

FORAGE SUITABILITY GROUP (FSG)

Claypan

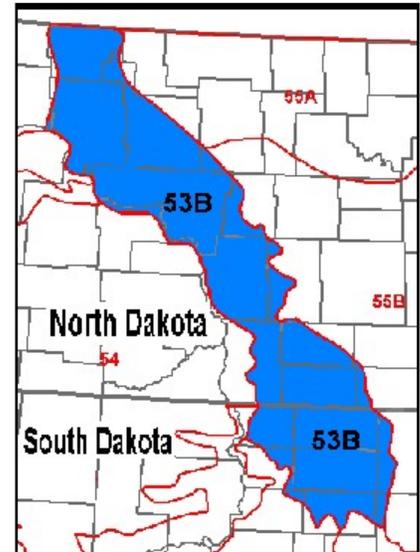
FSG No.: G053BY800ND

Major Land Resource Area (MLRA): 53B - Central Dark Brown Glaciated Plains

Physiographic Features

These soils are found on plane to concave surfaces on upland till plains and footslopes, and in low-lying flats on outwash plains and terraces and in basins.

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	1640	1970
Slope (percent):	0	6
Flooding:		
Frequency:	None	Rare
Duration:	None	Brief
Ponding:		
Depth (inches):		
Frequency:	None	None
Duration:	None	None
Runoff Class:	Negligible	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 53B. Average annual precipitation for all climate stations listed below is about 17 inches. About 79 percent of that occurs during the months of April through September. On average there are about 27 days with greater than .1 inches of precipitation during the same timeframe.

Average annual snowfall ranges from 21 inches at Turtle Lake, North Dakota (ND), to 38 inches at Eureka, South Dakota (SD). Days with snow cover at depths greater than 1 inch range from 22 at Garrison, ND, to 100 at Max, ND.

Average July temperatures are about 70°F and average January temperatures are about 8°F. Recorded temperature extremes in the MLRA during the years 1961 to 1990 are a low of -48°F at Powers Lake, ND, and a high of 111 recorded at Linton, ND. The MLRA lies in USDA Plant Hardiness Zones 3b and 4a.

At Bismarck, the average morning relative humidity in June is about 84 percent and average afternoon humidity is 55 percent. It is cloudy an average of 165 days a year.

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)	100	134
Last Killing Freeze in Spring (28 deg): (1 year in 10 later than)	Jun 06	May 16
Last Frost in Spring (32 deg): (1 year in 10 later than)	Jun 18	May 26

	From	To
First Frost in Fall (32 deg): (1 year in 10 earlier than)	Aug 23	Sep 12
First Killing Freeze in Fall (28 deg): (1 year in 10 earlier than)	Sep 02	Sep 19
Length of Growing Season (32 deg) (days): (9 years in 10 at least)	78	116
Growing Degree Days (40 deg):	3317	4367
Growing Degree Days (50 deg):	1793	2441
Annual Minimum Temperature:	-35	-25
Mean annual precipitation (inches):	15	19

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	0.17	0.14	0.26	0.37	0.95	1.79	0.86	0.65	0.65	0.22	0.13	0.23
Precip. More Than	0.63	0.80	1.96	3.53	3.81	4.82	3.82	2.89	2.63	1.66	1.07	0.70
Monthly Average:	0.42	0.42	0.82	1.80	2.30	3.21	2.49	1.96	1.69	0.98	0.46	0.43
Temp. Min.	-1.5	4.9	18.8	31.6	43.3	53.4	58.8	55.4	44.1	32.5	18.7	4.1
Temp. Max.	30.6	36.4	47.0	62.4	73.4	83.0	90.4	88.6	78.2	65.5	46.7	33.4
Temp. Avg.	8.0	14.3	26.6	42.2	54.8	64.3	70.2	68.2	56.8	45.2	27.8	13.1

<u>Climate Station</u>	<u>Location</u>	<u>From</u>	<u>To</u>
ND0961	Bowbells, ND	1961	1990
ND7281	Powers Lake, ND	1961	1990
ND1225	Butte, ND	1961	1990
ND3376	Garrison, ND	1961	1990
ND5638	Max, ND	1961	1990
ND8804	Turtle Lake, ND	1961	1990
ND8872	Underwood, ND	1961	1990
ND0382	Ashley, ND	1961	1990
ND9515	Wishek, ND	1961	1990
ND5210	Linton, ND	1961	1990
SD2797	Eureka, SD	1961	1990
SD4891	Leola, SD	1961	1990
SD4206	Ipswich, SD	1961	1990

Soil Interpretations

This group consists of somewhat poorly and moderately well drained, medium to moderately coarse textured soils formed from glacial till and glacial outwash sediments. They have claypan subsoils with slow permeability. The underlying material and lower part of the subsoil typically have high amounts of soluble salts and are alkaline.

Drainage Class:	Somewhat poorly drained	To	Moderately well drained
Permeability Class: (0 - 40 inches)	Slow	To	Slow
Frost Action Class:	Low	To	High

	<u>Minimum</u>	<u>Maximum</u>
Depth:	72	
Surface Fragments >3" (% Cover):	0	3
Organic Matter (percent): (surface layer)	1.0	4.0
Electrical Conductivity (mmhos/cm): (0 - 24 inches)	8	16
Sodium Absorption Ratio: (0 - 12 inches)	5	20
Soil Reaction (1:1) Water (pH): (0 - 12 inches)	6.1	7.8
Available Water Capacity (inches): (0 - 60 inches)	2	10
Calcium Carbonate Equivalent (percent): (0 - 12 inches)	0	8

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/>.

<u>Cool Season Grasses</u>	<u>Symbol</u>	<u>Adapted</u>	<u>Warm Season Grasses</u>	<u>Symbol</u>	<u>Adapted</u>
Beardless wildrye	LETR5	F	Blue grama	BOGR2	F
Crested wheatgrass	AGCR	F	<u>Legumes</u>		
Dahurian wildrye	ELDA3	F	Alfalfa	MESA	F
Green needlegrass	NAVI4	F	Hairy vetch	VIVI	F
Newhy hybrid wheatgrass		F	Sweetclover	MELIL	F
Russian wildrye	PSJU3	F			
Slender wheatgrass	ELTR7	G			
Tall wheatgrass	THPO7	F			
Western wheatgrass	PASM	G			

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 predicted harvest efficiency. Seventy 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	
	High (lbs/ac)	Low (lbs/ac)
Alfalfa	4600	2300
Alfalfa/Crested wheatgrass	3500	1800
Alfalfa/Intermediate wheatgrass	3700	1900
Crested wheatgrass	3400	1600
Intermediate wheatgrass	3600	1600
Tall wheatgrass	3600	1600
Western wheatgrass	2400	1100

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.

<u>Growth Curve Number:</u>	ND0003											
<u>Growth Curve Name:</u>	Warm season grass											
<u>Growth Curve Description:</u>	Warm season grass											
<u>Percent Production by Month</u>												
<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	

<u>Growth Curve Number:</u>	ND0001											
<u>Growth Curve Name:</u>	Alfalfa											
<u>Growth Curve Description:</u>	Alfalfa											
<u>Percent Production by Month</u>												
<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	25	30	20	15	5	0	0	0	

<u>Growth Curve Number:</u>	ND0002											
<u>Growth Curve Name:</u>	Cool season grass											
<u>Growth Curve Description:</u>	Cool season grass											
<u>Percent Production by Month</u>												
<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	40	35	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.

Pasture and hayland can include considerations for wildlife. Delaying grazing on portions of the pasture or rotating pastures will allow nest initiation of grassland nesting birds or species of concern. Nest initiation of most grassland nesting birds occurs from April 15 to June 1. Delaying haying until after July 15 allows for most species to fledge their young. Consider planting species with later maturity to allow for harvesting after nests have fledged. Avoid mowing around the field. Mow back and forth or from the inside to the outside of the field. Consider using flushing bars on swathers and mowers.

FSG Documentation

Similar FSG's:

FSG ID

G053BY210ND

FSG Narrative

Clayey subsoils 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 for soil surveys in North Dakota and South Dakota counties in MLRA 53B

NRCS North Dakota 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: North and South Dakota

Forage Suitability Group Approval:

Original Author: Tim Nordquist

Original Date: 1/10/05

Approval by: Dave Schmidt

Approval Date: 1/10/05