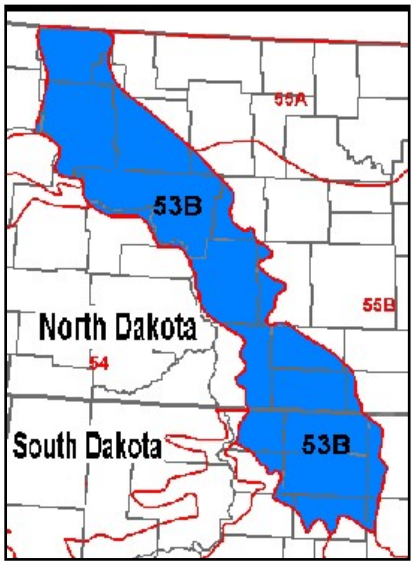
FORAGE SUITABILITY GROUP (FSG)
Steep Loam

FSG No.: G053BY109ND

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



Physiographic Features

The soils in this group are located on strongly sloping upland positions of till plains and moraines.

	Minimum	Maximum
Elevation (feet):	1640	1970
Slope (percent):	15	25
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		
Depth (inches):		
Frequency:	None	None
Duration:	None	None
Runoff Class:	Medium	Very 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. 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, 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:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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

Climate Station	Location	From	To
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
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

Soil Interpretations

This group consists of well drained, moderate textured soils formed mostly in glacial till or alluvium. Available water capacity is high and permeability is moderately slow to moderate.

Drainage Class:	Well drained	To	Well drained
Permeability Class: (0 - 40 inches)	Moderately slow	To	Moderate
Frost Action Class:	Moderate	To	Moderate

	Minimum	Maximum
Depth:	72	
Surface Fragments >3" (% Cover):	0	3
Organic Matter (percent): (surface layer)	1.0	7.0
Electrical Conductivity (mmhos/cm): (0 - 24 inches)	0	2
Sodium Absorption Ratio: (0 - 12 inches)	0	0

	Minimum	Maximum
Soil Reaction (1:1) Water (pH): (0 - 12 inches)	6.1	8.4
Available Water Capacity (inches): (0 - 60 inches)	9	13
Calcium Carbonate Equivalent (percent): (0 - 12 inches)	0	10

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/.

Cool Season Grasses	Symbol	Adapted	Warm Season Grasses	Symbol	Adapted
Altai wildrye	LEAN3	G	Big bluestem	ANGE	F
Basin wildrye	LECI4	F	Blue grama	BOGR2	G
Canada wildrye	ELCA4	F	Little bluestem	SCSC	G
Crested wheatgrass	AGCR	G	Prairie sandreed	CALO	G
Dahurian wildrye	ELDA3	G	Sideoats grama	BOCU	G
Green needlegrass	NAVI4	G	Switchgrass	PAVIV	F
Intermediate wheatgrass	THIN6	G	**Legumes**		
Meadow bromegrass	BRBI2	G	Alfalfa	MESA	G
Newhy hybrid wheatgrass		G	American vetch	VIAM	G
Pubescent wheatgrass	THIN6	G	Canada milkvetch	ASCAC6	G
Russian wildrye	PSJU3	G	Cicer milkvetch	ASCI4	G
Siberian wheatgrass	AGFR	F	Hairy Vetch	VIVI	F
Slender wheatgrass	ELTR7	G	Purple prairieclover	DAPUP	G
Smooth bromegrass	BRINI2	G	Sainfoin	ONVI	F
Tall wheatgrass	THPO7	F	Sweetclover	MELIL	G
Western wheatgrass	PASM	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. 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)	Management Intensity Low (lbs/ac)
Alfalfa	6600	3000
Alfalfa/Crested wheatgrass	4800	2200
Alfalfa/Intermediate wheatgrass	5100	2500
Alfalfa/Smooth bromegrass	5100	2500
Big bluestem	5100	2000
Crested wheatgrass	4400	2100
Green needlegrass	3100	1500
Intermediate wheatgrass	4700	2300
Smooth bromegrass	4700	2300
Switchgrass	5800	2000
Western wheatgrass	3100	1400

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: ND001
Growth Curve Name: Alfalfa
Growth Curve Description: Alfalfa

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	25	30	20	15	5	0	0	0

Growth Curve Number: ND002
Growth Curve Name: Cool season grass
Growth Curve Description: Cool season grass

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	40	35	10	5	5	0	0	0

Growth Curve Number: ND003
Growth Curve Name: Warm season grass
Growth Curve Description: Warm season grass

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	10	40	35	15	0	0	0	0

Soil Limitations

The slope of these soils range from 15 to 30 percent and have high and very high runoff potential. This results in less of the water entering the soil and being available for plant growth. The potential for water erosion on these steep slopes is high when establishing new stands or renovating stands, and in thin existing stands with exposed bare ground. Livestock trail erosion can be a severe problem. Also, the steep slopes can result in uneven grazing by livestock, and makes travel with wheeled vehicles dangerous.

Management Interpretations

Including sod forming grass species in new seedings will reduce the potential for sheet and rill erosion. Incorporate erosion control practices during the establishment period. Locate facilitating practices such as fences, lanes, and water developments to control livestock movement to more evenly distribute grazing and reduce livestock trailing perpendicular to steeper slopes.

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	FSG Narrative
G053BY100ND	Loamy soils are less steeply sloping.

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