

Ecological site R034AY250WY Sandy Foothills and Basins West (Sy)

Accessed: 11/07/2024

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.

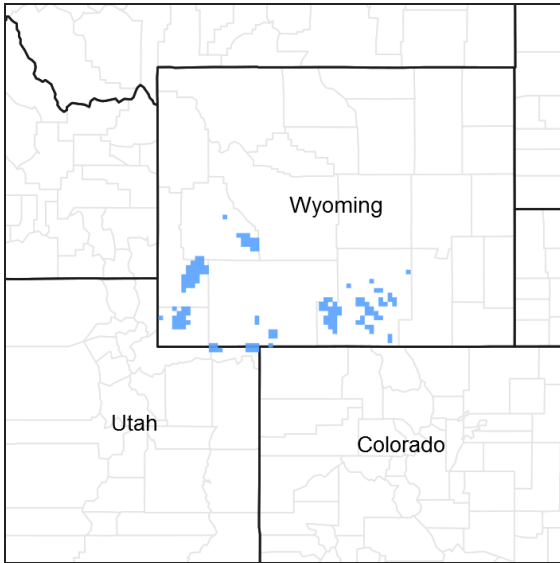


Figure 1. Mapped extent

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

R034AY222WY	Loamy Foothills and Basins West (Ly) Loamy
R034AY266WY	Shallow Sandy Foothills and Basins West (SwSy) Shallow Sandy

Similar sites

R034AY246WY	Sands Foothills and Basins West (Sa) Sands 10-14W has higher production and taller shrub height.
R034AY150WY	Sandy Green River and Great Divide Basins (Sy) Sandy 7-9GR has lower production.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site usually occurs in an upland position on relatively flat to moderately sloping land. Slopes commonly range from 1 to 15%. Elevations are mostly above 7000 feet.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Plateau (3) Stream terrace
Flooding frequency	None
Ponding frequency	None
Elevation	1,981–2,286 m
Slope	0–30%
Ponding depth	0 cm
Aspect	Aspect is not a significant factor

Climatic features

Annual precipitation ranges from 10-14 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. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring.

Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 mph.

Growth of native cool season plants begins about April 15 and continues to about August 15. Some green up of cool season plants usually occurs in September depending upon fall moisture occurrences.

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 stations representative of this precipitation zone include "Border 3 N" and Kemmerer Wtr Trtmt" in Lincoln County; "Evanston 1 E" in Uinta County; and "Merna" in Sublette County.

Table 3. Representative climatic features

Frost-free period (average)	67 days
Freeze-free period (average)	97 days
Precipitation total (average)	356 mm

Influencing water features

There are no water features associated with this site.

Soil features

These soils are mostly deep (greater than 20 inches) and well drained. Surface layers are 5 inches or more thick with sandy clay loam subsoils. Parent Material is residuum, alluvium, and aeolian deposits and is from sedimentary rock, usually sandstone

Major soil series correlated to this site include: Bosler, Edlin, Elk Mountain, Farson, Glendive, Grieves, and Ryan

Park.

Other soil series correlated in MLRA 34A to this site include: Cotha, Leckman, Relsob, Vible, Assiniboine, Comer, Folavar, Goslin, Kapps, Lupinto, McFadden, and Ryark.

Table 4. Representative soil features

Surface texture	(1) Fine sandy loam (2) Sandy loam (3) Loamy fine sand
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate to rapid
Soil depth	51–152 cm
Surface fragment cover <=3"	0–15%
Surface fragment cover >3"	0–5%
Available water capacity (0-101.6cm)	6.35–11.43 cm
Calcium carbonate equivalent (0-101.6cm)	0–5%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–15%
Subsurface fragment volume >3" (Depth not specified)	0–10%

Ecological dynamics

As this site deteriorates from improper grazing management, woody species such as big sagebrush and rabbitbrush will increase. Bunchgrasses such as Indian ricegrass and needleandthread will decrease in frequency and production.

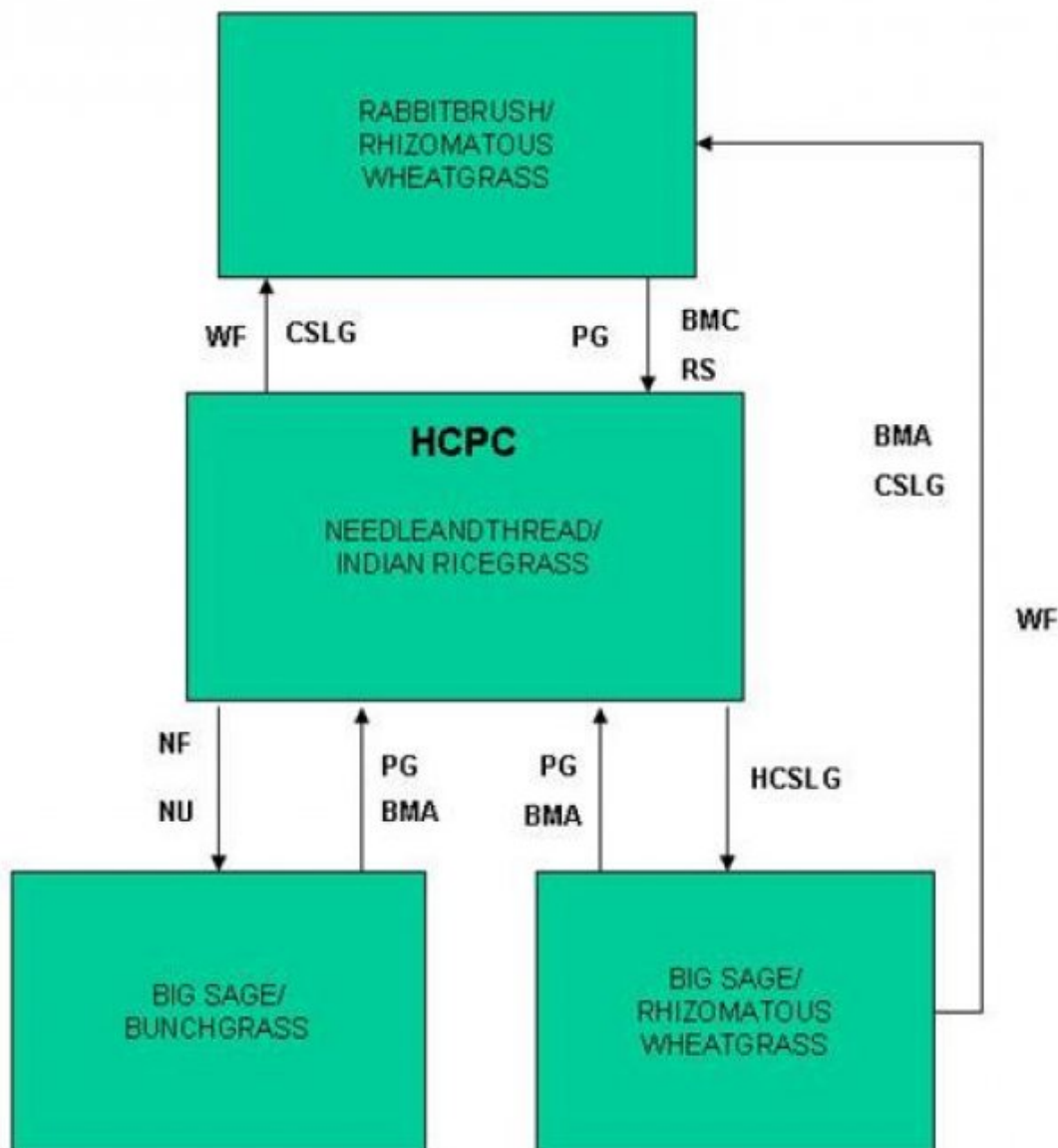
Big sagebrush will become dominant on some areas with an absence of fire. Wildfires are often actively controlled so chemical control using herbicides has replaced the historic role of fire on this site. Recently, prescribed burning has regained some popularity.

These plant communities narratives 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.

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 – Nonuse
 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
Needleandthread/Indian Ricegrass (HCPC)**

**Community 1.1
Needleandthread/Indian Ricegrass (HCPC)**

The interpretive plant community for this site is the Historic Climax Plant Community. This state evolved with grazing by large herbivores and is well suited for grazing by domestic livestock. Potential vegetation is estimated at 70% grasses or grass-like plants, 10% forbs, and 20% woody plants. The major grasses include needleandthread, Indian ricegrass, and thickspike wheatgrass. Other grasses occurring in the state may include bluebunch wheatgrass, bottlebrush squirreltail, Sandberg, Canby, and mutton bluegrass, prairie junegrass, needleleaf sedge, plains reedgrass, and Letterman needlegrass. Wyoming big sagebrush is the dominant woody plant. Other woody species include green and rubber rabbitbrush, bitterbrush, and winterfat. A typical plant composition for this state consists of needleandthread 10-30%, Indian ricegrass 10-20%, thickspike wheatgrass 10-25%, other grasses and grass-like plants 10-25%, perennial forbs 5-10%, Wyoming big sagebrush 5-15%, and 5-10% other woody species. Ground cover, by ocular estimate, varies from 25-35%. The total annual production (air-dry weight) of this state is about 1200 pounds per acre, but it can range from about 700 lbs./acre in unfavorable years to about 1500 lbs./acre in above average years. The state is stable and well adapted to the Cool Central Desertic Basins and Plateaus climatic conditions. The diversity in plant species allows 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: • Nonuse and No Fire will convert this plant community to the Big Sagebrush/Bunchgrass State. • Heavy Continuous Season-Long Grazing will convert this plant community to the Big Sagebrush/Rhizomatous Wheatgrass State. • Wildfire followed by Continuous Season-long Grazing will convert this plant community to the Rabbitbrush/Rhizomatous Wheatgrass State.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	549	942	1177
Shrub/Vine	157	269	336
Forb	78	135	168
Total	784	1346	1681

**Figure 5. Plant community growth curve (percent production by month).
WY0301, 34AC, Upland Sites. All Upland Sites.**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			5	40	50			5			

**State 2
Big Sagebrush/Bunchgrass**

**Community 2.1
Big Sagebrush/Bunchgrass**

This plant community is the result of nonuse and the absence of fire. Wyoming big sagebrush dominates the site, often exceeding 15% of the annual production and lowering herbaceous forage production. Bunchgrasses such as needleandthread and Indian ricegrass dominate the understory. The total annual production (air-dry weight) of this state is about 1000 pounds per acre, but it can range from about 500 lbs./acre in unfavorable years to about 1300 lbs./acre in above average years. The state is stable and protected from excessive erosion. The biotic integrity of this plant community is usually intact, however forage value will decrease and wildlife values will shift toward different species. The watershed is functioning. Transitional pathways leading to other plant communities are as follows: • Brush Management followed by deferment for 1 to 2 years as part of a Prescribed Grazing plan will return this state to near Historic Climax Plant Community (Needleandthread/Indian Ricegrass State). Care should be taken when planning brush management to consider wildlife habitat and critical winter ranges.

Figure 6. Plant community growth curve (percent production by month). WY0301, 34AC, Upland Sites. All Upland Sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			5	40	50			5			

State 3 Big Sagebrush/Rhizomatous Wheatgrass

Community 3.1 Big Sagebrush/Rhizomatous Wheatgrass

This plant community is the result of frequent and severe grazing. A thick canopy of Wyoming big sagebrush and rabbitbrush dominate. Thickspike wheatgrass and Letterman needlegrass dominate the understory with decreased amounts of Indian ricegrass and needleandthread. Common forbs include phlox and sagebrush gilia. The total annual production (air-dry weight) of this state is about 600 pounds per acre, but it can range from about 100 lbs./acre in unfavorable years to about 900 lbs./acre in above average years. The soil of this state is moderately protected with some bare ground present. The biotic community has been compromised, but is relatively stable though at risk due to invasive plants. The watershed is functioning, but is at risk of further degrading if disturbance intensifies or continues. Transitional pathways leading to other plant communities are as follows: • Brush Management followed by deferment for 1 to 2 years as part of a Prescribed Grazing plan will return this state to near Historic Climax Plant Community (Needleandthread/Indian Ricegrass State). Care should be taken when planning brush management to consider wildlife habitat and critical winter ranges. • Wildfire OR Brush Management followed by Continuous Season-long Grazing will convert this plant community to the Rabbitbrush/Rhizomatous Wheatgrass State.

Figure 7. Plant community growth curve (percent production by month). WY0301, 34AC, Upland Sites. All Upland Sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			5	40	50			5			

State 4 Rabbitbrush/Rhizomatous Wheatgrass

Community 4.1 Rabbitbrush/Rhizomatous Wheatgrass

This plant community is the result of severe disturbance such as brush management or wildfire followed by improper grazing. With sagebrush removed, it is dominated by sprouting shrubs such as rubber and green rabbitbrush. Thickspike wheatgrass and unpalatable annual and perennial forbs dominate the herbaceous understory. There is a substantial amount of bare ground. The total annual production (air-dry weight) of this state is about 300 pounds per acre, but it can range from about 100 lbs./acre in unfavorable years to about 600 lbs./acre in above average years. Soil erosion is accelerated because of increased bare ground. The biotic community has been compromised, but is relatively stable. The watershed is functioning, but is at risk of further degradation. Water flow patterns and pedestals are obvious. Infiltration is reduced and runoff is increased. Transitional pathways leading to other plant communities are as follows: • Brush Management (chemical) and Re-seeding followed by deferment for 1 to 2 years as part of a Prescribed Grazing plan will return this plant community to near Historic Climax Plant Community (Needleandthread/Indian Ricegrass State). Additional deferment may be necessary and should be prescribed on an individual site basis.

Figure 8. Plant community growth curve (percent production by month). WY0301, 34AC, Upland Sites. All Upland Sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			5	40	50			5			

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				135–404	
	needle and thread	HECO26	<i>Hesperostipa comata</i>	135–404	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	135–404	–
2				135–336	
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus ssp. lanceolatus</i>	135–336	–
3				135–269	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	135–269	–
4				135–336	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–67	–
	Letterman's needlegrass	ACLE9	<i>Achnatherum lettermanii</i>	0–67	–
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	0–67	–
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	0–67	–
	plains reedgrass	CAMO	<i>Calamagrostis montanensis</i>	0–67	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0–67	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–67	–
	muttongrass	POFE	<i>Poa fendleriana</i>	0–67	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–67	–
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	0–67	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–67	–
	Letterman's needlegrass	ACLE9	<i>Achnatherum lettermanii</i>	0–67	–
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	0–67	–
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	0–67	–
	plains reedgrass	CAMO	<i>Calamagrostis montanensis</i>	0–67	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0–67	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–67	–
	muttongrass	POFE	<i>Poa fendleriana</i>	0–67	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–67	–
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	0–67	–
Forb					
5				67–135	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–67	–
	common yarrow	ACMI2	<i>Achillea millefolium</i>	0–67	–
	rosy pussytoes	ANRO2	<i>Antennaria rosea</i>	0–67	–
	milkvetch	ASTRA	<i>Astragalus</i>	0–67	–
	water-starwort	CALLI6	<i>Callitriche</i>	0–67	–
	Indian paintbrush	CASTI2	<i>Castilleja</i>	0–67	–
	bastard toadflax	COUM	<i>Comandra umbellata</i>	0–67	–
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	0–67	–

	larkspur	DELPH	<i>Delphinium</i>	0-67	-
	fleabane	ERIGE2	<i>Erigeron</i>	0-67	-
	buckwheat	ERIOG	<i>Eriogonum</i>	0-67	-
	aster	EUCEP2	<i>Eucephalus</i>	0-67	-
	granite prickly phlox	LIPU11	<i>Linanthus pungens</i>	0-67	-
	tufted evening primrose	OECA10	<i>Oenothera caespitosa</i>	0-67	-
	beardtongue	PENST	<i>Penstemon</i>	0-67	-
	phacelia	PHACE	<i>Phacelia</i>	0-67	-
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0-67	-
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0-67	-
	stemless mock goldenweed	STAC	<i>Stenotus acaulis</i>	0-67	-
	groundsel	TEPHR3	<i>Tephrosia</i>	0-67	-
	clover	TRIFO	<i>Trifolium</i>	0-67	-
Shrub/Vine					
6				67-202	
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	67-202	-
7				67-135	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	0-67	-
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	0-67	-
	rubber rabbitbrush	ERNA10	<i>Ericameria nauseosa</i>	0-67	-
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	0-67	-
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	0-67	-

Animal community

Animal Community – Wildlife Interpretations

Needleandthread/Indian Ricegrass Plant Community: This plant community provides suitable thermal and escape cover for mule deer, elk, and antelope. Sagebrush, which can approach 15% protein and 40-60% digestibility, provides important winter forage for mule deer and antelope. Year-round habitat is provided for sage grouse and many other sagebrush obligate species such as the sage sparrow, Brewer's sparrow, sage thrasher, pygmy rabbit, sagebrush vole, horned lizard, and pronghorn antelope. Other birds that would frequent this plant community include horned larks and golden eagles.

Big Sagebrush/Bunchgrass Plant Community: This plant community may be useful for the same wildlife that would use the Historic Climax Plant Community.

Big Sagebrush/Rhizomatous Wheatgrass 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 the seasonal needs of these animals.

Rabbitbrush/Rhizomatous Wheatgrass Plant Community: These communities provide limited forage for antelope and mule deer due to low production and lack of sagebrush. They may be used as a foraging site by sage grouse if proximal to woody cover.

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.

Plant Community Production (lb./ac) and Carrying Capacity* (AUM/ac)

Needleandthread/Indian Ricegrass (HCPC) 700-1500 lb./ac and .4 AUM/ac

Big Sagebrush/Bunchgrass 500-1300 lb./ac and .33 AUM/ac

Big Sagebrush/Rhizomatous Wheatgrass 100-900 lb./ac and .2 AUM/ac

Rabbitbrush/Rhizomatous Wheatgrass 100-600 lb./ac and .1 AUM/ac

* - 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

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. 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. Cryptogammic 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 variety of plants which bloom from spring until fall have esthetic values that appeal to visitors.

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: Glen Mitchell, 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.

Contributors

Karen 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. Where present, short and widely spaced.
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2. **Presence of water flow patterns:** Barely observable.
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3. **Number and height of erosional pedestals or terracettes:** Rare to nonexistent.
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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground can range from 10-30%.
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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:** Rare to nonexistent.
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7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous litter expected to move only in small amounts (to leeward side of shrubs) due to wind. Large woody debris from sagebrush will show no movement.
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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 range from 1 (interspaces) to 6 (under plant canopy), but average values should be 2.7 or greater.

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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. Described A-horizons vary from 2-30 inches (5-76 cm) with OM of 1 to 2%.
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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 60-75% grasses, 10% forbs, and 15-30% shrubs. Evenly distributed plant canopy (45-75%) and litter plus moderate to moderately rapid infiltration rates result in minimal runoff. Basal cover is typically less than 5% for this site and does very little to effect 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):** None. A coarse, dry subsurface will often refuse a probe, causing misidentification of a compaction layer. Most soil profiles must be described by hand dug holes.
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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>> perennial shrubs>cool season rhizomatous grasses>>perennial forbs>short cool season bunchgrasses
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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 15-30% of total canopy measurement with total litter (including beneath the plant canopy) from 30-70% expected. Herbaceous litter depth typically ranges from 3-10mm. Woody litter can be up to a couple inches (4-6 cm).
-
15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** English: 700-1500 lb/ac (1200 lb/ac average); Metric 784-1680 kg/ha (1344 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 50% is the most common indicator of a threshold being crossed. Rabbitbrush, granite prickly phlox, Sandberg bluegrass, buckwheat, and phlox are common increasers. Annual weeds

such as kochia, mustards, lambsquarter, and Russian thistle are common invasive species in disturbed sites.

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