

## FORAGE SUITABILITY GROUP (FSG) Limy Upland

**FSG No.:** G064XY400NE

**Major Land Resource Area (MLRA):** 64 - Mixed Sandy and Silty Tableland



### Physiographic Features

The soils in this group are found on upland slopes, terraces, fans, and footslopes.

	<u>Minimum</u>	<u>Maximum</u>
<b>Elevation (feet):</b>	2950	3940
<b>Slope (percent):</b>	0	12
<b>Flooding:</b>		
<b>Frequency:</b>	None	None
<b>Duration:</b>	None	None
<b>Ponding:</b>		
<b>Depth (inches):</b>		
<b>Frequency:</b>	None	None
<b>Duration:</b>	None	None
<b>Runoff Class:</b>	Low	Very high

### Climatic Features

This group occurs in a mid-continental climate characterized by wide seasonal temperature and precipitation fluctuations and extremes.

Annual precipitation varies widely from year to year in MLRA 64. Average annual precipitation for all climate stations listed below is about 16 inches. About 79 percent of the annual precipitation occurs during the months of April through September. On average, there are about 26 days with greater than .1 inches of precipitation during that same time period.

Average annual snowfall ranges from 20 inches at Interior, South Dakota (SD), to 60 inches at Harrison, Nebraska (NE). Snow cover at depths greater than 1 inch range from 28 days at Interior, SD, to 60 days at Long Valley, SD.

Average July temperatures across the MLRA are about 74°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 -45°F and a high of 114 both recorded at Porcupine, SD. The MLRA lies mostly in USDA Plant Hardiness Zones 4a and 4b, with a small area of warmer 5a around Alliance, NE.

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>.

	<b>From</b>	<b>To</b>
<b>Freeze-free period (28 deg)(days):</b> (9 years in 10 at least)	111	158
<b>Last Killing Freeze in Spring (28 deg):</b> (1 year in 10 later than)	Jun 01	May 05
<b>Last Frost in Spring (32 deg):</b> (1 year in 10 later than)	Jun 12	May 14
<b>First Frost in Fall (32 deg):</b> (1 year in 10 earlier than)	Sep 06	Sep 19
<b>First Killing Freeze in Fall (28 deg):</b> (1 year in 10 earlier than)	Sep 11	Sep 28

	<b>From</b>	<b>To</b>
<b>Length of Growing Season (32 deg)(days):</b> (9 years in 10 at least)	94	135
<b>Growing Degree Days (40 deg):</b>	3867	4974
<b>Growing Degree Days (50 deg):</b>	2128	2913
<b>Annual Minimum Temperature:</b>	-30	-15
<b>Mean annual precipitation (inches):</b>	15	18

**Monthly precipitation (inches) and temperature (F):**

<b>2 years in 10:</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
<b>Precip. Less Than</b>	0.07	0.10	0.32	0.71	1.22	1.19	1.43	0.66	0.34	0.47	0.12	0.15
<b>Precip. More Than</b>	0.37	0.61	1.87	3.10	4.14	5.14	3.84	2.61	2.02	1.57	0.81	0.50
<b>Monthly Average:</b>	0.33	0.38	0.97	1.88	2.89	2.90	2.32	1.50	1.33	0.97	0.47	0.38
<b>Temp. Min.</b>	8.5	13.4	19.6	28.9	38.8	48.6	55.1	52.7	42.0	31.1	19.8	11.0
<b>Temp. Max.</b>	35.1	40.2	49.7	63.0	73.1	83.6	92.0	91.0	79.9	67.9	48.9	37.1
<b>Temp. Avg.</b>	22.4	27.4	35.2	46.2	56.8	66.7	74.2	72.2	61.3	49.4	35.1	24.5

<b><u>Climate Station</u></b>	<b><u>Location</u></b>	<b><u>From</u></b>	<b><u>To</u></b>
SD4184	Interior, SD	1961	1990
SD4983	Long Valley, SD	1961	1990
SD6736	Porcupine, SD	1963	1990
NE1575	Chadron, NE	1961	1990
NE0130	Alliance, NE	1961	1990
NE3615	Harrison, NE	1961	1990

**Soil Interpretations**

These are moderately deep to very deep, well drained, medium to moderately fine textured soils with elevated calcium carbonate levels near the soil surface. Permeability ranges from slow to moderately rapid and available water capacities range from low to high.

<b>Drainage Class:</b>	Well drained	To	Well drained
<b>Permeability Class:</b> (0 - 40 inches)	Slow	To	Moderately rapid
<b>Frost Action Class:</b>	Low	To	Moderate

	<b><u>Minimum</u></b>	<b><u>Maximum</u></b>
<b>Depth:</b>	20	
<b>Surface Fragments &gt;3" (% Cover):</b>		3
<b>Organic Matter (percent):</b> (surface layer)	0.5	2.0
<b>Electrical Conductivity (mmhos/cm):</b> (0 - 24 inches)	0	8
<b>Sodium Absorption Ratio:</b> (0 - 12 inches)	0	13
<b>Soil Reaction (1:1) Water (pH):</b> (0 - 12 inches)	7.4	8.4
<b>Available Water Capacity (inches):</b> (0 - 60 inches)	3	12
<b>Calcium Carbonate Equivalent (percent):</b> (0 - 12 inches)	0	28

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

Colby	Manvel
Graystone	Minnequa
Keota	

**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://www.plants.usda.gov>.

<u>Cool Season Grasses</u>	<u>Symbol</u>		<u>Warm Season Grasses</u>	<u>Symbol</u>
Altai wildrye	LEAN3	F	Big bluestem	ANGE F
Crested wheatgrass	AGCR	G	Indiangrass	SONU2 F
Green needlegrass	NAVI	F	Little bluestem	SCSC G
Intermediate wheatgrass	THIN	F	Prairie sandreed	CALO F
Newhy hybrid wheatgrass		F	Sideoats grama	BOCU G
Pubescent wheatgrass	THIN	G		
Russian wildrye	PSJU3	G	<u>Legumes</u>	<u>Symbol</u>
Streambank wheatgrass	ELLAL	G	Alfalfa	MESA G
Thickspike wheatgrass	ELM	G	Cicer milkvetch	ASCI4 G
Western wheatgrass	PASM	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 a 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.

<b>Forage Crop</b>	<b>Management Intensity</b>	
	<u>High</u> <b>(lbs/ac)</b>	<u>Low</u> <b>(lbs/ac)</b>
Alfalfa	4300	2300
Alfalfa/Crested wheatgrass	3700	1700
Alfalfa/Intermediate wheatgrass	4000	2000
Alfalfa/Pubescent wheatgrass	4000	2000
Alfalfa/Smooth brome		
Crested wheatgrass	2900	1700
Intermediate wheatgrass	2900	1700
Pubescent wheatgrass	3700	1700
Smooth brome		

**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:** SD0002  
**Growth Curve Name:** Alfalfa  
**Growth Curve Description:** Alfalfa, MLRA's 65, 64, 60A  
**Percent Production by Month**

<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	5	35	35	15	5	5	0	0	0

**Growth Curve Number:** SD0004  
**Growth Curve Name:** Cool season grass  
**Growth Curve Description:** Cool season grass, statewide  
**Percent Production by Month**

<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	10	40	30	10	5	5	0	0	0

**Growth Curve Number:** SD0005  
**Growth Curve Name:** Warm season grass  
**Growth Curve Description:** Warm season grass, statewide  
**Percent Production by Month**

<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	0	10	40	35	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. Also, because most of these are sloping soils, they are subject to water and wind erosion, especially when establishing or renovating stands. They also tend to be droughty, especially those with lower available water capacity.

**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, and also to droughty conditions. 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**

**Similar FSG's:**

G064XY100N Loamy soils do not have as high a lime content near the surface and are more productive.

**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, Nebraska, and Wyoming counties in MLRA 64
- NRCS Nebraska and Wyoming Field Office Technical Guides and South Dakota Technical Guide
- NRCS National Range and Pasture Handbook
- Various South Dakota and Nebraska 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: Nebraska, South Dakota, and Wyoming

**Forage Suitability Group Approval:**

Original Author: Tim Nordquist  
Original Date: 4/15/02  
Approval by: Dave Schmidt  
Approval Date: 9/20/04