USDA Natural Resources Conservation Service

Ecological site R032XY342WY
Saline Subirrigated (SS) 10-14" East Precipitation Zone

Accessed: 04/26/2024

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.

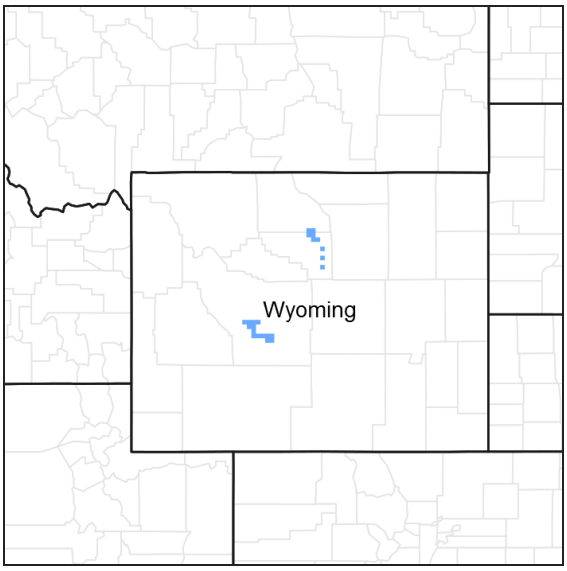


Figure 1. Mapped extent

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

R032XY338WY	**Saline Lowland (SL) 10-14" East Precipitation Zone**
R032XY378WY	**Wetland (WL) 10-14" East Precipitation Zone**

Similar sites

R032XY142WY	**Saline Subirrigated (SS) 5-9” Big Horn Basin Precipitation Zone**
R032XY242WY	**Saline Subirrigated (SS) 5-9” Wind River Basin Precipitation Zone**

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on relatively level lands adjacent to perennial streams, lakes, ponds and springs.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Stream terrace
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Rare to occasional
Ponding duration	Brief (2 to 7 days)
Ponding frequency	None to frequent
Elevation	5,400–7,500 ft
Slope	0–6%
Ponding depth	0–3 in
Water table depth	12–40 in
Aspect	Aspect is not a significant factor

Climatic features

Annual precipitation ranges from 10-14 inches per year. The normal precipitation pattern shows the least amount of precipitation in December, January, and February, increasing to a peak during the latter part of May. Amounts decrease through June, July, and August and then increase some in September. 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 exceeds 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.

Winds are generally not strong as compared to the rest of the state. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 75 mph.

Growth of native cool-season plants begins about April 15 and continues to about July 15. 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 “Thermopolis 2” climate station:
Minimum Maximum 5 yrs. out of 10 between
Frost-free period (days): 74 149 May 23 – September 16
Freeze-free period (days): 112 180 May 8 – October 1
Annual Precipitation (inches): 7.6 21.9

Mean annual precipitation: 12.35 inches
Mean annual air temperature: 46.2 F (30.1 F Avg. Min. to 62.3 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” Grass Creek 1E”, “Thermopolis”, Thermopolis 25NW”, “Buffalo Bill Dam” and “Black Mountain”.

Table 3. Representative climatic features

Frost-free period (average)	149 days
Freeze-free period (average)	180 days
Precipitation total (average)	14 in

Influencing water features

Stream Type: C (Rosgen)

Soil features

The soils of this site are moderately deep to very deep (greater than 20”to bedrock) poorly drained to moderately well drained soils formed in alluvium. These soils have water tables below the surface for all of the growing season. These areas may have water over the surface from run-in but only for short periods of time. The soil characteristics having the most influence on the plant community are depth to a water table during the growing season and the amount of soluble salts.

Major Soil Series correlated to this site include: Fluvaquents

Table 4. Representative soil features

Surface texture	(1) Loam (2) Clay loam (3) Silt loam
Family particle size	(1) Clayey
Drainage class	Poorly drained to well drained
Permeability class	Moderately slow to moderately rapid
Soil depth	20–60 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	2.8–6.2 in
Calcium carbonate equivalent (0-40in)	0–15%
Electrical conductivity (0-40in)	4–16 mmhos/cm
Sodium adsorption ratio (0-40in)	8–16
Soil reaction (1:1 water) (0-40in)	7.4–9
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

Potential vegetation on this site is dominated by plants that can tolerate soils that are saline and/or alkaline and have a water table near the surface for most of the growing season. The expected potential composition for this site is about 80% grasses, 5% 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 and species such as Russian olive, saltcedar and foxtail barley invade the site. Grasses such as alkali sacaton, Nuttall's alkaligrass, and basin wildrye will decrease in frequency and production.

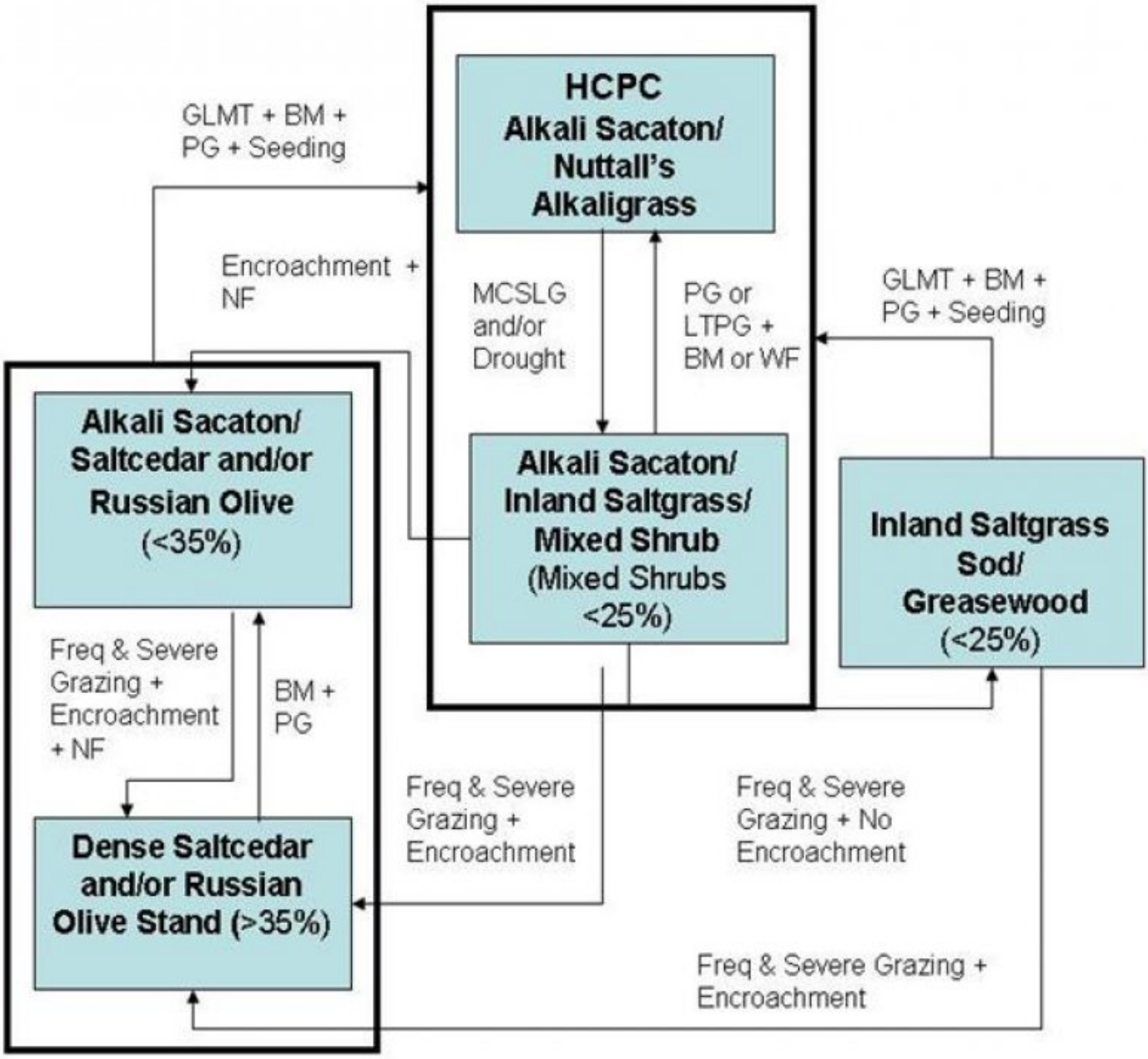
The Historic Climax Plant Community (description follows the plant community diagram) has been determined by study of rangeland relic areas, or areas protected from excessive disturbance. Trends in plant communities going from heavily grazed areas to lightly grazed areas, seasonal use pastures, and historical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

used.

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

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/ Nuttails Alkaligrass

Community 1.1
Alkali Sacaton/ Nuttails Alkaligrass

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 80% grasses or grass-like plants, 5% forbs and 15% woody plants. The major grasses include alkali sacaton, Nuttall's alkaligrass, and basin wildrye. Grasses of lesser importance are Baltic rush, Chairmaker's bulrush, western wheatgrass, alkali cordgrass, inland saltgrass, and tufted hairgrass. Woody plants are primarily rubber rabbitbrush, silver buffaloberry, wild rose, and greasewood. 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 3200 pounds per acre, but it can range from about 2800 lbs./acre in unfavorable years to about 3600 lbs./acre in above average years. The state is stable and well adapted to the Northern Intermountain Desertic Basins climate. The diversity in plant species and the reliable water table allow 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/Mixed Shrub Plant Community. Prolonged drought will exacerbate this transition.

Figure 3. Plant community growth curve (percent production by month). WY0703, 1014E Free water sites - WL, Sb, SS.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
				15	30	20	15	10	10		

State 2
Alkali Sacaton/ Inland Saltgrass/ Mixed Shrub

Community 2.1
Alkali Sacaton/ Inland Saltgrass/ Mixed Shrub

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, western wheatgrass, alkali cordgrass, and Baltic rush. Forbs commonly found in this plant community include alkali seepweed, silverweed, American licorice, seaside arrowgrass, and smooth horsetail. 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, Nuttall's alkaligrass, and tufted hairgrass have decreased. Inland saltgrass, forbs, greasewood, and rubber rabbitbrush have increased. Annual weedy plants have invaded, but occur in small patches. The total annual production (air-dry weight) of this state is about 2800 pounds per acre, but it can range from about 2200 lbs./acre in unfavorable years to about 3400 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 plus no encroachment will convert this plant community to the Inland Saltgrass Sod/Greasewood Plant Community. • Encroachment and no fire will convert this plant community to the Alkali Sacaton/ Saltcedar and/or Russian Olive Plant Community. • Frequent and Severe grazing plus encroachment will convert this plant community to a Dense Saltcedar and/or Russian Olive Stand Plant Community.

Figure 4. Plant community growth curve (percent production by month). WY0703, 1014E Free water sites - WL, Sb, SS.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
				15	30	20	15	10	10		

State 3
Inland Saltgrass Sod/ Greasewood

Community 3.1
Inland Saltgrass Sod/ Greasewood

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, the primary shrub, comprises less than 25% of the annual production, and shrub numbers are kept in check by the herbaceous sod understory. The dominant grasses are inland saltgrass, mat muhly, big bluegrass, Baltic rush and Chairmaker's bulrush. Forbs such as seaside arrowgrass, licorice root, curly dock, and smooth horsetail are common. Greasewood is the primary overstory species in this plant community, but rubber rabbitbrush can also become abundant. Noxious weeds such as Russian knapweed and Canada thistle often invade the site if a seed source is available. Plant diversity is moderate to poor. When compared to the Historic Climax Plant Community, the tall and medium grasses are significantly reduced or 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. Areas of bare ground may have increased in patches, and total production has decreased as the short grasses have replaced the tall and mid grasses. The total annual production (air-dry weight) of this state is about 1500 pounds per acre, but it can range from about 1200 lbs./acre in unfavorable years to about 2000 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 generally not functional as plant diversity is poor, especially the amount of herbaceous species. The vegetative structure has shifted as the shrubs and short grasses now occupy the majority of the site. 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 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 plus encroachment will convert this plant community to the Dense Saltcedar and/or Russian Olive Stand Plant Community. Prolonged drought will exacerbate this transition. Invasion of saltcedar or Russian olive should be consider serious and should be controlled.

Figure 5. Plant community growth curve (percent production by month). WY0703, 1014E Free water sites - WL, Sb, SS.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
				15	30	20	15	10	10		

State 4
Alkali Sacaton/Saltcedar and/ or Russian Olive

Community 4.1
Alkali Sacaton/Saltcedar and/ or Russian Olive

This plant community occurs where saltcedar and/or Russian olive encroaches into a saline subirrigated site and becomes established. This occurs with or without grazing and is the result of conditions conducive to the colonization of these two 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 had a healthy stand of alkali sacaton can still be infested. Saline and flood tolerant perennial plants make up the dominant understory species in this plant community. The dominant grasses include alkali sacaton, inland saltgrass, western wheatgrass, alkali cordgrass,

and Baltic rush. Forbs commonly found in this plant community include alkali seepweed, silverweed, American licorice, seaside arrowgrass, and smooth horsetail. Saltcedar and/or Russian olive comprise the majority of the woody species and usually make up greater than 35% of the annual production. When compared to the Historical Climax Plant Community, basin wildrye, Nuttall's alkaligrass, and tufted hairgrass have decreased. Inland Saltgrass and forbs have increased. Saltcedar and/or Russian olive have invaded. Total production is similar to the Alkali Sacaton/Inland Saltgrass/Mixed Shrub plant community. The total annual production (air-dry weight) of this state is about 2200 pounds per acre, but it can range from about 1600 lbs./acre in unfavorable years to about 2600 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/or 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 more 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 these plants and other weedy species.

Figure 6. Plant community growth curve (percent production by month). WY0703, 1014E Free water sites - WL, Sb, SS.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
				15	30	20	15	10	10		

State 5
Dense Saltcedar and / or Russian Olive stand

Community 5.1
Dense Saltcedar and / or Russian Olive stand

This plant community evolved under frequent and severe grazing with the absence of fire and encroachment of saltcedar and/or Russian olive. Saltcedar and/or Russian olive dominate this plant community. Most of the tall and medium grasses are 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 foxtail barley, curly dock, kochia, halogeton, swainsonpea, 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 removal of the perennial grasses and the amount of bare ground. The increase in woody species compensates for some of this loss. The total annual production (air-dry weight) of this state is about 1800 pounds per acre, but it can range from about 1500 lbs./acre in unfavorable years to about 2000 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 when 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 of salt

cedar and/or Russian olive is both 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 7. Plant community growth curve (percent production by month). WY0703, 1014E Free water sites - WL, Sb, SS.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
				15	30	20	15	10	10		

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				960–1280	
	alkali sacaton	SPAI	*Sporobolus airoides*	960–1280	–
2				800–960	
	Nuttall's alkaligrass	PUNU2	*Puccinellia nuttalliana*	800–960	–
3				160–480	
	basin wildrye	LECI4	*Leymus cinereus*	160–480	–
4				0–320	
	alkali cordgrass	SPGR	*Spartina gracilis*	0–320	–
5				0–320	
	Grass, perennial	2GP	*Grass, perennial*	0–160	–
	saltgrass	DISP	*Distichlis spicata*	0–160	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	0–160	–
	western wheatgrass	PASM	*Pascopyrum smithii*	0–160	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–160	–
	chairmaker's bulrush	SCAM6	*Schoenoplectus americanus*	0–160	–
Forb					
6				0–320	
	Forb, perennial	2FP	*Forb, perennial*	0–160	–
	silverweed cinquefoil	ARAN7	*Argentina anserina*	0–160	–
	horsetail	EQUIS	*Equisetum*	0–160	–
	povertyweed	IVAX	*Iva axillaris*	0–160	–
	common plantain	PLMA2	*Plantago major*	0–160	–
	dock	RUMEX	*Rumex*	0–160	–
	seepweed	SUAED	*Suaeda*	0–160	–
	Pursh seepweed	SUCA2	*Suaeda calceoliformis*	0–160	–
	arrowgrass	TRIGL	*Triglochin*	0–160	–
Shrub/Vine					
7				160–480	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–160	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–160	–
	Woods' rose	ROWOW	*Rosa woodsii var. woodsii*	0–160	–
	greasewood	SAVE4	*Sarcobatus vermiculatus*	0–160	–
	silver buffaloberry	SHAR	*Shepherdia argentea*	0–160	–

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, elk, and antelope. Suitable thermal and escape cover for deer may be limited due to the low quantities of woody plants. However, topographical variations could provide some escape cover. 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. Many grassland obligate small mammals would occur here.

Alkali Sacaton/Inland Saltgrass/Mixed Shrub: This plant community may be useful for the same large grazers that would use the Historic Climax Plant Community. However, the plant community composition is less diverse, and thus, less apt to meet the seasonal needs of these animals. It may provide some foraging opportunities for sage grouse when it occurs proximal to woody cover. Good grasshopper habitat equals good foraging for birds.

Inland Saltgrass Sod/Mixed Shrub: This plant community may be useful for the same large grazers that would use the Historic Climax Plant Community. However, the plant community composition is less diverse, and thus, less apt to meet the seasonal needs of these animals. It may provide some foraging opportunities for sage grouse when it occurs proximal to woody cover. Good grasshopper habitat equals good foraging for birds.

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 Plant Community: 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 (lb./ac)	Carrying Capacity* (AUM/ac)
Historic Climax Plant Community	2800-3600	1.8
Alkali Sacaton/Inland Saltgrass/Mixed Shrub	2200-3400	1.3
Inland Saltgrass Sod/Greasewood	1200-2000	0.8
Alkali Sacaton/Saltcedar and/or Russian Olive	1600-2600	0.4
Dense Saltcedar and/or Russian Olive Stand	1500-2000	1.0

* - 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

Climate 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 moderately slow to moderately 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 and dominate 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 are rare to non-existent. Cryptogamic crusts are present, but only cover 1-2% of the soil surface.

Recreational uses

This site provides hunting opportunities for upland game species. 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 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. 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.

Contributors

Ray Gullion

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	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.

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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 0-5%.

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 3 (interspaces) to 6 (under plant canopy), but average values should be 4.0 or greater.

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 1-2%.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant community consists of 75-90% grasses, 10% forbs, and 0-15% shrubs. Dense plant canopy (80-100%) and litter plus moderate infiltration rates result in minimal to nonexistent runoff. Basal cover is typically greater than 5% for this site and effectively reduces runoff on this site.

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.

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

    Sub-dominant:

    Other:

    Additional:

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

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 10-25 mm.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** English: 2800-3600 lb/ac (3200 lb/ac average); Metric: 3136-4032 kg/ha (3584 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 20% is the most common indicator of a threshold being crossed. Greasewood and inland saltgrass are common increasers. Russian olive, saltcedar, and foxtail barley may invade the site.

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