USDA Natural Resources
Conservation Service

Ecological site R034AY342WY
Saline Subirrigated High Plains Southeast (SS)

Accessed: 05/12/2025

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.

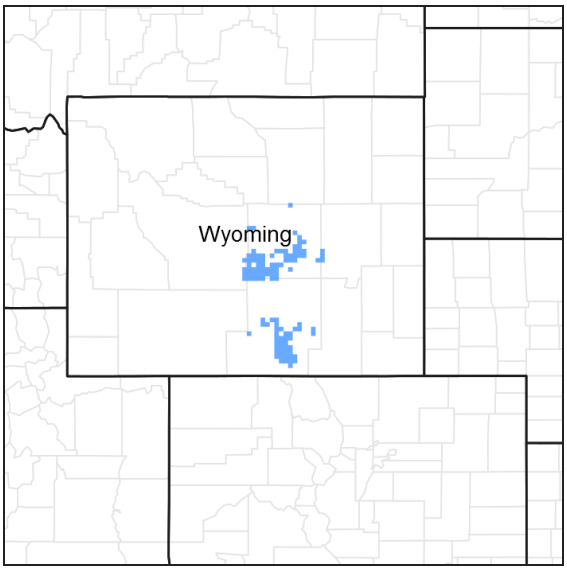


Figure 1. Mapped extent

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 nearly level land along perennial or intermittent streams, near seeps, sloughs, or springs. It is also found on broad, low lake terraces, lake plains, on alluvial bottoms, and poorly-drained bottom lands adjacent to stream channels. These areas receive additional run-in water from higher sites and from a fluctuating water table, well within the root zone. Slopes are mostly less than 3%.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Stream terrace
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Occasional to frequent
Ponding frequency	None

Elevation	1,676–2,286 m
Slope	0–10%
Ponding depth	0 cm
Water table depth	30–102 cm
Aspect	Aspect is not a significant factor

Climatic features

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

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

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

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

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)	356 mm

Influencing water features

Stream type: C (Rosgen)

Soil features

Soils of this site are mostly deep and somewhat poorly drained. Textures are loamy, sometimes stratified, with a seasonal high water table depth of 1 to 3 feet most years. The soil and soil water have enough salinity to restrict plant establishment and growth. Mottling or gleying may occur within 20 to 40 inches of the surface.

Table 4. Representative soil features

Surface texture	(1) Loam (2) Silt loam (3) Silty clay loam

Family particle size	(1) Loamy
Drainage class	Poorly drained to moderately well drained
Permeability class	Moderately slow to moderate
Soil depth	51–152 cm
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	7.62–15.24 cm
Calcium carbonate equivalent (0-101.6cm)	10–30%
Electrical conductivity (0-101.6cm)	8–16 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–10
Soil reaction (1:1 water) (0-101.6cm)	7.4–9
Subsurface fragment volume <=3" (Depth not specified)	0–30%
Subsurface fragment volume >3" (Depth not specified)	0–10%

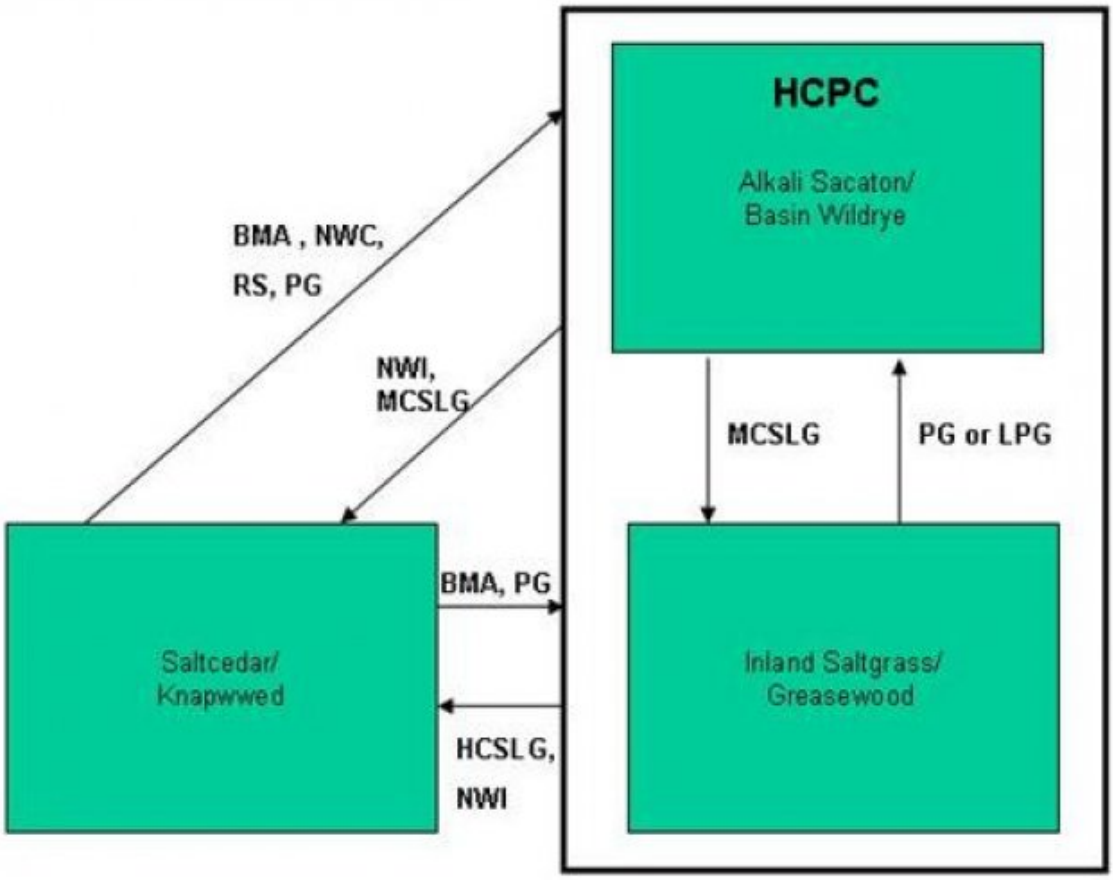
Ecological dynamics

As this site deteriorates from improper grazing management, species such as inland saltgrass and greasewood increase. Grasses such as alkali sacaton, basin wildrye, and Nuttall’s alkaligrass 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/Basin Wildrye Plant Community (HCPC)

Community 1.1
Alkali Sacaton/Basin Wildrye 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 suited for grazing by domestic livestock. Potential vegetation is estimated at 80% grasses or grass-like plants, 10% forbs and 10% woody plants. Saline tolerant species dominate the site. The major grasses include alkali sacaton, basin wildrye, Nuttall's alkaligrass, western wheatgrass, alkali bluegrass, and inland saltgrass. Common woody plants are greasewood and rubber rabbitbrush. A typical plant composition for this state consists of Alkali sacaton 50-60%, Basin wildrye 15-25%, alkali bluegrass 5-10%,perennial forbs 5-10%, greasewood 0-5%, and up to 5% rubber rabbitbrush. Ground cover, by ocular estimate, varies from 70-80%. The total annual production (air-dry weight) of this state is about 3000 pounds per acre, but it can range from about 2500 lbs./acre in unfavorable years to about 3400 lbs./acre in above average years. The state is stable and well adapted to the Cool Central Desertic Basins and Plateaus climatic conditions. It is a critical state providing water and habitat for the surrounding area. It is resistant to drought due to a dependable water supply. 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: • Moderate Continuous Season-long Grazing will convert this plant community to the Inland Saltgrass / Greasewood Plant Community. • Noxious Weed Invasion and Moderate Continuous Season-long Grazing will convert this plant community to the Salt Cedar/Knapweed Plant Community.

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

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

State 2
Inland Saltgrass / Greasewood Plant Community

Community 2.1
Inland Saltgrass / Greasewood Plant Community

This plant community evolved under continuous grazing by domestic livestock. Saline tolerant grasses make up the majority of the understory. Dominant grasses include inland saltgrass and western wheatgrass The total annual production (air-dry weight) of this state is about 2000 pounds per acre, but it can range from about 1500 lbs./acre in unfavorable years to about 2400 lbs./acre in above average years. The state is moderately stable and susceptible to excessive erosion. The biotic integrity of this plant community is at risk due to decreased species diversity. The watershed is usually functioning. Transitional pathways leading to other plant communities are as follows: • Prescribed Grazing will result in a plant community very similar to the Historic Climax Plant Community (Alkali Sacaton/Basin Wildrye State). • Noxious Weed Invasion and Heavy Continuous Season Long Grazing will convert this plant community to the Salt Cedar/Knapweed State.

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

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

State 3
Salt Cedar / Knapweed Plant Community

Community 3.1
Salt Cedar / Knapweed Plant Community

This plant community is the result of continuous grazing and invasion of non native species. Some salt tolerant

species remain but are limited in total production. Invasive species such as Russian knapweed, cheatgrass, and salt cedar replace desirable species. The total annual production (air-dry weight) of this state is about 1000 pounds per acre, but it can range from about 500 lbs./acre in unfavorable years to about 1400 lbs./acre in above average years. Bare ground has increased. The soil of this state is not well protected from erosion. The watershed is at risk and may produce excessive runoff. Transitional pathways leading to other plant communities are as follows: • Brush Management Chemical, Noxious Weed Control, Reseeding, and Prescribed grazing will convert this plant community to a state similar to the HCPC. • Brush Management Chemical, and Prescribed grazing will return this community towards the Inland Saltgrass / Greasewood state.

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

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

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				1681–2018	
	alkali sacaton	SPAI	*Sporobolus airoides*	1681–2018	–
2				504–841	
	basin wildrye	LECI4	*Leymus cinereus*	504–841	–
3				168–336	
	Sandberg bluegrass	POSE	*Poa secunda*	168–336	–
4				168–504	
	Grass, perennial	2GP	*Grass, perennial*	0–168	–
	saltgrass	DISP	*Distichlis spicata*	0–168	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	0–168	–
	western wheatgrass	PASM	*Pascopyrum smithii*	0–168	–
	Nuttall's alkaligrass	PUNU2	*Puccinellia nuttalliana*	0–168	–
Forb					
5				168–336	
	Forb, perennial	2FP	*Forb, perennial*	0–168	–
	milkvetch	ASTRA	*Astragalus*	0–168	–
	arrowgrass	TRIGL	*Triglochin*	0–168	–
Shrub/Vine					
6				0–168	
	greasewood	SAVE4	*Sarcobatus vermiculatus*	0–168	–
7				0–168	
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–168	–
8				0–168	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–168	–

Animal community

Animal Community – Wildlife Interpretations
Alkali Sacaton/Basin Wildrye Plant Community (HCPC): This plant community is very important for many of the

wildlife species in the area. With the presence of water at or near the soil surface, over 80% of all wildlife will use this site to fulfill some part of their habitat needs. It provides forage for mule deer and antelope. It provides nesting habitat for shorebirds, songbirds, and waterfowl as well as ground nesting birds such as harriers. The lush herbaceous material produces insects for sage grouse brood rearing and foraging. Dense ground cover provides escape cover, forage, and breeding areas for small mammals which draw predators such as raptors, red fox and coyote. Other birds that would frequent this plant community include red-wing blackbirds, sandhill cranes, western meadowlarks, and neotropical migrants.
Inland Saltgrass / Greasewood Plant Community: This plant community may be beneficial for the same wildlife that would use the Historic Climax Plant Community. However, the plant community composition is less diverse, and thus, less apt to meet the seasonal needs of these animals. It may provide some foraging opportunities for sage grouse when it occurs proximal to woody cover.

Salt Cedar/Knapweed Plant Community: 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 small animals 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
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/Basin Wildrye (HCPC) 2500-3400 .9
Inland Saltgrass/Greasewood 1500-2400 .6
Salt Cedar/Knapweed 500-1400 .3

* - 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 C and D. Infiltration ranges from moderately slow to moderately well. 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 are only slightly present in association with bunchgrasses. Litter typically falls in place, and signs of movement are not common. Chemical and physical crusts are sometimes present.

Recreational uses

This site provides a variety of hunting opportunities as well providing popular camping areas for recreationists. This site has a wide variety of forbs which bloom throughout spring and summer, providing esthetic values that appeal to visitors.

Wood products

No appreciable wood products are present on the site.

Other products

None noted.

Inventory data references

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

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

Contributors

B. Brazee

Rangeland health reference sheet

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

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

Indicators

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

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

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

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

bare ground): Bare ground is 10-20% occurring in small areas throughout site

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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 80% 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 moderately 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 is present. Some surface crusting of salts due to fluctuation of water table.

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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:

    Sub-dominant:

    Other:

    Additional: Mid stature Bunch Grasses > Mid stature rhizomatous Grasses > Shrubs > Short Grasses/Grasslikes > Forbs

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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 30-40% with depths of 0.25 to 1.0 inches

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 3000 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:** Inland saltgrass, Greasewood, Annuals, Foxtail barley, and Species found on Noxious Weed List

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

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