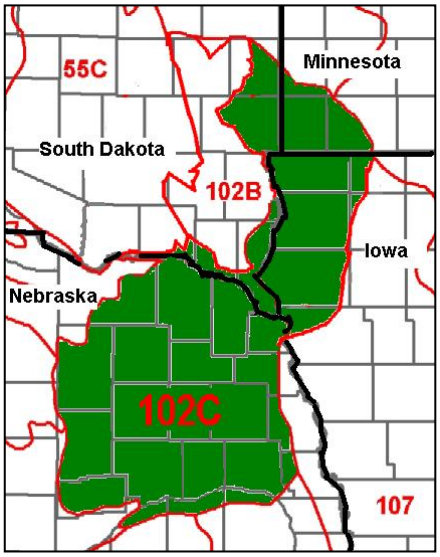
# FORAGE SUITABILITY GROUP

## Limy Upland




**FSG No.:** **G102CY400NE**
**Major Land Resource Area:** 102C - Loess Uplands

## Physiographic Features

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

| | Minimum | Maximum |
|---|---|---|
| **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 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):** | 138 | 168 |
| **(9 years in 10 at least)** | | |
| **Last Killing Freeze in Spring (28 deg):** | May 12 | Apr 25 |
| **(1 year in 10 later than)** | | |
| **Last Frost in Spring (32 deg):** | May 20 | May 10 |
| **(1 year in 10 later than)** | | |
| **First Frost in Fall (32 deg):** | Sep 12 | Sep 23 |
| **(1 year in 10 earlier than)** | | |

| | From | To |
|---|---|---|
| **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 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:** | Moderately slow | To | Moderately slow |
| **(0 - 40 inches)** | | | |
| **Frost Action Class:** | Moderate | To | Moderate |

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

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

Betts
Crofton
Ethan
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 | Symbol | | Warm Season Grasses | Symbol | |
|---|---|---|---|---|---|
| Green needlegrass | NAVI4 | F | Big bluestem | ANGE | G |
| Intermediate wheatgrass | THIN6 | F | Indiangrass | SONU2 | F |
| Meadow bromegrass | 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 bromegrass | 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. 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 | |
|---|---|---|
| | Low (lbs/ac) | High (lbs/ac) |
| Alfalfa | 4300 | 8600 |
| Alfalfa/Intermediate wheatgrass | 4000 | 7700 |
| Alfalfa/Smooth bromegrass | 4000 | 7700 |
| Big bluestem | 4000 | 7700 |
| Intermediate wheatgrass | 3400 | 5700 |
| Smooth bromegrass | 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, 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 |

## 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 FSGs:**

| FSG ID | FSG Narrative |
|---|---|
| G102CY100NE | 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 (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:**

| | |
|---|---|
| Original Author: | Tim Nordquist |
| Original Date: | 6/8/2001 |
| Approval by: | Dana Larsen |
| Approval Date: | |