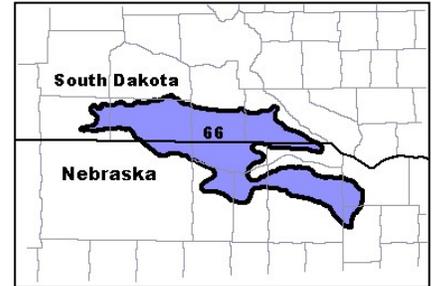


## FORAGE SUITABILITY GROUP

### Sand

**FSG No.:** G066XY300NE

**Major Land Resource Area:** 66 - Dakota-Nebraska Eroded Tableland



#### Physiographic Features

Soils in the Sand group are found on upland slopes, terraces, and flood plains.

|                          | <u>Minimum</u> | <u>Maximum</u> |
|--------------------------|----------------|----------------|
| <b>Elevation (feet):</b> | 1970           | 2950           |
| <b>Slope (percent):</b>  | 0              | 15             |
| <b>Flooding:</b>         |                |                |
| <b>Frequency:</b>        | None           | Frequent       |
| <b>Duration:</b>         | None           | Very Brief     |
| <b>Ponding:</b>          |                |                |
| <b>Depth (inches):</b>   |                |                |
| <b>Frequency:</b>        | None           | None           |
| <b>Duration:</b>         | None           | None           |
| <b>Runoff Class:</b>     | Negligible     | Medium         |

#### Climatic Features

This group occurs in a mid-continental climate characterized by wide seasonal temperature and precipitation fluctuations and extremes.

Annual precipitation varies widely from year to year in MLRA 66. Average annual precipitation for all climate stations listed below is about 21 inches. About 77 percent of the annual precipitation occurs during the months of April through September. On average there are about 29 days with greater than .1 inches of precipitation during that same time period.

Average annual snowfall ranges from 33 inches at O'Neill, NE to 43 inches at Harrington, SD. Snow cover at depths greater than 1 inch range from 43 days at Springview, NE to 64 days at Harrington, SD.

Average July temperatures across the MLRA are about 74 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 -38 at Harrington and a high of 110 both recorded at Mission, Springview, and O'Neill. The MLRA lies in USDA Plant Hardiness Zones 4b and 5a.

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 [www.wcc.nrcs.usda.gov](http://www.wcc.nrcs.usda.gov)

|  | <b>From</b> | <b>To</b> |
|--|-------------|-----------|
| <b>Freeze-free period (28 deg)(days):</b><br>(9 years in 10 at least)        | 120         | 150       |
| <b>Last Killing Freeze in Spring (28 deg):</b><br>(1 year in 10 later than)  | May 23      | May 08    |
| <b>Last Frost in Spring (32 deg):</b><br>(1 year in 10 later than)           | Jun 01      | May 20    |
| <b>First Frost in Fall (32 deg):</b><br>(1 year in 10 earlier than)          | Sep 07      | Sep 17    |
| <b>First Killing Freeze in Fall (28 deg):</b><br>(1 year in 10 earlier than) | Sep 11      | Sep 26    |

|   |             |           |
|---|-------------|-----------|
|   | <b>From</b> | <b>To</b> |
| <b>Length of Growing Season (32 deg)(days):</b><br>(9 years in 10 at least) | 104         | 130       |
| <b>Growing Degree Days (40 deg):</b>  | 4580        | 5148      |
| <b>Growing Degree Days (50 deg):</b>  | 2615        | 3038      |
| <b>Annual Minimum Temperature:</b>  | -25         | -15       |
| <b>Mean annual precipitation (inches):</b>                                  | 18          | 25        |

**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> | 0.08       | 0.11       | 0.33       | 0.62       | 1.70       | 1.51       | 1.54       | 0.91       | 0.65       | 0.53       | 0.15       | 0.16       |
| <b>Precip. More Than</b> | 0.54       | 1.24       | 2.70       | 3.97       | 5.70       | 5.65       | 4.96       | 3.94       | 4.34       | 2.64       | 1.49       | 0.85       |

**Monthly Average:**      0.34   0.49   1.42   2.16   3.40   3.46   3.07   2.22   2.15   1.32   0.71   0.52

|                   |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>Temp. Min.</b> | 7.1  | 12.4 | 20.8 | 31.7 | 42.4 | 52.3 | 58.5 | 55.8 | 45.2 | 33.5 | 20.7 | 10.0 |
| <b>Temp. Max.</b> | 30.3 | 36.2 | 46.8 | 62.1 | 72.9 | 82.8 | 88.7 | 86.5 | 76.2 | 64.5 | 46.4 | 33.3 |
| <b>Temp. Avg.</b> | 19.7 | 24.8 | 34.1 | 47.1 | 57.9 | 68.0 | 74.2 | 72.1 | 61.8 | 49.8 | 34.7 | 22.9 |

|                               |                        |                    |                  |
|-------------------------------|------------------------|--------------------|------------------|
| <b><u>Climate Station</u></b> | <b><u>Location</u></b> | <b><u>From</u></b> | <b><u>To</u></b> |
| SD3574                        | Harrington SD          | 1961               | 1990             |
| SD5620                        | Mission SD             | 1966               | 1990             |
| SD5638                        | Mission SD             | 1961               | 1990             |
| SD0778                        | Bonesteel SD           | 1961               | 1990             |
| NE8090                        | Springview NE          | 1961               | 1990             |
| NE6290                        | O'Neill NE             | 1961               | 1990             |

**Soil Interpretations**

This group consist of moderately deep to very deep, moderately well to excessively drained, coarse textured soils formed from alluvial and eolian sandy materials. Available water capacity mostly is low and permeability is mostly rapid.

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

|   |                       |                       |
|---|-----------------------|-----------------------|
|   | <b><u>Minimum</u></b> | <b><u>Maximum</u></b> |
| <b>Depth:</b>   | 20                    |                       |
| <b>Surface Fragments &gt;3" (% Cover):</b>                        | 0                     | 3                     |
| <b>Organic Matter (percent):</b><br>(surface layer)               | 0.5                   | 3.0                   |
| <b>Electrical Conductivity (mmhos/cm):</b><br>(0 - 24 inches)     | 0                     | 2                     |
| <b>Sodium Absorption Ratio:</b><br>(0 - 12 inches)                | 0                     | 0                     |
| <b>Soil Reaction (1:1) Water (pH):</b><br>(0 - 12 inches)         | 5.1                   | 8.4                   |
| <b>Available Water Capacity (inches):</b><br>(0 - 60 inches)      | 3                     | 10                    |
| <b>Calcium Carbonate Equivalent (percent):</b><br>(0 - 12 inches) | 0                     | 5                     |

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

|         |          |           |        |
|---------|----------|-----------|--------|
| Boelus  | Hennings | O'Neill   | Wewela |
| Calamus | Inavale  | Sandose   |        |
| Doger   | Ipage    | Simeon    |        |
| Dunday  | Mckelvie | Valentine |        |

**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>Dry</u> | <u>Irrig</u> | <u>Legumes</u>        | <u>Symbol</u> | <u>Dry</u> | <u>Irrig</u> |
|----------------------------|---------------|------------|--------------|-----------------------|---------------|------------|--------------|
| Crested wheatgrass         | AGCR          | F          | NS           | Alfalfa               | MESA          | G          | G            |
| Intermediate wheatgrass    | THIN6         | F          | G            | Birdsfoot trefoil     | LOCO6         | NS         | G            |
| Meadow brome grass         | BRBI2         | NS         | G            | Cicer milkvetch       | ASCI4         | F          | F            |
| Orchardgrass               | DAGL          | NS         | G            | Illinois bundleflower | DEIL          | F          | NS           |
| Pubescent wheatgrass       | THIN6         | F          | G            | Purple prairieclover  | DAPUP         | F          | NS           |
| Smooth brome grass         | BRINI2        | F          | G            | Red clover            | TRPR2         | NS         | G            |
| Western wheatgrass         | PASM          | F          | NS           |                       |               |            |              |
| <u>Warm Season Grasses</u> | <u>Symbol</u> | <u>Dry</u> | <u>Irrig</u> |                       |               |            |              |
| Big bluestem               | ANGE          | G          | G            |                       |               |            |              |
| Indiangrass                | SONU2         | G          | G            |                       |               |            |              |
| Little bluestem            | SCSC          | G          | NS           |                       |               |            |              |
| Prairie sandreed           | CALO          | G          | NS           |                       |               |            |              |
| Sand bluestem              | ANHA          | G          | NS           |                       |               |            |              |
| Sand lovegrass             | ERTR3         | F          | NS           |                       |               |            |              |
| Sideoats grama             | BOCU          | F          | NS           |                       |               |            |              |
| Switchgrass                | PAVIV         | G          | G            |                       |               |            |              |

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>       |            | <u>Irrigated</u>     |            |
|---------------------------------|----------------------|------------|----------------------|------------|
|                                 | Management Intensity |            | Management Intensity |            |
|                                 | <u>High</u>          | <u>Low</u> | <u>High</u>          | <u>Low</u> |
|                                 | (lbs/ac)             | (lbs/ac)   | (lbs/ac)             | (lbs/ac)   |
| Alfalfa                         | 5100                 | 3100       |                      |            |
| Alfalfa/Intermediate wheatgrass | 4000                 | 2600       | 14300                | 8600       |
| Alfalfa/Smooth brome            | 4000                 | 2600       | 14300                | 8600       |
| Indiangrass                     | 4000                 | 2300       |                      |            |
| Intermediate wheatgrass         | 2900                 | 2000       | 11400                | 6900       |
| Sand bluestem                   | 5100                 | 2900       |                      |            |
| Smooth brome                    | 3400                 | 2000       | 11400                | 6900       |
| Switchgrass                     | 5100                 | 2900       |                      |            |

**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 107, 102B, 63B, 66, 65

| <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          | 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

| <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         | 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

| <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          | 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

| <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          | 25         | 25         | 20         | 15         | 10         | 0          | 0          | 0          |

**Soil Limitations**

Soil blowing is a severe hazard during stand establishment or renovation of forage stands on the soils of this group. Bare areas where livestock concentrate are also susceptible. Production potential is low to moderate due to the low available water capacity and droughtiness of these soils. Also, these soils are typically low in native fertility and have reduced capacity to supply plant nutrients. Species choices are somewhat limited for pasture and hayland for these same reasons.

### **Management Interpretations**

The impact on yields of the low available water capacity of these soils can be reduced by selecting forage species that are highly tolerant to periods of drought and inadequate soil moisture and can grow on coarse soils. Incorporate wind erosion control practices during stand establishment. Properly locating facilitating practices such as fences, lanes, and water developments can help control livestock movement, reduce trailing perpendicular to steeper slopes, evenly distribute grazing pressure, and reduce bare areas.

### **FSG Documentation**

#### **Similar FSGs:**

##### **FSG ID**

G066XY130N

##### **FSG Narrative**

Very Droughty Loam soils have finer textures than sands.

#### **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 South Dakota and Nebraska counties in MLRA 66  
South Dakota and Nebraska NRCS Field Office Technical Guides  
NRCS National Range and Pasture Handbook  
Various South Dakota and Nebraska 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: 4/4/02

Approval by: Dana Larsen

Approval Date: