USDA Natural Resources Conservation Service

Ecological site R058BY144WY
Saline Upland (SU) 10-17” PZ

Last updated: 10/05/2023
Accessed: 05/18/2024

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.

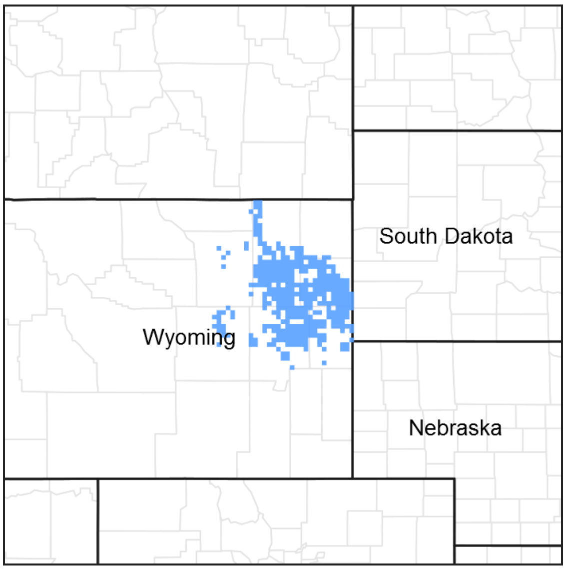


Figure 1. Mapped extent

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

The Saline Upland 10-17" PZ ecological site occurs on nearly level to moderate slopes on sedimentary plains or uplands. It is a cool- and warm-season, mixed-grass prairie (mid- and shortgrasses), with secondary shrubs, and a minor component of forbs. The salts, sodium and carbonates in the soil is the major limiting or identifying factor.

Associated sites

R058BY162WY	**Shallow Loamy (SwLy) 10-14" PZ** Shallow Loamy will tend to be on steep slopes above or below the Saline Upland.
R058BY158WY	**Shallow Clayey (SwCy) 10-14" PZ** Shallow Clayey will tend to be on steep slopes above or below the Saline Upland.

Similar sites

R058BY138WY	**Saline Lowland (SL) 10-14" PZ** Saline Lowland 10-14 has a water influence from runoff and spring flood events, saline upland is a dry upland site.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Atriplex gardneri* (2) *Krascheninnikovia lanata*
Herbaceous	(1) *Pascopyrum smithii* (2) *Sporobolus airoides*

Physiographic features

This site occurs on nearly level to moderately sloping alluvial fans, fan remnants, hills, and stream terraces; on sedimentary plains or uplands.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Fan remnant (3) Hill (4) Stream terrace
Runoff class	Medium to very high
Flooding frequency	None
Ponding frequency	None
Elevation	1,036–1,829 m
Slope	0–15%
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 CO_2 and 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 to 17 inch precipitation zone:

Table 3. Representative climatic features

Frost-free period (characteristic range)	85-103 days
Freeze-free period (characteristic range)	118-126 days
Precipitation total (characteristic range)	330-381 mm
Frost-free period (actual range)	82-104 days

Freeze-free period (actual range)	116-127 days
Precipitation total (actual range)	254-432 mm
Frost-free period (average)	101 days
Freeze-free period (average)	125 days
Precipitation total (average)	356 mm

Climate stations used

- (1) CASPER NATRONA CO AP [USW00024089], Casper, WY
- (2) WRIGHT 12W [USC00489805], Gillette, WY
- (3) DULL CTR 1SE [USC00482725], Douglas, WY
- (4) MIDWEST [USC00486195], Midwest, WY
- (5) WESTON 1 E [USC00489580], Weston, WY
- (6) GILLETTE 4SE [USC00483855], Gillette, WY
- (7) DILLINGER [USC00482580], Gillette, WY

Influencing water features

This upland ecological site is not influenced by a water table or run in from adjacent sites. Due to the semi-arid climate in which it occurs, the water budget is normally contained within the soil pedon. Soil moisture is recharged by spring rains, but it rarely exceeds field capacity in the upper 40 inches before being depleted by evapotranspiration. During intense precipitation events, precipitation rates frequently exceed infiltration rates and the site delivers moisture to downslope sites through surface runoff. Moisture loss through evapotranspiration exceeds precipitation for a majority of the growing season. Soil moisture is the primary limiting factor for vegetative production on this ecological site.

Soil features

The soils on this site are typically deep to very deep but include moderately deep, well drained soils that formed from alluvium; moderately deep soils formed from residuum derived from sandstone, shale, and siltstone. They typically have a very slow to slow permeability class, but range to moderately slow or impermeable in some soils. The available water capacity is typically moderate, but may range to low or high in some soils. The surface layer of the soils in this site are typically loam or silty clay loam, but may include clay loam, fine sandy loam, or very fine sandy loam. The surface layer ranges from a depth of 1 to 8 inches thick. The subsoil is typically clay, clay loam or silty clay loam, but may also include loam, sandy clay loam, or silty clay. Rock fragments are typically 0 to 5 percent in the subsoil but may range up to 15 percent in some soils. Soils in this site are typically calcareous to the surface, but some pedons may be leached as deep as 5 to 32 inches. These soils are susceptible to the hazard of erosion by water and wind. The potential for water erosion accelerates with increasing slope. The soil moisture regime is typically ustic aridic. The soil temperature regime is mesic.

Major soil series correlated to this ecological site include: Absted, Arvada, Cedar Butte, and Keyner.

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

Table 4. Representative soil features

Parent material	(1) Alluvium (2) Residuum
Surface texture	(1) Loam (2) Silty clay loam (3) Clay loam (4) Fine sandy loam (5) Very fine sandy loam (6) Silt loam
Drainage class	Well drained

Permeability class	Very slow to slow
Depth to restrictive layer	102–203 cm
Soil depth	51–152 cm
Surface fragment cover <=3"	0–5%
Available water capacity (Depth not specified)	9.14–21.34 cm
Calcium carbonate equivalent (Depth not specified)	0–10%
Electrical conductivity (Depth not specified)	4–16 mmhos/cm
Sodium adsorption ratio (Depth not specified)	5–25
Soil reaction (1:1 water) (Depth not specified)	6.1–9
Subsurface fragment volume <=3" (Depth not specified)	0–15%

Table 5. Representative soil features (actual values)

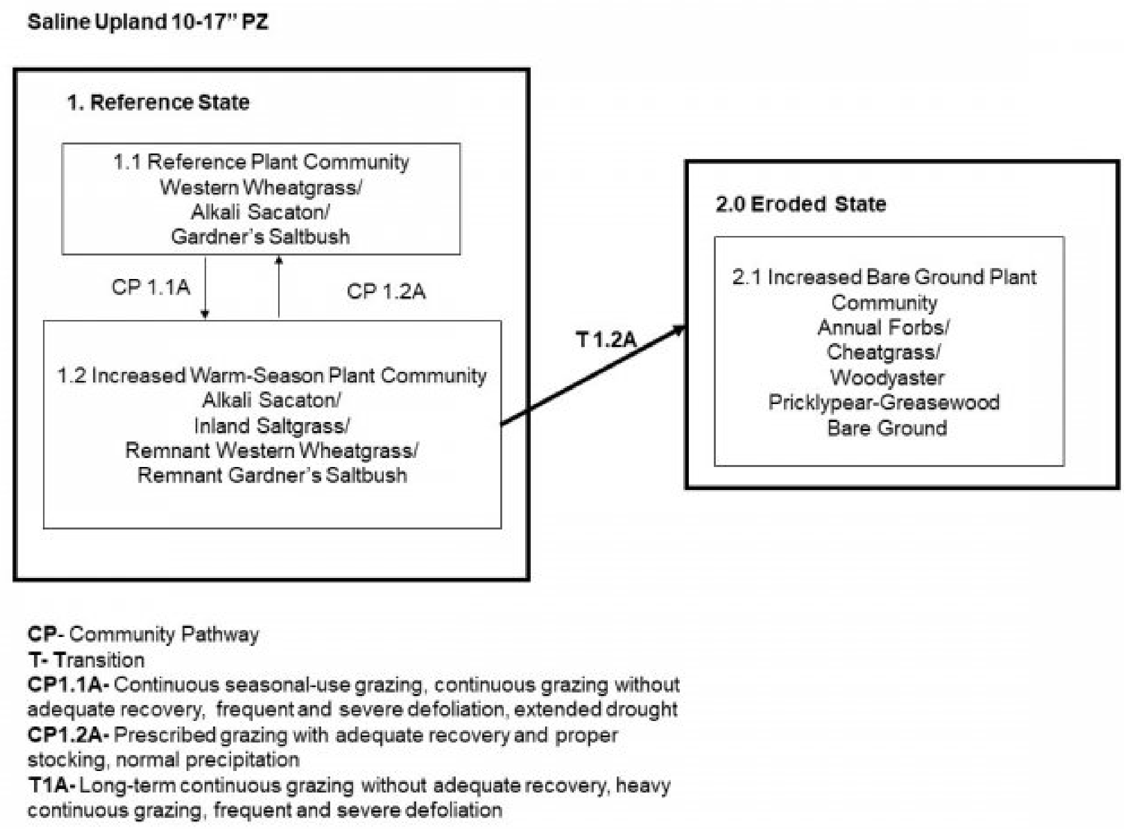
Drainage class	Not specified
Permeability class	Moderately slow
Depth to restrictive layer	51–203 cm
Soil depth	Not specified
Surface fragment cover <=3"	Not specified
Available water capacity (Depth not specified)	Not specified
Calcium carbonate equivalent (Depth not specified)	Not specified
Electrical conductivity (Depth not specified)	Not specified
Sodium adsorption ratio (Depth not specified)	Not specified
Soil reaction (1:1 water) (Depth not specified)	Not specified
Subsurface fragment volume <=3" (Depth not specified)	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 continuous season-long or year-long grazing, increased stocking rates, climatic conditions such as drought, and natural events. The Reference State is characterized by cool-season rhizomatous midgrasses (western- and thickspike wheatgrass), warm-season bunch midgrass (alkali sacaton), cool-season mid bunchgrasses (Indian ricegrass, Sandberg bluegrass), and warm-season shortgrass (blue grama). Shrubs such as Gardner’s saltbush, fourwing saltbush, and winterfat, are also present. The Reference Plant Community 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. Grazing practices such as continuous season-long or year-long grazing, heavier stocking rates, or a combination of these factors on this ecological site results in bunchgrasses such as alkali sacaton and rhizomatous wheatgrasses decreasing in both frequency and production. Grasses such as inland saltgrass will increase. Gardner's saltbush and winterfat will also be reduced. Forbs and shrubs such as curlycup gumweed, woodyaster, broom snakeweed, and greasewood will also increase. Over the long-term, this continuous use in combination with high stock densities, will result in bare ground developing, and species such as field brome (also known as Japanese brome), and cheatgrass invading. 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



State 1
Reference State

The Reference State is characterized by two distinct plant community phases: Reference and Increased Warm-Season Plant Community. The plant communities, and successional stages between them, represent the natural range of variability within the Reference State.

Community 1.1
Atriplex gardneri/Sporobolus airoides-Pascopyrum smithii (Gardner's saltbush/alkali sacaton-western wheatgrass)

This is the interpretive plant community for the Saline Upland 10 to 17 inch Precipitation Zone ecological site. It is well adapted to the Northern Great Plains climate. This community developed with grazing by large herbivores and is suited to grazing by domestic livestock. Historically, fires likely occurred infrequently, and were randomly distributed. This plant community can be found on areas where grazed plants receive adequate periods of recovery during the growing season. The potential vegetation is about 50 to 60 percent grasses and grass-likes, 5 percent forbs, and 40 to 45 percent woody plants. The major grasses include western wheatgrass, thickspike wheatgrass, alkali sacaton, Indian ricegrass, Sandberg bluegrass, and blue grama. Secondary and minor grasses include prairie Junegrass, bottlebrush squirreltail, and inland saltgrass. Forbs include scarlet globemallow, textile onion, and rush skeletonplant. Other forbs include white- and purple prairie clover, prairie coneflower, and American vetch. Shrubs such Gardner’s saltbush, fourwing saltbush, winterfat, rubber rabbitbrush, and big sagebrush; broom snakeweed, plains pricklypear and black greasewood also occur. See the species composition list. Plant diversity is high. In the Saline Upland 10 to 17 inch Precipitation Zone ecological site, the total annual production (air-dry weight) is about 600 pounds per acre during an average year, but it can range from about 350 pounds per acre in unfavorable years to about 750 pounds per acre in above-average years. Defoliation levels should be determined as part of a grazing management plan based on objectives. Community dynamics (nutrient and water cycles, and energy flow) are functioning properly. Infiltration rates are moderate, and soil erosion is low. Litter is properly distributed where vegetative cover is continuous. Plant decadence and natural mortality is low. This community is resistant to many disturbances except excessive grazing and development into urban or other uses.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	211	456	701
Shrub/Vine	252	463	673
Forb	15	30	45
Total	**478**	**949**	**1419**

Figure 7. Plant community growth curve (percent production by month). WY1401, 10-14NP upland sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	10	30	35	10	5	5	5	0	0

Community 1.2
Atriplex gardneri/Sporobolus airoides-Distichlis spicata (Gardner’s saltbush/alkali sacaton-inland saltgrass)

This plant community developed with seasonal-use grazing, or excessive grazing without adequate recovery opportunity during the growing season. Green needlegrass may initially increase or decrease depending on the season of grazing use. Palatable forbs and shrubs such as white- and purple prairie clover and winterfat are present in reduced amounts. Hairy false goldenaster, large Indian breadroot, and scarlet globemallow have increased. Eventually, long-term excessive grazing, or frequent and severe defoliation without adequate recovery during the growing season, grazing-tolerant species such as inland saltgrass, blue grama and/or buffalograss, and threadleaf sedge will continue to increase. Eventually Rhizomatous wheatgrasses are reduced or nearly absent. Forbs such as scarlet globemallow and curlycup gumweed, and rush skeletonplant have increased. Palatable shrubs such as Gardner’s saltbush, fourwing saltbush and winterfat have been reduced, and shrubs such as broom snakeweed, pricklypear, and black greasewood, have increased. Natural disturbances such as drought can contribute to this shift. In the Saline Upland 10 to 17 inch Precipitation Zone, the total annual production (air-dry weight) is about 400 pounds per acre during an average year, but it can range from about 150 pounds per acre in unfavorable years to about 550 pounds per acre in above average years. This plant community is at risk of crossing an ecological threshold to the Eroded State. Total aboveground biomass has been reduced. Reduction of rhizomatous wheatgrasses, nitrogen-fixing forbs, and increased warm-season shortgrasses have begun to alter the biotic integrity of this community. Water and nutrient cycles may be impaired. Nearly all plant species typically found in the Reference Plant Community are present and will respond to changes in grazing management.

Figure 8. Plant community growth curve (percent production by month). WY5803, Northern Rolling High Plains, Southern Part, cool-season/warm-season co-dominant. Cool-season/warm-season co-dominant.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		3	10	20	28	21	10	5	3		

Pathway 1.1A
Community 1.1 to 1.2

Excessive grazing without adequate recovery between grazing events, and extended drought can shift this plant community toward the Increased Warm-Season Plant Community. Over a period of years, plant species less tolerant to frequent and severe defoliation will decrease, and those more tolerant will increase. Excessive grazing from year-to-year will result in a reduction or loss of cool-season species. Biotic integrity and water and nutrient cycles may become impaired because of this community pathway.

Pathway 1.2A
Community 1.2 to 1.1

Grazing that allows for adequate recovery between grazing events, along with proper stocking rates, will shift the Increased Warm-Season Plant Community back toward the Reference Plant Community. Natural disturbances such as return to normal precipitation patterns will contribute to this shift.

State 2
Eroded State

The Eroded State develops with long-term excessive grazing or frequent and severe defoliation, without adequate recovery between grazing events, or heavy, excessive grazing with overstocking, will cause a shift across an ecological threshold to the Increased *Bare Ground* State. An ecological threshold has been crossed. Erosion and loss of organic matter or carbon reserves are resource concerns.

Community 2.1
Sarcobatus vermiculatus- Opuntia polyacantha/Distichlis spicata-Aristida purpurea (greasewood-plains pricklypear/inland saltgrass-Fendler's threeawn)

This plant community occurs where the rangeland is grazed year-round, at high stock densities. Physical impact such as trampling, soil compaction, and trailing typically contribute to this transition. The plant composition is made of annuals with a few species of perennial forbs and grasses that are very tolerant to frequent and severe defoliation. The dominant grasses include Fendler's threeawn and inland saltgrass. Threadleaf sedge may persist. Plants such as Russian thistle, kochia, and other annuals are prevalent. Annual bromes such as field brome (also known as Japanese brome), and cheatgrass invade. Woodyaster, broom snakeweed, pricklypear, and black greasewood will persist. In the Saline Upland 10 to 17 inch Precipitation Zone ecological site, the total annual production (air-dry weight) is about 300 pounds per acre during an average year, but it can range from about 150 pounds per acre in unfavorable years to about 450 pounds per acre in above average years. Soil erosion hazard has increased due to the increase of bare ground. Runoff is typically high and infiltration is low. All ecological functions are impaired. Desertification is advanced.

Figure 9. Plant community growth curve (percent production by month). WY5804, Northern Rolling High Plains, Southern Part upland w/warm-season. 10-14" PZ, with warm-season dominant grasses and forbs.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			5	20	35	30	8	2			

Transition T1A
State 1 to 2

Long-term excessive grazing or frequent and severe defoliation without adequate recovery between grazing events, or heavy, excessive grazing with overstocking, will cause a shift across an ecological threshold to the Eroded State.

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Cool-Season Rhizomatous**			28–135	
	western wheatgrass	PASM	*Pascopyrum smithii*	28–135	1–15
	thickspike wheatgrass	ELLAL	*Elymus lanceolatus ssp. lanceolatus*	28–135	1–15
2	**Cool-Season Bunch Midgrass**			112–342	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	28–90	5–10
	squirreltail	ELEL5	*Elymus elymoides*	28–90	5–10
	Grass, perennial	2GP	*Grass, perennial*	28–90	5–10
	Sandberg bluegrass	POSE	*Poa secunda*	28–73	5–10
3	**Warm-Season Bunchgrass**			71–224	
	saltgrass	DISP	*Distichlis spicata*	43–135	5–15
	alkali sacaton	SPAI	*Sporobolus airoides*	28–90	5–10
Forb					
5	**Forb**			15–45	
	Forb, perennial	2FP	*Forb, perennial*	15–45	1–5
	aster	ASTER	*Aster*	15–45	1–5
	desertparsley	LOMAT	*Lomatium*	15–45	1–5
	milkvetch	ASTRA	*Astragalus*	15–45	1–5
	purple prairie clover	DAPU5	*Dalea purpurea*	15–45	1–5
	white prairie clover	DACA7	*Dalea candida*	15–45	1–5
	textile onion	ALTE	*Allium textile*	15–45	1–5
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	15–45	1–5
	American vetch	VIAM	*Vicia americana*	15–45	1–5
	smooth woodyaster	XYGL	*Xylorhiza glabriuscula*	15–45	1–5
	scarlet beeblossom	GACO5	*Gaura coccinea*	15–45	1–5
Shrub/Vine					
6	**Subshrubs/Shrubs**			252–673	
	Gardner's saltbush	ATGA	*Atriplex gardneri*	140–364	10–50
	greasewood	SAVE4	*Sarcobatus vermiculatus*	28–90	5–10
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	28–73	5–10
	winterfat	KRLA2	*Krascheninnikovia lanata*	28–73	5–10
	Subshrub (<.5m)	2SUBS	*Subshrub (<.5m)*	28–73	5–10

Animal community

Animal Community – Wildlife Interpretations (from 2001 ESD, will be revised in future updates)

Gardners Saltbrush/ winterfat (Reference): The predominance of woody plants in this plant community provides winter grazing for mixed-feeders, such as bison, elk, and antelope. Suitable thermal and escape cover for deer may be limited due to the low quantities of tall woody plants. When found adjacent to sagebrush dominated states, this plant community may provide lek sites for sage grouse. Other birds that would frequent this plant community include western meadowlarks, horned larks, and golden eagles. Some grassland obligate small mammals would occur here.

Greasewood/woody aster: This plant community exhibits a low level of plant species diversity due to the accumulation of salts in the soil. It may provide some thermal and escape cover for deer and antelope if no other woody community is nearby, but in most cases it is not a desirable plant community to select as a wildlife habitat management objective.

Animal Community – Grazing Interpretations (updated in 2019 Provisional revision)

The following table is a guide to stocking rates for the plant communities described in the Saline Upland 10 to 17 inch Precipitation Zone ecological site. These are conservative estimates for initial planning. On-site conditions will vary, and stocking rates should be adjusted based on range inventories, animal kind/class, forage availability (adjusted for slope and distance to water), and the type of grazing system (number of pastures, planned moves, etc.), all of which is determined in the conservation planning process.

The following stocking rates are based on the total annual forage production in a normal year multiplied by 25 percent harvest efficiency of preferred and desirable forage species, divided by 912 pounds of ingested air-dry vegetation for an animal unit per month (Natl. Range and Pasture Handbook, 1997). An animal unit month is defined as the amount of forage required by one livestock animal, with or without one calf, for one month, and is shortened to AUM.

Plant Community (PC) Production (total lbs./acre in a normal year) and Stocking Rate (AUM/acre) are listed below:

Example:
600 lbs. per acre X 25% Harvest Efficiency = 150 lbs. forage demand for one month. 150 lbs. per acre/912 demand per AUM =0.16

Reference Plant Community 250-650 .15
Greasewood/woody aster 250-400 .05

Increased *Bare Ground* PC (*) (*)

* Highly variable stocking rates need to be determined on site.
Grazing by domestic livestock is one of the major income-producing industries in the area. Rangelands in this area provide year-long forage under prescribed grazing for cattle, sheep, horses and other herbivores. During the dormant period, livestock may need supplementation based on reliable forage analysis.

Hydrological functions

Water and salinity are the principal factors 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 slow to moderate. Runoff potential for this site varies from moderate to high depending on soil hydrologic group and ground cover. In many cases, areas with greater than 75 percent 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 percent have the greatest potential to have reduced infiltration and higher runoff (refer to Part 630, NRCS National Engineering Handbook for detailed hydrology information).

Rills are common on this site. They are typically connected and may begin to form deep rills. Some gullies may appear in concentrated flow areas on steep slopes (greater than 15 percent), or on lower slopes where runoff exits the slope. Water flow patterns are normally broken and irregular, becoming continuous on steeper slopes (greater than 15 percent). Debris dams will be evident and/or common.. Pedestals are noticeable and common but with few exposed roots. Pedestalled plants may include bunchgrasses and/or shrubs. Litter typically falls in place, and signs of movement are not common. Chemical and physical crusts may be present. Cryptogamic crusts are present, but only cover 1 to 2 percent of the soil surface.

Recreational uses

This site provides some hunting opportunities for upland game species.

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 data has been collected 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)
Number of Records: 19
Sample Period: 2004-2016
Counties: Campbell, Crook, Natrona, Weston

Additional data collection includes ESI data collection in conjunction with Soil Surveys conducted within MLRA 58B; ocular estimates; rangeland vegetative clipping 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	04/01/2005
Approved by	Kirt Walstad
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 30-40%.

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

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

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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.

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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):** Plant cover and litter is at 50% or greater of soil surface and maintains soil surface
integrity. Soil Stability class is anticipated to be 4 or greater.

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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.

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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 is slow to moderate.

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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.

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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: Shrubs >> Mid stature Grasses > Short stature Grasses Forbs

    Sub-dominant:

    Other:

    Additional:

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

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14. **Average percent litter cover (%) and depth (in):** Average litter cover is 10-15% with depths of 0.1 to 0.5 inches.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 600 lbs./ac

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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:** Buffalograss, Inland saltgrass, Broom Snakeweed, and Species found on Noxious Weed List.

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