Ecological site EX043B23A178
Wetland (WL) Absaroka Lower Foothills

Last updated: 10/04/2019
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.

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

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 elevational 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: Aquic [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 is controlled by a water table that is above the soil surface for part but not all of the growing season.
• Slope is <6%.
• Soils are:
o Textures range from Silt Loam to clay in top 4” (10 cm) of mineral soil surface
o Clay content is <40% within the top 4” (10 cm) of mineral soil surface
o All subsurface horizons in the particle size control section have a weighted average of <60% clay. (The particle size control section is the segment of the profile from either the start of an argillic horizon for 50 cm’s or from 25-100 cm’s).
o Moderately deep to very deep (20-80+ in. (50-200+ cm) that are poorly to very poorly drained.
o Surface layer of soil contains a high organic matter content.
o None to Slightly effervescent throughout top 20” (50 cm) of mineral soil surface
o Non-saline, sodic, or saline-sodic

Associated sites

R032XY342WY	**Saline Subirrigated (SS) 10-14" East Precipitation Zone** Saline Subirrigated sites generally surround or are part of the complex dynamic of this fluvial system and are a gradual transition from wetlands to (saline) lowland sites.
R032XY374WY	**Subirrigated (Sb) 10-14" East Precipitation Zone** Subirrigated sites generally surround or are part of the complex dynamic of this fluvial system and are a gradual transition from wetlands to lowland sites.
R032XY328WY	**Lowland (LL) 10-14" East Precipitation Zone** Lowland sites exist with inclusions of wetlands or may occur a step above wetlands, but co-exist within the drainage networks of the foothills.
R032XY338WY	**Saline Lowland (SL) 10-14" East Precipitation Zone** Saline Lowland sites exist with inclusions of wetlands or may occur a step above wetlands, but co-exist within the drainage networks of the foothills.

Similar sites

R032XY278WY	**Wetland (WL) 5-9” Wind River Basin Precipitation Zone** Wetland 5-9" Wind River Basin Precipitation Zone is lower in production that this site.

R032XY178WY	**Wetland (WL) 5-9” Big Horn Basin Precipitation Zone** Wetland 5-9" Big Horn Basin Precipitation Zone is lower in production that this site.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Salix*
Herbaceous	(1) *Carex nebrascensis* (2) *Deschampsia cespitosa*

Legacy ID

R043BX578WY

Physiographic features

This site normally occurs on level to nearly level bottomlands near springs, seeps and sloughs.

Table 2. Representative physiographic features

Landforms	(1) Foothills > Drainageway (2) Foothills > Oxbow (3) Foothills > Stream terrace
Runoff class	Negligible to medium
Flooding duration	Very brief (4 to 48 hours) to long (7 to 30 days)
Flooding frequency	Occasional to frequent
Ponding duration	Brief (2 to 7 days) to very long (more than 30 days)
Ponding frequency	Frequent
Elevation	5,400–7,500 ft
Slope	0–6%
Ponding depth	0–12 in
Water table depth	0–18 in
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)	11-12 in
Frost-free period (actual range)	46-118 days
Freeze-free period (actual range)	88-147 days
Precipitation total (actual range)	10-13 in
Frost-free period (average)	80 days
Freeze-free period (average)	117 days
Precipitation total (average)	12 in

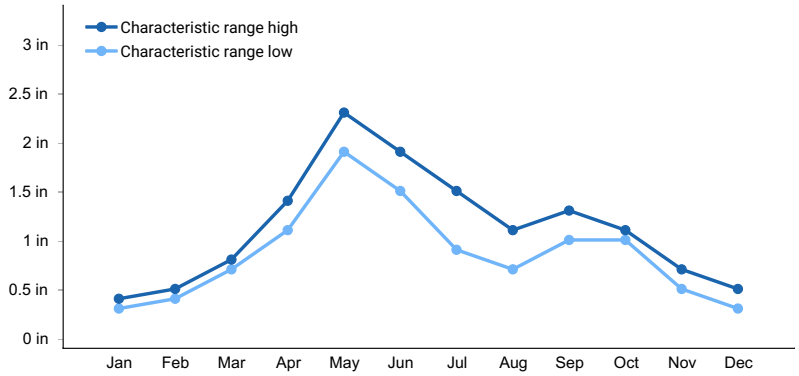


Figure 1. Monthly precipitation range

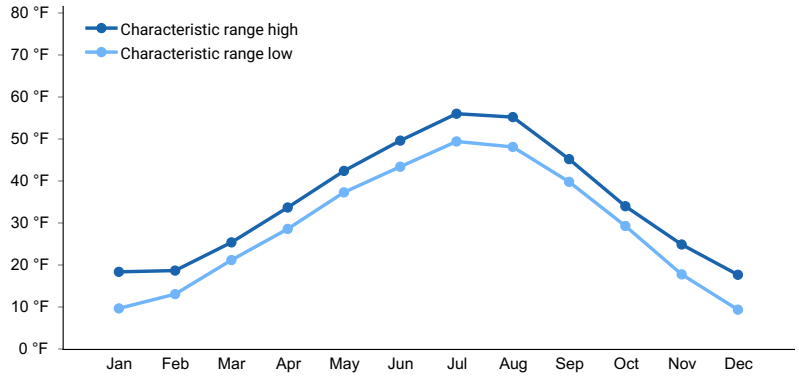


Figure 2. Monthly minimum temperature range

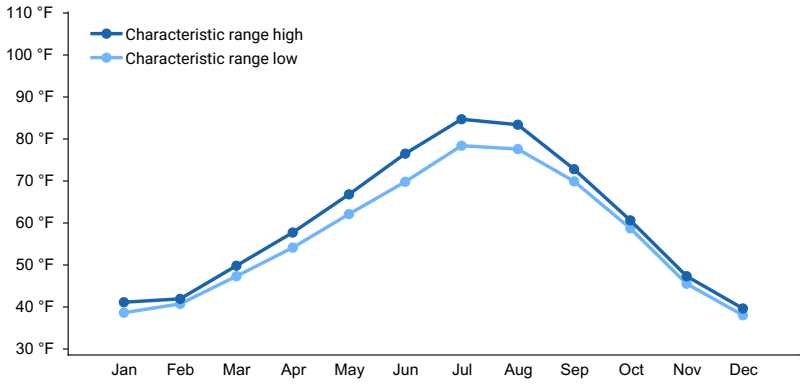


Figure 3. Monthly maximum temperature range

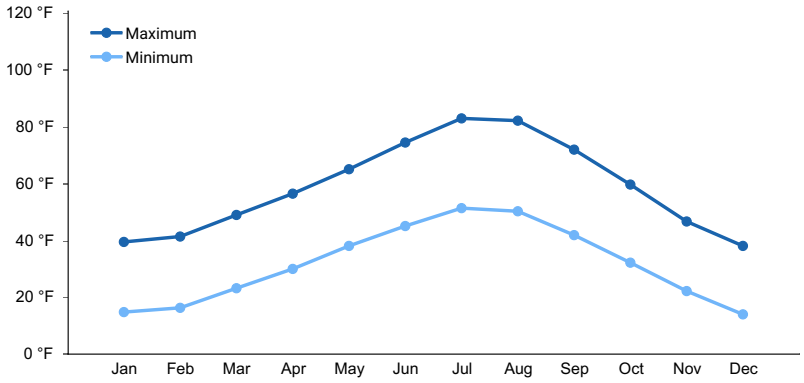


Figure 4. Monthly average minimum and maximum temperature

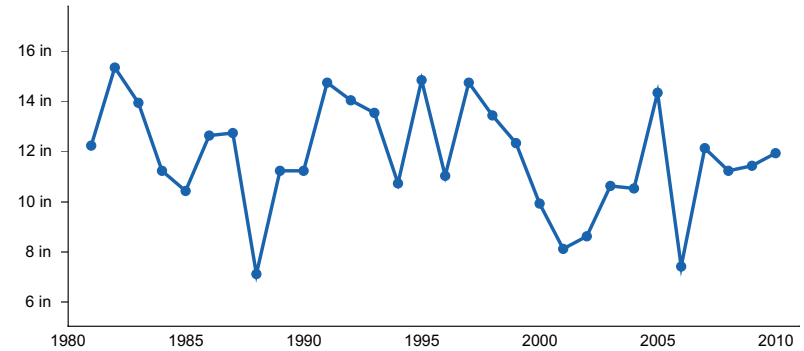


Figure 5. Annual precipitation pattern

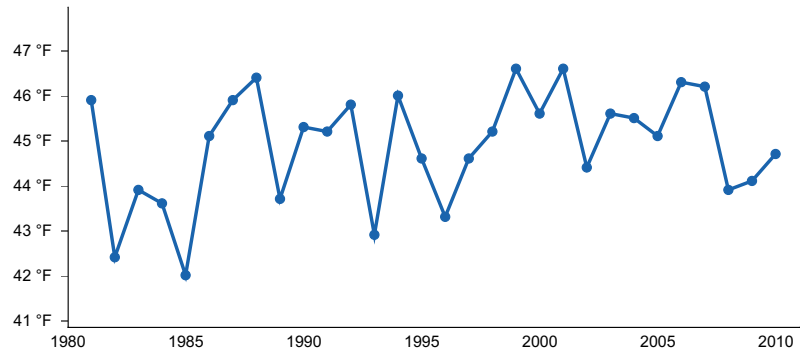


Figure 6. Annual average temperature pattern

Climate stations used

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

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

Influencing water features

The characteristics of these soils have influence from ground water (water table above 12 inches (30 cm)) and water will be above the soil surface for part but not all of the growing season. These soils are moderately deep to deep and poorly to very poorly drained.

Wetland description

System: Palustrine
Subsystem: None
Class: Emergent Wetland
Sub-class: Persistent

Stream type: C (Rosgen)

Soil features

This site consists of deep to very deep poorly drained soils formed in alluvium with a water table above the surface for part but not all of the growing season. They are on nearly level to slightly depressed areas with poor surface drainage. In some places the surface layers have a high organic matter content. is Layers of the soil most influential to the plant community vary from 3 to 6 inches thick.

Major Soil Series correlated to this site include: fluvaquents

Table 4. Representative soil features

Parent material	(1) Alluvium–igneous, metamorphic and sedimentary rock
Surface texture	(1) Mucky clay (2) Clay loam (3) Loam (4) Silty clay (5) Silty clay loam (6) Silt loam
Family particle size	(1) Fine-loamy
Drainage class	Somewhat poorly drained to poorly drained
Permeability class	Slow to moderate
Soil depth	20–60 in
Available water capacity (0-40in)	2.2–6.6 in
Calcium carbonate equivalent (0-40in)	0–15%
Electrical conductivity (0-40in)	0–16 mmhos/cm
Sodium adsorption ratio (0-40in)	0–15
Soil reaction (1:1 water) (0-40in)	6.6–8.4

Ecological dynamics

Potential vegetation on this site is dominated by plants that can tolerate soils that have a water table above the

surface for part of the growing season. The expected potential composition for this site is about 75% grasses, 5% forbs and 20% woody plants. The composition and production will vary naturally due to historical use, fluctuating precipitation and fire frequency.

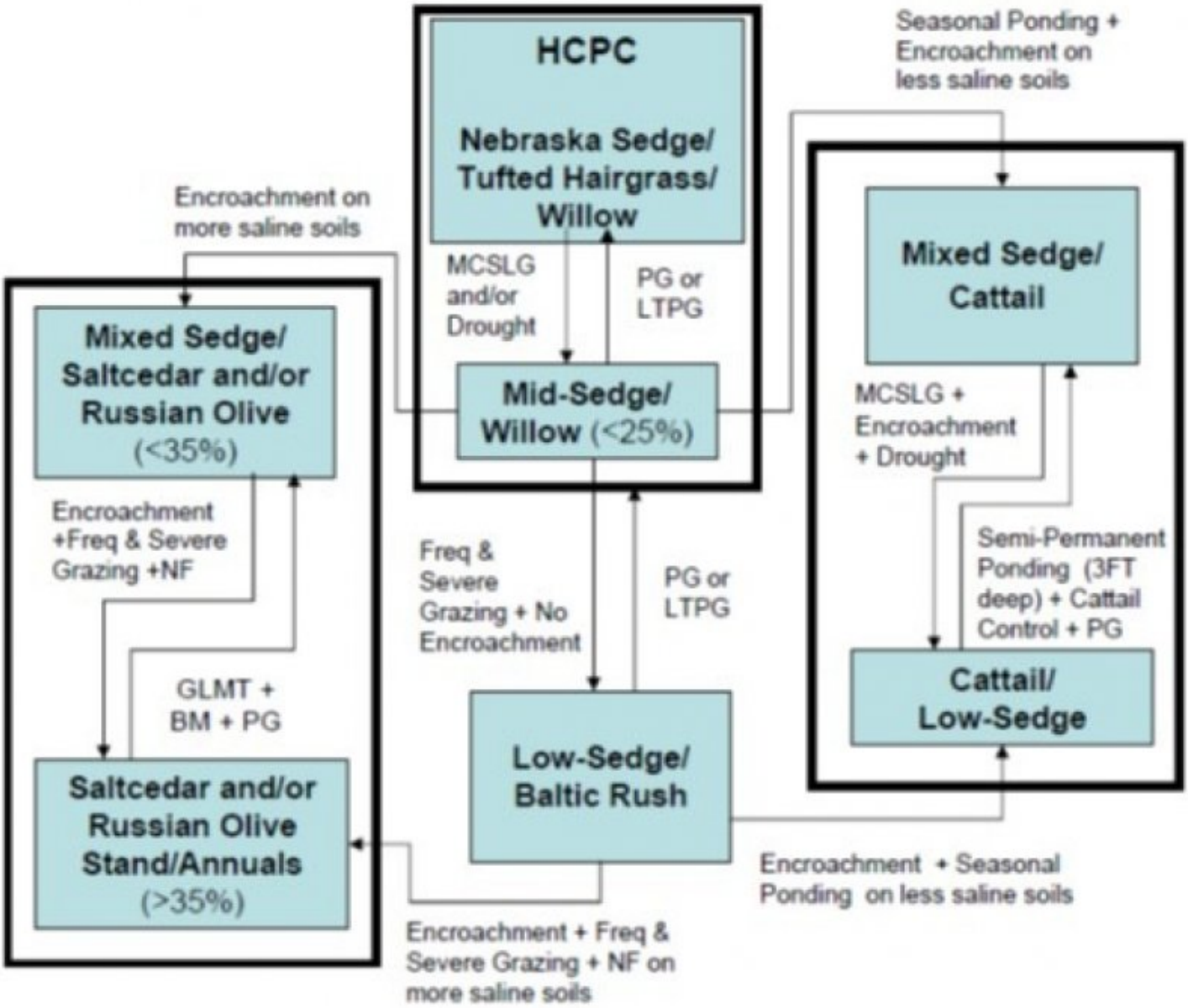
As this site deteriorates, species such as willows, low–growing sedges, cattails, and Baltic rush increase. Foxtail barley often invades. Grasses and grass-like plants such as Nebraska sedge, bluejoint reedgrass, and tufted hairgrass will decrease in frequency and production. Cattails, although native, are prolific producers and can become so thick that a monoculture emerges when adjacent to open water. Once dominant, cattails become difficult to impossible to remove. Methods of control usually require a multiple approach such as burning, grazing, and flooding.

Encroachment by saltcedar and Russian olive can also occur. This can happen regardless of any major disturbance. Stopping this invasion before these plants become established is imperative. Once established total removal is usually not likely. Methods of control usually requires a multiple approach and includes mechanical (cutting or mowing), flooding, burning, chemical, and biological.

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

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

State and transition model



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
Nebraska Sedge/ Tuffed Hairgrass/ Willow

Community 1.1
Nebraska Sedge/ Tuffed Hairgrass/ Willow

The interpretive plant community for this site is the Historic Climax Plant Community. This state evolved with grazing by large herbivores, a water table, and periodic wildfires. Potential vegetation is about 75% grasses or grass-like plants, 5% forbs, and 20% woody plants. The major grasses/grass-likes include Nebraska sedge, tufted hairgrass, and slough sedge. Grasses/grass-likes of lesser importance are Baltic rush, bluejoint reedgrass, and a variety of other sedges. Willows are the dominant shrub, but a variety of shrubs and 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 5400 pounds per acre, but it can range from about 4500 lbs./acre in unfavorable years to about 6500 lbs./acre in above average years. The state is well adapted to the Northern Intermountain Desertic Basins climate. It is a critical state providing water and habitat for the surrounding area. The diversity in plant species provides a variety of habitats for wildlife. It is resistant to drought due to a dependable water supply. This is a sustainable plant community (site/soil stability, watershed function, and biologic integrity). Transitions or pathways leading to other plant communities are as follows: • Moderate, continuous season-long grazing will convert this plant community to the Mid-sedge/Willow Plant Community. Prolonged drought will exacerbate this change.

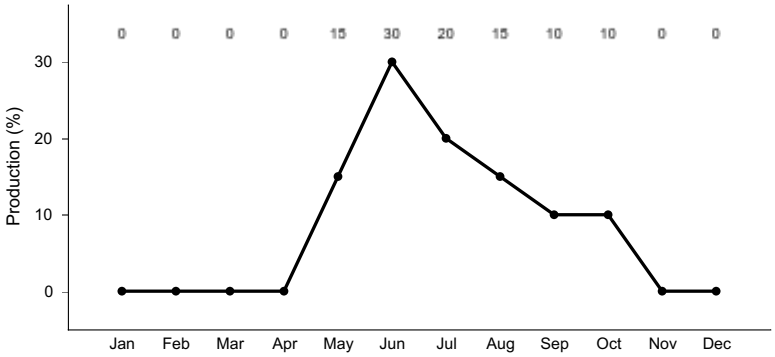


Figure 8. Plant community growth curve (percent production by month). WY0703, 1014E Free water sites - WL, Sb, SS.

State 2
Mid-Sedge/Willow

Community 2.1
Mid-Sedge/Willow

Historically, this plant community evolved under moderate grazing by large ungulates and low fire frequency. Currently, this site is normally found under moderate, season-long grazing, a relatively normal hydrologic regime, and in the absence of fire or brush control. Prolonged drought can also play an important role and will exacerbate these conditions. Flood tolerant perennial plants make up the dominant species in this plant community. The dominant grasses and grasslikes include Nebraska and slough sedges, tufted hairgrass, bluejoint reedgrass, and Baltic rush. Willows comprise the majority of the shrubs, but water birch can also be found near the dryer edges of this state. Forbs commonly found in this plant community include blue-eyed grass, smooth horsetail, seaside arrowgrass, buttercup, and common plaintain. Some annuals as well as cattails may have invaded the site, but are in isolated pockets. When compared to the Historical Climax Plant Community, Nebraska sedge and tufted hairgrass have decreased. Low-growing sedges and Baltic rush have increased. Total production shows only minimal reduction as willows offset the reduction in some perennial species. The total annual production (air-dry weight) of this state is about 5400 pounds per acre, but it can range from about 4200 lbs./acre in unfavorable years to about 6200 lbs./acre in above average years. The state is reasonably stable but certain weedy species can quickly invade with minimal disturbance. This site is protected from excessive erosion and the biotic integrity of this plant community is intact. The watershed is functioning. Transitional pathways leading to other plant communities are as follows: • Prescribed grazing over the long-term will result in a plant community very similar to the Historic Climax Plant Community. Return of a normal fire regime will also aide in this transition. • Frequent and Severe grazing plus no encroachment by cattails, saltcedar or Russian olive will convert this plant community to the Low-Sedge/Baltic Rush Plant Community. • Encroachment on more saline soils will convert this plant community to the Mixed Sedge/Saltcedar and/or Russian Olive Plant Community. Frequent and severe or moderate season long grazing may increase the likelihood of this occurring but is not necessary for this to occur. • Seasonal ponding plus

encroachment on less saline soils will convert this plant community to the Mixed Sedge/Cattail Plant Community. Frequent and severe grazing or moderate season long grazing may increase the likelihood of this occurring. Drought will exacerbate this occurrence.

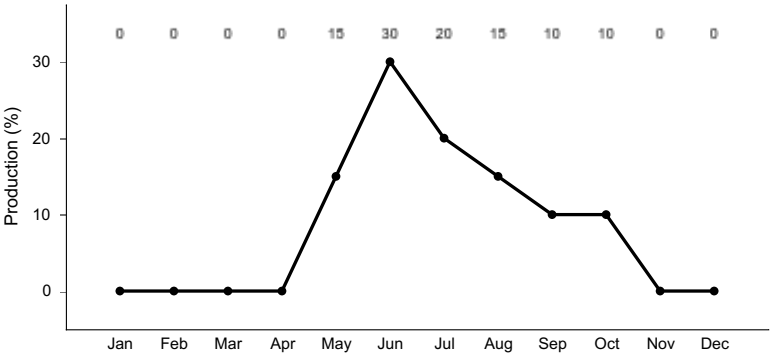


Figure 9. Plant community growth curve (percent production by month). WY0703, 1014E Free water sites - WL, Sb, SS.

State 3
Low-Sedge/ Baltic Rush

Community 3.1
Low-Sedge/ Baltic Rush

This plant community is the result of long-term improper grazing use. Baltic rush and bluegrasses as well as low growing sedges plus a host of forbs dominate the herbaceous plants. These forbs include both native and introduced. Willows have been significantly reduced due to heavy browsing. The main grasses or grass-like plants are Baltic rush, bluegrasses, low growing sedges, bulrush, and rushes. Forbs are pervasive and include both native and introduced species. The kind of forb species present depends on the available seed source and the soluble salt content of the soil. Native forb species can include American licorice, wild iris, seaside arrowgrass, smooth horsetail, and silverweed cinquefoil. Introduced forb species include curly dock and smartweed. Cattails are likely on the site but are not becoming a dominant species. This is especially true on less saline soils. If a seed source is available, recruits of Russian olive may begin establishing on the more saline sites. Plant diversity is moderate to poor. When compared to the Historic Climax Plant Community, the mid-sedges and tall and medium grasses and willows are significantly reduced or absent. Forbs and weedy annuals have significantly increased. Production has decreased and bare ground has increased. The total annual production (air-dry weight) of this state is about 4500 pounds per acre, but it can range from about 3600 lbs./acre in unfavorable years to about 5000 lbs./acre in above average years. This plant community is susceptible to change and species composition can be altered through long-term overgrazing and encroachment by weedy species. The herbaceous component is unstable and plant vigor and replacement capabilities may or may not be sufficient. The biotic community may or may not be intact as some of the mid sedges may be absent. Plant diversity is moderate to low. Soils are mostly stabilized and soil loss is minimal. Incidence of pedestalling is evident. The watershed may or may not be functional. Transitional pathways leading to other plant communities are as follows: • Prescribed Grazing over the long-term and possibly re-seeding will return this state to near Historic Climax Plant Community. If a seed source for Russian olive, cattails are available or plants exist on adjacent lands or in small patches, vigilante treatment to reduce the likelihood of colonization of the site is required. • Encroachment plus seasonal ponding on less saline soils will convert this plant community to the Cattail/Low-Sedge Plant Community. Frequent and severe or moderate long-term grazing may increase the likelihood of this occurring. • Encroachment plus frequent and severe grazing plus no fire on more saline soils will convert this plant community to the Saltcedar and/or Russian Olive Stand/Annuals Plant Community. Frequent and severe or moderate long-term grazing may increase the likelihood of this occurring.

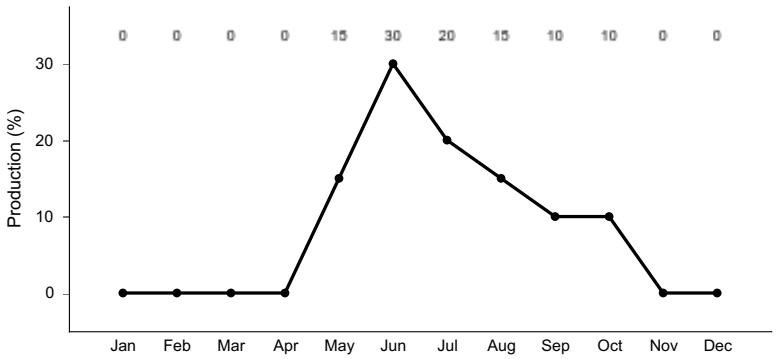


Figure 10. Plant community growth curve (percent production by month). WY0703, 1014E Free water sites - WL, Sb, SS.

State 4
Cattail/Low-Sedge

Community 4.1
Cattail/Low-Sedge

This plant community occurs where cattails encroach into the Low-Sedge Baltic Rush Plant Community and become established. This encroachment occurs on less saline soils and is exacerbated by seasonal ponding or fluctuating water levels. Encroachment occurs with or without grazing and is the result of conditions conducive to the colonization by this plant. 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 relatively healthy stand of sedges can be invaded. Flood tolerant plants make up the dominant understory species in this plant community. The dominant grasses and grass-like plants include cattails, mid and/or low sedges, reedgrasses, and Baltic rush. Forbs commonly found in this plant community include alkali seepweed, silverweed, American licorice, seaside arrowgrass, and smooth horsetail. Willows comprise the majority of the woody species and make up less than 35% of the annual production. When compared to the Historical Climax Plant Community, the mid-sedges have been reduced or are absent. Low growing sedges, and forbs have increased. Willows have probably increased. Cattails have invaded. Total production is lower as the mid sedges have decreased but the increase in cattails compensates for some of the loss. The total annual production (air-dry weight) of this state is about 4500 pounds per acre, but it can range from about 4000 lbs./acre in unfavorable years to about 5000 lbs./acre in above average years. This plant community is mostly resistant to change, but species composition will be altered through semi-ponding and flooding but can be exacerbated by drought and improper grazing. The herbaceous component may or may not be stable and plant vigor and replacement capabilities may or may not be sufficient. The biotic community is not intact due to the encroachment of these invasive species. Plant diversity is moderate. The state is stable and protected from excessive erosion as cattails are good soil stabilizers. 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. Transitional pathways leading to other plant communities are as follows: • Semi-permanent ponding at less 3 feet deep plus cattail control (chemical control, seeding) plus prescribed grazing will convert the plant community to a Mixed Sedge/Cattail Plant Community. Control of cattails is the key to this occurring and may require continuous treatments to reduce the stand and to allow other wetland plants to become established. • Recovery to near Historic Climax Plant Community condition is impractical and continued suppression or containment of cattails is optimal. Any methods of control should be followed by revegetation to reduce regeneration of cattails and other weeds.

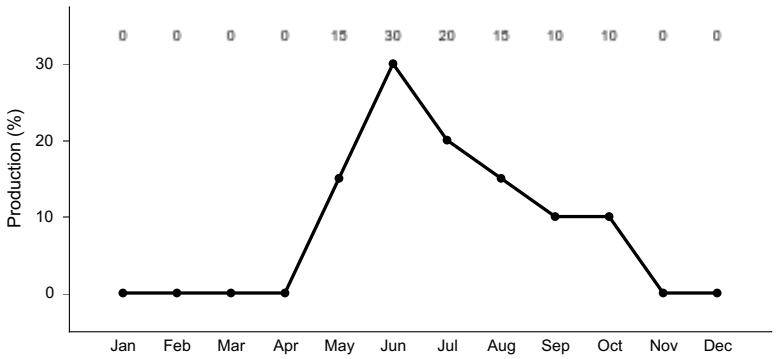


Figure 11. Plant community growth curve (percent production by month). WY0703, 1014E Free water sites - WL, Sb, SS.

State 5
Mixed Sedge/Cattail

Community 5.1
Mixed Sedge/Cattail

This plant community occurs where control of cattails has been successful in the Cattail Low-Sedge Plant community or encroachment occurs in the Mid-sedge/Willow Plant Community due to seasonal ponding or fluctuating flooding events. The cattails are confined to localized patches and tend to dominate these areas. Mid-sedges and other perennial grasses are now reestablished and prominent. Flood tolerant plants make up the dominant understory species in this plant community. The dominant grasses and grass-like plants include mid and low sedges, tufted hairgrass, reedgrasses, and Baltic rush. Forbs commonly found in this plant community include blue-eyed grass, alkali seepweed, silverweed, American licorice, seaside arrowgrass, and smooth horsetail. Willows comprise the majority of the woody species and make up less than 35% of the annual production. When compared to the Historical Climax Plant Community, the production of mid-sedges and perennial grasses are less. Low growing sedges, willows, and forbs have increased. Cattails have invaded. Total production is lower as mid-sedges are not as abundant but the production is offset by the increase in cattails and willows. The total annual production (air-dry weight) of this state is about 5200 pounds per acre, but it can range from about 4200 lbs./acre in unfavorable years to about 5800 lbs./acre in above average years. This plant community is mostly resistant to change, but species composition can be altered through a change in water levels and improper grazing. The herbaceous component is stable, but does not comprise the composition of HCPC. Plant vigor and replacement capabilities are sufficient. The biotic community is not intact because of the cattail infestation. Plant diversity is moderate. Soils are mostly stable and recent soil loss is minimal. Water flow patterns and litter movement is stable. Incidence of pedestalling is improving. The watershed may or may not be functioning Transitional pathways leading to other plant communities are as follows: • Moderate continued season long grazing plus encroachment will convert this plant community to the Cattail/Low-Sedge Plant Community. Drought will exacerbate this conversion. • Recovery to near Historic Climax Plant Community condition is impractical and continued suppression or containment of cattails is optimal. Any methods of control should be followed by revegetation to reduce regeneration of these two species and other weeds.

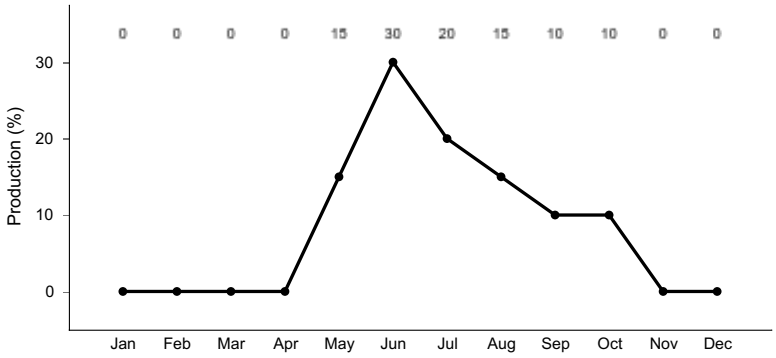


Figure 12. Plant community growth curve (percent production by month). WY0703, 1014E Free water sites - WL, Sb, SS.

State 6
Mixed Sedge/ Saltcedar and/ or Russian Olive

Community 6.1
Mixed Sedge/ Saltcedar and/ or Russian Olive

This plant community occurs on sites where Saltcedar and/or Russian olive encroaches into a wetland site and becomes established. This encroachment occurs mostly on mildly to moderately saline soil. Encroachment occurs with or without grazing and is the result of conditions conducive to the colonization of these two plants. 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 sedges can be infested. Flood tolerant and mild to moderately saline perennial plants make up the dominant understory species in this plant community. The dominant grasses and grass-like plants include mid and/or low sedges, alkali cordgrass, bulrush, reedgrasses, 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 make up less than 35% of the annual production. Invasion of saltcedar and /or Russian olive should be considered serious and should be controlled. Weedy herbaceous species are likely present. When compared to the Historical Climax Plant Community, the mid-sedges have been reduced as saltcedar and Russian olive can compete furiously for water and nutrients. Low growing sedges and forbs have increased. Saltcedar and Russian olive have invaded. Willows have been replaced. Total production is slightly lower as the mid sedges have decreased but the woody species have increased. The total annual production (air-dry weight) of this state is about 5000 pounds per acre, but it can range from about 4600 lbs./acre in unfavorable years to about 5400 lbs./acre in above average years. This plant community is mostly resistant to change, but species composition will be altered through further encroachment by saltcedar and/or Russian olive and long-term overgrazing can exacerbate this occurrence. The herbaceous component is or is not stable and plant vigor and replacement capabilities may or may not be 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: • Encroachment plus frequent and severe grazing plus no fire will convert the plant community to the Saltcedar and/or Russian Olive/Annuals Plant Community. • Recovery to near Historic Climax Plant Community condition is impractical. Any methods of control should be followed by revegetation to reduce regeneration of saltcedar, Russian olive, and other weeds.

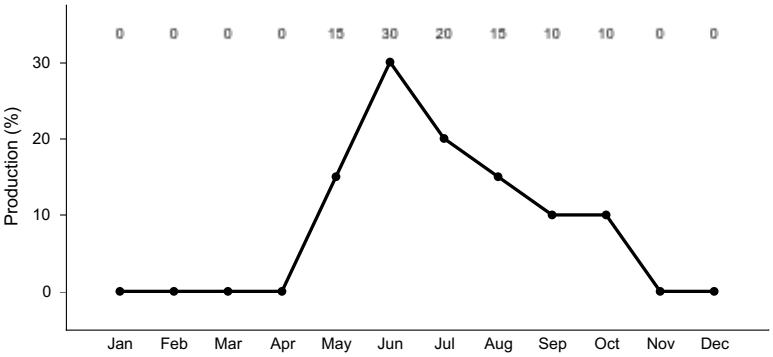


Figure 13. Plant community growth curve (percent production by month). WY0703, 1014E Free water sites - WL, Sb, SS.

State 7
Saltcedar and/or Russian Olive stands/ Annuals

Community 7.1
Saltcedar and/or Russian Olive stands/ Annuals

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 trees 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 the woody plants have expanded, leaving the amount of bare ground more typical and more soil surface

exposed to erosive elements or invaders. The weedy plants, such as foxtail barley, curly dock, kochia, halogeton, swainsonpea, and Russian knapweed, make up the dominant understory. Total annual production is mostly from shrubs and these weedy plants. Saltcedar and/or Russian olives make up greater than 35% of the total annual production. When compared with the HCPC, the annual production is slightly less due to the removal of the perennial grasses and sedges and the 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 4000 pounds per acre, but it can range from about 3500 lbs./acre in unfavorable years to about 4800 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. Saltcedar and /or 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: • Semi-permanent ponding or Brush management and prescribed grazing will result in a Mixed Sedge/Saltcedar and/or Russian Olive Plant Community. Controlling both saltcedar and Russian olive is a priority if these species have invaded. • Recovery to near Historic Climax Plant Community condition is impractical. Any methods of control should be followed by revegetation to reduce regeneration of saltcedar and Russian olive.

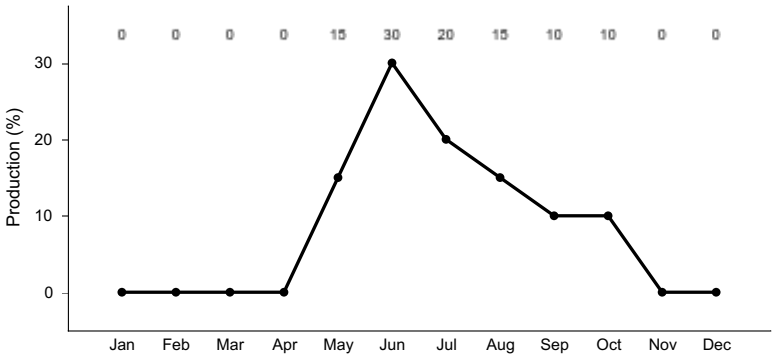


Figure 14. Plant community growth curve (percent production by month). WY0703, 1014E Free water sites - WL, Sb, SS.

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1				810–1620	
	Nebraska sedge	CANE2	*Carex nebrascensis*	810–1620	–
2				810–1350	
	slough sedge	CAOB3	*Carex obnupta*	810–1350	–
3				810–1620	
	tufted hairgrass	DECE	*Deschampsia cespitosa*	810–1620	–
4				270–1080	
	Grass, perennial	2GP	*Grass, perennial*	0–270	–
	water sedge	CAAQ	*Carex aquatilis*	0–270	–
	golden sedge	CAAU3	*Carex aurea*	0–270	–
	Macoun's reedgrass	CACAM	*Calamagrostis canadensis var. macouniana*	0–270	–
	inland sedge	CAIN11	*Carex interior*	0–270	–

	flatsedge	CYPER	*Cyperus*	0–270	–
	mountain rush	JUARL	*Juncus arcticus ssp. littoralis*	0–270	–
	rush	JUNCU	*Juncus*	0–270	–
Forb					
5				0–540	
	Forb, perennial	2FP	*Forb, perennial*	0–270	–
	silverweed cinquefoil	ARAN7	*Argentina anserina*	0–270	–
	scouringrush horsetail	EQHY	*Equisetum hyemale*	0–270	–
	Rocky Mountain iris	IRMI	*Iris missouriensis*	0–270	–
	rough bugleweed	LYAS	*Lycopus asper*	0–270	–
	waterhorehound	LYCOP4	*Lycopus*	0–270	–
	wild mint	MEAR4	*Mentha arvensis*	0–270	–
	common plantain	PLMA2	*Plantago major*	0–270	–
	alkali buttercup	RACY	*Ranunculus cymbalaria*	0–270	–
	sagebrush buttercup	RAGL	*Ranunculus glaberrimus*	0–270	–
	blue-eyed grass	SISYR	*Sisyrinchium*	0–270	–
	marsh hedgenettle	STPA	*Stachys palustris*	0–270	–
	Grass, perennial	2GP	*Grass, perennial*	0–225	–
	American sloughgrass	BESY	*Beckmannia syzigachne*	0–225	–
	reedgrass	CALAM	*Calamagrostis*	0–225	–
	flatsedge	CYPER	*Cyperus*	0–225	–
	fowl mannagrass	GLST	*Glyceria striata*	0–225	–
	rush	JUNCU	*Juncus*	0–225	–
	reed canarygrass	PHAR3	*Phalaris arundinacea*	0–225	–
	bluegrass	POA	*Poa*	0–225	–
	bulrush	SCIRP	*Scirpus*	0–225	–
	alkali cordgrass	SPGR	*Spartina gracilis*	0–225	–
Shrub/Vine					
6				270–810	
	willow	SALIX	*Salix*	270–810	–
7				0–270	
	redosier dogwood	COSE16	*Cornus sericea*	0–270	–
8				0–270	
	Woods' rose	ROWOW	*Rosa woodsii var. woodsii*	0–270	–
9				0–270	
	water birch	BEOC2	*Betula occidentalis*	0–270	–
10				0–270	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–270	–

Animal community

Animal Community – Wildlife Interpretations

Nebraska Sedge/Tufted Hairgrass/Willow 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. This plant community may provide brood rearing/foraging areas for upland game birds. Other birds that would frequent this plant community include red-wing blackbirds, sandhill cranes, Wilson snipe, western meadowlarks, and golden eagles. Many small mammals would occur here.

Mid-Sedge/Willow Plant Community: The abundant production and proximity to water make this state important for livestock and wildlife such as birds, mule deer, and whitetail deer. This plant community is useful for the same large grazers that would use the Historic Climax Plant Community. The increase in willow production makes this even more attractive to some wildlife due to the increase in thermal and escape cover. It can provide foraging and nesting opportunities for upland game birds and songbirds.

Low-Sedge/Baltic Rush Plant Community: The abundant production and proximity to water make this state important for livestock and wildlife such as birds, mule deer and whitetail deer.
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 upland game birds and songbirds, when it occurs proximal to woody cover.

Cattail/Low-Sedge Plant Community: The abundant production and proximity to water make this state important for livestock and wildlife such as birds, mule deer, and whitetail deer. This plant community is useful for the same large grazers that would use the Historic Climax Plant Community. The increase in cattail production makes this even more attractive to some wildlife due to the increase in thermal and escape cover. It can provide foraging and nesting opportunities for upland game birds and songbirds.

Mixed Sedge/Cattail Plant Community: The abundant production and proximity to water make this state important for livestock and wildlife such as birds, mule deer, and whitetail deer. This plant community is useful for the same large grazers that would use the Historic Climax Plant Community. The increase in cattail production makes this even more attractive to some wildlife due to the increase in thermal and escape cover. It can provide foraging and nesting opportunities for upland game birds and songbirds.

Mixed Sedge/Saltcedar and/or Russian Olive Plant Community: The abundant production and proximity to water make this state important for livestock and wildlife such as birds, mule deer, and whitetail deer. This plant community is useful for the same large grazers that would use the Historic Climax Plant Community. The increase in tall shrubs production makes this even more attractive to some wildlife due to the increase in thermal and escape cover. It can provide foraging and nesting opportunities for upland game birds and songbirds. Some species utilize the Russian olive berries for food and are attracted to these colonized areas.

Saltcedar and/or Russian Olive/Annuals Plant Community: The proximity to water makes this state important for wildlife such as birds, mule deer, and whitetail deer. This is useful for the same large grazers that would use the Historic Climax Plant Community. The low production of herbaceous understory of this plant community decreases the foraging potential and cover for many wildlife species. The increase in tall shrubs, however, makes this an attractive site for thermal and escape cover for large grazers and upland birds. It can provide foraging and nesting opportunities for songbirds. Some species utilize the Russian olive berries for food and are attracted to these colonized areas.

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 4500-6500 3.0
Mid-Sedge/Willow 4200-6200 2.5
Low-Sedge/Baltic Rush 3600-5000 1.5
Cattail/Low Sedge 4000-5000 1.5
Mixed Sedge/Cattail 4200-5800 2.5
Mixed Sedge/Saltcedar and/or Russian Olive 4600-5400 2.0
Saltcedar and/or Russian Olive Stand/Annuals 3500-4800 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 and runoff potential for this site varies from moderate to high depending on soil hydrologic group and water table. Runoff will be high on this site since the soil may be saturated. (Refer to Part 630, NRCS National Engineering Handbook for detailed hydraulic information.

Rills and gullies should not typically be present. Water flow patterns should be barely distinguishable if at all present. 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 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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Contributors

D. Tranas

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	05/02/2008
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:** Water flow patterns sometimes evident in floodplain zone where this site occurs.

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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 is typically less than 1%.

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 exhibits slight movement only associated with water flow patterns.

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 typically 6.0.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface variable, typically an A-horizon up to 12 inches (30 cm) colors with chromas of 2 or less and OM of 3-6%. Sometimes the A-horizon is overlain or replaced by an O-horizon of up to 30 inches (76 cm) with 40-60% OM.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant community consists of 70-90% grasses, 10% forbs, and 0-15% shrubs. Dense plant canopy (95-100%) 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: rhizomatous grass-likes

    Sub-dominant: mid-size, cool season bunchgrasses cool season rhizomatous grasses

    Other: perennial forbs = perennial shrubs

    Additional:

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.

14. **Average percent litter cover (%) and depth (in):** Litter ranges from 1-5% of total canopy measurement with total litter (including beneath the plant canopy) from 90-100% expected. Herbaceous litter depth typically ranges from 15-30 mm. Woody litter can be up to a couple inches (4-6cm).

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** English: 4500-6500 lb/ac (5500 lb/ac average); Metric: 5040-7280 kg/ha (6160 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% and presence of noxious weeds or creeping meadow foxtail are the most common indicators of a threshold being crossed. Willows, low-growing sedges, cattails and Baltic rush are common increasers. Canada thistle, foxtail barley and water hemlock are common invasive species.

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