

## FORAGE SUITABILITY GROUP SUBIRRIGATED

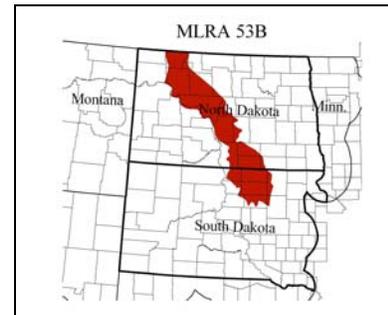
**FSG No.:** G053BY700ND

**Major Land Resource Area:** 53B - Central Dark Brown Glaciated Plains

### Physiographic Features

The soils in this group are found on level and nearly level flood plains, terraces, and outwash plains, and on plains and in swales, drainage ways, and depressions of upland areas.

	<u>Minimum</u>	<u>Maximum</u>
<b>Elevation (feet):</b>	1640	1970
<b>Slope (percent):</b>	0	6
<b>Flooding:</b>		
<b>Frequency:</b>	None	Frequent
<b>Duration:</b>	None	Brief
<b>Ponding:</b>		
<b>Depth (inches):</b>		
<b>Frequency:</b>	None	None
<b>Duration:</b>	None	None
<b>Runoff Class:</b>	Negligible	Medium



### 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 time frame. 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 21 inches at Turtle Lake, ND to 38 inches at Eureka, SD. Snow cover at depths greater than 1 inch, range from 22 days at Garrison, ND to 100 days at Max, ND.

Average July temperatures are about 70 degrees F., and average January temperatures are about 8 degrees F. Recorded temperature extremes in the MLRA during the years 1961 to 1990 are a low of -48 degrees F. at Powers Lake, ND, and a high of 111 degrees F. 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>.

	<u>From</u>	<u>To</u>
<b>Freeze-free period (28 deg)(days):</b> (9 years in 10 at least)	100	134
<b>Last Killing Freeze in Spring (28 deg):</b> (1 year in 10 later than)	Jun 06	May 16
<b>Last Frost in Spring (32 deg):</b> (1 year in 10 later than)	Jun 18	May 26
<b>First Frost in Fall (32 deg):</b> (1 year in 10 earlier than)	Aug 23	Sep 12
<b>First Killing Freeze in Fall (28 deg):</b> (1 year in 10 earlier than)	Sep 02	Sep 19
<b>Length of Growing Season (32 deg)(days):</b> (9 years in 10 at least)	78	116
<b>Growing Degree Days (40 deg):</b>	3317	4367
<b>Growing Degree Days (50 deg):</b>	1793	2441
<b>Annual Minimum Temperature:</b>	-35	-25
<b>Mean annual precipitation (inches):</b>	15	19

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

<b>2 years in 10:</b>	<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>
<b>Precip. Less Than</b>	0.17	0.14	0.26	0.37	0.95	1.79	0.86	0.65	0.65	0.22	0.13	0.23
<b>Precip. More Than</b>	0.63	0.80	1.96	3.53	3.81	4.82	3.82	2.89	2.63	1.66	1.07	0.70
<b>Monthly Average:</b>	0.42	0.42	0.82	1.80	2.30	3.21	2.49	1.96	1.69	0.98	0.46	0.43
<b>Temp. Min.</b>	-1.5	4.9	18.8	31.6	43.3	53.4	58.8	55.4	44.1	32.5	18.7	4.1
<b>Temp. Max.</b>	30.6	36.4	47.0	62.4	73.4	83.0	90.4	88.6	78.2	65.5	46.7	33.4
<b>Temp. Avg.</b>	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**

The soils in this group are fine to coarse textured and somewhat poorly to moderately well drained. They have a seasonal water table within 12 to 48 inches of the surface during part of the growing season.

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

	<u>Minimum</u>	<u>Maximum</u>
<b>Depth:</b>	20	
<b>Surface Fragments &gt;3" (% Cover):</b>	0	3
<b>Organic Matter (percent):</b> (surface layer)	0.5	6.0
<b>Electrical Conductivity (mmhos/cm):</b> (0 - 24 inches)	0	8
<b>Sodium Absorption Ratio:</b> (0 - 12 inches)	0	6
<b>Soil Reaction (1:1) Water (pH):</b> (0 - 12 inches)	5.6	8.4
<b>Available Water Capacity (inches):</b> (0 - 60 inches)	5	12
<b>Calcium Carbonate Equivalent (percent):</b> (0 - 12 inches)	0	55

### 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>
Altai wildrye	LEAN3	F	Big bluestem	ANGE	G
Bluebunch/Quackgrass Hybrid		G	Indiangrass	SONU2	F
Canada wildrye	ELCA4	F	Little bluestem	SCSC	G
Creeping foxtail	ALAR	F	Switchgrass	PAVIV	G
Crested wheatgrass	AGCR	G			
Dahurian wildrye	ELDA3	F	<u>Legumes</u>		
Green needlegrass	NAVI4	F	Alfalfa	MESA	G
Intermediate wheatgrass	THIN6	F	Alsike clover	TRHY	F
Meadow bromegrass	BRBI2	G	American vetch	VIAM	F
Pubescent wheatgrass	THIN6	F	Canada milkvetch	ASCAC6	G
Reed canarygrass	PHAR3	F	Cicer milkvetch	ASCI4	F
Slender wheatgrass	ELTR7	G	Hairy vetch	VIVI	F
Smooth bromegrass	BRINI2	G	Sweetclover	MELIL	G
Tall wheatgrass	THPO7	G	White clover	TRRE3	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. On site 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	8900	4300
Alfalfa/Intermediate wheatgrass	8300	3600
Alfalfa/Smooth brome	8300	3600
Big bluestem	7100	3700
Creeping foxtail	7000	4000
Indiangrass	5400	2800
Intermediate wheatgrass	6900	3000
Reed canarygrass	9000	4500
Smooth brome	6900	3000
Switchgrass	8300	3900

**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:** ND0001  
**Growth Curve Name:** Alfalfa  
**Growth Curve Description:** Alfalfa

**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	25	30	20	15	5	0	0	0

**Growth Curve Number:** ND0002  
**Growth Curve Name:** Cool season grass  
**Growth Curve Description:** Cool season grass

**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	40	35	10	5	5	0	0	0

**Growth Curve Number:** ND0003  
**Growth Curve Name:** Warm season grass  
**Growth Curve Description:** Warm season grass

**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**

These soils have few limitations to the production of climatically adapted forage crops, and production potential is high. Forage species like alfalfa that are less tolerant of saturated soils for extended periods of time may suffer stand loss during wet years when watertables stay abnormally high. Due to the dominant upward movement of water these soils may become saline. A number of them have high lime content near the surface, which reduces the availability of some plant nutrients. These soils are also subject to compaction if grazed or machinery is operated on them when wet. Coarser textured soils in this group may be subject to soil blowing when establishing new stands.

**Management Interpretations**

When establishing new stands select species that are tolerant of somewhat poorly drained, occasionally saturated soils, and that are also capable of utilizing the additional moisture inherent to these soils. Excluding livestock and machinery during extended periods of soil wetness will help reduce soil compaction. On coarser textured soils, incorporate wind erosion control practices during stand establishment.

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 FSGs:**

##### **FSG ID**

G053BY500ND

##### **FSG Narrative**

Overflow soils do not have watertables that come as near to the surface during part of the growing season.

### **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 North Dakota and South Dakota counties in MLRA 53B
- North Dakota and South Dakota NRCS Field Office Technical Guides
- 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 Dakota and South Dakota

### **Forage Suitability Group Approval**

**Original Author:** Tim Nordquist

**Original Date:** April 5, 2004

**Approval By:** Jeff Printz

**Approval Date:** March 2005