USDA Natural Resources Conservation Service

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

Accessed: 07/09/2020

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.

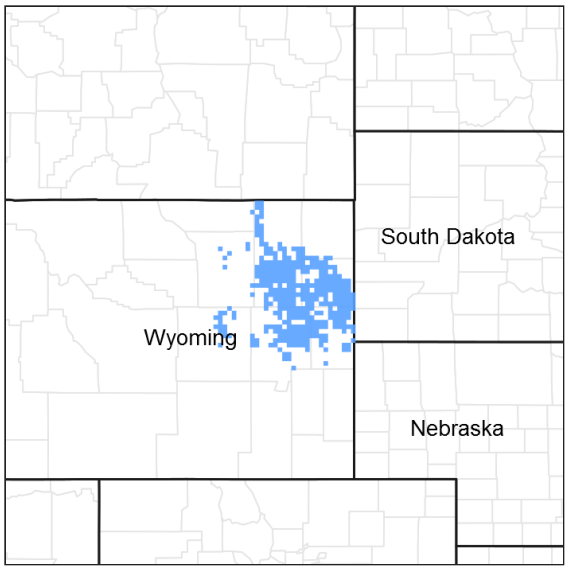

Figure 1. Mapped extent

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–Northern Rolling High Plains, Southern Part 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 are the Powder, Tongue, Belle Fourche, Cheyenne, and North Platte. Other tributaries include the Little Powder River, Little Missouri River, Clear and Crazy Woman Creeks, and others. This MLRA is traversed by Interstates 25 and 90, and by 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); while forest, urban, and miscellaneous land occupy the remainder (approximately 5 percent). Cities include Buffalo, Casper, Sheridan, and Gillette, WY. Land ownership is mostly private. Federal lands include Thunder Basin National Grassland (U.S. Forest Service) and Bureau of Land Management properties. 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 10-17 inches per year. Precipitation occurs mostly during the growing season, often during rapidly developing thunderstorms. Mean

annual air temperature is 46°F. Summer temperatures may exceed 100°F. Winter temperatures may drop to subzero, and 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

REVISION NOTES:

The Saline Upland 10-17” PZ ecological site was developed by an earlier version of the Saline Upland (SU) 10-14” Precipitation Zone ESD (2001, updated 2005) and Saline Upland (SU) 15-17” PZ Precipitation Zone ESD (2001, updated 2005). The earlier versions of the Saline Upland ESD’s were based upon input from NRCS (formerly Soil Conservation Service) and historical information obtained from the Saline Upland 12-14 Northern Plains (NP) and Saline Upland 15-17 NP Range Site Descriptions (1988). This ESD meets the Provisional requirements of the National Ecological Site Handbook (NESH). This ESD will continue refinement towards an Approved status according to the NESH.

Ecological site concept

The Saline Upland 10-17” PZ 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.

Associated sites

R058BY162WY	**Shallow Loamy (SwLy) 10-14” PZ**
R058BY158WY	**Shallow Clayey (SwCy) 10-14” PZ**

Similar sites

R058BY138WY	**Saline Lowland (SL) 10-14” PZ** Saline Lowland 10-14

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Atriplex gardneri*

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	3,400–6,000 ft
Slope	0–15%
Water table depth	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 (PZs). The 10-14” PZ 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, Wyoming. The 15-17” PZ occurs in northern and eastern portions of the MLRA, including portions of Sheridan, Campbell, and western Crook Counties, Wyoming. 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°F. 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 ranch operations during late winter and spring. High-intensity afternoon thunderstorms may arise in summer. Annual wind speed averages about 5 mph, ranging from 6 mph during the winter and spring. Daytime winds generally are stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 75 mph. The average length of the freeze-free period (28°F) is 125 days from May 16 to September 19. The average frost-free period (32°F) is 101 days from June 1 to September 9, area-wide.

Growth of native cool-season plants begins in late April to early May with peak growth 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 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:
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/

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)	13-15 in
Frost-free period (actual range)	82-104 days
Freeze-free period (actual range)	116-127 days
Precipitation total (actual range)	13-16 in
Frost-free period (average)	94 days
Freeze-free period (average)	122 days
Precipitation total (average)	14 in

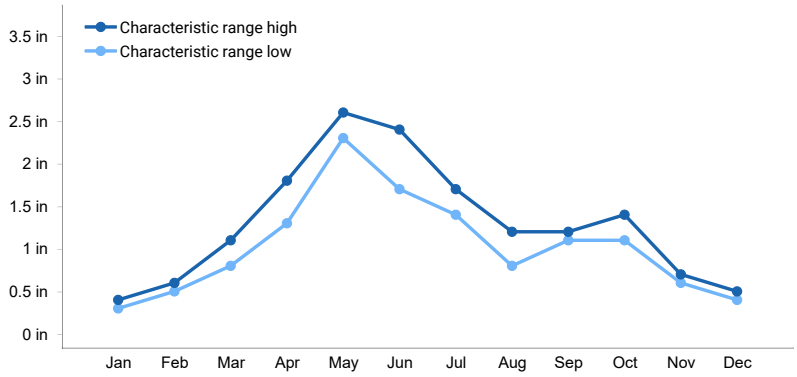

Figure 2. Monthly precipitation range

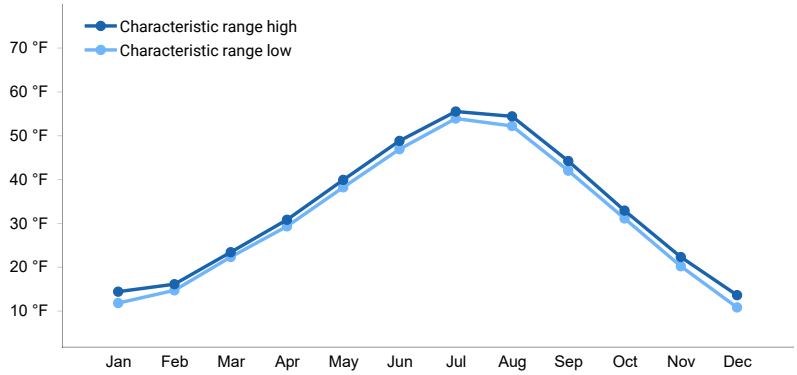

Figure 3. Monthly minimum temperature range

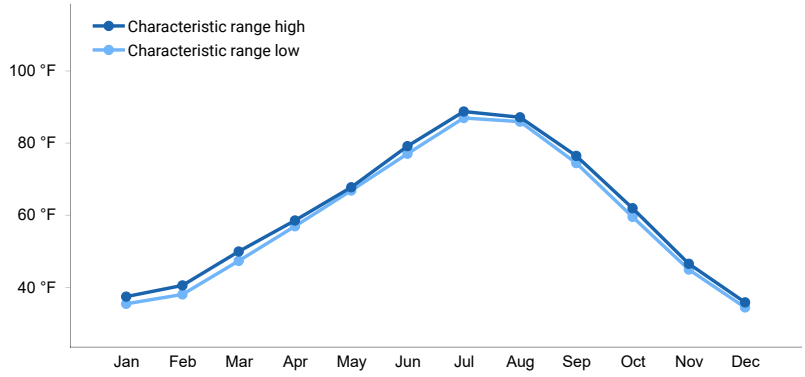

Figure 4. Monthly maximum temperature range

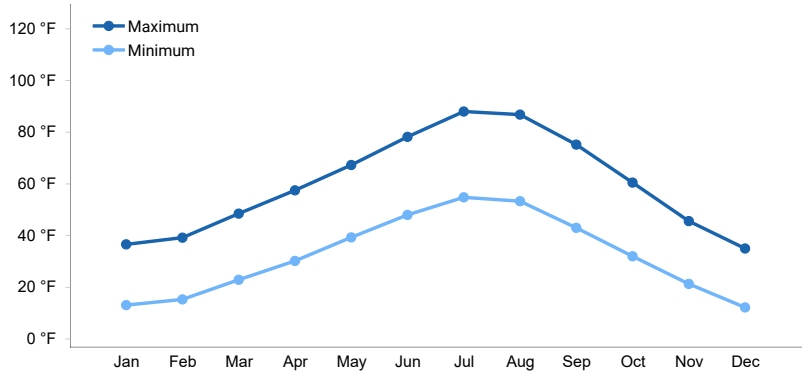

Figure 5. Monthly average minimum and maximum temperature

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

There are no water features of the ecological site or adjacent wetland/riparian regimes that influence the vegetation and management of the Saline Upland 10-17” PZ 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. Available water is the portion of water in a soil that can be readily absorbed by plant roots. This is the amount of water released between the field capacity and the permanent wilting point. As fineness of texture increases, there is a general increase in available moisture storage from sands to loams and silt loams. The soil moisture regime is typically ustic aridic. The soil temperature regime is mesic.

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.

Surface soil structure is medium to coarse granular or fine subangular blocky, and structure below the surface is columnar, prismatic, and/or subangular or angular blocky. Soil structure describes the way in which soil particles are aggregated and defines the nature of the system of pores and channels in a soil. Together, soil texture and structure help determine the ability of the soil to hold and conduct the water and air necessary for sustaining life.

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.

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

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	40–80 in
Soil depth	20–60 in
Surface fragment cover <=3"	0–5%
Available water capacity (Depth not specified)	3.6–8.4 in
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	20–80 in

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 information in this ESD, including the state-and-transition model diagram (STM), was developed using archeological and historical data, professional experience, and scientific studies. The information is representative of a dynamic set of plant communities that represent the complex interaction of several ecological processes. The plant composition has been determined by study of rangeland relic areas, areas protected from excessive disturbance, seasonal use pastures, short duration/time controlled grazing strategies, and historical accounts.

The Saline Upland 10-17” PZ ecological site is characterized by two states: Reference and Eroded. 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). Other grasses and grass-likes include inland saltgrass, green needlegrass, Prairie Junegrass, and threadleaf sedge. Shrubs such as Gardner’s saltbush, fourwing saltbush, and winterfat, are also present. A minor component of forbs such as scarlet globemallow, large Indian breadroot, twogrooved milkvetch, and purple prairie clover are present (see the species composition list for more information). The Eroded State is characterized by early-successional warm-season shortgrass (Fendler’s threeawn), forbs (curlycup gumweed and annuals), half-shrubs, and shrubs (woodyaster, broom snakeweed and black greasewood).

The degree of grazing has a significant impact on the ecological dynamics of the site. This region was historically occupied by large grazing animals such as bison and elk, along with pronghorn and mule deer. Grazing by these large herbivores, along with climatic fluctuations, had a major influence on the ecological dynamics of this site. Deer and pronghorn are widely distributed throughout the MLRA. Secondary influences of herbivory by species such as small rodents, insects and root-feeding organisms have impacted the vegetation and continues today.

Recurrent drought has historically impacted the vegetation of this region. Changes in species composition and production will vary depending upon the duration and severity of the drought cycle, and prior grazing management.

As the Saline Upland 10-17” PZ ecological site begins to shift from a combination of frequent and severe defoliation during the growing season, bunchgrasses such as alkali sacaton and rhizomatous wheatgrasses will decrease 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.

The following diagram illustrates the common plant communities that can occur on the site and the community pathways (CP) among plant communities. Plant Communities are identified by 1.1, 1.2 etc. and are described in the narrative. Bold lines surrounding each state represent ecological thresholds. Transitions (T) indicate the transition

across an ecological threshold to another state. Once a threshold has been crossed into another state, it may not be feasible to return to the original state, even with significant management inputs and practices. The ecological processes plant communities, community pathways, transition and/or restoration pathways will be discussed in more detail in the plant community descriptions following the diagram.

State and transition model

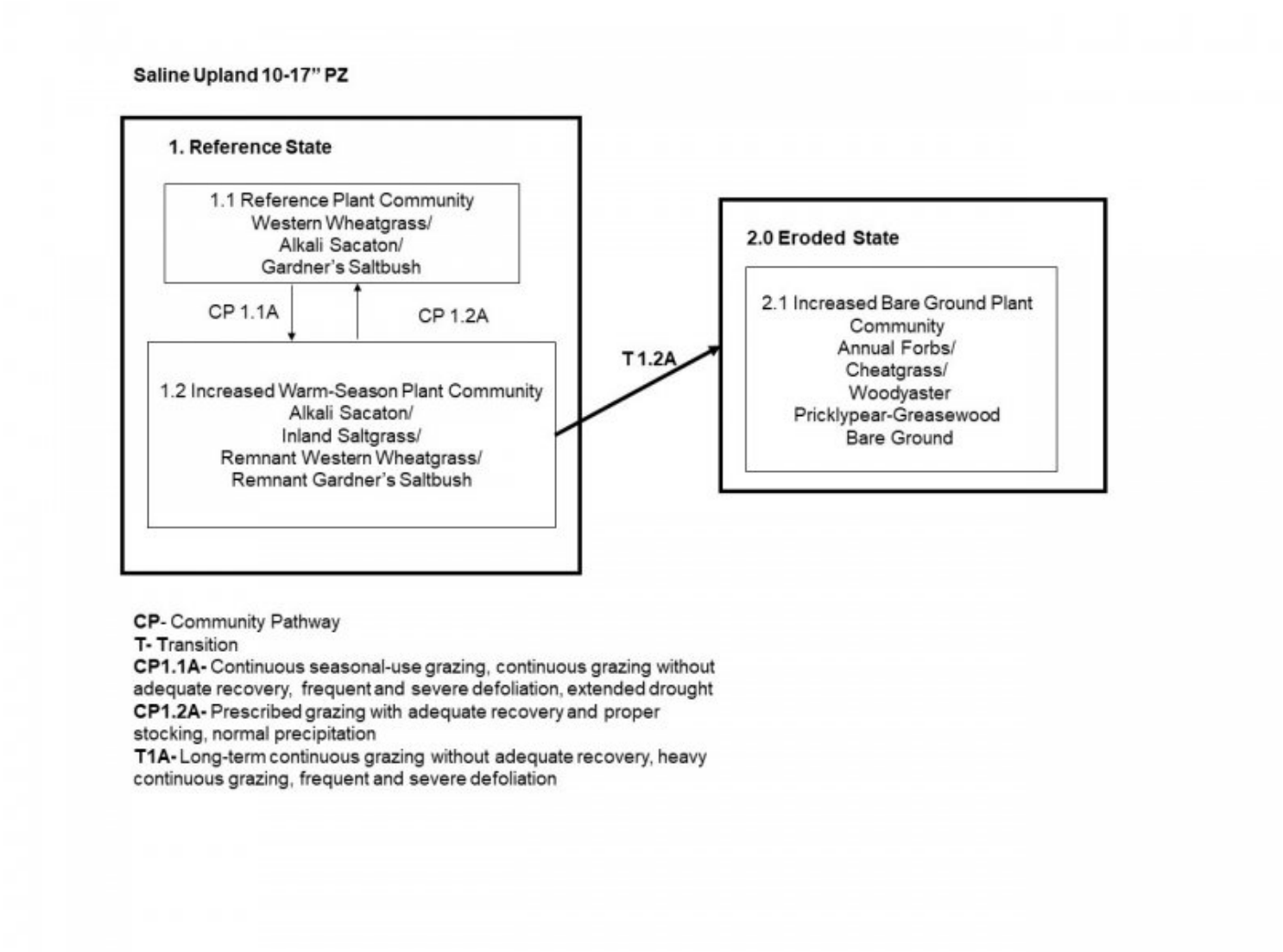

Figure 6.

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
Reference Plant Community– Western Wheatgrass, Alkali Sacaton, Gardner's Saltbush

This is the interpretive plant community for the Saline Upland 10-17" PZ 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 50-60 percent grasses and grass-likes, 5 percent forbs, and 40-45 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, green needlegrass, bottlebrush squirreltail, Nuttall's alkaligrass, inland saltgrass, buffalograss, hairy grama, and threadleaf sedge. Forbs include scarlet globemallow, textile onion, curlycup gumweed, and rush skeletonplant. Other forbs include twogrooved milkvetch, 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 10 to 17" PZ, 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 (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	120	324	415
Shrub/Vine	220	255	300
Forb	10	21	35
Total	**350**	**600**	**750**

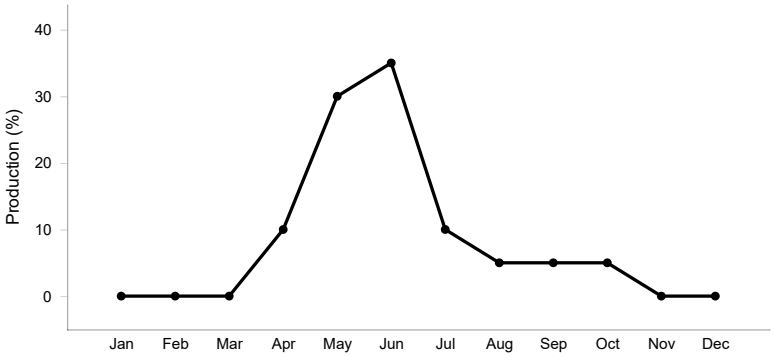

Figure 8. Plant community growth curve (percent production by month). WY1401, 10-14NP upland sites.

Community 1.2
Increased Warm-Season Plant Community—Alkali Sacaton, Inland Saltgrass, Remnant Western Wheatgrass, Remnant Gardner's Saltbush

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/or black greasewood, have increased. Natural disturbances such as drought can contribute to this shift.

In the 10 to 17“ PZ, 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.

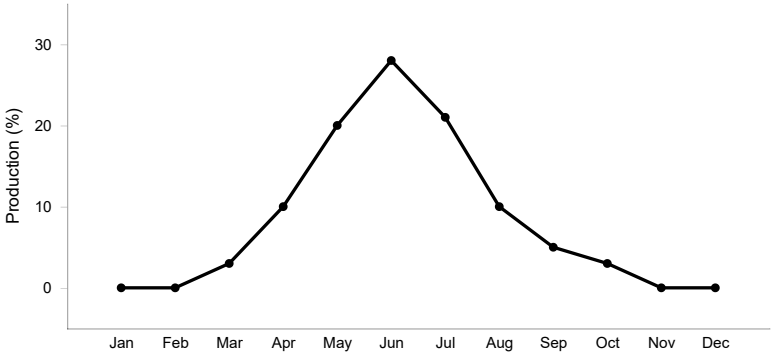

Figure 9. Plant community growth curve (percent production by month). WY5803, Northern Rolling High Plains, Southern Part, cool-season/warm-season co-dominant. Cool-season/warm-season co-dominant.

Pathway 1.1A
Community 1.1 to 1.2

Excessive grazing without adequate recovery between grazing events, and/or 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
Increased Bare Ground Community—Annual Forbs, Cheatgrass, Woodyaster, Pricklypear,

Greasewood and Bare Ground

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 10 to 17" PZ, 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.

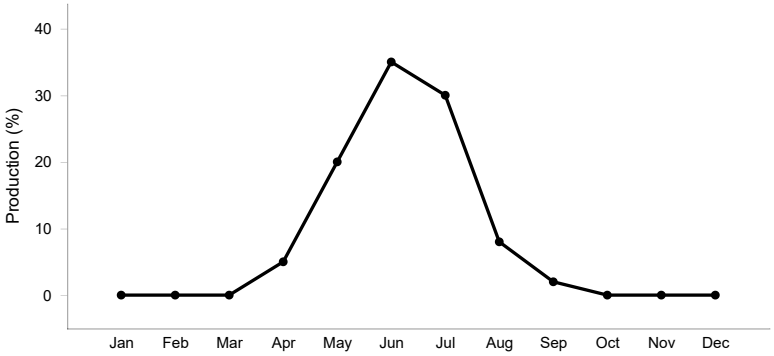

Figure 10. Plant community growth curve (percent production by month). WY5804, Northern Rolling High Plains, Southern Part upland w/warm-season. 10-14" PZ, with warm-season dominant grasses and forbs.

Transition T1.2A
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 (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Cool-Season Rhizomatous**			190–280	
	western wheatgrass	PASM	*Pascopyrum smithii*	180–240	–
	thickspike wheatgrass	ELLAL	*Elymus lanceolatus ssp. lanceolatus*	90–180	–
2	**Cool-Season Bunch Midgrass**			150–210	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	30–60	–
	Sandberg bluegrass	POSE	*Poa secunda*	30–60	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	6–30	–
	green needlegrass	NAVI4	*Nassella viridula*	6–30	–
3	**Warm-Season Bunchgrass**			30–60	

	alkali sacaton	SPAI	*Sporobolus airoides*	30–60	–
	blue grama	BOGR2	*Bouteloua gracilis*	30–60	–
4	**Miscellaneous**			12–60	
	Grass, perennial	2GP	*Grass, perennial*	19–95	–
	saltgrass	DISP	*Distichlis spicata*	12–42	–
	purple threeawn	ARPU9	*Aristida purpurea*	6–30	–
	buffalograss	BODA2	*Bouteloua dactyloides*	6–30	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	6–30	–
	squirreltail	ELEL5	*Elymus elymoides*	6–30	–
	needle and thread	HECO26	*Hesperostipa comata*	0–30	–
	Nuttall's alkaligrass	PUNU2	*Puccinellia nuttalliana*	6–30	–
	threadleaf sedge	CAFI	*Carex filifolia*	6–30	–
Forb					
5	**Forb**			12–30	
	aster	ASTER	*Aster*	6–30	–
	American licorice	GLLE3	*Glycyrrhiza lepidota*	6–30	–
	large Indian breadroot	PEES	*Pediomelum esculentum*	6–30	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	6–30	–
	rush skeletonplant	LYJU	*Lygodesmia juncea*	6–30	–
	curlycup gumweed	GRSQ	*Grindelia squarrosa*	6–30	–
	twogrooved milkvetch	ASBI2	*Astragalus bisulcatus*	6–30	–
	branched false goldenweed	OOMU	*Oonopsis multicaulis*	6–30	–
	hairy false goldenaster	HEVI4	*Heterotheca villosa*	6–30	–
	spiny phlox	PHHO	*Phlox hoodii*	6–30	–
	desert princesplume	STPIP	*Stanleya pinnata var. pinnata*	6–30	–
	stemless four-nerve daisy	TEAC	*Tetraneuris acaulis*	6–30	–
	purple prairie clover	DAPU5	*Dalea purpurea*	6–30	–
	white prairie clover	DACA7	*Dalea candida*	6–30	–
	textile onion	ALTE	*Allium textile*	6–30	–
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	6–30	–
	Forb, perennial	2FP	*Forb, perennial*	6–30	–
	American vetch	VIAM	*Vicia americana*	6–30	–
	desert goosefoot	CHPR5	*Chenopodium pratericola*	6–30	–
	upright prairie coneflower	RACO3	*Ratibida columnifera*	0–6	–
Shrub/Vine					
6	**Subshrubs/Shrubs**			240–270	
	Gardner's saltbush	ATGA	*Atriplex gardneri*	180–300	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	30–60	–
	Wyoming big sagebrush	ARTRW8	*Artemisia tridentata ssp. wyomingensis*	30–60	–

	fourwing saltbush	ATCA2	*Atriplex canescens*	30–60	–
	greasewood	SAVE4	*Sarcobatus vermiculatus*	6–48	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	6–30	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	6–30	–
	smooth woodyaster	XYGL	*Xylorhiza glabriuscula*	6–30	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	6–30	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	6–30	–

Animal community

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

Historic Climax Plant Community: 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 10-17" PZ 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% 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: Reference PC – (600) (0.16)

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

10-17 Inches PZ:

Reference PC - (600) (0.16)

Increased Warm-Season PC – (400) (0.11)

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% ground cover have the greatest potential for high infiltration and lower runoff. An example of an exception would be where short-grasses form a strong sod and dominate the site. Areas where ground cover is less than 50% have the greatest potential to have reduced infiltration and higher runoff (refer to Part 630, NRCS National Engineering Handbook for detailed hydrology information).

Rills and gullies should not typically be present. Water flow patterns should be barely distinguishable if at all present. Pedestals are only slightly present in association with bunchgrasses. Litter typically falls in place, and signs of movement are not common. Chemical and physical crusts may be present. Cryptogamic crusts are present, but only cover 1-2% 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

Information presented here has been derived from data collection on private and federal lands using:
• Double Sampling*
• Rangeland Health**
• Soil Stability**
• Line Point Intercept : Foliar canopy, basal cover (Forb, Graminoid, Shrub, Subshrub, Lichen, Moss, Rock fragments, Bare ground, Percentage of Litter)***
• Soil pedon descriptions collected on site****
*NRCS 528-Prescribed Grazing Standard job sheets.
**Interpreting Indicators of Rangeland Health, Version 4, 2005
***Monitoring Manual for Grassland, Shrubland and Savanna Ecosystems, Volume II, 2005
****Field Book for Describing and Sampling Soils, Version 3, 2012
NRI- Natural Resource Inventory data

Additional reconnaissance data collection using numerous ocular estimates and other inventory data; NRCS clipping data for USDA program support; field observations from experienced range-trained personnel.

Data Source: NRI
Number of Records: 19
Sample Period: 2004-2016
Counties: Campbell, Crook, Natrona, Weston

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Data collection for this ecological site was done in conjunction with the progressive soil surveys within the 58B Northern Rolling High Plains (Southern Part), of Wyoming and Montana.

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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program.intake@usda.gov.

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	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.

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

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%.

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 50% or greater of soil surface and maintains soil surface integrity. Soil Stability class is anticipated to be 4 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 is slow to moderate.

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: 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.
