USDA Natural Resources
Conservation Service

Ecological site R058BY128WY
Lowland (LL) 10-14” PZ

Last updated: 9/15/2024
Accessed: 05/21/2025

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.

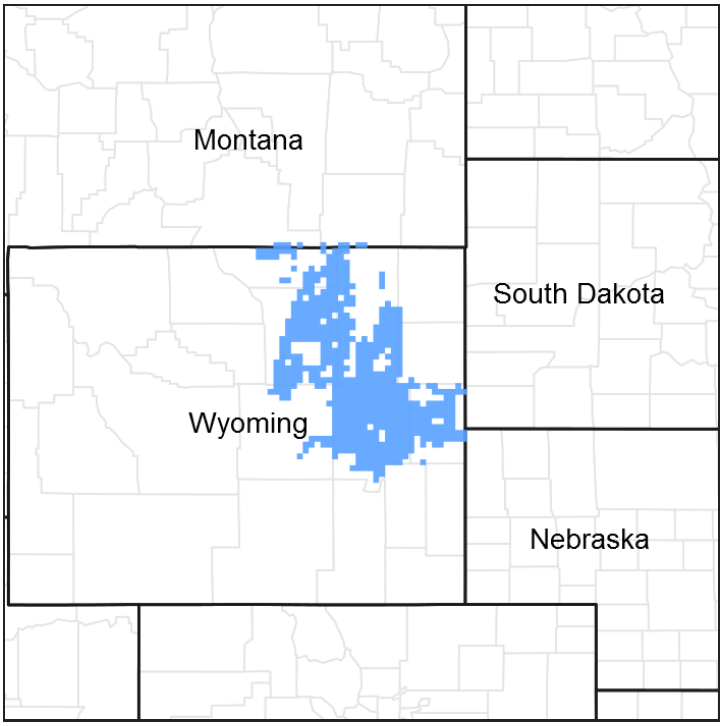


Figure 1. Mapped extent

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.

MLRA notes

Major Land Resource Area (MLRA): 058B–Northern Rolling High Plains, Southern Part

MLRA 58B is located in northeastern Wyoming (95 percent) and extreme southeastern Montana (5 percent). It is comprised of sedimentary plains, scoria hills, and river valleys.

The major rivers include the Powder, Tongue, Belle Fourche, Cheyenne, and North Platte. Tributaries include the Little Powder River, Little Missouri River, Clear Creek, Crazy Woman Creek, and others. This MLRA is traversed by Interstates 25 and 90, and U.S. Highways 14 and 16. The extent of MLRA 58B covers approximately 12.3 million acres. Major land uses include rangeland (approximately 93 percent), cropland, pasture, and hayland (approximately 2 percent), and forest, urban, and miscellaneous uses (approximately 5 percent). Cities include Buffalo, Casper, Sheridan, and Gillette, WY. Land ownership is mostly private. Federal lands include the Thunder Basin National Grassland (U.S. Forest Service) and lands administered by the Bureau of Land Management. Areas of interest in MLRA 58B in Wyoming include Fort Phil Kearny State Historic Site, Glendo State Park, and Lake DeSmet. The elevations in MLRA 58B increase gradually from north to south and range from approximately 2,900 to 5,900 feet. A few buttes are higher than 6,800 feet. The average annual precipitation in this area ranges from 10 to 17 inches per year. Precipitation occurs mostly during the growing season, often during rapidly developing thunderstorms. Mean annual air temperature is 46 degrees Fahrenheit. Summer temperatures may exceed 100 degrees Fahrenheit. Winter temperatures may drop to below zero. Snowfall averages 45 inches per year, but varies from 25 to over 70 inches in some locales.

Classification relationships

USDA Natural Resources Conservation Service (NRCS):
Land Resource Region – G Western Great Plains Range and Irrigation; Major Land Resource Area (MLRA) – 58B Northern Rolling High Plains, Southern Part (USDA, 2006)

Relationship to Other Classifications:

USDA Forest Service (FS) Classification Hierarchy:

Province – 331 Great Plains-Palouse Dry Steppe; Section – 331G-Powder River Basin; Subsections – 331Gb Montana Shale Plains, 331Ge Powder River Basin, 331Gf South Powder River Basin-Scoria Hills (Cleland et al, 1997)

Environmental Protection Agency (EPA) Classification Hierarchy:

Level III Ecoregion – 43 Northwestern Great Plains; Level IV Ecoregion – 43p Scoria Hills, 43q Mesic-Dissected Plains, 43w Powder River Basin (EPA, 2013)
https://www.epa.gov/eco-research/ecoregions

Ecological site concept

This ecological site occurs on nearly level to gently sloping drainageways, floodplains, and stream terraces at elevations ranging from 2,900 to 5,900 feet. Slopes range from 0 to 6 percent. This site occurs on all aspects, although aspect is not a significant factor. The soils of this ecological site are deep to very deep and are well drained. The soil surface

textures are typically fine sandy loam, sandy loam, or loam, but may include very fine sandy loam, silt loam, loamy fine sand, or clay loam.

Associated sites

R058BY104WY	**Clayey (Cy) 10-14" PZ** The Clayey 10-14 ecological site occurs on slopes ranging from 0 to 15 percent and has soils with 35 percent or greater clay content. The Clayey 10-14 ecological site has lower total annual production and is positioned above the Lowland 10-14 ecological site.
R058BY122WY	**Loamy (Ly) 10-14" PZ** The Loamy 10-14 ecological site occurs on slopes ranging from 0 to 15 percent. The Loamy 10-14 ecological site has lower total annual production and is positioned above the Lowland 10-14 ecological site.
R058BY130WY	**Overflow (Ov) 10-14" PZ** The Overflow 10-14 ecological site occurs on slopes ranging from 0 to 5 percent. The Overflow 10-14 ecological site is located on similar landform positions and has lower total annual production than the Lowland 10-14 ecological site.
R058BY174WY	**Subirrigated (Sb) 10-17" PZ** The Sub-Irrigated 10-17 ecological site occurs on slopes ranging from 0 to 6 percent. The Sub-Irrigated 10-17 ecological site is located on similar landform positions and has higher total annual production than the Lowland 10-14 ecological site.

Similar sites

R058BY130WY	**Overflow (Ov) 10-14" PZ** The Overflow 10-14 ecological site occurs on slopes ranging from 0 to 5 percent. The Overflow 10-14 ecological site is located on similar landform positions and has lower total annual production than the Lowland 10-14 ecological site.
R058BY138WY	**Saline Lowland (SL) 10-14" PZ** Saline Lowland 10-14 ecological site occurs on slopes ranging from 0 to 6 percent. The Saline Lowland 10-14 ecological site is located on similar landform positions, has a greater composition of salt tolerant species, and has lower total annual production than the Lowland 10-14 ecological site.
R058BY142WY	**Saline Subirrigated (SS) 10-14" PZ** Saline Sub-Irrigated 10-14 ecological site occurs on slopes ranging from 0 to 6 percent. The Saline Sub-Irrigated 10-14 ecological site is located on similar landform positions, has a greater composition of salt tolerant species, and has higher total annual production than the Lowland 10-14 ecological site.

R058BY174WY	**Subirrigated (Sb) 10-17” PZ** The Sub-Irrigated 10-17 ecological site occurs on slopes ranging from 0 to 6 percent. The Sub-Irrigated 10-17 ecological site is located on similar landform positions and has higher total annual production than the Lowland 10-14 ecological site.

Table 1. Dominant plant species

Tree	(1) *Populus deltoides*
Shrub	(1) *Artemisia cana* (2) *Symphoricarpos occidentalis*
Herbaceous	(1) *Leymus cinereus* (2) *Nassella viridula*

Physiographic features

This ecological site occurs on nearly level to gently sloping drainageways, floodplains, and stream terraces on sedimentary plains or lowlands, adjacent to streams that run water at least during the major part of the growing season. Elevations range from 2,900 to 5,900 feet and slopes range from 0 to 6 percent. This ecological site occurs on all aspects. Aspect is not a significant factor.

Table 2. Representative physiographic features

Landforms	(1) Drainageway (2) Flood plain (3) Stream terrace
Runoff class	Negligible to high
Flooding duration	Brief (2 to 7 days) to long (7 to 30 days)
Flooding frequency	Rare to frequent
Ponding frequency	None
Elevation	2,900–5,900 ft
Slope	0–6%
Ponding depth	0 in
Water table depth	36–80 in
Aspect	Aspect is not a significant factor

Climatic features

The average annual precipitation ranges from 10 to 17 inches per year across MLRA 58B. There are two Precipitation Zones (PZ). The 10 to 14 inch precipitation zone is predominant across the MLRA, including portions of Sheridan, Johnson, and Natrona

Counties; portions of Campbell and Converse Counties; and smaller portions of Weston and Niobrara Counties. The 15 to 17 inch precipitation zone occurs in northern and eastern portions of the MLRA, including portions of Sheridan, Campbell, and western Crook Counties. Wide fluctuations in precipitation may occur from year to year, and occasional periods of extended drought (longer than one year in duration) can be expected. Two-thirds of the annual precipitation occurs during the growing season from May through September. Mean Annual Air Temperature (MAAT) is 46 degrees Fahrenheit. Cold air outbreaks from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may also occur in winter and bring rapid rises in temperature. Extreme storms may occur during the winter, but most severely affect ranching operations during late winter and spring. High-intensity afternoon thunderstorms may occur during the summer. Annual wind speeds average about 5 mph. Daytime winds are generally stronger than nighttime winds. Occasional strong storms may bring brief periods of high winds with gusts of more than 75 mph. The average length of the freeze-free period (28 degrees Fahrenheit) is 125 days and generally occurs from May 16 to September 19. The average frost-free period (32 degrees Fahrenheit) is 101 days and generally occurs from June 1 to September 9.

The growth of native cool-season plants begins in late April to early May with peak growth occurring in mid to late June. Native warm-season plants begin growth in late May to early June and continue into August. Regrowth of cool-season plants occurs in September in most years, depending upon moisture.

Note: The climate described here is based on historic climate station data and is averaged to provide an overview of the annual precipitation, temperatures, and growing season. Future climate is beyond the scope of this document. However, research to determine the effects of elevated CO2 and/or heating on mixed-grass prairie ecosystems, and how it may relate to future plant communities, is ongoing.

For detailed information, or to find a specific climate station, visit the Western Regional Climate Center (WRCC) website: Western Regional Climate Center, Historical Data, Western U.S. Climate summaries, NOAA Coop Stations, Wyoming (Note: Montana climate stations are also listed under the Wyoming link).
https://wrcc.dri.edu/summary/Climsmwy.html

Wind speed averages can be found at the WRCC home page, under the Specialty Climate tab: https://wrcc.dri.edu/

The following tables represent area-wide climate data for the 10-14 inch PZ:

Table 3. Representative climatic features

Frost-free period (characteristic range)	92-103 days
Freeze-free period (characteristic range)	121-128 days

Precipitation total (characteristic range)	12-13 in
Frost-free period (actual range)	86-107 days
Freeze-free period (actual range)	116-129 days
Precipitation total (actual range)	10-14 in
Frost-free period (average)	101 days
Freeze-free period (average)	125 days
Precipitation total (average)	13 in

Climate stations used

- (1) DULL CTR 1SE [USC00482725], Douglas, WY
- (2) GLENROCK 5 ESE [USC00483950], Glenrock, WY
- (3) KAYCEE [USC00485055], Kaycee, WY
- (4) MIDWEST [USC00486195], Midwest, WY
- (5) SHERIDAN CO AP [USW00024029], Sheridan, WY
- (6) WESTON 1 E [USC00489580], Weston, WY
- (7) BUFFALO [USC00481165], Buffalo, WY
- (8) CASPER NATRONA CO AP [USW00024089], Casper, WY
- (9) WRIGHT 12W [USC00489805], Gillette, WY

Influencing water features

This ecological site is associated with ephemeral streams and adjacent upslope sites. During intense precipitation events, this site receives additional moisture from overflow of ephemeral streams and surface runoff moisture from adjacent upslope sites resulting in increased vegetative production. Due to the semi-arid climate in which it occurs, the water budget is normally contained within the soil profile. Soil moisture rarely exceeds field capacity in the upper 40 inches before being depleted by evapotranspiration. This site has no permanent water table.

Wetland description

N/A

Soil features

The soils on this ecological site are deep to very deep, well drained, and formed from alluvium. The depth to a soil restrictive layer is greater than 40 inches from the soil surface. The surface layer ranges from a depth of 2 to 7 inches in thickness. The soil surface horizon textures are typically fine sandy loam, sandy loam, or loam but may include very fine sandy loam, silt loam, loamy fine sand, or clay loam. The subsoil horizons are typically loam, clay loam, silty clay loam, clay, sandy loam, fine sandy loam, or loamy

sand. The soils associated with this site are typically calcareous to the surface, but some pedons are leached as deep as 8 to 20 inches, depending upon the source material of the most recent deposition. The soil moisture regime is typically ustic aridic and the soil temperature regime is mesic.

Major soil series correlated to this ecological site include the Clarkelen, Draknab, Haverdad, and Lohmiller series.

The attributes listed below represent 0 to 40 inches in depth or to the first restrictive layer.

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Loam (2) Sandy loam (3) Fine sandy loam (4) Very fine sandy loam (5) Silt loam (6) Loamy fine sand (7) Clay loam
Drainage class	Well drained
Permeability class	Moderate to moderately slow
Depth to restrictive layer	40–80 in
Soil depth	40–80 in
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	1.2–8.4 in
Calcium carbonate equivalent (0-40in)	0–10%
Electrical conductivity (0-40in)	0–8 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5
Soil reaction (1:1 water) (0-40in)	6.6–8.4
Subsurface fragment volume <=3" (0-40in)	0–15%
Subsurface fragment volume >3" (0-40in)	0%

Table 5. Representative soil features (actual values)

Drainage class	Moderately well drained to excessively drained
Permeability class	Slow to rapid
Depth to restrictive layer	Not specified
Soil depth	Not specified
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-40in)	Not specified
Calcium carbonate equivalent (0-40in)	Not specified
Electrical conductivity (0-40in)	Not specified
Sodium adsorption ratio (0-40in)	Not specified
Soil reaction (1:1 water) (0-40in)	Not specified
Subsurface fragment volume <=3" (0-40in)	Not specified
Subsurface fragment volume >3" (0-40in)	Not specified

Ecological dynamics

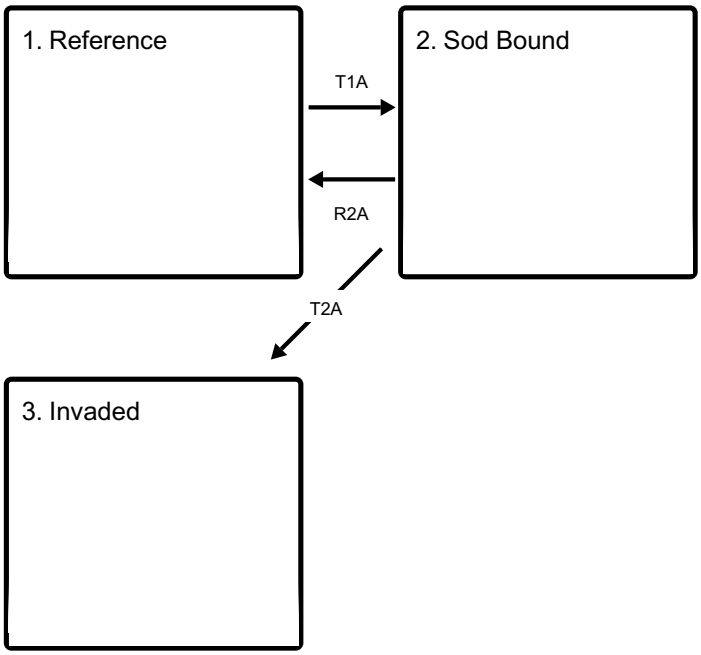
The Reference state is the plant community in which interpretations are primarily based and is used as a reference in order to understand the original potential of the site. The Reference state evolved under the combined influences of climatic conditions, periodic fire activity, grazing by large herbivores, and impacts from small mammals and insects. Changes may occur to the Reference state due to management actions such as improper grazing management, climatic conditions such as drought, and natural events such as multiple fires in close succession. The reference state for this ecological site is dominated by a diversity of tall and medium height, cool-season and warm-season grasses which are tightly intermixed and well distributed over the site. Various forbs, half-shrubs, and shrubs are common on this site. The Reference state is not necessarily the management goal, as other vegetative states may be considered desired plant communities as long as critical resource concerns are met.

In addition to the Reference state, other plant communities can occur on this site and are usually the result of historic management practices. Long term overgrazing on this ecological site results in a decrease of tallgrasses, mid-grasses, and more palatable forbs and in an increase of shortgrasses, sedges, and less palatable forbs. Half-shrubs and

shrubs increase in the absence of prescribed fire and wildfire. More frequent fire intervals decreases the shrub component resulting in a site dominated by herbaceous species. There are various transitional stages which may occur on this ecological site. The information presented is representative of a dynamic set of plant communities that illustrate the complex interaction of several ecological processes.

State and transition model

Ecosystem states

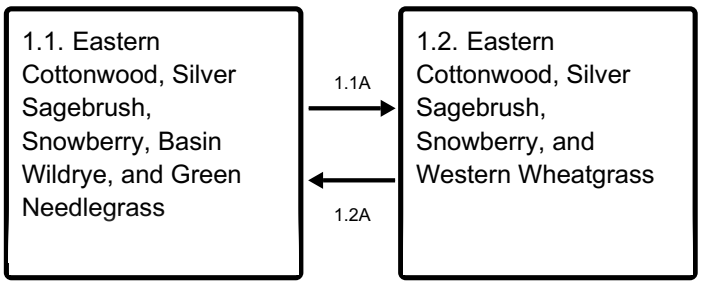


T1A - Prolonged drought, improper grazing, or a combination of these factors

R2A - Proper grazing management in combination with rangeland seeding, grazing land mechanical treatment, and timely moisture (management intensive and costly)

T2A - Introduction of non-native, invasive species (annual bromes, crested wheatgrass, noxious weeds)

State 1 submodel, plant communities



1.1A - Drought, improper grazing management

1.2A - Normal or above average precipitation; proper grazing management

State 2 submodel, plant communities

2.1. Eastern Cottonwood, Snowberry, and Smooth Brome

State 3 submodel, plant communities

3.1. Eastern Cottonwood, Snowberry, and Cheatgrass

State 1
Reference

The Reference state evolved under the combined influences of climatic conditions, periodic fire activity, grazing by large herbivores, and impacts from small mammals and insects. The Reference state is the plant community in which interpretations are primarily based and is used as a reference in order to understand the original potential of the site. The plant communities and various successional stages represent the natural range of variability. The Reference state for this ecological site consists of two communities.

Dominant plant species

- eastern cottonwood (*Populus deltoides*), tree
- silver sagebrush (*Artemisia cana*), shrub
- western snowberry (*Symphoricarpos occidentalis*), shrub
- basin wildrye (*Leymus cinereus*), grass
- green needlegrass (*Nassella viridula*), grass
- western wheatgrass (*Pascopyrum smithii*), grass

Community 1.1
Eastern Cottonwood, Silver Sagebrush, Snowberry, Basin Wildrye, and Green Needlegrass

Community 1.1 is characterized by a mixed-grass community, shrubs, and eastern cottonwood. The predominant species are cool-season grasses such as basin wildrye, green needlegrass, needle and thread, Canada wildrye, slender wheatgrass, western wheatgrass, and thickspike wheatgrass. Shortgrasses such as blue grama, prairie Junegrass, Sandberg bluegrass, and mat muhly are present at low cover. Forbs such as American vetch, prairie coneflower, biscuitroot, breadroot scurfpea, purple prairie clover,

white prairie clover, American licorice, two-grooved milkvetch, and sulphur flower buckwheat are present. The dominant shrub species include silver sagebrush and western snowberry, although species such as silverberry, rubber rabbitbrush, and Woods rose are also common. The dominant tree species is eastern cottonwood. The potential vegetation is approximately 61 percent grasses, 7 percent forbs, and 32 percent shrubs. The total annual production (air-dry weight) is approximately 2,300 pounds per acre during an average year but can range from approximately 1,600 pounds per acre in below average years to approximately 3,000 pounds per acres in above average years.

Table 6. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	976	1403	1830
Shrub/Vine	512	736	960
Forb	112	161	210
Total	**1600**	**2300**	**3000**

Figure 9. Plant community growth curve (percent production by month). WY1502, 15-17NP Extra water sites - LL, Ov, CyO, SL.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	20	35	25	5	10	0	0	0

Community 1.2
Eastern Cottonwood, Silver Sagebrush, Snowberry, and Western Wheatgrass

Community 1.2 is characterized by rhizomatous wheatgrasses, unpalatable forbs, silver sagebrush, western snowberry, and eastern cottonwood. The predominant grass species is western wheatgrass. Cool-season bunchgrasses such as green needlegrass and basin wildrye may occur at low canopy cover and exhibit low vigor. Unpalatable forbs such as American vetch, prairie coneflower, breadroot scurfpea, American licorice, green sagewort, two-grooved milkvetch, stemless mock goldenweed, and tapertip hawksbeard are increasing under this community phase. Silver sagebrush and western snowberry are the predominant shrub species.

Pathway 1.1A
Community 1.1 to 1.2

Drought, improper grazing practices such as continuous season-long or year-long grazing, or a combination of these factors can shift community 1.1 to community 1.2. These factors favor an increase in rhizomatous wheatgrasses such as western wheatgrass and a decrease in cool-season bunchgrasses such as green needlegrass and basin wildrye.

Shrub cover for species such as silver sagebrush and western snowberry will be similar to community 1.1.

Pathway 1.2A
Community 1.2 to 1.1

Normal or above-normal spring precipitation and proper grazing management transitions community 1.2 back to community 1.1.

State 2
Sod Bound

The dynamics of the Sod Bound state are driven by long-term drought, improper grazing management such as continuous season-long or year-long grazing, or a combination of these factors. The Sod Bound state for this ecological site consists of one community.

Dominant plant species

- eastern cottonwood (*Populus deltoides*), tree
- western snowberry (*Symphoricarpos occidentalis*), shrub
- smooth brome (*Bromus inermis*), grass

Community 2.1
Eastern Cottonwood, Snowberry, and Smooth Brome

Community 2.1 is characterized by a dominance of non-native, invasive, sod-forming species such as smooth brome. Tall to mid-statured grasses such as basin wildrye, western wheatgrass, thickspike wheatgrass, green needlegrass, needle and thread, Canada wildrye, Cusick's bluegrass, and slender wheatgrass are rare or absent. Unpalatable forbs such as American vetch, prairie coneflower, breadroot scurfpea, American licorice, green sagewort, two-grooved milkvetch, stemless mock goldenweed, and tapertip hawksbeard are common. Shrubs and sub-shrubs such as silver sagebrush, western snowberry, rubber rabbitbrush, silverberry, Woods rose, and prairie sagewort are present. Community 2.1 is capable of tolerating season-long, heavy grazing and therefore is highly resistant to change.

State 3
Invaded

The Invaded state occurs when invasive plant species invade native plant communities and displace the native species. The Invaded state for this ecological site consists of one community.

Dominant plant species

- eastern cottonwood (*Populus deltoides*), tree

- western snowberry (*Symphoricarpos occidentalis*), shrub
- cheatgrass (*Bromus tectorum*), grass

Community 3.1
Eastern Cottonwood, Snowberry, and Cheatgrass

Observations suggest that native species diversity declines significantly when invasive or noxious species exceed approximately 30 percent of the plant community. Non-native, perennial, drought tolerant grasses such as crested wheatgrass, non-native, annual, invasive species such as cheatgrass and field brome, and noxious weed species can eventually dominate the seedbank of this site and displace native species. Reduced plant species diversity, simplified structural complexity, and altered ecological processes result in a state that is substantially departed from the Reference state. The dominance of annual, invasive grasses such as cheatgrass and field brome increases the fire cycle frequency. Community 3.1 occurs when the site is grazed year-round at higher stocking densities. Physical impacts such as soil compaction from trampling and trailing typically contribute to this transition. The plant community composition is typically comprised of annual, invasive grasses such as cheatgrass and field brome; non-native, introduced, species such as smooth brome, Kentucky bluegrass, and crested wheatgrass; annual forbs, perennial forbs such as curlycup gumweed and hairy false goldenaster; shrubs such as broom snakeweed and plains pricklypear, and noxious weeds. The site may also be invaded with introduced trees such as Russian olive and tamarisk.

Transition T1A
State 1 to 2

Prolonged drought, improper grazing practices such as continuous season-long or year-long grazing, or a combination of these factors weaken the resilience of the Reference state and drive its transition to the Sod Bound state. The Reference state transitions to the Sod Bound state when mid-statured grasses are greatly reduced and non-native, invasive species such as smooth brome are introduced and dominate the plant community.

Restoration pathway R2A
State 2 to 1

Sod-forming species such as smooth brome can resist displacement by other species. A reduction in livestock grazing pressure alone may not be sufficient to reduce the cover of smooth brome in the Sod Bound state and mechanical treatments may be necessary. Therefore, returning the Sod Bound state to the Reference state can require considerable cost, energy, and time.

Conservation practices

Prescribed Grazing

Transition T2A
State 2 to 3

The Sod Bound state transitions to the Invaded state when non-native grasses, noxious weeds, and other invasive plants invade the Sod Bound state. Exotic plant species dominate the site in terms of cover and production. Site resilience has been substantially reduced.

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Cool-Season Rhizomatous Grasses**			160–300	
	western wheatgrass	PASM	*Pascopyrum smithii*	160–300	5–10
	thickspike wheatgrass	ELLAL	*Elymus lanceolatus ssp. lanceolatus*	160–300	5–10
2	**Cool-Season Bunchgrasses**			1040–1950	
	green needlegrass	NAVI4	*Nassella viridula*	400–750	10–25
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	160–300	5–10
	Cusick's bluegrass	POCU3	*Poa cusickii*	160–300	5–10
	needle and thread	HECO26	*Hesperostipa comata*	160–300	5–10
	basin wildrye	LECI4	*Leymus cinereus*	80–150	1–5
	Canada wildrye	ELCA4	*Elymus canadensis*	80–150	1–5
3	**Miscellaneous Grasses**			240–450	
	mat muhly	MURI	*Muhlenbergia richardsonis*	80–150	1–5
	prairie Junegrass	KOMA	*Koeleria macrantha*	80–150	1–5
	Sandberg bluegrass	POSE	*Poa secunda*	80–150	1–5
	Grass, perennial	2GP	*Grass, perennial*	80–150	1–5
	blue grama	BOGR2	*Bouteloua gracilis*	80–150	1–5
Forb					
4	**Forbs**			160–300	
	Forb, perennial	2FP	*Forb, perennial*	80–150	1–5
	American vetch	VIAM	*Vicia americana*	80–150	1–5

	upright prairie coneflower	RACO3	*Ratibida columnifera*	80–150	1–5
	aster	ASTER	*Aster*	80–150	1–5
	desertparsley	LOMAT	*Lomatium*	80–150	1–5
	large Indian breadroot	PEES	*Pediomelum esculentum*	80–150	1–5
	rosy pussytoes	ANRO2	*Antennaria rosea*	80–150	1–5
	milkvetch	ASTRA	*Astragalus*	80–150	1–5
	scarlet beeblossom	GACO5	*Gaura coccinea*	80–150	1–5
	purple prairie clover	DAPU5	*Dalea purpurea*	80–150	1–5
	white prairie clover	DACA7	*Dalea candida*	80–150	1–5
	American licorice	GLLE3	*Glycyrrhiza lepidota*	80–150	1–5
	tarragon	ARDR4	*Artemisia dracunculus*	80–150	1–5
	twogrooved milkvetch	ASBI2	*Astragalus bisulcatus*	80–150	1–5
	bluebells	MERTE	*Mertensia*	80–150	1–5
	textile onion	ALTE	*Allium textile*	80–150	1–5
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	80–150	1–5
Shrub/Vine					
5	**Shrubs**			560–1200	
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	80–150	1–5
	silverberry	ELCO	*Elaeagnus commutata*	80–150	1–5
	Woods' rose	ROWO	*Rosa woodsii*	80–150	1–5
	western snowberry	SYOC	*Symphoricarpos occidentalis*	80–150	1–5
	prairie sagewort	ARFR4	*Artemisia frigida*	80–150	1–5
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	80–150	1–5
	Subshrub (<.5m)	2SUBS	*Subshrub (<.5m)*	80–150	1–5
	silver sagebrush	ARCA13	*Artemisia cana*	80–150	1–5
Tree					
6	**Trees**			160–300	
	eastern cottonwood	PODE3	*Populus deltoides*	160–300	5–10

Animal community

Rhizomatous wheatgrass/ Green Needlegrass/ Cottonwood (Reference): 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.

Mature Cottonwoods/Grass: This plant community may be useful for the same large grazers that would use the Historic Climax Plant Community. However, the plant community composition is less diverse, and thus, less apt to meet the seasonal needs of these animals. It may provide some foraging opportunities for sage grouse when it occurs proximal to woody cover. The overstory of large cottonwoods provides habitat for a variety of birds ranging from raptors to neo-tropical migrants.

Mature Cottonwoods/Cheatgrass: The plant community composition is less diverse, and thus, less apt to meet the seasonal needs of large herbivores such as deer and antelope. It may provide some foraging opportunities for sage grouse when it occurs proximal to woody cover. The overstory of large cottonwoods provides habitat for a variety of birds ranging from raptors to neo-tropical migrants.

Rhizomatous wheatgrass
This plant community may be useful for the same large grazers that would use the Historic Climax Plant Community. However, the plant community composition is less diverse, and thus, less apt to meet the seasonal needs of these animals. It may provide some foraging opportunities for sage grouse when it occurs proximal to woody cover. Good grasshopper habitat equals good foraging for birds.

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)
Reference Plant Community 1600-3000 .6
Mature Cottonwoods/Grass 1000-3000 .5
Mature Cottonwoods/Cheatgrass 600-1200 .25
Rhizomatous wheatgrass 1200-2000 .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

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 should not be present. 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 variety 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.

Other information

Site Development & Testing Plan

General Data (MLRA and Revision Notes, Hierarchical Classification, Ecological Site Concept, Physiographic, Climate, and Water Features, and Soils Data):

Updated. All “Required” items complete to Provisional level.

Community Phase Data (Ecological Dynamics, STM, Transition & Recovery Pathways, Reference Plant Community, Species Composition List, Annual Production Table):

Updated. All “Required” items complete to Provisional level.

Annual Production Table is from the “Previously Approved” ESD (2001).

The Annual Production Table and Species Composition List will be reviewed for future updates at the Approved level.

Each Alternative State/Community:

Complete to Provisional level.

Supporting Information (Site Interpretations, Assoc. & Similar Sites, Inventory Data References, Agency/State Correlation, References):

Updated. All “Required” items complete to Provisional level.

Wildlife Interpretations: Narrative is from “Previously Approved” ESD (2001). Wildlife species will need to be updated at the next Approved level.

Livestock Interpretations: Plant community names and stocking rates updated.

Hydrology, Recreational Uses, Wood Products, and Other Products carried over from previously “Approved” ESD (2001).

Existing NRI Inventory Data References updated. More field data collection is needed to support this site concept.

Reference Sheet
Rangeland Health Reference Sheet carried over from previously “Approved” ESD (2005). It will be updated at the next “Approved” level.

“Future work, as described in a project plan, to validate the information in this provisional ecological site description is needed. This will include field activities to collect low and

medium intensity sampling, soil correlations, and analysis of that data. Annual field reviews should be done by soil scientists and vegetation specialists. A final field review, peer review, quality control, and quality assurance reviews of the ESD will be needed to produce the final document." (NI 430_306 ESI and ESD, April 2015)

Inventory data references

Inventory information has been derived from data collection on private and federal lands by the following methods:
• Double Sampling (Determining Vegetation Production and Stocking Rates, WY-ECS-1)
• Rangeland Health (Interpreting Indicators of Rangeland Health, Version 4, 2005)
• Soil Stability (Interpreting Indicators of Rangeland Health, Version 4, 2005)
• Line Point Intercept (Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems, Volume II, 2005)
• Soil Pedon Descriptions (Field Book for Describing and Sampling Soils, Version 3, 2012)
• SCS-RANGE-417 (Production & Composition Record for Native Grazing Lands)

National Resources Inventory (NRI) Data
• Number of Records: 4
• Sample Period: 2005-2017
• State: Wyoming
• Counties: Converse, Johnson, Niobrara

Additional reconnaissance data collection includes ocular estimates and other inventory data; vegetative clipping data for NRCS program support; field observations from experienced rangeland personnel

Data collection for this ecological site was done in conjunction with the progressive soil surveys within MLRA 58B Northern Rolling High Plains (Southern Part)

Note: Revisions to soil surveys are on-going. For the most recent updates, visit the Web Soil Survey, the official site for soils information:
http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

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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	09/05/2024
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

   _____

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

   _____

3. **Number and height of erosional pedestals or terracettes:**

   _____

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

   _____

5. **Number of gullies and erosion associated with gullies:**

   _____

6. **Extent of wind scoured, blowouts and/or depositional areas:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

---

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

---

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

---

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

---

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:

---

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

---

14. **Average percent litter cover (%) and depth (in):**

---

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

---

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:**

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17. **Perennial plant reproductive capability:**
