

Ecological site R032XY328WY

Lowland (LL)

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
R032XY306WY	Clayey Overflow (CyO) 10-14" East Precipitation Zone
R032XY322WY	Loamy (Ly) 10-14" East Precipitation Zone
R032XY330WY	Overflow (Ov) 10-14" East Precipitation Zone

Similar sites

R032XY228WY	Lowland (LL) 5-9" Wind River Basin Precipitation Zone
R032XY128WY	Lowland (LL) 5-9" Big Horn Basin 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 adjacent to streams that run water at least during the major part of the growing season.

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	1,650 – 2,290 m
Slope	0 – 10 %
Ponding depth	0 cm
Water table depth	90 – 150 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

Influencing water features

Stream Type: C (Rosgen)

Soil features

The soils of this site are moderately deep to very deep poorly drained to well-drained soils formed in mixed alluvium. These soils have slow to rapid permeability. The surface soil will be highly variable and vary from 2 to 8 inches in thickness over gravel or bedrock. Layers of the soil most influential to the plant community vary from 3 to 6 inches thick. A fluctuating water table occurs in these areas that is usually deeper than 3 feet but within the reach of trees. The soil characteristics having the most influence on the plant community are depth to a water table during the growing season and the minimal amount of soluble salts.

Major Soil Series correlated to this site include:

Table 4. Representative soil features

Surface texture	(1) Loam (2) Clay loam (3) Clay
Family particle size	(1) Loamy
Drainage class	Well drained to poorly drained
Permeability class	Slow to rapid
Soil depth	50 – 150 cm
Surface fragment cover <=3"	0 – 10 %
Surface fragment cover >3"	0 – 10 %
Available water capacity (0-101.6cm)	2.54 – 15.24 cm

Calcium carbonate equivalent (0-101.6cm)	0 – 10 %
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)	6.6 – 8.4
Subsurface fragment volume <=3" (Depth not specified)	0 – 10 %
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, which are adapted to occasional overflows during flooding conditions and a water table near the surface during these times. Other significant vegetation includes narrowleaf cottonwood and a variety of riparian shrubs and forbs. The expected potential composition for this site is about 60% grasses, 15% forbs and 25% 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 basin big sagebrush, wild rose, silver buffaloberry, and boxelder will increase. Weedy annuals will invade. Cool season grasses such as basin wildrye, green needlegrass, and slender wheatgrass will decrease in frequency and production. In cases of hydrologic disruption and/or channelization upland species will increase and cottonwood stands will become increasingly mature and regeneration will cease.

Fire behavior plays an important role in this plant community especially due to the addition of tree species as part of the vegetative composition. The intensity of a fire determines vegetative succession and structure. Low intensive, or ground fires, typically result in thinning of cottonwoods and provide microsites, which can quickly be colonized by new saplings and riparian shrubs. These transitions are relatively short lived and tend to be mosaic in nature. As such, these areas maintain a mixed age stand of mature and younger trees with a sapling understory.

Moderate or severe fires, however, usually result in total stand mortality, as cottonwood trees are not very resistant to high temperatures. Under these scenarios, cottonwood seedlings may or may not quickly become established depending on if the soils are sterilized. Eventually, if the conditions are right, seedlings will establish, but it may take decades to return to a multiage mature stand. As a result of any wildfire, shrubs can also play an important role as to what plants will emerge first and what will the species composition develop into after fire succession. The effects of fire in these plant communities have not been adequately studied and the understanding of fire succession is minimal.

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				387-773	
	basin wildrye	LECI4	<i>Leymus cinereus</i>	387-773	–
2				129-387	
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	129-387	–
3				129-387	
	green needlegrass	NAVI4	<i>Nassella viridula</i>	129-387	–
4				129-387	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	129-387	–
5				0-258	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0-129	–
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	0-129	–
	sedge	CAREX	<i>Carex</i>	0-129	–
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	0-129	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0-129	–
Forb					
6				129-387	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0-129	–
	silverweed cinquefoil	ARAN7	<i>Argentina anserina</i>	0-129	–
	milkvetch	ASTRA	<i>Astragalus</i>	0-129	–
	Indian paintbrush	CASTI2	<i>Castilleja</i>	0-129	–
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	0-129	–
	larkspur	DELPH	<i>Delphinium</i>	0-129	–
	aster	EUCEP2	<i>Eucephalus</i>	0-129	–
	lupine	LUPIN	<i>Lupinus</i>	0-129	–
	phlox	PHLOX	<i>Phlox</i>	0-129	–
	dock	RUMEX	<i>Rumex</i>	0-129	–
	clover	TRIFO	<i>Trifolium</i>	0-129	–
Shrub/Vine					
7				129-258	
	narrowleaf cottonwood	POAN3	<i>Populus angustifolia</i>	129-258	–

8				258-387	
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	0-129	–
	boxelder	ACNE2	<i>Acer negundo</i>	0-129	–
	silver sagebrush	ARCA13	<i>Artemisia cana</i>	0-129	–
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	0-129	–
	rubber rabbitbrush	ERNA10	<i>Ericameria nauseosa</i>	0-129	–
	Rocky Mountain juniper	JUSC2	<i>Juniperus scopulorum</i>	0-129	–
	golden currant	RIAU	<i>Ribes aureum</i>	0-129	–
	Woods' rose	ROWOW	<i>Rosa woodsii</i> var. <i>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	–

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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Table 11. Community 7.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 12. Community 8.1 plant community composition

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

Animal Community – Wildlife Interpretations Historic Climax Plant Community: The abundant production and proximity to water make this state important favors grazers and mixed-feeders, such as bison, elk, deer, and antelope. This also provides suitable thermal and escape cover for these animals. This plant community may provide brood rearing/foraging areas for upland game birds as well as lek sites. Other birds that would frequent this plant community include western meadowlarks, horned larks, and golden eagles. Bald eagles may also frequent this area if adjacent to large streams or rivers and may even nest in this site. Many grassland obligate small mammals would occur here. Mature Cottonwoods/Cool Season Mid-Grass: The abundant production and proximity to water make this state important favors grazers and mixed-feeders, such as bison, elk, deer, and antelope. This also provides suitable thermal and escape cover for these animals. This plant community may provide brood rearing/foraging areas for upland birds and sage grouse, as well as lek sites. Other birds that would frequent this plant community include western meadowlarks, horned larks, and golden eagles. Bald eagles may also frequent this area if adjacent to large streams or rivers and may even nest in this site. Many grassland obligate small mammals would occur here. Cottonwood Sapling/Riparian Shrub Regeneration: This plant community may be useful for the same large grazers that would use the Historic Climax Plant Community. Usually after a fire, young succulent plants are preferred as are young shrubs by these large ungulates. Once reestablished this site may provide foraging and nesting opportunities for upland game birds as well as songbirds. Many grassland obligate small mammals would occur here. Bluegrass Sod/Over-Mature Cottonwood Stand: The proximity to water makes this state important for wildlife such as birds, mule deer, and whitetail deer. Grazers may find the sod grass preferable, however, mixed-feeders will find less diverse and productive plants. Some thermal and escape cover exists but is not as common as found in some of the other states. It may provide some foraging opportunities for upland game birds and sage grouse. Good grasshopper habitat equals good foraging for birds. Many grassland obligate small mammals would occur here. Bluegrass Sod/Mixed Shrub: The proximity to water makes

this state important for wildlife such as birds, mule deer, and whitetail deer. However, the plant community composition is less diverse and productive, and thus, less apt to meet the seasonal needs of these animals. The shrub cover does provide good thermal and escape cover for both large animals and upland birds. However, it provides little foraging opportunities for upland game birds, as fewer forbs are available. Many grassland obligate small mammals would occur here. Cool-Season Upland Grass: The proximity to water makes this state important for wildlife such as birds, mule deer, and whitetail deer. The plant community composition is diverse, able to meet the seasonal needs of these animals. It will provide some foraging opportunities for upland game birds and sage grouse. Good grasshopper habitat equals good foraging for birds. Many grassland obligate small mammals would occur here. Russian Olive Stand: The proximity to water makes this state important for wildlife such as birds, mule deer, and whitetail deer. This is useful for the same large grazers that would use the Historic Climax Plant Community. The low production of herbaceous understory of this plant community decreases the foraging potential and cover for many wildlife species. The increase in tall shrubs, however, makes this an attractive site for thermal and escape cover for large grazers and upland birds. It can provide foraging and nesting opportunities for songbirds. Some species utilize the Russian olive berries for food and are attracted to these colonized areas. Perennial Grass/Russian Olive: The abundant production and proximity to water make this state important for wildlife such as birds, mule deer, and whitetail deer. This plant community is useful for the same large grazers that would use the Historic Climax Plant Community. The increase in tall shrubs production makes this even more attractive to some wildlife due to the increase in thermal and escape cover. It can provide foraging and nesting opportunities for upland game birds and songbirds. Some species utilize the Russian olive berries for food and are attracted to these colonized areas. 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) Historic Climax Plant Community 1600-3000 .60 Mature Cottonwoods/Cool Season Mid-Grass 1300-2800 .50 Cottonwood Sapling/Riparian Shrub Regeneration 1000-2000 .35 Bluegrass Sod/O-M Cottonwood Stand 1200-2000 .22 Bluegrass Sod/Mixed Shrub 1000-1500 .15 Cool-Season Upland Grass 1200-2400 .35 Russian Olive Stand 1000-1500 .15 Perennial Grass/Russian Olive 1200-2000 .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 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. 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

Boxelder and cottonwood trees have no real commercial value. A limited amount of wood could be harvested as firewood.

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

Ray Gullion

Rangeland health reference sheet

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

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Date	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 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%.

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.

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: mid-size, cool season bunchgrasses> tall, cool season bunchgrasses=cool season rhizomatous grasses=perennial shrubs=perennial forbs>trees>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/tree component.

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).

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).

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. Basin big sagebrush, silver buffaloberry, boxelder 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.
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