

# Ecological site R034AY208WY Coarse Upland Foothills and Basins West (CU)

Accessed: 05/03/2024

## 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.

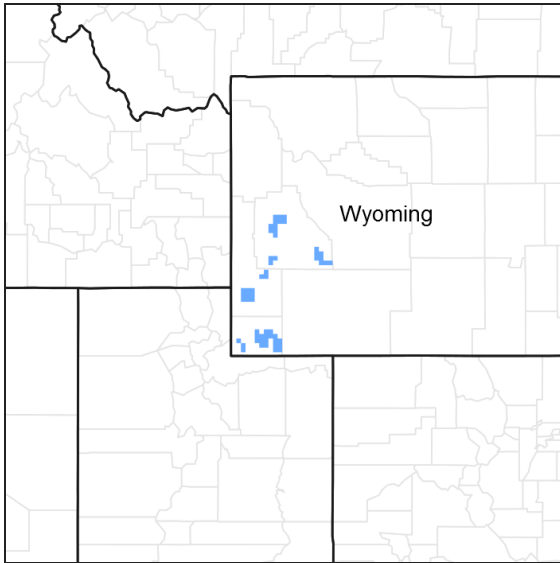


Figure 1. Mapped extent

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

R034AY204WY	<b>Clayey Foothills and Basins West (Cy)</b> Clayey
R034AY228WY	<b>Lowland Foothills and Basins West (LL)</b> Lowland
R034AY230WY	<b>Overflow Foothills and Basins West (Ov)</b> Overflow
R034AY250WY	<b>Sandy Foothills and Basins West (Sy)</b> Sandy
R034AY262WY	<b>Shallow Loamy Foothills and Basins West (SwLy)</b> Shallow Loamy

## Similar sites

R043BY208WY	<b>Coarse Upland Foothills and Mountains West</b> Coarse Upland (CU), 15-19" Foothills and Mountains West has higher production.
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Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

## Physiographic features

This site will usually occur in an upland position on gentle slopes but may occur on all slopes and positions. Elevations are mostly above 7000 feet.

**Table 2. Representative physiographic features**

Landforms	(1) Alluvial fan (2) Ridge (3) Stream terrace
Flooding frequency	None
Ponding frequency	None
Elevation	1,981–2,286 m
Slope	0–70%
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

The soils of this site are deep, well-drained and generally non-calcareous from glacial till and alluvium. Surface soils are usually loams or sandy loams. Soils contain a least 35 percent by volume coarse fragments in the first 20 inches. The volume of coarse fragments generally increases with depth. These stony, and/or bouldery soils occur as terraces, fan terraces, or glacial moraines.

Soil texture modifiers are stony, very stony and cobbly.

Major Soil Series correlated to this site includes: Michelson and some phases of Gelkie.

**Table 4. Representative soil features**

Surface texture	(1) Loam (2) Sandy loam (3) Stony sandy loam
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Moderately slow to moderate
Soil depth	51–152 cm
Surface fragment cover <=3"	0–20%
Surface fragment cover >3"	20–30%
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
Soil reaction (1:1 water) (0-101.6cm)	6.1–7.3
Subsurface fragment volume <=3" (Depth not specified)	0–15%
Subsurface fragment volume >3" (Depth not specified)	0–15%

## Ecological dynamics

As this site deteriorates because of a combination of frequent and severe grazing, species such as green rabbitbrush and big sagebrush will increase. Cheatgrass often invades with ground disturbance and fire. Cool-season grasses such as bluebunch wheatgrass, needleandthread, and woody plants such as bitterbrush will decrease in frequency and production.

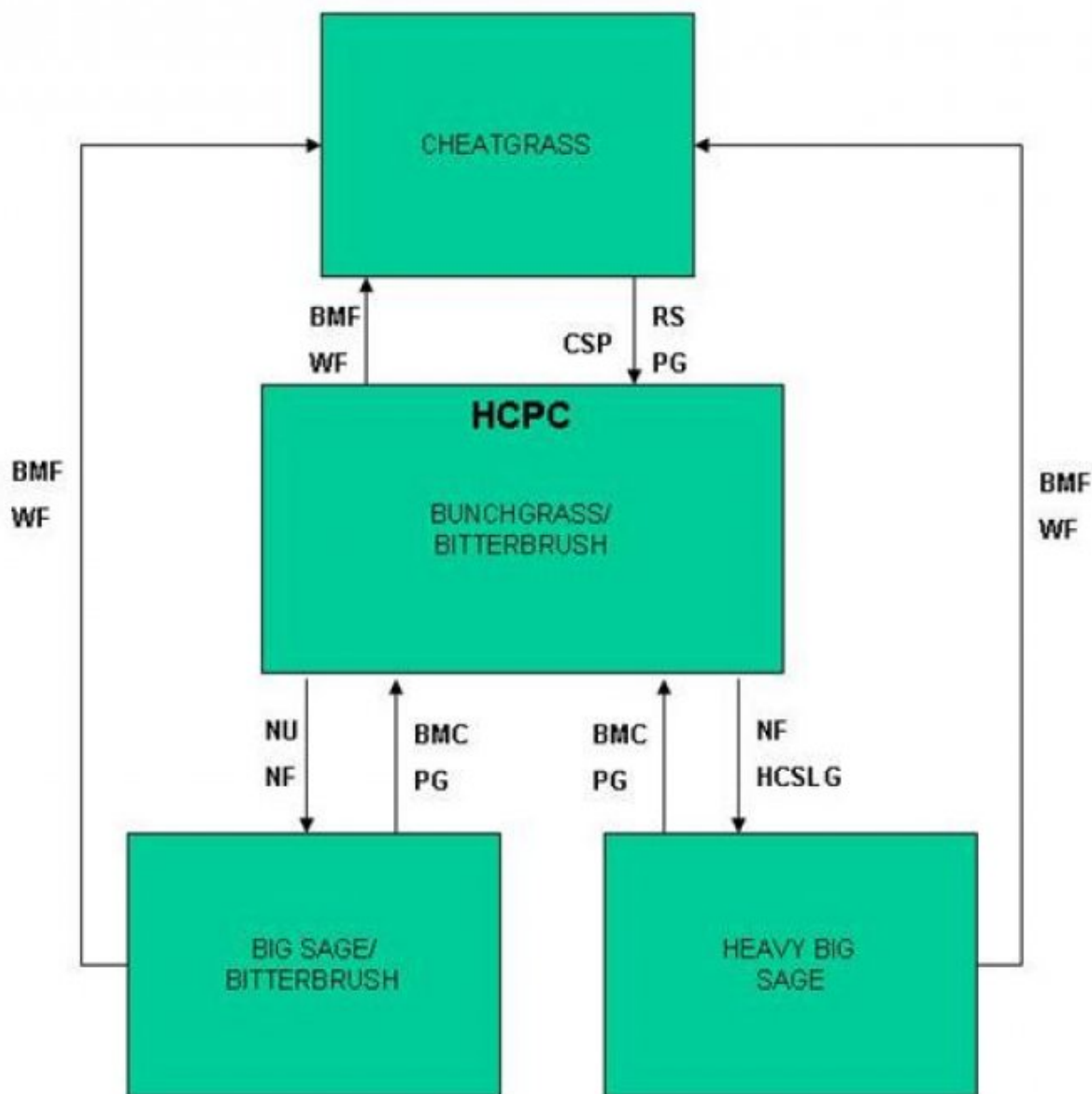
Big sagebrush will become dominant on some areas with an absence of fire. Wildfires are often actively controlled so chemical control using herbicides has replaced the historic role of fire on this site. Recently, prescribed burning has regained some popularity.

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**  
**Bunchgrass/Bitterbrush (HCPC)**

**Community 1.1**  
**Bunchgrass/Bitterbrush (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 60% grasses or grass-like plants, 10% forbs, and 30% woody plants. The major grasses include bluebunch wheatgrass, needleandthread, Letterman needlegrass, and bottlebrush squirreltail. Other grasses may include basin wildrye, Indian ricegrass, prairie junegrass, Sandberg, Canby, and mutton bluegrass, needleleaf sedge, rhizomatous wheatgrasses, and plains reedgrass. Bitterbrush and big sagebrush (Wyoming and mountain) are the dominant woody plants. Other woody species may include green rabbitbrush, black sagebrush, and winterfat. A typical plant composition for this state consists of bluebunch wheatgrass 10-35%, needleandthread 10-20%, Letterman needlegrass 5-15%, bottlebrush squirreltail 5-15%, other grasses and grass-like plants 10-20%, perennial forbs 5-10%, bitterbrush 5-10%, big sagebrush 1-10%, and 5-10% other woody species. The overstory of sagebrush and understory of grass and forbs provide a diverse plant community that will support domestic livestock and wildlife such as mule deer and antelope. Ground cover, by ocular estimate, varies from 40-50% and canopy cover of shrubs ranges from 30-40%. The total annual production (air-dry weight) of this state is about 1000 lbs./acre, but it can range from about 600 lbs./acre in unfavorable years to about 1400 lbs./acre in above average years. This plant community is extremely stable and well adapted to the Cool Central Desertic Basins and Plateaus 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: • Nonuse and No Fire will convert this plant community to the Big Sagebrush/Bitterbrush State. • Heavy Continuous Season-long Grazing with No Fire will convert this plant community to the Heavy Big Sagebrush State. • Wildfire or Prescribed Fire (on predominantly south and west facing slopes) will convert this plant community to the Cheatgrass State.

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

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	404	673	942
Shrub/Vine	202	336	471
Forb	67	112	157
<b>Total</b>	<b>673</b>	<b>1121</b>	<b>1570</b>

**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/Bitterbrush**

**Community 2.1**  
**Big Sagebrush/Bitterbrush**

This plant community is a result of nonuse and lack of fire. Woody plants such as big sagebrush and bitterbrush are dominant, making up 20 to 75% of the annual production. Woody plants may become decadent and of lower nutritive value for wildlife and livestock. Major grasses in the understory include bluebunch wheatgrass, needleandthread, and bottlebrush squirreltail. The total annual production (air-dry weight) of this state is about 600 pounds per acre, but it can range from about 300 lbs./acre in unfavorable years to about 800 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. Transitions or pathways leading to other plant communities are as follows: • Chemical

Brush Management followed by deferment for 1 to 2 years as part of a Prescribed Grazing plan will result in a plant community very similar to the Historic Climax Plant Community (Bunchgrass/Bitterbrush State). Care should be taken when planning brush management to consider wildlife and critical winter ranges. • Wildfire or Prescribed Fire (on predominantly south and west facing slopes) will convert this plant community to the Cheatgrass State.

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 Heavy Big Sagebrush

#### Community 3.1 Heavy Big Sagebrush

This plant community is the result of heavy continuous season-long grazing with long-term protection from fire. Sagebrush eventually dominates this plant community with annual production often exceeding 60%. Bitterbrush, although present, will be severely suppressed by sagebrush overstory and heavy browsing. Dominant grasses include rhizomatous wheatgrass, Canby and Sandberg bluegrass, and bottlebrush squirreltail. The total annual production (air-dry weight) of this state is about 600 pounds per acre, but it can range from about 300 lbs./acre in unfavorable years to about 800 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. Transitions or pathways leading to other plant communities are as follows: • Chemical Brush Management followed by deferment for 1 to 2 years as part of a Prescribed Grazing plan will result in a plant community very similar to the Historic Climax Plant Community (Bunchgrass/Bitterbrush State). Care should be taken when planning brush management to consider wildlife and critical winter ranges. • Wildfire or Prescribed Fire (on predominantly south and west facing slopes) will convert this plant community to the Cheatgrass 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 Cheatgrass

#### Community 4.1 Cheatgrass

This plant community is a result of wildfire or a hot prescribed fire. Bunchgrasses such as basin wildrye, bluebunch wheatgrass, bottlebrush squirreltail, needleandthread, Indian ricegrass and letterman needlegrass respond well as long as deferment follows the fire. The response of bitterbrush to fire can be quite varied, depending on the intensity of the fire. Cheatgrass often invades these sites, particularly on south and west facing slopes, effectively increasing the fire frequency of the site, and preventing further shrub establishment. The total annual production (air-dry weight) of this state is about 500 pounds per acre, but it can range from about 200 lbs./acre in unfavorable years to about 700 lbs./acre in above average years. The state is vulnerable to excessive erosion. The biotic integrity of this plant community is at risk depending on how far a shift has occurred in plant composition toward green rabbitbrush, cheatgrass, and annual forbs. The watershed is at risk as bare ground increases. Transitions or pathways leading to other plant communities are as follows: • Chemical Seedbed Preparation and Re-seeding followed by deferment for 1 to 2 years as part of a Prescribed Grazing plan will result in a plant community very similar to the Historic Climax Plant Community (Bunchgrass/Bitterbrush State) although cheatgrass will remain a part of the plant community. Additional deferment may be necessary and should be prescribed on an individual site basis.

Figure 8. Plant community growth curve (percent production by month).

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 (%)
<b>Grass/Grasslike</b>					
1				112–392	
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	112–392	–
2				112–224	
	needle and thread	HECO26	<i>Hesperostipa comata</i>	112–224	–
3				56–168	
	squirreltail	ELEL5	<i>Elymus elymoides</i>	56–168	–
4				56–168	
	Letterman's needlegrass	ACLE9	<i>Achnatherum lettermanii</i>	56–168	–
5				112–224	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–56	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	0–56	–
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	0–56	–
	plains reedgrass	CAMO	<i>Calamagrostis montanensis</i>	0–56	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–56	–
	basin wildrye	LECI4	<i>Leymus cinereus</i>	0–56	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0–56	–
	muttongrass	POFE	<i>Poa fendleriana</i>	0–56	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–56	–
<b>Forb</b>					
6				56–112	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–56	–
	common yarrow	ACMI2	<i>Achillea millefolium</i>	0–56	–
	agosaris	AGOSE	<i>Agoseris</i>	0–56	–
	rosy pussytoes	ANRO2	<i>Antennaria rosea</i>	0–56	–
	milkvetch	ASTRA	<i>Astragalus</i>	0–56	–
	castilla	CASTI	<i>Castilla</i>	0–56	–
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	0–56	–
	larkspur	DELPH	<i>Delphinium</i>	0–56	–
	fleabane	ERIGE2	<i>Erigeron</i>	0–56	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–56	–
	aster	EUCEP2	<i>Eucephalus</i>	0–56	–
	granite prickly phlox	LIPU11	<i>Linanthus pungens</i>	0–56	–
	desertparsley	LOMAT	<i>Lomatium</i>	0–56	–
	lupine	LUPIN	<i>Lupinus</i>	0–56	–
	bluebells	MERTE	<i>Mertensia</i>	0–56	–
	tufted evening primrose	OECA10	<i>Oenothera caespitosa</i>	0–56	–



	beardtongue	PENST	<i>Penstemon</i>	0–56	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0–56	–
	buttercup	RANUN	<i>Ranunculus</i>	0–56	–
	stemless mock goldenweed	STAC	<i>Stenotus acaulis</i>	0–56	–
	groundsel	TEPHR3	<i>Tephrosia</i>	0–56	–
	clover	TRIFO	<i>Trifolium</i>	0–56	–
<b>Shrub/Vine</b>					
7				56–112	
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	56–112	–
8				11–112	
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	11–112	–
9				56–112	
	black sagebrush	ARNO4	<i>Artemisia nova</i>	0–56	–
	yellow rabbitbrush	CHV18	<i>Chrysothamnus viscidiflorus</i>	0–56	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	0–56	–

## Animal community

### Animal Community – Wildlife Interpretations

Bunchgrass/Bitterbrush Plant Community (HCPC): This plant community provides suitable thermal and escape cover for mule deer, elk, and antelope. Bitterbrush and sagebrush provide important winter forage for mule deer, antelope, and elk. 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/Bitterbrush 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.

Heavy Big Sagebrush 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. Bitterbrush suppression affects the quality and quantity of winter forage for mule deer and elk.

Cheatgrass Plant Community: This plant community provides limited forage and cover for elk and mule deer due to lack of woody species. The site 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)

Bunchgrass/Bitterbrush 600-1400 lb./ac and .3 AUM/ac

Big Sagebrush/Bitterbrush 500-1200 lb./ac and .25 AUM/ac

Heavy Big Sagebrush 300-800 lb./ac and .15 AUM/ac

Cheatgrass 200-700 lb./ac and .07 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 A and B. Infiltration ranges from rapid to moderate. Runoff potential for this site varies from low to moderate depending on soil hydrologic group and ground cover. 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 and shrubs. 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. The varied topography and large boulders appeal to hikers and mountain bikers.

## **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: 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.

## **Contributors**

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## **Rangeland health reference sheet**

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

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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 3.0 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 2-11 inches (5-28 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 60-80% grasses, 10% forbs, and 10-30% shrubs. Evenly distributed plant canopy (55-80%) 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.
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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>>perennial forbs>cool season rhizomatous grasses=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 5-30% 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).
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** English: 600-1400 lb/ac (1000 lb/ac average); Metric 672-1568 kg/ha (1120 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, big sagebrush, Sandberg bluegrass, buckwheat, and phlox are common increasers. Annual weeds such as cheatgrass, mustards, kochia, lambsquarter, and Russian thistle are common invasive species in disturbed sites.
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17. **Perennial plant reproductive capability:** All species are capable of reproducing, except in drought years.
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