USDA Natural Resources
Conservation Service

Ecological site R043BY242WY
Saline Subirrigated Foothills and Mountains West

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.

Associated sites

R043BY230WY	**Overflow Foothills and Mountains West** Overflow
R043BY274WY	**Subirrigated Foothills and Mountains West** Subirrigated
R043BY278WY	**Wetland Foothills and Mountains West** Wetland

Similar sites

R034AY238WY	**Saline Lowland Foothills and Basins West (SL)** Saline Lowland (SL) 10-14W has lower production and is dominated by greasewood.
R034AY242WY	**Saline Subirrigated Foothills and Basins West (SS)** Saline Subirrigated (SS) 10-14W has lower production.

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, and 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.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Drainageway (3) 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	5,600–8,300 ft
Slope	0–10%

Ponding depth	0 in
Water table depth	0–30 in

Climatic features

Annual precipitation ranges from 15-19 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.

Prevailing winds are from the southwest, and strong winds are less frequent than over other areas of Wyoming. Occasional storms, however, can bring brief periods of high winds with gusts exceeding 50 mph.

Growth of native cool season plants begins about May 15 and continues to about August 15.

The following information is from the “Jackson” climate station:
Minimum Maximum 5 yrs. out of 10 between
Frost-free period (days): 12 60 July 9 – August 12
Freeze-free period (days): 42 100 June 20 – August 26

Annual Precipitation (inches): <11.98 >19.69 (2 years in 10)

Mean annual precipitation: 17.00 inches

Mean annual air temperature: 38.9?F (23.3?F Avg. Min. to 54.5?F Avg. Max.)

For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at http://www.wcc.nrcs.usda.gov/cgibin/state.pl?state=wy website. Other climate stations representative of this precipitation zone include ”Afton” in Lincoln County; and “Darwin Ranch” in Teton County.

Table 3. Representative climatic features

Frost-free period (average)	60 days
Freeze-free period (average)	100 days
Precipitation total (average)	19 in

Influencing water features

Soil features

Soils of this site are mostly deep, somewhat poorly drained and affected by wetness and salt. Textures are range from loamy fine sand to clay, with loam to clay being most common. Salt crusts are commonly found on mounds during dry periods. The water table fluctuates during the growing season and is generally between 20 to 40 inches 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) Sandy loam (3) Sandy clay loam
Family particle size	(1) Loamy
Drainage class	Somewhat poorly drained to moderately well drained

Permeability class	Moderately slow to moderate
Soil depth	20–60 in
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	3–6 in
Calcium carbonate equivalent (0-40in)	10–30%
Electrical conductivity (0-40in)	8–16 mmhos/cm
Sodium adsorption ratio (0-40in)	0–10
Soil reaction (1:1 water) (0-40in)	7.4–9
Subsurface fragment volume <=3" (Depth not specified)	0–30%
Subsurface fragment volume >3" (Depth not specified)	0–10%

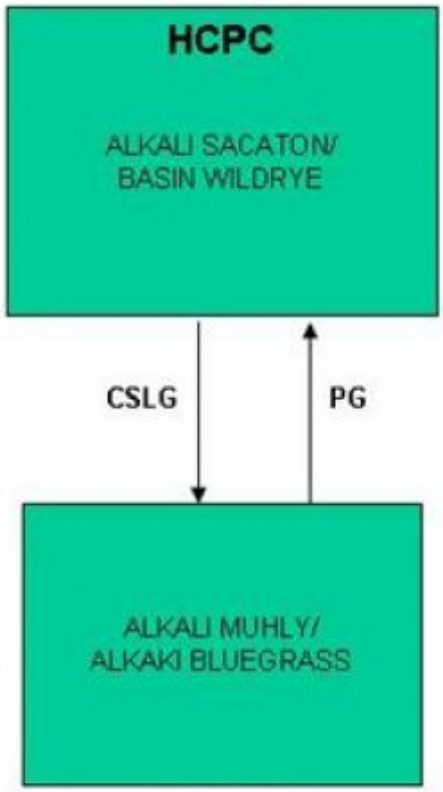
Ecological dynamics

As this site deteriorates from improper grazing management, species such as inland saltgrass, alkali bluegrass, and alkali muhly 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)
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 75% grasses or grass-like plants, 10% forbs and 15% woody plants. Saline tolerant species dominate the site. The major grasses include alkali sacaton, basin wildrye, Nuttall's alkaligrass, alkali bluegrass, and inland saltgrass. Common woody plants are greasewood and rubber rabbitbrush. A typical plant composition for this state consists of Alkali sacaton 40-50%, Basin wildrye 5-10%, Nuttall's alkaligrass 5-10%, alkali bluegrass 5-10%, up to 10% inland saltgrass, perennial forbs 1-10%, greasewood 5-10%, 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 3800 pounds per acre, but it can range from about 3000 lbs./acre in unfavorable years to about 4500 lbs./acre in above average years. The following is the growth curve of this plant community expected during a normal year: Growth curve number: WY0203 Growth curve name: 15-19W, FREE WATER SITES Growth curve description: WL, SB, SS FREE WATER SITES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC 0 0 0 0 10 40 30 15 5 0 0 0 (Monthly percentages of total annual growth) The state is stable and well adapted to the Central Rocky Mountains 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: • Continuous Season-long Grazing will convert this plant community to the Alkali Muhly/Alkali Bluegrass State.

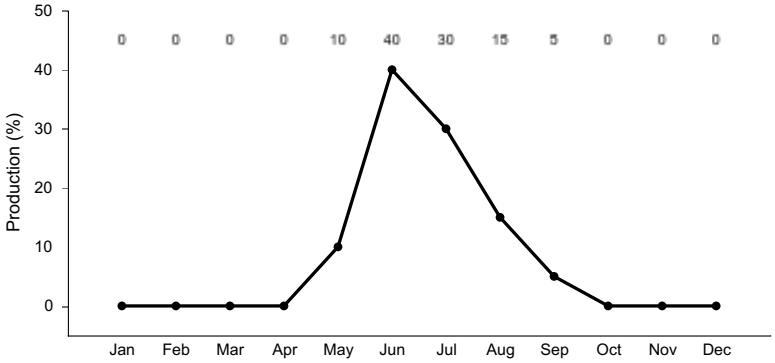


Figure 2. Plant community growth curve (percent production by month). WY0203, 15-19W Free water sites - WL, Sb, SS.

State 2
Alkali Muhly/Alkali Bluegrass Plant Community

Community 2.1
Alkali Muhly/Alkali Bluegrass 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 alkali muhly and alkali bluegrass. The total annual production (air-dry weight) of this state is about 2800 pounds per acre, but it can range from about 2000 lbs./acre in unfavorable years to about 3500 lbs./acre in above average years. The following is the growth curve of this plant community expected during a normal year: Growth curve number: WY0203 Growth curve name: 15-19W, FREE WATER SITES Growth curve description: WL, SB, SS FREE WATER SITES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC 0 0 0 0 10 40 30 15 5 0 0 0 (Monthly percentages of total annual growth) The state is stable and protected from 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).

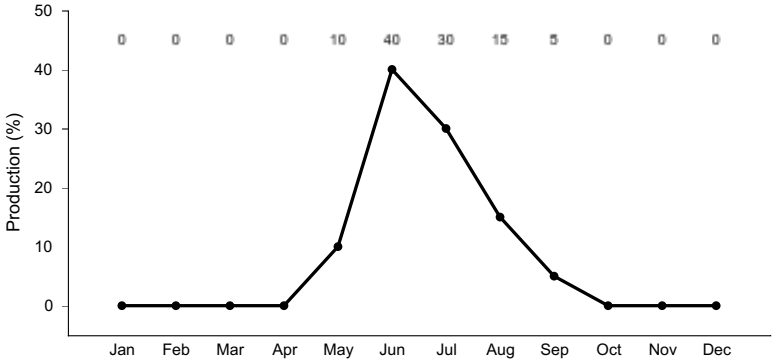


Figure 3. Plant community growth curve (percent production by month). WY0203, 15-19W Free water sites - WL, Sb, SS.

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				1520–1900	
	alkali sacaton	SPAI	*Sporobolus airoides*	1520–1900	–
2				190–380	
	basin wildrye	LECI4	*Leymus cinereus*	190–380	–
3				190–380	
	Nuttall's alkaligrass	PUNU2	*Puccinellia nuttalliana*	190–380	–
4				190–380	
5				38–380	
	saltgrass	DISP	*Distichlis spicata*	38–380	–
6				190–570	
	Grass, perennial	2GP	*Grass, perennial*	0–190	–
	bentgrass	AGROS2	*Agrostis*	0–190	–
	shortawn foxtail	ALAE	*Alopecurus aequalis*	0–190	–
	inland sedge	CAIN11	*Carex interior*	0–190	–
	Nebraska sedge	CANE2	*Carex nebrascensis*	0–190	–
	sedge	CAREX	*Carex*	0–190	–
	spreading wheatgrass	ELSC4	*Elymus scribneri*	0–190	–
	little barley	HOPU	*Hordeum pusillum*	0–190	–
	rush	JUNCU	*Juncus*	0–190	–
	scratchgrass	MUAS	*Muhlenbergia asperifolia*	0–190	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	0–190	–
	western wheatgrass	PASM	*Pascopyrum smithii*	0–190	–
Forb					
7				38–380	
	Forb, perennial	2FP	*Forb, perennial*	0–190	–
	agoseris	AGOSE	*Agoseris*	0–190	–
	milkvetch	ASTRA	*Astragalus*	0–190	–
	elk thistle	CIFO	*Cirsium foliosum*	0–190	–
	gentian	GENTI	*Gentiana*	0–190	–
	owl's-clover	ORTHO	*Orthocarpus*	0–190	–
	cinquefoil	POTEN	*Potentilla*	0–190	–
	arrowgrass	TRIGL	*Triglochin*	0–190	–
Shrub/Vine					
8				190–380	
	greasewood	SAVE4	*Sarcobatus vermiculatus*	190–380	–
9				0–190	
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–190	–
10				0–190	
	shortfruit willow	SABR	*Salix brachycarpa*	0–190	–
11				0–190	

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 neo-tropical migrants.

Alkali Muhly/Alkali Bluegrass 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.

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) 3000-4500 1.2
Alkali Muhly/Alkali Bluegrass 2000-3500 .9

* - 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 group 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 as 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.

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. Those involved in developing this site include: Bill Christensen, Range Management Specialist, NRCS; Karen Clause, Range Management Specialist, NRCS; and Everet Bainter, Range Management Specialist, NRCS. 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 58 1966-1986 WY Lincoln & others

Contributors

K. Clause

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.

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Date	03/16/2007
Approved by	E. Bainter
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rare to nonexistent.

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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:** Rare to nonexistent.

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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 can range from 0-5%.

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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:** Minimal to nonexistent.

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7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous litter not expected to move.

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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):** Soil Stability Index ratings range from 4 (interspaces) to 6 (under plant canopy), but average values should be 5.0 or greater.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Typically an A-horizon of greater than 2 inches (5 cm) with massive structure and color hues of 10YR or 2.5Y, values of 5-6, and chromas of 2-3. Organic matter typically is 3-6%.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant community consists of 75-85% grasses, 10% forbs, and 5-15% shrubs. Dense plant canopy (80-100%) and litter, despite slow to moderate infiltration rates, results in no runoff on this site until soils are saturated. Basal cover is typically greater than 10% for this site and effectively reduces runoff on this site.

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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 exists.

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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: warm season bunchgrasses>>tall, cool season bunchgrasses=perennial forbs=mid-size, cool season bunchgrasses=cool season rhizomatous grasses=warm season rhizomatous grasses>perennial shrubs

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

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14. **Average percent litter cover (%) and depth (in):** Litter ranges from 0-20% of total canopy measurement with total litter (including beneath the plant canopy) from 80-100% expected. Herbaceous litter depth typically ranges from 15-30 mm.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** English: 3000-4500 lb/ac (3800 lb/ac average); Metric: 3360-5040 kg/ha (4256 kg/ha average).

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:** Bare ground greater than 15% is the most common indicator of a threshold being crossed. Alkali muhly, inland saltgrass, and alkali bluegrass are common increasers.

17. **Perennial plant reproductive capability:** All species are capable of reproducing, except in drought years.