

United States Department of Agriculture Natural Resources Conservation Service

Ecological Site Description

Site Type: Rangeland

Site Name: Subirrigated (Sb) 10-14" Foothills and Basins East Precipitation Zone,

Site ID: R032XY374WY

Major Land Resource Area: 32 – Northern Intermountain Desertic Basins

Physiographic Features

This site is located on nearly level land adjacent to streams that run water at least during the major part of the growing season.

Landform: alluvial fans, drainage ways & stream terraces

Aspect: N/A

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	5400	7500
Slope (percent):	0	6
Water Table Depth (inches):	12	>60
Flooding:		
Frequency:	occasional	frequent
Duration:	brief	long
Ponding:		
Depth (inches):	0	3
Frequency:	none	frequent
Duration:	none	brief
Runoff Class:	negligible	low

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>
Frost-free period (days):	74	149	May 23 – September 16
Freeze-free period (days):	112	180	May 8 – October 1
Annual Precipitation (inches):	7.6	21.9	

Mean annual precipitation: 12.35 inches

Mean annual air temperature: 46.2 °F (30.1°F Avg. Min. to 62.3°F Avg. Max.)

For detailed information, visit the Natural Resources Conservation Service National Water and Climate Center at <http://www.wcc.nrcs.usda.gov/> website. Other climate station(s) representative of this precipitation zone include” Grass Creek 1E”, “Thermopolis”, Thermopolis 25NW”, “Buffalo Bill Dam” and “Black Mountain”.

Influencing Water Features

Wetland Description:	<u>System</u>	<u>Subsystem</u>	<u>Class</u>	<u>Sub-class</u>
	None	None	None	None

Stream Type: C (Rosgen)

Representative Soil Features

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

Major Soil Series correlated to this site include:

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

Parent Material Kind: alluvium

Parent Material Origin: sandstone, shale

Surface Texture: loam, clay loam, clay, fine sandy loam, sandy loam, loamy sand, very fine sandy loam, silt loam, silty clay

Surface Texture Modifier: none is most common, but gravelly or cobbly may occur

Subsurface Texture Group: loam

Surface Fragments ≤ 3” (% Cover): typically 0, occasionally up to 10

Surface Fragments > 3” (%Cover): typically 0, occasionally up to 10

Subsurface Fragments ≤ 3” (% Volume): typically 0, occasionally up to 10

Subsurface Fragments > 3" (% Volume): typically 0, occasionally up to 10

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	well drained	poorly drained
Permeability Class:	slow	rapid
Depth (inches):	20	>60
Electrical Conductivity (mmhos/cm) $\leq 20''$:	0	8
Sodium Absorption Ratio $\leq 20''$:	0	10
Soil Reaction (1:1 Water) $\leq 20''$:	6.6	8.4
Soil Reaction (0.1M CaCl₂) $\leq 20''$:	NA	NA
Available Water Capacity (inches) $\leq 30''$:	2.2	6.6
Calcium Carbonate Equivalent (percent) $\leq 20''$:	0	5

Plant Communities

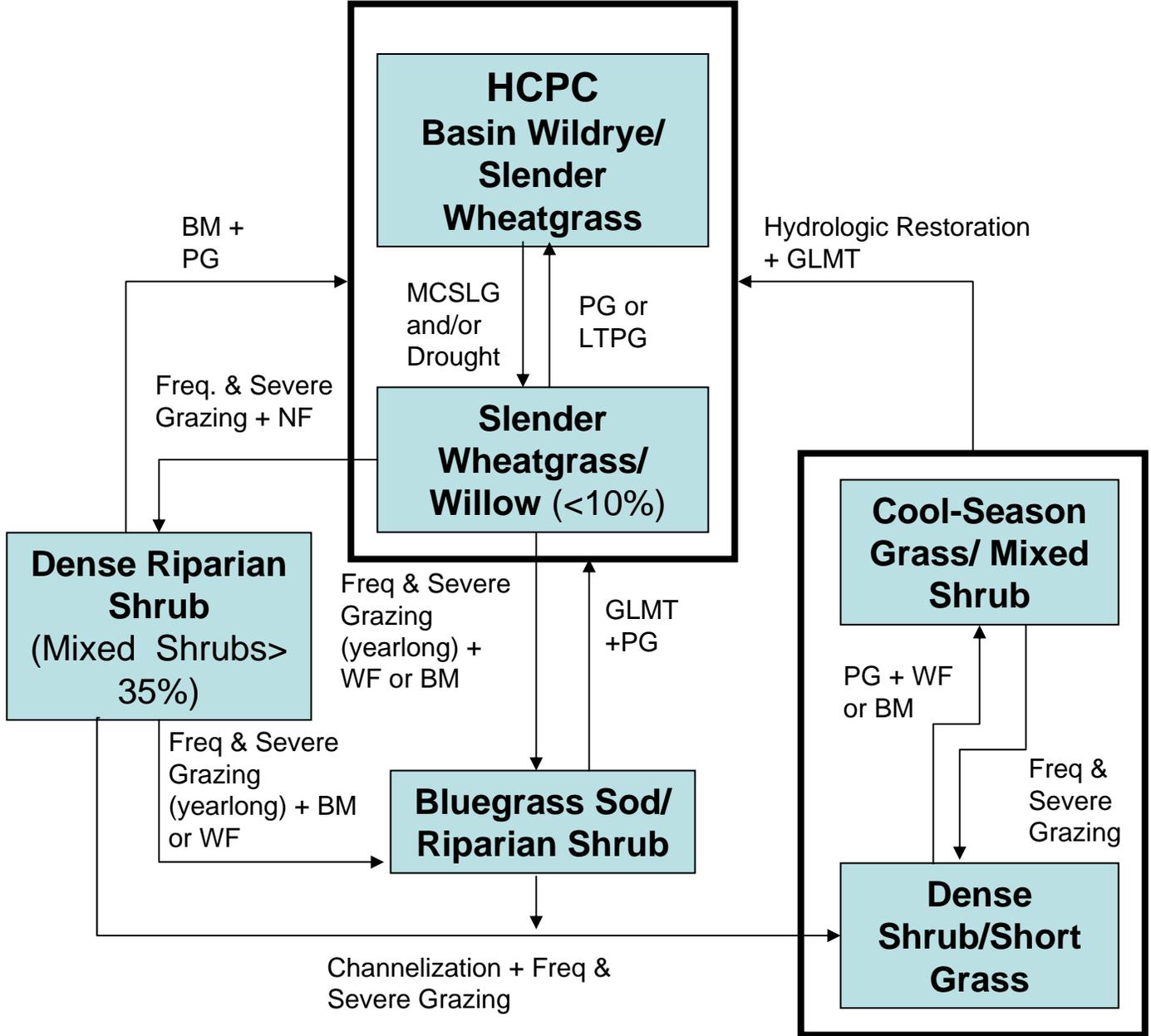
Ecological Dynamics of the Site:

Potential vegetation on this site is dominated by plants that can tolerate a water table near the surface for most of the growing season. Significant vegetation includes tall and mid cool season grasses, and a variety of riparian shrubs and forbs. The expected potential composition for this site is about 70% grasses, 10% forbs and 20% woody plants. The composition and production will vary naturally due to historical use, fluctuating precipitation and fire frequency.

As this site deteriorates, species such as willows, wild rose, and boxelder will increase. Weedy annuals and Kentucky bluegrass will invade. Cool season grasses such as basin wildrye and slender wheatgrass will decrease in frequency and production.

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

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



- 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.
			Total: 3600		
GRASSES AND GRASS-LIKES					
GRASSES/GRASSLIKES					
Basin wildrye	Leymus cinereus	LECI4	1	1260 - 1800	35 - 50
Slender wheatgrass	Elymus trachycaulus	ELTR7	2	540 - 900	15 - 25
MISC. GRASSES/GRASSLIKES			3	360 - 900	10 - 25
Big bluegrass	Poa ampla (syn. to Poa secunda)	POAM (POSE)	3	0 - 180	0 - 5
Bluejoint reedgrass	Calamagrostis canadensis	CACAM	3	0 - 180	0 - 5
Bulrush	Scirpus Pungens var. polyphyllus	SCPUP3	3	0 - 180	0 - 5
Canby bluegrass	Poa canbyi (syn. P. secunda)	POCA(POSE)	3	0 - 180	0 - 5
Inland sedge	Carex interior	CAIN11	3	0 - 180	0 - 5
other rushes	Juncus spp.	JUNCA	3	0 - 180	0 - 5
Streambank wheatgrass	Elymus lanceolatus	ELLA3	3	0 - 180	0 - 5
Thickspike wheatgrass	Elymus lanceolatus ssp. lanceolatus	ELLAL	3	0 - 180	0 - 5
Tufted hairgrass	Deschampsia caespitosa	DECA18	3	0 - 180	0 - 5
Western wheatgrass	Pascopyrum smithii	PASM	3	0 - 180	0 - 5
other perennial grasses (native)		2GP	3	0 - 180	0 - 5
FORBS			4	0 - 360	0 - 10
American bistort	Polygonum bistortoides	POBI6	4	0 - 180	0 - 5
American licorice	Glycyrrhiza lepidota	GLLE3	4	0 - 180	0 - 5
Buttercup	Ranunculus spp.	RANUN	4	0 - 180	0 - 5
Cinquefoil	Potentilla spp.	POTEN	4	0 - 180	0 - 5
Clovers	Trifolium spp.	TRIFO	4	0 - 180	0 - 5
Cow parsnip	Heracleum maximum	HEMA80	4	0 - 180	0 - 5
Dock	Rumex spp.	RUMEX	4	0 - 180	0 - 5
Fleabane	Erigeron spp.	ERIGE2	4	0 - 180	0 - 5
Goldenpea	Thermopsis spp.	THERM	4	0 - 180	0 - 5
Horsetail	Equisetum spp.	EQUIS	4	0 - 180	0 - 5
Iris	Iris spp.	IRIS	4	0 - 180	0 - 5
Mint	Mentha spp.	MENTH	4	0 - 180	0 - 5
Phlox	Phlox spp.	PHLOX	4	0 - 180	0 - 5
Swamp vervain	Verbena hastata	VEHA2	4	0 - 180	0 - 5
Water hemlock	Cicuta spp.	CICUT	4	0 - 180	0 - 5
Western yarrow	Achillea lanulosa	ACHIL	4	0 - 180	0 - 5
other perennial forbs (native)		2FP	4	0 - 180	0 - 5
TREES/SHRUBS			5	180 - 900	5 - 25
Boxelder	Acer negundo var. interius	ACNE12	5	0 - 180	0 - 5
Cottonwood	Populus angustifolia	POAN3	5	0 - 180	0 - 5
Roses	Rosa woodsii var. woodsii	ROWOW	5	0 - 180	0 - 5
Rubber rabbitbrush	Ericameria nauseosa	ERNA10	5	0 - 180	0 - 5
Shrubby cinquefoil	Dasiphora floribunda	DAFL3	5	0 - 180	0 - 5
Snowberry	Symphoricarpus occidentalis	SYOC	5	0 - 180	0 - 5
Water Birch	Betula occidentalis	BEOC2	5	0 - 180	0 - 5
Willows	Salix spp.	SALIX	5	0 - 180	0 - 5
other shrubs & half shrubs (native)		2SHRUB	5	0 - 180	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.

Basin Wildrye/Slender Wheatgrass 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 within reach of the herbaceous plants through most of the growing season, and periodic fires. Potential vegetation is about 70% grasses or grass-like plants, 10% forbs and 20% woody plants. Cool season tall and mid-grasses dominate this state. The major grasses include basin wildrye and slender wheatgrass. Other grasses occurring in this state include tufted hairgrass, rhizomatous wheatgrasses, big bluegrass, and bluejoint reedgrass. Riparian shrubs comprise the primary overstory species, but may include tree species as well. A variety of forbs occurs in this state as well (see Plant Composition Table).

The total annual production (air-dry weight) of this state is about 3600 pounds per acre, but it can range from about 2800 lbs./acre in unfavorable years to about 4500 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 extremely stable and well adapted to the Northern Intermountain Desertic Basins climate. The diversity in plant species allows for high drought tolerance. 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 and Drought will convert this plant community to the *Slender Wheatgrass/Willow Plant Community*. Prolonged drought will exacerbate this transition, as periodic flooding of the site will not occur.

Slender Wheatgrass/Willow Plant Community

This plant community evolved under moderate grazing by domestic livestock, a water table within reach of the herbaceous plants through most of the growing season, and fire suppression. Cool-season grasses make up the majority of the understory with the balance made up of short warm-season grasses, annual cool-season grasses, and miscellaneous forbs. Willows and other riparian shrubs comprise up to about one-third of the total annual production of this plant community.

Dominant grasses include slender wheatgrass, rhizomatous wheatgrasses, and bluejoint reedgrass. Grasses/grasslikes of secondary importance include big, and Canby bluegrasses, and inland sedge. Forbs include similar species as the HCPC. Willows and a variety of riparian species comprise most of the total annual shrub production.

When compared to the Historical Climax Plant Community, basin wildrye has decreased. Rhizomatous wheatgrasses, all species of bluegrass and inland sedge have increased. All Shrubs and forbs have also increased.

The total annual production (air-dry weight) of this state is about 3200 pounds per acre, but it can range from about 2600 lbs./acre in unfavorable years to about 3600 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 state is stable and protected from excessive erosion. The biotic integrity of this plant community is intact. The watershed is functioning. Water flow patterns and litter movement may be occurring but in isolated areas. Incidence of pedestalling is minimal. Soils are mostly stable and the surface shows minimum soil loss.

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*. In addition, the removal of fire suppression will allow a somewhat natural fire regime to reoccur to more easily transition between this plant community and the HCPC. A prescribed fire treatment can be useful to hasten this transition if desired. Without fire as a natural component, the frequency and production of shrub species may continue to be higher than desired in the HCPC.
- Frequent and severe grazing plus fire or brush control will convert this plant community to a *Bluegrass Sod/ Riparian Shrub Plant Community*.
- Frequent and severe grazing plus no fire or brush control will convert this plant community to the *Dense Riparian Shrub Plant Community*.

Dense Riparian Shrub Plant Community

This plant community evolved under frequent and severe grazing and no fire or brush control. Extended periods of drought will exacerbate this situation. The hydrologic features of this site are still functioning. Shrubs dominate this state as the herbaceous plants have been removed by shading from the shrubs as well as grazing pressure.

Tall and medium cool season grasses have been reduced or eliminated. The annual grasses, warm season grasses, and annual forbs have increased in the small patches where the shrubs have not become too dense. Total annual production is mostly from shrubs and these condensed patches of herbaceous plants. Shrubs make up greater than 35% of the total annual production and typically account for more than two thirds of this production. When compared with the HCPC, the annual

production is slightly less but the dense shrub component makes up for the loss in herbaceous production.

The total annual production (air-dry weight) of this state is about 2800 pounds per acre, but it can range from about 2600 lbs./acre in unfavorable years to about 3200 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 resistant to change as the stand becomes more decadent. The dense nature of this state makes any fire during the summer extremely intense and if burned usually results in delayed succession, as the soils are usually sterile. Continued frequent and severe grazing or the removal of grazing does not seem to affect the plant composition or structure of the plant community. The exception is if trampling or browsing of the shrubs is severe enough and sustained for a number of years to reduce frequency and production of the shrubs on the site or even possible total removal. The dense overstory, warm-season grasses, weedy species and bare ground can compromise the biotic integrity. Plant diversity is moderate to poor and the potential for native grasses to reproduce is minimal. The shift in the vegetative structure and function is moderate to extreme, the biotic integrity is minimally functional as the dominant tall and mid-grasses have been reduced.

The soil of this state is somewhat protected where the sod patches are located but erosion has accelerated between the patches where bare ground is common. Water flow patterns and pedestalling are obvious. Hummocks are likely present but not usually pervasive. Infiltration is reduced and runoff is increased. Rill channels may be noticeable in the interspaces and gullies may be establishing where rills have concentrated.

Transitional pathways leading to other plant communities are as follows:

- Brush management plus prescribed grazing will convert this plant community to HCPC.
- Wildfire or brush Management plus frequent and severe grazing (yearlong) will convert this plant community to a *Bluegrass Sod/ Riparian Shrub Plant Community*.
- Channelization plus frequent and severe grazing will convert this plant community to a *Dense Shrub/Warm-Season Grass Plant Community*.

Bluegrass Sod/Riparian Shrub Plant Community

This plant community is the result of long-term improper grazing use. The hydrologic features of this site may or may not be functioning as flooding is occurring but may be less than in the past. This plant community is dominated by a dense short grass sod of Kentucky bluegrass and includes a mosaic of riparian shrub overstory.

Weedy forbs are prevalent and noxious weeds such as Russian knapweed, Canada thistle, and leafy spurge have invaded the site, if a seed source is available. Shrub species include willows, western snowberry, water birch, shrubby cinquefoil, and wild rose.

When compared to the Historic Climax Plant Community, the tall and medium grasses are reduced or absent. Short warm season grasses are dominant and weedy annuals are common. Shrubs will have increased as a percentage of the total production, but will not dominate as the sod prevents a homogeneous shrub cover. Areas of bare ground may have increased in patches and total production has decreased. Total production is reduced but the increase in shrubs and Kentucky bluegrass offset some of the loss of tall and mid perennial grasses.

The total annual production (air-dry weight) of this state is about 2600 pounds per acre, but it can range from about 2200 lbs./acre in unfavorable years to about 3000 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 sod component of this plant community is extremely resistant to change and continued frequent and severe grazing or the removal of grazing does not seem to affect the plant composition or structure of the plant community. The biotic integrity of this state is mostly not functional as plant diversity is poor especially amongst herbaceous species. The vegetative structure is not intact, as warm season grasses and weedy plants are prevalent and the tall and most of the mid-grasses are absent.

This sod bound plant community is very resistant to water infiltration. While this sod protects the site itself, excessive runoff increases erosion on bare ground and can cause rill channels and gully erosion. Water flow patterns are obvious in the bare ground areas and shrubs and sod patches are pedestalled. Hummocks are usually present and may be widespread. Rill channels are noticeable in the interspaces and gullies may be establishing where rills have concentrated. The watershed may or may not be functioning, as runoff is excessive and erosional processes are accelerated.

Transitional pathways leading to other plant communities are as follows

- Grazing land mechanical treatment, plus prescribed grazing and/or brush management or wildfire will convert this plant community in to the *Slender Wheatgrass/Willow Plant Community*. This sod is extremely resistant to change and will require grazing land mechanical treatments, such as chiseling, to change to a different state. Reseeding areas with native plant species and implementing proper grazing management will accelerate this change where few desirable plants remain. Fire may also be necessary to open up areas dominated by riparian shrubs.
- Channelization plus frequent and severe grazing will convert this plant community to a *Dense Shrub/Short Grass Plant Community*.

Dense Shrub/Short Grass Plant Community

This plant community evolved under frequent and severe grazing and channelization or down cutting of an adjacent water source. The disruption in the natural hydrologic regime is either directly caused

by human, such as dams or dikes, or indirectly through accelerated erosion and channelization. Extended periods of drought will exacerbate this situation. Upland plants are more pronounced and shrubs dominate the site. Shrub species can vary and range from a dominant basin big sagebrush and/or rubber rabbitbrush plant community on drier warmer sites to cooler wetter sites with a mixture of sagebrush and isolated patches of riparian species.

Tall and medium cool season grasses have been reduced or eliminated. Dense sod patches of Kentucky bluegrass and/or upland short grasses occur amongst the shrubs and bare ground. The annual grasses and forbs such as cheatgrass, kochia, halogeton, and Russian thistle, are prevalent along with noxious weeds such as Russian knapweed. Total annual production is mostly from shrubs and these short grasses. Shrubs make up greater than 40% of the total annual production. When compared with the HCPC, the annual production is reduced but the dense shrub component makes up for some of this loss in total production.

The total annual production (air-dry weight) of this state is about 1500 pounds per acre, but it can range from about 1000 lbs./acre in unfavorable years to about 1800 lbs./acre in above average years.

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 resistant to change as the stand becomes more decadent. These areas may actually become more susceptible to severe fire as the brush becomes denser and the fire loads increase. Continued frequent and severe grazing or the removal of grazing does not seem to affect the plant composition or structure of the plant community. Short 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 somewhat protected where the sod patches are located and the dense shrubs occur, but erosion has accelerated in places between the patches where bare ground may be common. Water flow patterns and pedestalling are obvious. Infiltration is reduced and runoff is increased. Rill channels may be noticeable in the interspaces.

Transitional pathways leading to other plant communities are as follows:

- Brush management plus prescribed grazing without restoring the hydrologic function, will convert this plant community to a *Cool-Season Grass/Mixed Shrub Plant Community*.
- Hydrologic restoration and grazing land mechanical treatment, will convert this plant community in to the *Slender Wheatgrass/Willow Plant Community*. Restoring the hydrological function of an area is usually very expensive and may take many years. This may require reintroducing both periodic flooding and an overflow regime. In addition, grazing land mechanical treatment, such as chiseling, and reseeding with natives to accelerate recovery is usually required. Fire may also be necessary to open up areas dominated by riparian shrubs so seedlings can establish.

Cool-Season Grass/Mixed Shrub Plant Community

This plant community can occur where the Dense Shrub/Short Grass Plant Community under goes brush management treatment and a prescribed grazing management practice is implemented. Preferred cool season grasses have reestablished and shrubs have been controlled, but are still a part of the community. Upland plants are more pronounced as the hydrologic regime has been disrupted and the water table has been greatly altered.

This state is dominated by an overstory of a variety of shrubs, such as basin big sagebrush, rubber rabbitbrush, and silver sagebrush. Small patches of riparian shrubs may remain where moisture can accumulate. Perennial cool season mid-grasses have once again reestablished such as rhizomatous wheatgrasses, Indian ricegrass, needleandthread, and bottlebrush squirreltail. Other grasses include Sandberg bluegrass and blue grama. Basin wildrye and slender wheatgrass may also be reestablishing but will not be at the frequency or productivity found in the HCPC. Patches of annuals such as cheatgrass and other weedy annual forbs such as halogeton, Russian thistle, and kochia may persist on this site. Noxious weeds such as Russian knapweed may also remain if not treated. The interspaces between plants will have diminished in size. When compared with the HCPC, the annual production has been significantly reduced and the plant composition is clearly unique as upland plants now make up the balance of the species.

The total annual production (air-dry weight) of this state is about 1800 pounds per acre, but it can range from about 1200 lbs./acre in unfavorable years to about 2400 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 long-term overgrazing. The herbaceous component is stable, but does not include most climax species. Plant vigor and replacement capabilities are sufficient. The biotic community is not intact because of the predominant upland plants and lack of climax grass species. Plant diversity is moderate.

Soils are mostly stable and recent soil loss is minimal. This should not be confused with evidence of remnant erosion. Water flow patterns and litter movement is stable but is still occurring on steeper slopes. Incidence of pedestalling is improving. The watershed is not functioning.

Transitional pathways leading to other plant communities are as follows:

- Frequent and severe grazing will convert this plant community to the *Dense Shrub/Short Grass Plant Community*. Prolonged drought will exacerbate this transition.
- Hydrologic restoration and grazing land mechanical treatment will convert this plant community to the *Slender Wheatgrass/Willow Plant Community*. Restoring the hydrological function of an area is usually very expensive and may take many years. This may require reintroducing both periodic flooding and an overflow regime. In addition, grazing land mechanical treatment, such as chiseling, and reseeding with natives to accelerate recovery is usually required. Fire may also be necessary to open up areas dominated by riparian shrubs so seedlings can establish.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

Historic Climax Plant Community: The predominance of grasses and shrubs in this plant community favors grazers and mixed-feeders, such as bison, elk, moose, deer, and antelope. Suitable thermal and escape cover exists. When found adjacent to sagebrush dominated states, this plant community may provide brood rearing/foraging areas for upland game birds including sage grouse. Other birds that would frequent this plant community include western meadowlarks, horned larks, and golden eagles. Many grassland obligate small mammals would occur here.

Slender Wheatgrass/Willow Plant Community: This plant community is extremely useful for the same large grazers that would use the Historic Climax Plant Community. It provides forage year around forage and cover and especially during critical times such as times of drought and winter. When found adjacent to sagebrush dominated states, this plant community may provide brood rearing/foraging areas for upland game birds including sage grouse. Good grasshopper habitat equals good foraging for birds. Other birds that would frequent this plant community include western meadowlarks, horned larks, and golden eagles. Many grassland obligate small mammals would occur here.

Dense Riparian Shrub Plant Community: This plant community can provide important winter cover and forage for mule deer, moose, and antelope during that critical time. Grazers, however, will find little forage value in this state. The plant community composition comprises little diversity, and thus, less apt to meet all the seasonal needs of large grazers. The dense shrub cover does provide good thermal and escape cover for both large animals and upland birds.

Bluegrass Sod/Riparian Shrub Plant Community : 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 some animals. It may provide some foraging opportunities for sage grouse when it occurs proximal to woody cover. Good grasshopper habitat equals good foraging for birds. Other birds that would frequent this plant community include western meadowlarks, horned larks, and golden eagles.

Dense Shrub/Short Grass Plant Community: The proximity to water makes this state important for wildlife such as birds, mule deer, and whitetail deer. However, the plant community composition is less diverse and productive, and thus, less apt to meet the seasonal needs of these animals. The dense shrub cover does provide good thermal and escape cover for both large animals and upland birds. However, it provides little foraging opportunities for upland game birds, as fewer forbs are available. Many grassland obligate small mammals would occur here.

Cool-Season Grass/Mixed Shrub Plant Community: The proximity to water makes this state important for wildlife such as birds, mule deer, and whitetail deer. The plant community composition is diverse, and able to meet the seasonal needs of these animals. It will provide foraging opportunities for upland game birds and sage grouse. Good grasshopper habitat equals good foraging for birds. Many grassland obligate small mammals would occur here.

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
GRASSES/GRASSLIKES										
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 alkali grass	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
FORBS										
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
Woolly groundsel	Packera cana	PACA15	TTTT	UUUU	TTTT	UUUU	UUUU	TTTT	UUUU	UUUU
TREES, SHRUBS & HALF-SHRUBS										
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 conservative estimates should be used only as guidelines in the initial stages of the conservation planning process. Often, the current plant composition does not entirely match any particular plant community (as described in this ecological site description). Because of this, a field visit is recommended, in all cases, to document plant composition and production. More precise carrying capacity estimates should eventually be calculated using this information along with animal preference data, particularly when grazers other than cattle are involved. Under more intensive grazing management, improved harvest efficiencies can result in an increased carrying capacity. If distribution problems occur, stocking rates must be reduced to maintain plant health and vigor.

Plant Community	Production (lb./ac)	Carrying Capacity* (AUM/ac)
Historic Climax Plant Community	2800-4500	2.0
Slender Wheatgrass/Willow	2600-3600	1.5
Dense Riparian Shrub	2600-3200	0.6
Bluegrass Sod/Riparian Shrub	2200-3000	1.0
Dense Shrub/Short Grass	1000-1800	.30
Cool-Season Grass/Mixed Shrub	1200-2400	.35

* - 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

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group B and C, with localized areas in hydrologic group D. Infiltration ranges from moderately slow to rapid. Runoff potential for this site varies from low to moderate depending on soil hydrologic group and ground cover. In many cases, areas with greater than 75% ground cover have the greatest potential for high infiltration and lower runoff. An example of an exception would be where short-grasses form a strong sod and dominate the site. Areas where ground cover is less than 50% have the greatest potential to have reduced infiltration and higher runoff (refer to Part 630, NRCS National Engineering Handbook for detailed hydrology information).

Rills and gullies should not typically be present. Water flow patterns should be barely distinguishable if at all present. Pedestals are only slightly present in association with bunchgrasses. Litter typically falls in place, and signs of movement are not common. Chemical and physical crusts are rare to non-existent. Cryptogamic crusts are present, but only cover 1-2% of the soil surface.

Recreational Uses

This site provides hunting opportunities for upland game species. The wide varieties of plants, which bloom from spring until fall, have an esthetic value that appeals to visitors.

Wood Products

No appreciable wood products are present on the site.

Other Products

None noted.

Supporting Information

Associated Sites

Wetland	032XY378WY
Lowland	032XY328WY
Overflow	032XY330WY
Clayey Overflow	032XY306WY

Similar Sites

() – Subirrigated 15-19" Foothills and Mountains East P.Z. [higher production than Subirrigated 10-14" E]	043XY374WY
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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

This site occurs entirely within 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

State Range Management Specialist

Date