FORAGE SUITABILITY GROUP
Shallow

FSG No.: G102AY003SD

Major Land Resource Area: 102A - Rolling Till Prairie

Physiographic Features
These soils are found on glacial moraines and outwash plains.

	Minimum	Maximum
Elevation (feet):	980	1970
Slope (percent):	1	6
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		
Depth (inches):		
Frequency:	None	None
Duration:	None	None
Runoff Class:	Very low	Low

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 102A. Average annual precipitation for all climate stations listed below is about 23 inches. About 75 percent of that occurs during the months of April through September. On average, there are about 31 days with greater than .1 inches of precipitation during the same timeframe.

Average annual snowfall ranges from 36 inches at Britton to 48 inches at Tracy. Snow cover at depths greater than 1 inch range from 56 days at Milbank to 105 days at Morris.

Average July temperatures are about 72^0F and average January temperatures are about 11^0F. Recorded temperature extremes in the MLRA during the years 1961 to 1990 are a low of -40 at Brookings and a high of 108 recorded at both Britton and Milbank. The MLRA lies in USDA Plant Hardiness Zones 4a and 4b.

Average annual wind speeds range from about 8 mph in the eastern part of the MLRA to about 11 mph in the west. The highest wind speeds occur during March through May. It is cloudy about 154 days a year in the west and 166 days in the east. Average morning relative humidity in June is about 86 percent and average afternoon humidity is 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.

	From	To
Freeze-free period (28 deg)(days):	127	145
(9 years in 10 at least)		
Last Killing Freeze in Spring (28 deg):	May 22	May 11
(1 year in 10 later than)		
Last Frost in Spring (32 deg):	May 31	May 17
(1 year in 10 later than)		

	From	To
First Frost in Fall (32 deg):	Sep 08	Sep 19
(1 year in 10 earlier than)		
First Killing Freeze in Fall (28 deg):	Sep 17	Sep 26
(1 year in 10 earlier than)		
Length of Growing Season (32 deg)(days):	109	134
(9 years in 10 at least)		
Growing Degree Days (40 deg):	4066	4515
Growing Degree Days (50 deg):	2441	2698
Annual Minimum Temperature:	-30	-20
Mean annual precipitation (inches):	19	26

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	0.13	0.19	0.28	0.66	1.29	1.83	1.54	0.91	0.68	0.45	0.17	0.10
Precip. More Than	0.97	1.08	2.70	3.68	4.83	4.92	5.21	3.75	4.63	3.32	2.19	1.19
Monthly Average:	0.54	0.59	1.37	2.20	2.88	3.67	3.21	2.77	2.32	1.83	0.96	0.54
Temp. Min.	-2.8	3.1	17.6	32.8	44.6	54.6	59.3	56.2	45.7	34.2	20.5	4.6
Temp. Max.	21.4	26.5	39.3	56.5	70.4	80.5	85.5	82.9	73.2	61.0	42.0	26.6
Temp. Avg.	10.1	15.9	29.0	44.6	57.2	66.8	72.0	69.5	59.3	47.5	30.8	15.6

Climate Station	**Location**	**From**	**To**
SD1049	Britton, SD	1961	1990
SD1076	Brookings, SD	1961	1990
SD1739	Clark, SD	1961	1990
SD1777	Clear Lake, SD	1961	1990
SD5536	Milbank, SD	1961	1990
MN5400	Milan, MN	1961	1990
MN5638	Morris, MN	1961	1990
MN8323	Tracy, MN	1961	1990

Soil Interpretations

This group consists of excessively drained, medium textured soils that are shallow over sand and gravel.

Drainage Class:	Excessively drained	To	Excessively drained
Permeability Class:	Moderate	To	Moderately rapid
(0 - 40 inches)			
Frost Action Class:	Low	To	Low

	Minimum	**Maximum**
Depth:	72	
Surface Fragments >3" (% Cover):	0	3
Organic Matter (percent):	1.0	3.0
(surface layer)		
Electrical Conductivity (mmhos/cm):	0	2
(0 - 24 inches)		
Sodium Absorption Ratio:	0	0
(0 - 12 inches)		
Soil Reaction (1:1) Water (pH):	7.4	8.4
(0 - 12 inches)		
Available Water Capacity (inches):	3	4
(0 - 60 inches)		
Calcium Carbonate Equivalent (percent):	0	8
(0 - 12 inches)		

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 those species can be accessed at http://plants.usda.gov.

Cool Season Grasses	Dryland
Crested wheatgrass	F
Green needlegrass	F
Intermediate wheatgrass	F
Newhy hybrid wheatgrass	F
Pubescent wheatgrass	F
Russian wildrye	F
Slender wheatgrass	F
Smooth bromegrass	F
Western wheatgrass	F

Warm Season Grasses	Dryland
Little bluestem	F
Prairie sandreed	F
Sand bluestem	F
Sideoats grama	F

Legumes	Dryland
Purple prairieclover	G
Sweetclover	F
White prairieclover	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 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	Low
	(lbs/ac)	(lbs/ac)
Alfalfa	5100	2900
Alfalfa/Intermediate wheatgrass	4300	2600
Alfalfa/Smooth bromegrass	4300	2600
Crested wheatgrass	2900	1400
Intermediate wheatgrass	3700	2000
Pubescent wheatgrass	2900	1700
Western wheatgrass	2200	1300

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: ND0002
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: ND0003
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 primary limitation for these soils is their low available water capacity due to shallow depth to sand and gravel. This results in severely limited species selection and production potential and difficulty maintaining vigorous forage stands. Wind and water erosion are potential problems during establishment, when renovating stands, and in thin established stands. Livestock trail erosion is a potential problem on established stands.

Management Interpretations

The impact on yields of the low available water capacity of these soils can be reduced by selecting forage species that are highly 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.

Where these soils are protected by native or introduced vegetation the existing stand should be managed to maintain or increase vigor. Where these soils are cultivated, returning them to rangeland may be a better alternative than pasture or hayland.

FSG Documentation

Similar FSGs:

FSG ID	FSG Narrative
G102AY130S	Very Droughty Loam soils have higher available water capacity and greater 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 South Dakota and Minnesota counties in MLRA 102A
South Dakota NRCS SDTG and Minnesota NRCS FOTG
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: Minnesota and South Dakota

Forage Suitability Group Approval

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