USDA Natural Resources
Conservation Service

Ecological site EX043B23A138
Saline Lowland (SL) Absaroka Lower Foothills

Last updated: 10/04/2019
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.

MLRA notes

Major Land Resource Area (MLRA): 043B–Central Rocky Mountains

Major Land Resource Unit (MLRA) 43B: Central Rocky Mountains

43B – Central Rocky Mountains – The Central Rocky Mountains extends from northern Montana to southern extent of Wyoming and from Idaho to central Wyoming. The southern extent of 43B is comprised of a combination of metamorphic, igneous, and sedimentary mountains and foothills. Climatic changes across this extent are broad and create several unique breaks in the landscape.

Further information regarding MLRAs, refer to: United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.
Available electronically at: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_053624#handbook.

LRU notes

LRU Notes:
Land Resource Unit (LRU) 43B23A: Absaroka Lower Foothills

Based on the shifts in geology, precipitation patterns and other climatic factors, as well as elevations and vegetation, the Absaroka Range was divided into LRU 23. Further division of this LRU is necessary due to the gradient moving from the foothills to the summit, as well as aspect shifts (north/east face versus south/west face). Subset A is set for the lower elevations within the foothills with 10 to 14 inches of precipitation. To verify or identify the LRU A (the referenced LRU for this ecological site), refer to the Wyoming LRU matrix key contained within the Ecological Site Key. This particular LRU occurs along the eastern lower foothills of the Absaroka Range. This LRU starts north of Clark, WY and runs to the Thermopolis, WY area. Once the foothills cross into the Northern Beartooth Range, the climatic patterns and elevation changes shifts the plant community and allows for a break in LRU's near the Montana state line. As the LRU follows to the south and tracks east with the intersection of the Absaroka and Owl Creek Ranges, the face changes aspect and geology creating a shift in plant dynamics and a break in the LRU. The extent of soils currently correlated to this ecological site does not fit within the digitized boundary. Many of the noted soils are provisional and will be reviewed and corrected in mapping update projects. Other map units are correlated as small inclusions within other MLRA’s/LRU’s based on elevation, landform, and biological references.

Moisture Regime: Aridic Ustic or Ustic Aridic – Progressive Initial mapping has shown that soil correlations completed prior to 2014 were identified as ustic aridic, after further evaluation of climatic and soil taxonomy information the proper moisture regime is aridic ustic. Both are recorded here until an update project is completed to correct the previous correlations.

Temperature Regime: Frigid

Dominant Cover: Rangeland – Sagebrush Steppe (major species is Wyoming Big Sagebrush)
Representative Value (RV) Effective Precipitation: 10-14 inches (254 – 355 mm)
RV Frost-Free Days: 80-110 days

Classification relationships

Relationship to Other Established Classification Systems:

National Vegetation Classification System (NVC):
3 Xeromorphic Woodland, Scrub & Herb Vegetation Class
3.B Cool Semi-Desert Scrub & Grassland Subclass
3.B.1 Cool Semi-Desert Scrub & Grassland formation
3.B.1.NE Western North American Cool Semi-Desert Scrub & Grassland Division
M169 Great Basin & Intermountain Tall Sagebrush Shrubland & Steppe Macrogroup

Ecoregions (EPA):
Level I: 10 North American Deserts Level II: 10.1 Cold Deserts
Level III: 10.1.18 Wyoming Basin
Level IV: 10.1.18.b Big Horn Basin and
10.1.18.d Foothills and Low Mountains

Ecological site concept

• Site receives additional water as overflow from stream channel and influence from a fluctuating water table.
• Water table will fluctuate from 2.5 to 5 ft deep, but is generally 3 ft or deeper from the soil surface.
• Slope is <6%
• Soils are:
- saline, sodic, or saline-sodic, gypsic
- Shallow, moderately deep, deep, or very deep (depth to restrictive layer is greater than 10” (25 cm).
- Textures usually range from very fine sandy loam to clay
- Clay content is < 40% in mineral soil surface 4”.
- With an average particle size class < 60% clay

Associated sites

R032XY328WY	**Lowland (LL) 10-14" East Precipitation Zone** Lowland will occur intermixed with saline lowland, especially in drainages that are controlled by inter-bedded sedimentary bedrock.
R032XY304WY	**Clayey (Cy) 10-14" East Precipitation Zone** Clayey sites are common on higher points in the landscape intermixed with saline lowland, or will be dominant on the step above these soils (stream terraces, alluvial fans).
R032XY342WY	**Saline Subirrigated (SS) 10-14" East Precipitation Zone** Saline Subirrigated is associated with Saline Lowland in perennial stream systems or in irrigated landscapes (historic flood irrigation seepage or runoff).

Similar sites

R032XY238WY	**Saline Lowland (SL) 5-9” Wind River Basin Precipitation Zone** Saline Lowland 5-9" Wind River Basin Precipitation Zone is lower in production than this site.
R032XY138WY	**Saline Lowland (SL) 5-9” Big Horn Basin Precipitation Zone** Saline Lowland 5-9" Big Horn Basin Precipitation Zone is lower in production than this site.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Sarcobatus vermiculatus*

Herbaceous	(1) *Sporobolus airoides*

Legacy ID

R043BX538WY

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) Foothills > Flood plain (2) Foothills > Drainageway (3) Foothills > Stream terrace
Runoff class	Negligible to low
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	1,646–2,286 m
Slope	0–10%
Water table depth	91–152 cm
Aspect	Aspect is not a significant factor

Climatic features

Annual precipitation and modeled relative effective annual precipitation ranges from 10 to 14 inches (254 – 355 mm). 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 15th and continues until about July 1st. Cool weather and moisture in September may produce some green up of cool season plants that will continue through late October.

Review of a 30 year trend of data for Average Temperature as well as Average Precipitation, there has been a warming trend, but as the last 12 years graphed, the temperatures have swayed high and low, but overall it has maintained a steady trajectory, neither increasing nor decreasing. Where on the moisture side, the trajectory in trend has been a slow decline. The swings of when spring warm up and first frost hit with the decline in average precipitation have produced a drought effect where the moisture is not being received when the plants and ground is able to utilize the moisture. And in some cases, the late precipitation has encouraged the warm season or mat forming species over the cool season bunchgrasses that are the drivers of the natural system. Early frosts, with dry open winters has created a more arid or desert effect on plants resulting in high rates of winter kill, loss of vigor or overall damage to the plant.

For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at

http://www.wcc.nrcs.usda.gov/. “Buffalo Bill Dam", "Cody 21SW", "Thermopolis", "Thermopolis 25WNW" and "Wapiti 1NE" are the representative weather stations within LRU D. The following graphs and charts are a collective sample representing the averaged normals and 30 year annual rainfall data for the selected weather stations from 1981 to 2010.

Table 3. Representative climatic features

Frost-free period (characteristic range)	64-106 days
Freeze-free period (characteristic range)	101-144 days
Precipitation total (characteristic range)	279-305 mm
Frost-free period (actual range)	46-118 days
Freeze-free period (actual range)	88-147 days
Precipitation total (actual range)	254-330 mm
Frost-free period (average)	80 days
Freeze-free period (average)	117 days
Precipitation total (average)	305 mm

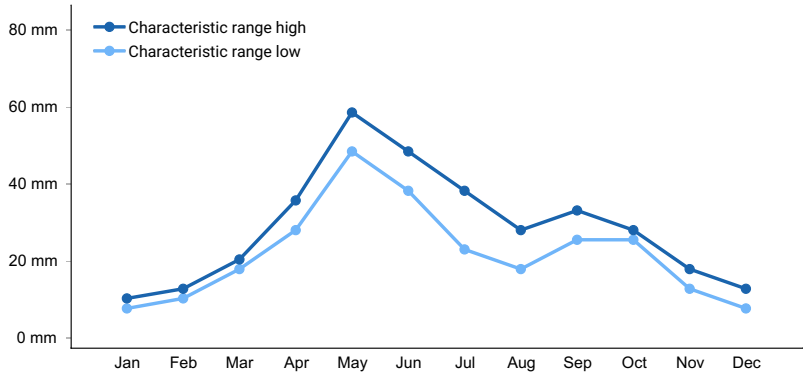


Figure 1. Monthly precipitation range

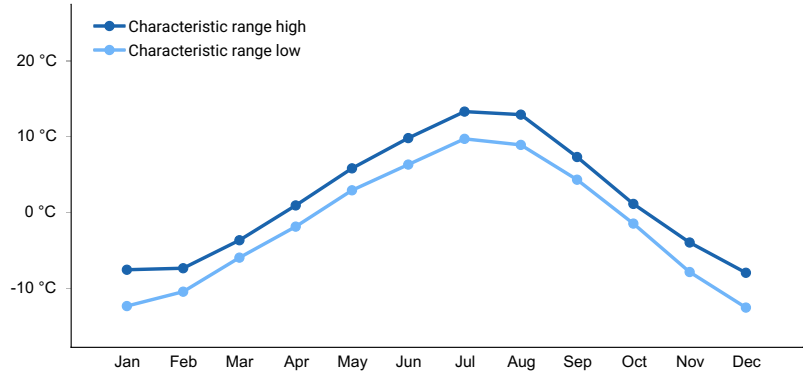


Figure 2. Monthly minimum temperature range

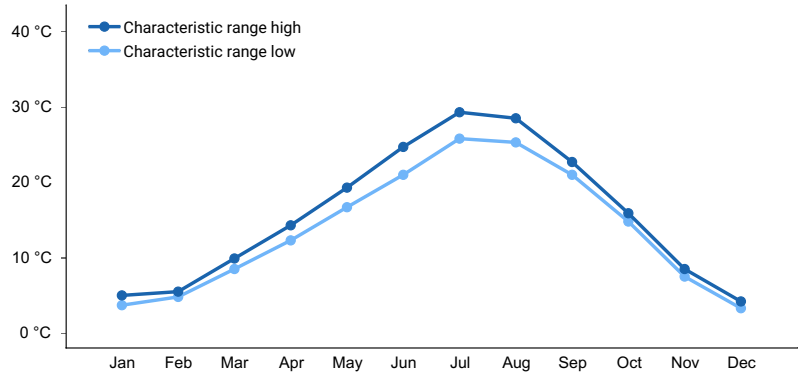


Figure 3. Monthly maximum temperature range

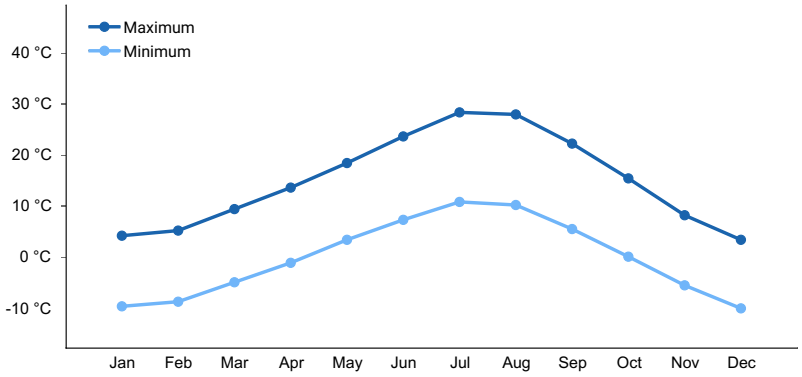


Figure 4. Monthly average minimum and maximum temperature

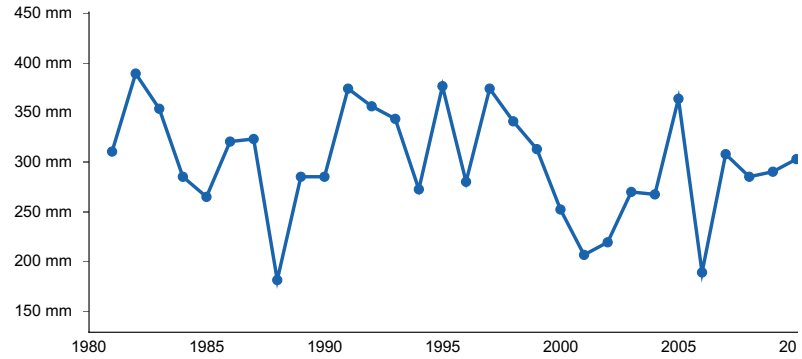


Figure 5. Annual precipitation pattern

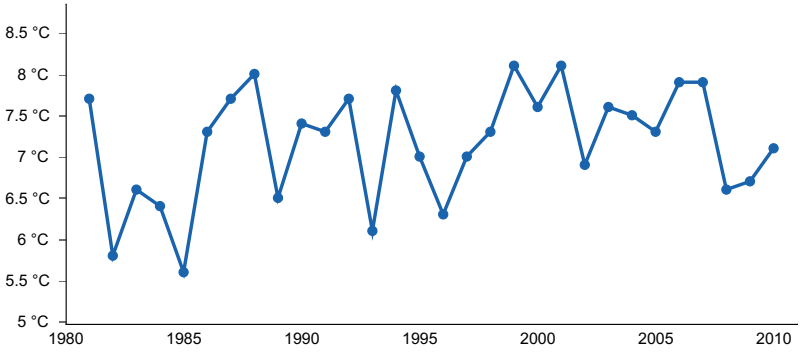


Figure 6. Annual average temperature pattern

Climate stations used

- (1) THERMOPOLIS [USC00488875], Thermopolis, WY
- (2) THERMOPOLIS 25WNW [USC00488888], Thermopolis, WY
- (3) SUNSHINE 3NE [USC00488758], Meeteetse, WY

- (4) CODY 21 SW [USC00481855], Cody, WY
- (5) WAPITI 1NE [USC00489467], Cody, WY
- (6) BUFFALO BILL DAM [USC00481175], Cody, WY

Influencing water features

The characteristics of these bottomland soils have influence from ground water (water table below 36 inches (150 cm)) and have an influence from surface water/overland flow. Irrigation seepage and pockets of higher snow accumulation and slower melt off will create isolated occurrences of these sites on upland positions.

Wetland description

No wetland or stream type identified, although site is associated with these features.

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 range 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.

Major Soil Series correlated to this site include:

Table 4. Representative soil features

Parent material	(1) Alluvium–sedimentary rock (2) Slope alluvium–sedimentary rock
Surface texture	(1) Loam (2) Clay loam (3) Silt loam (4) Silty clay (5) Sandy loam (6) Clay
Family particle size	(1) Loamy
Drainage class	Somewhat poorly drained to excessively drained
Permeability class	Moderate to rapid
Soil depth	51–152 cm
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)	13–40
Soil reaction (1:1 water) (0-101.6cm)	8.4–9.6

Ecological dynamics

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 75% grasses, 10% forbs and 15% 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.

Any significant hydrologic disturbance and consequently channelization will result in the conversion to a plant community dominated more by upland plant species. These sites are usually not recoverable and with time will develop into a Saline Lowland-Drained ecological site (see Saline Lowland-Drained 10-14” East, 032XY340WY).

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.

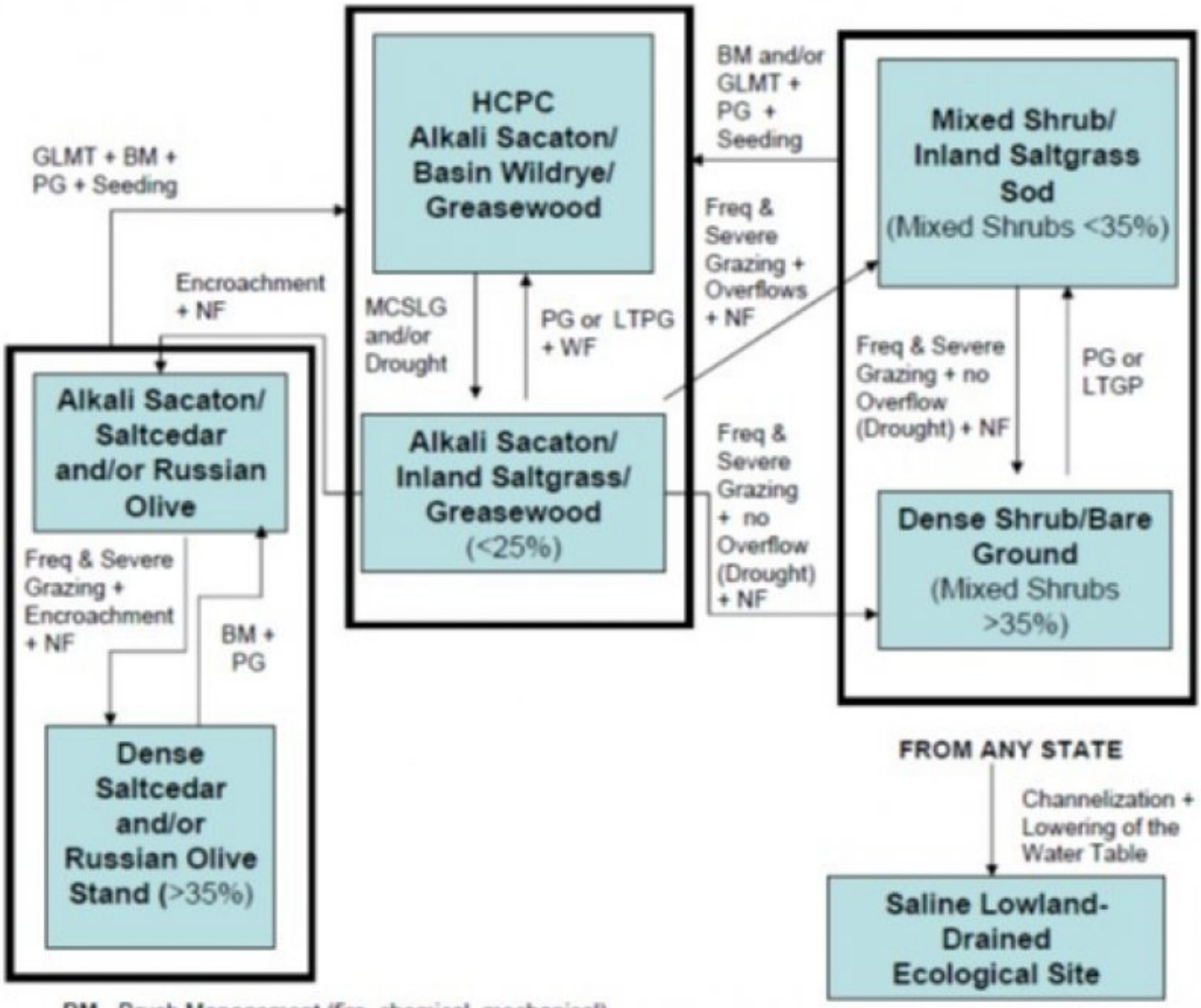
The following is a State and Transition Model Diagram that illustrates the common plant communities (states) that can occur on the site and the transitions between these communities. The ecological processes will be discussed in more detail in the plant community narratives following the diagram.

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

Site Type: Rangeland
MLRA: 32 – Northern Intermountain Desertic Basins

Saline Lowland 10-14" E
032XY338WY



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 75% grasses or grass-like plants, 10% forbs and 15% woody plants. Saline tolerant grasses dominate the state. The major grasses include alkali sacaton, basin and Canada wildrye, and rhizomatous wheatgrasses. Dominant woody plants are typically 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 1800 pounds per acre, but it can range from about 1200 lbs. /acre in unfavorable years to about 2200 lbs. /acre in above average years. This state is stable and well adapted to the Northern Intermountain Desertic Basins 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.

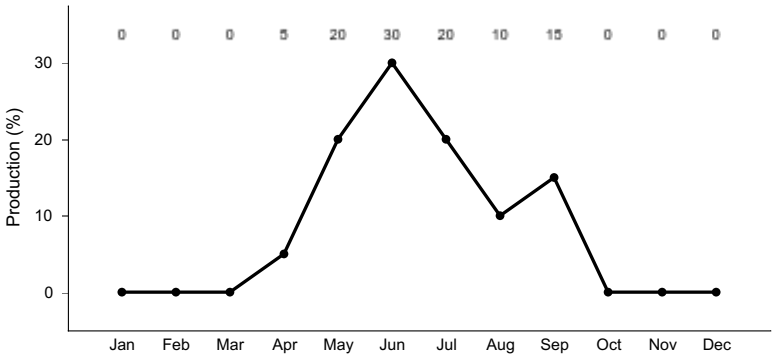


Figure 8. Plant community growth curve (percent production by month). WY0702, 10-14E Extra water sites - LL, SL, Ov, CyO.

State 2
Alkali Sacaton/Inland Saltgrass/ Greasewood

Community 2.1
Alkali Sacaton/Inland Saltgrass/ Greasewood

Historically, this plant community evolved under moderate grazing by domestic livestock and low fire frequency. Currently, this site is normally found under a moderate, 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. The dominant grasses include alkali sacaton, inland saltgrass, rhizomatous wheatgrasses, bottlebrush squirreltail, and Sandberg bluegrass. Forbs commonly found in this plant community include wild onion, pursh seepweed, smooth goldaster, and povertyweed. Greasewood and rubber rabbitbrush comprises 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 and Canada wildrye have decreased. Annual weedy plants have invaded, 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 1500 pounds per acre, but it can range from about 1000 lbs./acre in unfavorable years to about 1800 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 or possibly 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 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. • Encroachment of saltcedar and/or Russian Olive and no fire will convert this plant community to the Alkali Sacaton/Saltcedar and/or Russian Olive plant community. • Channelization and lowering of the Water Table will result in a Saline Lowland-Drained Ecological Site

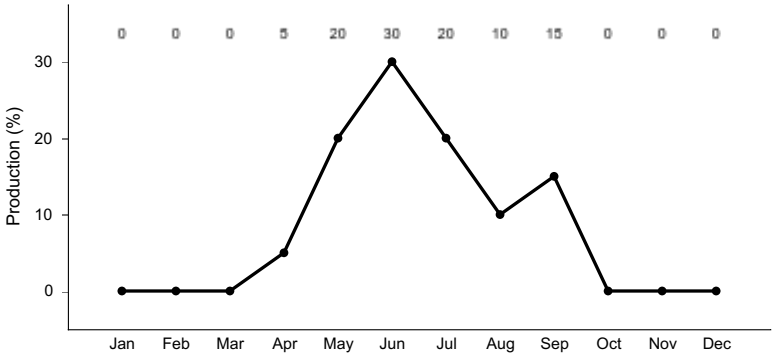


Figure 9. Plant community growth curve (percent production by month). WY0702, 10-14E Extra water sites - LL, SL, Ov, CyO.

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 35% of the annual production. The dominant grasses are inland saltgrass, Sandberg bluegrass, 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 Plant Community, the annual production is reduced, but the shrub production compensates for some of 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 1000 pounds per acre, but it can range from about 700 lbs./acre in unfavorable years to about 1300 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 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 rill channels and gully erosion. Water flow patterns are obvious in the bare ground areas and shrubs and sod patches are pedestalled. Rill channels 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* Plant Community. Prolonged drought will exacerbate this transition. • Channelization and lowering of the Water Table will result in a Saline Lowland-Drained Ecological Site

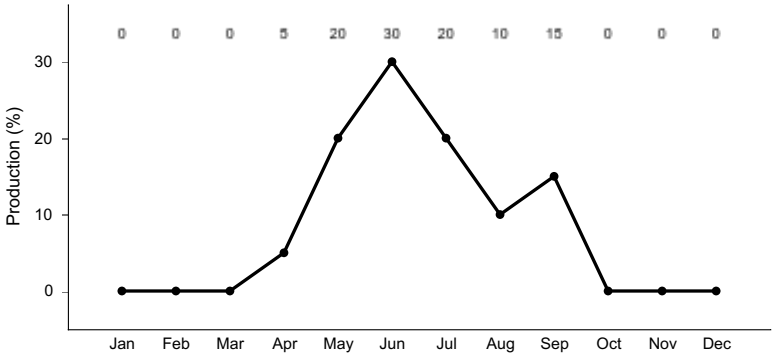


Figure 10. Plant community growth curve (percent production by month). WY0702, 10-14E Extra water sites - LL, SL, Ov, CyO.

State 4
Dense Shrub/ Bare Gound

Community 4.1
Dense Shrub/ Bare Gound

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 35% 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 800 pounds per acre, but it can range from about 500 lbs. /acre in unfavorable years to about 1200 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. Rill channels 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, followed by prescribed grazing and seeding if necessary, will return this plant community at or near the HCPC. If prescribed fire is used as a means to reduce or remove the shrubs, sufficient fine fuels will need to be present. This may require deferment from grazing prior to treatment. Since both greasewood and rubber rabbitbrush are difficult to remove, repeated treatments or a combination of treatments may be necessary. Post management is critical to success. This can range from two or more years of rest to partial growing season deferment, depending on the condition of the understory at the time of treatment and the growing conditions following treatment. In the case of an intense wildfire that occurs when desirable plants are not completely dormant, the length of time required to reach the HCPC may be increased and seeding of natives is recommended. • Prescribed Grazing or possibly Long Term Prescribed Grazing will convert this plant community 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.

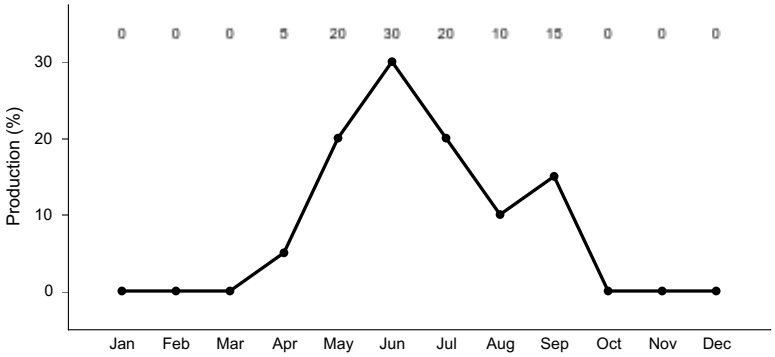


Figure 11. Plant community growth curve (percent production by month). WY0702, 10-14E Extra water sites - LL, SL, Ov, CyO.

State 5
Alkali Sacaton/ Saltcedar and/or Russian Olive

Community 5.1
Alkali Sacaton/ Saltcedar and/or Russian Olive

This plant community occurs where saltcedar and/or Russian olive encroach into a saline lowland-drained site or once these species invade a saline lowland site and become established. This occurs with or without grazing and is the result of conditions conducive to the colonization of these plants. An increase in bare ground is likely to increase the potential for colonization. However, areas that have been deferred or removed from grazing and have a healthy stand of alkali sacaton can be infested. Saline tolerant perennial plants make up the dominant understory species in this plant community. The dominant grasses include alkali sacaton, inland saltgrass, rhizomatous wheatgrasses, and blue grama. Forbs commonly found in this plant community include wild onion, pursh seepweed, smooth woodyaster, and povertyweed. Saltcedar and/or Russian olive comprise the majority of the woody species and usually make up greater than 35% of the annual production. Invasion of saltcedar or Russian olive should be considered serious and should be controlled. When compared to the Historical Climax Plant Community, basin wildrye has decreased. Inland saltgrass has increased. Saltcedar and Russian olive have invaded. Total production is less but is similar to the Alkali Sacaton/Inland Saltgrass/Greasewood Plant community. The total annual production (air-dry weight) of this state is about 1200 pounds per acre, but it can range from about 800 lbs./acre in unfavorable years to about 1600 lbs./acre in above average years. This plant community is mostly resistant to change, but species composition can be altered through long-term overgrazing and further encroachment of saltcedar and Russian olive. The herbaceous component is stable and plant vigor and replacement capabilities are sufficient. The biotic community is not intact due to the encroachment of these invasive species. Plant diversity is moderate. Soils are mostly stabilized. 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 may or may not be functional. Transitions or pathways leading to other plant communities are as follows: • Frequent and severe grazing plus Encroachment will convert the plant community to the Dense Saltcedar and/or Russian Olive Stand Plant Community. • Grazing land mechanical treatment, brush management, and prescribed grazing may convert this plant community to the Historic Climax Plant Community, but recovery is mostly impractical as removal of salt cedar and/or Russian olive is expensive and total removal is typically not obtainable. Salt cedar and Russian olive will still probably persist as suppression and containment of this plant is optimal. Any methods of control should be followed by revegetation to reduce regeneration of this plant and other weedy species.

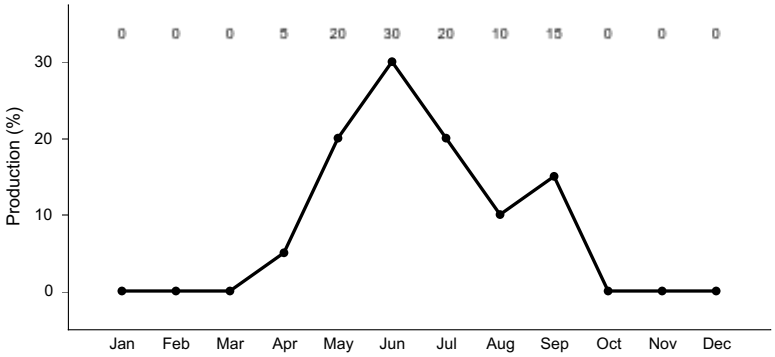


Figure 12. Plant community growth curve (percent production by month). WY0702, 10-14E Extra water sites - LL, SL, Ov, CyO.

State 6
Dense Saltcedar and or/ Russian Olive Stand

Community 6.1
Dense Saltcedar and or/ Russian Olive Stand

This plant community evolved under frequent and severe grazing and encroachment of saltcedar and/or Russian olive. Saltcedar and/or Russian olive dominate this plant community. Most of the tall and medium grasses have been eliminated and an understory of weedy herbaceous plants is prevalent. The interspaces between woody plants have expanded leaving more soil surface exposed to erosive elements or invaders. The weedy plants, such as kochia, halogeton, Russian knapweed, and Russian thistle, make up the dominant understory. Total annual production is mostly from shrubs and these weedy plants. Saltcedar and/or Russian olive make up greater than 35% of the total annual production. When compared with the HCPC, the annual production is less due to the remove of the perennial grass and amount of bare ground. The increase in woody species, however, compensates for some of this loss. The total annual production (air-dry weight) of this state is about 800 pounds per acre, but it can range from about 500 lbs./acre in unfavorable years to about 1000 lbs./acre in above average years. This plant community is resistant to change as the stand becomes denser. 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. Saltcedar, Russian olive, 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 protected as erosion has accelerated because of increased bare ground. Water flow patterns and pedestalling are obvious. Infiltration is reduced and runoff is increased. Rill channels may be noticeable in the interspaces and gullies may be establishing where rills have concentrated. The watershed is not functional due to excessive runoff, erosion and bare ground. Transitional pathways leading to other plant communities are as follows: • Brush management and prescribed grazing will result in an Alkali Sacaton/Saltcedar and/or Russian Olive Plant Community. Controlling both saltcedar and Russian olive is a priority if these species have invaded. Any methods of control should be followed by revegetation to reduce regeneration of these two species and other weedy plants. • Grazing land mechanical treatment, brush management, and prescribed grazing may convert this plant community to the Historic Climax Plant Community, but recovery is mostly impractical as removal saltcedar and/or Russian olive is both expensive and total removal is typically not obtainable. Saltcedar and Russian olive will still probably persist as suppression and containment of this plant is optimal. Any methods of control should be followed by revegetation to reduce regeneration of this plant and other weedy species.

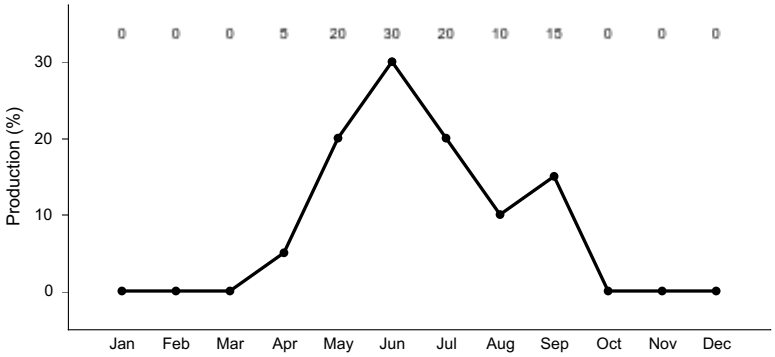


Figure 13. Plant community growth curve (percent production by month). WY0702, 10-14E Extra water sites - LL, SL, Ov, CyO.

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				303–504	
	alkali sacaton	SPAI	*Sporobolus airoides*	303–504	–
2				404–706	
	basin wildrye	LECI4	*Leymus cinereus*	404–706	–
3				0–202	
	Canada wildrye	ELCA4	*Elymus canadensis*	0–202	–
4				101–303	
	western wheatgrass	PASM	*Pascopyrum smithii*	101–303	–
5				0–202	
	Grass, perennial	2GP	*Grass, perennial*	0–101	–
	saltgrass	DISP	*Distichlis spicata*	0–101	–
	squirreltail	ELEL5	*Elymus elymoides*	0–101	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–101	–
Forb					
6				0–202	
	Forb, perennial	2FP	*Forb, perennial*	0–101	–
	textile onion	ALTE	*Allium textile*	0–101	–
	silverweed cinquefoil	ARAN7	*Argentina anserina*	0–101	–
	povertyweed	IVAX	*Iva axillaris*	0–101	–
	phlox	PHLOX	*Phlox*	0–101	–
	Pursh seepweed	SUCA2	*Suaeda calceoliformis*	0–101	–
	woodyaster	XYLOR	*Xylorhiza*	0–101	–
Shrub/Vine					
7				202–404	
	greasewood	SAVE4	*Sarcobatus vermiculatus*	202–404	–
8				0–101	
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–101	–
9				0–101	
	Woods' rose	ROWOW	*Rosa woodsii var. woodsii*	0–101	–
10				0–101	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–101	–

Animal community

Animal Community – Wildlife Interpretations

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, as well as lek sites. 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. 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.

Mixed Shrub/Inland Saltgrass Sod Plant Community: These communities provide some foraging and cover for deer, antelope, and other large ungulates. This plant community 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 during that time. The plant community composition comprises little diverse, and thus, less apt to meet the seasonal needs of large grazers. It may provide some foraging opportunities and cover for sage grouse, pheasant, and partridge.

Alkali Sacaton/Saltcedar and/or Russian Olive: This plant community may be useful for the same large grazers that would use the Historic Climax Plant Community. However, the plant community is less productive, and thus, less apt to meet the seasonal needs of these animals. The shrub cover does provide good thermal and escape cover for both large animals and upland birds. Russian olive may provide a good source of food for some upland game birds and large animals. Many grassland obligate small mammals would occur here.

Dense Saltcedar and/or Russian Olive Stand: This plant community can provide important winter cover for mule deer and antelope during that time and some foraging value if Russian olive trees are present. The plant community composition comprises little diversity, and thus, less apt to meet the seasonal needs of large grazers. The dense shrub cover does provide good thermal and escape cover for both large animals and upland birds. Russian olive may provide a good source of food for some upland game birds and large animals. Many grassland obligate small mammals would occur here.

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 1200-2200 .50
Alkali sacaton/Inland saltgrass/Greasewood 1000-1800 .40
Mixed Shrub/Inland Saltgrass Sod 700-1300 .15
Dense Shrub/*Bare Ground* 400-1200 .10
Alkali Sacaton/Saltcedar and/or Russian Olive 800-1600 .30
Dense Saltcedar and/or Russian Olive Stand 500-1000 .10

* - 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 varieties 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

Information presented in the original site description was derived from NRCS inventory data. Field observations from range trained personnel were also used. Those involved in developing the original site include: Chris Krassin, Range Management Specialist, NRCS and Everet Bainter, Range Management Specialist. Other sources used as references include USDA NRCS Water and Climate Center, USDA NRCS National Range and Pasture Handbook, USDI and USDA Interpreting Indicators of Rangeland Health Version 3, and USDA NRCS Soil Surveys from various counties.

Information presented here has been derived from NRCS inventory data, Field observations from range trained personnel, and the existing range site descriptions. Those involved in developing the Loamy range site include: Chris Krassin, Range Management Specialist, NRCS and Everet Bainter, Range Management Specialist.

Those involved in the development of the new concept for Loamy and Loamy Calcareous Ecological site include: Ray Gullion, Area Range Management Specialist, NRCS; Jim Wolf, Resource Manager, USDI-BLM; Jack Mononi, Range Management Specialist, USDI-BLM; Daniel Wood, MLRA Soil Survey Leader, NRCS; Jane Karinen, Soil Data Quality Specialist, NRCS; and Marji Patz, Ecological Site Specialist, NRCS.

Inventory Data References:
Ocular field estimations observed by trained personnel were completed at each site. Then sites were selected where a 100 foot tape was stretched and the following sample procedures were completed by inventory staff. For full sampling protocol and guidelines with forms please refer to the Wyoming ESI Operating Procedures, compiled in 2012 for the Powell and Rock Springs Soil Survey Office, USDA-NRCS.
• Double Sampling Production Data (9.6 hoop used to estimate 10 points, clipped a minimum of 3 of these estimated points, with two 21 foot X 21 foot square extended shrub plots).
• Line Point Intercept (over story and understory captured with soil cover). Height of herbaceous and woody cover is collected every three feet along established transect.)
• Continuous Line Intercept (Woody Canopy Cover, with minimum gap of 0.2 of a foot for all woody species and succulents. Intercept height collected at each measurement.),
• Gap Intercept (Basal Gap measured with a minimum gap requirement of 0.7 foot.),
• Sample Point (10 – 1 meter square point photographs taken at set distances on transect. Red using the sample point computer program established by the High Plains Agricultural Research Center, WY).
• Soil Stability (Slake Test – surface and subsurface samples collected and processed according to the soil stability guidelines provided by the Jornada Research Center, NM.)

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Approval

Scott Woodall, 10/04/2019

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)	Ray Gullion, E. Bainter
Contact for lead author	ray.gullion@wy.usda.gov or 307-347-2456
Date	05/01/2008
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.

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

3. **Number and height of erosional pedestals or terracettes:** Rare to nonexistent.

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 0-20%.

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:** Minimal to nonexistent.

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

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 2 (interspaces) to 6 (under plant canopy), but average values should be 3.5 or greater.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil data is limited for this site. Organic matter typically ranges from .5 to 2%.

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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 60-80% grasses, 5% forbs, and 15-35% shrubs. Dense plant canopy (75-100%) and litter, despite slow to moderate infiltration rates, result in minimal runoff. Basal cover is typically greater than 5% for this site and does effectively reduce 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: tall, cool season bunchgrasses perennial shrubs

    Sub-dominant: cool season rhizomatous grasses

    Other: mid & short-size, cool season bunchgrasses = perennial forbs

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Minimal decadence, typically associated with shrub component.

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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 75-100% expected. Herbaceous litter depth typically ranges from 10-25 mm. Woody litter can be up to a couple inches (4-6 cm).

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** English: 1200-2200 lb/ac (1700 lb/ac average); Metric: 1344-2464 kg/ha (1904 kg/ha average).

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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:** Bare ground greater than 30% is the most common indicator of a threshold being crossed. Greasewood and inland saltgrass are common increasers. Perennial pepperweed, annual mustards, halogeton, kochia,

and Russian thistle are common invasive species in disturbed sites.

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