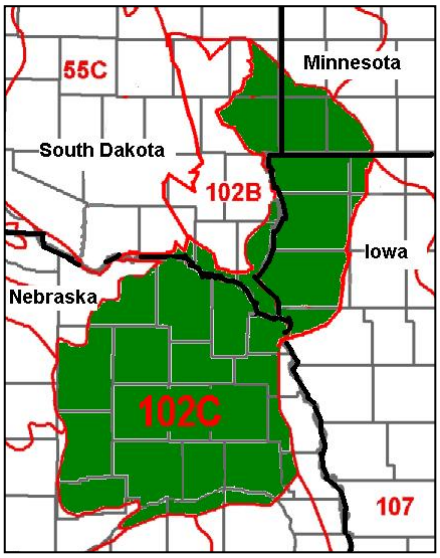
FORAGE SUITABILITY GROUP

Clayey

FSG No.: **G102CY210NE**
Major Land Resource Area: 102C - Loess Uplands



Physiographic Features

The soils in this group are mostly found on high flood plains, broad upland flats, and swales.

	Minimum	Maximum
Elevation (feet):	980	1640
Slope (percent):	0	1
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		
Depth (inches):		
Frequency:	None	None
Duration:	None	None
Runoff Class:	Low	Low

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 degrees F., and average January temperatures are about 20 degrees 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, 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

	From	To
First Frost in Fall (32 deg):	Sep 12	Sep 23
(1 year in 10 earlier than)		
First Killing Freeze in Fall (28 deg):	Sep 20	Oct 04
(1 year in 10 earlier than)		
Length of Growing Season (32 deg)(days):	126	146
(9 years in 10 at least)		
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:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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

Climate Station	Location	From	To
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 moderately well to excessively drained, medium to fine textured soils formed in alluvium and loess. Permeability is slow.

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

	Minimum	Maximum
Depth:	20	
Surface Fragments >3" (% Cover):		
Organic Matter (percent):	0.5	4.0
(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):	6.1	8.4
(0 - 12 inches)		
Available Water Capacity (inches):	3	11
(0 - 60 inches)		
Calcium Carbonate Equivalent (percent):	0	8
(0 - 12 inches)		

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

Boyd Detroit Sarpy

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	Symbol	Dry	Irrig
Canada wildrye	ELCA4	F	NS
Green needlegrass	NAVI4	G	NS
Intermediate wheatgrass	THIN6	G	G
Meadow bromegrass	BRBI2	G	G
Orchardgrass	DAGL	F	G
Pubescent wheatgrass	THIN6	G	G
Smooth bromegrass	BRINI2	G	G
Tall fescue	LOAR10	F	F
Tall wheatgrass	THPO7	F	NS
Virginia wildrye	ELVI3	F	NS
Western wheatgrass	PASM	F	NS

Warm Season Grasses	Symbol	Dry	Irrig
Big bluestem	ANGE	G	G
Indiangrass	SONU2	F	G
Little bluestem	SCSC	F	NS
Sideoats grama	BOCU	F	NS
Switchgrass	PAVIV	G	G
Legumes	**Symbol**	**Dry**	**Irrig**
Alfalfa	MESA	G	G
Birdsfoot trefoil	LOCO6	F	G
Canada milkvetch	ASCAC6	F	NS
Cicer milkvetch	ASCI4	G	F
Purple prairieclover	DAPUP	F	NS
Red clover	TRPR2	F	G
White prairieclover	DACAC	F	NS

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
NS - Species is not adapted to the site and should not be planted

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. 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	Dryland Management Intensity		Irrigated Management Intensity	
	Low	High	Low	High
Alfalfa	4000	8600		
Alfalfa/Intermediate wheatgrass	3100	7700	8600	14300
Alfalfa/Smooth bromegrass	3100	7700	8600	14300
Big bluestem	3700	8000		
Intermediate wheatgrass	2600	7100	6900	11400
Smooth bromegrass	2600	6600	6900	11400
Switchgrass	3700	8000		

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, MLRAs 102B, 102C, 63B, 66, 65

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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, state wide

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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, state wide

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

Growth Curve Number: SD0003
Growth Curve Name: Irrigated Alfalfa
Growth Curve Description: Irrigated Alfalfa, state wide

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	25	25	20	15	10	0	0	0

Soil Limitations

Low Water Holding Capacity - Water holding capacity is low on some of these soils. Forage production will be noticeably affected during dry growing seasons.

Permeability - The slow permeability results in high and very high runoff potential on sloping soils. These heavy clay soils provide a less than ideal rooting zone.

Water erosion - A potential problem during establishment, and in thin, open established stands.

Livestock trail erosion - A potential problem in established stands.

Management Interpretations

Low available water capacity - When establishing new stands select forage species that are tolerant to periods of drought and inadequate soil moisture.

Permeability - Include sod-forming species in plantings to reduce runoff. Select species adapted to heavy, clayey soils.

Water Erosion - Include sod forming grass species in new seedings on steeper slopes to reduce sheet and rill erosion. Incorporate water erosion control practices during the establishment period.

Livestock trail erosion - Locate fences, lanes, water developments, and mineral areas to reduce livestock trailing perpendicular to steeper slopes.

FSG Documentation

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 Nebraska and South Dakota counties in MLRA 102C
Nebraska and South Dakota 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:
NE
SD

Forage Suitability Group Approval:

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