

Ecological site R032XY322WY

Loamy (Ly)

10-14" East Precipitation Zone

Accessed: 08/18/2026

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

R032XY304WY	Clayey (Cy) 10-14" East Precipitation Zone
R032XY328WY	Lowland (LL) 10-14" East Precipitation Zone
R032XY350WY	Sandy (Sy) 10-14" East Precipitation Zone
R032XY362WY	Shallow Loamy (SwLy) 10-14" East Precipitation Zone

Similar sites

R032XY122WY	Loamy (Ly) 5-9" Big Horn Basin Precipitation Zone
R032XY222WY	Loamy (Ly) 5-9" Wind River Basin Precipitation Zone

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on near level to gently undulating rolling land and on slope generally less than 20%.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Alluvial fan (3) Ridge
Elevation	1,650 – 2,290 m
Slope	0 – 30 %
Ponding depth	0 cm
Aspect	Aspect is not a significant factor

Climatic features

Annual Precipitation and modeled relative effective annual precipitation ranges from 10 to 14 inches (254 – 355 mm). The normal precipitation pattern shows peaks in May and June and a secondary peak in September. This amounts to about 50% of the mean annual precipitation. Much of the moisture that falls in the latter part of the summer is lost by evaporation and much of the moisture that falls during the winter is lost by sublimation. Average snowfall is about 20 inches annually. 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, due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air outbreaks from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may occur in winter and bring rapid rises in temperature. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring. High winds are generally blocked from the basin by high mountains, but can occur in conjunction with an occasional thunderstorm.

Growth of native cool-season plants begins about April 1st and continues to about July 1st. Cool weather and moisture in September may produce some green up of cool season plants that will continue to late October.

For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at <http://www.wcc.nrcs.usda.gov/>. "Black MTN", "Clark 3NE", "Cody", "Cody 12SE", "Heart Mtn", Powell Fld Stn", and "Tensleep 16SSE" are the representative weather stations within LRU D. The following graphs and charts are a collective sample representing the averaged normals and 30 year annual rainfall data for the selected weather stations from 1981 to 2010.

Table 3 Representative climatic features

Frost-free period (average)	110 days
Freeze-free period (average)	150 days
Precipitation total (average)	310 mm

Influencing water features

Stream Type: None

Soil features

The soils of this site are very deep to moderately deep (greater than 20" to bedrock), moderately well to well-drained & moderately slow to moderate permeable. The soil characteristic having the most influence on plant community is the available moisture and the potential to develop soluble salts near the surface.

Major Soil Series correlated to this site include: Lupinto, Frisite, Rock River, Sinkson, Elkol, Grieves, Yamac, Luhon, Rootel

Table 4. Representative soil features

Surface texture	(1) Loam (2) Fine sandy loam (3) Sandy loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderately slow to moderate
Soil depth	50 – 150 cm
Surface fragment cover <=3"	0 – 10 %
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	7.62 – 20 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 20 %
Electrical conductivity (0-101.6cm)	0 – 10 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0 – 10
Soil reaction (1:1 water) (0-101.6cm)	7.4 – 10

Subsurface fragment volume <=3" (Depth not specified)	0 – 20 %
Subsurface fragment volume >3" (Depth not specified)	0 – 10 %

Ecological dynamics

Potential vegetation on this site is dominated by mid cool-season perennial grasses. Other significant vegetation includes winterfat, big sagebrush, and a variety of forbs. The expected potential composition for this site is about 75% grasses, 10% forbs and 15% woody plants. The composition and production will vary naturally due to historical use, fluctuating precipitation and fire frequency.

As this site deteriorates species such as blue grama, Sandberg bluegrass, and big sagebrush will increase. Plains pricklypear and weedy annuals will invade. Cool-season grasses such as Griffiths and bluebunch wheatgrass, rhizomatous wheatgrasses, needleandthread, and Indian ricegrass will decrease in frequency and production.

Big sagebrush may become dominant on areas with an absence of fire and sufficient amount of precipitation. Wildfires are actively controlled in recent times and as a result old decadent stands of big sagebrush persist. Chemical control using herbicides has replaced the historic role of fire on this site. Recently, prescribed burning has regained some popularity.

Due to the amount and pattern of the precipitation, the big sagebrush component may not be resilient once it has been removed or severely reduced if a vigorous stand of grass exists and is maintained. On these areas, blue grama may become dominant if the area is subjected to a combination of frequent and severe grazing especially yearlong grazing. As a result, a dense sod cover of blue grama will become established.

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.

Plant Community Narratives

Following are the narratives for each of the described plant communities. These plant communities 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.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1				314-448	
	Montana wheatgrass	ELAL7	<i>Elymus albicans</i>	314-448	–
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	314-448	–
2				0-90	
	needle and thread	HECO26	<i>Hesperostipa comata</i>	0-90	–

3				45-135	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	45-135	–
4				0-90	
	green needlegrass	NAVI4	<i>Nassella viridula</i>	0-90	–
5				0-90	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	0-90	–
6				0-90	
	spike fescue	LEKI2	<i>Leucopoa kingii</i>	0-90	–
7				0-90	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0-45	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	0-45	–
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	0-45	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0-45	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0-45	–
	basin wildrye	LECI4	<i>Leymus cinereus</i>	0-45	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0-45	–
Forb					
8				45-135	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0-45	–
	textile onion	ALTE	<i>Allium textile</i>	0-45	–
	small-leaf pussytoes	ANPA4	<i>Antennaria parvifolia</i>	0-45	–
	rosy pussytoes	ANRO2	<i>Antennaria rosea</i>	0-45	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	0-45	–
	Missouri milkvetch	ASMI10	<i>Astragalus missouriensis</i>	0-45	–
	wavyleaf Indian paintbrush	CAAPM	<i>Castilleja applegatei ssp. martinii</i>	0-45	–
	bastard toadflax	COUM	<i>Comandra umbellata</i>	0-45	–
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	0-45	–
	little larkspur	DEBI	<i>Delphinium bicolor</i>	0-45	–
	threadleaf fleabane	ERFI2	<i>Erigeron filifolius</i>	0-45	–
	parsnipflower buckwheat	ERHE2	<i>Eriogonum heracleoides</i>	0-45	–
	bigseed biscuitroot	LOMA3	<i>Lomatium macrocarpum</i>	0-45	–
	leafy wildparsley	MUDI	<i>Musineon divaricatum</i>	0-45	–
	white locoweed	OXSES2	<i>Oxytropis sericea var. speciosa</i>	0-45	–
	beardtongue	PENST	<i>Penstemon</i>	0-45	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0-45	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0-45	–
	stemless mock goldenweed	STAC	<i>Stenotus acaulis</i>	0-45	–
	smooth woodyaster	XYGL	<i>Xylorhiza glabriuscula</i>	0-45	–
	meadow deathcamas	ZIVE	<i>Zigadenus venenosus</i>	0-45	–
Shrub/Vine					
9				45-135	
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	45-135	–
10				0-45	
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	0-45	–
11				0-45	
	rubber rabbitbrush	ERNA10	<i>Ericameria nauseosa</i>	0-45	–

12				0-45	
	winterfat	KRASC	<i>Krascheninnikovia</i>	0-45	–
13				0-45	
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	0-45	–

Table 6. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 5.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 10. Community 6.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Animal community

Animal Community – Wildlife Interpretations Bluebunch Wheatgrass/Rhizomatous Wheatgrasses (HCPC): The predominance of grasses in this plant community favors grazers and mixed-feeders, such as bison, elk, and antelope. Suitable thermal and escape cover for deer may be limited due to the low quantities of woody plants. However, topographical variations could provide some escape cover. When found adjacent to sagebrush dominated states, this plant community may provide brood rearing/foraging areas for sage grouse, as well as lek sites. Other birds that would frequent this plant community include western meadowlarks, horned larks, and golden eagles. Many grassland obligate small mammals would occur here. Perennial Grass/Big Sagebrush Plant Community: The combination of an overstory of sagebrush and an understory of grasses and forbs provide a very diverse plant community for wildlife. The crowns of sagebrush tend to break up hard crusted snow on winter ranges, so mule deer and antelope may use this state for foraging and cover year-round, as would cottontail and jack rabbits. It provides important winter, nesting, brood-rearing, and foraging habitat for sage grouse. Brewer's sparrows' nest in big sagebrush plants and hosts of other nesting birds utilize stands in the 20-30% cover range. Big Sagebrush/Bare Ground Plant Community: This plant community can provide important winter foraging for elk, mule deer and antelope, as sagebrush can approach 15% protein and 40-60% digestibility during that time. This community provides excellent escape and thermal cover for large ungulates, as well as nesting habitat for sage grouse. Blue Grama Sod Plant Community: These communities provide limited foraging for antelope and other grazers. They may be used as a foraging site by sage grouse if proximal to woody cover and if the Historic Climax Plant Community or the Perennial Grass/ Big Sagebrush Plant Community is limited. Generally, these are not target plant communities for wildlife habitat management. Salt Tolerant Shrub/Bare Ground Plant Community: This plant community exhibits a low level of plant species diversity due to the accumulation of salts near the soil surface. It may provide some thermal and escape cover for deer and antelope if no other woody community is nearby, but in most cases, it is not a desirable plant community to select as a wildlife habitat management objective. Salt Tolerant Shrub/Rhizomatous Wheatgrass Plant Community: The combination of an overstory of sagebrush and an understory of grasses and forbs provide a diverse plant community for wildlife. The crowns of these shrubs tend to break up hard crusted snow on winter ranges, so mule deer and antelope may use this state for foraging and cover year-round, as would cottontail and jack rabbits. It provides important winter nesting, brood-rearing, and foraging habitat for sage grouse and other upland birds. Brewer's sparrows' nest in big sagebrush plants and hosts of other nesting birds utilize stands in the 20-30% cover range. 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) Bluebunch Wheatgrass/ Rhizomatous Wheatgrasses 500-1100 .40 Perennial Grass/Big Sagebrush 400-900 .30 Big Sagebrush/Bare Ground 300-700 .20 Blue Grama Sod 100-300 .10 Salt Tolerant Shrub/Bare Ground 250-550 .13 Salt Tolerant Shrub/Rhizomatous Wheatgrasses 400-800 .22 * - 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 and C, with localized areas in hydrologic group D. Infiltration ranges from moderately slow 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. An example of an exception would be where short-grasses form a strong sod and dominate the site. 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. Cryptogamic 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 varieties of plants which bloom from spring until fall have an esthetic value that appeals 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 inventory data. Field observations from range trained personnel were also used. Those involved in developing this site include: Chris Krassin, Range Management Specialist, NRCS and Everett Bainter, Range Management Specialist. Other sources used as references include USDA NRCS Water and Climate Center, USDA NRCS National Range and Pasture Handbook, USDI and USDA Interpreting Indicators of Rangeland Health Version 3, and USDA NRCS Soil Surveys from various counties.

Contributors

D. Tranas

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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Approval date	

Composition (Indicators 10 and 12) based on	Annual Production
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Indicators

1. **Number and extent of rills:** Rare to nonexistent. Where present, short and widely spaced.

2. **Presence of water flow patterns:** Barely observable.

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 10-30%.

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 litter expected to move only in small amounts (to leeward side of shrubs). Large woody debris from sagebrush will show no movement.

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.

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 1-12 inches (3-30 cm) with OM of 1 to 2%.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant community consists of 55-75% grasses, 15% forbs, and 10-30% shrubs. Evenly distributed plant canopy (50-75%) 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.

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: Mid-size, cool season bunchgrasses>> perennial shrubs=cool season rhizomatous grasses>>perennial forbs>short cool season bunchgrasses

Sub-dominant:

Other:

Additional:

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: 500-1100 lb/ac (800 lb/ac average); Metric 560-1232 kg/ha (896 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. Blue grama, Sandberg bluegrass, big sagebrush, buckwheat, and phlox are common increasers. Annual weeds such as kochia, mustards, 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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