USDA Natural Resources
Conservation Service

Ecological site EX043B23A130
Overflow (Ov) Absaroka Lower Foothills

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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.

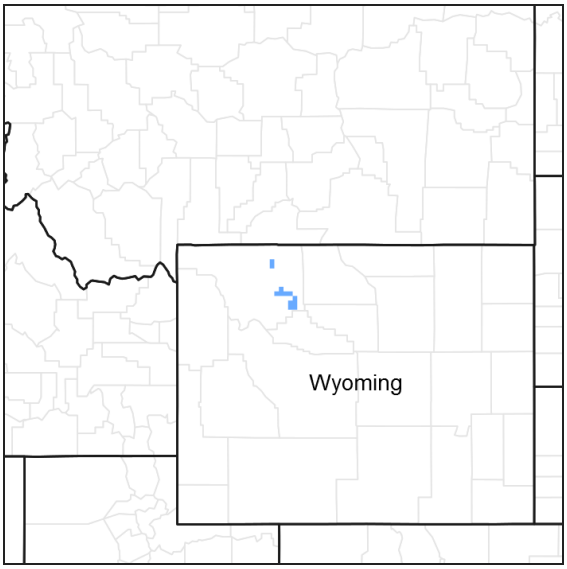


Figure 1. Mapped extent

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): 043B–Central Rocky Mountains

Major Land Resource Unit (MLRA) 43B: Central Rocky Mountains

43B – Central Rocky Mountains – The Central Rocky Mountains extends from northern Montana to southern extent of Wyoming and from Idaho to central Wyoming. The southern extent of 43B is comprised of a combination of metamorphic, igneous, and sedimentary mountains and foothills. Climatic changes across this extent are broad and create several unique breaks in the landscape.

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

LRU notes

Land Resource Unit (LRU) 43B23A: Absaroka Lower Foothills

Based on the shifts in geology, precipitation patterns and other climatic factors, as well as elevations and vegetation, the Absaroka Range was divided into LRU 23. Further division of this LRU is necessary due to the gradient moving from the foothills to the summit, as well as aspect shifts (north/east face versus south/west face). Subset A is set for the lower elevations within the foothills with 10 to 14 inches of precipitation. To verify or identify the LRU A (the referenced LRU for this ecological site), refer to the Wyoming LRU matrix key contained within the Ecological Site Key. This particular LRU occurs along the eastern lower foothills of the Absaroka Range. This LRU starts north of Clark, WY and runs to the Thermopolis, WY area. Once the foothills cross into the Northern Beartooth Range, the climatic patterns and elevational changes shifts the plant community and allows for a break in LRU's near the Montana state line. As the LRU follows to the south and tracks east with the intersection of the Absaroka and Owl Creek Ranges, the face changes aspect and geology creating a shift in plant dynamics and a break in the LRU. The extent of soils currently correlated to this ecological site does not fit within the digitized boundary. Many of the noted soils are provisional and will be reviewed and corrected in mapping update projects. Other map units are correlated as small inclusions within other MLRA's/LRU's based on elevation, landform, and biological references.

Moisture Regime: Aridic Ustic or Ustic Aridic – Progressive Initial mapping has shown that soil correlations completed prior to 2014 were identified as ustic aridic, after further evaluation of climatic and soil taxonomy information the proper moisture regime is aridic ustic. Both are recorded here until an update project is completed to correct the previous correlations.

Temperature Regime: Frigid
Dominant Cover: Rangeland – Sagebrush Steppe (major species is Wyoming Big Sagebrush)
Representative Value (RV) Effective Precipitation: 10-14 inches (254 – 355 mm)
RV Frost-Free Days: 80-110 days

Classification relationships

Relationship to Other Established Classification Systems:

National Vegetation Classification System (NVC):
3 Xeromorphic Woodland, Scrub & Herb Vegetation Class
3.B Cool Semi-Desert Scrub & Grassland Subclass
3.B.1 Cool Semi-Desert Scrub & Grassland formation
3.B.1.NE Western North American Cool Semi-Desert Scrub & Grassland Division
M169 Great Basin & Intermountain Tall Sagebrush Shrubland & Steppe Macrogroup

Ecoregions (EPA):
Level I: 10 North American Deserts Level II: 10.1 Cold Deserts
Level III: 10.1.18 Wyoming Basin
Level IV: 10.1.18.b Big Horn Basin and
10.1.18.d Foothills and Low Mountains

Ecological site concept

• Site receives significant additional effective moisture as overland flow.
• Slope is < 30%
• Soils are:
o Textures range from sandy loam to sandy clay loam in top 4" (10 cm) of mineral soil surface
o All subsurface horizons in the particle size control section have a weighted average of > 18% clay but < 35% clay. (The particle size control section is the segment of the profile from either the start of an argillic horizon for 50 cm's or from 25-100 cm's).
o Moderately deep to very deep (20-80+ in. (50-200+ cm)
o <3% stone and boulder cover and occasionally up to 10% cobble and gravel cover
o Not skeletal (<35% rock fragments) within 20" (50 cm) of mineral soil surface
o None to Slightly effervescent throughout top 20" (50 cm) of mineral soil surface
o Non-saline, sodic, or saline-sodic

Associated sites

R032XY322WY	**Loamy (Ly) 10-14" East Precipitation Zone** Overflow occurs as inclusions in concave positions with loamy sites occurring on the flat or convex positions of the hill slope, on fans or escarpment toe slopes inter-bedded parent materials.
R032XY350WY	**Sandy (Sy) 10-14" East Precipitation Zone** Overflow occurs as inclusions in concave positions with Clayey sites occurring on the flat or convex positions of the hill slope, on fans or escarpment toe slopes with sandstone parent material.
R032XY304WY	**Clayey (Cy) 10-14" East Precipitation Zone** Overflow occurs as inclusions in concave positions with Clayey sites occurring on the flat or convex positions of the hill slope, on fans or escarpment toe slopes with shale parent material.
R032XY328WY	**Lowland (LL) 10-14" East Precipitation Zone** Lowland sites are found in association with Overflow sites along active perennial or intermittent channels, with lowland sites occurring on the floodplain or with overflow occurring on the floodplain step or stream terrace.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia tridentata ssp. tridentata*
Herbaceous	(1) *Leymus cinereus* (2) *Elymus trachycaulus*

Legacy ID

R043BX530WY

Physiographic features

This site is located on nearly level to steepland and either adjacent to streams that run water at least during the major part of the growing season or on landforms receiving runoff from adjacent slopes.

Table 2. Representative physiographic features

Landforms	(1) Foothills > Eroded fan remnant sideslope (2) Foothills > Escarpment (3) Foothills > Alluvial fan
Runoff class	Negligible to low
Flooding duration	Brief (2 to 7 days)
Flooding frequency	None to occasional
Ponding duration	Brief (2 to 7 days)
Ponding frequency	None to rare
Elevation	1,646–2,286 m
Slope	0–30%
Aspect	Aspect is not a significant factor

Climatic features

Annual precipitation and modeled relative effective annual precipitation ranges from 10 to 14 inches (254 – 355 mm). The normal precipitation pattern shows peaks in May and June and a secondary peak in September. This amounts to about 50% of the mean annual precipitation. Much of the moisture that falls in the latter part of the summer is lost by evaporation and much of the moisture that falls during the winter is lost by sublimation. Average snowfall is about 20 inches annually. Wide fluctuations may occur in yearly precipitation and result in more dry years than those with more than normal precipitation.

Temperatures show a wide range between summer and winter and between daily maximums and minimums, due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air outbreaks from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may occur in winter and bring rapid rises in temperature. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring. High winds are generally blocked from the basin by high mountains, but can occur in conjunction with an occasional thunderstorm. Growth of native cool-season plants begins about April 15th and continues until about July 1st. Cool weather and moisture in September may produce some green up of cool season plants that will continue through late October.

Review of a 30 year trend of data for Average Temperature as well as Average Precipitation, there has been a warming trend, but as the last 12 years graphed, the temperatures have swayed high and low, but overall it has maintained a steady trajectory, neither increasing nor decreasing. Where on the moisture side, the trajectory in trend has been a slow decline. The swings of when spring warm up and first frost hit with the decline in average precipitation have produced a drought effect where the moisture is not being received when the plants and ground is able to utilize the moisture. And in some cases, the late precipitation has encouraged the warm season or mat forming species over the cool season bunchgrasses that are the drivers of the natural system. Early frosts, with dry open winters has created a more arid or desert effect on plants resulting in high rates of winter kill, loss of vigor or overall damage to the plant.

For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at http://www.wcc.nrcs.usda.gov/. “Buffalo Bill Dam", "Cody 21SW", "Thermopolis", "Thermopolis 25WNW" and "Wapiti 1NE" are the representative weather stations within LRU D. The following graphs and charts are a collective sample representing the averaged normals and 30 year annual rainfall data for the selected weather stations from 1981 to 2010.

Table 3. Representative climatic features

Frost-free period (characteristic range)	64-106 days
Freeze-free period (characteristic range)	101-144 days
Precipitation total (characteristic range)	279-305 mm
Frost-free period (actual range)	46-118 days
Freeze-free period (actual range)	88-147 days
Precipitation total (actual range)	254-330 mm
Frost-free period (average)	80 days
Freeze-free period (average)	117 days
Precipitation total (average)	305 mm

Climate stations used

- (1) THERMOPOLIS [USC00488875], Thermopolis, WY
- (2) THERMOPOLIS 25WNW [USC00488888], Thermopolis, WY
- (3) SUNSHINE 3NE [USC00488758], Meeteetse, WY
- (4) CODY 21 SW [USC00481855], Cody, WY
- (5) WAPITI 1NE [USC00489467], Cody, WY
- (6) BUFFALO BILL DAM [USC00481175], Cody, WY

Influencing water features

The characteristics of these soils have no influence from ground water (water table below 60 inches (150 cm)) and but do have significant influence from surface water/overland flow. Irrigation runoff as well as isolated features that are affected by snow pack that persists longer than surrounding areas due to position on the landform (shaded/protected pockets) will create this site in non-typical locations.

Soil features

The soils of this site are very deep to moderately deep (greater than 20" to bedrock), moderately well to well-drained that formed in alluvium or alluvium over residuum. These soils have moderately slow to moderately rapid permeability. The soil characteristic having the most influence on the plant community is the additional available moisture. These areas receive additional water from overflow of intermittent streams or runoff from adjacent slopes.

Major Soil Series correlated to this site include: Assinniboine, Cooers, Evanston, ferball, Kayso, Yamacall, and Vonalee.

Table 4. Representative soil features

Parent material	(1) Alluvium–igneous, metamorphic and sedimentary rock (2) Slope alluvium–igneous, metamorphic and sedimentary rock (3) Residuum–sedimentary rock
Surface texture	(1) Gravelly loam (2) Fine sandy loam (3) Sandy loam (4) Sandy clay loam (5) Silty clay (6) Clay loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderately slow to moderate
Soil depth	51–152 cm
Surface fragment cover <=3"	0–10%
Available water capacity (0-101.6cm)	7.62–16 cm
Calcium carbonate equivalent (0-101.6cm)	0–20%
Electrical conductivity (0-101.6cm)	0–8 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–13
Soil reaction (1:1 water) (0-101.6cm)	7.4–9
Subsurface fragment volume <=3" (Depth not specified)	0–15%
Subsurface fragment volume >3" (Depth not specified)	0–10%

Ecological dynamics

Potential vegetation on this site is dominated by tall and mid cool-season perennial grasses. Other significant vegetation includes basin big sagebrush, silver sagebrush, rubber rabbitbrush, and a variety of forbs. The expected potential composition for this site is about 80% grasses, 10% forbs and 10% 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 rhizomatous wheatgrasses, Sandberg bluegrass, basin big sagebrush, and silver sagebrush will increase. Plains pricklypear and weedy annuals will invade. Cool-season grasses such as, basin wildrye, green needlegrass, slender wheatgrass, needleandthread, and Indian ricegrass will decrease in frequency and production.

Typically, many of these overflow sites have been altered or modified, due to its productive features and proximate to water. Consequently, basin big sagebrush, which is tied ecologically to these sites, has lost much of its original

habitat. As basin big sagebrush is not a resilient plant, once removed it will require many years before the stand can be replace. Some stands may never be replaced, if a vigorous stand of grass exists and is maintained.

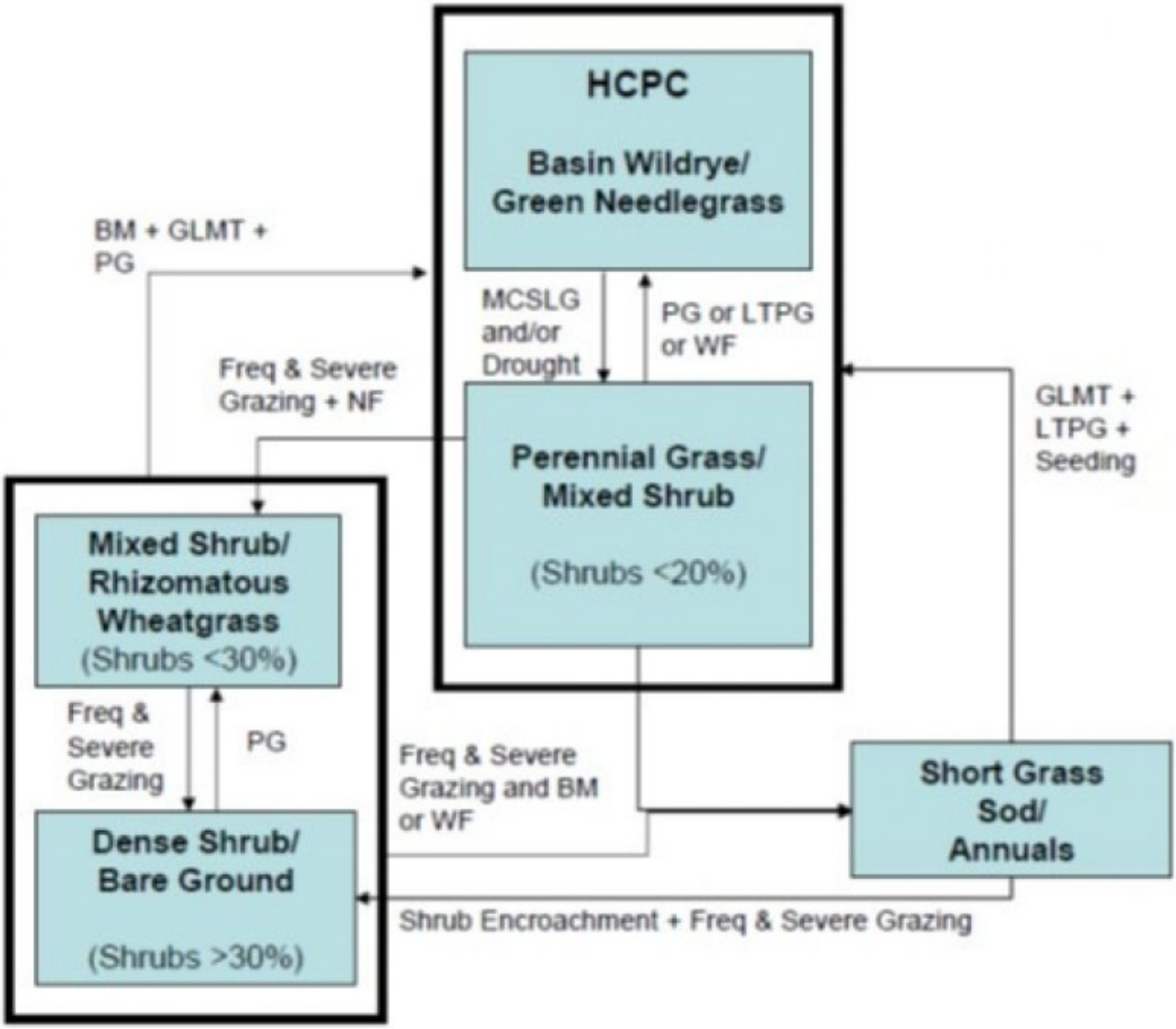
In some instances, basin big sagebrush may become dominant on areas with an absence of fire and sufficient amount of overflow. If treatment of a stand is necessary, thinning is usually preferred instead of total removal. This can be accomplished by chemical, mechanical or closely monitored burning.

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 (Natural or Human Caused)

State 1
Basin Wildrye/ Green Needlegrass

Community 1.1
Basin Wildrye/ Green Needlegrass

This plant community is the interpretive plant community for this site and is considered to be the Historic Climax Plant Community (HCPC). This state evolved with grazing by large herbivores, additional overflow moisture, and periodic fires. The cyclical natural of the fire regime in this community prevented sagebrush from being the dominant landscape. This plant community can be found on areas that are properly managed with grazing and/or prescribed burning, and on areas receiving occasional periods of rest. The potential vegetation is about 80% grasses or grass-like plants, 10% forbs, and 10% woody plants. Cool season tall and mid-grasses dominate this state. The major grasses include basin wildrye, green needlegrass, slender wheatgrass, rhizomatous wheatgrasses, needleandthread, and Indian ricegrass. Other grasses occurring in this state include bottlebrush squirreltail, prairie junegrass, and Sandberg bluegrass. Basin big sagebrush, silver sagebrush, and rubber rabbitbrush stands are conspicuous elements of this state and occur in a mosaic pattern. A variety of forbs also occurs in this state and plant diversity is high (see Plant Composition Table). The total annual production (air-dry weight) of this state is about 1800 lbs./acre, but it can range from about 1200 lbs./acre in unfavorable years to about 2400 lbs./acre in above average years. This plant community is stable and well adapted to the Northern Intermountain Desertic Basins climatic conditions. 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 will convert the plant community to the Perennial Grass/Mixed Shrub Plant Community. Prolonged drought will exacerbate this transition.

Figure 9. Plant community growth curve (percent production by month). WY0702, 10-14E Extra water sites - LL, SL, Ov, CyO.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			5	20	30	20	10	15			

State 2
Perennial Grass/ Mixed Shurb

Community 2.1
Perennial Grass/ Mixed Shurb

Historically, this plant community evolved under grazing and a low fire frequency. Currently, it is found under moderate, season-long grazing by livestock and will be exacerbated by prolonged drought conditions. In addition, the fire regime for this site has been modified and extended periods without fire is now common. This plant community is still dominated by cool-season grasses, while short warm-season grasses and miscellaneous forbs account for the balance of the understory. Basin big sagebrush, silver sagebrush, and rubber rabbitbrush are now conspicuous parts of the overall production. The dominant grasses include green needlegrass, slender wheatgrass, rhizomatous wheatgrasses, and needleandthread. Grasses and grass-like species of secondary importance include bottlebrush squirreltail, prairie junegrass, blue grama, Sandberg bluegrass and threadleaf sedge. Forbs commonly found in this plant community include scarlet globemallow, fringed sagewort, wavyleaf paintbrush, little larkspur, and Hood's phlox. Basin big sagebrush along with silver sagebrush and rubber rabbitbrush can make up to 20% of the annual production. The overstory of shrubs and understory of grass and forbs provide a diverse plant community. When compared to the Historic Climax Plant Community, shrubs and rhizomatous wheatgrasses have increased. Plains pricklypear cactus will also have invaded, but occurs only in small patches. Basin wildrye and Indian ricegrass have decreased and may occur in only trace amounts under the shrub canopy or within the patches of pricklypear. Total production has decreased, but the increase of shrubs has offset some of this loss. 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 2000 lbs./acre in above average years. This plant community is resistant to change. The herbaceous species present are adapted to grazing; however, species composition can be altered through long-term overgrazing. The herbaceous component is mostly intact and plant vigor and replacement capabilities are sufficient. Water flow patterns and litter movement may be occurring but only on steeper slopes. Incidence of pedestalling is minimal. Soils are mostly stable and the surface shows minimum soil loss. The watershed is functioning and the biotic community is intact. Transitions or pathways leading to other plant communities are as follows: • Prescribed grazing or possibly long-term prescribed grazing, will convert this plant community to the HCPC. The probability of this occurring is high especially if rotational grazing along with short

deferred grazing is implemented as part of the prescribed method of use. 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, but close monitoring is advised to make sure total removal of basin big sagebrush is avoided. • Frequent and severe grazing plus no fire, will convert the plant community to the Mixed Shrub/Rhizomatous Wheatgrass Plant Community. The probability of this occurring is high. This is especially evident on areas where shrub stands are not adversely impacted by drought, heavy use or the occasional wildfires. • Frequent and severe grazing (yearlong grazing) plus wildfire or brush control, will convert the plant community to the Short Grass Sod/Annuals Plant Community. The probability of this occurring is high, especially, if the sagebrush stand has been severely affected by drought or heavy use or has been removed altogether.

Figure 10. Plant community growth curve (percent production by month). WY0702, 10-14E Extra water sites - LL, SL, Ov, CyO.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			5	20	30	20	10	15			

State 3
Mixed Shrub/ Rhizomatous Wheatgrass

Community 3.1
Mixed Shrub/ Rhizomatous Wheatgrass

This plant community is the result of frequent and severe grazing and protection from fire. This improper grazing has negatively affected the tall and some of the mid perennial grasses. Most of the preferred cool season grasses have been reduced. Shrubs such as basin and silver sagebrush and rubber rabbitbrush account for up to one-third of the total production of this plant community. The dominant grasses are rhizomatous wheatgrasses, prairie junegrass, Sandberg bluegrass, threadleaf sedge, and blue grama. Weedy annual species such as cheatgrass may occur in patches if a seed source is available. Cactus and sageworts often increase. The interspaces between plants have expanded leaving the amount of bare ground more prevalent. As compared with the HCPC or the Perennial Grass/Mixed Shrub Plant Communities, the annual production is less, but the increase in shrub and rhizomatous wheatgrass production compensates for some of the loss of the tall and mid perennial grass production. The total annual production (air-dry weight) of this state is about 1200 pounds per acre, but it can range from about 800 lbs./acre in unfavorable years to about 1600 lbs./acre in above average years. This plant community is relatively resistant to change as the stand becomes more decadent, although continued improper grazing can eventually lead to the reduction in the rhizomatous wheatgrasses and increase the dominance of shrubs. These areas may actually become more resistant to fire as less fine fuels are available and the bare ground between the sagebrush plants is increased. Plant diversity is moderate. The plant vigor is diminished and replacement capabilities are limited due to the reduced number of cool-season grasses. Plant litter is noticeably less when compared to the HCPC. Soil erosion is 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 down slope. Transitions or pathways leading to other plant communities are as follows: • Brush management and/or grazing land mechanical treatment (seeding, etc.) and pricklypear cactus control (if needed), followed by prescribed grazing, will return this plant community to near Historic Climax Plant Community condition. If treatment of a stand is necessary, thinning is usually preferred instead of total removal. This can be accomplished by chemical, mechanical or closely monitored burning. Close monitoring is advised to make sure total removal of basin big sagebrush is avoided. If prescribed fire is used, sufficient fine fuels will need to be present. This may require deferment from grazing prior to treatment. Post management is critical to ensure success. This can range from two or more years of rest to partial growing season deferment, depending on the condition of the understory at the time of treatment and the growing conditions following treatment. Seeding of native grasses is generally recommended after fire if these grasses have been removed or a seed source is not available. • Frequent and severe grazing plus no wildfire will result in the Dense Shrub/*Bare Ground* Plant Community. • Wildfire or brush management and/or frequent and severe grazing (yearlong), will convert the plant community to the Short Grass Sod/Annuals Plant Community.

Figure 11. Plant community growth curve (percent production by month). WY0702, 10-14E Extra water sites - LL, SL, Ov, CyO.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			5	20	30	20	10	15			

State 4
Dense Shrub/ Bare Ground

Community 4.1
Dense Shrub/ Bare Ground

This plant community is the result of frequent and severe grazing and protection from fire. Basin big sagebrush usually dominates this plant community with the occasional heavy patches of silver sagebrush and rubber rabbitbrush. However, on sites which have burned or the basin big sagebrush removed, silver sagebrush and rubber rabbitbrush will now dominate. The annual production of shrubs exceeds 30% of the total production and usually is much higher. Most of the preferred cool season grasses have been greatly reduced or eliminated. The dominant grasses/grasslikes are rhizomatous wheatgrasses, prairie junegrass, Sandberg bluegrass, threadleaf sedge, and blue grama. Weedy annual species such as cheatgrass may occupy the site if a seed source is available. Cactus and sageworts often increase. Noxious weeds such as Russian knapweed, leafy spurge, or Canada thistle may invade the site if a seed source is available. The interspaces between plants have expanded leaving the amount of bare ground more prevalent. As compared with the HCPC or the Perennial Grass/Mixed Shrub Plant Communities, the annual production is less, but the shrub production compensates for some of the decline in the herbaceous production. The total annual production (air-dry weight) of this state is about 800 pounds per acre, but it can range from about 500 lbs./acre in unfavorable years to about 1000 lbs./acre in above average years. This plant community is resistant to change as the stand becomes more decadent. These areas may actually be more resistant to fire as less fine fuels are available and the bare ground between the sagebrush plants is increased. The exception is if cheatgrass has become a major part of this community, which can result in an increase in the frequency of fires. Continued frequent and severe grazing or the removal of grazing does not seem to affect the composition or structure of the plant community unless the shrub component is being lost by trampling. Plant diversity is moderate to poor. The plant vigor is diminished and replacement capabilities are limited due to the reduced number of cool-season grasses. Plant litter is noticeably less when compared to the HCPC. Soil erosion is 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 down slope. Transitions or pathways leading to other plant communities are as follows: • Brush management and/or grazing land mechanical treatment (seeding, etc.) and pricklypear cactus control (if needed), followed by prescribed grazing, will return this plant community to near Historic Climax Plant Community condition. If treatment of a stand is necessary thinning is usually preferred instead of total removal. This can be accomplished by chemical, mechanical or closely monitored burning. Close monitoring is advised to make sure total removal of basin big sagebrush is avoided. If prescribed fire is used, sufficient fine fuels will need to be present. This may require deferment from grazing prior to treatment. Post management is critical to ensure success. This can range from two or more years of rest to partial growing season deferment, depending on the condition of the understory at the time of treatment and the growing conditions following treatment. Seeding of native grasses is generally recommended after fire if these grasses have been removed or a seed source is not available. • Prescribed Grazing will convert this plant community to a Mixed Shrub/Rhizomatous Wheatgrass Plant Community. • Wildfire or brush management and/or frequent and severe grazing (yearlong), will convert the plant community to the Short Grass Sod/Annuals Plant Community.

Figure 12. Plant community growth curve (percent production by month). WY0702, 10-14E Extra water sites - LL, SL, Ov, CyO.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			5	20	30	20	10	15			

State 5
Short Grass Sod/ Annuals

Community 5.1

Short Grass Sod/ Annuals

This plant community is the result of frequent and severe yearlong grazing, which has adversely affected the perennial grasses as well as the addition of other impacts that can affect the shrub component. These factors include drought and wildfires, trampling, and human brush control measures. Annual grasses and forbs along with areas of a dense sod of short grass dominate this state. Pricklypear cactus can become dense enough in patches so that livestock cannot graze forage growing within the cactus clumps. Basin big and silver sagebrush have been reduced to small patches or in some cases removed. Rubber rabbitbrush may be the sole remaining shrub. Weedy annual species occupy the site and can even dominate. These annuals include cheatgrass, mustards and stickseed. Noxious weeds such as Russian knapweed, leafy spurge, or Canada thistle may invade the site if a seed source is available and can occupy large patches. When compared to the Historic Climax Plant Community, blue grama, threadleaf sedge have increased and pricklypear and weedy annuals have invaded. All cool-season tall and mid-grasses, forbs, and most shrubs have been greatly reduced. Production has been significantly decreased. The total annual production (air-dry weight) of this state is about 500 pounds per acre, but it can range from about 300 lbs./acre in unfavorable years to about 800 lbs./acre in above average years. The vegetation is resistant to change and continued improper grazing does not affect the vegetative structure. The biotic integrity of this state is not functional and plant diversity is extremely low. The plant vigor is significantly weakened and replacement capabilities are limited due to the absences of cool-season grasses. This plant community is resistant to water infiltration on the sod occupied sites. While this sod protects the site itself, un-sodded areas are affected by excessive runoff that can cause rills and gully erosion. Water flow patterns are obvious in the bare ground areas and pedestalling is apparent along the sod edges. Rill channels are noticeable in the interspaces and down slope. The watershed may or may not be functioning, as runoff may affect adjoining sites. Transitions or pathways leading to other plant communities are as follows: • Grazing land mechanical treatment (seeding, chiseling, etc.) and pricklypear cactus control (if needed), followed by long term prescribed grazing, may eventually return this plant community to near Historic Climax Plant Community condition. • Shrub encroachment and continued severe and frequent grazing will result in the Dense Shrub/*Bare Ground* Plant Community.

Figure 13. Plant community growth curve (percent production by month). WY0702, 10-14E Extra water sites - LL, SL, Ov, CyO.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			5	20	30	20	10	15			

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				303–605	
	basin wildrye	LECI4	*Leymus cinereus*	303–605	–
2				303–605	
	green needlegrass	NAVI4	*Nassella viridula*	303–605	–
3				202–404	
	needle and thread	HECO26	*Hesperostipa comata*	202–404	–
4				101–303	
	western wheatgrass	PASM	*Pascopyrum smithii*	101–303	–
5				0–202	
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	0–202	–
6				0–101	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	0–101	–
7				0–303	
	Grass, perennial	2GP	*Grass, perennial*	0–101	–
	squirreltail	ELEL5	*Elymus elymoides*	0–101	–

	squirreltail	ELEL5	*Elymus elymoides*	0–101	
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–101	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–101	–
Forb					
8				0–202	
	Forb, perennial	2FP	*Forb, perennial*	0–101	–
	textile onion	ALTE	*Allium textile*	0–101	–
	prairie sagewort	ARFR4	*Artemisia frigida*	0–101	–
	Indian paintbrush	CASTI2	*Castilleja*	0–101	–
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	0–101	–
	larkspur	DELPH	*Delphinium*	0–101	–
	parsnipflower buckwheat	ERHE2	*Eriogonum heracleoides*	0–101	–
	fleabane	ERIGE2	*Erigeron*	0–101	–
	bigseed biscuitroot	LOMA3	*Lomatium macrocarpum*	0–101	–
	desertparsley	LOMAT	*Lomatium*	0–101	–
	beardtongue	PENST	*Penstemon*	0–101	–
	phlox	PHLOX	*Phlox*	0–101	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	0–101	–
	stemless mock goldenweed	STAC	*Stenotus acaulis*	0–101	–
Shrub/Vine					
9				0–202	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–101	–
	silver sagebrush	ARCA13	*Artemisia cana*	0–101	–
	basin big sagebrush	ARTRT	*Artemisia tridentata ssp. tridentata*	0–101	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–101	–
	western snowberry	SYOC	*Symphoricarpos occidentalis*	0–101	–

Animal community

Animal Community – Wildlife Interpretations

Basin Wildrye/Green Needlegrass (HCPC): The predominance of grasses in this plant community favors grazers and mixed-feeders, such as bison, elk, deer, and antelope. Suitable thermal and escape cover for deer may be limited due to the low quantities of woody plants. However, topographical variations could provide some escape cover. When found adjacent to sagebrush dominated states, this plant community may provide brood rearing/foraging areas for sage grouse, as well as lek sites. Other birds that would frequent this plant community include western meadowlarks, horned larks, and golden eagles. Many grassland obligate small mammals would occur here.

Perennial Grass/Mixed Shrub Plant Community: The combination of an overstory of shrubs and an understory of grasses and forbs plus it proximity to water provides a very diverse plant community for wildlife. The crowns of sagebrush tend to break up hard crusted snow on winter ranges, so mule deer and antelope may use this state for foraging and cover year-round, as would cottontail and jack rabbits. It provides important winter, nesting, brood-rearing, and foraging habitat for sage grouse. Brewer’s sparrows’ nest in big sagebrush plants and hosts of other nesting birds utilize stands in the 20-30% cover range.

Mixed Shrub/Rhizomatous Wheatgrass Plant Community: The combination of an overstory of shrubs and an understory of grasses and forbs plus it proximity provides a very diverse plant community for wildlife. The crowns of

sagebrush tend to break up hard crusted snow on winter ranges, so mule deer and antelope may use this state for foraging and cover year-round, as would cottontail and jack rabbits. It provides important winter, nesting, brood-rearing, and foraging habitat for sage grouse. Brewer's sparrows' nest in big sagebrush plants and hosts of other nesting birds utilize stands in the 20-30% cover range.

Dense Shrub/*Bare Ground* Plant Community: This plant community can provide important winter foraging for elk, mule deer and antelope, as sagebrush can approach 15% protein and 40-60% digestibility during that time. This community provides adequate escape and thermal cover for large ungulates, as well as nesting habitat for upland game birds including sage grouse.

Short Grass Sod/Annuals Plant Community:
These communities provide limited foraging for antelope and other grazers. They may be used as a foraging site by sage grouse if proximal to woody cover and if the Historic Climax Plant Community or the Perennial Grass/Mixed Shrub Plant Community is limiting. Generally, these are not target plant communities for wildlife habitat management.

Animal Community – Grazing Interpretations

The following table lists suggested stocking rates for cattle under continuous season-long grazing under normal growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of the conservation planning process. Often, the current plant composition does not entirely match any particular plant community (as described in this ecological site description). Because of this, a field visit is recommended, in all cases, to document plant composition and production. More precise carrying capacity estimates should eventually be calculated using this information along with animal preference data, particularly when grazers other than cattle are involved. Under more intensive grazing management, improved harvest efficiencies can result in an increased carrying capacity. If distribution problems occur, stocking rates must be reduced to maintain plant health and vigor.

Plant Community Production Carrying Capacity*
(lb./ac) (AUM/ac)
Basin Wildrye/Green Needlegrass 1200-2400 .60
Perennial Grass/Mixed Shrub 1000-2000 .50
Mixed Shrub/Rhizomatous Wheatgrass 800-1600 .25
Dense Shrub/*Bare Ground* 500-1000 .20
Short Grass Sod/Annuals 300-800 .15

* - 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 moderate. 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 in the original site description was derived from NRCS inventory data. Field observations from range trained personnel were also used. Those involved in developing the original site include: Chris Krassin, Range Management Specialist, NRCS and Everet Bainter, Range Management Specialist. Other sources used as references include USDA NRCS Water and Climate Center, USDA NRCS National Range and Pasture Handbook, USDI and USDA Interpreting Indicators of Rangeland Health Version 3, and USDA NRCS Soil Surveys from various counties.

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

Those involved in the development of the new concept for Loamy and Loamy Calcareous Ecological site include: Ray Gullion, Area Range Management Specialist, NRCS; Jim Wolf, Resource Manager, USDI-BLM; Jack Mononi, Range Management Specialist, USDI-BLM; Daniel Wood, MLRA Soil Survey Leader, NRCS; Jane Karinen, Soil Data Quality Specialist, NRCS; and Marji Patz, Ecological Site Specialist, NRCS.

Inventory Data References:
Ocular field estimations observed by trained personnel were completed at each site. Then sites were selected where a 100 foot tape was stretched and the following sample procedures were completed by inventory staff. For full sampling protocol and guidelines with forms please refer to the Wyoming ESI Operating Procedures, compiled in 2012 for the Powell and Rock Springs Soil Survey Office, USDA-NRCS.
• Double Sampling Production Data (9.6 hoop used to estimate 10 points, clipped a minimum of 3 of these estimated points, with two 21 foot X 21 foot square extended shrub plots).
• Line Point Intercept (over story and understory captured with soil cover). Height of herbaceous and woody cover is collected every three feet along established transect.)
• Continuous Line Intercept (Woody Canopy Cover, with minimum gap of 0.2 of a foot for all woody species and succulents. Intercept height collected at each measurement.),
• Gap Intercept (Basal Gap measured with a minimum gap requirement of 0.7 foot.),
• Sample Point (10 – 1 meter square point photographs taken at set distances on transect. Red using the sample point computer program established by the High Plains Agricultural Research Center, WY).
• Soil Stability (Slake Test – surface and subsurface samples collected and processed according to the soil stability guidelines provided by the Jornada Research Center, NM.)

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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	05/01/2008
Approved by	E. Bainter
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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

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

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground can range from 5-20%.

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

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

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7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous litter expected to move in water flow patterns.

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil Stability Index ratings range from 2 (interspaces) to 6 (under plant canopy), but average values should be 2.5 or greater.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil data is limited for this site. Described A-horizons vary from 1 to 9 inches (3-23 cm). Organic matter is typically 2 to 3%.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant community consists of 55-70% grasses, 20% forbs, and 10-25% shrubs. Moderate plant canopy (50-70%) and litter plus moderate to moderately rapid infiltration rates result in minimal runoff. Basal cover is typically around 2-3% for this site and does not effectively reduce runoff on this site.

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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

    Sub-dominant: perennial shrubs = cool season rhizomatous grasses tall, cool season bunchgrasses = perennial forbs

    Other: short, cool season bunchgrasses

    Additional:

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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 20-40% of total canopy measurement with total litter (including beneath the plant canopy) from 75-90% expected. Herbaceous litter depth typically ranges from 10-25 mm. Woody litter can be up to several inches (>8 cm).

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** English: 1200-2400 lb/ac (1800 lb/ac average); Metric: 1344-2688 kg/ha (2016 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 40% or noxious weed invasion are the most common indicators of a threshold being crossed. Rhizomatous wheatgrasses, Sandberg bluegrass, basin big sagebrush and sliver sagebrush are common increasers. Annual weeds such as pepperweed and blue mustard are common invasive species on disturbed sites.

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