United States Department of Agriculture
Natural Resources Conservation Service

Ecological Site Description

Site Type: Rangeland

Site Name: Clayey (Cy) 15-17" Northern Plains Precipitation Zone

Site ID: 058BY204WY

Major Land Resource Area: 58B – Northern Rolling High Plains

Physiographic Features
This site occurs on nearly level to 30% slopes.

Landform: Hill sides, alluvial fans & stream terraces **Aspect:** N/A

	Minimum	Maximum
Elevation (feet):	3400	4600
Slope (percent):	0	30
Water Table Depth (inches):	None within 60 inches	
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		
Depth (inches):	0	0
Frequency:	None	None
Duration:	None	None
Runoff Class:	very low	very high

Climatic features
Annual precipitation ranges from 15-17 inches per year. Wide fluctuations may occur in yearly precipitation and result in more drought 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.

Wind speed averages about 8 mph, ranging from 10 mph during the spring to 7 mph during late summer. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 75 mph.

Growth of native cool-season plants begins about April 1 and continues to about July 1. Native warm-season plants begin growth about May 15 and continue to about August 15. Green up of cool season plants may occur in September and October of most years.

The following information is from the "Echeta 2 NW" climate station:

Frost-free period (32 °F): 70-142 days; (5 yrs. out of 10, these days will occur between June 7 – September 16)
Freeze-free period (28 °F): 106-154 days; (5 yrs. out of 10, these days will occur between May 14 – September 23)
Mean annual precipitation: 15.82 inches
Mean annual air temperature: 45.2 °F (30.0°F Avg. Min. - 60.4°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: "Recluse 14 NNW".

Influencing Water Features

Wetland Description:	**System**	**Subsystem**	**Class**	**Sub-class**
None	None	None	None	None

Stream Type: None

Soils

The soils of this site are moderately deep (greater than 20" to bedrock) to very deep, well-drained soils that formed in alluvium or alluvium over residuum. These soils have slow permeability. The layers of soil having the most influence on plants vary from 4 to 8 inches thick. The surface soil will vary from 2 to 5 inches deep and have one of the following textures: silty clay, sandy clay, clay, and the finer portions of silty clay loam, clay loam, and sandy clay loam. These soils may develop severe cracks.

Major Soil Series correlate to this site include: Echeta, Leiter, Moorhead, Cromack, Sabatka and Nuncho,

Other Soil Series correlated to this site in MLRA 58B include: Emigrant, Nunnston, Platscher and Worthenton

Representative Soil Features

Parent Material Kind: alluvium and residuum
Parent Material Origin: shale, calcareous
Surface Texture: clay loam, clay, silty clay loam, silty clay
Surface Texture Modifier: none is most common but gravelly or cobbly may occur
Subsurface Texture Group: clay,
Surface Fragments ≤ 3" (% Cover): 0
Surface Fragments > 3" (%Cover): typically 0, occasionally up to 10
Subsurface Fragments ≤ 3" (% Volume): typically 0, occasionally up to 15
Subsurface Fragments > 3" (% Volume): typically 0, occasionally up to 10

	Minimum	**Maximum**
Drainage Class:	moderately well drained	well drained
Permeability Class:	slow	moderately slow
Depth (inches):	20	>60
Electrical Conductivity (mmhos/cm) ≤20":	0	4
Sodium Absorption Ratio ≤20":	0	5
Soil Reaction (1:1 Water) ≤20":	6.6	8.4

Soil Reaction (0.1M CaCl2) ≤20"	NA	NA
Available Water Capacity (inches) ≤30":	2.8	5.7
Calcium Carbonate Equivalent (percent) ≤20":	0	5

Plant Communities

Ecological Dynamics of the Site:

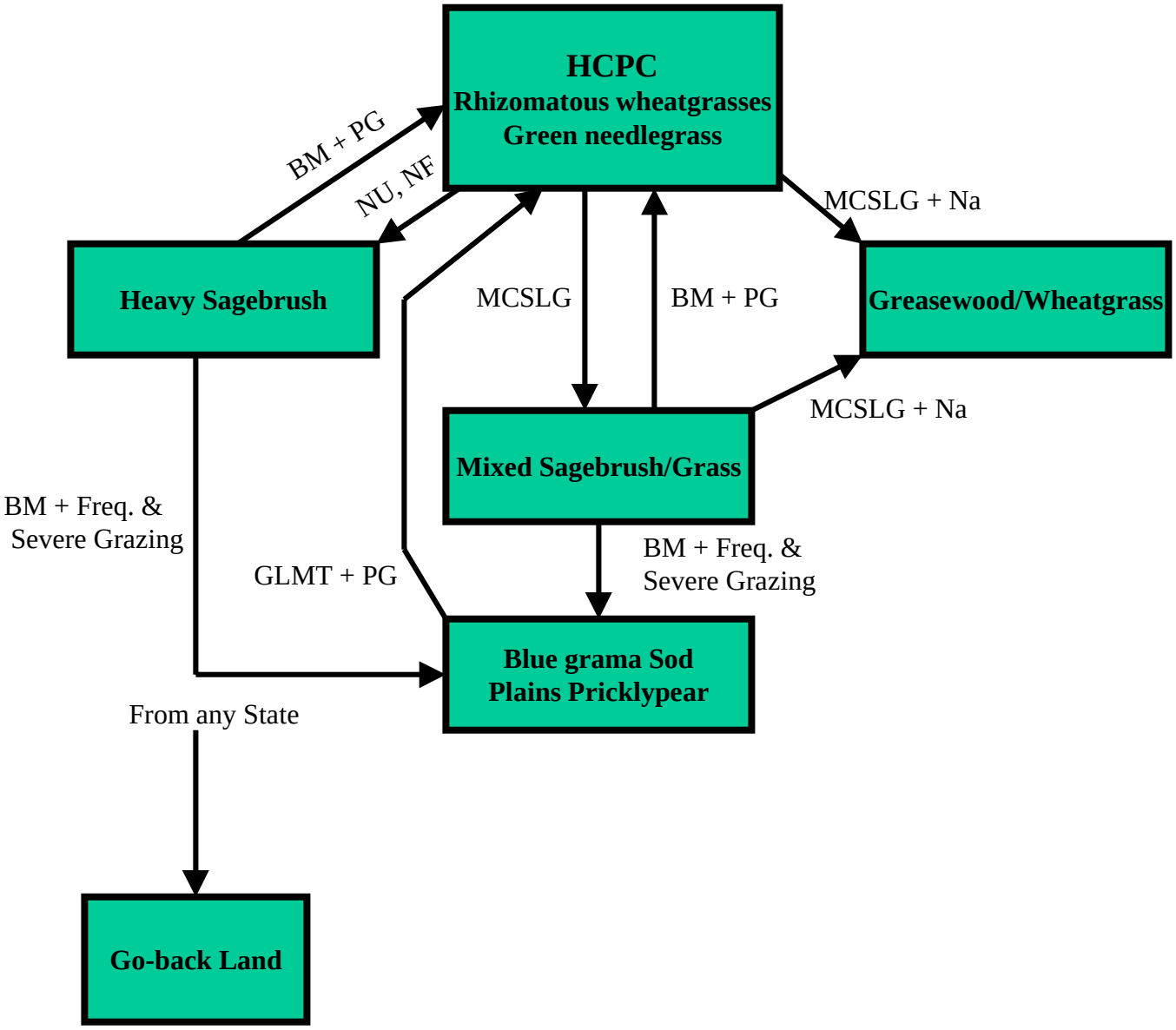
As this site deteriorates because of a combination of frequent and severe grazing, species such as blue grama and big sagebrush will increase. Grasses such as green needlegrass, big bluestem, and western wheatgrass will decrease in frequency and production.

Big sagebrush may become dominant on some areas with an absence of fire. Wildfires are actively controlled in recent times so 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 typically is not resilient once it has been removed if a healthy and vigorous stand of grass exists and is maintained. The exception to this is where the herbaceous component is severely degraded at the time of treatment, growing conditions are unfavorable after treatment, and/or recovery periods are inadequate.

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

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



BM - Brush Management (fire, chemical, mechanical)
Freq. & Severe Grazing - Frequent and Severe Utilization of the Cool-season Mid-grasses during the Growing Season
GLMT - Grazing Land Mechanical Treatment
LTPG - Long-tem 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)
Na - Moderate Sodium in Soil

PLANT COMMUNITY DYNAMICS
REFERENCE PLANT COMMUNITY

COMMON NAME/ GROUP NAME	SCIENTIFIC NAME	SCIENTIFIC SYMBOL	Grp	Allowable Annual Production lbs./acre below normal 1500	normal 1900	above normal 2300	% Comp (MAX.)
GRASSES/GRASSLIKES							
RHIZOMATOUS WHEATGRASSES:			1	450	570	690	30%
thickspike wheatgrass	Elymus lanceolatus	ELLAL	1	450	570	690	30%
western wheatgrass	Pascopyrum smithii	PASM	1	450	570	690	30%
OTHER GRASSES							
big bluestem	Andropogon gerardii	ANGE	2	150	190	230	10%
green needlegrass	Nassella viridula	NAVI4	3	750	950	1150	50%
sideoats grama	Bouteloua curtipendula	BOCU	4	150	190	230	10%
blue grama	Bouteloua gracilis	BOGR2	5	150	190	230	10%
hairy grama	Bouteloua hirsuta	BOHI2	5	150	190	230	10%
MISCELLANEOUS GRASSES/GRASSLIKES*		PPGG	6	300	380	460	20%
plains reedgrass	Calamagrostis montanensis	CAMO	6	75	95	115	5%
needleleaf sedge	Carex duriuscula	CADU6	6	75	95	115	5%
buffalograss	Buchloe dactyloides	BUDA	6	75	95	115	5%
prairie junegrass	Koeleria macrantha	KOMA	6	75	95	115	5%
Sandberg bluegrass	Poa secunda	POSE	6	75	95	115	5%
FORBS							
MISCELLANEOUS FORBS*		PPFF	7	225	285	345	15%
American vetch	Vicia americana	VIAM	7	75	95	115	5%
prairie coneflower	Ratibida columnifera	RACO3	7	75	95	115	5%
asters	Asters	ASTRA	7	75	95	115	5%
biscuitroots	Lomatium spp.	LOMAT	7	75	95	115	5%
breadroot scurfpea	Pediomelum esculentum	PEES	7	75	95	115	5%
western yarrow	Achillea lanulosa	ACHIL	7	75	95	115	5%
rosy pussytoes	Antennaria rosea	ANRO2	7	75	95	115	5%
milkvetches	Astragalus	ASTRA	7	75	95	115	5%
scarlet gaura	Gaura coccinea	GACO5	7	75	95	115	5%
purple prairie clover	Dalea purpurea	DAPU5	7	75	95	115	5%
white prairie clover	Dalea candida	DACA7	7	75	95	115	5%
bluebells	Mertensia	MERTE	7	75	95	115	5%
wild onion	Allium textile	ALTE	7	75	95	115	5%
stemless goldenweed	Haplopappus acaulis	HAAC	7	75	95	115	5%
hawksbeard	Crepis acuminata	CRAC2	7	75	95	115	5%
sulphur flower buckwheat	Eriogonum umbellatum	ERUM	7	75	95	115	5%
TREES, SHRUBS & HALF-SHRUBS							
big sagebrush	Artemisia tridentata	ARTR2	8	150	190	230	10%
winterfat	Krascheninnikovia lanata	KRLA2	9	75	95	115	5%
fourwing saltbush	Atriplex canescens	ATCA2	10	75	95	115	5%

* Common native perennials are listed. Other native perennials may also be counted but no species in the group may be counted for more than 5%.

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

Plant Community Narratives

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

Rhizomatous Wheatgrasses, Green needlegrass Community

The interpretive plant community for this site is the Historic Climax Plant Community. This state evolved with grazing by large herbivores and is well suited for grazing by domestic livestock. Potential vegetation is about 80% grasses or grass-like plants, 10% forbs, and 10% woody plants. The state is a mix of cool season midgrasses and warm season grasses. The major grasses include western wheatgrass, big bluestem, sideoats grama, and green needlegrass. Other grasses occurring in this state include Sandberg bluegrass, needleleaf sedge, blue grama, and plains reedgrass. Big sagebrush is a conspicuous element of this state, occurs in a mosaic pattern, and makes up 5 to 10% of the annual production. Big sagebrush may become dominant on some areas with absence of fire. Natural fire occurred frequently in this community and prevented big sagebrush from being the dominant landscape. Wildfires are actively controlled in recent times so chemical control using herbicides has replaced the historic role of fire on this site. Recently, controlled burning has regained some popularity.

The total annual production (air-dry weight) of this state is about 1900 pounds per acre, but it can range from about 1500 lbs./acre in unfavorable years to about 2300 lbs./acre in above average years.

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

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	10	25	40	10	5	5	5	0	0

(monthly percentages of total annual growth)

The state is stable and well adapted to the Northern Great Plains climatic conditions. The diversity in plant species allow for high drought resistance. 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:

- Protection from grazing and fire, will convert this plant community to the *Heavy Sagebrush Vegetation State*.
- Moderate, continuous season-long grazing will convert the plant community to the *Mixed Sagebrush/Grass Vegetation State.*
- Moderate, continuous season-long grazing where greasewood is present will convert the state to a *Greasewood/Wheatgrass* V*egetation State*.

- Frequent and severe grazing and Brush Management that eliminates the sagebrush will convert the plant community to the *Blue grama/Pricklypear* V*egetation State*.

- When cropped annually and then abandoned without reseeding, this state is converted to the *Go-back Land Vegetation State.*

Heavy Sagebrush Plant Community
This plant community is the result of protection from grazing and fire. Sagebrush dominates this plant community with canopy cover often exceeding 60%. The understory of grass includes rhizomatous wheatgrasses, green needlegrass, sideoats grama, Sandberg bluegrass, and prairie junegrass. The sagebrush canopy protects the cool season grasses, but this protection makes them unavailable for grazing. Big sagebrush is long-lived and will persist for a long period.

The total annual production (air-dry weight) of this state is about 900 pounds per acre, but it can range from about 600 lbs./acre in unfavorable years to about 1200 lbs./acre in above average years.

This state differs from the Historic Climax Plant Community by an increase in big sagebrush and a decrease in grasses such as green needlegrass and big bluestem.

The following is the growth curve expected during a normal year:
Growth curve number:
Growth curve name:
Growth curve description:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	10	25	40	10	5	5	5	0	0

(monthly percentages of total annual growth)

This plant community can provide valuable winter feed for both livestock (especially sheep) and wildlife (such as mule deer and antelope). The soil is protected from erosion. The watershed is functioning and the biotic community is intact.

Transitional pathways leading to other plant communities are as follows:

- Brush management followed by deferment for 1 to 2 years and prescribed grazing management thereafter will return this state to near *Historic Climax Plant Community*. Care should be taken when planning brush control to exclude critical winter ranges.

- Frequent and severe grazing and Brush Management that eliminates the sagebrush will convert the plant community to the *Blue grama/Pricklypear* V*egetation State*.

Greasewood/ wheatgrass plant community
This plant community is the result of moderate, continuous season-long grazing where greasewood is present adjacent to the state. Greasewood will invade the state. Western wheatgrass, cactus, and cheatgrass dominate the understory. Several annual forbs are found in this community. Greasewood canopy commonly ranges from 25 to 50%.

The total annual production (air-dry weight) of this state is about 1000 pounds per acre, but it can range from about 800 lbs./acre in unfavorable years to about 1200 lbs./acre in above average years.

When compared to the Historic Climax Plant Community, greasewood has replaced sagebrush; green needlegrass and rhizomatous wheatgrasses have decreased. Cheatgrass has invaded the state. This state has less production for domestic livestock and is less desirable for antelope and deer.

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

Growth curve description:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	10	25	40	10	5	5	5	0	0

(monthly percentages of total annual growth)

This state is not protected from erosion due to excessive amounts of bare ground. The watershed has an excessive amount of runoff. The biotic integrity of this plant community is not intact, due to the invasion of greasewood, cheatgrass, and excessive bare ground.

Transitional pathways leading to other plant communities are as follows:

- Due to the resistance of greasewood to herbicides a return to *Historic Climax Plant Community* may not be practical.

Mixed Sagebrush/Grass Plant Community
Historically, this plant community evolved under grazing by bison and a low fire frequency. Currently, it is found under moderate, season-long grazing by livestock in the absence of fire or brush control. Big sagebrush is a significant component of this plant community. Cool-season grasses make up the majority of the understory with the balance made up of short warm-season grasses, annual cool-season grass, and miscellaneous forbs.

Dominant grasses include rhizomatous wheatgrasses, and green needlegrass. Grasses of secondary importance include blue grama, prairie junegrass, sideoats grama, and Sandberg bluegrass. Forbs commonly found in this plant community include Louisiana sagewort (cudweed), plains wallflower, hairy goldaster, slimflower scurfpea, and scarlet globemallow. Sagebrush canopy ranges from 20% to 30%. Fringed sagewort is commonly found. Plains pricklypear and winterfat can also occur.

When compared to the Historic Climax Plant Community, sagebrush and blue grama have increased. Green needlegrass and big bluestem have decreased, often occurring only where protected from grazing by the sagebrush canopy. Production of cool-season grasses has also been reduced. Cheatgrass (downy brome) has invaded the state. The overstory of sagebrush and understory of grass and forbs provide a diverse plant community, which will support domestic livestock and wildlife such as mule deer and antelope.

The total annual production (air-dry weight) of this state is about 1200 pounds per acre, but it can range from about 900 lbs./acre in unfavorable years to about 1500 lbs./acre in above average years.

The following is the growth curve expected during a normal year:
Growth curve number:
Growth curve name:
Growth curve description:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	10	25	40	10	5	5	5	0	0

(monthly percentages of total annual growth)

This state is stable and protected from excessive erosion. The biotic integrity of this plant community is usually intact. However, it can be at risk depending on how far a shift has occurred in plant composition toward blue grama, big sagebrush, and/or cheatgrass. The watershed is usually functioning. However, it can become at risk when blue grama sod, and/or bare ground increases.

Transitional pathways leading to other plant communities are as follows:

- Brush control followed by prescribed grazing, will result in a plant community very similar to the *Historic Climax Plant Community*.
- Brush management followed by frequent and severe grazing, will result in a *Blue grama/ Plains pricklypear Vegetation State.*
- Moderate and continuous season-long grazing where greasewood is present will result in a *Greasewood/Rhizomatous wheatgrass vegetation state.*

Blue Grama Sod/Plains Pricklypear Plant Community
This plant community is the result of frequent and severe grazing. It is dominated by a dense sod of blue grama and pricklypear cactus that covers up to 90% of the soil surface. Pricklypear cactus can become dense enough so that livestock cannot graze forage growing within the cactus clumps.

The total annual production (air-dry weight) of this state is about 800 pounds per acre, but it can range from about 600 lbs./acre in unfavorable years to about 1100 lbs./acre in above average years.

When the historic climax plant community is replaced by warm season grass dominated communities grass production is reduced. The sod formed by these grasses is resistant to water infiltration. While the soil is protected by this sod, off-site areas are affected by excessive runoff which may cause gully erosion. This sod is resistant to change and may require practices such as range renovation to return to a cool season grass community.

The following is the growth curve expected during a normal year:
Growth curve number:
Growth curve name:
Growth curve description:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	5	25	35	20	5	5	5	0	0

(monthly percentages of total annual growth)

This state is stable and protected from excessive erosion. The biotic integrity of this plant community is not intact. The watershed is usually functioning, although runoff may affect adjoining sites. However, it can become at risk when bare ground increases.

Transitional 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.*

Go-back Land
This plant community occurs on land that has been cropped annually in the past and then abandoned without reseeding. Natural succession has resulted in a plant community dominated by varying combinations of red threeawn, cheatgrass, blue grama, Sandberg bluegrass, and some rhizomatous wheatgrasses. Forage production is low and grasses such as red threeawn and cheatgrass are not used efficiently by livestock.

The total annual production (air-dry weight) of this state is about 700 pounds per acre, but it can range from about 500 lbs./acre in unfavorable years to about 900 lbs./acre in above average years.

The following is the growth curve expected during a normal year:
Growth curve number:
Growth curve name:
Growth curve description:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	10	25	40	10	5	5	5	0	0

(monthly percentages of total annual growth)

The potential for accelerated erosion can be highly variable depending on amount of bare ground present. Biological diversity is low.

Transitional pathways leading to other plant communities are as follows:

- Prescribed grazing may increase desirable native cool season grass production. It may be difficult to return to near *Historic Climax Plant Community* condition, in a timely manner, because of past soil loss.

- Grazing land mechanical treatment (chiseling, etc.) may improve forage production where significant rhizomatous wheatgrass is present to respond to the treatment.

- Where there is a lack of perennial grass, reseeding to tame or native species may be necessary to return these lands to production in the form of pastureland.

Introduced Pasture
These pastures are normally seeded to crested wheatgrass, pubescent wheatgrass, or Russian wildrye. They require considerable investment to establish and have a variable life expectancy.

The total annual production (air-dry weight) of this state is about 1900 pounds per acre, but it can range from about 1000 lbs./acre in unfavorable years to about 2500 lbs./acre in above average years.

Introduced pastures do produce up to 50% more than native range, but their value as forage is somewhat limited due to the single species usually seeded.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

Rhizomatous Wheatgrasses/ Green needlegrass Community: The predominance of grasses in this plant community favors grazers and mixed-feeders, such as bison, elk, and antelope. Suitable thermal and escape cover for deer may be limited due to the low quantities of woody plants. 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.

Heavy Sagebrush 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 excellent escape and thermal cover for large ungulates, as well as nesting and brood rearing habitat for sage grouse.

Greasewood/ wheatgrass plant community: This plant community exhibits a low level of plant species diversity due to the accumulation of salts in the soil. It may provide some thermal and escape cover for deer and antelope if no other woody community is nearby, but in most cases it is not a desirable plant community to select as a wildlife habitat management objective.

Mixed Sagebrush/Grass Plant Community: The combination of an overstory of sagebrush and an understory of grasses and forbs 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 a host of other nesting birds utilize stands in the 20-30% cover range.

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 Mixed sagebrush/Grass Plant Community are limiting. Generally, these are not target plant communities for wildlife habitat management.

Go-back Land: 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 Mixed sagebrush/Grass Plant Community are limiting. Generally, these are not target plant communities for wildlife habitat management.

Introduced Pasture: These communities are highly variable depending on the species planted. Refer to Forage Suitability Groups for more information.

Animal Preferences (Quarterly - 1,2,3,4) for commonly occuring plants in MLRA 58B, 15-17 inch Northern Plains

COMMON NAME/	SCIENTIFIC NAME	SCI. SYMBOL	*Cattle*	*Sheep*	*Horses*	*Mule Deer*	*Antelope*
GRASSES/GRASSLIKES							
alkali bluegrass	Poa secunda ssp. juncifolia	POSEJ	DDDD	PPPP	DDDD	PPPP	PPPP
alkali cordgrass	Spartina gracilis	SPGR	DDDD	UUUU	DDDD	UUUU	UUUU
alkali sacaton	Sporobolus airoides	SPAI	PPPP	DDDD	PPPP	DDDD	DDDD
Baltic rush	Juncus balticus	JUBA	DDDD	UUUU	DDDD	UUUU	UUUU
basin wildrye	Leymus cinereus	LECI4	PPPP	PPPP	PPPP	DDDD	DDDD
bearded wheatgrass	Elymus caninus	ELCA	PPPP	DDDD	PPPP	DDDD	DDDD
big bluestem	Andropogon gerardii	ANGE	PPPP	PPPP	PPPP	DDDD	DDDD
blue grama	Bouteloua gracilis	BOGR2	DDDD	DDDD	DDDD	DDDD	DDDD
bluebunch wheatgrass	Pseudoroegneria spicata	PSSP6	PPPP	PPPP	PPPP	DDDD	DDDD
bluejoint reedgrass	Calamagrostis canadensis	CACA4	PPPP	DDDD	PPPP	UUUU	UUUU
bottlebrush squirreltail	Elymus elymoides	ELELE	DDDD	DDDD	DDDD	UUUU	UUUU
buffalograss	Buchloe dactyloides	BUDA	DDDD	DDDD	DDDD	DDDD	DDDD
Canada wildrye	Elymus canadensis	ELCA4	PPPP	PPPP	PPPP	DDDD	DDDD
Canby bluegrass	Poa canbyi (syn. to Poa secunda)	POCA (POSE)	PPPP	PPPP	PPPP	PPPP	PPPP
Cusick's bluegrass	Poa cusickii	POCU3	PPPP	PPPP	PPPP	PPPP	PPPP
Fendler threeawn	Aristida purpurea	ARPUL	UUUU	UUUU	UUUU	UUUU	UUUU
green needlegrass	Nassella viridula	NAVI4	PPPP	PPPP	PPPP	PPPP	PPPP
hairy grama	Bouteloua hirsuta	BOHI2	DDDD	DDDD	DDDD	DDDD	DDDD
Indian ricegrass	Achnatherum hymenoides	ACHY	PPPP	PPPP	PPPP	PPPP	PPPP
inland saltgrass	Distichlis spicata	DISP	UUUU	UUUU	UUUU	UUUU	UUUU
inland sedge	Carex interior	CAIN11	DDDD	DDDD	DDDD	UUUU	UUUU
little bluestem	Schizachyrium scoparium	SCSC	PPPP	PPPP	PPPP	DDDD	DDDD
mat muhly	Muhlenbergia richardsonis	MURI	UUUU	UUUU	UUUU	UUUU	UUUU
Nebraska sedge	Carex nebraskensis	CANE2	PPPP	PPPP	PPPP	DDDD	DDDD
needleandthread	Hesperostipa comata	HECO26	PPPP	PPPP	PPPP	PPPP	PPPP
needleleaf sedge	Carex duriuscula	CADU6	UUUU	UUUU	UUUU	UUUU	UUUU
northern reedgrass	Calamagrostis stricta	CAST13	PPPP	DDDD	PPPP	UUUU	UUUU
Nuttall's alkaligrass	Puccinellia nuttaliana	PUNU2	PPPP	PPPP	PPPP	PPPP	PPPP
plains muhly	Muhlenbergia cuspidata	MUCU3	DDDD	DDDD	DDDD	UUUU	UUUU
plains reedgrass	Calamagrostis montanensis	CAMO	DDDD	DDDD	DDDD	DDDD	DDDD
prairie cordgrass	Spartina pectinata	SPPE	PPPP	DDDD	PPPP	UUUU	UUUU
prairie junegrass	Koeleria macrantha	KOMA	DDDD	DDDD	DDDD	DDDD	DDDD
prairie sandreed	Calamovilfa longifolia	CALO	PPPP	DDDD	PPPP	UUUU	UUUU
sand bluestem	Andropogon halli	ANHA	PPPP	DDDD	PPPP	UUUU	UUUU
sand dropseed	Sporobolus cryptandrus	SPCR	DDDD	DDDD	DDDD	UUUU	UUUU
Sandberg bluegrass	Poa secunda	POSE	DDDD	DDDD	DDDD	DDDD	DDDD
sideoats grama	Bouteloua curtipendula	BOCU	PPPP	PPPP	PPPP	DDDD	UUUU
slender wheatgrass	Elymus trachycaulus	ELTR7	PPPP	DDDD	PPPP	DDDD	DDDD
spike sedge	Carex nardina	CANA2	DDDD	DDDD	DDDD	UUUU	UUUU
sun sedge	Carex inops ssp. heliophila	CAINH2	PPPP	DDDD	PPPP	UUUU	UUUU
thickspike wheatgrass	Elymus lanceolatus	ELLAL	DDDD	DDDD	DDDD	DDDD	DDDD
threadleaf sedge	Carex filifolia	CAFI	DDDD	DDDD	DDDD	DDDD	PPPP
tufted hairgrass	Deschampsia caespitosa	DECA18	PPPP	PPPP	PPPP	DDDD	DDDD
western wheatgrass	Pascopyrum smithii	PASM	DDDD	DDDD	DDDD	DDDD	DDDD
FORBS							
American licorice	Glycyrrhiza lepidota	GLLE3	UUUU	UUUU	UUUU	UUUU	UUUU
American vetch	Vicia americana	VIAM	PPPP	PPPP	PPPP	PPPP	PPPP
arrowgrass	Triglochin spp.	TRIGL	T	T	T	T	T
asters	Asters	ASTER	UUUU	UUUU	UUUU	UUUU	UUUU
biscuitroots	Lomatium spp.	LOMAT	DDDD	DDDD	UUUU	DDDD	DDDD
bluebells	Mertensia	MERTE	DDDD	PPPP	DDDD	DDDD	DDDD
blue-eyed grass	Sisyrinchium spp.	SISYR	DDDD	PPPP	DDDD	DDDD	DDDD
breadroot scurfpea	Pediomelum esculentum	PEES	DDDD	DDDD	DDDD	DDDD	DDDD
cattail, broad-leaf	Typha latifolia	TYLA	DDDD	UUUU	DDDD	UUUU	UUUU
cattail, narrow-leaf	Typha angustifolia	TYAN	DDDD	UUUU	DDDD	UUUU	UUUU
fringed sagewort	Artemisia frigida	ARFR4	UUUU	UUUU	UUUU	UUUU	UUUU
green sagewort	Artemisia dracunculus	ARDR4	UUUU	UUUU	UUUU	UUUU	UUUU
hawksbeard	Crepis acuminata	CRAC2	UUUU	PPPP	UUUU	DDDD	DDDD
horsetails	Equisetum spp.	EQUIS	UUUU	UUUU	UUUU	UUUU	UUUU
iris	Iris spp.	IRIS	UUUU	UUUU	UUUU	UUUU	UUUU
milkvetches	Astragalus	ASTRA	DDDD	DDDD	DDDD	DDDD	DDDD
poison hemlock	Conium maculatum	COMA2	T	T	T	T	T
prairie coneflower	Ratibida columnifera	RACO3	DDDD	PPPP	DDDD	PPPP	PPPP
prairie thermopsis	Thermopsis rhombifolia	THRHA	UUUU	UUUU	UUUU	UUUU	UUUU
purple prairie clover	Dalea purpurea	DAPU5	PPPP	PPPP	PPPP	PPPP	PPPP
Pursh seepweed	Suaeda calceoliformis	SUCA2	UUUU	UUUU	UUUU	UUUU	UUUU
rosy pussytoes	Antennaria rosea	ANRO2	UUUU	UUUU	UUUU	UUUU	UUUU
scarlet gaura	Gaura coccinea	GACO5	UUUU	UUUU	UUUU	UUUU	UUUU
stemless goldenweed	Haplopappus acaulis	HAAC	UUUU	UUUU	UUUU	UUUU	UUUU
sulphur flower buckwheat	Eriogonum umbellatum	ERUM	UUUU	UUUU	UUUU	UUUU	UUUU
twogrooved milkvetch	Astragalus bisulcatus	ASBI2	T	T	T	T	T
water hemlocks	Cicuta spp.	CICUT	T	T	T	T	T
western yarrow	Achillea lanulosa	ACHIL	UUUU	UUUU	UUUU	UUUU	UUUU
white prairie clover	Dalea candida	DACA7	PPPP	PPPP	PPPP	PPPP	PPPP
wild onion	Allium textile	ALTE	DDDD	DDDD	DDDD	DDDD	DDDD
woodyaster	Xylorhiza spp.	XYLOR	T	T	T	T	T
TREES, SHRUBS & HALF-SHRUBS							
big sagebrush	Artemisia tridentata	ARTR2	UUUU	DDDD	UUUU	DDDD	DDDD
birdfoot sagebrush	Artemisia pedatifida	ARPE6	UUUU	UUUU	UUUU	UUUU	UUUU
black greasewood	Sarcobatus vermiculatus	SAVE4	DDDD	DDDD	UUUU	DDDD	DDDD
bur oak	Quercus macrocarpa	QUMA2	UUUU	DDDD	UUUU	PPPP	DDDD
fourwing saltbush	Atriplex canescens	ATCA2	PPPP	PPPP	PPPP	PPPP	PPPP
Gardners saltbush	Atriplex gardneri	ATGA	PPPP	PPPP	DDDD	PPPP	PPPP
green rabbitbrush	Chrysothamnus viscidiflorous	CHVI8	DDDD	DDDD	DDDD	DDDD	DDDD
junipers	Juniperus scopulorum	JUSC2	UUUU	UUUU	UUUU	DDDD	UUUU
leadplant	Amorpha canescens	AMCA6	PPPP	PPPP	PPPP	PPPP	PPPP
plains cottonwood (sprouts)	Populous deltoides	PODEM	DDDD	DDDD	DDDD	DDDD	DDDD
ponderosa pine (abortion in cattle)	Pinus ponderosa	PIPO	UUUU	UUUU	UUUU	UUUU	UUUU
rubber rabbitbrush	Ericameria nauseosa	ERNA10	UUUU	DDDD	UUUU	DDDD	DDDD
silver sagebrush	Artemisia cana	ARCAC5	DDDD	DDDD	DDDD	PPPP	PPPP
silverberry	Eleagnus commutata	ELCO	UUUU	UUUU	UUUU	DDDD	UUUU
skunkbush sumac	Rhus trilobata	RHTR	DDDD	DDDD	DDDD	DDDD	DDDD
western snowberry	Symphoricarpos occidentalis	SYOC	UUUU	UUUU	UUUU	DDDD	UUUU
wildrose	Rosa woodsii var. woodsii	ROWOW	DDDD	DDDD	UUUU	DDDD	DDDD
willows	Salix L.	SALIX	PPPP	PPPP	DDDD	PPPP	UUUU
winterfat	Krascheninnikovia lanata	KRLA2	PPPP	PPPP	PPPP	PPPP	PPPP
yucca	Yucca glauca	YUGL	DDDD	DDDD	DDDD	DDDD	DDDD

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

Animal Community – Grazing Interpretations

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

Plant Community	Production (lb./ac)	Carrying Capacity* (AUM/ac)
Historic Climax Plant Community	1500-2300	.5
Heavy Sagebrush	900-1500	.33
Blue Grama Sod	600-1100	.25
Mixed Sagebrush/Grass	900-1500	.4
Greasewood/wheatgrass	800-1200	.25
Go-back Land	500- 900	.2
Introduced Pasture	1000-2500	1.0

* - Continuous, season-long grazing by cattle under average growing conditions.

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage for cattle, sheep, or horses. During the dormant period, the forage for livestock use needs to be supplemented with protein because the quality does not meet minimum livestock requirements.

Hydrology Functions

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group C, with localized areas in hydrologic group D. Infiltration ranges from slow to moderately slow. Runoff potential for this site varies from moderate to high 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 hydrologic 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.

Supporting Information

Associated Sites

Shallow Clayey	058BY204WY
Sandy	058BY250WY
Loamy	058BY222WY
Overflow	058BY230WY
Lowland	058BY228WY

Similar Sites
() – Clayey 10-14" Northern Plains P.Z. 058BY104WY
[Lower production]

Inventory Data References (narrative)
Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range trained personnel was also used. Those involved in developing this site include: Glen Mitchell, Range Management Specialist, NRCS; Chuck Ring, 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, and USDA NRCS Soil Surveys from various counties.

Inventory Data References

Data Source	Number of Records	Sample Period	State	County
SCS-RANGE-417		1971-1994	WY	Campbell & others
Ocular estimates		1990-1999	WY	Campbell & others

State Correlation
This site occurs entirely within Wyoming.

Type Locality

Field Offices
Gillette, Lusk, Newcastle, Sundance

Relationship to Other Established Classifications

Other References

Site Description Approval

Digitally signed by Everet Bainter, SRMS, Wyoming
cn=Everet Bainter, SRMS, Wyoming, c=US
Date: 2001.03.30 15:56:23 -07'00'
Reason: I am approving this document

3/30/01

State Range Management Specialist

Date

Ecological Reference Worksheet

Author(s)/participant(s):_____

Contact for lead author: _____ **Reference site used? Yes/No**

Date: __4/05_ ___ **MLRA:** ___58B__ **Ecological Site:** R058BY204WY Clayey (Cy) 15-17"NP

__ This *must* be verified based on soils and climate (see Ecological Site Description). Current plant community *cannot* be used to identify the ecological site.

Indicators. For each indicator, describe the potential for the site. Where possible, (1) use numbers, (2) include expected range of values for above- and below-average years for **each** community within the reference state, when appropriate & (3) cite data. Continue descriptions on separate sheet.

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

2. Presence of water flow patterns: Barely observable

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

4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are *not* bare ground): Bare ground is 15-25% occurring in small areas throughout site

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: 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 for both plant canopy and interspaces, if different): Plant cover and litter is at 75% 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 and strength of structure, and A-horizon color and thickness for both plant canopy and interspaces, if different): Use Soil Series description for depth and color of A-horizon

10. Effect of plant community composition (relative proportion of different functional groups) & spatial distribution on infiltration & 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 Slow.

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 weight using symbols: >>, >, = to indicate much greater than, greater than, and equal to): Mid stature Cool Season Bunch Grasses > Mid stature Cool Season Rhizomatous Grasses > Mid stature Warm Season Grasses > Short stature Grasses/grasslikes > Shrubs > 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 : Average litter cover is 30-40% with depths of 0.5 to 1.0 inches

15. Expected annual production (this is all above-ground production, not just forage production):
1900 lbs/ac

16. Potential invasive (including noxious) species (native and non-native). List species which characterize degraded states and which, after a threshold is crossed, "can, and often do, continue to increase regardless of the management of the site and may eventually dominate the site": Blue grama, Curlycup Gumweed, Fringed sagewort, Prickly Pear, Broom Snakeweed, and Species found on Noxious Weed List

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