Ecological Sites

Prior to development of the ecological site concept rangelands were segmented into range sites. Pendleton (1989) stated that range sites are the basic ecological units into which a rangeland landscape is divided for study, evaluation, and management. Range sites are kinds of rangeland that differ significantly in their ability to produce kind or amount of climax or original vegetation (Dyksterhuis 1949). Dyksterhuis (1958) further defined range sites as different kinds of rangeland resulting from complexes of soil and climate whose functional differences are based on measurable dissimilarities in kind or amount of climax vegetation. Renner and Allred (1962) expanded on Dyksterhuis's definition stating that a range site is a distinctive kind of rangeland plant community that has certain potential for producing range plants as a result of all the environmental factors (topography – slope, aspect, run-on, run-off; climate – temperature and precipitation; and soil – texture, structure, depth, chemical properties) responsible for its development.

Although range site descriptions were based on environmental factors they were also based on what the "Climax" vegetation of the site was proposed to be. The condition of a range site was then judged against what it would be if in "Climax". Inherent problems existed with using the range site/condition concept in that it was assumed that if a disturbance was removed and the site was provided adequate time it would eventually succeed to its climax (original) vegetation (Pendleton 1989). The following discussion from Rangeland Health: New Methods to Classify, Inventory, and Monitor Rangelands (1994) states why many Range Scientists have had problems with use of the range site and condition concept.

> "Plant composition at any one point in time varies because plant communities are constantly changing in composition and production owing to changes in environmental influences. Some scientists have questioned whether the concept of a single, definable, and predicable climax plant community can be applied to all rangelands. Others have suggested that succession may follow multiple pathways and that the pathway followed by a particular rangeland depends on the kind of disturbance and the environmental conditions during secondary succession."

The practical difficulty of determining climax vegetation for many sites has also been cited as a concern with the use of the range site/condition concept (Pendleton 1989). Due to these concerns the Range Inventory and Standardization Committee of the Society for Range Management recommended in 1983 the term "ecological site" for the basic unit of rangeland classification. The Society for Range Management defines ecological sites as a kind of land that with physical characteristics that differ from those of other kinds of land in their ability to produce distinctive kinds and amounts of vegetation and in their response to management. Justification fro using ecological site rather than range site is based on the reasoning that site classification is not necessarily oriented to any particular land use (e.g. livestock grazing) or land type.

Ecological Site Description (USDA-NRCS)

Looking across any landscape it is not difficult to recognize that some parts are different from other parts in regard to the kinds and amounts of vegetation. To understand this variation across the landscape, we classify these different parts into units called ecological sites. Ecological site is defined as “a distinctive kind of land with specific characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation”. Any land inventory, analysis, and resulting management decisions require the knowledge of these individual sites and their interrelationships to one another on the landscape. The ecological site description is the document that will contain information about the individual ecological sites.

The data comprising an ecological site description is presented in four major categories:

- Site Characteristics -- Identifies the site and describes the physiographic, climate, soil, and water features associated with the site.
- Plant Communities -- Describes the ecological dynamics and the common plant communities comprising the various vegetation states of the site. The disturbances that cause a shift from one state to another are also described.
- Site Interpretations -- Interpretive information pertinent to the use and management of the site and its related resources.
- Supporting Information – Provides information on sources of information and data utilized in developing the site description and the relationship of the site to other ecological sites.

Differentiating Ecological Sites -- The following criteria are used to differentiate one ecological site from another:

- Significant differences in the species or species groups that are in the characteristic plant community.
- Significant differences in the relative proportion of species or species groups in the characteristic plant community.
- Soil factors that determine plant production and composition, the hydrology of the site, and the functioning of the ecological processes of the water cycle, mineral cycles, and energy flow.
- Differences in the kind, proportion, and production of the over story and under story plants due to differences in soil, topography, climate, and environment factors, or the response of vegetation to management.

Rangeland ecological sites are separated based on the historic climax plant community.

Historic Climax Plant Communities -- The historic climax plant community for a site in North America is the plant community that existed at the time of European immigration and settlement. It is the plant community that was best adapted to the unique combination of environmental factors associated with the site. The historic climax plant community was in dynamic equilibrium with its environment. It is the plant community

that was able to avoid displacement by the suite of disturbances and disturbance patterns that naturally occurred within the area occupied by the site. Natural disturbances, such as drought, fire, grazing of native fauna, and insects, were inherent in the development and maintenance of these plant communities. The effects of these disturbances are part of the range of characteristics of the site that contribute to that dynamic equilibrium.

Fluctuations in plant community structure and function caused by the effects of these natural disturbances establish the boundaries of dynamic equilibrium. They are accounted for as part of the range of characteristics for an ecological site. Plant communities that are subjected to abnormal disturbances and physical site deterioration or that are protected from natural influences, such as fire, for long periods seldom typify the historic climax vegetation and may exist in a steady state that is different from the historic climax plant community.

The historic climax plant community of an ecological site is not a precise assemblage of species for which the proportions are the same from place to place or from year to year. In all plant communities, variability is apparent in productivity and occurrence of individual species. Spatial boundaries of the communities; however, can be recognized by characteristic patterns of species composition, association, and community structure.

At times, normally less frequently occurring plants may increase on a site, or plants not formerly found in the climax community may invade the site. The presence or abundance of these plants may fluctuate greatly because of differences in microenvironment, weather conditions, or human actions. Consequently, using them for site identification can be misleading, so they should not be used to differentiate sites. Site differentiation, characterization, and determinations are based on the plant community that developed along with the soils. A study of several locations over several years is needed to differentiate and characterize a site.

Where changes in soils, aspect, topography, or moisture conditions are abrupt, ecological site boundaries are distinct. Boundaries are broader and less distinct where plant communities change gradually along broad environmental gradients of relatively uniform soils and topography. Although some plant communities may appear to be along a continuum, distinctive plant communities can be identified and described. These communities occur with predictable regularity and are associated with concurrent differences in soil, topography, hydrology, or climate that can also be recognized.

Updated 7/28/2003

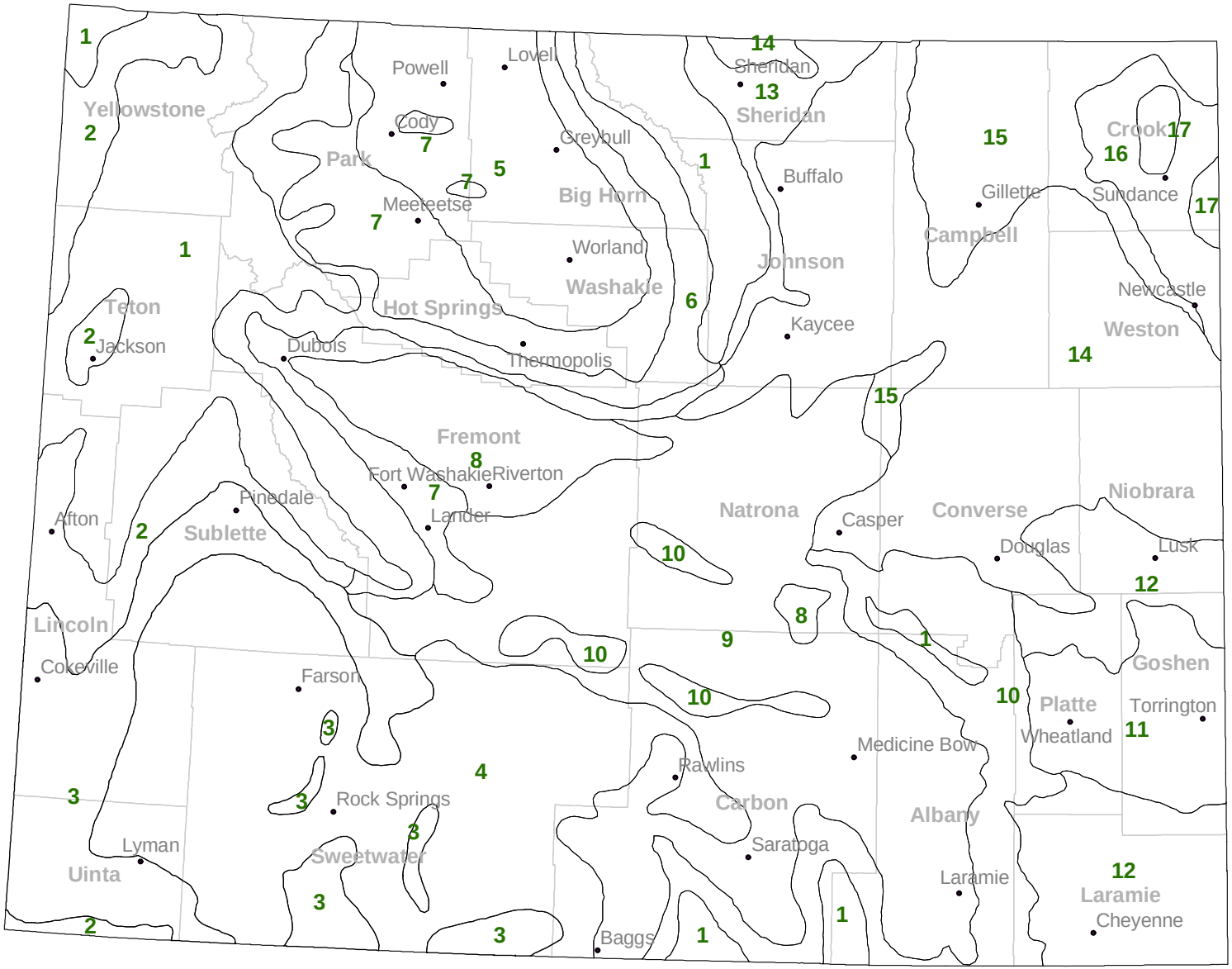
You can obtain Ecological Site descriptions for Wyoming by accessing the following NRCS web site: http://www.nrcs.usda.gov/technical/efotg/

In the lower right hand corner of the above web page there is a map of the USA. Click on the map and then click on Wyoming. Then click on any county (it does not matter which one).

Along the left side of this web page there is an open folder symbol labeled eFOTG with closed folders labeled Section I – V below it. Click on the folder labeled Section II to open it. Section II contains numerous folders labeled A – H. Click on folder G (Ecological Site Descriptions) to open it. This folder contains folders that correspond with Precipitation Zones for ecological site descriptions (see following page). Click on a Precipitation Zone folder of interest for a list of Adobe files for all the range site descriptions within that Precipitation Zone. The ecological site description for Rangeland, Loamy 10-14" Foothills and Basins East Precipitation Zone follows the page on abbreviations for ecological sites in Wyoming.

Most of the conversions from range site descriptions to ecological site descriptions have been completed for Wyoming. However, for precipitation zone 9 – High Plains Southeast (10-14 SE) they have not. The range site descriptions for zone 9 can be found in folder H (Range Sites) within the Section II folder.

Precipitation Zones for Ecological Site Descriptions



Zone_Number, Zone_Name

- 1, Mountains (20+ M)
- 2, Foothills and Mountains West (15-19 W)
- 3, Foothills and Basins West (10-14 W)
- 4, Green River and Great Divide Basin (7-9 GR)
- 5, Big Horn Basin
- 6, Foothills and Mountains East (15-19 E)
- 7, Foothills and Basins East (10-14 E)
- 8, Wind River Basin (5-9 WR)
- 9, High Plains Southeast (10-14 SE)
- 10, Foothills and Mountains Southeast (15-19 SE)
- 11, Southern Plains (12-14 SP)
- 12, Southern Plains (15-17 SP)
- 13, Northern Plains (15-19 NP)
- 14, Northern Plains (10-14 NP)
- 15, Northern Plains (15-17 NP)
- 16, Black Hills (15-19 BL)
- 17, Blackhills (Forestland)

Wyoming

N

April 1995

0 40 80 160 Miles

US Department of Agriculture
Natural Resources Conservation Service

Abbreviation	Ecological Site Name
CS	Choppy Sands
CU	Coarse Upland
Cy	Clayey
CyO	Clayey Overflow
DC	Dense Clay
Gr	Gravelly
GrLy	Gravelly Loamy
IC	Impervious Clay
Ig	Igneous
LiU	Limy Upland
LL	Lowland
Ly	Loamy
LyL	Loamy Lowland
LyO	Loamy Overflow
Ov	Overflow
PC	Porous Clay
RH	Rocky Hills
SLy	Steep Loamy
Sa	Sands
SaB	Sandstone Breaks
Sb	Subirrigated
Sh	Shale
SL	Saline Lowland
SLdr	Saline Lowland, drained
SnLy	Saline Loamy
SS	Saline Subirrigated
SSt	Steep Stony
St	Stony
StLy	Steep Loamy
SU	Saline Upland
SwB	Shallow Breaks
SwCy	Shallow Clayey
SwIg	Shallow Igneous
SwLy	Shallow Loamy
SwPC	Shallow Porous Clay
SwSy	Shallow Sandy
Sy	Sandy
SyL	Sandy Lowland
VS	Very Shallow
WL	Wetland

United States Department of Agriculture
Natural Resources Conservation Service

Ecological Site Description

Site Type: Rangeland

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

Site ID: R032XY322WY

Major Land Resource Area: 32 – Northern Intermountain Desertic Basins

Physiographic Features

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

Landform: Hillsides, alluvial fans, ridges & stream terraces **Aspect:** N/A

	Minimum	Maximum
Elevation (feet):	5400	7500
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:	negligible	high

Climatic Features

Annual precipitation ranges from 10-14 inches per year. The normal precipitation pattern shows the least amount of precipitation in December, January, and February, increasing to a peak during the latter part of May. Amounts decrease through June, July, and August and then increase some in September. Much of the moisture that falls in the latter part of the summer is lost by evaporation and much of the moisture that falls during the winter is lost by sublimation. Average snowfall exceeds 20 inches annually. Wide fluctuations may occur in yearly precipitation and result in more dry years than those with more than normal precipitation.

Temperatures show a wide range between summer and winter and between daily maximums and minimums, due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air outbreaks from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may occur in winter and bring rapid rises in temperature. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring.

Winds are generally not strong as compared to the rest of the state. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 75 mph.

Growth of native cool-season plants begins about April 15 and continues to about July 15. Cool weather and moisture in September may produce some green up of cool season plants that will continue to late October.

The following information is from the "Thermopolis 2" climate station:

	Minimum	Maximum	5 yrs. out of 10 between
Frost-free period (days):	74	149	May 23 – September 16
Freeze-free period (days):	112	180	May 8 – October 1
Annual Precipitation (inches):	7.6	21.9	

Mean annual precipitation: 12.35 inches
Mean annual air temperature: 46.2 °F (30.1°F Avg. Min. to 62.3°F Avg. Max.)
For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at http://www.wcc.nrcs.usda.gov/ website. Other climate station(s) representative of this precipitation zone include" Grass Creek 1E", "Thermopolis", Thermopolis 25NW", "Buffalo Bill Dam" and "Black Mountain".

Influencing Water Features

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

Stream Type: None

Representative Soil Features

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

Major Soil Series correlated to this site include: Lupinto, Frisite, Rock River, Sinkson, Elkol, Grieves, Yamac, Luhon, Rootel

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

Parent Material Kind: alluvium and residuum
Parent Material Origin: sandstone, shale
Surface Texture: loam, fine sandy loam, and sandy loam
Surface Texture Modifier: none is most common but gravelly may occur
Subsurface Texture Group: loam, sandy clay loam, clay loam, silty clay, sandy loam
Surface Fragments ≤ 3" (% Cover): 0, occasionally up to10
Surface Fragments > 3" (%Cover): 0
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:	moderately slow	moderate
Depth (inches):	20	>60
Electrical Conductivity (mmhos/cm) ≤20":	0	8
Sodium Absorption Ratio ≤20":	0	13
Soil Reaction (1:1 Water) ≤20":	7.4	9.0
Soil Reaction (0.1M CaCl2) ≤20":	NA	NA
Available Water Capacity (inches) ≤30":	3.0	6.3
Calcium Carbonate Equivalent (percent) ≤20":	0	20

Plant Communities

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.

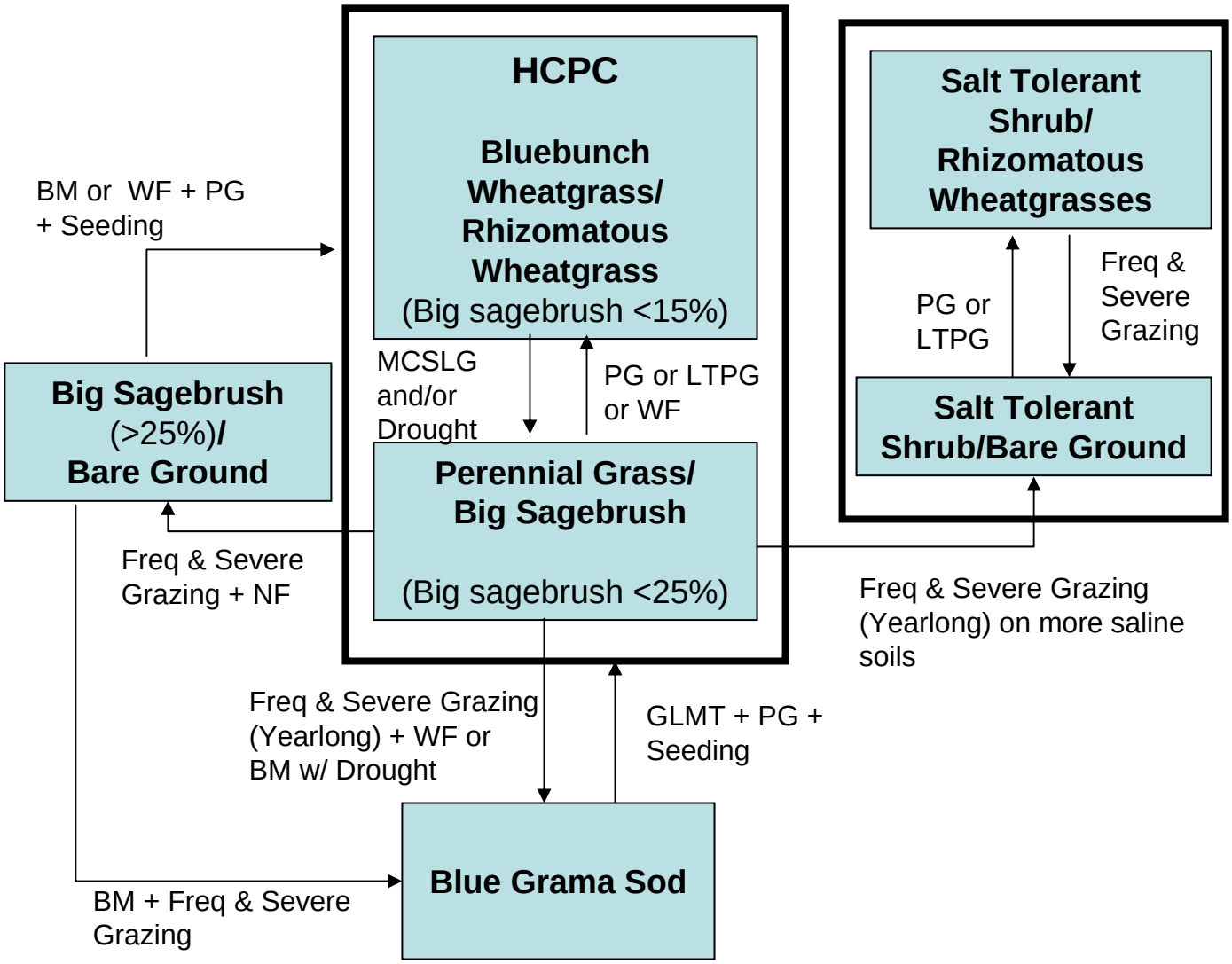
As this site deteriorates species such as blue grama, Sandberg bluegrass, and big sagebrush will increase. Plains pricklypear and weedy annuals will invade. Cool-season grasses such as Griffiths and bluebunch wheatgrass, rhizomatous wheatgrasses, needleandthread, and Indian ricegrass will decrease in 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 resulted 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.



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)

Plant Community Composition and Group Annual Production
Reference Plant Community (HCPC)

COMMON NAME/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Annual Production (Normal Year) Total: 800		
			Group	lbs./acre	% Comp.
GRASSES AND GRASS-LIKES					
GRASSES/GRASSLIKES					
Griffiths wheatgrass or	Elymus albicans	ELAL7	1	280 - 400	35 - 50
Bluebunch wheatgrass	Pseudoroegneria spicata	PSSP6			
Needleandthread grass	Hesperostipa comata	HECO26	2	0 - 80	0 - 10
Rhizomatous wheatgrass	Pascopyrum smithii	PASM	3	40 - 120	5 - 15
Green needlegrass	Nassella viridula	NAVI4	4	0 - 80	0 - 10
Indian ricegrass	Achnatherum hymenoides	ACHY	5	0 - 80	0 - 10
Spikefescue	Leucopoa kingii	LEKI2	6	0 - 80	0 - 10
MISC. GRASSES/GRASSLIKES			**7**	**0 - 80**	**0 - 10**
Basin wildrye	Leymus cinereus	LECI4	7	0 - 40	0 - 5
Blue grama	Bouteloua gracilis	BOGR2	7	0 - 40	0 - 5
Bottlebrush squirreltail	Elymus elymoides	ELEL5	7	0 - 40	0 - 5
Canby bluegrass	Poa canbyi (syn. P. secunda)	POCA (POSE)	7	0 - 40	0 - 5
Prairie junegrass	Koeleria macrantha	KOMA	7	0 - 40	0 - 5
Sandberg bluegrass	Poa secunda	POSE	7	0 - 40	0 - 5
Threadleaf sedge	Carex filifolia	CAFI	7	0 - 40	0 - 5
other perennial grasses (native)		2GP	7	0 - 40	0 - 5
FORBS			**8**	**40 - 120**	**5 - 15**
Bigseed biscuitroot	Lomatium macrocarpum	LOMA3	8	0 - 40	0 - 5
Fringed sagewort	Artemisia frigida	ARFR4	8	0 - 40	0 - 5
Goldenweed	Stenotus acaulis	STAC	8	0 - 40	0 - 5
Hood's phlox	Phlox hoodii	PHHO	8	0 - 40	0 - 5
Leafy wildparsley	Musineon divaricatum	MUDI	8	0 - 40	0 - 5
Little larkspur	Delphinium bicolor	DEBI	8	0 - 40	0 - 5
Meadow deathcamas	Zigadenas venenosus	ZIVE	8	0 - 40	0 - 5
Missouri milkvetch	Astragalus missouriensis	ASMI10	8	0 - 40	0 - 5
Parsnipflower buckwheat	Eriogonum heracleoides	ERHE2	8	0 - 40	0 - 5
Penstemon	Penstemon spp.	PENST	8	0 - 40	0 - 5
Pussytoes	Antennaria rosea	ANRO2	8	0 - 40	0 - 5
Scarlet globemallow	Sphaeralcea coccinea	SPCO	8	0 - 40	0 - 5
Small-leaf pussytoes	Antennaria parvifolia	ANPA4	8	0 - 40	0 - 5
Smooth woodyaster	Xylorhiza glabruiscula	XUGL	8	0 - 40	0 - 5
Tapertip hawksbread	Crepis acuminata	CRAC2	8	0 - 40	0 - 5
Threadleaf fleabane	Erigeron filifolius	ERFI2	8	0 - 40	0 - 5
Toadflax	Comandra umbellata	COUM	8	0 - 40	0 - 5
Wavyleaf paintbrush	Castilleja applegatei martinii	CAAPM	8	0 - 40	0 - 5
White loco	Oxytropis sericea	OXSES2	8	0 - 40	0 - 5
Wild onion	Allium textile	ALTE	8	0 - 40	0 - 5
other perennial forbs (native)		2FP	8	0 - 40	0 - 5
TREES/SHRUBS					
Big sagebrush	Artemisia tridentata	ARTR2	9	40 - 120	5 - 15
Bitterbrush	Purshia tridentata	ARTR2	10	0 - 40	0 - 5
Rubber rabbitbrush	Ericameria nauseosa	ERNA10	11	0 - 40	0 - 5
Winterfat	Krascheninnikovia lanata	KRAL2	12	0 - 40	0 - 5
other shrubs & half shrubs (native)		2SHRUB	13	0 - 40	0 - 5

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

Plant Community Narratives

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

Bluebunch Wheatgrass/Rhizomatous Wheatgrasses Plant Community

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 Griffiths and bluebunch wheatgrasses, rhizomatous wheatgrasses, needleandthread, and Indian ricegrass. Other grasses occurring in this state include bottlebrush squirreltail, prairie junegrass, and Sandberg bluegrass. 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. 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 800 lbs./acre, but it can range from about 500 lbs./acre in unfavorable years to about 1100 lbs./acre in above average years.

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

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

(Monthly percentages of total annual growth)

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.

Perennial Grass/Big Sagebrush Plant Community
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. Wyoming big sagebrush is now a conspicuous part of the overall production and accounts for the majority of the overstory.

The dominant grasses include Griffiths and bluebunch wheatgrasses, rhizomatous wheatgrasses, and needleandthread. Grasses and grass-like species of secondary importance include 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. Sagebrush can make up to 25% of the annual production. The overstory of sagebrush and understory of grasses 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 invaded, 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 600 pounds per acre, but it can range from about 400 lbs./acre in unfavorable years to about 900 lbs./acre in above average years.

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

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

(Monthly percentages of total annual growth)

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 on soils with limited soluble salts, 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.

Big Sagebrush/Bare Ground Community
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 excess 25%. Wyoming big sagebrush is a significant component of the plant community and the preferred cool season grasses have been greatly reduced.

The dominant grasses are prairie junegrass, 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 invade. 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 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 500 pounds per acre, but it can range from about 300 lbs./acre in unfavorable years to about 700 lbs./acre in above average years.

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

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

(Monthly percentages of total annual growth)

This plant community is resistant to change as the stand becomes more decadent. These areas may actually 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 is recommended.

- Brush management, followed by frequent and severe grazing, will convert the plant community to the *Blue Grama Sod Plant Community*.

Blue Grama Sod Plant Community
This plant community is the result of frequent and severe yearlong grazing, which has adversely affected the perennial grasses as well as impacted the shrub component. Other factors that can affect the shrubs include drought, heavy browsing, wildfires, and/or 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. Rubber rabbitbrush may be the sole remaining shrub on the site.

When compared to the Historic Climax Plant Community, blue grama and threadleaf sedge,have increased. Pricklypear has invaded. 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 200 pounds per acre, but it can range from about 100 lbs./acre in unfavorable years to about 300 lbs./acre in above average years.

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

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

(Monthly percentages of total annual growth)

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, and possibly seeding of natives will return this plant community to near *Historic Climax Plant Community* condition.

Salt Tolerant Shrub/Bare Ground Plant Community
This plant community can occur on sites subjected to frequent and severe grazing and on soils influenced by elevated amounts of soluble salts. Salt tolerant shrubs replace Wyoming big sagebrush as the major overstory species while the preferred cool season grasses have been eliminated or greatly reduced. Bare ground and weedy grasses and forbs dominate the understory.

This state is dominated by an overstory of salt tolerant shrubs, such as greasewood, birdfoot sagebrush and saltbushes, which can vary widely in their composition and production. The leaves of some 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. Big sagebrush and rubber rabbitbrush are present but are mostly in small patches.

Perennial cool season mid-grasses have been 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 the site. Plant diversity is moderate to poor.

When compared to the HCPC, grass production has diminished but is off set by the increase in shrub production. 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 total annual production (air-dry weight) of this state is about 450 pounds per acre, but it can range from about 250 lbs./acre in unfavorable years to about 550 lbs./acre in above average years.

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

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

(Monthly percentages of total annual growth)

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 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 native grasses and forbs will improve the productivity of site and plant cover.

Salt Tolerant Shrub/Rhizomatous Wheatgrasses Plant Community
This plant community can occur where the Salt Tolerant/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 prairie junegrass, Sandberg bluegrass and blue grama. Patches of annuals such as cheatgrass and other 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 somewhat similar, but the plant species are mostly unique.

The total annual production (air-dry weight) of this state is about 650 pounds per acre, but it can range from about 400 lbs./acre in unfavorable years to about 800 lbs./acre in above average years.

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

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

(Monthly percentages of total annual growth)

This plant community is mostly resistant to change, but species composition can be altered through long-term overgrazing. The herbaceous component is stable, but does not include most climax species. Plant vigor and replacement capabilities are sufficient. The biotic community is not intact because of the predominant salt tolerant shrub overstory and lack of climax grass species. Plant diversity is moderate.

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

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

Bluebunch Wheatgrass/Rhizomatous Wheatgrasses (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 excellent escape and thermal cover for large ungulates, as well as nesting habitat for sage grouse.

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 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.

Salt Tolerant Shrub/Rhizomatous Wheatgrass Plant Community: The combination of an overstory of sagebrush and an understory of grasses and forbs provide a diverse plant community for wildlife. The crowns of these shrubs 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 and other upland birds. Brewer's sparrows' nest in big sagebrush plants and hosts of other nesting birds utilize stands in the 20-30% cover range.

Animal Preferences (Quarterly - 1,2,3,4) for commonly occuring plants in MLRA 32, 10-14 inch Foothills and Basins East

COMMON NAME/ GROUP NAME	SCIENTIFIC NAME	SCIENTIFIC SYMBOL	*Cattle*	*Sheep*	*Horses*	*Mule Deer*	*Antelope*	*Elk*	*Moose*	*Mtn. Sheep*
GRASSES/GRASSLIKES										
Alkali bluegrass	Poa juncifolia (syn. P. secunda)	POJU (POSE)	DDDD	PPPP	DDDD	PPPP	PPPP	DDDD	DDDD	DDDD
Alkali cordgrass	Spartina gracilis	SPGR	DDDD	UUUU	DDDD	UUUU	UUUU	DDDD	DDDD	UUUU
Alkali sacaton	Sporobolus airoides	SPAI	PPPP	DDDD	PPPP	DDDD	DDDD	PPPP	DDDD	DDDD
Baltic rush	Juncus balticus	JUBA	DDDD	UUUU	DDDD	UUUU	UUUU	DDDD	UUUU	UUUU
Basin wildrye	Leymus cinereus	LECI4	PPPP	PPPP	PPPP	DDDD	DDDD	PPPP	DDDD	PPPP
Big bluegrass	Poa Ampla (syn. P. secunda)	POAM (POSE)	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP
Blue grama	Bouteloua gracilis	BOGR2	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Bluebunch wheatgrass	Pseudoroegneria spicata	PSSP6	PPPP	PPPP	PPPP	DDDD	DDDD	PPPP	PPPP	DDDD
Bluejoint reedgrass	Calamagrostis canadensis	CACAM	PPPP	DDDD	PPPP	UUUU	UUUU	PPPP	DDDD	DDDD
Bottlebrush squirreltail	Elymus elymoides	ELELE	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Bulrush	Scripus spp.	SCIRP	DDDD	UUUU	DDDD	UUUU	UUUU	DDDD	DDDD	DDDD
Canada wildrye	Elymus canadensis	ELCA4	PPPP	PPPP	PPPP	DDDD	DDDD	PPPP	PPPP	PPPP
Canby bluegrass	Poa canbyi (syn. to Poa secunda)	POCA (POSE)	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP
Golden sedge	Carex aurea	CAAU3	DDDD	DDDD	DDDD	UUUU	UUUU	DDDD	UUUU	DDDD
Green needlegrass	Nassella viridula	NAVI4	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP
Indian ricegrass	Achnatherum hymenoides	ACHY	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP
Inland saltgrass	Distichlis spicata	DISP	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Inland sedge	Carex interior	CAIN11	DDDD	DDDD	DDDD	UUUU	UUUU	DDDD	DDDD	DDDD
Mat muhly	Muhlenbergia richardsonis	MURI	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Griffith's wheatgrass	Elymus albicans	ELAL7	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Nebraska sedge	Carex nebrascensis	CANE2	PPPP	PPPP	PPPP	DDDD	DDDD	PPPP	DDDD	DDDD
Needleandthread	Hesperostipa comata	HECO26	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP
Nuttall's alkaligrass	Puccinellia nuttalliana	PUNU2	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP
Prairie junegrass	Koeleria macrantha	KOMA	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Prairie sandreed	Calamovilfa longifolia	CALO	PPPP	DDDD	PPPP	UUUU	UUUU	PPPP	DDDD	DDDD
Sandberg bluegrass	Poa secunda	POSE	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Sand dropseed	Sporobolus cryptandrus	SPCR	DDDD	DDDD	DDDD	UUUU	UUUU	DDDD	UUUU	UUUU
Slender wheatgrass	Elymus trachycaulus	ELTR7	PPPP	DDDD	PPPP	DDDD	DDDD	PPPP	DDDD	DDDD
Slough sedge	Carex obnupta	CAOB3	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Spike fescue	Leucopa kingii	LEKI2	PPPP	DDDD	PPPP	PPPP	DDDD	PPPP	DDDD	DDDD
Streambank wheatgrass	Elymus lanceolatus	ELLAL3	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Thickspike wheatgrass	Elymus lanceolatus	ELLAL3	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Threadleaf sedge	Carex filifolia	CAFI	DDDD	DDDD	DDDD	DDDD	PPPP	DDDD	DDDD	DDDD
Tufted hairgrass	Deschampsia caespitosa	DECA18	PPPP	PPPP	PPPP	DDDD	DDDD	PPPP	DDDD	DDDD
Upland sedges	Carex spp.	CAREX	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Water sedge	Carex aquatilis	CAAQ	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Western wheatgrass	Pascopyrum smithii	PASM	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
FORBS										
Alkali seepweed	Suaeda vera	SUVE2	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
American bistort	Polygonum bistortoides	POB16	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Arrowgrass	Triglochin spp.	TRIGL	TTTT	TTTT	TTTT	TTTT	TTTT	TTTT	TTTT	TTTT
Asters	Eucephalus spp.	EUCEP2	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Biscuitroots	Lomatium spp.	LOMAT	DDDD	DDDD	UUUU	DDDD	DDDD	DDDD	DDDD	DDDD
Cinquefoil	Potentilla spp.	POTEN	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Deathcamas	Zigadenus Michx.	ZIGAD	TTTT	TTTT	TTTT	TTTT	TTTT	TTTT	TTTT	TTTT
Dock	Rumex spp.	RUMEX	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Evening primrose	Oenothera caespitosa	OECA10	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
False carrot	Turgenia spp.	TURGE	UUUU	DDDD	UUUU	UUUU	UUUU	UUUU	UUUU	DDDD
Fleabanes	Erigeron spp.	ERIGE2	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Fringed sagewort	Artemisia frigida	ARFR4	UUUU	UUUU	UUUU	UUUU	DDDD	UUUU	UUUU	UUUU
Goldenweed	Stenotus acaulis	STAC	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Gromwell	Buglossoides arvensis	BUAR3	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Hawksbeard	Crepis acuminata	CRAC2	UUUU	PPPP	UUUU	DDDD	DDDD	UUUU	DDDD	DDDD
Horsetails	Equisetum spp.	EQUIS	UUUU	UUUU	TTTT	UUUU	UUUU	UUUU	UUUU	UUUU
Iris	Iris spp.	IRIS	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Larkspur	Delphinium spp.	DELPH	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Milkvetch	Astragalus spp.	ASTRA	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Paintbrush	Castilleja spp.	CAST	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Penstemons	Penstemon spp.	PENST	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP
Phlox	Phlox spp.	PHLOX	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Prairie thermopsis	Thermopsis rhombifolia	THRH	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Princesplume	Stanleya spp.	STANL	TTTT	TTTT	TTTT	TTTT	TTTT	TTTT	TTTT	TTTT
Nuttalll's povertyweed	Monoepis nuttalliana	MONU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Pussytoes	Antennaria spp.	ANTEN	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Salsify	Tragopogon porrifolius	TRPO	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Scarlet globemallow	Sphaeralcea coccinea	SPCO	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Stemless hymenoxys	Tetraneuris acaulis	TEACA2	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Wild onion	Allium textile	ALTE	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD
Winterfat	Krascheninnikovia lanata	KRAL2	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP
Woody aster	Xylorhiza spp.	XYLOR	TTTT	TTTT	TTTT	TTTT	TTTT	TTTT	TTTT	TTTT
Wooly groundsel	Packera cana	PACA15	TTTT	UUUU	TTTT	UUUU	UUUU	TTTT	UUUU	UUUU
TREES, SHRUBS & HALF-SHRUBS										
Antelope bitterbrush	Purshia tridentata	PUTR2	PPPP	PPPP	DDDD	PPPP	PPPP	PPPP	PPPP	PPPP
Boxelder	Acer negundo L. var. interius	ACNE12	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Silver sagebrush	Artemisia cana	ARCA13	DDDD	DDDD	DDDD	PPPP	PPPP	DDDD	DDDD	DDDD
Big sagebrush	Artemisia tridentata	ARTR2	DDDD	DDDD	UUUU	DDDD	DDDD	DDDD	DDDD	DDDD
Birdfoot sagebrush	Artemisia pedatifida	ARPE6	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Black sagebrush	Artemesia nova	ARNO4	UUUU	PPPP	UUUU	PPPP	PPPP	UUUU	UUUU	DDDD
Cottonwoods (sprouts)	Populus spp.	POPUL	DDDD	DDDD	DDDD	DDDD	UUUU	DDDD	DDDD	UUUU
Curlleaf mountainmahogany	Cercocarpus ledifolius	CELE3	PPPP	PPPP	DDDD	PPPP	UUUU	PPPP	PPPP	DDDD
Gardners saltbush	Atriplex gardneri	ATGA	PPPP	PPPP	DDDD	PPPP	PPPP	PPPP	DDDD	DDDD
Greasewood	Sarcobatus vermiculatus	SAVE4	DDDD	DDDD	UUUU	DDDD	DDDD	DDDD	UUUU	UUUU
Green rabbitbrush	Chrysothamnus viscidiflorus	CHVI8	PPPP	DDDD	PPPP	PPPP	PPPP	PPPP	DDDD	DDDD
Limber pine	Pinus flexilis	PIFL2	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Rubber rabbitbrush	Ericameria nauseosa	ERNA10	UUUU	PPPP	UUUU	DDDD	PPPP	UUUU	UUUU	DDDD
Rocky Mountain juniper	Juniperus scopulorum	JUSC2	UUUU	UUUU	UUUU	DDDD	UUUU	UUUU	UUUU	UUUU
Shadscale	Atriplex confertifolia	ATCO	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
Shrubby cinquefoil	Dasiphora floribunda	DAFL3	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	DDDD	UUUU
Silver buffaloberry	Shepherdia argentea	SHAR	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU	UUUU
skunkbush sumac	Rhus trilobata	RHTR	DDDD	DDDD	DDDD	DDDD	DDDD	DDDD	UUUU	UUUU
Snowberry	Symphoricarpus occidentalis	SYOC	UUUU	UUUU	UUUU	DDDD	UUUU	UUUU	UUUU	UUUU
Utah juniper	Juniperus osteosperma	JUOS	UUUU	UUUU	UUUU	DDDD	UUUU	UUUU	UUUU	UUUU
Wildrose	Rosa woodsii var. woodsii	ROWOW	DDDD	DDDD	UUUU	DDDD	DDDD	DDDD	DDDD	DDDD
Willows	Salix spp.	SALIX	PPPP	PPPP	DDDD	PPPP	UUUU	PPPP	PPPP	DDDD
Winterfat	Krascheninnikovia lanata	KRAL2	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP	PPPP
Yucca	Yucca spp.	YUCCA	DDDD	DDDD	UUUU	DDDD	DDDD	DDDD	UUUU	DDDD

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

Animal Community – Grazing Interpretations

The following table lists suggested stocking rates for cattle under continuous season-long grazing under normal growing conditions. These 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)
Bluebunch Wheatgrass/ Rhizomatous Wheatgrasses	500-1100	.40
Perennial Grass/Big Sagebrush	400-900	.30
Big Sagebrush/Bare Ground	300-700	.20
Blue Grama Sod	100-300	.10
Salt Tolerant Shrub/Bare Ground	250-550	.13
Salt Tolerant Shrub/Rhizomatous Wheatgrasses	400-800	.22

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

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

Hydrology Functions

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

Supporting Information

Associated Sites

Shallow Loamy	R032XY362WY
Sandy	R032XY350WY
Clayey	R032XY304WY
Lowland	R032XY328WY

Similar Sites
() – Loamy 5-9" Wind River Basin P.Z. R032XY222WY
Loamy 5-9" Big Horn Basin P.Z. R032XY122WY
[Lower production than Loamy 10-14" E]

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

Inventory Data References
Ocular field estimations observed by trained personnel.

State Correlation
This site occurs entirely within Wyoming.

Type Locality

Field Offices
Casper, Cody, Dubois, Fort Washakie, Greybull, Lander, Powell, Riverton, Thermopolis, Worland,

Relationship to Other Established Classifications

Other References

Site Description Approval

State Range Management Specialist Date