

## United States Department of Agriculture Natural Resources Conservation Service

### Ecological Site Description

**Site Type:** Rangeland

**Site Name:** Wetland 10-14” Foothills and Basins East Precipitation Zone

**Site ID:** R032XY378WY

**Major Land Resource Area:** 32 – Northern Intermountain Desertic Basins

### Physiographic Features

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

**Landform:** drainageways, oxbows, and stream terraces.

**Aspect:** N/A

	<u>Minimum</u>	<u>Maximum</u>
<b>Elevation (feet):</b>	5400	7500
<b>Slope (percent):</b>	0	6
<b>Water Table Depth (inches):</b>	0	18
<b>Flooding:</b>		
<b>Frequency:</b>	occasional	frequent
<b>Duration:</b>	very brief	long
<b>Ponding:</b>		
<b>Depth (inches):</b>	0	12
<b>Frequency:</b>	frequent	frequent
<b>Duration:</b>	brief	very long
<b>Runoff Class:</b>	negligible	medium

### 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:

	<u>Minimum</u>	<u>Maximum</u>	<u>5 yrs. out of 10 between</u>
<b>Frost-free period (days):</b>	74	149	May 23 – September 16
<b>Freeze-free period (days):</b>	112	180	May 8 – October 1
<b>Annual Precipitation (inches):</b>	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”.

## Influencing Water Features

<b>Wetland Description:</b>	<u>System</u>	<u>Subsystem</u>	<u>Class</u>	<u>Sub-class</u>
	Palustrine	None	Emergent Wetland	Persistent

**Stream Type:** C (Rosgen)

## Representative 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 high organic matter content. The soil characteristic having the most influence on the plant community is a water table at or near the surface for all of the growing season.

Major Soil Series correlated to this site include: Fluvaquents

Other Soil Series in MLRA 32 correlated to this site include: Connerton, Haverson

**Parent Material Kind:** alluvium

**Parent Material Origin:** sandstone, shale

**Surface Texture:** clay, clay loam, loam, silty clay, silty clay loam, silt loam

**Surface Texture Modifier:** mucky

**Subsurface Texture Group:** loam

**Surface Fragments ≤ 3” (% Cover):** 0

**Surface Fragments > 3” (%Cover):** 0

**Subsurface Fragments ≤ 3” (% Volume):** 0

**Subsurface Fragments > 3” (% Volume):** 0

	<u>Minimum</u>	<u>Maximum</u>
<b>Drainage Class:</b>	poorly drained	very poorly drained
<b>Permeability Class:</b>	slow	moderate

<b>Depth (inches):</b>	20	>60
<b>Electrical Conductivity (mmhos/cm) <math>\leq 20</math>"</b> :	4	16
<b>Sodium Absorption Ratio <math>\leq 20</math>"</b> :	0	15
<b>Soil Reaction (1:1 Water) <math>\leq 20</math>"</b> :	6.6	8.4
<b>Soil Reaction (0.1M CaCl<sub>2</sub>) <math>\leq 20</math>"</b> :	NA	NA
<b>Available Water Capacity (inches) <math>\leq 30</math>"</b> :	2.2	6.6
<b>Calcium Carbonate Equivalent (percent) <math>\leq 20</math>"</b> :	5	15

## Plant Communities

### Ecological Dynamics of the Site:

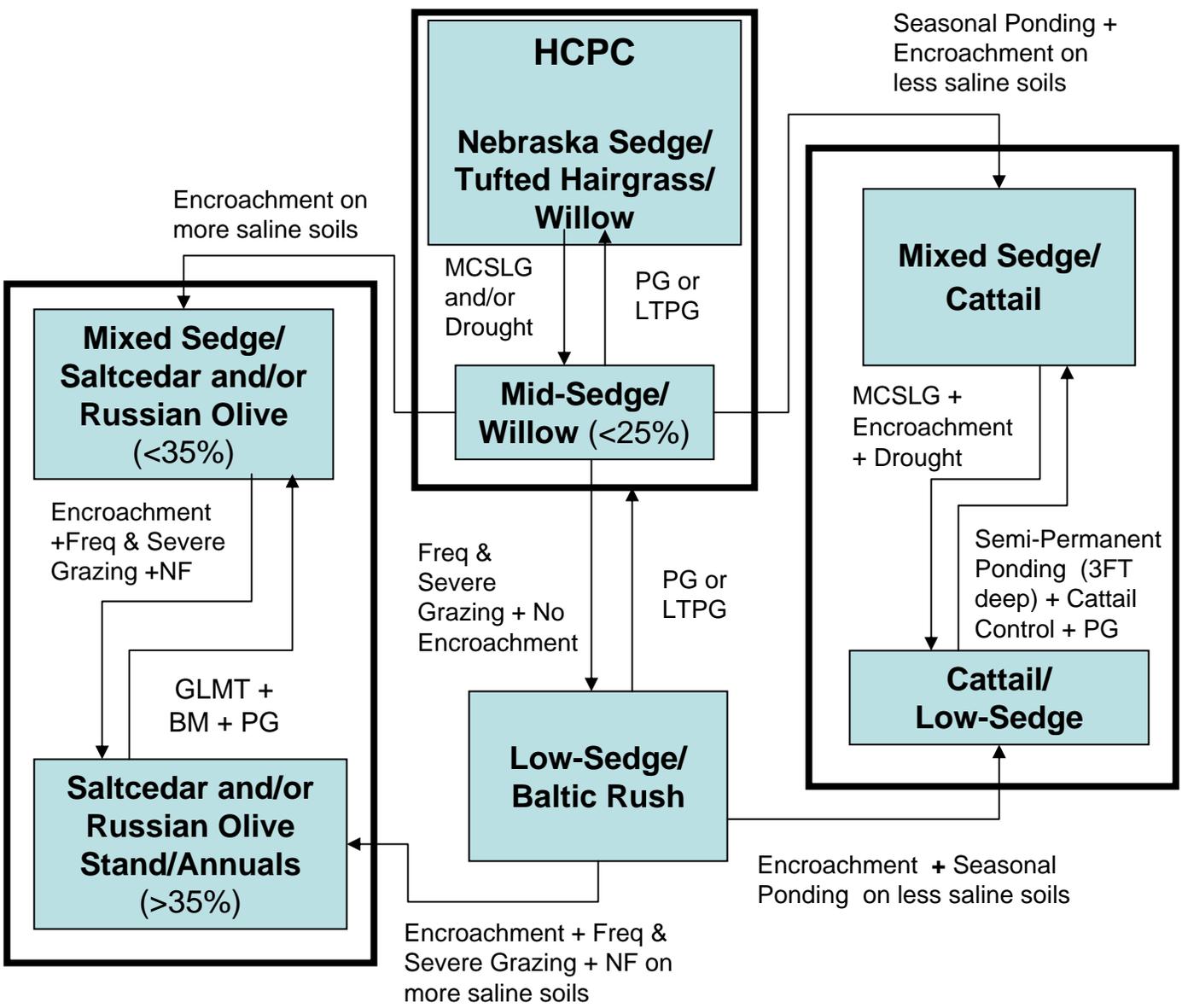
Potential vegetation on this site is dominated by plants that can tolerate soils that have a water table above the surface for part of the growing season. The expected potential composition for this site is about 75% grasses, 5% forbs and 20% woody plants. The composition and production will vary naturally 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.



- 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

**Plant Community Composition and Group Annual Production**  
**Reference Plant Community (HCPC)**

COMMON NAME/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Annual Production (Normal Year)		
			Group	lbs./acre	% Comp.
			<b>Total: 5400</b>		
<b>GRASSES AND GRASS-LIKES</b>					
<b>GRASSES/GRASSLIKES</b>					
Nebraska sedge	Carex nebrascensis	CANE2	1	810 - 1620	15 - 30
Slough sedge	Carex obnupta	CAOB3	2	810 - 1350	15 - 25
Tufted hairgrass	Deschampsia caespitosa	DECA18	3	810 - 1620	15 - 30
<b>MISC. GRASSES/GRASSLIKES</b>			<b>4</b>	<b>270 - 1080</b>	<b>5 - 20</b>
Baltic rush	Juncus balticus	JUBA	4	0 - 270	0 - 5
Bluejoint reedgrass	Calamagrostis canadensis	CACAM	4	0 - 270	0 - 5
Golden sedge	Carex aurea	CAAU3	4	0 - 270	0 - 5
Inland sedge	Carex interior	CAIN11	4	0 - 270	0 - 5
other hydrophilic sedges	Carex spp.	CYPER	4	0 - 270	0 - 5
other rushes	Juncus spp.	JUNCA	4	0 - 270	0 - 5
Water sedge	Carex aquatilis	CAAQ	4	0 - 270	0 - 5
other perennial grasses (native)		2GP	4	0 - 270	0 - 5
<b>FORBS</b>			<b>5</b>	<b>0 - 540</b>	<b>0 - 10</b>
Alkali buttercup	Ranunculus cymbalaria	RACY	5	0 - 270	0 - 5
Blue-eyed grass	Sisyrinchium spp.	SISYR	5	0 - 270	0 - 5
Bugleweeds	Lycopus spp.	LYCOP4	5	0 - 270	0 - 5
Common mint	Mentha arvensis	MEAR4	5	0 - 270	0 - 5
Common plaintain	Plantago major	PLMA2	5	0 - 270	0 - 5
Horsetails	Equisetum ssp.	EQHY	5	0 - 270	0 - 5
Iris	Iris spp.	IRIS	5	0 - 270	0 - 5
Marsh hedgenettle	Stachys palustris	STPA	5	0 - 270	0 - 5
Rough bugleweed	Lycopus asper	LYAS	5	0 - 270	0 - 5
Sagebrush buttercup	Ranunculus glaberrimus	RAGL	5	0 - 270	0 - 5
Seaside arrowgrass	Triglochin maritimum	TRMA4	5	0 - 270	0 - 5
Silverweed cinquefoil	Argentina anserina	ARAN7	5	0 - 270	0 - 5
other perennial forbs (native)		2FP	5	0 - 270	0 - 5
<b>TREES/SHRUBS</b>					
Willows	Salix spp.	SALIX	6	270 - 810	5 - 15
Dogwood	Cornus sericea	COSE16	7	0 - 270	0 - 5
Roses	Rosa woodsii var. woodsii	ROWOW	8	0 - 270	0 - 5
Water Birch	Betula occidentalis	BEOC2	9	0 - 270	0 - 5
other shrubs & half shrubs (native)		2SHRUB	10	0 - 270	0 - 5

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors.

### **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.

#### **Nebraska Sedge/Tufted Hairgrass/Willow Plant Community**

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-like include Nebraska sedge, tufted hairgrass, and slough sedge. Grasses/grass-like 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 following is the growth curve of this plant community expected during a normal year:

Growth curve number:

Growth curve name:

Growth curve description:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	5	20	30	20	10	15	0	0	0

(Monthly percentages of total annual growth)

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.

#### **Mid-Sedge/Willow Plant Community**

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 following is the growth curve expected during a normal year:

Growth curve number:

Growth curve name:

Growth curve description:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	5	20	30	20	10	15	0	0	0

(Monthly percentages of total annual growth)

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.

**Low-Sedge/Baltic Rush Plant Community**

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.

The following is the growth curve expected during an average year.

Growth curve number:

Growth curve name:

Growth curve description:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	5	20	30	20	10	15	0	0	0

(Monthly percentages of total annual growth)

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.

### **Cattail/Low-Sedge Plant Community**

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.

The following is the growth curve expected during a normal year:

Growth curve number:

Growth curve name:

Growth curve description:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	5	20	30	20	10	15	0	0	0

(Monthly percentages of total annual growth)

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.

### **Mixed Sedge/Cattail Plant Community**

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.

The following is the growth curve expected during a normal year:

Growth curve number:

Growth curve name:

Growth curve description:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	5	20	30	20	10	15	0	0	0

(Monthly percentages of total annual growth)

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.

**Mixed Sedge/Saltcedar and/or Russian Olive Plant Community**

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.

The following is the growth curve of this plant community expected during a normal year:

Growth curve number:

Growth curve name:

Growth curve description:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	5	20	30	20	10	15	0	0	0

(Monthly percentages of total annual growth)

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.

### **Saltcedar and/or Russian Olive/Annuals Plant Community**

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.

The following is the growth curve of this plant community expected during a normal year:

Growth curve number:  
 Growth curve name:  
 Growth curve description:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	5	20	30	20	10	15	0	0	0

(Monthly percentages of total annual growth)

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.

## Ecological Site Interpretations

### 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 Preferences (Quarterly - 1,2,3,4) for commonly occurring plants in MLRA 32, 10-14 inch Foothills and Basins East

COMMON NAME/ GROUP NAME	SCIENTIFIC NAME	SCIENTIFIC SYMBOL	Cattle	Sheep	Horses	Mule Deer	Antelope	Elk	Moose	Mtn. Sheep
<b>GRASSES/GRASSLIKES</b>										
Alkali bluegrass	Poa juncea (syn. P. secunda)	POJU (POSE)	DDDD	PPPP	DDDD	PPPP	PPPP	DDDD	DDDD	DDDD
Alkali cordgrass	Spartina gracilis	SPGR	DDDD	UUUU	DDDD	UUUU	UUUU	DDDD	DDDD	UUUU
Alkali sacaton	Sporobolus airoides	SPA1	PPPP	DDDD	PPPP	DDDD	DDDD	PPPP	DDDD	DDDD
Baltic rush	Juncus balticus	JUBA	DDDD	UUUU	DDDD	UUUU	UUUU	DDDD	UUUU	UUUU
Basin wildrye	Leymus cinereus	LECI4	PPPP	PPPP	PPPP	DDDD	DDDD	PPPP	DDDD	PPPP
Big bluegrass	Poa Ampla (syn. P. secunda)	POAM (POSE)	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP
Blue grama	Bouteloua gracilis	BOGR2	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Bluebunch wheatgrass	Pseudoroegneria spicata	PSSP6	PPPP	PPPP	PPPP	DDDD	DDDD	PPPP	PPPP	DDDD
Bluejoint reedgrass	Calamagrostis canadensis	CACAM	PPPP	DDDD	PPPP	UUUU	UUUU	PPPP	DDDD	DDDD
Bottlebrush squirreltail	Elymus elymoides	ELELE	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Bulrush	Scirpus spp.	SCRIP	DDDD	UUUU	DDDD	UUUU	UUUU	DDDD	DDDD	DDDD
Canada wildrye	Elymus canadensis	ELCA4	PPPP	PPPP	PPPP	DDDD	DDDD	PPPP	PPPP	PPPP
Canby bluegrass	Poa canbyi (syn. to Poa secunda)	POCA (POSE)	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP
Golden sedge	Carex aurea	CAAU3	DDDD	DDDD	DDDD	UUUU	UUUU	DDDD	UUUU	DDDD
Green needlegrass	Nassella viridula	NAV14	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP
Indian ricegrass	Achnatherum hymenoides	ACHY	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP
Inland saltgrass	Distichlis spicata	DISP	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Inland sedge	Carex interior	CAIN11	DDDD	DDDD	DDDD	UUUU	UUUU	DDDD	DDDD	DDDD
Mat muhly	Muhlenbergia richardsonis	MURI	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Griffith's wheatgrass	Elymus albicans	ELAL7	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Nebraska sedge	Carex nebrascensis	CANE2	PPPP	PPPP	PPPP	DDDD	DDDD	PPPP	DDDD	DDDD
Needleandthread	Hesperostipa comata	HECO26	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP
Nuttall's alkaligrass	Puccinellia nuttalliana	PUNU2	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP
Prairie junegrass	Koeleria macrantha	KOMA	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Prairie sandreed	Calamovilfa longifolia	CALO	PPPP	DDDD	PPPP	UUUU	UUUU	PPPP	DDDD	DDDD
Sandberg bluegrass	Poa secunda	POSE	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Sand dropseed	Sporobolus cryptandrus	SPCR	DDDD	DDDD	DDDD	UUUU	UUUU	DDDD	UUUU	UUUU
Slender wheatgrass	Elymus trachycaulus	ELTR7	PPPP	DDDD	PPPP	DDDD	DDDD	PPPP	DDDD	DDDD
Slough sedge	Carex obnupta	CAOB3	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Spike fescue	Leucophaea kingii	LEKI2	PPPP	DDDD	PPPP	PPPP	DDDD	PPPP	DDDD	DDDD
Streambank wheatgrass	Elymus lanceolatus	ELLAL3	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Thickspike wheatgrass	Elymus lanceolatus	ELLAL3	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Threadleaf sedge	Carex filifolia	CAFI	DDDD	DDDD	DDDD	DDDD	PPPP	DDDD	DDDD	DDDD
Tufted hairgrass	Deschampsia caespitosa	DECA18	PPPP	PPPP	PPPP	DDDD	DDDD	PPPP	DDDD	DDDD
Upland sedge	Carex spp.	CAREX	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Water sedge	Carex aquatilis	CAAQ	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Western wheatgrass	Pascopyrum smithii	PASM	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
<b>FORBS</b>										
Alkali seepweed	Suaeda vera	SUVE2	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
American bistort	Polygonum bistortoides	POBI16	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Arrowgrass	Triglochin spp.	TRIGL	TTTT	TTTT	TTTT	TTTT	TTTT	TTTT	TTTT	TTTT
Asters	Eucephalus spp.	EUCEP2	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Biscuitroots	Lomatium spp.	LOMAT	DDDD	DDDD	UUUU	DDDD	DDDD	DDDD	DDDD	DDDD
Cinquefoil	Potentilla spp.	POTEN	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Deathcamas	Zigadenus Michx.	ZIGAD	TTTT	TTTT	TTTT	TTTT	TTTT	TTTT	TTTT	TTTT
Dock	Rumex spp.	RUMEX	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Evening primrose	Oenothera caespitosa	OECA10	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
False carrot	Turgenia spp.	TURGE	UUUU	DDDD	UUUU	UUUU	UUUU	UUUU	UUUU	DDDD
Fleabanes	Erigeron spp.	ERIGE2	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Fringed sagewort	Artemisia frigida	ARFR4	UUUU	UUUU	UUUU	UUUU	DDDD	UUUU	UUUU	UUUU
Goldenweed	Stenotus acaulis	STAC	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Gromwell	Buglossoides arvensis	BUAR3	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Hawksbeard	Crepis acuminata	CRAC2	UUUU	PPPP	UUUU	DDDD	DDDD	UUUU	DDDD	DDDD
Horsetails	Equisetum spp.	EQUIS	UUUU	UUUU	TTTT	UUUU	UUUU	UUUU	UUUU	UUUU
Iris	Iris spp.	IRIS	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Larkspur	Delphinium spp.	DELPH	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Milkvetch	Astragalus spp.	ASTRA	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Painbrush	Castilleja spp.	CAST	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Penstemons	Penstemon spp.	PENST	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP
Phlox	Phlox spp.	PHLOX	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Prairie thermopsis	Thermopsis rhombifolia	THRH	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Princessplume	Stanleya spp.	STANL	TTTT	TTTT	TTTT	TTTT	TTTT	TTTT	TTTT	TTTT
Nuttall's povertyweed	Monoecis nuttalliana	MONU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Pussytoes	Antennaria spp.	ANTEN	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Salsify	Tragopogon porrifolius	TRPO	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Scarlet globemallow	Sphaeralcea coccinea	SPCO	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Stemless hymenoxys	Tetranneuris acaulis	TEACA2	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Wild onion	Allium textile	ALTE	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Winterfat	Krascheninnikovia lanata	KRAL2	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP
Woody aster	Xylorhiza spp.	XYLOR	TTTT	TTTT	TTTT	TTTT	TTTT	TTTT	TTTT	TTTT
Wooly groundsel	Packera cana	PACA15	TTTT	UUUU	TTTT	UUUU	UUUU	TTTT	UUUU	UUUU
<b>TREES, SHRUBS &amp; HALF-SHRUBS</b>										
Antelope bitterbrush	Purshia tridentata	PUTR2	PPPP	PPPP	DDDD	PPPP	PPPP	PPPP	PPPP	PPPP
Boxelder	Acer negundo L. var. interius	ACNE12	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Silver sagebrush	Artemisia cana	ARCA13	DDDD	DDDD	PPPP	PPPP	PPPP	DDDD	DDDD	DDDD
Big sagebrush	Artemisia tridentata	ARTR2	DDDD	DDDD	UUUU	DDDD	DDDD	DDDD	DDDD	DDDD
Birdfoot sagebrush	Artemisia pedatifida	ARPE6	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Black sagebrush	Artemisia nova	ARNO4	UUUU	PPPP	UUUU	PPPP	PPPP	UUUU	UUUU	DDDD
Cottonwoods (sprouts)	Populus spp.	POPUL	DDDD	DDDD	DDDD	DDDD	UUUU	DDDD	DDDD	UUUU
Curleaf mountainmahogany	Cercocarpus ledifolius	CELE3	PPPP	PPPP	DDDD	PPPP	UUUU	PPPP	PPPP	DDDD
Gardners saltbush	Atriplex gardneri	ATGA	PPPP	PPPP	DDDD	PPPP	PPPP	PPPP	PPPP	DDDD
Greasewood	Sarcobatus vermiculatus	SAVE4	DDDD	DDDD	UUUU	DDDD	DDDD	DDDD	UUUU	UUUU
Green rabbitbrush	Chrysothamnus viscidiflorus	CHVI8	PPPP	DDDD	PPPP	PPPP	PPPP	PPPP	DDDD	DDDD
Limber pine	Pinus flexilis	PINF2	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Rubber rabbitbrush	Ericameria nauseosa	ERNA10	UUUU	PPPP	UUUU	DDDD	PPPP	UUUU	UUUU	DDDD
Rocky Mountain juniper	Juniperus scopulorum	JUSC2	UUUU	UUUU	UUUU	DDDD	UUUU	UUUU	UUUU	UUUU
Shadscale	Atriplex confertifolia	ATCO	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Shrubby cinquefoil	Dasiphora floribunda	DAFL3	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	DDDD	UUUU
Silver buffalobery	Shepherdia argentea	SHAR	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
skunkbush sumac	Rhus trilobata	RHTR	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	UUUU	UUUU
Snowberry	Symphoricarpos occidentalis	SYOC	UUUU	UUUU	UUUU	DDDD	UUUU	UUUU	UUUU	UUUU
Utah juniper	Juniperus osteosperma	JUOS	UUUU	UUUU	UUUU	DDDD	UUUU	UUUU	UUUU	UUUU
Wildrose	Rosa woodsii var. woodsii	ROWOW	DDDD	DDDD	UUUU	DDDD	DDDD	DDDD	DDDD	DDDD
Willows	Salix spp.	SALIX	PPPP	PPPP	DDDD	PPPP	UUUU	PPPP	PPPP	DDDD
Winterfat	Krascheninnikovia lanata	KRAL2	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP
Yucca	Yucca spp.	YUCCA	DDDD	DDDD	UUUU	DDDD	DDDD	DDDD	UUUU	DDDD

N = not used; U = undesirable; D = desirable; P = preferred; T = toxic

## **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.

<b>Plant Community</b>	<b>Production (lb./ac)</b>	<b>Carrying Capacity* (AUM/ac)</b>
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.

## **Hydrology 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.

## Supporting Information

### Associated Sites

Saline Subirrigated	032XY342WY
Saline Lowland	032XY338WY
Lowland	032XY328WY
Subirrigated	032XY374WY

### Similar Sites

() – Wetland 5-9” Wind River Basin P.Z.	032XY278WY
Wetland 5-9” Big Horn Basin P.Z.	032XY178WY

[Lower production than Wetland 10-14” E]

### Inventory Data References (narrative)

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

### Inventory Data References

Ocular field estimations observed by trained personnel.

### State Correlation

The site occurs entirely in Wyoming.

### Type Locality

### Field Offices

Casper, Cody, Dubois, Fort Washakie, Greybull, Lander, Powell, Riverton, Thermopolis, Worland,

### Relationship to Other Established Classifications

### Other References

### Site Description Approval

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State Range Management Specialist

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Date