

Ecological site R043BY260WY
Shallow Igneous Foothills and Mountains West

Accessed: 05/18/2024

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.

Associated sites

R043BY262WY	Shallow Loamy Foothills and Mountains West Shallow Loamy
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Similar sites

R043BY216WY	Igneous Foothills and Mountains West Igneous (lg) 15-19 has lower production and less bitterbrush.
R034AY260WY	Shallow Igneous Foothills and Basins West (Swlg) Shallow Igneous (Swl) 10-14W has lower production and lacks Idaho fescue, Columbia needlegrass, and threetip sagebrush.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site is found on rolling to steep mountain slopes and ridges.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Ridge (3) Escarpment
Flooding frequency	None
Ponding frequency	None
Elevation	1,707–2,530 m
Slope	5–70%
Ponding depth	0 cm

Climatic features

Annual precipitation ranges from 15-19 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.

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 May 15 and continues to about August 15.

The following information is from the “Jackson” climate station:

Minimum Maximum 5 yrs. out of 10 between
Frost-free period (days): 12 60 July 9 – August 12
Freeze-free period (days): 42 100 June 20 – August 26

Annual Precipitation (inches): <11.98 >19.69 (2 years in 10)

Mean annual precipitation: 17.00 inches

Mean annual air temperature: 38.9°F (23.3°F Avg. Min. to 54.5°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 stations representative of this precipitation zone include "Afton" in Lincoln County; and "Darwin Ranch" in Teton County.

Table 3. Representative climatic features

Frost-free period (average)	60 days
Freeze-free period (average)	100 days
Precipitation total (average)	483 mm

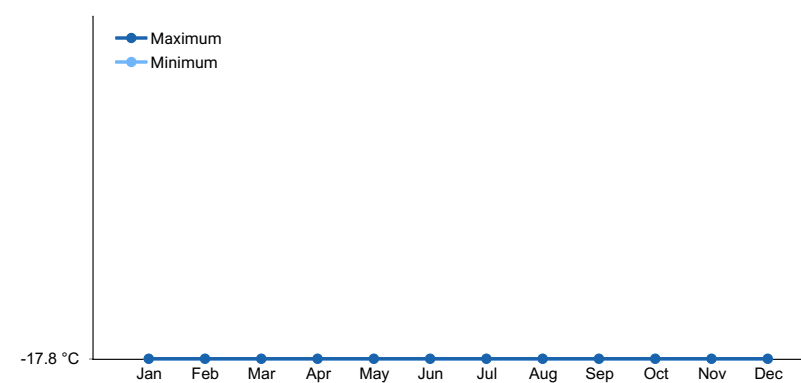


Figure 1. Monthly average minimum and maximum temperature

Influencing water features

Soil features

These are shallow (10-20”), well-drained soils with medium to moderately coarse textures over igneous or volcanic bedrock. This site may also include some deep gravelly and/or cobbly soils on south and west facing slopes which react like shallow soils.

Table 4. Representative soil features

Surface texture	(1) Very gravelly loam (2) Cobbly sandy loam (3) Very cobbly
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate to moderately rapid
Soil depth	25–51 cm
Surface fragment cover <=3"	10–25%
Surface fragment cover >3"	20–45%
Available water capacity (0-101.6cm)	1.52–3.05 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	5.6–7.2
Subsurface fragment volume <=3" (Depth not specified)	15–30%
Subsurface fragment volume >3" (Depth not specified)	30–50%

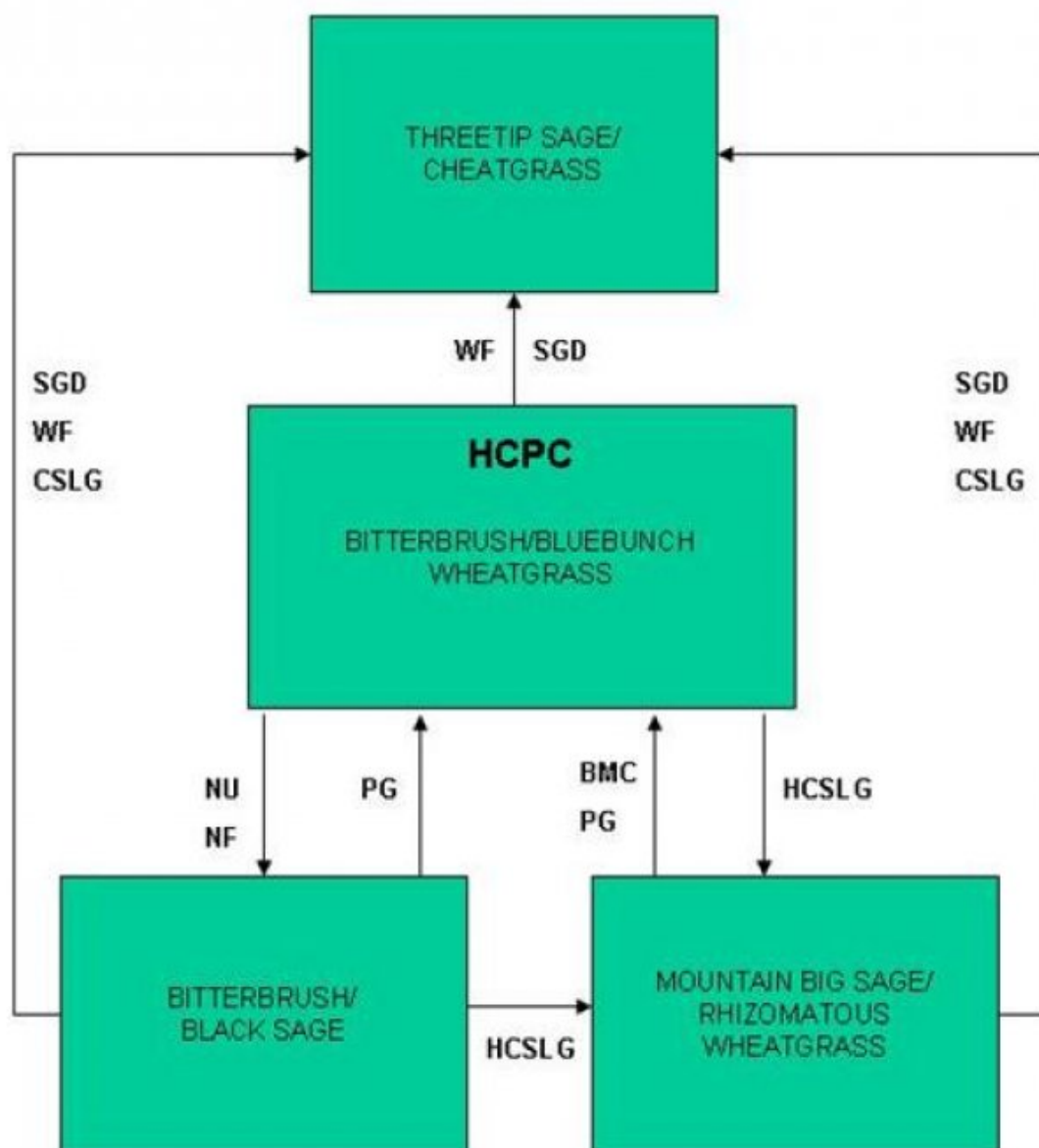
Ecological dynamics

As this site deteriorates, species such as thickspike wheatgrass, needleleaf sedge, threetip and mountain big sagebrush, snowberry, and green rabbitbrush will increase. Bluebunch wheatgrass, Columbia needlegrass, and bitterbrush will decrease in frequency and production.

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
Bitterbrush/Bluebunch Wheatgrass Plant Community (HCPC)

Community 1.1
Bitterbrush/Bluebunch Wheatgrass Plant Community (HCPC)

The interpretive plant community for this site is the Historic Climax Plant Community. Potential vegetation is about 65% grasses or grass-like plants, 10% forbs, and 25% woody plants. The major grasses include bluebunch wheatgrass, Idaho fescue, and Columbia needlegrass. Other grasses and grasslikes include Canby, mutton, big, and Sandberg bluegrass, needleleaf sedge, bottlebrush squirreltail, California and timber oatgrass, Letterman and western needlegrass, mountain brome, mountain muhly, oniongrass, spike fescue, spike trisetum, thickspike wheatgrass, and prairie junegrass. Threetip and black sagebrush and bitterbrush are the dominant woody plants. Other woody plants include green rabbitbrush, snowberry, snowbush ceanothus, mountain big sagebrush, mountainmahogany, chokecherry, serviceberry, and silver sagebrush. A typical plant composition for this state consists of bluebunch wheatgrass 10-35%, Idaho fescue 10-25%, Columbia needlegrass 5-15%, other grasses and grass-like plants 10-20%, perennial forbs 5-10%, bitterbrush 5-15%, black sagebrush 5-10%, threetip sagebrush 5-10%, and 5-10% other woody species. Ground cover, by ocular estimate, varies greatly depending on the amount of exposed parent material, and herbage cover ranges from 30-35%. The total annual production (air-dry weight) of this state is about 1200 pounds per acre, but it can range from about 900 lbs./acre in unfavorable years to about 1500 lbs./acre in above average years. The following is the growth curve of this plant community expected during a normal year: Growth curve number: WY0201 Growth curve name: 15-19W, UPLAND SITES Growth curve description: ALL UPLAND SITES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC 0 0 0 0 10 35 30 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 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 Bitterbrush/Black Sage State. • Heavy Continuous Season-Long Grazing will convert this plant community to the Mountain Big Sage/Rhizomatous Wheatgrass State. • Wildfire or Severe Ground Disturbance will convert this plant community to the Threetip Sage/Cheatgrass State.

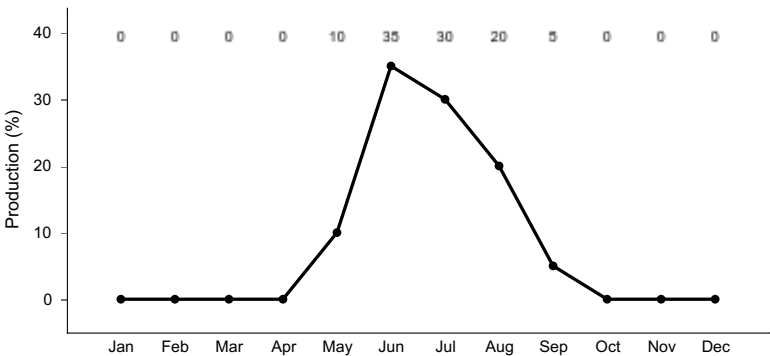


Figure 3. Plant community growth curve (percent production by month). WY0201, 15-19W Upland sites.

State 2
Bitterbrush/Black Sage Plant Community

Community 2.1
Bitterbrush/Black Sage Plant Community

This plant community is a result of nonuse and protection from fire. Bitterbrush, and big and black sagebrush are significant components of this plant community, often making up 20-75% of the annual production. Dominant grasses include bluebunch wheatgrass and Columbia needlegrass. The total annual production (air-dry weight) of this state is about 950 pounds per acre, but it can range from about 700 lbs./acre in unfavorable years to about 1300 lbs./acre in above average years. The following is the growth curve of this plant community expected during a normal year: Growth curve number: WY0201 Growth curve name: 15-19W, UPLAND SITES Growth curve description: ALL UPLAND SITES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC 0 0 0 0 10 35 30 20 5 0 0 0 (Monthly percentages of total annual growth) 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: • Prescribed Grazing will return this state to near Historic Climax Plant Community (Bitterbrush/Bluebunch Wheatgrass State). • Continuous Season-Long Grazing with Severe Ground Disturbance or Wildfire will convert this plant community to the Threetip Sage/Cheatgrass State.

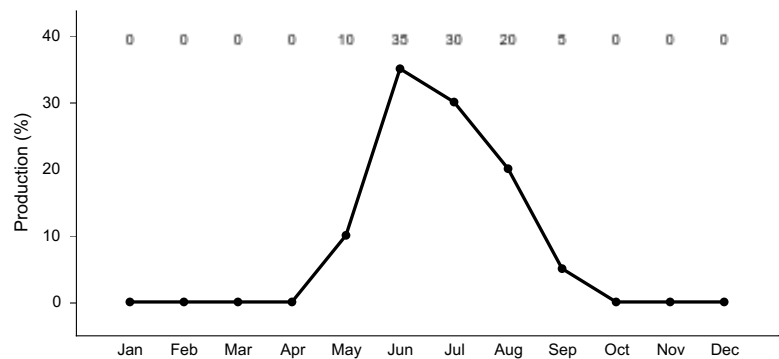


Figure 4. Plant community growth curve (percent production by month). WY0201, 15-19W Upland sites.

State 3

Mountain Big Sage/Rhizomatous Wheatgrass Plant Community

Community 3.1

Mountain Big Sage/Rhizomatous Wheatgrass Plant Community

This plant community results from heavy, continuous season-long grazing. Mountain big sagebrush, green rabbitbrush, and various forbs are significant components of this plant community. Dominant grasses in the understory include rhizomatous wheatgrass, Canby and Sandberg bluegrass, and Letterman needlegrass. Phlox and goldenweed are common forbs found on this site. The total annual production (air-dry weight) of this state is about 650 pounds per acre, but it can range from about 300 lbs./acre in unfavorable years to about 900 lbs./acre in above average years. The following is the growth curve of this plant community expected during a normal year: Growth curve number: WY0201 Growth curve name: 15-19W, UPLAND SITES Growth curve description: ALL UPLAND SITES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC 0 0 0 0 10 35 30 20 5 0 0 0 (Monthly percentages of total annual growth) 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: • Chemical 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 (Bitterbrush/Bluebunch Wheatgrass State). Care should be taken when planning brush management to consider wildlife habitat and critical winter ranges. • Continuous Season-Long Grazing with Severe Ground Disturbance or Wildfire will convert this plant community to the Threetip Sage/Cheatgrass State.

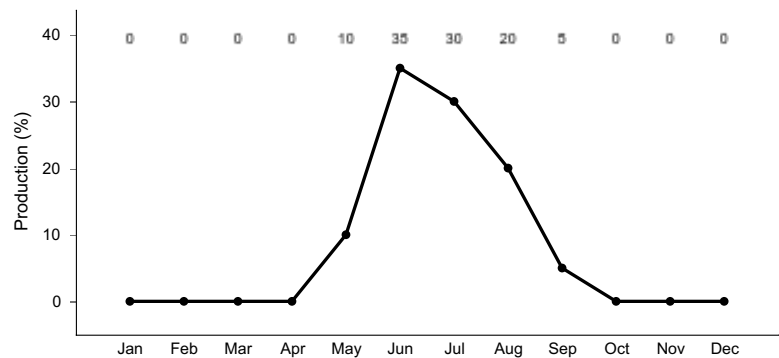


Figure 5. Plant community growth curve (percent production by month). WY0201, 15-19W Upland sites.

State 4

Threetip Sage/Cheatgrass Plant Community

Community 4.1

Threetip Sage/Cheatgrass Plant Community

This vegetation state currently is a result of improper grazing management techniques followed by wildfire or severe ground disturbance. Threetip sage flourishes and rhizomatous wheatgrass is the dominant understory grass. Other grasses and grasslikes include needleleaf sedge and Letterman needlegrass. Cheatgrass invades, effectively decreasing the fire interval (fewer years between fire events) and limiting the ability for non-sprouting woody plants to reestablish. The total annual production (air-dry weight) of this state is about 300 pounds per acre, but it can range from about 150 lbs./acre in unfavorable years to about 650 lbs./acre in above average years. The following is the growth curve of this plant community expected during a normal year: Growth curve number: WY0201 Growth curve name: 15-19W, UPLAND SITES Growth curve description: ALL UPLAND SITES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC 0 0 0 0 10 35 30 20 5 0 0 0 (Monthly percentages of total annual growth) 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 cheatgrass and annual forbs. The watershed is at risk as bare ground increases. Transitional pathways leading to other plant communities are as follows: It is not often practicable or economically feasible to convert this plant community.

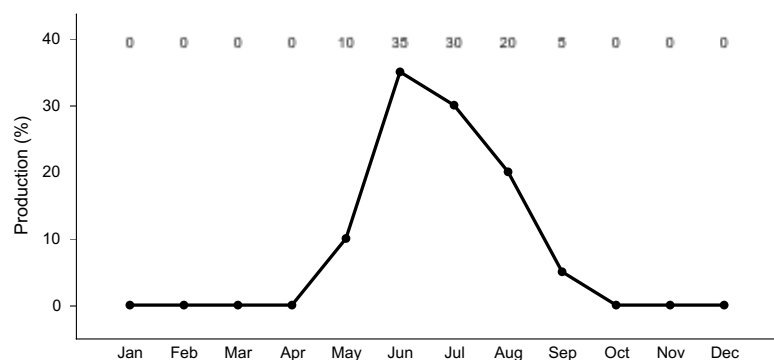


Figure 6. Plant community growth curve (percent production by month). WY0201, 15-19W Upland sites.

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				135–471	
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	135–471	–
2				135–336	
	Idaho fescue	FEID	<i>Festuca idahoensis</i>	135–336	–
3				67–202	
	Columbia needlegrass	ACNE9	<i>Achnatherum nelsonii</i>	67–202	–
4				135–269	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–67	–
	Letterman's needlegrass	ACLE9	<i>Achnatherum lettermanii</i>	0–67	–
	western needlegrass	ACOC3	<i>Achnatherum occidentale</i>	0–67	–
	mountain brome	BRMA4	<i>Bromus marginatus</i>	0–67	–
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	0–67	–
	California oatgrass	DACA3	<i>Danthonia californica</i>	0–67	–
	timber oatgrass	DAIN	<i>Danthonia intermedia</i>	0–67	–

	squirreltail	ELELE	<i>Elymus elymoides ssp. elymoides</i>	0–67	–
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus ssp. lanceolatus</i>	0–67	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–67	–
	spike fescue	LEKI2	<i>Leucopoa kingii</i>	0–67	–
	oniongrass	MEBU	<i>Melica bulbosa</i>	0–67	–
	mountain muhly	MUMO	<i>Muhlenbergia montana</i>	0–67	–
	muttongrass	POFE	<i>Poa fendleriana</i>	0–67	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–67	–
	spike trisetum	TRSP2	<i>Trisetum spicatum</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	–
	arrowleaf balsamroot	BASA3	<i>Balsamorhiza sagittata</i>	0–67	–
	sego lily	CANU3	<i>Calochortus nuttallii</i>	0–67	–
	Indian paintbrush	CASTI2	<i>Castilleja</i>	0–67	–
	fleabane	ERIGE2	<i>Erigeron</i>	0–67	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–67	–
	aster	EUCEP2	<i>Eucephalus</i>	0–67	–
	stoneseed	LITHO3	<i>Lithospermum</i>	0–67	–
	creeping barberry	MARE11	<i>Mahonia repens</i>	0–67	–
	bluebells	MERTE	<i>Mertensia</i>	0–67	–
	locoweed	OXYTR	<i>Oxytropis</i>	0–67	–
	ragwort	PACKE	<i>Packera</i>	0–67	–
	phlox	PHLOX	<i>Phlox</i>	0–67	–
	stonecrop	SEDUM	<i>Sedum</i>	0–67	–
	clover	TRIFO	<i>Trifolium</i>	0–67	–
	American vetch	VIAM	<i>Vicia americana</i>	0–67	–
Shrub/Vine					
6				67–135	
	black sagebrush	ARNO4	<i>Artemisia nova</i>	67–135	–
7				67–202	
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	67–202	–
8				67–135	
	threetip sagebrush	ARTR4	<i>Artemisia tripartita</i>	67–135	–
9				67–135	
	Saskatoon serviceberry	AMAL2	<i>Amelanchier alnifolia</i>	0–67	–
	silver sagebrush	ARCA13	<i>Artemisia cana</i>	0–67	–
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	0–67	–
	mountain mahogany	CERCO	<i>Cercocarpus</i>	0–67	–
	snowbrush ceanothus	CEVE	<i>Ceanothus velutinus</i>	0–67	–

	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	0–67	–
	chokecherry	PRVI	<i>Prunus virginiana</i>	0–67	–
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	0–67	–

Animal community

Animal Community – Wildlife Interpretations

Bitterbrush/Bluebunch Wheatgrass Plant Community (HCPC): Suitable thermal and escape cover for most wildlife is limited due to the low height and density of woody plants. Bitterbrush and sagebrush provide important winter forage for mule deer 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.

Bitterbrush/Black Sage 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.

Mountain Big Sage/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.

Threetip/Cheatgrass Plant Community: This plant community exhibits a low level of plant species diversity. In most cases it is not a desirable plant community to select as a wildlife habitat management objective.

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)

Bitterbrush/Bluebunch Wheatgrass (HCPC) 900-1500 .35

Bitterbrush/Black Sage 700-1300 .3

Mountain Big Sage/Rhizomatous Wheatgrass 300-900 .2

Threetip Sage/Cheatgrass 150-650 .1

* - 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 highly variable and is dominated by soils in hydrologic group B and C, with localized areas in hydrologic group D. Infiltration ranges from slow to very rapid. Runoff potential for this site varies from moderate to high depending on soil hydrologic group, depth and degree of bedrock fracturing, slope, and ground cover (refer to Part 630, NRCS National Engineering Handbook for detailed hydrology information.)

Rills and gullies may be present, but should be small. Water flow patterns should be barely distinguishable.

Pedestals are only slightly present in association with bunchgrasses such as bluebunch wheatgrass. 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.

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
SCS-RANGE-417 58 1966-1986 WY Lincoln & others

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.

Author(s)/participant(s)	K. Clause, E. Bainter
Contact for lead author	karen.clause@wy.usda.gov or 307-367-2257
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.
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 0-30%.
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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:** Rare to nonexistent.
-
7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous and large woody litter not expected to move.
-
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 2 (interspaces) to 6 (under plant canopy), but average values should be 3.5 or greater.
-
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Currently no soil series are correlated to this ecological site. Soil Organic Matter of less than 3% 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 45-75% grasses, 10% forbs, and 15-45% shrubs. Evenly distributed plant canopy (50-75%) and litter plus moderate infiltration rates result in minimal runoff. Basal cover is typically less than 10% and marginally affects runoff on this site. Surface rock fragments of 5-30% provide stability to the site, but reduce infiltration.
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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.
-
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 15-20% of total canopy measurement with total litter (including beneath the plant canopy) from 50-80% 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: 900-1500 lb/ac (1200 lb/ac average); Metric 1008-1680 kg/ha (1344 kg/ha average).
-
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, Sandberg bluegrass, buckwheat, and phlox are common increasers. Annual weeds such as cheatgrass and mustards are common invasive species in disturbed sites.
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17. **Perennial plant reproductive capability:** All species are capable of reproducing, except in extreme drought years.
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