

## FORAGE SUITABILITY GROUP

### Droughty Loam

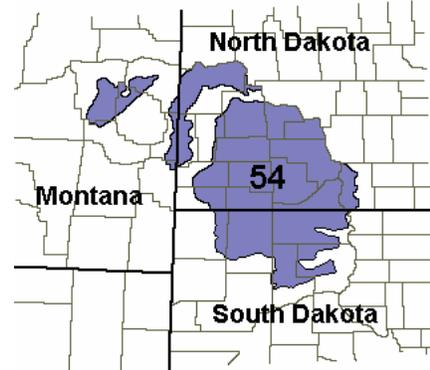
**FSG No.:** G054XY120ND

**Major Land Resource Area:** 54 - Rolling Soft Shale Plain

#### Physiographic Features

The soils in this group are mostly located on glacial outwash plains, alluvial fan remnants, terraces, and on flood plains.

	<u>Minimum</u>	<u>Maximum</u>
<b>Elevation (feet):</b>	1600	3600
<b>Slope (percent):</b>	0	15
<b>Flooding:</b>		
<b>Frequency:</b>	None	Occasional
<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>	Very 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 54. Average annual precipitation for all climate stations listed below is about 17 inches. About 78 percent of that occurs during the months of April through September. On average there are about 25 days with greater than .1 inches of precipitation during the same time period. 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 23 inches at McLaughlin, SD to 48 inches at Glad Valley, SD. Snow cover at depths greater than 1 inch range from 20 days at Bison, SD to 92 days at Hebron, ND.

Average July temperatures are about 71 degrees F., and average January temperatures are about 13 degrees F. Recorded temperature extremes in the MLRA during the years 1961 to 1990 are a low of -49 degrees at Breien, ND, and a high of 111 recorded at Hettinger, ND. The MLRA lies in USDA Plant Hardiness Zones 3b, 4a, and 4B.

At Bismarck, the closest station with such records, 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>.

<b>Freeze-free period (28 deg)(days):</b> (9 years in 10 at least)	<b>From</b> 108	<b>To</b> 140
<b>Last Killing Freeze in Spring (28 deg):</b> (1 year in 10 later than)	May 31	May 12
<b>Last Frost in Spring (32 deg):</b> (1 year in 10 later than)	Jun 07	May 23
<b>First Frost in Fall (32 deg):</b> (1 year in 10 earlier than)	Aug 29	Sep 11
<b>First Killing Freeze in Fall (28 deg):</b> (1 year in 10 earlier than)	Sep 07	Sep 23
<b>Length of Growing Season (32 deg)(days):</b> (9 years in 10 at least)	93	122
<b>Growing Degree Days (40 deg):</b>	3774	4647
<b>Growing Degree Days (50 deg):</b>	2033	2700
<b>Annual Minimum Temperature:</b>	-35	-20
<b>Mean annual precipitation (inches):</b>	16	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>	0.12	0.10	0.32	0.56	1.08	1.75	0.92	0.76	0.37	0.22	0.13	0.16
<b>Precip. More Than</b>	0.80	0.80	1.61	3.17	4.32	4.95	3.48	2.76	2.29	1.72	0.91	0.96
<b>Monthly Average:</b>	0.33	0.36	0.81	1.90	2.66	3.22	2.19	1.68	1.45	1.00	0.74	0.41
<b>Temp. Min.</b>	-2.0	4.4	16.0	28.7	40.2	50.1	54.6	52.2	41.4	31.0	16.8	3.0
<b>Temp. Max.</b>	27.2	32.9	43.3	58.9	70.8	80.7	89.2	88.1	76.2	63.4	44.0	29.9
<b>Temp. Avg.</b>	12.7	18.5	29.2	43.4	55.1	64.9	71.3	69.5	57.9	46.4	30.1	16.5

<b><u>Climate Station</u></b>	<b><u>Location</u></b>	<b><u>From</u></b>	<b><u>To</u></b>
ND0766	Beulah, ND	1961	1990
ND1052	Breien, ND	1961	1990
ND1370	Carson, ND	1961	1990
ND2183	Dickinson, ND	1961	1990
ND2365	Dunn Center, ND	1961	1990
ND4102	Hebron, ND	1964	1990
ND4178	Hettinger, ND	1961	1990
ND5479	Mandan Exp Station, ND	1961	1990
SD0701	Bison, SD	1961	1990
SD2429	Dupree, SD	1961	1990
SD2852	Faith, SD	1961	1990
SD3316	Glad Valley, SD	1961	1990
SD4864	Lemmon, SD	1961	1990
SD5046	McLaughlin, SD	1961	1990
SD5381	McIntosh, SD	1961	1990
SD8528	Usta, SD	1961	1990

**Soil Interpretations**

This group consists of very deep, mostly well drained, moderately coarse to medium textured soils formed in loamy and sandy materials deposited by glacial meltwaters. Available water capacity is in the moderate range due to moderately coarse soil textures or moderate depth to sand and gravel.

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

	<u>Minimum</u>	<u>Maximum</u>
<b>Depth:</b>	72	
<b>Surface Fragments &gt;3" (% Cover):</b>	0	3
<b>Organic Matter (percent):</b> (surface layer)	0.5	8.0
<b>Electrical Conductivity (mmhos/cm):</b> (0 - 24 inches)	0	4
<b>Sodium Absorption Ratio:</b> (0 - 12 inches)	0	5
<b>Soil Reaction (1:1) Water (pH):</b> (0 - 12 inches)	5.1	8.4
<b>Available Water Capacity (inches):</b> (0 - 60 inches)	6	9
<b>Calcium Carbonate Equivalent (percent):</b> (0 - 12 inches)	0	15

### 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	F
Basin wildrye	LECI4	F	Blue grama	BOGR2	G
Canada wildrye	ELCA4	G	Little bluestem	SCSC	G
Crested wheatgrass	AGCR	G	Prairie sandreed	CALO	G
Dahurian wildrye	ELDA3	G	Sand bluestem	ANHA	G
Green needlegrass	NAVI4	G	Sideoats grama	BOCU	G
Intermediate wheatgrass	THIN6	F	Switchgrass	PAVIV	F
Meadow brome	BRBI2	F			
Newhy hybrid wheatgrass		G	<u>Legumes</u>		
Pubescent wheatgrass	THIN6	F	Alfalfa	MESA	G
Russian wildrye	PSJU3	G	American vetch	VIAM	G
Siberian wheatgrass	AGFR	G	Canada milkvetch	ASCAC6	F
Slender wheatgrass	ELTR7	G	Cicer milkvetch	ASCI4	G
Smooth brome	BRINI2	F	Hairy vetch	VIVI	F
Tall wheatgrass	THPO7	F	Purple prairieclover	DAPUP	G
Western wheatgrass	PASM	G	Sainfoin	ONVI	G
			Sweetclover	MELIL	G
			White prairieclover	DACAC	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	
	High (lbs/ac)	Low (lbs/ac)
Alfalfa	5400	2300
Alfalfa/Crested wheatgrass	4600	2000
Alfalfa/Intermediate wheatgrass	4600	2300
Alfalfa/Pubescent wheatgrass	4600	2300
Alfalfa/Smooth brome grass	4600	1900
Crested wheatgrass	4000	1700
Green needlegrass	2900	1400
Intermediate wheatgrass	4000	2100
Sideoats grama	2800	1200
Smooth brome grass	4000	1600
Western wheatgrass	2900	1200

### 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

The primary limitation for these soils is their moderate available water capacity which limits plant growth during periods of moisture deficit. On steeper slopes water erosion is a potential problem during stand establishment, and livestock trail erosion is a potential problem on established stands. Also, wind erosion is a potential problem during stand establishment on moderately coarse textured soils.

### **Management Interpretations**

The impact on yields of the moderate available water capacity of these soils can be reduced by selecting forage species that are tolerant to periods of drought and inadequate soil moisture. 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.

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**

G054XY100SD

##### **FSG Narrative**

Loamy soils have greater available water capacity and greater production potential.

G054XY130SD

Very Droughty Loams have lower available water capacity and lower production potential.

#### **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 Montana counties in MLRA 54
- North Dakota, South Dakota, and Montana 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:

MT

ND

SD

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

**Original Author:** Tim Nordquist

**Original Date:** 2/25/03

**Approval by:** Jeff Prinz

**Approval Date:**