

Ecological site R032XY306WY Clayey Overflow (CyO) 10-14" East Precipitation Zone

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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
R032XY322WY	Loamy (Ly) 10-14" East Precipitation Zone
R032XY328WY	Lowland (LL) 10-14" East Precipitation Zone
R032XY350WY	Sandy (Sy) 10-14" East Precipitation Zone

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site is located on nearly level land and either adjacent to streams that run water at least during the major part of the growing season or on alluvial fans adjacent to toe slopes or foothills.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Stream terrace
Flooding duration	Brief (2 to 7 days)

Flooding frequency	None to occasional
Ponding duration	Brief (2 to 7 days)
Ponding frequency	None to rare
Elevation	1,650 – 2,290 m
Slope	0 – 30 %
Ponding depth	0 cm
Aspect	Aspect is not a significant factor

Climatic features

Annual precipitation ranges from 10-14 inches per year. The normal precipitation pattern shows the least amount of precipitation in December, January, and February, increasing to a peak during the latter part of May. Amounts decrease through June, July, and August and then increase some in September. 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 exceeds 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.

Winds are generally not strong as compared to the rest of the state. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 75 mph.

Growth of native cool-season plants begins about April 15 and continues to about July 15. Cool weather and moisture in September may produce some green up of cool season plants that will continue to late October.

The following information is from the "Thermopolis 2" climate station:

Minimum Maximum 5 yrs. out of 10 between

Frost-free period (days): 74 149 May 23 – September 16

Freeze-free period (days): 112 180 May 8 – October 1

Annual Precipitation (inches): 7.6 21.9

Mean annual precipitation: 12.35 inches

Mean annual air temperature: 46.2 F (30.1 F Avg. Min. to 62.3 F Avg. Max.)

For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at <http://www.wcc.nrcs.usda.gov/> website. Other climate station(s) representative of this precipitation zone include "Grass Creek 1E", "Thermopolis", Thermopolis 25NW", "Buffalo Bill Dam" and "Black Mountain".

Table 3 Representative climatic features

Frost-free period (average)	150 days
Freeze-free period (average)	180 days

Precipitation total (average)	360 mm
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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 that formed in alluvium or alluvium over residuum. These soils have slow to moderate permeability. The surface soil will vary from 2 to 5 inches deep. These soils may develop severe cracks. The soil characteristics having the most influence on plants are the heavy texture and the additional available moisture. These areas receive additional water from overflow of intermittent streams or runoff from adjacent slopes.

Table 4. Representative soil features

Surface texture	(1) Clay loam (2) Clay (3) Silty clay loam
Family particle size	(1) Clayey
Drainage class	Moderately well drained to well drained
Permeability class	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 tall and mid cool-season perennial grasses. Other significant vegetation includes basin big sagebrush, silver sagebrush, rubber rabbitbrush, 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 rhizomatous wheatgrasses, blue grama, Sandberg bluegrass, and basin big sagebrush will increase. Plains pricklypear and weedy annuals will invade. Cool-season grasses such as, basin wildrye, green needlegrass, slender wheatgrass, needleandthread, and Indian ricegrass will decrease in frequency and production.

Typically, many of these overflow sites have been altered or modified, due to its productive features and proximity to water. Consequently, basin big sagebrush, which is specifically tied to the ecological feature of this site, has lost much of its original habitat. As basin big sagebrush is not a resilient plant, once removed it will require many years before the stand can be replaced. Some stands may never be replaced, if a vigorous stand of grass exists and is maintained.

In some instances, basin big sagebrush may become dominant on areas with an absence of fire and sufficient amount of overflow. If treatment of a stand is necessary, thinning is usually preferred instead of total removal. This can be accomplished by chemical, mechanical or closely monitored burning.

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

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1				504-706	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	504-706	–
2				404-605	

	green needlegrass	NAVI4	<i>Nassella viridula</i>	404-605	–
3				101-303	
	basin wildrye	LECI4	<i>Leymus cinereus</i>	101-303	–
4				101-303	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0-101	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	0-101	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	0-101	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0-101	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	0-101	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	0-101	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0-101	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0-101	–
Forb					
5				20-202	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0-101	–
	textile onion	ALTE	<i>Allium textile</i>	0-101	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	0-101	–
	Indian paintbrush	CAST12	<i>Castilleja</i>	0-101	–
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	0-101	–
	larkspur	DELPH	<i>Delphinium</i>	0-101	–
	parsnipflower buckwheat	ERHE2	<i>Eriogonum heracleoides</i>	0-101	–
	fleabane	ERIGE2	<i>Erigeron</i>	0-101	–
	bigseed biscuitroot	LOMA3	<i>Lomatium macrocarpum</i>	0-101	–
	desertparsley	LOMAT	<i>Lomatium</i>	0-101	–
	phlox	PHLOX	<i>Phlox</i>	0-101	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0-101	–
	stemless mock goldenweed	STAC	<i>Stenotus acaulis</i>	0-101	–
Shrub/Vine					
6				101-303	
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	0-101	–
	silver sagebrush	ARCA13	<i>Artemisia cana</i>	0-101	–
	basin big sagebrush	ARTRT	<i>Artemisia tridentata ssp. tridentata</i>	0-101	–
	rubber rabbitbrush	ERNA10	<i>Ericameria nauseosa</i>	0-101	–
	winterfat	KRASC	<i>Krascheninnikovia</i>	0-101	–

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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Animal community

Animal Community – Wildlife Interpretations Rhizomatous Wheatgrass/Green Needlegrass (HCPC): The predominance of grasses in this plant community favors grazers and mixed-feeders, such as bison, elk, deer, 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 Grasses/Big Sagebrush Plant Community: The combination of an overstory of shrubs and an understory of grasses and forbs plus its proximity to water provides 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/Rhizomatous Wheatgrass Plant Community: The combination of an overstory of shrubs and an understory of grasses and forbs plus its proximity provides 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. Dense Shrub/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 upland game birds including sage grouse. Weedy Annuals/Short Grass 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 Grasses/ Big Sagebrush Plant Community is limiting. Generally, these are not target plant communities for wildlife habitat management. 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)

Rhizomatous Wheatgrass/Green Needlegrass	1200-2400	.60
Perennial Grass/Big Sagebrush	1100-2000	.50
Big Sagebrush/Rhizomatous Wheatgrass	800-1600	.25
Dense Shrub/Bare Ground	800-1500	.20
Weedy Annuals/Short Grass	300-800	.15

* - 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 Everet 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.

Author(s)/participant(s)	Ray Gullion, E. Bainter
Contact for lead author	ray.gullion@wy.usda.gov or 307-347-2456
Date	05/01/2008
Approved by	
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 ephemeral 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 5-20%.

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 2.5 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 to 2 inches (3-5 cm). Organic matter is typically 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 60-75% grasses, 20% forbs, and 5-20% shrubs. Moderate plant canopy (50-70%) and litter plus slow to moderately slow infiltration rates result in slight to moderate runoff. Basal cover is typically around 2-3% for this site and does not effectively reduce 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): No compaction layer exists.

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: cool season rhizomatous grasses>>mid-size, cool season bunchgrasses=tall, cool season bunchgrasses>perennial shrubs=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.

14. Average percent litter cover (%) and depth (in): Litter ranges from 20-40% of total canopy measurement with total litter (including beneath the plant canopy) from 75-90% expected. Herbaceous litter depth typically ranges from 10-25 mm. Woody litter can be up to

several inches (>8 cm).

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**
English: 1200-2400 lb/ac (1800 lb/ac average); Metric: 1344-2688 kg/ha (2016 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 40% or noxious weed invasion are the most common indicators of a threshold being crossed. Rhizomatous wheatgrasses, Blue grama, Sandberg bluegrass, and Basin big sagebrush are common increasers. Annual weeds such as pepperweed and blue mustard are common invasive species on 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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