

FORAGE SUITABILITY GROUP (FSG)

Overflow

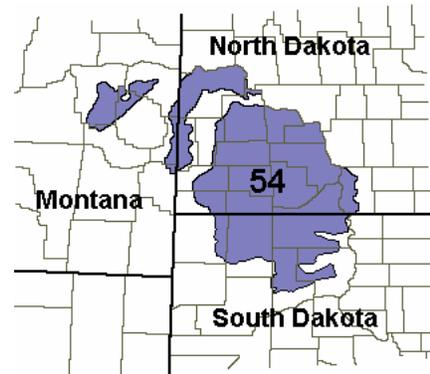
FSG No.: G054XY500ND

Major Land Resource Area (MLRA): 54 - Rolling Soft Shale Plain

Physiographic Features

The soils in this group are generally found in nearly level to gently sloping positions on stream terraces, fan remnants, and flood plains, and in swales and drainage ways on uplands. They receive beneficial additional moisture as run-on from up slope or from flooding.

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	1600	3600
Slope (percent):	0	6
Flooding:		
Frequency:	None	Frequent
Duration:	None	Brief
Ponding:		
Depth (inches):		
Frequency:	None	None
Duration:	None	None
Runoff Class:	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 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, South Dakota (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, North Dakota (ND).

Average July temperatures are about 71°F and average January temperatures are about 13°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>.

	From	To
Freeze-free period (28 deg)(days): (9 years in 10 at least)	108	140
Last Killing Freeze in Spring (28 deg): (1 year in 10 later than)	May 31	May 12
Last Frost in Spring (32 deg): (1 year in 10 later than)	Jun 07	May 23
First Frost in Fall (32 deg): (1 year in 10 earlier than)	Aug 29	Sep 11
First Killing Freeze in Fall (28 deg): (1 year in 10 earlier than)	Sep 07	Sep 23
Length of Growing Season (32 deg)(days): (9 years in 10 at least)	93	122
Growing Degree Days (40 deg):	3774	4647
Growing Degree Days (50 deg):	2033	2700
Annual Minimum Temperature:	-35	-20
Mean annual precipitation (inches):	16	18

Monthly precipitation (inches) and temperature (F):

2 years in 10:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Precip. Less Than	0.12	0.10	0.32	0.56	1.08	1.75	0.92	0.76	0.37	0.22	0.13	0.16
Precip. More Than	0.80	0.80	1.61	3.17	4.32	4.95	3.48	2.76	2.29	1.72	0.91	0.96
Monthly Average:	0.33	0.36	0.81	1.90	2.66	3.22	2.19	1.68	1.45	1.00	0.74	0.41
Temp. Min.	-2.0	4.4	16.0	28.7	40.2	50.1	54.6	52.2	41.4	31.0	16.8	3.0
Temp. Max.	27.2	32.9	43.3	58.9	70.8	80.7	89.2	88.1	76.2	63.4	44.0	29.9
Temp. Avg.	12.7	18.5	29.2	43.4	55.1	64.9	71.3	69.5	57.9	46.4	30.1	16.5

<u>Climate Station</u>	<u>Location</u>	<u>From</u>	<u>To</u>
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 moderately well drained, moderately coarse to moderately fine textured soils formed from alluvium. Permeability is slow to moderately rapid. Many of these soils have a seasonal watertable within three feet of the surface which benefits deep rooted plants.

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

	<u>Minimum</u>	<u>Maximum</u>
Depth:	72	
Surface Fragments >3" (% Cover):	0	0
Organic Matter (percent): (surface layer)	0.5	6.0
Electrical Conductivity (mmhos/cm):	0	8
Sodium Absorption Ratio: (0 - 12 inches)	0	2
Soil Reaction (1:1) Water (pH): (0 - 12 inches)	6.1	8.4
Available Water Capacity (inches): (0 - 60 inches)	5	12
Calcium Carbonate Equivalent (percent): (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	G	Big bluestem	ANGE	G
Basin wildrye	LECI4	F	Blue grama	BOGR2	F
Canada wildrye	ELCA4	G	Little bluestem	SCSC	F
Crested wheatgrass	AGCR	G	Sideoats grama	BOCU	G
Dahurian wildrye	ELDA3	G	Switchgrass	PAVIV	G
Green needlegrass	NAVI4	G	<u>Legumes</u>		
Intermediate wheatgrass	THIN6	G	Alfalfa	MESA	G
Meadow brome	BRBI2	G	American vetch	VIAM	G
Newhy hybrid wheatgrass		G	Canada milkvetch	ASCAC6	G
Pubescent wheatgrass	THIN6	G	Cicer milkvetch	ASCI4	G
Reed canarygrass	PHAR3	F	Hairy vetch	VIVI	F
Russian wildrye	PSJU3	G	Purple prairie clover	DAPUP	F
Slender wheatgrass	ELTR7	G	Sainfoin	ONVI	F
Smooth brome	BRINI2	G	Sweetclover	MELIL	G
Tall wheatgrass	THPO7	G	White clover	TRRE3	G
Western wheatgrass	PASM	G	White prairieclover	DACAC	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

	High (lbs/ac)	Low (lbs/ac)
Alfalfa	9100	3700
Alfalfa/Intermediate wheatgrass	7200	2900
Alfalfa/Smooth brome grass	7200	2900
Big bluestem	6500	2800
Indiangrass	4600	2500
Intermediate wheatgrass	5600	2600
Smooth brome grass	5600	2600
Switchgrass	7200	3200

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. Production potential is high. Flooding is a potential hazard to some of these soils. Also, all of these soils receive additional moisture, so the potential exists for soil compaction from grazing or operating machinery on them when wet.

Management Interpretations

Soils in this group that are subject to flooding can have forage production adversely impacted if it occurs during the spring or growing season. Flooding duration, or the time period plants are under water is more important than flooding frequency for the survival of forage crops. If these soils flood it is generally for only a brief time. Exclude livestock and machinery during extended periods of soil wetness to reduce soil compaction. When establishing new stands or renovating stands select species and varieties that can make best use of the additional soil moisture this group receives.

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

G054XY100SD

FSG Narrative

Loamy soils do not receive the additional water and are less productive.

G054XY700SD

Subirrigated soils have elevated watertables between 18-48 of 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 for soil surveys in North Dakota, South Dakota, and Montana counties in MLRA 54

NRCS North Dakota and Montana 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: Montana, North Dakota, and South Dakota

Forage Suitability Group Approval:

Original Author: Tim Nordquist

Original Date: 2/25/03

Approval by: Dave Schmidt

Approval Date: 9/15/04