

FORAGE SUITABILITY GROUP (FSG)

Limy Upland

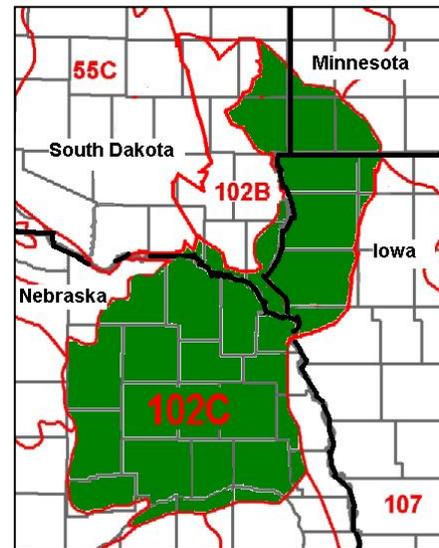
FSG No.: G102CY400NE

Major Land Resource Area (MLRA): 102C - Loess Uplands

Physiographic Features

The soils in this group are found on nearly level to moderately steep uplands.

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	980	1640
Slope (percent):	0	15
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		
Depth (inches):		
Frequency:	None	None
Duration:	None	None
Runoff Class:	Low	High



Climatic Features

Annual precipitation varies widely from year to year in MLRA 102C. Average annual precipitation for all climate stations listed below is about 27 inches. About 73 percent of the annual precipitation occurs during the months of April through September. On average, there are about 33 days with greater than .1 inches of precipitation during the same time period. Annual precipitation and temperature increase from the northwest to the southeast in the MLRA. 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 19 inches at Creighton, to 36 inches at Wakefield. Days with snow cover at depths greater than 1 inch range from 9 days at Creighton to 55 days at Wakefield.

Average July temperatures are about 76°F and average January temperatures are about 20°F. Recorded temperature extremes in the MLRA during the years 1961 to 1990 are a low of -36 at Creighton and a high of 108 recorded at both Columbus and Wakefield. The MLRA lies mostly in USDA Plant Hardiness Zone 4b with some small areas of warmer 5a.

At Norfolk, Nebraska (NE), the average annual wind speeds are about 11.2 MPH. The highest wind speeds occur during March and April. It is cloudy about 146 days a year. Average morning relative humidity in June is about 82 percent and average afternoon humidity is 55 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): (9 years in 10 at least)	138	168
Last Killing Freeze in Spring (28 deg): (1 year in 10 later than)	May 12	Apr 25
Last Frost in Spring (32 deg): (1 year in 10 later than)	May 20	May 10
First Frost in Fall (32 deg): (1 year in 10 earlier than)	Sep 12	Sep 23

	From	To
First Killing Freeze in Fall (28 deg): (1 year in 10 earlier than)	Sep 20	Oct 04
Length of Growing Season (32 deg) (days): (9 years in 10 at least)	126	146
Growing Degree Days (40 deg):	4833	5730
Growing Degree Days (50 deg):	2815	3551
Annual Minimum Temperature:	-25	-15
Mean annual precipitation (inches):	23	30

Monthly precipitation (inches) and temperature (F):

2 years in 10:	<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>
Precip. Less Than	0.15	0.17	0.51	0.83	1.92	1.98	1.71	1.35	1.07	0.44	0.15	0.30
Precip. More Than	1.13	1.20	3.39	3.93	5.93	6.63	4.33	5.39	5.53	3.85	2.16	1.47
Monthly Average:	0.55	0.76	2.04	2.53	4.03	4.20	3.09	3.03	3.00	2.02	1.18	0.86
Temp. Min.	5.3	10.6	23.0	35.4	46.5	56.8	61.9	58.7	48.4	35.6	23.8	10.7
Temp. Max.	32.4	38.2	50.2	65.2	75.6	84.8	88.7	86.1	77.7	66.5	49.7	35.3
Temp. Avg.	19.7	25.3	36.8	50.6	61.6	71.3	75.9	73.1	63.9	52.3	37.1	23.5

<u>Climate Station</u>	<u>Location</u>	<u>From</u>	<u>To</u>
NE1825	Columbus, NE	1961	1990
NE1990	Creighton, NE	1961	1990
NE3050	Fremont, NE	1961	1990
NE6018	NE Nebraska Experiment	1964	1990
NE8110	Stanton, NE	1961	1990
NE8480	Tekamah, NE	1961	1990
NE8915	Wakefield, NE	1961	1990
NE8935	Walthill, NE	1961	1990

Soil Interpretations

This group consists of well drained, medium to moderately fine textured soils formed in calcareous glacial till, or residuum weathered from soft chalky siltstone. Permeability is moderately slow.

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

	<u>Minimum</u>	<u>Maximum</u>
Depth:	20	
Surface Fragments >3" (% Cover):		
Organic Matter (percent): (surface layer)	1.0	3.0
Electrical Conductivity (mmhos/cm): (0 - 24 inches)	0	8
Sodium Absorption Ratio: (0 - 12 inches)	0	3
Soil Reaction (1:1) Water (pH): (0 - 12 inches)	6.6	8.4
Available Water Capacity (inches): (0 - 60 inches)	5	
Calcium Carbonate Equivalent (percent): (0 - 12 inches)	15	50

Soil Component List (Some phases of these soils may also occur in other FSGs)

Betts Ethan
Crofton Redstoe

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>.

Cool Season Grasses			Warm Season Grasses		
	Symbol			Symbol	
Green needlegrass	NAVI4	F	Big bluestem	ANGE	G
Intermediate wheatgrass	THIN6	F	Indiangrass	SONU2	F
Meadow brome	BRBI2	F	Little bluestem	SCSC	G
Newhy Hybrid wheatgrass		F	Prairie sandreed	CALO	F
Orchardgrass	DAGL	F	Sideoats grama	BOCU	G
Pubescent wheatgrass	THIN6	G	Switchgrass	PAVIV	F
Smooth brome	BRINI2	F	Legumes	Symbol	
Tall fescue	LOAR10	F	Alfalfa	MESA	G
Western wheatgrass	PASM	G	Birdsfoot trefoil	LOCO6	F
			Cicer milkvetch	ASCI4	G
			Purple Prairieclover	DAPUP	G
			Red clover	TRPR2	F
			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. 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	Dryland	
	Management Intensity	
	Low	High
	(lbs/ac)	(lbs/ac)
Alfalfa	4300	8600
Alfalfa/Intermediate wheatgrass	4000	7700
Alfalfa/Smooth brome	4000	7700
Big bluestem	4000	7700
Intermediate wheatgrass	3400	5700
Smooth brome	3400	5400

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: SD0001
Growth Curve Name: Alfalfa
Growth Curve Description: Alfalfa, MLRA's 102B, 102C, 63B, 66, 65

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	30	25	20	15	5	0	0	0

Growth Curve Number: SD0004
Growth Curve Name: Cool season grass
Growth Curve Description: Cool season grass, statewide

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	10	40	30	10	5	5	0	0	0

Growth Curve Number: SD0005
Growth Curve Name: Warm season grass
Growth Curve Description: Warm season grass, statewide

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

The primary limitation to the soils in this group is the high lime content close to the soil surface. The lime reduces the availability of some plant nutrients, and also acts like a salt. This reduces species choices and yield potential. Also, because most of these are sloping soils on ridges and knobs, they are subject to water and wind erosion, especially when establishing or renovating stands. Also, the Redstoe series is moderately deep over siltstone and has a reduced water capacity which will affect yields during times of moisture deficit.

Management Interpretations

The impact on yields can be reduced by selecting forage species that are tolerant of the high lime levels inherent to these soils. 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.

FSG Documentation

Similar FSG's:

FSG ID
 G102CY100NE

FSG Narrative

Loamy soils do not have as high a lime content near the surface and are more productive.

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 Nebraska and South Dakota counties in MLRA 102C
 NRCS Nebraska 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: Nebraska and South Dakota

Forage Suitability Group Approval:

Original Author: Tim Nordquist
Original Date: 6/8/2001
Approval by: Dave Schmidt
Approval Date: 1/13/05