

FORAGE SUITABILITY GROUP Claypan

FSG No.: G102BY800SD

Major Land Resource Area: 102B - Till Plains

Physiographic Features

The soils in this group are found on upland till plains and footslopes.

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	1000	2300
Slope (percent):	0	2
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		
Depth (inches):		
Frequency:	None	None
Duration:	None	None
Runoff Class:	Medium	High

Climatic Features

Annual precipitation varies widely from year to year in MLRA 102B. Average annual precipitation for all climate stations listed below is about 24 inches. Over 75 percent of that occurs during the months of April through September. On average, there are about 30 days with greater than .1 inches of precipitation during the same timeframe.

Average annual snowfall ranges from 25 to 39 inches across the MLRA. Snow cover at depths greater than 1 inch range from 15 days at Bridgewater to 79 days at Madison.

Average July temperatures are about 75⁰F and average January temperatures are about 15⁰F. Recorded temperature extremes in the MLRA are a low of -36 degrees and a high of 110 degrees both recorded at Sioux Falls.

Average annual wind speeds at Sioux Falls are 11 mph with the highest wind speeds occurring during March and April. It is cloudy an average of 157 days a year at Sioux Falls, with the greatest incidence of cloudy weather occurring in November and December. Average morning relative humidity in June is 82 percent and average afternoon humidity is 59 percent.

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)	139	154
Last Killing Freeze in Spring (28 deg): (1 year in 10 later than)	May 13	May 03
Last Frost in Spring (32 deg): (1 year in 10 later than)	May 24	May 17
First Frost in Fall (32 deg): (1 year in 10 earlier than)	Sep 10	Sep 19

	From	To
First Killing Freeze in Fall (28 deg): (1 year in 10 earlier than)	Sep 19	Sep 30
Length of Growing Season (32 deg)(days): (9 years in 10 at least)	117	133
Growing Degree Days (40 deg):	4565	5314
Growing Degree Days (50 deg):	2600	3179
Annual Minimum Temperature:	-25	-20
Mean annual precipitation (inches):	23	25

Monthly precipitation (inches) and temperature (F):

2 years in 10:	<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>
Precip. Less Than	0.13	0.19	0.63	1.12	1.56	1.86	1.71	1.47	1.33	0.71	0.20	0.26
Precip. More Than	0.73	1.35	2.33	3.33	4.79	5.83	4.96	4.17	3.71	2.66	1.63	1.04
Monthly Average:	0.47	0.62	1.64	2.36	3.26	3.70	3.17	2.80	2.62	1.66	1.04	0.67
Temp. Min.	2.1	8.2	20.8	34.5	45.9	55.5	60.8	57.9	48.3	36.5	22.5	8.0
Temp. Max.	29.9	35.8	48.2	64.6	75.4	84.7	89.3	86.3	78.1	66.3	48.0	32.9
Temp. Avg.	15.1	21.3	33.5	48.1	59.9	69.4	74.7	71.9	62.2	50.2	34.2	19.7

<u>Climate Station</u>	<u>Location</u>	<u>From</u>	<u>To</u>
SD1032	Bridgewater, SD	1961	1990
SD1392	Canton, SD	1961	1990
SD1579	Centerville, SD	1961	1990
SD5090	Madison Research Farm, SD	1962	1990
SD5228	Marion, SD	1961	1990
SD5481	Menno, SD	1961	1990
SD7667	Sioux Falls, SD	1961	1990
SD8472	Tyndall, SD	1961	1990
SD8622	Vermillion, SD	1961	1990
SD9502	Yankton, SD	1961	1990

Soil Interpretations

This group consists of moderately well drained, moderate textured soils formed in glacial till. They have dense claypan subsoils with slow permeability. The underlying material and lower part of the subsoil typically have high amounts of soluble salts and are sodic.

Drainage Class:	Moderately well drained	To	Moderately well drained
Permeability Class: (0 - 40 inches)	Slow	To	Slow
Frost Action Class:	Moderate	To	Moderate

	<u>Minimum</u>	<u>Maximum</u>
Depth:	72	
Surface Fragments >3" (% Cover):	0	3
Organic Matter (percent): (surface layer)	2.0	4.0
Electrical Conductivity (mmhos/cm): (0 - 24 inches)	8	16
Sodium Absorption Ratio: (0 - 12 inches)	20	20
Soil Reaction (1:1) Water (pH): (0 - 12 inches)	6.1	7.3
Available Water Capacity (inches): (0 - 60 inches)	10	10
Calcium Carbonate Equivalent (percent): (0 - 12 inches)	0	3

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 at <http://plants.usda.gov/>

Cool Season Grasses

Beardless wildrye	F
Crested wheatgrass	F
Green needlegrass	F
Intermediate wheatgrass	F
Newhy hybrid wheatgrass	F
Pubescent wheatgrass	F
Russian wildrye	F
Slender wheatgrass	F
Smooth bromegrass	F
Tall wheatgrass	G
Western wheatgrass	G

Legumes

Alfalfa	F
Sweetclover	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.

Forage Crop	Management Intensity	
	<u>High</u> (lbs/ac)	<u>Low</u> (lbs/ac)
Alfalfa	5600	3000
Alfalfa/Crested wheatgrass	4500	2500
Alfalfa/Intermediate wheatgrass	4700	2700
Crested wheatgrass	4000	2000
Intermediate wheatgrass	4200	2100
Tall wheatgrass	4200	2100
Western wheatgrass	2900	1400

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: SD0001
Growth Curve Name: Alfalfa
Growth Curve Description: Alfalfa, MLRAs 107, 102B, 63B, 66, 65

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	30	25	20	15	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

Soil Limitations

These soils have severe limitations to the production of climatically adapted forage species. The claypan and the soluble salts and sodicity in the subsoil produce an unfavorable rooting environment, limiting species selection and production potential.

Management Interpretations

The impact on yields can be reduced by selecting forage species that are tolerant of salinity and sodicity and can root in dense, clayey subsoils.

FSG Documentation

Similar FSGs:

<u>FSG ID</u>	<u>FSG Narrative</u>
G102BY210S	Clayey Subsoil soils are less saline and/or sodic and have a more favorable rooting zone.

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 (NASIS) for soil surveys in South Dakota counties in MLRA 102B
 South Dakota NRCS 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

Forage Suitability Group Approval

Original Author: Tim Nordquist
Original Date:
Approval By: Dave Schmidt
Approval Date: 1/14/03