

Ecological site R034AY228WY

Lowland Foothills and Basins West (LL)

Accessed: 05/19/2024

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.

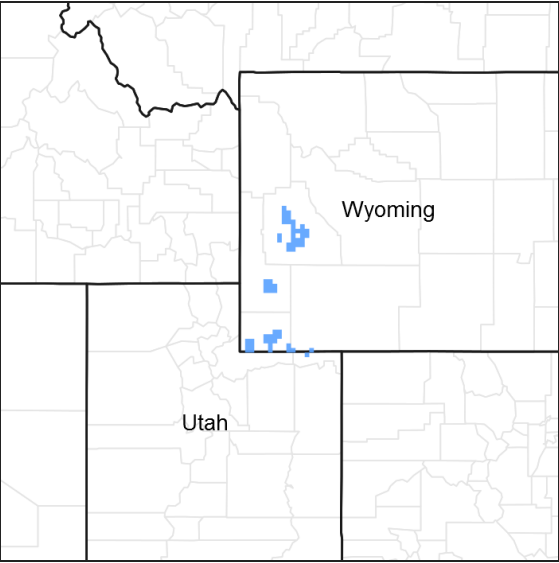


Figure 1. Mapped extent

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

R034AY230WY	Overflow Foothills and Basins West (Ov) Overflow
R034AY274WY	Subirrigated Foothills and Basins West (Sb) Subirrigated
R034AY278WY	Wetland Foothills and Basins West (WL) Wetland

Similar sites

R034AY274WY	Subirrigated Foothills and Basins West (Sb) Subirrigated (Sb) 10-14W has a higher water table and the absence of cottonwood.
R034AY230WY	Overflow Foothills and Basins West (Ov) Overflow (Ov) 10-14W lacks a water table and is more often associated with ephemeral drainages.
R034AY128WY	Lowland Green River and Great Divide Basins (LL) Lowland (LL) 7-9GR has lower production.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on gently sloping land along perennial or intermittent streams. It is found on all exposures. Slopes are mostly from 0 to 3%. Elevations are mostly above 7000 feet.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Drainageway (3) Stream terrace
Flooding duration	Brief (2 to 7 days) to long (7 to 30 days)
Flooding frequency	Occasional to frequent
Ponding frequency	None
Elevation	1,981–2,286 m
Slope	0–10%
Ponding depth	0 cm
Water table depth	30–152 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, moderately well-drained soils on second bottoms near perennial streams and were formed in alluvium. A fluctuating water table occurs in these areas and ranges from 1 to 5 feet, but is usually deeper than 3 feet. Parent material is from mixed sources.

Table 4. Representative soil features

Surface texture	(1) Loam (2) Clay loam (3) Silty clay loam
Family particle size	(1) Clayey
Drainage class	Somewhat poorly drained to well drained
Permeability class	Moderately slow to moderate
Soil depth	51–152 cm
Surface fragment cover ≤3"	0–10%
Surface fragment cover >3"	0%
Available water capacity (0–101.6cm)	7.62–15.24 cm
Calcium carbonate equivalent (0–101.6cm)	0–10%
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)	6.6–8.4
Subsurface fragment volume ≤3" (Depth not specified)	0–10%
Subsurface fragment volume >3" (Depth not specified)	0–5%

Ecological dynamics

As this site deteriorates from improper grazing management, species such as big sagebrush and rubber rabbitbrush will increase, and species such as thistles and Kentucky bluegrass invade the site. Grasses such as basin wildrye and needleandthread will decrease in frequency and production. Cottonwood will lose younger age classes.

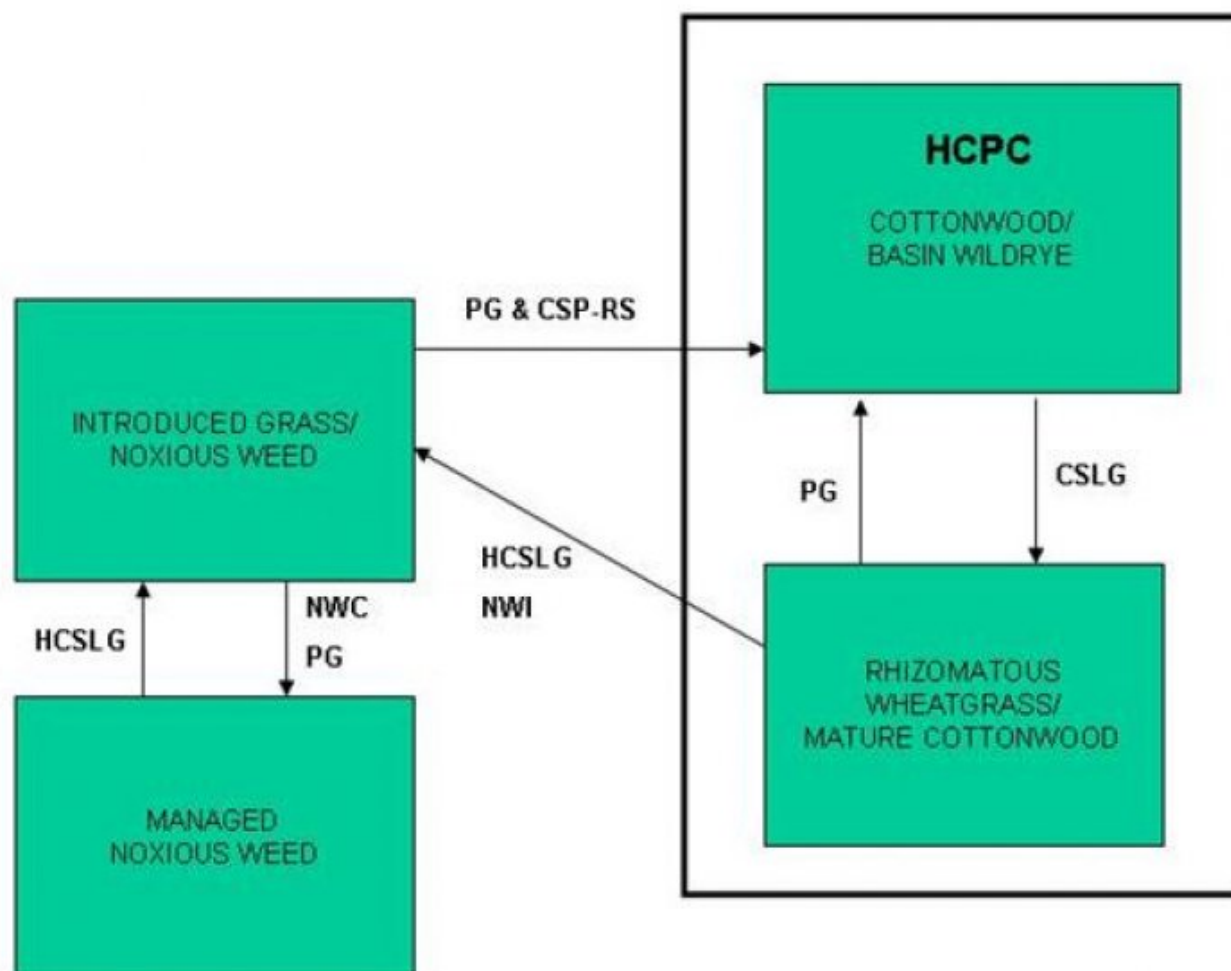
These plant communities narratives may not represent every possibility, but they probably are the most prevalent and repeatable plant communities. The plant composition tables shown above have been developed from the best available knowledge at the time of this revision. As more data is collected, some 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 – 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
Cottonwood/Basin Wildrye (HCPC)

Community 1.1
Cottonwood/Basin Wildrye (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 60% grasses or grass-like plants, 15% forbs and 25% woody plants. The major grasses include rhizomatous wheatgrass, needleandthread, and basin wildrye. Other grasses occurring in this state may include mutton, Canby, and Sandberg bluegrass, prairie junegrass, Letterman needlegrass, bluebunch wheatgrass, Indian ricegrass, bottlebrush squirreltail, mat muhly, and needleleaf sedge. Cottonwoods of various age classes are a conspicuous part of the overstory. Other woody plants may include willows, wild rose, dogwood, snowberry, skunkbush sumac, silver buffaloberry, chokecherry, big and silver sagebrush, and rabbitbrush. A typical plant composition for this state consists of needleandthread 10-25%, rhizomatous wheatgrass 10-25%, Basin wildrye 10-20%, other grasses and grass-like plants 10-25%, perennial forbs 10-20%, cottonwood 1-10%, and 10-20% other woody species. Ground cover, by ocular estimate, varies from 70-80%. The total annual production (air-dry weight) of this state is about 2300 pounds per acre, but it can range from about 1600 lbs./acre in unfavorable years to about 3000 lbs./acre in above average years. This state is stable and well adapted to the Cool Central Desertic Basins and Plateaus climatic conditions. The diversity in plant species and seasonal water table 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: • Continuous Season-long Grazing will convert this plant community to the Rhizomatous Wheatgrass/Mature Cottonwood State.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1076	1547	2018
Shrub/Vine	269	387	504
Forb	269	387	504
Tree	179	258	336
Total	1793	2579	3362

Figure 5. Plant community growth curve (percent production by month).
WY0302, 10-14W, Extra Water Sites - LL, Ov, CyO, SL. LL. OV, CYO, SL
Extra Water Sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			5	15	35	35	10				

State 2
Managed Noxious Weed

Community 2.1
Managed Noxious Weed

This plant community is the result of noxious weed control and prescribed grazing. Grazing is used as a tool to control introduced and noxious weeds by selecting livestock type and timing use during the flowering of the identified weed. Other weed control efforts such as chemical, mechanical, or biological methods are employed in conjunction with a grazing management scheme. The native plant community responds to this management by increasing in production and vigor, however it is very sensitive to any management change that allows the seed production and increase of noxious weeds such as nonuse or overuse. Noxious weeds are still present, but in smaller amounts. The state is dominated by smooth brome, Kentucky bluegrass, rhizomatous wheatgrass, mat muhly, Canada and musk thistle, and other introduced grasses. Cottonwood is rejuvenating with young shoots present in the understory of mature trees, but a middle age class is conspicuously absent. The total annual production (air-dry weight) of this state is about 2000 pounds per acre, but it can range from about 1300 lbs./acre in

unfavorable years to about 2700 lbs./acre in above average years. Bare ground has decreased. The soil of this state is moderately protected. 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. • Heavy Continuous Season-long Grazing will convert this plant community to the Introduced Grass/Noxious Weed State.

Figure 6. Plant community growth curve (percent production by month).
WY0302, 10-14W, Extra Water Sites - LL, Ov, CyO, SL. LL. OV, CYO, SL
Extra Water Sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			5	15	35	35	10				

State 3

Rhizomatous Wheatgrass/Mature Cottonwood

Community 3.1

Rhizomatous Wheatgrass/Mature Cottonwood

This plant community evolved under heavy grazing by domestic livestock. Dominant grasses include rhizomatous wheatgrass, Kentucky bluegrass, and other introduced grasses. Woody plants resistant to grazing such as wild rose and silverberry increase. Cottonwoods become mature and decadent without younger age classes present. As the site dries, woody species such as rubber rabbitbrush and big sagebrush increase. This state is extremely vulnerable to the invasion of noxious weeds. The total annual production (air-dry weight) of this state is about 1800 pounds per acre, but it can range from about 1100 lbs./acre in unfavorable years to about 2500 lbs./acre in above average years. The soil of this state is not well protected. The biotic integrity is somewhat compromised by more xeric species, decreased plant diversity, and increased bare ground. The watershed is somewhat functioning, but may produce excessive runoff. Transitional pathways leading to other plant communities are as follows: • Prescribed Grazing will result in a plant community very similar to the Historic Climax Plant Community (Cottonwood/Basin Wildrye State). • Heavy Continuous Season-long Grazing and Noxious Weed Invasion will convert this plant community to the Introduced Grass/Noxious Weed State.

Figure 7. Plant community growth curve (percent production by month).
WY0302, 10-14W, Extra Water Sites - LL, Ov, CyO, SL. LL. OV, CYO, SL
Extra Water Sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			5	15	35	35	10				

State 4

Introduced Grass/Noxious Weed

Community 4.1

Introduced Grass/Noxious Weed

This plant community is the result of long-term improper grazing use. This state is dominated by Kentucky bluegrass, smooth brome grass, and burdock. Rabbitbrush, big and silver sagebrush, wild rose, and snowberry have increased. Woody species are greatly diminished if not totally absent. Noxious weeds, such as Canada thistle have invaded. The total annual production (air-dry weight) of this state is about 800 pounds per acre, but it can range from about 500 lbs./acre in unfavorable years to about 1500 lbs./acre in above average years. Bare ground has increased. The soil of this state is not well protected. The watershed is nonfunctioning and usually produces excessive runoff. The biotic community is nonfunctioning due to invasive plants. Transitional pathways leading to other plant communities are as follows • Prescribed Grazing and Noxious Weed Control will convert this plant community to the Managed Noxious Weed State. • Chemical Seedbed Preparation and Re-seeding followed one to two years of deferment as part of a Prescribed Grazing Plan may return this state to near Historic Climax Plant Community (Cottonwood/Basin Wildrye State). However, noxious weeds will persist to some degree.

Figure 8. Plant community growth curve (percent production by month).
WY0302, 10-14W, Extra Water Sites - LL, Ov, CyO, SL. LL. OV, CYO, SL

Extra Water Sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			5	15	35	35	10				

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				258–644	
	needle and thread	HECO26	<i>Hesperostipa comata</i>	258–644	–
2				258–644	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	258–644	–
3				258–516	
	basin wildrye	LECI4	<i>Leymus cinereus</i>	258–516	–
4				258–644	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–129	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	0–129	–
	Letterman's needlegrass	ACLE9	<i>Achnatherum lettermanii</i>	0–129	–
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	0–129	–
	squirreldtail	ELEL5	<i>Elymus elymoides</i>	0–129	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–129	–
	mat muhly	MURI	<i>Muhlenbergia richardsonis</i>	0–129	–
	muttongrass	POFE	<i>Poa fendleriana</i>	0–129	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–129	–
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	0–129	–
Forb					
5				258–516	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–129	–
	common yarrow	ACMI2	<i>Achillea millefolium</i>	0–129	–
	rosy pussytoes	ANRO2	<i>Antennaria rosea</i>	0–129	–
	fleabane	ERIGE2	<i>Erigeron</i>	0–129	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–129	–
	aster	EUCEP2	<i>Eucephalus</i>	0–129	–
	beardtongue	PENST	<i>Penstemon</i>	0–129	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0–129	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–129	–
	goldenbanner	THERM	<i>Thermopsis</i>	0–129	–
	clover	TRIFO	<i>Trifolium</i>	0–129	–
	violet	VIOLA	<i>Viola</i>	0–129	–
Tree					
6				26–258	
	narrowleaf cottonwood	POAN3	<i>Populus angustifolia</i>	26–258	–
	narrowleaf cottonwood	POAN3	<i>Populus angustifolia</i>	26–258	–

Shrub/Vine					
7				258–516	
	boxelder	ACNEI2	<i>Acer negundo var. interius</i>	0–129	–
	silver sagebrush	ARCA13	<i>Artemisia cana</i>	0–129	–
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	0–129	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	0–129	–
	dogwood	CORNU	<i>Cornus</i>	0–129	–
	rubber rabbitbrush	ERNA10	<i>Ericameria nauseosa</i>	0–129	–
	chokecherry	PRVIV	<i>Prunus virginiana var. virginiana</i>	0–129	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	0–129	–
	Woods' rose	ROWOW	<i>Rosa woodsii var. woodsii</i>	0–129	–
	willow	SALIX	<i>Salix</i>	0–129	–
	silver buffaloberry	SHAR	<i>Shepherdia argentea</i>	0–129	–
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	0–129	–

Animal community

Animal Community – Wildlife Interpretations

Cottonwood/Basin Wildrye Plant Community (HCPC): The high degree of plant species and structural diversity, proximity to areas with water at or near the soil surface, and woody plants in this community favors a large variety of wildlife. Trees and shrubs provide suitable thermal and escape cover for mule deer, moose, and occasional whitetail deer as well as valuable nesting habitat for all primary and secondary tree-nesting birds. This community provides habitat for a wide array of small mammals such as jackrabbits, cottontail rabbits, mice, and voles so diverse prey populations are available for badgers, fox, coyotes, and raptors such as red-tail and Swainson's hawks. Birds such as western kingbird, western meadowlark, lark bunting, and grasshopper sparrow will utilize this community for nesting and foraging. The overstory of large cottonwoods provides habitat for a variety of birds ranging from golden eagles to neotropical migrants.

Managed Noxious Weed 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.

Rhizomatous Wheatgrass/Mature Cottonwood 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 nesting for tree-nesting birds is impacted.

Introduced Grass/Noxious Weed Plant Community: This plant community is less diverse, and thus, less able to meet the habitat needs of many wildlife species. Herbaceous forage and cover is not as dense and will aid in successful predation of nesting birds, therefore improving habitat for predators such as raptors, red fox, and coyote. It may provide some brood rearing and foraging opportunities for sage grouse when it occurs proximal to shrub 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)

Cottonwood/Basin Wildrye (HCPC) 1600-3000 lb./ac and .6 AUM/ac

Managed Noxious Weed 1300-2700 lb./ac and .55 AUM/ac

Rhizomatous Wheatgrass/Mature Cottonwood 1100-2500 lb./ac and .5 AUM/ac

Introduced Grass/Noxious Weed 500-1500 lb./ac and .25 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 herbaceous forage production on this site. This site is dominated by soils in hydrologic groups B and C, with localized areas in hydrologic group D. Infiltration ranges from moderately slow to rapid. 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. Litter typically falls in place, and signs of movement are not common. 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.

Wood products

Limited value for firewood.

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 Everett 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.

Author(s)/participant(s)	K. Clause, J. Haverkamp, 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.

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

- 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 can range from 0-20%.

- 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:** Minimal to nonexistent.

- 7. Amount of litter movement (describe size and distance expected to travel):** Herbaceous litter expected to move in water flow patterns.

- 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 4.0 or greater.

- 9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Typically an A-horizon of 8 to 20 inches (20-50 cm) with highly variable structure and color. Organic matter is typically 1 to 5%.

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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 50-70% grasses, 20% forbs, and 10-30% shrubs/trees. Dense plant canopy (75-100%) and litter plus moderate to rapid infiltration rates result in minimal to nonexistent runoff. Basal cover is typically greater than 5% for this site and does effectively reduce runoff on this site. Surface gravels are common on this site, which provide site stability, 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):** 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=cool season rhizomatous grasses=perennial shrubs=perennial forbs>trees>short, cool season bunchgrasses
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Minimal decadence, typically associated with shrub/tree component.
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14. **Average percent litter cover (%) and depth (in):** Litter ranges from 10-30% of total canopy measurement with total litter (including beneath the plant canopy) from 75-100% expected. Herbaceous litter depth typically ranges from 10-25 mm. Woody litter can be up to several inches (>8 cm).
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** English: 1600-3000 lb/ac (2300 lb/ac average); Metric: 1792-3360 kg/ha (2576 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% or noxious weed invasion are the most common indicators of a threshold being crossed. Wyoming big sagebrush, rabbitbrush, and woods rose are common increasers. Perennial pepperweed, annual mustards, Canada thistle, Russian knapweed, and Kentucky bluegrass are common invasive species.
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17. **Perennial plant reproductive capability:** All species are capable of reproducing, except in drought years.
