USDA Natural Resources Conservation Service

Ecological site R032XY238WY
Saline Lowland (SL) 5-9” Wind River Basin Precipitation Zone

Last updated: 4/30/2024
Accessed: 05/13/2025

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.

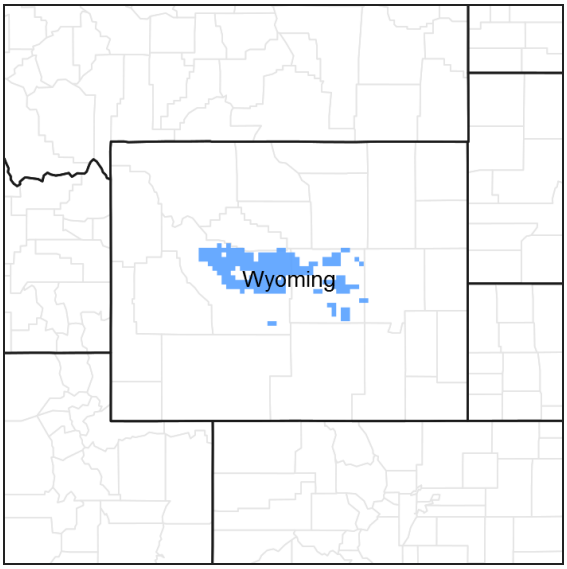


Figure 1. Mapped extent

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.

Associated sites

R032XY204WY	**Clayey (Cy) 5-9” Wind River Basin Precipitation Zone**
R032XY228WY	**Lowland (LL) 5-9” Wind River Basin Precipitation Zone**
R032XY242WY	**Saline Subirrigated (SS) 5-9” Wind River Basin Precipitation Zone**

Similar sites

R032XY338WY	**Saline Lowland (SL) 10-14" East Precipitation Zone** Saline Lowland 10-14" East P.Z. has higher production.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site normally occurs on land that receives overflow from intermittent streams or runoff from adjacent slopes.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Drainageway (3) Stream terrace
Flooding duration	Brief (2 to 7 days)
Flooding frequency	None to occasional
Ponding duration	Brief (2 to 7 days)
Ponding frequency	None to rare
Elevation	1,372–2,012 m
Slope	0–10%
Ponding depth	0 cm
Aspect	Aspect is not a significant factor

Climatic features

Annual precipitation ranges from 5-9 inches per year. The normal precipitation pattern shows peaks in May and June and a secondary peak in September. This amounts to about 50% of the mean annual precipitation. Much of the moisture that falls in the latter part of the summer is lost by evaporation and much of the moisture that falls during the winter is lost by sublimation. Average snowfall is about 20 inches annually. 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, due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air outbreaks from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may 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 winds are generally blocked from the basin by high mountains, but can occur in conjunction with an occasional thunderstorm.

Growth of native cool-season plants begins about April 1 and continues to about July 1. Cool weather and moisture in September may produce some green up of cool season plants that will continue to late October.

The following information is from the “Pavillion” climate station:
Minimum Maximum 5 yrs. out of 10 between
Frost-free period (days): 95 175 May 19 – September 19
Freeze-free period (days): 98 185 May 6 – October 3
Mean Annual Precipitation (inches): 2.50 12.54

Mean annual precipitation: 7.85 inches
Mean annual air temperature: 44.53 F (30.5 F Avg. Min. to 58.5 F Avg. Max.)
For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at http://www.wcc.nrcs.usda.gov/ website. Other climate station(s) representative of this precipitation zone include” Riverton”, “Arminto”, and “Lost Cabin”.

Table 3. Representative climatic features

Frost-free period (average)	175 days
Freeze-free period (average)	185 days
Precipitation total (average)	229 mm

Influencing water features

Stream Type: None

Soil features

The soils of this site are moderately deep and very deep well-drained soils formed in alluvium. These soils have moderate to rapid permeability and are moderately to strongly saline and/or alkaline. Higher soluble salt concentrations may be found in the subsoils. The surface soil will be highly variable and vary from 2 to 8 inches in thickness. A fluctuating water table occurs in these areas and ranges from 2.5 to 5 feet. These areas are subject to occasional overflow. The soil characteristics having the most influence on the plant community are depth to a water table during the growing season, occasional overflow or flooding during the growing season, and the elevated quantities of soluble salts.

Table 4. Representative soil features

Surface texture	(1) Loam (2) Clay loam (3) Silt loam
Family particle size	(1) Loamy
Drainage class	Somewhat poorly drained to excessively drained
Permeability class	Moderate to rapid
Soil depth	51–152 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	2.54–15.75 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%
Electrical conductivity (0-101.6cm)	4–16 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	8–16
Soil reaction (1:1 water) (0-101.6cm)	8.4–9.6
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

Ecological Dynamics of the Site:

Potential vegetation on this site is dominated by tall and mid perennial grasses, which can tolerate soils with moderate amounts of salinity and alkalinity. These grasses are also adapted to periodic overflows and a water table near the surface for a portion of the growing season. Other significant vegetation includes greasewood, rubber rabbitbrush and a variety of forbs. The expected potential composition for this site is about 70% grasses, 10% forbs and 20% woody plants. The composition and production will vary naturally due to historical use, fluctuating precipitation and fire frequency.

As this site deteriorates, species such as inland saltgrass and greasewood increase. Weedy annuals will invade. Grasses such as alkali sacaton, basin wildrye, and rhizomatous wheatgrasses will decrease in frequency and

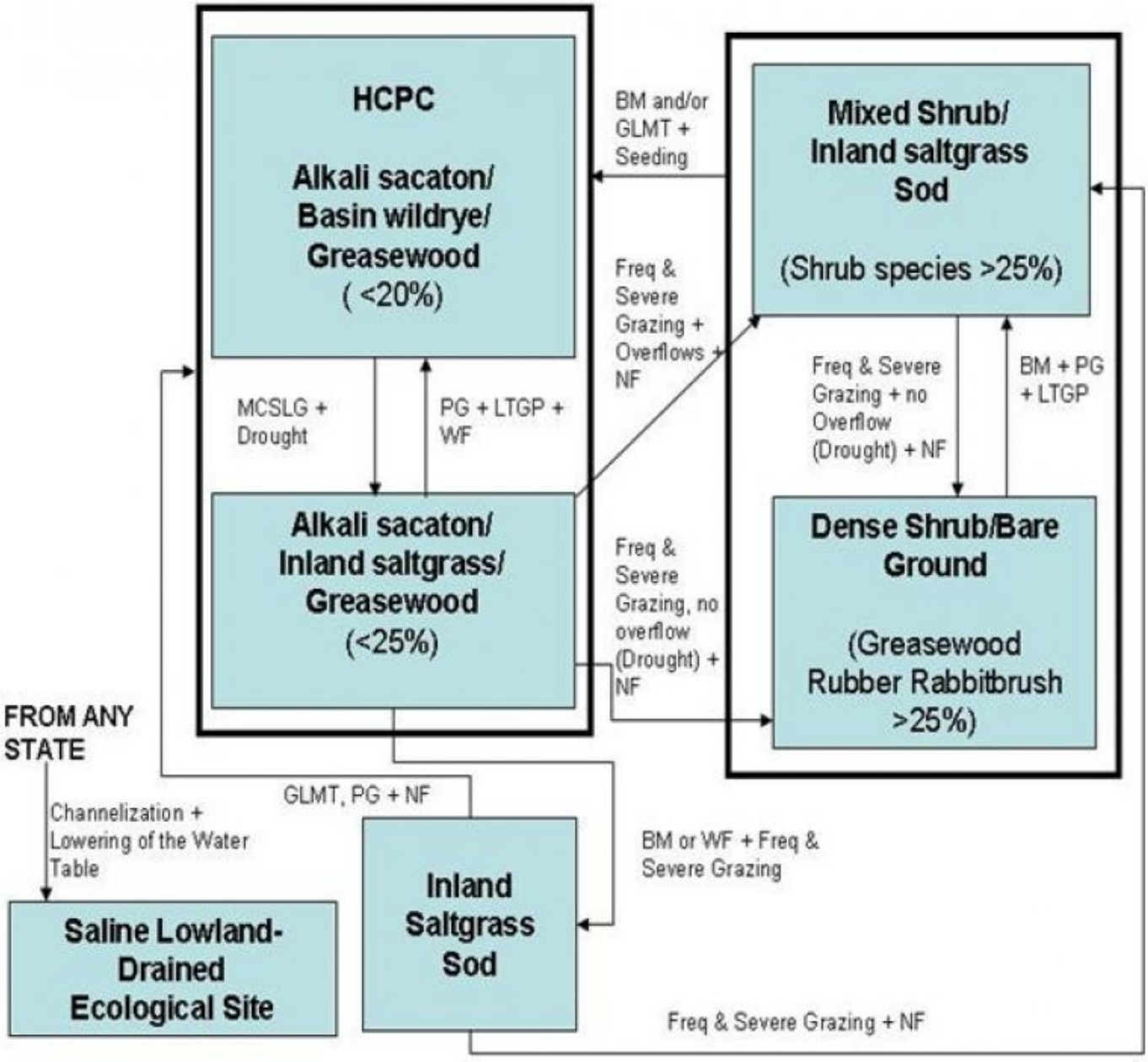
production.

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.

Plant Community Narratives
Following are the narratives for each of the described plant communities. These plant communities may not represent every possibility, but they probably are the most prevalent and repeatable plant communities. The plant composition tables shown above have been developed from the best available knowledge at the time of this revision. As more data is collected, some of these plant communities may be revised or removed, and new ones may be added. None of these plant communities should necessarily be thought of as “Desired Plant Communities”. According to the USDA NRCS National Range and Pasture Handbook, Desired Plant Communities (DPC’s) will be determined by the decision-makers and will meet minimum quality criteria established by the NRCS. The main purpose for including any description of a plant community here is to capture the current knowledge and experience at the time of this revision.

State and transition model



BM - Brush Management (fire, chemical, mechanical)
Freq. & Severe Grazing - Frequent and Severe Utilization of the Cool-season Mid-grasses during the Growing Season
GLMT - Grazing Land Mechanical Treatment
LTPG - Long-term Prescribed Grazing
MCSLG - Moderate, Continuous Season-long Grazing
NU, NF - No Use and No Fire
PG - Prescribed Grazing (proper stocking rates with adequate recovery periods during the growing season)
VLTPG - Very Long-term Prescribed Grazing (could possibly take generations)
WF - Wildfire

State 1
Alkali sacaton/ Basin wildrye/ Greasewood

Community 1.1
Alkali sacaton/ Basin wildrye/ Greasewood

The interpretive plant community for this site is the Historic Climax Plant Community. This state evolved with grazing by large herbivores, periodic fires, supplemental moisture, and saline and/or alkali soils. Potential vegetation is about 70% grasses or grass-like plants, 10% forbs and 20% woody plants. Saline tolerant grasses dominate the state. The major grasses include alkali sacaton, basin wildrye, rhizomatous wheatgrasses, and bottlebrush squirreltail. Woody plants are greasewood and rubber rabbitbrush. A variety of forbs also occurs in this state and plant diversity is high (see Plant Composition Table). The total annual production (air-dry weight) of this state is about 1200 pounds per acre, but it can range from about 700 lbs./acre in unfavorable years to about 1600 lbs./acre in above average years. This state is stable and well adapted to the Northern Great Plains climatic conditions. The diversity in plant species 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: • Moderate, continuous season-long grazing will convert this plant community to the Alkali Sacaton/Inland Saltgrass/Greasewood Plant Community. Prolonged Drought will exacerbate this transition. • Channelization and lowering of the Water Table will result in a Saline Lowland-Drained Ecological Site.

Figure 3. Plant community growth curve (percent production by month). WY0802, 5-9WR extra water sites.

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

State 2
Alkali sacaton/ Inland saltgrass/ Greasewood

Community 2.1
Alkali sacaton/ Inland saltgrass/ Greasewood

Historically, this plant community evolved under moderate grazing by large ungulates and low fire frequency. Currently, this site is normally found under a moderate, continuous season-long grazing regime and in the absence of fire or brush control. Prolonged drought can also play an important role and will exacerbate these conditions. Saline and flood tolerant perennial plants make up the dominant species in this plant community. Dominant grasses include alkali sacaton, inland saltgrass, rhizomatous wheatgrasses, blue grama, and mat muhly. Forbs commonly found in this plant community include wild onion, pursh seepweed, smooth goldaster, and povertyweed. Greasewood and rubber rabbitbrush comprise the majority of the woody species and make up less than 25% of the annual production. When compared to the Historical Climax Plant Community, basin wildrye and rhizomatous wheatgrasses have decreased. Annual weedy plants have increased, but occur in small patches. Inland saltgrass, greasewood, and rubber rabbitbrush have increased. The total annual production (air-dry weight) of this state is about 880 pounds per acre, but it can range from about 500 lbs./acre in unfavorable years to about 1100 lbs./acre in above average years. This state is stable and protected from excessive erosion. The herbaceous component is mostly intact and plant vigor and replacement capabilities are sufficient. Only minimal occurrences of water flow patterns and litter movement is evident. Incidence of pedestalling is minimal. Soils are mostly stable and the surface shows minimum soil loss. The watershed is functioning and the biotic community is intact. Transitional pathways leading to other plant communities are as follows: • Prescribed grazing and possible long-term prescribed grazing will result in a plant community very similar to the Historic Climax Plant Community, except that greasewood will persist without a return to a normal fire regime or some form of brush control. • Frequent and severe grazing with brush management or wildfire will convert this plant community to the Inland Saltgrass Sod Vegetation State. • Frequent and severe grazing with the occasional overflow and no fire will convert this plant community to the Mixed Shrub/Inland Saltgrass Sod Plant Community. • Frequent and severe grazing with no overflow and no fire will convert this plant community to the Dense Shrub/*Bare Ground* Plant Community. Prolonged Drought will exacerbate this transition. • Channelization and lowering of the Water Table will result in a Saline Lowland-Drained Ecological Site

Figure 4. Plant community growth curve (percent production by month).

WY0802, 5-9WR extra water sites.

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

State 3
Mixed Shrub/ Inland saltgrass Sod

Community 3.1
Mixed Shrub/ Inland saltgrass Sod

This plant community is the result of frequent and severe grazing with periodic overflows and no fire or brush control. This plant community is dominated by a dense short grass sod and includes a mosaic shrub overstory. Greasewood and rubber rabbitbrush are the primary overstory species in this plant community. Shrubs comprise less than 25% of the annual production. The dominant grasses are inland saltgrass, mat muhly, and blue grama. Noxious weeds such as Russian knapweed, leafy spurge, or Canada thistle may invade the site. Plant diversity is moderate to poor. When compared with the HCPC or the Mixed Shrub/ Perennial Grass Plant Communities, the annual production is similar, as the shrub production compensates for the decline in the herbaceous production. When compared to the Historic Climax Plant Community, the tall and medium grasses are absent. Short warm season grasses are dominant and weedy annuals are common. Shrubs will have increased as a percentage of the total production, but will not dominate as the sod prevents a homogeneous shrub cover. Noxious weeds such as Russian knapweed are present if a seed source is available. Areas of bare ground may have increased in patches and total production has decreased. The total annual production (air-dry weight) of this state is about 480 pounds per acre, but it can range from about 300 lbs./acre in unfavorable years to about 600 lbs./acre in above average years. The sod component of this plant community is extremely resistant to change and continued frequent and severe grazing or the removal of grazing does not seem to affect the plant composition or structure of the plant community. The biotic integrity of this state is mostly not functional as plant diversity is poor especially the amount of herbaceous species. However, the vegetative structure may still be partially intact as the shrub component is still within a reasonable percentage of the total composition. This sod bound plant community is very resistant to water infiltration. While this sod protects the site itself, excessive runoff increases erosion on bare ground and can cause rills, channels and gully erosion. Water flow patterns are obvious in the bare ground areas and shrubs and sod patches are pedestalled. Rills are noticeable in the interspaces and gullies may be establishing where rills have concentrated. The watershed may or may not be functioning, as runoff is excessive and erosional processes are accelerated. Transitional pathways leading to other plant communities are as follows: • Grazing land mechanical treatment (chiseling, etc.) and brush management followed by prescribed grazing and if necessary seeding will return this plant community to near Historic Climax Plant Community. • Frequent and severe grazing with no overflow will convert this plant community to the Dense Shrub/*Bare Ground* Sod Plant Community. Prolonged Drought will exacerbate this transition. • Channelization and lowering of the Water Table will result in a Saline Lowland-Drained Ecological Site

Figure 5. Plant community growth curve (percent production by month). WY0802, 5-9WR extra water sites.

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

State 4
Dense Shrub/ Bare Ground

Community 4.1
Dense Shrub/ Bare Ground

This plant community evolved under frequent and severe grazing with the absence of fire and an interruption in overflow or an extended period of drought. Greasewood and rubber rabbitbrush are the dominant species of this plant community. Tall and medium grasses have been eliminated. The interspaces between shrubs have expanded leaving the amount of bare ground more prevalent and more soil surface exposed to erosive elements. The annual grasses and forbs, such as cheatgrass, foxtail barley, kochia, halogeton, and Russian thistle, make up the dominant

understory along with noxious weeds such as Russian Knapweed. Total annual production is mostly from shrubs and these weedy annuals. Shrubs make up greater than 25% of the total annual production. When compared with the Mixed Shrub/Inland Saltgrass Sod Plant Community, the annual production is similar as the shrub production compensates for the decline in the herbaceous production. The total annual production (air-dry weight) of this state is about 450 pounds per acre, but it can range from about 350 lbs./acre in unfavorable years to about 600 lbs./acre in above average years. This plant community is resistant to change as the stand becomes more decadent. These areas may actually be more resistant to fire as less fine fuels are available and the bare ground between the shrubs is increased. Continued frequent and severe grazing or the removal of grazing does not seem to affect the plant composition or structure of the plant community. Annual grasses, weedy species and bare ground compromise the biotic integrity. Plant diversity is poor and the potential for native grasses to reproduce is absent. The shift in the vegetative structure and function is extreme and the biotic integrity is lost. The soil of this state is not well protected as erosion has accelerated because of increased bare ground. Water flow patterns and pedestalling are obvious. Infiltration is reduced and runoff is increased. Rills may be noticeable in the interspaces and gullies may be establishing where rills have concentrated. Transitional pathways leading to other plant communities are as follows: • Brush management, Prescribed grazing and possible long-term prescribed grazing will result in the Mixed Shrub/Inland Saltgrass Sod plant community. • Channelization and lowering of the Water Table will result in a Saline Lowland-Drained Ecological Site.

Figure 6. Plant community growth curve (percent production by month). WY0802, 5-9WR extra water sites.

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

State 5
Inland Saltgrass Sod

Community 5.1
Inland Saltgrass Sod

This plant community is the result of long-term improper grazing use plus fire or some form of brush management. This state is dominated by inland saltgrass sod. Intermittent areas of bare ground have increased and extend between the patches of sod. When compared to the Historic Climax Plant Community, the tall and medium grasses are absent. Short warm season grasses are dominant and weedy annuals are common. Noxious weeds such as Russian knapweed are present if a seed source is available. The total annual production (air-dry weight) of this state is about 280 pounds per acre, but it can range from about 100 lbs./acre in unfavorable years to about 350 lbs./acre in above average years. This sod is extremely resistant to change and continued frequent and severe grazing or the removal of grazing does not seem to affect the plant composition or structure of the plant community. The biotic integrity of this state is not functional and plant diversity is extremely low. This sod bound plant community is very resistant to water infiltration. While this sod protects the site itself, excessive runoff increases erosion on bare ground areas and can cause rills, channels and gully erosion. Water flow patterns are obvious in the bare ground areas and pedestalling is apparent along the sod edges. Rills are noticeable in the interspaces and gullies may be establishing where rills have concentrated. The watershed is not normally functioning, as runoff is excessive and erosional processes are accelerated. Transitional pathways leading to other plant communities are as follows: • Grazing land mechanical treatment (chiseling, etc.) followed by prescribed grazing, no fire, and possible reseeding with native species, will return this plant community to near Historic Climax Plant Community condition. • Frequent and severe grazing with the occasional overflows and no fire will convert this state to the Mixed Shrub/Inland Saltgrass Sod Plant Community. • Channelization and lowering of the Water Table will result in a Saline Lowland-Drained Ecological Site

Figure 7. Plant community growth curve (percent production by month). WY0802, 5-9WR extra water sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	35	35	15	5	10	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				202–336	
	alkali sacaton	SPAI	*Sporobolus airoides*	202–404	–
2				135–336	
	basin wildrye	LECI4	*Leymus cinereus*	135–336	–
3				67–135	
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	67–135	–
4				67–202	
	western wheatgrass	PASM	*Pascopyrum smithii*	67–202	–
5				135–269	
	Grass, perennial	2GP	*Grass, perennial*	0–67	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	0–67	–
	blue grama	BOGR2	*Bouteloua gracilis*	0–67	–
	saltgrass	DISP	*Distichlis spicata*	0–67	–
	Canada wildrye	ELCA4	*Elymus canadensis*	0–67	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	0–67	–
Forb					
6				135–269	
	Forb, perennial	2FP	*Forb, perennial*	0–67	–
	textile onion	ALTE	*Allium textile*	0–67	–
	silverweed cinquefoil	ARAN7	*Argentina anserina*	0–67	–
	povertyweed	IVAX	*Iva axillaris*	0–67	–
	spiny phlox	PHHO	*Phlox hoodii*	0–67	–
	Pursh seepweed	SUCA2	*Suaeda calceoliformis*	0–67	–
	smooth woodyaster	XYGL	*Xylorhiza glabriuscula*	0–67	–
Shrub/Vine					
7				135–269	
	greasewood	SAVE4	*Sarcobatus vermiculatus*	135–269	–
8				0–67	
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–67	–
9				0–67	
	basin big sagebrush	ARTRT	*Artemisia tridentata ssp. tridentata*	0–67	–
10				0–67	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–67	–

Animal community

Historic Climax Plant Community: The predominance of grasses in this plant community favors grazers and mixed-feeders, such as bison, deer, and antelope. Suitable thermal and escape cover for wildlife is available as quantities of woody plants are adequate. In addition, topographical variations provide some escape cover as well. When found adjacent to sagebrush dominated states, this plant community may provide brood rearing/foraging areas for sage grouse. Other birds that would frequent this plant community include western meadowlarks, horned larks, and golden eagles as well as upland game birds. Many grassland obligate small mammals would occur here.

Alkali Sacaton/Inland Saltgrass/Greasewood Plant Community: This plant community exhibits a moderate level of plant species diversity due to the accumulation of salts in the soil. It provides both thermal and escape cover for deer and antelope especially if other woody communities are nearby. Birds that would frequent this plant community include western meadowlarks, horned larks, and golden eagles as well as upland game birds. Many grassland obligate small mammals would occur here.

Mixed Shrub/Inland Saltgrass Sod Plant Community: These communities provide some foraging and cover for deer, antelope, and other large ungulates. This plant community, especially if proximal to other woody cover, may be used by sage grouse and other game birds for foraging and cover.

Dense Shrub/*Bare Ground* Plant Community: This plant community can provide important winter foraging and cover for mule deer and antelope. The plant community composition has little diversity, and thus, is less apt to meet the seasonal needs of large grazers. It may provide some foraging opportunities and cover for sage grouse, pheasant, and partridge.

Inland Saltgrass Sod Plant Community: This plant community may be used by the same large grazers that would use the Historic Climax Plant Community. However, the plant community composition is less diverse and productive, 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.

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)
Historic Climax Plant Community 700-1600 .30
Alkali sacaton/Inland saltgrass/Greasewood 500-1100 .22
MixedShrub/Inland Saltgrass Sod 300-600 .12
Dense Shrub/*Bare Ground* 350-600 .07
Inland Saltgrass Sod 100-350 .07

* - 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

Water is the principal factor 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 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. An example of an exception would be where short-grasses form a strong sod that dominates 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 hunting opportunities for upland game species and big game such as deer and antelope. The wide variety of plants which bloom from spring until fall have an esthetic value that appeals 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 inventory data. Field observations from range trained personnel were also used. Those involved in developing this site include: Chris Krassin, 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
Ocular field estimations observed by trained personnel.

Contributors

C. Krassin

Approval

Kirt Walstad, 4/30/2024

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	07/01/2005
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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 15-25% 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 70% 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 > Forbs > Short stature Grasses/grasslikes

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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 25-35% with depths of 0.2 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):** 1200 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:** Cheatgrass and other annuals, Greasewood, Rubber rabbitbrush, Inland saltgrass, Exotics 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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