USDA Natural Resources Conservation Service

Ecological site R032XY222WY
Loamy (Ly) 5-9” Wind River Basin Precipitation Zone

Accessed: 05/12/2024

General information

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

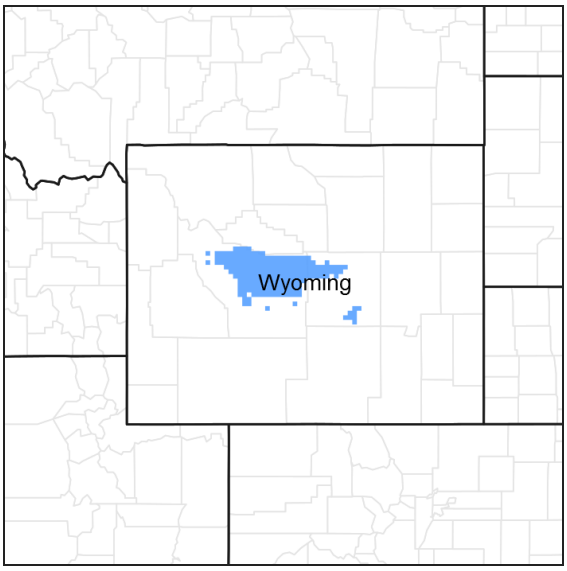


Figure 1. Mapped extent

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.

Associated sites

R032XY146WY	**Sands (Sa) 5-9” Big Horn Basin Precipitation Zone**
R032XY204WY	**Clayey (Cy) 5-9” Wind River Basin Precipitation Zone**
R032XY228WY	**Lowland (LL) 5-9” Wind River Basin Precipitation Zone**
R032XY250WY	**Sandy (Sy) 5-9” Wind River Basin Precipitation Zone**
R032XY262WY	**Shallow Loamy (SwLy) 5-9” Wind River Basin Precipitation Zone**

Similar sites

R032XY322WY	**Loamy (Ly) 10-14" East Precipitation Zone** Loamy 10-14" East P.Z. has higher production.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on nearly level to gently undulating rolling land and on slopes generally less than 20%.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Alluvial fan (3) Stream terrace
Flooding frequency	None
Ponding frequency	None
Elevation	1,372–2,012 m
Slope	0–30%
Ponding depth	0 cm
Aspect	Aspect is not a significant factor

Climatic features

Annual precipitation ranges from 5-9 inches per year. 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 1 and continues to about July 1. Cool weather and moisture in September may produce some green up of cool season plants that will continue to late October.

The following information is from the “Pavillion” climate station:
Minimum Maximum 5 yrs. out of 10 between
Frost-free period (days): 95 175 May 19 – September 19
Freeze-free period (days): 98 185 May 6 – October 3
Mean Annual Precipitation (inches): 2.50 12.54

Mean annual precipitation: 7.85 inches
Mean annual air temperature: 44.53 F (30.5 F Avg. Min. to 58.5 F Avg. Max.)
For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at http://www.wcc.nrcs.usda.gov/ website. Other climate station(s) representative of this precipitation zone include” Riverton”, “Arminto”, and “Lost Cabin”.

Table 3. Representative climatic features

Frost-free period (average)	175 days
Freeze-free period (average)	185 days
Precipitation total (average)	229 mm

Influencing water features

Stream Type: None

Soil features

The soils of this site are moderately deep to very deep (greater than 20" to bedrock), moderately well to well-drained & moderately slow to moderate permeable. The soil characteristic having the most influence on the plant community is the available moisture and the potential to develop soluble salts near the surface.

Table 4. Representative soil features

Surface texture	(1) Loam (2) Fine sandy loam (3) Sandy loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Slow to moderate
Soil depth	51–152 cm
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0%
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

Ecological Dynamics of the Site:

Potential vegetation on this site is dominated by mid cool-season perennial grasses. Other significant vegetation includes winterfat, big sagebrush, and a variety of forbs. The expected potential composition for this site is about 75% grasses, 10% forbs and 15% 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 blue grama, Sandberg bluegrass, and big sagebrush will increase. Weedy annuals will invade. Cool-season grasses such as, rhizomatous wheatgrasses, needleandthread, and Indian ricegrass will decrease in frequency and production.

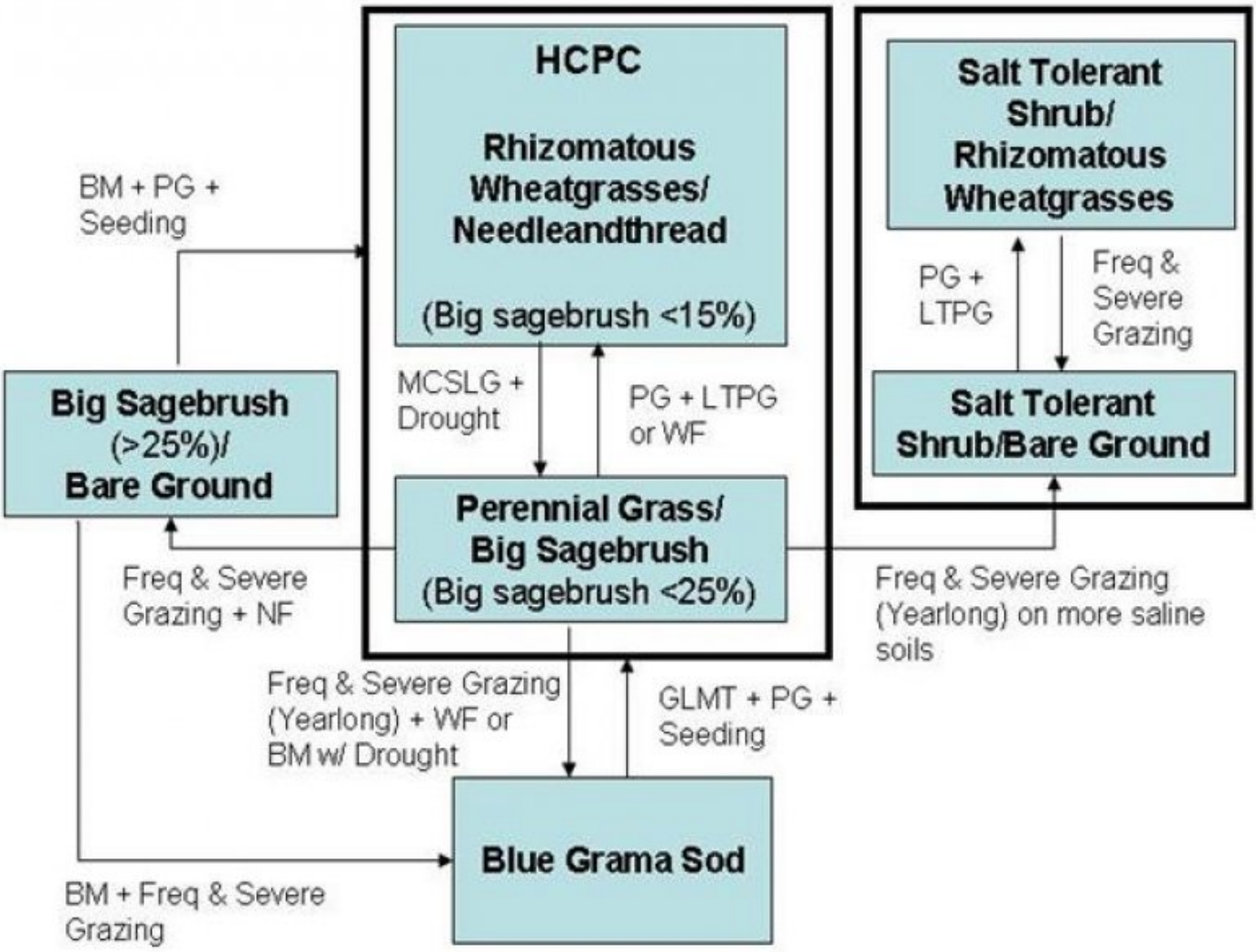
Big sagebrush may become dominant on areas with an absence of fire and sufficient amount of precipitation. Wildfires are actively controlled in recent times and as a result old decadent stands of big sagebrush persist. Chemical control using herbicides has replaced the historic role of fire on this site. Recently, prescribed burning has regained some popularity.

Due to the amount and pattern of the precipitation, the big sagebrush component may not be resilient once it has been removed or severely reduced if a vigorous stand of grass exists and is maintained. On these areas, blue grama may become dominant if the area is subjected to a combination of frequent and severe grazing, especially yearlong grazing. As a result, a dense sod cover of blue grama will become established.

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

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

State and transition model



BM - Brush Management (fire, chemical, mechanical)
Freq. & Severe Grazing - Frequent and Severe Utilization of the Cool-season Mid-grasses during the Growing Season
GLMT - Grazing Land Mechanical Treatment
LTPG - Long-term Prescribed Grazing
MCSLG - Moderate, Continuous Season-long Grazing
NU, NF - No Use and No Fire
PG - Prescribed Grazing (proper stocking rates with adequate recovery periods during the growing season)
VLTPG - Very Long-term Prescribed Grazing (could possibly take generations)
WF - Wildfire (Natural or Human Caused)

State 1
Rhizomatous Wheatgrass/NeedleandThread

Community 1.1
Rhizomatous Wheatgrass/NeedleandThread

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 and periodic fires. The cyclical natural of the fire regime in this community prevented big 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 short periods of rest. The potential vegetation is about 75% grasses or grass-like plants, 10% forbs, and 15% woody plants. This state is dominated by cool season mid-grasses. The major grasses include western wheatgrass, needleandthread, and Indian ricegrass. Other grasses occurring in this state include thickspike wheatgrass, bluebunch wheatgrass, and bottlebrush squirreltail. A variety of forbs and half-shrubs also occur, as shown in the preceding table. Big sagebrush is a conspicuous element of this state, occurs in a mosaic pattern, and makes up 5 to 15% of the annual production. Winterfat is a common component found on this site. The total annual production (air-dry weight) of this state is about 400 lbs./acre, but it can range from about 225 lbs./acre in unfavorable years to about 600 lbs./acre in above average years. This plant community is extremely 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/Big Sagebrush Plant Community. Prolonged Drought will exacerbate this transition.

Figure 4. Plant community growth curve (percent production by month). WY0801, 5-9WR upland sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			10	50	25	5		10			

State 2
Perennial Grass/Big Sagebrush

Community 2.1
Perennial Grass/Big Sagebrush

Historically, this plant community evolved under grazing by large ungulates 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. Wyoming big sagebrush is now a conspicuous part of the overall production and accounts for the majority of the overstory. Dominant grasses include western wheatgrass, and needleandthread. Grasses and grass-like species of secondary importance include blue grama, Sandberg bluegrass and threadleaf sedge. Forbs commonly found in this plant community include scarlet globemallow, fringed sagewort, hairy goldaster, and phlox. Sagebrush can make up to 25% of the annual production. The overstory of sagebrush and understory of grass and forbs provide a diverse plant community. When compared to the Historic Climax Plant Community, big sagebrush and blue grama have increased. Plains pricklypear cactus will also have increased, but occurs only in small patches. Indian ricegrass has decreased and may occur in only trace amounts under the sagebrush canopy or within the patches of pricklypear. In addition, the amount of winterfat may or may not have changed depending on the season of use. The total annual production (air-dry weight) of this state is about 320 pounds per acre, but it can range from about 180 lbs./acre in unfavorable years to about 480 lbs./acre in above average years. This plant community is resistant to change. The herbaceous species present are well 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 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. • Frequent and severe grazing plus no fire, will convert the plant community to the Big Sagebrush/Bare Ground Plant Community. The probability of this occurring is high. This is especially evident on areas with historically higher precipitation and the sagebrush stand is not adversely impacted by drought or heavy browsing. • Frequent and severe grazing (yearlong grazing) plus wildfire or brush control, will convert the plant community to the Blue Grama Sod 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. • Frequent and severe grazing (yearlong grazing) on more saline soils, will convert the plant community to the Salt Tolerant Shrub/Bare Ground Plant Community. The probability of this occurring is high especially on soils with elevated salts and the sagebrush stand has been severely affected by drought and heavy use or has been removed altogether.

Figure 5. Plant community growth curve (percent production by month). WY0801, 5-9WR upland sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			10	50	25	5		10			

State 3
Big Sagebrush/Bare Ground

Community 3.1
Big Sagebrush/Bare Ground

This plant community is the result of frequent and severe grazing and protection from fire. Sagebrush dominates this plant community, as the annual production of sagebrush exceeds 25%. Wyoming big sagebrush is a significant component of the plant community and the preferred cool season grasses have been eliminated or greatly reduced. The dominant grasses are Sandberg bluegrass, 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/Big Sagebrush Plant Communities, the annual production is similar, as the shrub production compensates for the decline in the herbaceous production. The total annual production (air-dry weight) of this state is about 300 pounds per acre, but it can range from about 200 lbs./acre in unfavorable years to about 400 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. Continued frequent and severe grazing or the removal of grazing does not seem to affect the composition or structure of the plant community. 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, followed by prescribed grazing, will return this plant community at or near the HCPC. If prescribed fire is used as a means to reduce or remove the shrubs, 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. In the case of an intense wildfire that occurs when desirable plants are not completely dormant, the length of time required to reach the HCPC may be increased and seeding of natives are recommended. • Brush management, followed by frequent and severe grazing, will convert the plant community to the Blue Grama Sod Plant Community.

Figure 6. Plant community growth curve (percent production by month). WY0801, 5-9WR upland sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			10	50	25	5		10			

State 4
Blue Grama Sod

Community 4.1
Blue Grama Sod

This plant community is the result of frequent and severe yearlong grazing, which have 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, and human brush control measures. A dense sod of blue grama with patches of threadleaf sedge dominates this state. Pricklypear cactus can become dense enough in patches so that livestock cannot graze forage growing within the cactus clumps. Big sagebrush has been reduced to small patches or in some cases removed. When compared to the Historic Climax Plant Community, blue grama, threadleaf sedge, and pricklypear have increased. All cool-season 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 100 pounds per acre, but it can range from about 55 lbs./acre in unfavorable years to about 150 lbs./acre in above average years. This sod 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 not functional and plant diversity is extremely low. The plant vigor is significantly weakened and replacement capabilities are limited due to the reduced number of cool-season grasses. This sod bound plant community is very resistant to water infiltration. While this sod protects the site itself, off-site 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 (chiseling, etc.) and pricklypear cactus control (if needed), followed by prescribed grazing, will return this plant community to near Historic Climax Plant Community condition. Seeding with native species may also be needed depending on how far a shift away from mid cool-season grasses has occurred.

Figure 7. Plant community growth curve (percent production by month). WY0801, 5-9WR upland sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			10	50	25	5		10			

State 5
Salt Tolerant Shrub/ Bare Ground

Community 5.1
Salt Tolerant Shrub/ Bare Ground

This plant community can occur where states are subjected to continuous yearlong grazing and where soils are influenced by elevated amounts of soluble salts. Salt tolerant shrubs are a significant component of the plant community and the preferred cool season grasses have been eliminated or greatly reduced. Wyoming big sagebrush is still a component of the plant community but may not be the primary overstory species. This site is dominated by an overstory of shrubs, which can vary widely in the composition and production. This variation results from the dissimilarity in quantity of soluble salts present in the soils and the availability of shrubs to occupy the site. The dominant shrubs are greasewood, big sagebrush, rubber rabbitbrush, and a number of different saltbushes. Perennial cool season mid-grasses have been reduced or removed, leaving mostly patches of blue grama and annuals. Cheatgrass and weedy annual forbs such as halogeton, Russian thistle, and kochia will occupy the site if a seed source is available. Noxious weeds such as Russian Knapweed may also invade this site. The interspaces between plants have expanded leaving the amount of bare ground more prevalent. Surface salts have increased, especially on sites dominated by greasewood and saltbushes. The leaves of these plants contain high amounts of sodium and other salts, and when shed these soluble salts are transferred to the soils underneath the

plants. Consequently, the soil can exhibit wide variations in soluble salts, which can explain the variation in shrub composition. The total annual production (air-dry weight) of this state is about 225 pounds per acre, but it can range from about 125 lbs./acre in unfavorable years to about 350 lbs./acre in above average years. This plant community is resistant to change. These areas are actually more resistant to fire as less fine fuels are available and the bare ground between the shrubs has increased. Continued frequent and severe grazing does not affect the composition or structure of the plant community. Plant diversity is moderate to poor. The biotic integrity of this state is mostly dysfunctional because of the predominant salt tolerant shrub overstory and absence of perennial cool-season grasses. 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: • Prescribed grazing or possibly long-term prescribed grazing, will convert this plant community to the Salt Tolerant Shrub/Rhizomatous Wheatgrass Vegetative State. Recovery to near Historic Climax Plant Community condition is difficult to impossible due to the resistance of these shrubs to herbicides and other brush management techniques. In addition, the increase in surface salts has had accumulated effects on the soil so most of the herbaceous plants associated with the HCPC are no longer suitable for this site. The most notable exception is the rhizomatous wheatgrasses and bottlebrush squirreltail. Soil remediation to reduce the surface salts is not recommended, as this is mostly ineffective and extremely costly. Seeding more salt-tolerant native grasses and forbs will improve plant cover and the productivity of the site.

Figure 8. Plant community growth curve (percent production by month). WY0801, 5-9WR upland sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			10	50	25	5		10			

State 6
Salt Tolerant Shrub/ Rhizomatous Wheatgrasses

Community 6.1
Salt Tolerant Shrub/ Rhizomatous Wheatgrasses

This plant community can occur where the Salt Tolerant Shrub/Bare Ground Plant Community is rested and a prescribed grazing management practice is implemented. Salt tolerant shrubs and Wyoming big sagebrush remain a significant component of the plant community but preferred cool season grasses have reestablished. This site is dominated by an overstory of a variety of shrubs, such as Wyoming big sagebrush, rubber rabbitbrush, greasewood, and a variety of saltbushes. Some perennial cool season mid-grasses have once again reestablished such as rhizomatous wheatgrasses and bottlebrush squirreltail. Other important grasses include Sandberg bluegrass and blue grama. Patches of annuals such as cheatgrass and weedy annual forbs such as halogeton, Russian thistle, and kochia will persist on this site. Noxious weeds such as Russian Knapweed may also remain if not treated. The interspaces between plants will have diminished in size. When compared with the HCPC or the Perennial Grass/Big Sagebrush Plant Communities, the annual production is similar, but the plant species are clearly unique. The total annual production (air-dry weight) of this state is about 300 pounds per acre, but it can range from about 200 lbs./acre in unfavorable years to about 425 lbs./acre in above average years. This plant community is mostly resistant to change, but species composition can be altered through long-term overgrazing. The herbaceous component is stable, but does not include most historical species. Plant vigor and replacement capabilities are sufficient. The biotic community is not intact because of the predominant salt tolerant shrub overstory and lack of historic grass species. Plant diversity is moderate. Soils are mostly stable and recent soil loss is minimal. This should not be confused with evidence of remnant erosion. Water flow patterns and litter movement is stable but is still occurring on steeper slopes. Incidence of pedestalling is improving. The watershed may or may not be functioning. Transitions or pathways leading to other plant communities are as follows: • Frequent and severe grazing will convert the plant community to the Salt Tolerant Shrub/Bare Ground Plant Community. • Recovery to near Historic Climax Plant Community condition is difficult to impossible due to the resistance of these shrubs to herbicides and other brush management techniques. In addition, the increase in surface salts has had accumulated effects on the soil so most of the herbaceous plants associated with the HCPC are no longer suitable for this site. The most notable exception is the rhizomatous wheatgrasses and bottlebrush squirreltail. Soil remediation to reduce the surface salts is not recommended, as this is mostly ineffective and extremely costly. Seeding more salt-tolerant grasses and forbs will improve the productivity of site and plant cover, but will not improve the biotic integrity.

Figure 9. Plant community growth curve (percent production by month). WY0801, 5-9WR upland sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			10	50	25	5		10			

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				90–179	
	thickspike wheatgrass	ELLAL	*Elymus lanceolatus ssp. lanceolatus*	90–179	–
	western wheatgrass	PASM	*Pascopyrum smithii*	90–179	–
2				22–45	
	Montana wheatgrass	ELAL7	*Elymus albicans*	22–45	–
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	22–45	–
3				45–90	
	needle and thread	HECO26	*Hesperostipa comata*	45–90	–
4				22–67	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	22–67	–
5				22–45	
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	22–45	–
6				22–67	
	Grass, perennial	2GP	*Grass, perennial*	0–22	–
	Fendler threeawn	ARPUL	*Aristida purpurea var. longiseta*	0–22	–
	blue grama	BOGR2	*Bouteloua gracilis*	0–22	–
	threadleaf sedge	CAFI	*Carex filifolia*	0–22	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–22	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–22	–
Forb					
7				22–45	
	Forb, perennial	2FP	*Forb, perennial*	0–22	–
	textile onion	ALTE	*Allium textile*	0–22	–
	small-leaf pussytoes	ANPA4	*Antennaria parvifolia*	0–22	–
	prairie sagewort	ARFR4	*Artemisia frigida*	0–22	–
	Missouri milkvetch	ASMI10	*Astragalus missouriensis*	0–22	–
	wavyleaf Indian paintbrush	CAAPM	*Castilleja applegatei ssp. martinii*	0–22	–
	bastard toadflax	COUM	*Comandra umbellata*	0–22	–
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	0–22	–
	little larkspur	DEBI	*Delphinium bicolor*	0–22	–
	threadleaf fleabane	ERFI2	*Erigeron filifolius*	0–22	–
	parsnipflower buckwheat	ERHE2	*Eriogonum heracleoides*	0–22	–

	bigseed biscuitroot	LOMA3	*Lomatium macrocarpum*	0–22	–
	leafy wildparsley	MUDI	*Musineon divaricatum*	0–22	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	0–22	–
	white locoweed	OXSES2	*Oxytropis sericea var. speciosa*	0–22	–
	spiny phlox	PHHO	*Phlox hoodii*	0–22	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	0–22	–
	smooth woodyaster	XYGL	*Xylorhiza glabriuscula*	0–22	–
	meadow deathcamas	ZIVE	*Zigadenus venenosus*	0–22	–
Shrub/Vine					
8				22–67	
	Wyoming big sagebrush	ARTRW8	*Artemisia tridentata ssp. wyomingensis*	22–67	–
9				0–22	
	winterfat	KRLA2	*Krascheninnikovia lanata*	0–22	–
10				22–45	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–22	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	0–22	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–22	–

Animal community

Rhizomatous Wheatgrasses/Needleandthread (HCPC): The predominance of grasses in this plant community favors grazers and mixed-feeders, such as bison, elk, and antelope. Suitable thermal and escape cover for deer may be limited due to the low quantities of woody plants. 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/Big Sagebrush Plant Community: The combination of an overstory of sagebrush and an understory of grasses and forbs provide 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.

Big Sagebrush/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 nesting habitat for sage grouse. However, it provides little foraging opportunities for upland game birds, as fewer forbs are available. Many grassland obligate small mammals would occur here.

Blue Grama Sod 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/ Big Sagebrush Plant Community is limited. Generally, these are not target plant communities for wildlife habitat management.

Salt Tolerant Shrub/Bare Ground Plant Community: This plant community exhibits a low level of plant species diversity due to the accumulation of salts near the soil surface. It does, however, provide thermal and escape cover for upland birds. Upland game birds may find little foraging opportunities, as fewer forbs are available. Many grassland obligate small mammals would occur here.

Salt Tolerant Shrub/Rhizomatous Wheatgrass Plant Community: This plant community can provide winter foraging

for elk, mule deer and antelope. This community provides nesting habitat for upland game birds. However, it provides little foraging opportunities for upland game birds, as fewer forbs are available. 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 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 (lb./ac)	Carrying Capacity* (AUM/ac)
Rhizomatous WG/Needleandthread	225-600	.20
Perennial Grass/Big Sagebrush	180-480	.16
Big Sagebrush/Bare Ground	200-400	.10
Blue Grama Sod	55-150	.05
Salt Tolerant Shrub/Bare Ground	125-350	.07
Salt Tolerant Shrub/Rhizomatous Wheatgrasses	200-425	.16

* - 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 variety 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

Inventory Data References (narrative)
Information presented here has been derived from NRCS inventory data. Field observations from range trained personnel were also used. Those involved in developing this site include: Chris Krassin, Range Management Specialist, NRCS and Everet Bainter, Range Management Specialist, NRCS. Other sources used as references include: USDA NRCS Water and Climate Center, USDA NRCS National Range and Pasture Handbook, and USDA NRCS Soil Surveys from various counties.

Inventory Data References
Ocular field estimations observed by trained personnel.

Contributors

C. Krassin

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)	
Contact for lead author	
Date	07/01/2005
Approved by	E. Bainter
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills should not be present

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2. **Presence of water flow patterns:** Barely observable

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3. **Number and height of erosional pedestals or terracettes:** Essentially non-existent

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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 is 25-35% occurring in small areas throughout site

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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:** None

7. **Amount of litter movement (describe size and distance expected to travel):** Little to no plant litter movement. Plant litter remains in place and is not moved by erosional forces.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Plant cover and litter is at 60% or greater of soil surface and maintains soil surface integrity. Soil Stability class is anticipated to be 5 or greater.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Use Soil Series description for depth and color of A-horizon

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Grass canopy and basal cover should reduce raindrop impact and slow overland flow providing increased time for infiltration to occur. Healthy deep rooted native grasses enhance infiltration and reduce runoff. Infiltration is Moderate.

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 or soil surface crusting should be present.

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:

    Sub-dominant:

    Other:

    Additional: Cool Season mid stature grasses >> Shrubs > Short stature grasses/grasslikes > Forbs

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very Low

14. **Average percent litter cover (%) and depth (in):** Average litter cover is 20-30% with depths of 0.1 to 0.25 inches

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 400 lbs/ac

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: Blue grama, Sandberg bluegrass, Threadleaf sedge, Fendler threeawn, Fringed sagewort, Prickly Pear, Big sagebrush, Broom Snakeweed, Annuals, Exotics and Species found on Noxious Weed List

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17. **Perennial plant reproductive capability:** All species are capable of reproducing

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