

Ecological site R043BY174WY

Subirrigated High Mountains

Accessed: 05/14/2024

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

R043BY130WY	Overflow High Mountains Overflow
R043BY178WY	Wetland High Mountains Wetland

Similar sites

R043BY178WY	Wetland High Mountains Wetland (WL) 20+M has a higher water table and higher production.
R043BY274WY	Subirrigated Foothills and Mountains West Subirrigated (Sb) 15-19W has lower production.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site usually occurs on level to nearly level land along perennial or intermittent streams and near seeps, springs, and sloughs.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Stream terrace
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	Rare to occasional
Ponding frequency	None
Elevation	1,981–3,658 m
Slope	1–10%
Ponding depth	0 cm
Water table depth	30–102 cm

Climatic features

Annual precipitation is fairly evenly distributed through the year and averages over 20 inches. Snows are heavy and usually remain in place during the winter. Annual snowfall averages 150 to 200 inches per year. Wide fluctuations may occur in yearly precipitation and result in more dry years than those with more than normal precipitation. Temperatures show a wide range between summer and winter and between daily maximums and minimums. This is predominantly due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air outbreaks in winter move rapidly from northwest to southeast and account for extreme minimum temperatures.

Prevailing winds are from the southwest, and strong winds are less frequent than over other areas of Wyoming. Occasional storms, however, can bring brief periods of high winds with gusts exceeding 50 mph.

Growth of native cool season plants begins about June 1 at lower elevations, as late as July 15 at higher elevations, and continues until the beginning of September.

The following information is from the “Moran 5 WNW” climate station:

Minimum Maximum 5 yrs. out of 10 between
Frost-free period (days): 31 78 June 30 – August 24
Freeze-free period (days): 65 118 June 5 – September 9

Annual Precipitation (inches): <20.78 >29.35 (2 years in 10)

Mean annual precipitation: 25.23 inches

Mean annual air temperature: 36.5°F (22.1°F Avg. Min. to 50.9°F Avg. Max.)

For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at <http://www.wcc.nrcs.usda.gov/cgibin/state.pl?state=wy> website. Other climate station representative of this precipitation zone include “Alta 1 NW”, “Lake Yellowstone”, “Moose”, “Old Faithful”, and “Snake River” in Teton County; “Bedford 3 SE” in Lincoln County; and “Bondurant” in Sublette County.

Table 3. Representative climatic features

Frost-free period (average)	78 days
Freeze-free period (average)	118 days
Precipitation total (average)	737 mm

Influencing water features

Stream type: C (Rosgen)

Soil features

The soils of this site are moderately deep to very deep (greater than 20" to bedrock) with high organic matter content and are affected by wetness. They have seasonal water tables about 1 to 3 feet below the surface for all of the growing season, but may have surface water from run-in for short periods. The water table is non-saline and non-alkaline. Soil textures range from moderately coarse to fine, but most commonly are medium and moderately fine. Mottling or gleying usually occurs within 20-40 inches of the surface.

Table 4. Representative soil features

Surface texture	(1) Gravelly loam (2) Cobbly clay loam (3) Sandy loam
Family particle size	(1) Loamy
Drainage class	Somewhat poorly drained to moderately well drained
Permeability class	Moderately slow to moderate
Soil depth	51–152 cm
Surface fragment cover ≤3"	0–20%
Surface fragment cover >3"	0–5%
Available water capacity (0-101.6cm)	6.35–13.97 cm
Calcium carbonate equivalent (0-101.6cm)	0–40%
Electrical conductivity (0-101.6cm)	0–8 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.6
Subsurface fragment volume ≤3" (Depth not specified)	0–30%
Subsurface fragment volume >3" (Depth not specified)	0–15%

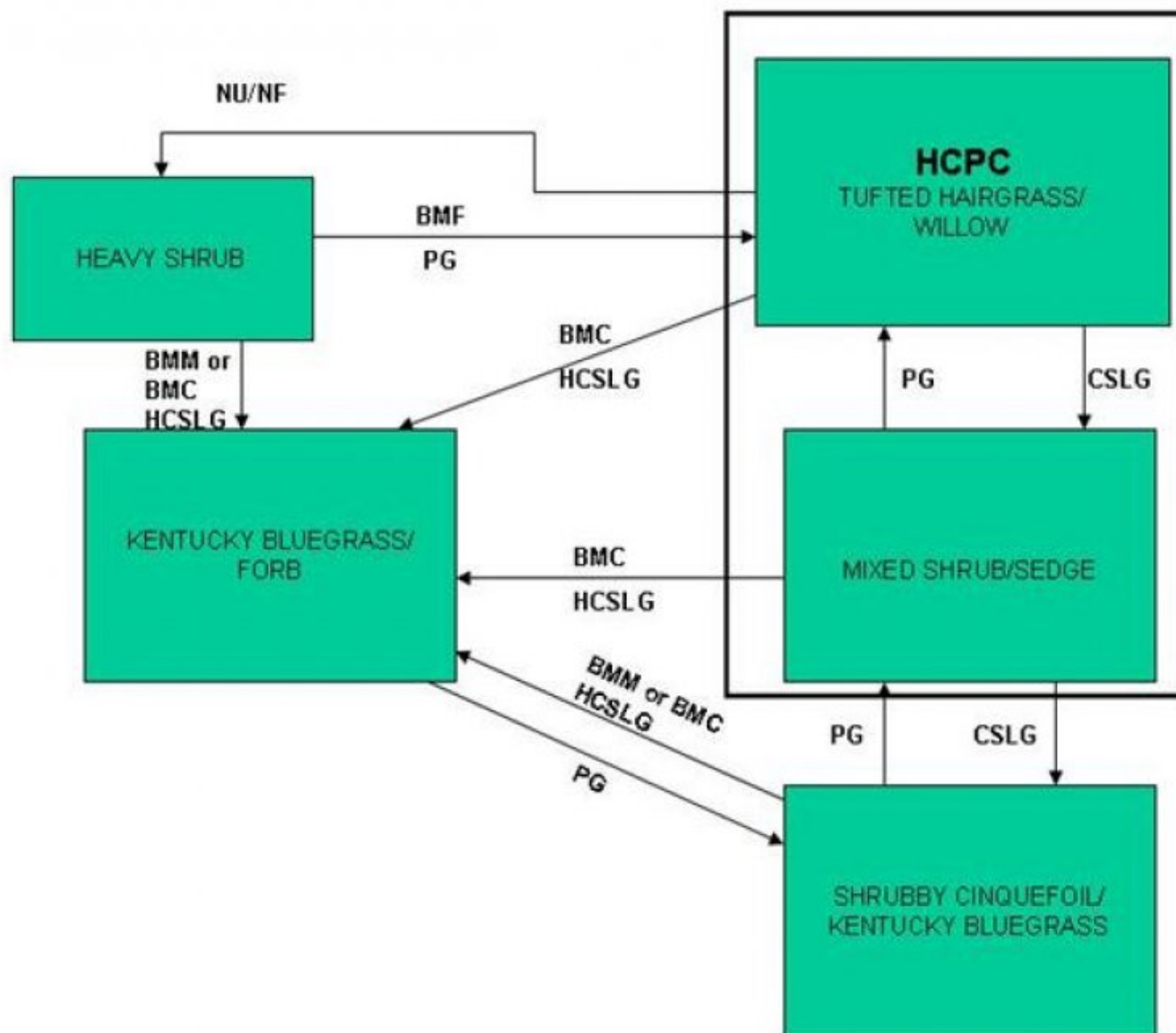
Ecological dynamics

As this site deteriorates, species such as inland sedge, rhizomatous wheatgrass, shrubby cinquefoil, Rocky Mountain iris, other forbs, and Baltic rush increase. Grasses and grasslikes such as tufted hairgrass, Nebraska sedge, and basin wildrye will decrease in frequency and production and willow stands will become decadent with a lack of diverse age classes.

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.

State and transition model



BMA – Brush Management (all methods)
BMC – Brush Management (chemical)
BMF – Brush Management (fire)
BMM – Brush Management (mechanical)
CSP – Chemical Seedbed Preparation
CSLG – Continuous Season-long Grazing
DR – Drainage
CSG – Continuous Spring Grazing
HB – Heavy Browse
HCSLG – Heavy Continuous Season-long Grazing
HI – Heavy Inundation
LPG – Long-term Prescribed Grazing
MT – Mechanical Treatment (chiseling, ripping, pitting)

NF – No Fire
NS – Natural Succession
NWC – Noxious Weed Control
NWI – Noxious Weed Invasion
NU – No Use
P&C – Plow & Crop (including hay)
PG – Prescribed Grazing
RPT – Re-plant Trees
RS – Re-seed
SGD – Severe Ground Disturbance
SHC – Severe Hoof Compaction
WD – Wildlife Damage (Beaver)
WF – Wildfire

State 1
Tufted Hairgrass/Willow Plant Community (HCPC)

Community 1.1
Tufted Hairgrass/Willow Plant Community (HCPC)

The interpretive plant community for this site is the Historic Climax Plant Community. This state evolved with grazing by large herbivores and is suited for grazing by domestic livestock. Potential vegetation is estimated at 65% grasses or grass-like plants, 20% forbs, and 15% woody plants. The major grasses and grass-like plants include slender wheatgrass, mountain brome, tufted hairgrass, blue wildrye, basin wildrye, and Nebraska sedge. Other grasses and grass-like species that may occur on this site include alpine timothy, Baltic rush, bearded wheatgrass, bentgrass, big bluegrass, bluejoint reedgrass, Canby bluegrass, Columbia needlegrass, sedges, fowl bluegrass, mannagrass, nodding brome, northern reedgrass, shortawn foxtail, spike trisetum, and western wheatgrass. Woody plants are mainly willows and shrubby cinquefoil, but may also include chokecherry, wild rose, and water birch. A typical plant composition for this state consists of slender wheatgrass 5-15%, mountain brome 5-15%, tufted hairgrass 5-15%, blue wildrye 5-15%, basin wildrye 5-10%, Nebraska sedge 5-10%, other grasses and grass-like plants 10-20%, perennial forbs 10-20%, and 5-15% woody plants. Ground cover, by ocular estimate, varies from 85-100%. The total annual production (air-dry weight) of this state is about 5000 pounds per acre, but it can range from about 4000 lbs./acre in unfavorable years to about 6000 lbs./acre in above average years. The following is the growth curve of this plant community expected during a normal year: Growth curve number: WY0103 Growth curve name: 20+M, FREE WATER SITES Growth curve description: WL, SB, SS FREE WATER SITES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC 0 0 0 0 5 30 40 20 5 0 0 0 (Monthly percentages of total annual growth) The state is stable and well adapted to the Central Rocky Mountains climatic conditions. The diversity in plant species and the reliable water table, allow for high drought resistance. 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: • Continuous Season-long Grazing will convert this plant community to the Mixed Shrub/Sedge State. • Chemical Brush Management and Heavy Continuous Season-long Grazing will convert this plant community to the Kentucky Bluegrass/Forb State. • Nonuse and No Fire will convert this plant community to the Heavy Shrub State.

Figure 4. Plant community growth curve (percent production by month).
WY0103, 20+ free water sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
				5	30	40	20	5			

State 2
Heavy Shrub Plant Community

Community 2.1
Heavy Shrub Plant Community

This plant community is the result of nonuse and the lack of a natural or prescribed fire regime. Willows and other shrubs dominate the plant community, and there is a high proportion of decadent woody material. The total annual production (air-dry weight) of this state is about 4500 pounds per acre, but it can range from about 3500 lbs./acre in unfavorable years to about 5500 lbs./acre in above average years. The following is the growth curve of this plant community expected during a normal year: Growth curve number: WY0103 Growth curve name: 20+M, FREE WATER SITES Growth curve description: WL, SB, SS FREE WATER SITES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC 0 0 0 0 5 30 40 20 5 0 0 0 (Monthly percentages of total annual growth) Bare ground is minimal. The soil of this state is well protected. The biotic community is stable and there is little risk due to invasive plants. The watershed is functioning. Transitional pathways leading to other plant communities are as follows: • Brush Management via Chemical or Mechanical with Heavy Continuous Season-long Grazing will convert this plant community to the Kentucky Bluegrass/Forb State. • Prescribed Fire followed by Prescribed Grazing will result in a plant community very similar to the Historic Climax Plant Community (Tufted Hairgrass/Willow State).

Figure 5. Plant community growth curve (percent production by month).
WY0103, 20+ free water sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
				5	30	40	20	5			

State 3

Mixed Shrub/Sedge Plant Community

Community 3.1

Mixed Shrub/Sedge Plant Community

This plant community is the result of moderate continuous season-long grazing. The native plant community responds to this management by decreasing in production and vigor. Desirable shrubs such as willows and water birch are replaced by less desirable woody plants such as rose and shrubby cinquefoil. The herbaceous understory is relatively intact, however less productive. The total annual production (air-dry weight) of this state is about 4000 pounds per acre, but it can range from about 3000 lbs./acre in unfavorable years to about 5000 lbs./acre in above average years. The following is the growth curve of this plant community expected during a normal year: Growth curve number: WY0103 Growth curve name: 20+M, FREE WATER SITES Growth curve description: WL, SB, SS FREE WATER SITES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC 0 0 0 0 5 30 40 20 5 0 0 0 (Monthly percentages of total annual growth) Bare ground is minimal. The soil of this state is moderately protected. Degraded stream banks may still erode, but increased amounts of deep-rooting sedges provide adequate stability to the system. The biotic community has been compromised, but is relatively stable and at risk due to invasive plants. The watershed is functioning, but is at risk of degrading rapidly with the introduction of improper management techniques. Transitional pathways leading to other plant communities are as follows: • Continuous Season-long Grazing will convert this plant community to the Shrubby Cinquefoil/Kentucky Bluegrass State. • Chemical Brush Management followed by Heavy Continuous Season-long Grazing will convert this plant community to the Kentucky Bluegrass/Forb State. • Prescribed Grazing will result in a plant community very similar to the Historic Climax Plant Community (Tufted Hairgrass/Willow State).

Figure 6. Plant community growth curve (percent production by month).
WY0103, 20+ free water sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
				5	30	40	20	5			

State 4

Shrubby Cinquefoil/Kentucky Bluegrass Plant Community

Community 4.1

Shrubby Cinquefoil/Kentucky Bluegrass Plant Community

This plant community is the result of continued historic season-long grazing. Kentucky bluegrass and Baltic rush are the dominant species with other grasses including redtop, rhizomatous wheatgrass, and bearded wheatgrass. The site has dried due to downcutting associated with soil erosion. Common forbs include herbaceous cinquefoils, elephanthead, arrowgrass, and Rocky Mountain iris. Shrubby cinquefoil often dominates the landscape and produces more than 10-15% of the annual production on the site. Remnant willow communities will lack a diversity of age classes. The total annual production (air-dry weight) of this state is about 2500 pounds per acre, but it can range from about 1500 lbs./acre in unfavorable years to about 3500 lbs./acre in above average years. The following is the growth curve of this plant community expected during a normal year: Growth curve number: WY0103 Growth curve name: 20+M, FREE WATER SITES Growth curve description: WL, SB, SS FREE WATER SITES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC 0 0 0 0 5 30 40 20 5 0 0 0 (Monthly percentages of total annual growth) The state is moderately stable, but vulnerable to excessive erosion. The biotic integrity of this plant community is intact, but at risk. The watershed may be functioning, but is at risk of degradation. Transitional pathways leading to other plant communities are as follows: • Prescribed Grazing will convert this plant community to the Mixed Shrub/Sedge State although Kentucky bluegrass will remain a part of the plant community. • Heavy Continuous Season-long Grazing and Mechanical or Chemical Brush Management will convert this plant community to the Kentucky Bluegrass/Forb State.

Figure 7. Plant community growth curve (percent production by month).
WY0103, 20+ free water sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
				5	30	40	20	5			

State 5
Kentucky Bluegrass/Forb Plant Community

Community 5.1
Kentucky Bluegrass/Forb Plant Community

This plant community evolved under continuous heavy grazing pressure by domestic livestock along with shrub control. Kentucky bluegrass dominates as the site dries out. Shrubby cinquefoil remnants provide little protection for the herbaceous understory. Herbaceous cinquefoils are the dominant forbs. Willows and other woody species are rare to nonexistent. The total annual production (air-dry weight) of this state is about 3000 pounds per acre, but it can range from about 2000 lbs./acre in unfavorable years to about 4000 lbs./acre in above average years. The following is the growth curve of this plant community expected during a normal year: Growth curve number: WY0103 Growth curve name: 20+M, FREE WATER SITES Growth curve description: WL, SB, SS FREE WATER SITES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC 0 0 0 0 5 30 40 20 5 0 0 0 (Monthly percentages of total annual growth) The state is unstable and vulnerable to excessive erosion. The biotic integrity of this plant community and watershed is nonfunctioning. Transitional pathways leading to other plant communities are as follows: • Prescribed Grazing will convert this plant community to the Shrubby Cinquefoil/Kentucky Bluegrass State.

Figure 8. Plant community growth curve (percent production by month).
WY0103, 20+ free water sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
				5	30	40	20	5			

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				280–841	
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	280–841	–
2				280–841	
	mountain brome	BRMA4	<i>Bromus marginatus</i>	280–841	–
3				280–841	
4				280–841	
	blue wildrye	ELGL	<i>Elymus glaucus</i>	280–841	–
5				280–560	
	basin wildrye	LECI4	<i>Leymus cinereus</i>	280–560	–
6				280–560	
	Nebraska sedge	CANE2	<i>Carex nebrascensis</i>	280–560	–
7				560–1121	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–280	–
	Columbia needlegrass	ACNE9	<i>Achnatherum nelsonii</i>	0–280	–
	bentgrass	AGROS2	<i>Agrostis</i>	0–280	–

	shortawn foxtail	ALAE	<i>Alopecurus aequalis</i>	0–280	–
	Porter brome	BRPO2	<i>Bromus porteri</i>	0–280	–
	bluejoint	CACA4	<i>Calamagrostis canadensis</i>	0–280	–
	inland sedge	CAIN11	<i>Carex interior</i>	0–280	–
	dunhead sedge	CAPH2	<i>Carex phaeocephala</i>	0–280	–
	northern reedgrass	CASTI3	<i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>	0–280	–
	slender wheatgrass	ELTRS	<i>Elymus trachycaulus</i> ssp. <i>subsecundus</i>	0–280	–
	mannagrass	GLYCE	<i>Glyceria</i>	0–280	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0–280	–
	alpine timothy	PHAL2	<i>Phleum alpinum</i>	0–280	–
	fowl bluegrass	POPA2	<i>Poa palustris</i>	0–280	–
	spike trisetum	TRSP2	<i>Trisetum spicatum</i>	0–280	–
Forb					
8				560–1121	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–280	–
	common yarrow	ACMI2	<i>Achillea millefolium</i>	0–280	–
	agoseris	AGOSE	<i>Agoseris</i>	0–280	–
	milkvetch	ASTRA	<i>Astragalus</i>	0–280	–
	water hemlock	CICUT	<i>Cicuta</i>	0–280	–
	elk thistle	CIFO	<i>Cirsium foliosum</i>	0–280	–
	shootingstar	DODEC	<i>Dodecatheon</i>	0–280	–
	horsetail	EQUIS	<i>Equisetum</i>	0–280	–
	aster	EUCEP2	<i>Eucephalus</i>	0–280	–
	bedstraw	GALIU	<i>Galium</i>	0–280	–
	gentian	GENTI	<i>Gentiana</i>	0–280	–
	avens	GEUM	<i>Geum</i>	0–280	–
	common sneezeweed	HEAU	<i>Helenium autumnale</i>	0–280	–
	sweetvetch	HEDYS	<i>Hedysarum</i>	0–280	–
	common cowparsnip	HEMA80	<i>Heracleum maximum</i>	0–280	–
	hawkweed	HIERA	<i>Hieracium</i>	0–280	–
	waterleaf	HYDRO4	<i>Hydrophyllum</i>	0–280	–
	rubberweed	HYMEN7	<i>Hymenoxys</i>	0–280	–
	bowltube iris	IRMA	<i>Iris macrosiphon</i>	0–280	–
	pea	LATHY	<i>Lathyrus</i>	0–280	–
	flax	LINUM	<i>Linum</i>	0–280	–
	mayflower	MAIAN	<i>Maianthemum</i>	0–280	–
	wild mint	MEAR4	<i>Mentha arvensis</i>	0–280	–
	monkeyflower	MIMUL	<i>Mimulus</i>	0–280	–
	forget-me-not	MYOSO	<i>Myosotis</i>	0–280	–
	sweetroot	OSMOR	<i>Osmorhiza</i>	0–280	–
	ragwort	PACKE	<i>Packera</i>	0–280	–
	elephanthead lousewort	PEGR2	<i>Pedicularis groenlandica</i>	0–280	–
	plantain	PLANT	<i>Plantago</i>	0–280	–

	American bistort	POBI6	<i>Polygonum bistortoides</i>	0–280	–
	cinquefoil	POTEN	<i>Potentilla</i>	0–280	–
	buttercup	RANUN	<i>Ranunculus</i>	0–280	–
	ragwort	SENEC	<i>Senecio</i>	0–280	–
	goldenrod	SOLID	<i>Solidago</i>	0–280	–
	goldenbanner	THERM	<i>Thermopsis</i>	0–280	–
	clover	TRIFO	<i>Trifolium</i>	0–280	–
	violet	VIOLA	<i>Viola</i>	0–280	–
Shrub/Vine					
9				280–841	
	Shrub, deciduous	2SD	<i>Shrub, deciduous</i>	0–280	–
	Shrub, evergreen	2SE	<i>Shrub, evergreen</i>	0–280	–
	Tree, deciduous	2TD	<i>Tree, deciduous</i>	0–280	–
	Tree, evergreen	2TE	<i>Tree, evergreen</i>	0–280	–
	Saskatoon serviceberry	AMAL2	<i>Amelanchier alnifolia</i>	0–280	–
	water birch	BEOC2	<i>Betula occidentalis</i>	0–280	–
	silverberry	ELCO	<i>Elaeagnus commutata</i>	0–280	–
	honeysuckle	LONIC	<i>Lonicera</i>	0–280	–
	Utah honeysuckle	LOUT2	<i>Lonicera utahensis</i>	0–280	–
	narrowleaf cottonwood	POAN3	<i>Populus angustifolia</i>	0–280	–
	quaking aspen	POTR5	<i>Populus tremuloides</i>	0–280	–
	chokecherry	PRVI	<i>Prunus virginiana</i>	0–280	–
	currant	RIBES	<i>Ribes</i>	0–280	–
	Woods' rose	ROWOW	<i>Rosa woodsii</i> var. <i>woodsii</i>	0–280	–
	willow	SALIX	<i>Salix</i>	0–280	–
	Greene's mountain ash	SOSCS	<i>Sorbus scopulina</i> var. <i>scopulina</i>	0–280	–

Animal community

Animal Community – Wildlife Interpretations

Tufted Hairgrass/Willow Plant Community (HCPC): This plant community is very important for most wildlife in the area. Over 80% of all wildlife use this site to fulfill some part of their habitat needs. It provides forage and thermal and hiding cover for mule deer and moose. It provides nesting habitat for shorebirds, songbirds, and waterfowl as well as ground nesting birds such as harriers. Dense ground cover provides escape cover, forage, and breeding areas for small mammals which draw predators such as raptors, red fox and coyote. Other birds that would frequent this plant community include red-wing blackbirds, sandhill cranes, western meadowlarks, neo-tropical migrants, and golden eagles.

Heavy Shrub Plant Community: This plant community may be beneficial for the same wildlife that would use the Historic Climax Plant Community. However, the plant community composition is less diverse, and thus, less apt to meet all life cycle needs of these animals.

Mixed Shrub/Sedge Plant Community: This plant community may be beneficial for the same wildlife that would use the Historic Climax Plant Community. However, the plant community composition is less diverse, and thus, less apt to meet all seasonal needs of these animals.

Shrubby Cinquefoil/Kentucky Bluegrass Plant Community: This plant community may be useful for the same large grazers that would use the Historic Climax Plant Community. However, the plant community composition is less diverse, and thus, less apt to meet the seasonal needs of these animals.

Kentucky Bluegrass/Forb Plant Community: This plant community may be beneficial for some of the same wildlife that would use the Historic Climax Plant Community. However, the woody component is typically less productive and unable to support large browsers such as moose. As woody plants decrease, structural diversity is lost for neotropical migrants, cover decreased for deer and elk, and nesting for shrub-nesting birds is impacted.

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)

Tufted Hairgrass/Willow (HCPC) 4000-6000 1.6

Heavy Shrub 3500-5500 1.4

Mixed Shrub/Sedge 3000-5000 1.3

Shrubby Cinquefoil/Kentucky Bluegrass 1500-3500 0.8

Kentucky Bluegrass/Forb 2000-4000 0.9

* - 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 yearlong 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

Climate is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group C. Infiltration rate is slow when soils are thoroughly wet. These soils have a slow rate of water transmission due to moderately fine to fine textures and/or high water table conditions. However, high forage production on this site diminishes runoff potential as long as site is managed for maintaining adequate residual vegetation. (Refer to Part 630, NRCS National Engineering Handbook for detailed hydraulic information).

Rills and gullies should not typically be present. Water flow patterns may be present if associated with a perennial flowing stream. Litter typically falls in place, and signs of movement are not common unless associated with a perennial flowing stream. Chemical and physical crusts are rare to non-existent.

Recreational uses

This site provides a variety of hunting opportunities as well providing popular camping areas for recreationists. This site has a wide variety of forbs which bloom throughout spring and summer, providing esthetic values that appeal to visitors. These areas have a fair potential for snowmobiling in the winter.

Wood products

No appreciable wood products are present on the site.

Inventory data references

Inventory Data References (narrative)

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: Bill Christensen, Range Management Specialist, NRCS; Karen Clause, Range Management Specialist, NRCS; and Everet Bainter, Range Management Specialist, NRCS. 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.

Inventory Data References

Data Source Number of Records Sample Period State County

Contributors

K. Clause

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.

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Date	03/16/2007
Approved by	E. Bainter
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rare to nonexistent.

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2. **Presence of water flow patterns:** Water flow patterns sometimes evident in floodplain zone where this site occurs.

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3. **Number and height of erosional pedestals or terracettes:** Rare to nonexistent.

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

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5. **Number of gullies and erosion associated with gullies:** Active gullies should not be present.
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6. **Extent of wind scoured, blowouts and/or depositional areas:** Minimal to nonexistent.
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7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous litter exhibits slight movement only associated with water flow patterns.
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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):** Soil Stability Index ratings typically 6.0.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil data is limited for this site. Soil OM of 10-20% is expected.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant community consists of 65-75% grasses, 20% forbs, and 5-15% shrubs. Dense plant canopy (75-100%) and litter, despite slow to moderate infiltration rates, results in no runoff on this site until soils are saturated. Basal cover is typically 10-20% for this site and effectively reduces runoff on this site.
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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 exists.
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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:
- Sub-dominant:
- Other:
- Additional: mid-size, cool season bunchgrasses>> tall, cool season bunchgrasses>>perennial forbs>perennial shrubs>rhizomatous grass-likes>cool season rhizomatous grasses
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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Minimal decadence, typically associated with shrub component.
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14. **Average percent litter cover (%) and depth (in):** Litter ranges from 0-25% of total canopy measurement with total litter (including beneath the plant canopy) from 75-100% expected. Herbaceous litter depth typically ranges from 15-30 mm. Woody litter can be up to a couple inches (4-6 cm).
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** English: 4000-6000 lb/ac (5000 lb/ac average); Metric: 4480-6720 kg/ha (5600 kg/ha average).

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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: Bare ground greater than 15% and presence of noxious weeds or Kentucky bluegrass are the most common indicators of a threshold being crossed. Baltic rush, inland sedge, herbaceous cinquefoil, Rocky Mountain iris, and shrubby cinquefoil are common increasers. Kentucky bluegrass, common dandelion, and Canada thistle are common invasive species.
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17. **Perennial plant reproductive capability:** All species are capable of reproducing, except in drought years.
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