USDA Natural Resources
Conservation Service

Ecological site R034AY378WY
Wetland High Plains Southeast (WL)

Accessed: 05/13/2025

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.

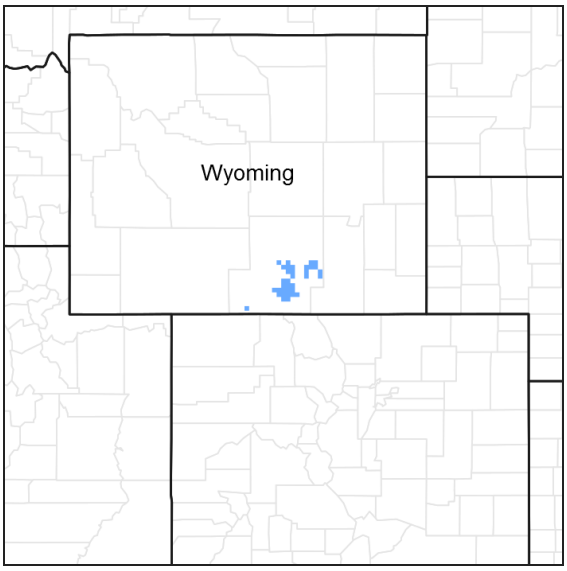


Figure 1. Mapped extent

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.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site will usually occur on level or gently sloping bottomlands, near springs, seeps, and sloughs.

Table 2. Representative physiographic features

Landforms	(1) Drainageway (2) Oxbow (3) Stream terrace
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Occasional to frequent
Ponding frequency	None
Elevation	1,676–2,286 m

Slope	0–6%
Ponding depth	0–30 cm
Water table depth	0–46 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 June 15. Some green up of cool season plants usually occurs in September.

The following information is from the “Laramie” climate station:
Minimum Maximum 5 yrs. out of 10 between
Frost-free period (days): 57 149 June 1 – September 16
Freeze-free period (days): 94 183 May 15 – September 28
Annual Precipitation (inches): 5.8 17.3

Mean annual precipitation: 11.53 inches
Mean annual air temperature: 42.2 F (30.4 F Avg. Min. to 53.9 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 "Dixon ” and “Medicine Bow”.

Table 3. Representative climatic features

Frost-free period (average)	149 days
Freeze-free period (average)	183 days
Precipitation total (average)	356 mm

Influencing water features

Stream type: C (Rosgen)

Soil features

This site consists of moderately deep organic and deep loamy or silty soils with a seasonal high water table at or very near the surface. They are on nearly level to slightly depressed areas with poor surface drainage. Subsoils are usually mottled or gleyed.

Table 4. Representative soil features

Surface texture	(1) Loam (2) Clay loam (3) Silty clay loam
Family particle size	(1) Loamy

Drainage class	Poorly drained
Permeability class	Slow to moderate
Soil depth	51–152 cm
Surface fragment cover <=3"	0–20%
Surface fragment cover >3"	0–5%
Available water capacity (0-101.6cm)	5.72–15.24 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%
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)	6.1–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–40%
Subsurface fragment volume >3" (Depth not specified)	0–15%

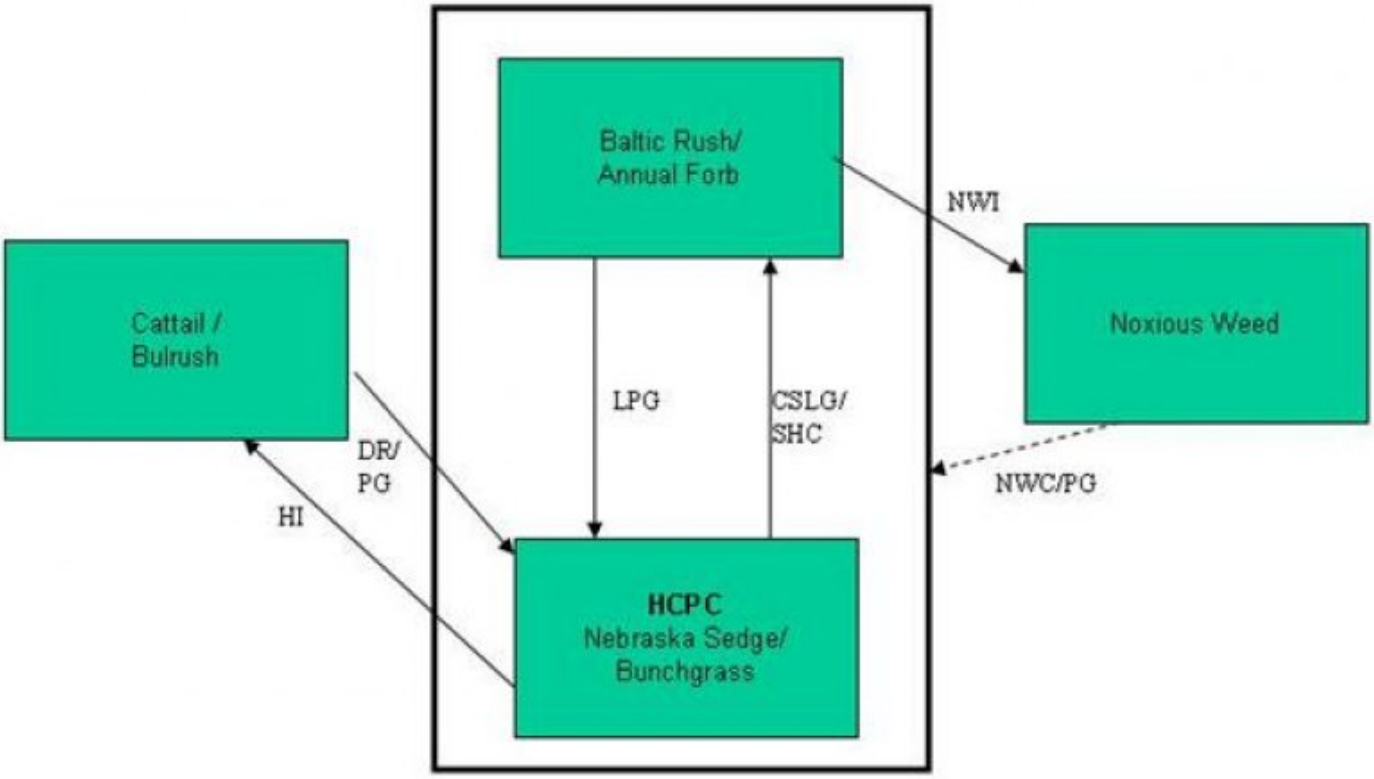
Ecological dynamics

As this site deteriorates species such as Baltic rush, low growing sedges, and forbs replace more desirable species. Production and density of native bunchgrasses such as tufted hairgrass and northern reedgrass are greatly reduced. Willows ,if present, may become decadent as a result of heavy browsing and the site becomes vulnerable to noxious weed invasion.

The Historic Climax Plant Community (description follows the plant community diagram) has been determined by the 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)
MCSLG – Moderate Continuous Season Long Grazing

NF – No Fire
NS – Natural Succession
NWC – Noxious Weed Control
NWI – Noxious Weed Invasion
NU – Nonuse
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
Nebraska Sedge / Bunchgrass Plant Community (HCPC)

Community 1.1
Nebraska Sedge / Bunchgrass Plant Community (HCPC)

The interpretive plant community for this site is the Historic Climax Plant Community. Potential vegetation is estimated at 80% grasses or grass-like plants, 10% forbs and 10% woody plants. The major grasses/grasslikes include Nebraska sedge, northern reedgrass, tufted hairgrass, and bluejoint reedgrass. Other species that may occur on this site include Baltic rush, American mannagrass, and a variety of wetland sedges and rushes. Willows or rose may also be present. A typical plant composition for this state consists of Nebraska sedge 35-50%, northern reedgrass 10-20%, tufted hairgrass 5-15%, bluejoint reedgrass 5-10%, perennial forbs 5-10%, and willows 5-15%. Ground cover, by ocular estimate, varies from 60-70%. The total annual production (air-dry weight) of this state is about 5000 pounds per acre, but it can range from about 3000 lbs./acre in unfavorable years to about 6000 lbs./acre in above average years. This state is extremely stable and well adapted to the Cool Central Desertic Basins and Plateaus climate. The diversity in plant species allows for high drought resistance. This is a sustainable plant community (site/soil stability, watershed function, and biologic integrity). Transitions or pathways leading to other plant communities are as follows: • Continuous Season-long Grazing and Severe Hoof Compaction will convert the plant community to the Baltic Rush/Annual Forbs • Heavy Inundation will convert this community to a Cattail/Bulrush Plant Community.

Figure 4. Plant community growth curve (percent production by month). WY0903, 10-14SE free water sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	20	40	20	15	5	0	0	0

State 2
Baltic Rush / Annual Forbs Plant Community

Community 2.1
Baltic Rush / Annual Forbs Plant Community

This plant community evolved under continuous season long grazing and severe hoof compaction. Species such as Baltic rush, Horsetail, American licorice, annual forbs and introduced species replace native bunchgrasses and Nebraska sedge. Continued disturbance of this plant community may allow invasion of noxious weeds. This state is susceptible to down cutting and excessive erosion due to reduced hydrologic function and replacement of deep rooted perennials. The total annual production (air-dry weight) of this state is about 2500 pounds per acre, but it can range from about 1500 lbs. /acre in unfavorable years to about 3500 lbs. /acre in above average years. Transitional pathways leading to other plant communities are as follows: • Long-term Prescribed Grazing will return this state to one which is similar to the Historic Climax Plant Community (Nebraska Sedge / Bunchgrass Plant Community). • Noxious Weed Invasion / Continuous Season Long grazing will convert the plant community to the Noxious Weed Plant Community.

Figure 5. Plant community growth curve (percent production by month). WY0903, 10-14SE free water sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	20	40	20	15	5	0	0	0

State 3
Cattail / Bulrush Plant Community

Community 3.1
Cattail / Bulrush Plant Community

This plant community is the result of heavy inundation or flooding conditions. The historic vegetation is replaced by

cattails, bulrushes and other species tolerant of this condition. This state is very stable but often dependant on hydrology created by small man made structures or beavers. The total annual production (air-dry weight) of this state is about 4500 pounds per acre, but it can range from about 3500 lbs. /acre in unfavorable years to about 5500 lbs. /acre in above average years. Transitional pathways leading to other plant communities are as follows: • Drainage followed by Prescribed grazing may eventually return this state to near Historic Climax Plant Community (Nebraska Sedge/Bunchgrass Plant Community).

Figure 6. Plant community growth curve (percent production by month). WY0903, 10-14SE free water sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	20	40	20	15	5	0	0	0

State 4
Noxious Weed Plant Community

Community 4.1
Noxious Weed Plant Community

This plant community is the result of continuous grazing use accompanied by noxious weed invasion. Species such as Canada thistle, arrowgrass, and American licorice dominate this state. Bare ground has increased. The soil of this state is not well protected. Degraded stream banks may erode. The watershed is at risk and may produce excessive runoff. The total annual production (air-dry weight) of this state is about 1500 pounds per acre, but it can range from about 500 lbs./acre in unfavorable years to about 2500 lbs./acre in above average years. Transitional pathways leading to other plant communities are as follows: • Noxious Weed Control with Prescribed Grazing may eventually convert this plant community to one similar to HCPC or Baltic Rush/Annual Forbs plant communities

Figure 7. Plant community growth curve (percent production by month). WY0903, 10-14SE free water sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	20	40	20	15	5	0	0	0

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				1961–2802	
	Nebraska sedge	CANE2	*Carex nebrascensis*	1961–2802	–
2				560–1121	
	northern reedgrass	CASTI3	*Calamagrostis stricta ssp. inexpansa*	560–1121	–
3				280–841	
4				280–560	
	Macoun's reedgrass	CACAM	*Calamagrostis canadensis var. macouniana*	280–560	–
5				280–560	
	Grass, perennial	2GP	*Grass, perennial*	0–280	–
	American mannagrass	GLGR	*Glyceria grandis*	0–280	–
Forb					
6				280–560	
	Forb, perennial	2FP	*Forb, perennial*	0–280	–
	water hemlock	CICUT	*Cicuta*	0–280	–
	scouringrush horsetail	EQHY	*Equisetum hyemale*	0–280	–
	waterleaf	HYDRO4	*Hydrophyllum*	0–280	–
	iris	IRIS	*Iris*	0–280	–
	American bistort	POBI6	*Polygonum bistortoides*	0–280	–
	blue-eyed grass	SISYR	*Sisyrinchium*	0–280	–
	arrowgrass	TRIGL	*Triglochin*	0–280	–
Shrub/Vine					
7				280–841	
	willow	SALIX	*Salix*	280–841	–
8				0–280	
	Woods' rose	ROWOW	*Rosa woodsii var. woodsii*	0–280	–
9				0–280	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–280	–

Animal community

Animal Community – Wildlife Interpretations
Nebraska Sedge/ Bunchgrass (HCPC): This plant community is very important for most wildlife in the area. Over 80% of all wildlife use this site to fulfill some part of their habitat needs. It provides forage and thermal and hiding cover for mule deer and moose. It provides nesting habitat for shorebirds, songbirds, and waterfowl as well as ground nesting birds such as harriers. The lush herbaceous material produces insects for sage grouse brood rearing and foraging. Dense ground cover provides escape cover, forage, and breeding areas for small mammals which draw predators such as raptors, red fox and coyote. Other birds that would frequent this plant community include red-wing blackbirds, sandhill cranes, western meadowlarks, neotropical migrants, and golden eagles.

Cattail/Bulrush Plant Community: This plant community may be beneficial for the same wildlife that would use the Historic Climax Plant Community. However, the plant community composition is less diverse, and thus, less apt to meet the seasonal needs of these animals. Red-wing blackbird and sandhill crane habitat is excellent.

Baltic Rush/Annual Forbs Plant Community: This plant community may be beneficial for some of the same wildlife that would use the Historic Climax Plant Community. However, the forage component is typically reduced and unable to support the same numbers of grazing animals, structural diversity is lost for neo-tropical migrants, cover decreased for deer, and nesting habitat for birds is impacted. It may provide some brood rearing and foraging opportunities for sage grouse when it occurs proximal to woody cover.

Noxious Weed Plant Community: This plant community is less diverse, and thus, less able to meet the habitat needs of many wildlife. 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 woody 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. If distribution problems occur, stocking rates must be reduced to maintain plant health and vigor.

Plant Community Production Carrying Capacity*
(lb. /ac) (AUM/ac)
Nebraska Sedge/Bunchgrass 4000-6000 1.6
Cattail/Bulrush 3500-5500 1.4
Baltic Rush/ Annual Forbs 1500-3500 0.8
Noxious Weed 500-2500 0.5

* - 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

Climate is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group D. Infiltration rate is very slow and runoff potential high for the soils of this site due to a high water table and saturated soil conditions. However, high forage production on this site diminishes runoff potential as long as site is managed for maintaining adequate residual vegetation. (Refer to Part 630, NRCS National Engineering Handbook for detailed hydraulic information).

Rills and gullies should not typically be present. Water flow patterns may be present if associated with a perennial flowing stream. Litter typically falls in place, and signs of movement are not common unless associated with a perennial flowing stream. Chemical and physical crusts are rare to non-existent.

Recreational uses

This site provides a variety of hunting and fishing opportunities as well as providing popular camping areas for recreationists when not saturated. Waterfowl hunting opportunities exist when associated with open water. The wide variety of plants which bloom from spring until fall have esthetic values that appeal to visitors.

Wood products

No appreciable wood products are present on the site.

Other products

None noted.

Inventory data references

Inventory Data References (narrative)
Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range trained personnel were also used. Other sources used as references include: USDA NRCS Water and Climate Center, USDA NRCS National Range and Pasture Handbook, and USDA NRCS Soil Surveys from various counties.

Inventory Data References
Data Source Number of Records Sample Period State County
SCS-RANGE-417 69 1967-1988 WY Carbon
& others

Contributors

B. Brazee

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)	
Contact for lead author	
Date	05/01/2005
Approved by	E. Bainter
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills should not be present

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

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3. **Number and height of erosional pedestals or terracettes:** Essentially non-existent

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is less than 5%

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5. **Number of gullies and erosion associated with gullies:** Active gullies should not be present

6. **Extent of wind scoured, blowouts and/or depositional areas:** None

7. **Amount of litter movement (describe size and distance expected to travel):** Little to no plant litter movement. Plant litter remains in place and is not moved by erosional forces.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Plant cover and litter is at 95% or greater of soil surface and maintains soil surface integrity. Soil Stability class is anticipated to be 5 or greater.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Use Soil Series description for depth and color of A-horizon

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Grass canopy and basal cover should reduce raindrop impact and slow overland flow providing increased time for infiltration to occur. Healthy deep rooted native grasses enhance infiltration and reduce runoff. Infiltration varies from moderate to low and runoff is high since the soil is usually saturated.

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 or soil surface crusting should be present.

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: Tall Grasses and Grasslike > Mid stature Grasses/Grasslike > Shrubs/Trees > Forbs

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very Low

14. **Average percent litter cover (%) and depth (in):** Average litter cover is 50-55% with depths of 0.75 to 1.5 inches

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 5000 lbs/ac

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:** Baltic rush, Arrowgrass, Horsetails, Kentucky Bluegrass, Annuals, and Species found on Noxious Weed List.

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17. **Perennial plant reproductive capability:** All species are capable of reproducing

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