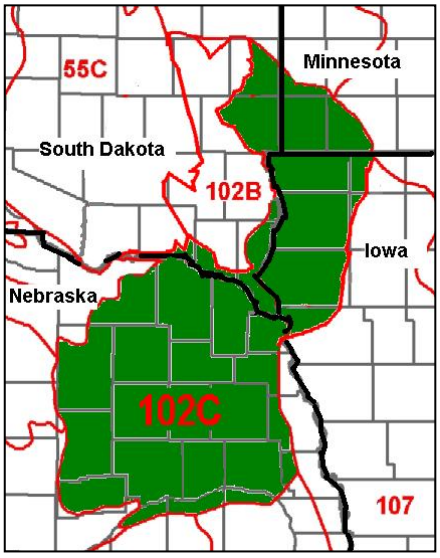
# FORAGE SUITABILITY GROUP (FSG)

## Wet

**FSG No.: G102CY900NE**




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

## Physiographic Features

The soils in this group are found on flood plains and lower stream terraces and benches and gently sloping alluvial fans, as well as in upland depressions and swales, and in interdunal areas of sandhills.

| | Minimum | Maximum |
|---|---|---|
| **Elevation (feet):** | 980 | 1640 |
| **Slope (percent):** | 0 | 2 |
| **Flooding:** | | |
| **Frequency:** | None | Frequent |
| **Duration:** | None | Long |
| **Ponding:** | | |
| **Depth (inches):** | 0 | 6 |
| **Frequency:** | None | |
| **Duration:** | None | Long |
| **Runoff Class:** | Negligible | Medium |

## 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$^{o}$F and average January temperatures are about 20$^{o}$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):** | 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)** | | |

| | 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 somewhat poorly to very poorly drained, coarse to fine textured soils. They are ponded during a portion of the year or have a watertable near the surface during part of the growing season.

| | | | |
|---|---|---|---|
| **Drainage Class:** | Somewhat poorly drained | To | Very poorly drained |
| **Permeability Class:** | Very slow | To | Rapid |
| **(0 - 40 inches)** | | | |
| **Frost Action Class:** | Moderate | To | High |

| | **Minimum** | **Maximum** |
|---|---|---|
| **Depth:** | 60 | |
| **Surface Fragments >3" (% Cover):** | | |
| **Organic Matter (percent):** | 0.5 | 8.0 |
| **(surface layer)** | | |
| **Electrical Conductivity (mmhos/cm):** | 0 | 4 |
| **(0 - 24 inches)** | | |
| **Sodium Absorption Ratio:** | 0 | 0 |
| **(0 - 12 inches)** | | |
| **Soil Reaction (1:1) Water (pH):** | 5.1 | 8.4 |
| **(0 - 12 inches)** | | |
| **Available Water Capacity (inches):** | 3 | |
| **(0 - 60 inches)** | | |
| **Calcium Carbonate Equivalent (percent):** | 0 | 18 |
| **(0 - 12 inches)** | | |

## Soil Component List (some phases of these soils may also occur in other FSG's)

| | | | |
|---|---|---|---|
| Albaton | Calco | Gothenburg | Rusco variant |
| Arlo | Clamo | Loup | Scott |
| Baltic | Clamo variant | Luton | Tetonka |
| Barney | Colo | Norway | Worthing |
| Barney variant | Fillmore | Obert | |
| Butler | Gibbon variant | Obert, wet | |

## 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 | |
|---|---|---|---|---|---|
| Creeping foxtail | ALAR | G | Switchgrass | PAVIV | F |
| Reed canarygrass | PHAR3 | G | **Legumes** | **Symbol** | |
| Tall wheatgrass | THPO7 | F | Alsike clover | TRHY | F |
| Western wheatgrass | PASM | 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 (lbs/ac) | High (lbs/ac) |
| Creeping foxtail | 4300 | 8600 |
| Reed Canarygrass | 5100 | 10300 |

## 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:** SD0004
**Growth Curve Name:** Cool season grass
**Growth Curve Description:** Cool season grass, statewide

**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, statewide

**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 wetness, which may severely limit species selection, delay planting, and harvesting of forage crops or result in wheeltrack ruts or livestock poach marks from hooves. The result can be soil compaction, injury to plants, poor soil aeration affecting plant growth, and problems with movement of livestock and machinery. Many of the soils in this group are subject to flooding or ponding that will adversely impact forage production when it occurs during the growing season. The time period plants are under water and the soil temperature while it occurs are important for the survival of forage crops. Dormant forages are little affected by inundation unless the water turns to ice.

## Management Interpretations

When establishing new stands or renovating older stands select species that are tolerant of poorly and very poorly drained soils. Exclude livestock and machinery during extended periods of soil wetness to reduce poaching, rutting, and soil compaction.

## FSG Documentation

**Similar FSG's:**

| FSG ID | FSG Narrative |
|---|---|
| G102CY295NE | Clayey Bottomland soils are finer textured, somewhat drier, and have a broader selection of species adapted to grow on them. |
| G102CY895NE | Saline/Sodic - Wet soils have elevated levels of salinity that are detrimental to forage production. |

**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 |