

## FORAGE SUITABILITY GROUP CLAYPAN

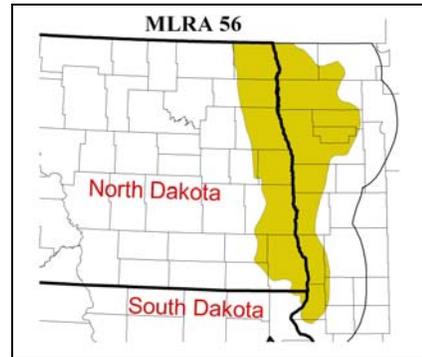
**FSG No.:** G056XY800ND

**Major Land Resource Area:** 056X - Red River Valley of the North

### Physiographic Features

The soils in this group are found on lake plains.

	<u>Minimum</u>	<u>Maximum</u>
<b>Elevation (feet):</b>	660	1000
<b>Slope (percent):</b>	0	1
<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	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 56. Average annual precipitation for all climate stations listed below is about 20 inches. About 70 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 period.

Average annual snowfall ranges from 21 inches at Grafton, ND to 47 inches at Fargo, ND. Snow cover at depths greater than 1 inch range from 33 days at Grafton, ND to 124 days at Cavalier, ND.

Average July temperatures are about 70 degrees F., and average January temperatures are about 6 degrees F. Recorded temperature extremes in the MLRA during the years 1971 to 2000 are a low of -41 at McLeod, and a high of 107 recorded at both Colgate and Wapheton. The MLRA lies in USDA Plant Hardiness Zones 3b and 4a.

At Fargo, ND the average annual wind speed is about 12 MPH. The highest wind speeds occur during early spring and the lowest occur during the summer. It is cloudy about 165 days a year. Average morning relative humidity in June is about 82 percent and average afternoon humidity is about 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>.

	<b>From</b>	<b>To</b>
<b>Freeze-free period (28 deg)(days):</b> (9 years in 10 at least)	126	141
<b>Last Killing Freeze in Spring (28 deg):</b> (1 year in 10 later than)	May 24	May 14
<b>Last Frost in Spring (32 deg):</b> (1 year in 10 later than)	Jun 05	May 21

	<b>From</b>	<b>To</b>
<b>First Frost in Fall (32 deg):</b> (1 year in 10 earlier than)	Aug 27	Sep 18
<b>First Killing Freeze in Fall (28 deg):</b> (1 year in 10 earlier than)	Sep 11	Sep 25
<b>Length of Growing Season (32 deg)(days):</b> (9 years in 10 at least)	104	129
<b>Growing Degree Days (40 deg):</b>	3550	4444
<b>Growing Degree Days (50 deg):</b>	1968	2524
<b>Annual Minimum Temperature:</b>	-35	-25
<b>Mean annual precipitation (inches):</b>	18	22

**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>	0.20	0.20	0.40	0.40	1.20	1.60	1.50	1.40	0.80	0.30	0.20	0.10
<b>Precip. More Than</b>	0.90	0.80	1.40	2.20	3.60	4.80	4.70	3.70	3.20	2.90	1.50	0.70
<b>Monthly Average:</b>	0.60	0.50	0.90	1.30	2.40	3.30	3.20	2.60	2.00	1.70	0.90	0.40
<b>Temp. Min.</b>	-3.5	3.9	17.3	31.0	44.1	53.4	57.6	55.4	45.2	33.7	18.0	3.4
<b>Temp. Max.</b>	15.4	22.8	34.9	54.2	70.1	77.8	82.0	81.1	70.3	56.1	34.8	20.7
<b>Temp. Avg.</b>	6.0	13.3	26.1	42.6	57.1	65.6	69.8	68.3	57.8	44.9	26.4	12.0

<b><u>Climate Station</u></b>	<b><u>Location</u></b>	<b><u>From</u></b>	<b><u>To</u></b>
ND5754	MC LEOD, ND	1971	2000
ND9100	WAHPETON, ND	1971	1999
ND1686	COLGATE, ND	1971	2000
ND2859	FARGO, ND	1971	2000
ND4203	HILLSBORO, ND	1971	2000
ND3616	GRAND FORKS, ND	1971	2000
ND5013	LARIMORE, ND	1971	2000
ND3594	GRAFTON, ND	1971	2000
ND1435	CAVALIER, ND	1971	2000

**Soil Interpretations**

This group consists mostly of moderately well drained, medium textured soils formed from clayey sediments. They have claypan subsoils with very slow permeability. The underlying material and lower part of the subsoil typically have high amounts of soluble salts and are alkaline.

<b>Drainage Class:</b>	Moderately well drained	To	Moderately well drained
<b>Permeability Class:</b> (0 - 40 inches)	Very slow	To	Very slow
<b>Frost Action Class:</b>	Moderate	To	Moderate

	<b><u>Minimum</u></b>	<b><u>Maximum</u></b>
<b>Depth:</b>	72	
<b>Surface Fragments &gt;3" (% Cover):</b>	0	0
<b>Organic Matter (percent):</b> (surface layer)	2.0	6.0
<b>Electrical Conductivity (mmhos/cm):</b> (0 - 24 inches)	2	16
<b>Sodium Absorption Ratio:</b> (0 - 12 inches)	3	10
<b>Soil Reaction (1:1) Water (pH):</b> (0 - 12 inches)	5.6	7.3

	<u>Minimum</u>	<u>Maximum</u>
<b>Available Water Capacity (inches):</b> (0 - 60 inches)	10	10
<b>Calcium Carbonate Equivalent (percent):</b> (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 on the web at <http://plants.usda.gov>.

<b>Cool Season Grasses</b>	<u>Symbol</u>		<b>Warm Season Grasses</b>	<u>Symbol</u>	
Beardless wildrye	LETR5	F	Blue grama	BOGR2	F
Bluebunch/Quackgrass Hybrid		F			
Crested wheatgrass	AGCR	F	<b>Legumes</b>	<u>Symbol</u>	
Dahurian wildrye	ELDA3	F	Alfalfa	MESA	F
Green needlegrass	NAVI4	F	Hairy vetch	VIVI	F
Intermediate wheatgrass	THIN6	F	Sweet clover	MELIL	F
Pubescent wheatgrass	THIN6	F			
Russian wildrye	PSJU3	F			
Slender wheatgrass	ELTR7	F			
Smooth brome grass	BRINI2	F			
Tall wheatgrass	THPO7	G			
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	<u>Dryland</u>	
	Management Intensity	
	<u>Low</u> (lbs/ac)	<u>High</u> (lbs/ac)
Alfalfa	3000	5800
Alfalfa/Crested wheatgrass	2400	4500
Alfalfa/Intermediate wheatgrass	2600	4800
Crested wheatgrass	2000	4200
Intermediate wheatgrass	2000	4400
Tall wheatgrass	2000	4400
Western wheatgrass	1500	3000

**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

<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

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

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

**Soil Limitations**

These soils have moderate to severe limitations to the production of climatically adapted forage species. The claypan and soluble salts 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 FSGs:**

#### **FSG ID**

G056XY210ND

#### **FSG Narrative**

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 North Dakota, South Dakota and Minnesota counties in MLRA 56
- North Dakota NRCS Field Office Technical Guide, South Dakota NRCS Field Office Technical Guide and Minnesota NRCS Field Office 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: ND, SD, MN

### **Forage Suitability Group Approval:**

Original Author: Tim Nordquist

Original Date: 3/19/2000

Approval by: Jeff Printz

Approval Date: March 2005