FORAGE SUITABILITY GROUP (FSG)

Limy Upland

FSG No.: G062XY400SD
Major Land Resource Area (MLRA): 062X - Black Hills

Physiographic Features

These soils are on long, narrow, gently sloping bottoms or valleys and strongly sloping toeslopes.

	Minimum	Maximum
Elevation (feet):	3600	6600
Slope (percent):	2	9
Flooding:		
Frequency:	Rare	Rare
Duration:	Very Brief	Very Brief
Ponding:		
Depth (inches):		
Frequency:	None	None
Duration:	None	None
Runoff Class:	Low	Low

Climatic Features

The climate of MLRA 62 is influenced by the mountainous Black Hills. Annual precipitation is generally higher and temperature is lower than the plains and foothills which surround it. Growing season length is considerably reduced with the potential for frost at the higher elevations occurring virtually every month of the year.

Annual precipitation varies widely from year to year in MLRA 62. Average annual precipitation for all climate stations listed below is about 24 inches, with about 73 percent of that occurring during the months of April through September. On average, there are about 34 days with greater than .1 inches of precipitation during the same time period. Precipitation is less than needed for optimum forage production and is the single largest factor limiting production from this group on non-irrigated lands.

Average annual snowfall ranges from 42 inches at Custer, South Dakota (SD), to 164 inches at Lead, SD. Days with snow cover at depths greater than 1 inch range from 18 days at Deadwood, SD, to 120 days at Alva, Wyoming (WY).

Average July temperatures across the MLRA are about 67°F and average January temperatures are about 22°F. Recorded temperature extremes in the MLRA during the years 1961 to 1990 are a low of -43°F at Custer, and a high of 102 at both Alva and Deadwood. The MLRA lies in USDA Plant Hardiness Zones 4b and 5a.

The climate data listed in the tables below represent high and low ranges and averages for the climate stations and dates listed. For additional climate data access the National Water and Climate Center at http://www.wcc.nrcs.usda.gov.

	From	To
Freeze-free period (28 deg)(days): (9 years in 10 at least)	89	127
Last Killing Freeze in Spring (28 deg): (1 year in 10 later than)	Jun 08	May 23
Last Frost in Spring (32 deg): (1 year in 10 later than)	Jul 03	Jun 03

	From	To
First Frost in Fall (32 deg): (1 year in 10 earlier than)	Aug 20	Sep 10
First Killing Freeze in Fall (28 deg): (1 year in 10 earlier than)	Aug 30	Sep 20
Length of Growing Season (32 deg)(days): (9 years in 10 at least)	52	111
Growing Degree Days (40 deg):	2940	4191
Growing Degree Days (50 deg):	1375	2206
Annual Minimum Temperature:	-30	-20
Mean annual precipitation (inches):	19	29

Monthly precipitation (inches) and temperature (F):

2 years in 10:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Precip. Less Than	0.35	0.40	0.70	1.41	1.77	1.90	1.45	0.94	0.65	0.68	0.46	0.51
Precip. More Than	1.03	1.30	2.24	4.03	5.87	5.80	3.92	2.83	2.72	2.06	1.30	1.31
Monthly Average:	0.71	0.89	1.52	2.80	3.98	3.99	2.77	1.96	1.78	1.38	0.90	0.92
Temp. Min.	10.2	13.9	19.1	28.4	37.7	46.6	52.9	50.7	41.0	31.7	20.9	12.7
Temp. Max.	33.9	37.8	43.0	52.6	62.9	73.0	81.0	79.6	69.1	58.1	44.1	35.8
Temp. Avg.	22.1	25.8	31.1	40.5	50.3	59.8	66.9	65.2	55.1	44.9	32.5	24.3

Climate Station	Location	From	To
SD2207	Deadwood, SD	1961	1990
SD4834	Lead, SD	1961	1990
SD5870	Mt. Rushmore, SD	1961	1990
SD6427	Pactola Dam, SD	1961	1990
SD2087	Custer, SD	1961	1990
WY0200	Alva, WY	1961	1990

Soil Interpretations

This group consists of very deep, somewhat excessively drained, moderately rapidly permeable soils that formed in mixed alluvium from sedimentary rocks.

Drainage Class:	Excessively drained	To	Somewhat excessively drained
Permeability Class: (0 - 40 inches)	Moderately rapid	To	Moderately rapid
Frost Action Class:	Moderate	To	Moderate

	Minimum	Maximum
Depth:	72	
Surface Fragments >3" (% Cover):		
Organic Matter (percent): (surface layer)	1.0	3.0
Electrical Conductivity (mmhos/cm): (0 - 24 inches)	0	2
Sodium Absorption Ratio: (0 - 12 inches)	0	0
Soil Reaction (1:1) Water (pH): (0 - 12 inches)	7.4	8.4
Available Water Capacity (inches): (0 - 60 inches)	4	5
Calcium Carbonate Equivalent (0 - 12 inches)	0	15

Soil Map Unit Component List (Some phases of these soils may also occur in other FSG's.)

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Adapted Species List

The following forage species are considered adapted to grow on the soils in this group. Additional information concerning plant characteristics of a number of the listed species as well as individual cultivars of many of those species can be accessed on the web at http://plants.usda.gov.

Cool Season Grasses	Symbol	
Crested wheatgrass	AGCR	G
Green needlegrass	NAVI4	F
Intermediate wheatgrass	THIN6	F
Newhy hybrid wheatgrass	F	
Pubescent wheatgrass	THIN6	F
Western wheatgrass	PASM	G
Warm Season Grasses	**Symbol**	
Big bluestem	ANGE	F
Little bluestem	SCSC	G
Sideoats grama	BOCU	G
Legumes	**Symbol**	
Cicer milkvetch	ASCI4	G
Purple prairieclover	DAPUP	F
Sainfoin	ONVI	F
White prairieclover	DACAC	F

G - Good adaptation for forage production on this group of soils in this MLRA
F - Fair adaptation but will not produce at its highest potential

Production Estimates

Production estimates listed here should only be used for making general management recommendations. Onsite production information should always be used for making detailed planning and management recommendations.

The high forage production estimates listed below are based on dense, vigorous stands of climatically adapted, superior performing cultivars. They are properly fertilized for high yields, and pest infestations are kept below economic thresholds. Mechanical harvests are managed to maintain stand life by cutting at appropriate stages of maturity and harvest intervals. If grazed, optimum beginning and ending grazing heights are adhered to. Adequate time is allowed for plant recovery before entering winter dormancy under both uses.

The production estimates listed below represent total annual above ground plant production on an air-dry-matter basis. Estimates of hay and grazing yields can be calculated from these numbers by multiplying them by the expected harvest efficiency. A 70 percent harvest efficiency is commonly used when converting to hay yields. Pasture harvest efficiency is highly dependent on the grazing management system applied, ranging from 25 to 50 percent.

Forage Crop	Dryland Management Intensity	
	Low (lbs/ac)	High (lbs/ac)
Crested wheatgrass	2200	4500
Intermediate wheatgrass	2300	4700
Western wheatgrass	1900	4200

Forage Growth Curves

Growth curves estimate the seasonal distribution of growth of the various forage crops. They indicate when the forages may be available for grazing or mechanical harvest.

Growth Curve Number: SD0006
Growth Curve Name: Legumes
Growth Curve Description: Alsike clover, Red Clover, Cicer Milk vetch, MLRA 62

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	35	40	15	5	5	0	0	0

Growth Curve Number: SD0007
Growth Curve Name: Cool season grass
Growth Curve Description: Cool season grass, MLRA 62

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	40	35	10	5	5	0	0	0

Growth Curve Number: SD0008
Growth Curve Name: Warm season grass
Growth Curve Description: Warm season grass, MLRA 62

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	10	35	40	15	0	0	0	0

Soil Limitations

The primary limitation to the soils in this group is the high lime content close to the soil surface. The lime reduces the availability of some plant nutrients. This reduces species choices and yield potential.

Management Interpretations

The impact on yields can be reduced by selecting forage species that are tolerant of the high lime levels inherent to these soils. Including sod forming grass species in stands, especially on steeper slopes, will reduce the potential for sheet and rill erosion. Incorporate both wind and water erosion control practices during the establishment period. Properly locating facilitating practices such as fences, lanes, and water developments can help control livestock movement, reduce trailing perpendicular to steeper slopes, and evenly distribute grazing pressure.

FSG Documentation

Inventory Data References:
Agriculture Handbook 296-Land Resource Regions and Major Land Resource Areas
Natural Resources Conservation Service (NRCS) National Water and Climate Center data
USDA Plant Hardiness Zone Maps
National Soil Survey Information System for soil surveys in South Dakota and Wyoming counties in MLRA 62.
NRCS Wyoming Field Office Technical Guide and South Dakota Technical Guide
NRCS National Range and Pasture Handbook
Various Agricultural Research Service, Cooperative Extension Service, and NRCS research trials for plant adaptation and production.

State Correlation:
This site has been correlated with the following states: South Dakota and Wyoming

Forage Suitability Group Approval:

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Original Date:	6/25/2003
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