

## FORAGE SUITABILITY GROUP Sands

FSG No.: G106XY300NE

Major Land Resource Area: 106X -Nebraska and Kansas Loess-Drift Hills

### Physiographic Features

The soils in this group are found on both uplands and flood plains.

|                          | <u>Minimum</u> | <u>Maximum</u> |
|--------------------------|----------------|----------------|
| <b>Elevation (feet):</b> | 1000           | 1650           |
| <b>Slope (percent):</b>  | 0              | 17             |
| <b>Flooding:</b>         |                |                |
| <b>Frequency:</b>        | None           | Frequent       |
| <b>Duration:</b>         | None           | Long           |
| <b>Ponding:</b>          |                |                |
| <b>Depth (inches):</b>   |                |                |
| <b>Frequency:</b>        | None           | None           |
| <b>Duration:</b>         | None           | None           |
| <b>Runoff Class:</b>     | Very low       | Low            |

### Climatic Features

Annual precipitation varies widely from year to year in MLRA 106. Average annual precipitation for all climate stations listed below is about 34 inches. About 71 percent of that occurs during the months of April through September. On average there are about 35 days with greater than .1 inches of precipitation during the same time frame. Annual precipitation and temperature increase from the north to the south in the MLRA.

Average annual snowfall ranges from 16 inches at Wamego, KS to 37 inches at Wahoo, NE. Snow cover at depths greater than 1 inch range from 10 days at Holton, KS to 42 days at Auburn, NE.

Average July temperatures are about 79 degrees F., and average January temperatures are about 25 degrees F. Recorded temperature extremes in the MLRA during the years 1961 to 1990 are a low of -31 at Waho, NE, and a high of 110 recorded at Auburn and Pawnee City in Nebraska and also at Centralia and Holton in Kansas. The MLRA lies mostly in USDA Plant Hardiness Zones 5a and 5b.

At Topeka, KS, the average annual wind speeds are about 9.7 MPH. The highest wind speeds occur during February through May. It is cloudy about 154 days a year. Average morning relative humidity in June is about 87 percent and average afternoon humidity is 62 percent.

At Lincoln, NE, the average annual wind speeds are about 10.1 MPH. The highest wind speeds occur during March and April. It is cloudy about 149 days a year. Average morning relative humidity in June is about 83 percent and average afternoon humidity is 58 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>.

PASTURE AND HAYLAND INTERPRETATIONS

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|  | <b>From</b> | <b>To</b> |
|--|-------------|-----------|
| <b>Freeze-free period (28 deg)(days):</b><br>(9 years in 10 at least)        | 162         | 201       |
| <b>Last Killing Freeze in Spring (28 deg):</b><br>(1 year in 10 later than)  | Apr 29      | Apr 15    |
| <b>Last Frost in Spring (32 deg):</b><br>(1 year in 10 later than)           | May 10      | Apr 22    |
| <b>First Frost in Fall (32 deg):</b><br>(1 year in 10 earlier than)          | Sep 20      | Oct 15    |
| <b>First Killing Freeze in Fall (28 deg):</b><br>(1 year in 10 earlier than) | Oct 01      | Oct 26    |
| <b>Length of Growing Season (32 deg)(days):</b><br>(9 years in 10 at least)  | 140         | 183       |
| <b>Growing Degree Days (40 deg):</b>   | 5742        | 6961      |
| <b>Growing Degree Days (50 deg):</b>   | 3881        | 4376      |
| <b>Annual Minimum Temperature:</b>   | -20         | -10       |
| <b>Mean annual precipitation (inches):</b>                                   | 30          | 39        |

**Monthly precipitation (inches) and temperature (F):**

| <b>2 years in 10:</b>    | <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> |
|--------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>Precip. Less Than</b> | 0.25       | 0.24       | 0.85       | 1.36       | 2.58       | 1.84       | 1.69       | 1.79       | 1.52       | 0.83       | 0.49       | 0.35       |
| <b>Precip. More Than</b> | 1.99       | 1.61       | 3.94       | 4.95       | 6.62       | 8.42       | 6.02       | 5.71       | 6.87       | 5.10       | 3.62       | 2.69       |
| <b>Monthly Average:</b>  | 0.81       | 0.92       | 2.38       | 3.03       | 4.47       | 5.00       | 3.74       | 4.06       | 4.18       | 2.81       | 1.72       | 1.19       |
| <b>Temp. Min.</b>        | 10.8       | 15.7       | 27.1       | 39.6       | 50.7       | 60.4       | 65.5       | 62.4       | 52.8       | 40.3       | 28.3       | 15.8       |
| <b>Temp. Max.</b>        | 39.2       | 44.7       | 56.8       | 68.9       | 77.4       | 85.7       | 91.3       | 89.4       | 81.3       | 70.9       | 55.5       | 42.3       |
| <b>Temp. Avg.</b>        | 25.4       | 30.7       | 42.1       | 54.6       | 64.5       | 73.6       | 78.6       | 76.1       | 67.6       | 56.4       | 42.2       | 29.4       |

| <b><u>Climate Station</u></b> | <b><u>Location</u></b> | <b><u>From</u></b> | <b><u>To</u></b> |
|-------------------------------|------------------------|--------------------|------------------|
| KS1408                        | Centralia, KS          | 1961               | 1990             |
| KS3759                        | Holton, KS             | 1961               | 1990             |
| KS4559                        | Lawrence, KS           | 1961               | 1990             |
| KS8563                        | Wamego, KS             | 1961               | 1990             |
| NE0435                        | Auburn, NE             | 1961               | 1990             |
| NE6570                        | Pawnee City, NE        | 1961               | 1990             |
| NE8395                        | Syracuse, NE           | 1961               | 1990             |
| NE8905                        | Wahoo, NE              | 1961               | 1990             |

**Soil Interpretations**

This group consists of somewhat excessively and excessively drained, coarse textured soils formed from sandy alluvium, eolian material, and outwash. Permeability is rapid, and available water capacity is low.

|   |                              |    |                     |
|---|------------------------------|----|---------------------|
| <b>Drainage Class:</b>                        | Somewhat excessively drained | To | Excessively drained |
| <b>Permeability Class:</b><br>(0 - 40 inches) | Rapid                        | To | Rapid               |
| <b>Frost Action Class:</b>                    | Low                          | To | Low                 |

|   | <u>Minimum</u> | <u>Maximum</u> |
|---|----------------|----------------|
| <b>Depth:</b>   | 72             |                |
| <b>Surface Fragments &gt;3" (% Cover):</b>                        | 0              | 0              |
| <b>Organic Matter (percent):</b><br>(surface layer)               | 0.0            | 1.0            |
| <b>Electrical Conductivity (mmhos/cm):</b><br>(0 - 24 inches)     | 0              | 0              |
| <b>Sodium Absorption Ratio:</b><br>(0 - 12 inches)                | 0              | 0              |
| <b>Soil Reaction (1:1) Water (pH):</b><br>(0 - 12 inches)         | 5.6            | 8.4            |
| <b>Available Water Capacity (inches):</b><br>(0 - 60 inches)      | 3              | 6              |
| <b>Calcium Carbonate Equivalent (percent):</b><br>(0 - 12 inches) | 0              | 3              |

### Soil Series

|         |            |         |
|---------|------------|---------|
| Inavale | Sarpy      | Thurman |
| Pahuk   | Stonehouse | Wathena |

### 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/>.

| <u>Cool Season Grasses</u> | <u>Symbol</u> | <u>Dryland</u> | <u>Irrigated</u> |
|----------------------------|---------------|----------------|------------------|
| Creeping foxtail           | ALAR          | NS             | G                |
| Intermediate wheatgrass    | THIN6         | F              | G                |
| Meadow brome               | BRBI2         | NS             | G                |
| Orchardgrass               | DAGL          | NS             | G                |
| Pubescent wheatgrass       | THIN6         | F              | G                |
| Smooth brome               | BRINI2        | NS             | G                |
| Tall fescue                | LOAR10        | F              | F                |
| <u>Warm Season Grasses</u> |               |                |                  |
| Big bluestem               | ANGE          | F              | F                |
| Eastern gamagrass          | TRDA3         | NS             | F                |
| Indiangrass                | SONU2         | F              | F                |
| Little bluestem            | SCSC          | F              | NS               |
| Sand bluestem              | ANHA          | G              | F                |
| Sand lovegrass             | ERTR3         | G              | F                |
| Sideoats grama             | BOCU          | F              | NS               |
| Switchgrass                | PAVIV         | F              | F                |
| <u>Legumes</u>             |               |                |                  |
| Alfalfa                    | MESA          | F              | G                |
| Cicer milkvetch            | ASCI4         | NS             | F                |
| Red clover                 | TRPR2         | NS             | 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  
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. 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               | <u>Dryland</u>         |                         |
|---------------------------|------------------------|-------------------------|
|                           | Management Intensity   |                         |
|                           | <u>Low</u><br>(lbs/ac) | <u>High</u><br>(lbs/ac) |
| Alfalfa                   | 4300                   | 12900                   |
| Alfalfa/Cool Season Grass | 3700                   | 10000                   |
| Sand bluestem             | 2900                   | 8600                    |
| Smooth brome grass        | 2900                   | 7100                    |
| Switchgrass               | 2900                   | 8600                    |
| Tall fescue               | 2900                   | 6600                    |

**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:** NE0601  
**Growth Curve Name:** Alfalfa  
**Growth Curve Description:** Alfalfa - MLRAs 107, 106, 75, irrigated 73, 72

| <u>Percent Production by Month</u> |            |            |            |            |            |            |            |            |            |            |            |
|------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <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         | 25         | 25         | 20         | 15         | 5          | 0          | 0          | 0          |

**Growth Curve Number:** NE0602  
**Growth Curve Name:** Cool-season grass  
**Growth Curve Description:** Cool-season grass fertilized early - MLRAs 107, 106, 75, irrigated 73, 72

| <u>Percent Production by Month</u> |            |            |            |            |            |            |            |            |            |            |            |
|------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <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          | 5          | 10         | 35         | 30         | 5          | 5          | 10         | 0          | 0          | 0          |

**Growth Curve Number:** NE0603  
**Growth Curve Name:** Warm-season grass  
**Growth Curve Description:** Warm-season grass - statewide

| <u>Percent Production by Month</u> |            |            |            |            |            |            |            |            |            |            |            |
|------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <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          | 15         | 30         | 30         | 15         | 5          | 0          | 0          | 0          |

**Growth Curve Number:** NE0604  
**Growth Curve Name:** Eastern gamagrass  
**Growth Curve Description:** Eastern gamagrass - statewide

| <b>Percent Production by Month</b> |            |            |            |            |            |            |            |            |            |            |            |
|------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <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         | 35         | 40         | 15         | 0          | 0          | 0          | 0          | 0          |

### **Soil Limitations**

Available Water Capacity

- Production potential is low to moderate due to the low available water capacity and droughtiness of these soils. Species choices are somewhat limited for pasture and hayland.

### **Management Interpretations**

Available Water Capacity

- When establishing new stands select species that are tolerant of drought and coarse soils.

### **FSG Documentation**

#### **Similar FSGs:**

##### **FSG ID**

G106XY120NE

##### **FSG Narrative**

Loamy, Coarse soils have greater available water holding capacity, making them 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) database for soil surveys in Nebraska and Kansas counties in MLRA 106  
Nebraska and Kansas 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:

KS

NE

#### **Forage Suitability Group Approval:**

**Original Author:** Tim Nordquist

**Original Date:** 3/5/01

**Approval by:**

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State Range Management Specialist

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Date

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State Range Management Specialist

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Date

