

Ecological site DX032X01W174 Subirrigated (Sb) Big Horn Basin Wet

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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

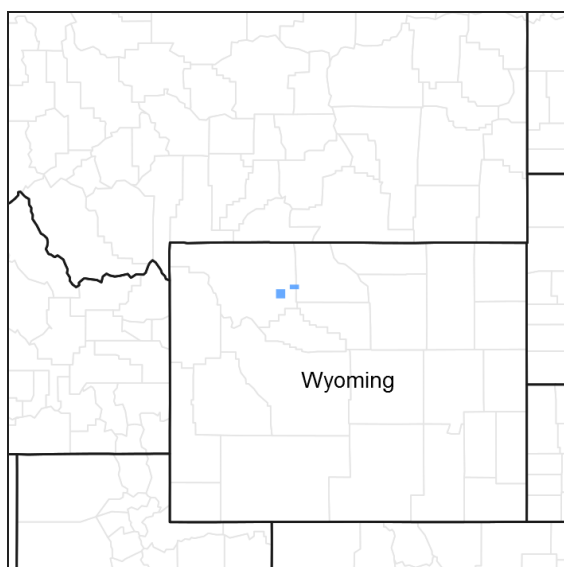


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

MLRA notes

Major Land Resource Area (MLRA): 032X–Northern Intermountain Desertic Basins

Major land resource area (MLRA):

032X – Northern Intermountain Desertic Basins – This MLRA is comprised of two major Basins, the Big Horn and Wind River. These two basins are distinctly different and are split by LRU's to allow individual ESD descriptions. These warm basins are surrounded by uplifts and rimmed by mountains, creating a unique set of plant responses and communities. Unique characteristics of the geology and geomorphology single these two basins out.

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

LRU notes

Land Resource Unit (LRU):

32X01W (WY): This LRU is the Big Horn Basin within MLRA 32. This LRU is lower in elevation, slightly warmer and

receives slightly less overall precipitation than the Wind River Basin (LRU 02). This LRU was originally divided into two LRU's - LRU A which was the core and LRU B which was the rim. With the most current standards, this LRU is divided into two Subsets. This group is ambiguous of the two official subsets and will be referred to as Subset W, capturing those sites that are a factor of water or other processes outside of the general subset divisions (climate). As the LRU shifts outer edges, aspect and relation to the major bodies of water and taller landforms create minor shifts in soil chemistry influencing the variety of ecological sites and plant interactions. The extent of soils currently correlated to this ecological site does not fit within the digitized boundary. Many of the noted soils are provisional and will be reviewed and corrected in mapping update projects. Other map units are correlated as small inclusions within other MLRA's/LRU's based on elevation, landform, and biological references.

Moisture Regime: Aquic, typic aridic, or ustic aridic.

Temperature Regime: Mesic

Dominant Cover: Rangeland, with Saltbush flats the dominant vegetative cover for this MLRA.

Representative Value (RV) Effective Precipitation: 5-14 inches (127 – 355 mm)

RV Frost-Free Days: 105-150 days

Classification relationships

Relationship to Other Established Classification Systems:

National Vegetation Classification System (NVC):

3 Xeromorphic Woodland, Scrub & Herb Vegetation Class

3.B Cool Semi-Desert Scrub & Grassland Subclass

3.B.1 Cool Semi-Desert Scrub & Grassland formation

3.B.1.NE Western North American Cool Semi-Desert Scrub & Grassland Division

M169 Great Basin & Intermountain Tall Sagebrush Shrubland & Steppe Macrogroup

G302 Artemisia Tridentata - Artemisia tripartita - Purshia tridentata Big Sagebrush Steppe Group

Ecoregions (EPA):

Level I: 10 North American Deserts

Level II: 10.1 Cold Deserts

Level III: 10.1.18 Wyoming Basin

Level IV: 10.1.18.g Big Horn Salt Desert Shrub Basin

Ecological site concept

- Site influence by a water table below soil surface through the entire growing season (within 40 inches), and water may move over the surface from run-in but only for short periods.
- Slope is <6%
- Soils are:
 - Moderately deep, deep, or very deep (depth to restrictive layer is greater than 20" (50 cm).
 - Poorly to moderately well drained
 - Textures usually range from loamy sand to clay loam
 - Clay content is < 60% in mineral soil surface 4".
 - With an average particle size class < 40% clay
 - Not saline, sodic, or saline-sodic, gypsic

Associated sites

| | |
|-------------|---|
| R032XY306WY | Clayey Overflow (CyO) 10-14" East Precipitation Zone Clayey Overflow sites occur upslope from subirrigated sites, on a terrace or alluvial fan. Clayey overflow lacks the influence from a water table and can be found on upland positions as well as lowland positions. |
| R032XY330WY | Overflow (Ov) 10-14" East Precipitation Zone Overflow sites occur upslope from subirrigated sites, on a terrace or alluvial fan. Overflow lacks the influence from a water table and can be found on upland positions as well as lowland positions. |

| | |
|-------------|---|
| R032XY328WY | Lowland (LL) 10-14" East Precipitation Zone Lowland sites are found in a complex with subirrigated and wetland sites. Subirrigated is the transition from the wettest site (wetland) to the drier site (lowland.) |
| R032XY378WY | Wetland (WL) 10-14" East Precipitation Zone Wetland sites are found in a complex with subirrigated and lowland sites. Subirrigated is the transition from the wettest site (wetland) to the drier site (lowland.) |

Similar sites

| | |
|-------------|---|
| R043BY374WY | Subirrigated (Sb) 15-19" Foothills and Mountains East Precipitation Zone Subirrigated 15-19 |
|-------------|---|

Table 1. Dominant plant species

| | |
|------------|--|
| Tree | Not specified |
| Shrub | (1) <i>Salix</i> |
| Herbaceous | (1) <i>Leymus cinereus</i> (2) <i>Elymus trachycaulus</i> |

Legacy ID

R032XB174WY

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.

Table 2. Representative physiographic features

| | |
|--------------------|--|
| Landforms | (1) Intermontane basin > Alluvial fan (2) Intermontane basin > Drainageway (3) Intermontane basin > Stream terrace (4) Intermontane basin > Flood plain |
| Flooding duration | Brief (2 to 7 days) to long (7 to 30 days) |
| Flooding frequency | Occasional to frequent |
| Ponding duration | Brief (2 to 7 days) |
| Ponding frequency | None to frequent |
| Elevation | 1,646–2,286 m |
| Slope | 0–6% |
| Ponding depth | 0–8 cm |
| Water table depth | 30–152 cm |
| Aspect | Aspect is not a significant factor |

Climatic features

Annual precipitation and modeled relative effective annual precipitation ranges from 5 to 14 inches (127 – 355 mm). The normal precipitation pattern shows peaks in May and June and a secondary peak in September. The noted peaks account for approximately 50% of the mean annual precipitation. Much of the moisture that falls in the latter part of the summer is lost by evaporation and much of the moisture that falls during the winter is lost by sublimation.

Average snowfall is about 20 inches annually. Wide fluctuations may occur in yearly precipitation and result in more dry years than those with more than normal precipitation. Temperatures show a wide range between summer and winter and between daily maximums and minimums, due to the high elevation and dry air, which permits rapid

incoming and outgoing radiation. Cold air outbreaks from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may occur in winter and bring rapid rises in temperature. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring. High winds are generally blocked from the basin by high mountains but can occur in conjunction with an occasional thunderstorm.

Growth of native cool-season plants begins approximately on April 1st and continues through to July 1st. Cool weather and moisture in September may produce some green up of cool season plants that will continue to late October. For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at <http://www.wcc.nrcs.usda.gov/>. "Basin", "Clark 3NE", "Cody", "Cody 12SE", "Emblem", "Greybull", "Heart Mtn", "Lovell", "Powell Fld Stn", "Worland FAA AP", and "Worland" are the representative weather stations for LRU A. The following graphs and charts are a collective sample representing the averaged normals and 30-year annual rainfall data for the selected weather stations from 1981 to 2010.

Table 3. Representative climatic features

| | |
|--|--------------|
| Frost-free period (characteristic range) | 92-115 days |
| Freeze-free period (characteristic range) | 116-138 days |
| Precipitation total (characteristic range) | 178-229 mm |
| Frost-free period (actual range) | 90-118 days |
| Freeze-free period (actual range) | 112-147 days |
| Precipitation total (actual range) | 178-254 mm |
| Frost-free period (average) | 105 days |
| Freeze-free period (average) | 129 days |
| Precipitation total (average) | 203 mm |

Climate stations used

- (1) WORLAND [USC00489770], Worland, WY
- (2) WORLAND [USW00024062], Worland, WY
- (3) BASIN [USC00480540], Basin, WY
- (4) GREYBULL [USC00484080], Greybull, WY
- (5) EMBLEM [USC00483031], Burlington, WY
- (6) CODY 12SE [USC00481850], Meeteetse, WY
- (7) CODY [USC00481840], Cody, WY
- (8) HEART MTN [USC00484411], Powell, WY
- (9) POWELL FLD STN [USC00487388], Powell, WY
- (10) LOVELL [USC00485770], Lovell, WY
- (11) CLARK 3NE [USC00481775], Powell, WY

Influencing water features

The characteristics of these soils have influence from ground water that is within 40 inches of the soil surface and will be just below the surface for all of the growing season. Water over the surface from run-in may occur but only for short periods of time. These soils are moderately deep to deep and poorly to somewhat well drained.

Wetland description

No wetland classification determined for this site.
Stream Type: C (Rosgen)

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:

Table 4. Representative soil features

| | |
|--|---|
| Parent material | (1) Alluvium—sandstone and shale |
| Surface texture | (1) Gravelly, cobbly, cobbly loam (2) Clay loam (3) Clay (4) Loamy sand (5) Sandy loam (6) Silt loam |
| Family particle size | (1) Loamy |
| Drainage class | Well drained to poorly drained |
| Permeability class | Slow to rapid |
| Soil depth | 51–152 cm |
| Surface fragment cover <=3" | 0–10% |
| Surface fragment cover >3" | 0–10% |
| Available water capacity (0-101.6cm) | 5.59–16.76 cm |
| Calcium carbonate equivalent (0-101.6cm) | 0–5% |
| Electrical conductivity (0-101.6cm) | 0–8 mmhos/cm |
| Sodium adsorption ratio (0-101.6cm) | 0–10 |
| Soil reaction (1:1 water) (0-101.6cm) | 6.6–8.4 |
| Subsurface fragment volume <=3" (Depth not specified) | 0–10% |
| Subsurface fragment volume >3" (Depth not specified) | 0–10% |

Ecological dynamics

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.

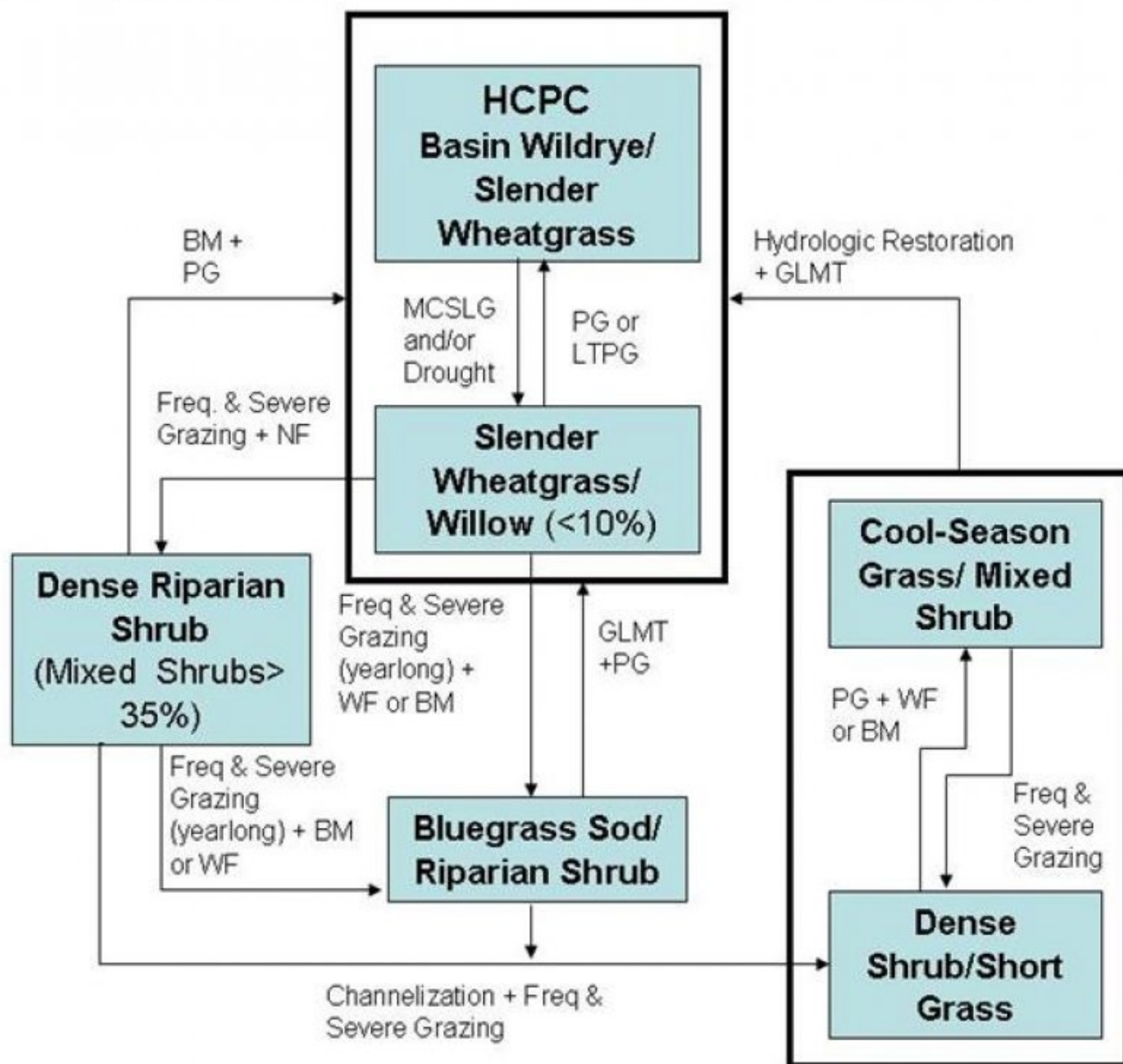
The Historic Climax Plant Community (description follows the plant community diagram) has been determined by study of rangeland relic areas, or areas protected from excessive disturbance. Trends in plant communities going from heavily grazed areas to lightly grazed areas, seasonal use pastures, and historical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

Plant Community Narratives

Following are the narratives for each of the described plant communities. These plant communities may not represent every possibility, but they probably are the most prevalent and repeatable plant communities. The plant composition tables shown above have been developed from the best available knowledge at the time of this revision. As more data is collected, some of these plant communities may be revised or removed, and new ones may be added. None of these plant communities should necessarily be thought of as “Desired Plant Communities”. According to the USDA NRCS National Range and Pasture Handbook, Desired Plant Communities (DPC's) will be determined by the decision-makers and will meet minimum quality criteria established by the NRCS. The main purpose for including any description of a plant community here is to capture the current knowledge and experience at the time of this revision.

State and transition model



BM - Brush Management (fire, chemical, mechanical)

Freq. & Severe Grazing - Frequent and Severe Utilization of the Cool-season Mid-grasses during the Growing Season

GLMT - Grazing Land Mechanical Treatment

LTPG - Long-term Prescribed Grazing

MCSLG - Moderate, Continuous Season-long Grazing

NU, NF - No Use and No Fire

PG - Prescribed Grazing (proper stocking rates with adequate recovery periods during the growing season)

VLTPG - Very Long-term Prescribed Grazing (could possibly take generations)

WF - Wildfire

State 1
Basin Wildrye/Slender Wheatgrass

Community 1.1
Basin Wildrye/Slender Wheatgrass

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. 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.

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

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

State 2
Slender Wheatgrass/ Willow

Community 2.1
Slender Wheatgrass/ Willow

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. 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.

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

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

State 3

Dense Riparian Shrub

Community 3.1

Dense Riparian Shrub

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. 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.

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

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

State 4

Bluegrass Sod/ Riparian Shrub

Community 4.1

Bluegrass Sod/ Riparian Shrub

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 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.

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

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

State 5

Dense Shrub/ Short Grass

Community 5.1

Dense Shrub/ Short Grass

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. 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

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

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

Cool-Season Grass/ Mixed Shrub

Cool-Season Grass/ Mixed Shrub

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

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

Table 5. Community 1.1 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production (Kg/Hectare) | Foliar Cover (%) |
|------------------------|-----------------------|--------|--|-----------------------------------|---------------------|
| Grass/Grasslike | | | | | |
| 1 | | | | 1412–2018 | |
| | basin wildrye | LECI4 | <i>Leymus cinereus</i> | 1412–2018 | – |
| 2 | | | | 605–1009 | |
| | slender wheatgrass | ELTR7 | <i>Elymus trachycaulus</i> | 605–1009 | – |
| 3 | | | | 404–1009 | |
| | Grass, perennial | 2GP | <i>Grass, perennial</i> | 0–202 | – |
| | Macoun's reedgrass | CACAM | <i>Calamagrostis canadensis</i> var. <i>macouniana</i> | 0–202 | – |
| | inland sedge | CAIN11 | <i>Carex interior</i> | 0–202 | – |
| | thickspike wheatgrass | ELLA3 | <i>Elymus lanceolatus</i> | 0–202 | – |
| | thickspike wheatgrass | ELLAL | <i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i> | 0–202 | – |
| | western wheatgrass | PASM | <i>Pascopyrum smithii</i> | 0–202 | – |
| Forb | | | | | |
| 4 | | | | 0–404 | |
| | Forb, perennial | 2FP | <i>Forb, perennial</i> | 0–202 | – |
| | yarrow | ACHIL | <i>Achillea</i> | 0–202 | – |
| | water hemlock | CICUT | <i>Cicuta</i> | 0–202 | – |
| | horsetail | EQUIS | <i>Equisetum</i> | 0–202 | – |
| | fleabane | ERIGE2 | <i>Erigeron</i> | 0–202 | – |
| | American licorice | GLLE3 | <i>Glycyrrhiza lepidota</i> | 0–202 | – |
| | common cowparsnip | HEMA80 | <i>Heracleum maximum</i> | 0–202 | – |
| | iris | IRIS | <i>Iris</i> | 0–202 | – |
| | mint | MENTH | <i>Mentha</i> | 0–202 | – |
| | phlox | PHLOX | <i>Phlox</i> | 0–202 | – |
| | American bistort | POBI6 | <i>Polygonum bistortoides</i> | 0–202 | – |
| | cinquefoil | POTEN | <i>Potentilla</i> | 0–202 | – |
| | buttercup | RANUN | <i>Ranunculus</i> | 0–202 | – |
| | dock | RUMEX | <i>Rumex</i> | 0–202 | – |
| | goldenbanner | THERM | <i>Thermopsis</i> | 0–202 | – |
| | clover | TRIFO | <i>Trifolium</i> | 0–202 | – |
| | swamp verbena | VEHA2 | <i>Verbena hastata</i> | 0–202 | – |
| Shrub/Vine | | | | | |
| 5 | | | | 202–1009 | |
| | Shrub (>.5m) | 2SHRUB | <i>Shrub (>.5m)</i> | 0–202 | – |
| | boxelder | ACNE2 | <i>Acer negundo</i> | 0–202 | – |
| | water birch | BEOC2 | <i>Betula occidentalis</i> | 0–202 | – |
| | rubber rabbitbrush | ERNA10 | <i>Ericameria nauseosa</i> | 0–202 | – |
| | narrowleaf cottonwood | POAN3 | <i>Populus angustifolia</i> | 0–202 | – |
| | Woods' rose | ROWOW | <i>Rosa woodsii</i> var. <i>woodsii</i> | 0–202 | – |
| | willow | SALIX | <i>Salix</i> | 0–202 | – |

| | | | | | |
|--|-------------------|------|------------------------------------|-------|---|
| | western snowberry | SYOC | <i>Symphoricarpos occidentalis</i> | 0–202 | – |
|--|-------------------|------|------------------------------------|-------|---|

Animal community

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 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 Carrying Capacity*
 (lb./ac) (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.

Hydrological functions

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group B and C, with localized areas in hydrologic group D. Infiltration ranges from 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

Inventory data references

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

Approval

Scott Woodall, 10/04/2019

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

| | |
|---|---|
| Author(s)/participant(s) | Ray Gullion, E. Bainter |
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| Date | 05/02/2008 |
| Approved by | Marji Patz |
| Approval date | |
| Composition (Indicators 10 and 12) based on | Annual Production |

Indicators

1. **Number and extent of rills:** Rare to nonexistent.

2. **Presence of water flow patterns:** Water flow patterns sometimes evident in floodplain zone where this site occurs.

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

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is typically less than 5%.

5. **Number of gullies and erosion associated with gullies:** Active gullies should not be present.

6. **Extent of wind scoured, blowouts and/or depositional areas:** Minimal to nonexistent.

7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous litter exhibits slight movement only associated with water flow patterns.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil Stability Index ratings typically 6.0.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface highly variable, from 2 to 20 inches (5-50 cm) in depth with OM of 1-3%.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant community consists of 55-75% grasses, 15% forbs, and 10-30% shrubs. Dense plant canopy (75-100%) and litter plus moderate to moderately rapid infiltration rates result in minimal to nonexistent runoff. Basal cover is typically greater than 5% for this site and effectively reduces runoff on this site.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** No compaction layer exists.
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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

Dominant: mid-size, cool season bunchgrasses tall, cool season bunchgrasses

Sub-dominant: perennial shrubs rhizomatous grass-likes

Other: perennial forbs cool season rhizomatous grasses

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Minimal decadence, typically associated with shrub component.
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14. **Average percent litter cover (%) and depth (in):** Litter ranges from 1-25% of total canopy measurement with total litter (including beneath the plant canopy) from 75-100% expected. Herbaceous litter depth typically ranges from 10-25 mm. Woody litter can be up to a couple inches (4-6cm).
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** English: 2800 - 4500 lb/ac (3650 lb/ac average); Metric: 3136 - 5040 kg/ha (4088 kg/ha average).
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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** Bare ground greater than 20% and presence of noxious weeds or Kentucky bluegrass are the most common indicators of a threshold being crossed. Willows, wild rose, boxelder, Baltic rush, inland sedge and shrubby cinquefoil are common increasers. Kentucky bluegrass and Canada thistle are common invasive species.
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17. **Perennial plant reproductive capability:** All species are capable of reproducing, except in drought years.
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