for sage grouse, as well as lek sites. Other birds that would frequent this plant community include western meadowlark, lark bunting, sage thrasher, horned larks, red-tail and ferruginous hawks, and golden eagles. Many grassland obligate small mammals would occur here.

Lettermans Needlegrass/Big Sagebrush Plant Community: The combination of an overstory of big sagebrush and an understory of grasses and forbs provides a very diverse plant community for wildlife. The crowns of sagebrush tend to break up hard crusted snow on winter ranges, so mule deer and antelope may use this state for foraging and cover year-round, as would cottontail and jack rabbits. Due to the location of these sites on the foot slopes of mountains and important shrubs for browsing, these are valuable for elk and deer winter ranges. It provides important winter, nesting, brood-rearing, and foraging habitat for sage grouse. Brewer’s sparrows’ nest in big sagebrush plants and hosts of other nesting birds utilize stands in the 20-30% cover range. Other birds that would frequent this plant community include western meadowlark, lark bunting, sage thrasher, horned larks, red-tail and ferruginous hawks, and golden eagles.

Rhizomatous Wheatgrass/Big Sagebrush Plant Community: The combination of an overstory of big sagebrush and an understory of grasses and forbs provides a very diverse plant community for wildlife. The crowns of sagebrush tend to break up hard crusted snow on winter ranges, so mule deer, elk, and antelope may use this state for foraging and cover year-round, as would cottontail and jack rabbits. It provides important winter, nesting, brood-rearing, and foraging habitat for sage grouse. Brewer's sparrows' nest in big sagebrush plants and hosts of other nesting birds utilize stands in the 20-30% cover range. Other birds that would frequent this plant community include western meadowlark, lark bunting, sage thrasher, horned larks, red-tail and ferruginous hawks, and golden eagles.

Mixed Shrub/Bluegrass Plant Community: This plant community can provide important winter foraging for elk, mule deer and antelope, as sagebrush can approach 15% protein and 40-60% digestibility during that time. This community provides escape and thermal cover for large ungulates, as well as nesting and brood rearing habitat for sage grouse. Other birds that would frequent this plant community include western meadowlark, lark bunting, sage thrasher, horned larks, red-tail and ferruginous hawks, and golden eagles. Due to the lack of herbaceous production and diversity of mid cool season grasses on this site, it is not as beneficial to grazers.

Juniper/*Bare Ground* Plant Community: This plant community can provide important winter and escape cover for elk, mule deer and antelope, as the juniper and limber pine can approach 70% cover. However, due to the lack of quality browsing and herbaceous species, this site provides only a minimal source of forage for most wildlife species. Specific bird species such as the nuthatches, western tanager, western kingbird, mountain bluebird, wood-warblers, and northern flicker frequent this site.

Rhizomatous Wheatgrass/Lettermans Needlegrass Plant Community: The production of herbaceous species provided for good foraging for grazers. However, the lack of tall or mid growing shrubs does not benefit browsers nor provides cover for many wildlife species. As these site greens-up sooner in the spring, this site tends to provide early new growth for foraging large and small mammals. If located adjacent to shrub dominated sites, It provides good foraging habitat for sage grouse.

Cheatgrass/Annual Plant Community: This community provides limited foraging for elk and other grazers. They may be used as a foraging site by chukars if proximal to woody cover. Generally, these are not target plant communities for wildlife habitat management.

Animal Community – Grazing Interpretations

The following table lists suggested stocking rates for cattle under continuous season-long grazing under normal growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of the conservation planning process. Often, the current plant composition does not entirely match any particular plant community (as described in this ecological site description). Because of this, a field visit is recommended, in all cases, to document plant composition and production. More precise carrying capacity estimates should eventually be calculated using this information along with animal preference data, particularly when grazers other than cattle are involved. Under more intensive grazing management, improved harvest efficiencies can result in an increased carrying capacity. If distribution problems occur, stocking rates must be reduced to maintain plant health and vigor.

Plant Community Production Carrying Capacity*
(lb./ac) (AUM/ac)
Columbia Needlegrass/Mountain Brome 1100-1600 .6
Lettermans Needlegrass/Big Sagebrush 900-1400 .5
Rhizomatous WG/Big Sagebrush 700-1200 .4
Mixed Shrub/Bluegrass 600-1000 .3
Juniper/*Bare Ground* 500-900 .15
Rhizomatous WG/ Lettermans Needlegrass 900-1300 .4
Cheatgrass/Annual 350-650 .15

* - Continuous, season-long grazing by cattle under average growing conditions.

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide forage for cattle, sheep, or horses. During the dormant period, the forage for livestock use needs to be supplemented with protein because the quality does not meet minimum livestock requirements.

Hydrological functions

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group B, with localized areas in hydrologic group C. Infiltration potential for this site varies from moderately rapid to rapid depending on soil hydrologic group and ground cover. Runoff varies from low to moderate. In many cases, areas with greater than 75% ground cover have the greatest potential for high infiltration and lower runoff. An example of an exception would be where; short-grasses form a strong sod and dominate the site. Areas where ground cover is less than 50% have the greatest potential to have reduced infiltration and higher runoff (refer to Part 630, NRCS National Engineering Handbook for detailed hydrology information).

Rills and gullies should not typically be present. Water flow patterns should be barely distinguishable if at all present. Pedestals are only slightly present in association with bunchgrasses. Litter typically falls in place, and signs of movement are not common. Chemical and physical crusts are rare to non-existent. Cryptogamic crusts are present, but only cover 1-2% of the soil surface.

Recreational uses

This site provides hunting opportunities for upland game species. The wide varieties of plants that bloom from spring until fall have an esthetic value that appeals to visitors. Other recreational uses may include hiking, camping, mountain biking, and in the winter snowshoeing and cross-country skiing.

Wood products

No appreciable wood products are present on the site.

Other products

None noted.

Inventory data references

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range trained personnel were also used. Those involved in developing this site include: Chris Krassin, Range Management Specialist, James Haverkamp, Range Management Specialist, Steven Gullion, Range Management Specialist, James Mischke, District Conservationist, and Everet Bainter, State Range Management Specialist. Other sources used as references include USDA NRCS Water and Climate Center, USDA NRCS National Range and Pasture Handbook, and USDA NRCS Soil Surveys from various counties.

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Contributors

R. Gullion

Approval

Kirt Walstad, 4/30/2024

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)	Ray Gullion, Everet Bainter
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Date	05/30/2008
Approved by	Marji Patz
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 15-25% occurring in small areas throughout site

5. **Number of gullies and erosion associated with gullies:** Active gullies should not be present

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):** Plant cover and litter is at 75% or greater of soil surface and maintains soil surface integrity. Soil Stability class is anticipated to be 4 or greater.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Use Soil Series description for depth and color of A-horizon

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Grass canopy and basal cover 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. Infiltration is Moderately Rapid to Rapid.

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 present.

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-Stature Cool-Season Grasses >>

    Sub-dominant: Forbs> Shrubs

    Other: Short-stature Grasses/Grasslike

    Additional:

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):** Average litter cover is 30-40% with depths of 0.25 to 1.0 inches

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 1350 lbs/ac

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:** Bare ground greater than 30% is the most common indicator of a threshold being crossed. Big sagebrush, rubber rabbitbrush, and bluegrasses are common increasers. Kentucky bluegrass, common dandelion, thistles, and annual weeds such as kochia and mustards are common invasive species in disturbed sites.

17. **Perennial plant reproductive capability:** All species are capable of reproducing except in extreme drought years.