USDA Natural Resources
Conservation Service

Ecological site R034AY338WY
Saline Lowland High Plains Southeast (SL)

Accessed: 05/10/2025

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

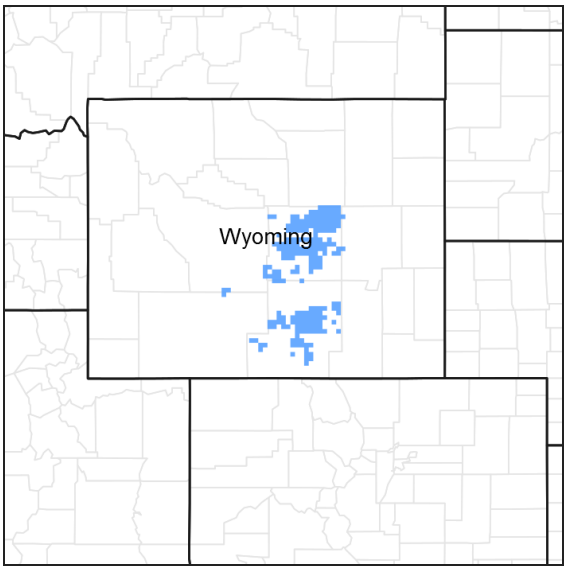


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on gently sloping land along perennial or intermittent streams. Slopes are mostly from 0 to 5%.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Drainageway (3) Stream terrace
Flooding frequency	None
Ponding frequency	None
Elevation	5,500–7,500 ft
Slope	0–10%

Ponding depth	0 in
Aspect	Aspect is not a significant factor

Climatic features

Annual precipitation ranges from 10-14 inches per year. Wide fluctuations may occur in yearly precipitation and result in more dry years than those with more than normal precipitation. Temperatures show a wide range between summer and winter and between daily maximums and minimums. This is predominantly due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air outbreaks in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring.

Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 mph.

Growth of native cool season plants begins about April 15 and continues to about June 15. Some green up of cool season plants usually occurs in September.

The following information is from the “Laramie” climate station:
Minimum Maximum 5 yrs. out of 10 between
Frost-free period (days): 57 149 June 1 – September 16
Freeze-free period (days): 94 183 May 15 – September 28
Annual Precipitation (inches): 5.8 17.34

Mean annual precipitation: 11.53 inches
Mean annual air temperature: 42.2 F (30.4 F Avg. Min. to 53.9 F Avg. Max.)
For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at http://www.wcc.nrcs.usda.gov/ website. Other climate station(s) representative of this precipitation zone include ”Dixon ” and “Medicine Bow”.

Table 3. Representative climatic features

Frost-free period (average)	149 days
Freeze-free period (average)	183 days
Precipitation total (average)	14 in

Influencing water features

Stream type: None

Soil features

The soils of this site are deep, loamy soils with high salinity. The depth to a seasonal high water table ranges from about 2 feet to more than 4 feet and is beneficial to the woody plants but not to the majority of the forbs or grasses. These soils may occasionally receive overflow water.

Table 4. Representative soil features

Surface texture	(1) Sandy loam (2) Fine sandy loam (3) Loam
Family particle size	(1) Loamy
Drainage class	Somewhat poorly drained to well drained
Permeability class	Slow to moderately slow

Soil depth	20–60 in
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	2–3 in
Calcium carbonate equivalent (0-40in)	5–20%
Electrical conductivity (0-40in)	8–16 mmhos/cm
Sodium adsorption ratio (0-40in)	10–20
Soil reaction (1:1 water) (0-40in)	8.8–9.6
Subsurface fragment volume <=3" (Depth not specified)	0–15%
Subsurface fragment volume >3" (Depth not specified)	0–10%

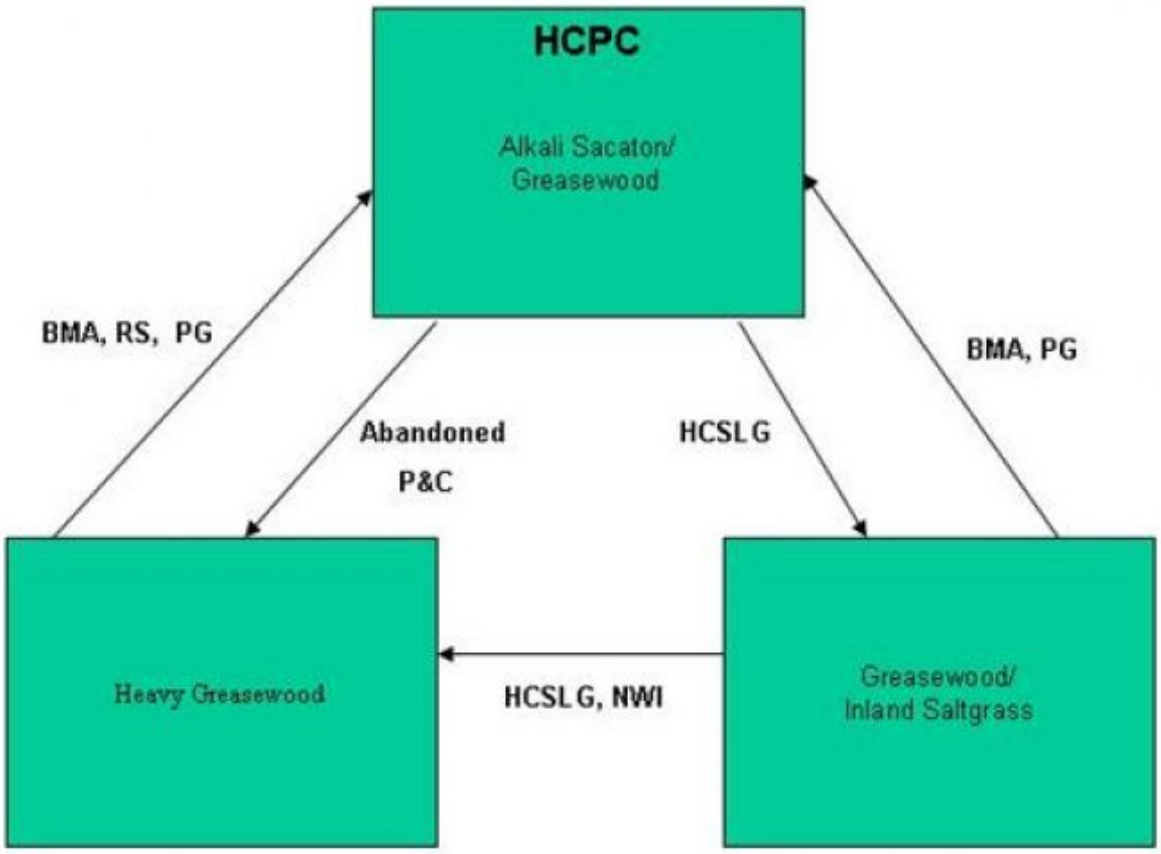
Ecological dynamics

As this site deteriorates from improper grazing management, species such as greasewood increase and annuals invade. Grasses such as alkali sacaton and basin wildrye will decrease in frequency and production.

The Historic Climax Plant Community (description follows the plant community diagram) has been determined by study of rangeland relic areas, or areas protected from excessive disturbance. Trends in plant communities going from heavily grazed areas to lightly grazed areas, seasonal use pastures, and historical accounts have also been used.

The following is a State and Transition Model Diagram that illustrates the common plant communities (states) that can occur on the site and the transitions between these communities. The ecological processes will be discussed in more detail in the plant community narratives following the diagram.

State and transition model



BMA – Brush Management (all methods)
BMC – Brush Management (chemical)
BMF – Brush Management (fire)
BMM – Brush Management (mechanical)
CSP – Chemical Seedbed Preparation
CSLG – Continuous Season-long Grazing
DR – Drainage
CSG – Continuous Spring Grazing
HB – Heavy Browse
HCSLG – Heavy Continuous Season-long Grazing
HI – Heavy Inundation
LPG – Long-term Prescribed Grazing
MT – Mechanical Treatment (chiseling, ripping, pitting)
MCSLG – Moderate Continuous Season Long Grazing

NF – No Fire
NS – Natural Succession
NWC – Noxious Weed Control
NWI – Noxious Weed Invasion
NU – Nonuse
P&C – Plow & Crop (including hay)
PG – Prescribed Grazing
RPT – Re-plant Trees
RS – Re-seed
SGD – Severe Ground Disturbance
SHC – Severe Hoof Compaction
WD – Wildlife Damage (Beaver)
WF – Wildfire

State 1
Alkali Sacaton/Greasewood Plant Community (HCPC)

Community 1.1
Alkali Sacaton/Greasewood Plant Community (HCPC)

The interpretive plant community for this site is the Historic Climax Plant Community. This state evolved with grazing by large herbivores and is well suited for grazing by domestic livestock. Potential vegetation is about 70% grasses or grass-like plants, 10% forbs and 20% woody plants. Saline tolerant species dominate the state. The major grasses include alkali sacaton, basin wildrye, and rhizomatous wheatgrass. Other grasses on this site may include Indian ricegrass, Sandberg bluegrass, and inland saltgrass. Greasewood is the dominant woody plant. Other woody plants include Gardners Saltbush, Winterfat, Birdfoot Sagebrush, and Rubber Rabbitbrush. A typical plant composition for this state consists of alkali sacaton 25-35%, basin wildrye 10-20%, rhizomatous wheatgrass 5-15%, other grasses and grass-like plants 5-10%, perennial forbs 5-10%, greasewood 10-20%, and 5-10% other woody species. Ground cover, by ocular estimate, varies from 65-75%. The total annual production (air-dry weight) of this state is about 1800 pounds per acre, but it can range from about 1200 lbs./acre in unfavorable years to about 2500 lbs./acre in above average years. This state is stable and well adapted to the Cool Central Desertic Basins and Plateaus climatic conditions. The diversity in plant species and seasonal water table allows for high drought resistance. This is a sustainable plant community (site/soil stability, watershed function, and biologic integrity). Transitions or pathways leading to other plant communities are as follows: • Heavy Continuous Season-long Grazing will convert this plant community to the Greasewood/Inland Saltgrass State. • Plowing & Cropping (haying) followed by abandonment will convert this plant community to the Heavy Greasewood State.

Figure 3. Plant community growth curve (percent production by month). WY0902, 10-14SE extra water sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	15	35	35	10	0	0	0	0

State 2
Greasewood/Inland Saltgrass Plant Community

Community 2.1
Greasewood/Inland Saltgrass Plant Community

This plant community evolved under heavy continuous grazing by domestic livestock. Saline tolerant grasses and forbs make up the majority of the understory. Greasewood has increased to over 30% of the annual production on the site. Dominant grasses include inland saltgrass, Sandberg bluegrass, and rhizomatous wheatgrass. Dominant forbs found in this plant community include woody aster and poverty weed. The total annual production (air-dry weight) of this state is about 1000 pounds per acre, but it can range from about 400 lbs./acre in unfavorable years to about 1700 lbs./acre in above average years. The soil of this state is not well protected. The biotic integrity is somewhat compromised by more xeric species, decreased plant diversity, and increased bare ground. The watershed is somewhat functioning, but may produce excessive runoff. Transitional pathways leading to other plant communities are as follows: • Brush Management followed by deferment for 1 to 2 years as part of a Prescribed Grazing plan will result in a plant community very similar to the Historic Climax Plant Community (Alkali Sacaton/Greasewood State), except that a higher proportion of greasewood will persist. • Heavy Continuous Season-long Grazing and Noxious weed Invasion will convert this plant community to the Heavy Greasewood State.

Figure 4. Plant community growth curve (percent production by month). WY0902, 10-14SE extra water sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	15	35	35	10	0	0	0	0

State 3
Heavy Greasewood Plant Community

Community 3.1
Heavy Greasewood Plant Community

This plant community is the result of long-term improper grazing or haying and abandonment. This state is dominated by greasewood with much bare ground. Annuals such as cheatgrass, little barley, pepperweeds, and noxious perennials such as Russian knapweed and white top are the dominant understory. The total annual production (air-dry weight) of this state is about 500 pounds per acre, but it can range from about 200 lbs./acre in unfavorable years to about 1000 lbs./acre in above average years. Bare ground has increased. The soil of this state is not well protected. The watershed is nonfunctioning and usually produces excessive runoff. The biotic community is nonfunctioning due to annual and invasive plants. Transitional pathways leading to other plant communities are as follows: • Brush Management and Re-seeding followed by deferment for 1 to 2 years as part of a Prescribed Grazing plan over the long-term may return this state to near Historic Climax Plant Community (Alkali Sacaton/Basin Wildrye State), except that a higher proportion of greasewood will persist. Additional deferment may be necessary and should be prescribed on an individual site basis.

Figure 5. Plant community growth curve (percent production by month). WY0902, 10-14SE extra water sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	15	35	35	10	0	0	0	0

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1				450–630	
	alkali sacaton	SPAI	*Sporobolus airoides*	450–630	–
2				180–360	
	basin wildrye	LECI4	*Leymus cinereus*	180–360	–
3				90–270	
	western wheatgrass	PASM	*Pascopyrum smithii*	90–270	–
4				90–180	
	saltgrass	DISP	*Distichlis spicata*	90–180	–
5				90–180	
	Nuttall's alkaligrass	PUNU2	*Puccinellia nuttalliana*	90–180	–
6				90–180	
	Grass, perennial	2GP	*Grass, perennial*	0–90	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	0–90	–
	threadleaf sedge	CAFI	*Carex filifolia*	0–90	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	0–90	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–90	–
Forb					
7				90–180	
	Forb, perennial	2FP	*Forb, perennial*	0–90	–
	milkvetch	ASTRA	*Astragalus*	0–90	–
Shrub/Vine					
8				180–360	
	greasewood	SAVE4	*Sarcobatus vermiculatus*	180–360	–
9				90–180	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–90	–
	birdfoot sagebrush	ARPE6	*Artemisia pedatifida*	0–90	–
	fourwing saltbush	ATCA2	*Atriplex canescens*	0–90	–
	Gardner's saltbush	ATGA	*Atriplex gardneri*	0–90	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–90	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	0–90	–

Animal community

Animal Community – Wildlife Interpretations
Alkali Sacaton/Greasewood Plant Community (HCPC): The high degree of plant species and structural diversity, proximity to areas with water at or near the soil surface, and woody plants in this community favors a large variety of wildlife. Greasewood provides suitable thermal and escape cover for mule deer and antelope. When found adjacent to sagebrush dominated sites, this plant community may provide brood rearing/foraging areas for sage grouse. This community provides habitat for a wide array of small mammals such as jackrabbits, cottontail rabbits, mice, and voles so diverse prey populations are available for badgers, fox, coyotes, and raptors such as red-tail and Swainson’s hawks. Birds such as western kingbird, western meadowlark, lark bunting, and grasshopper sparrow will utilize this community for nesting and foraging.

Greasewood/Inland Saltgrass Plant Community: 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.

Heavy Greasewood Plant Community: This plant community exhibits a low level of plant species. In most cases it is not a desirable plant community to select as a wildlife habitat management objective.

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)
Alkali Sacaton/Greasewood (HCPC) 1200-2500 .5
Greasewood/Inland Saltgrass 400-1700 .3
Heavy Greasewood 200-1000 .1

* - 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

Salinity/Alkalinity is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic groups B and C, with localized areas in hydrologic group D. Infiltration ranges from moderate to rapid. 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. 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 may be present in association with bunchgrasses. Litter typically falls in place, and signs of movement are not common. Chemical and physical crusts are often present.

Recreational uses

This site provides limited hunting opportunities.

Wood products

No appreciable wood products are present on the site.

Other products

None noted.

Inventory data references

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

counties.

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

Contributors

B. Brazee

Rangeland health reference sheet

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

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

Indicators

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

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 10-20% occurring in small areas throughout site

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 80% 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 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:

    Sub-dominant:

    Other:

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

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

14. **Average percent litter cover (%) and depth (in):** Average litter cover is 30-40% with depths of 0.25 to 1.0 inches

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 1800 lbs/ac

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** Cheatgrass and other annuals, Greasewood, Inland saltgrass and Species found on Noxious

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