

FORAGE SUITABILITY GROUP (FSG) Loam

FSG No.: G063BY100SD

Major Land Resource Area (MLRA): 63B - Southern Rolling Pierre Shale Plains

Physiographic Features

Soils in this group typically occur on upland positions such as backslopes, footslopes, and toeslopes. Some occur on high flood plains and terraces.



| | <u>Minimum</u> | <u>Maximum</u> |
|--------------------------|----------------|----------------|
| Elevation (feet): | 1300 | 2000 |
| Slope (percent): | 0 | 15 |
| Flooding: | | |
| Frequency: | None | Rare |
| Duration: | None | Very Brief |
| Ponding: | | |
| Depth (inches): | | |
| Frequency: | None | None |
| Duration: | None | None |
| Runoff Class: | Negligible | High |

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 63B. Average annual precipitation for all climate stations listed below is about 22 inches. About 76 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 frame. 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, Nebraska (NE), to 44 inches at Winner, South Dakota (SD). Snow cover at depths greater than 1 inch range from 4 days at Stephan, SD, to 57 days at Winner.

Average July temperatures across the MLRA are about 76°F and average January temperatures are about 17°F. Recorded temperature extremes in the MLRA during the years 1961 to 1990 are a low of -37°F and a high of 114 both recorded at Kennebec, SD. 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 <http://www.wcc.nrcs.usda.gov>.

| | From | To |
|---|-------------|-----------|
| Freeze-free period (28 deg)(days): (9 years in 10 at least) | 128 | 152 |
| Last Killing Freeze in Spring (28 deg): (1 year in 10 later than) | May 20 | May 08 |
| Last Frost in Spring (32 deg): (1 year in 10 later than) | Jun 09 | May 17 |
| First Frost in Fall (32 deg): (1 year in 10 earlier than) | Sep 01 | Sep 21 |

| | From | To |
|--|-------------|-----------|
| First Killing Freeze in Fall (28 deg): (1 year in 10 earlier than) | Sep 19 | Sep 30 |
| Length of Growing Season (32 deg)(days): (9 years in 10 at least) | 92 | 131 |
| Growing Degree Days (40 deg): | 4526 | 5505 |
| Growing Degree Days (50 deg): | 2652 | 3257 |
| Annual Minimum Temperature: | -25 | -15 |
| Mean annual precipitation (inches): | 18 | 25 |

Monthly precipitation (inches) and temperature (F):

| 2 years in 10: | <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> |
|--------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Precip. Less Than | 0.06 | 0.09 | 0.27 | 0.66 | 1.18 | 1.80 | 1.24 | 0.73 | 0.65 | 0.55 | 0.12 | 0.13 |
| Precip. More Than | 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: | 0.41 | 0.55 | 1.56 | 2.36 | 3.34 | 3.54 | 3.08 | 2.45 | 2.13 | 1.45 | 0.77 | 0.56 |
| Temp. Min. | 1.3 | 7.5 | 18.2 | 31.1 | 42.2 | 52.3 | 58.2 | 55.5 | 44.9 | 32.8 | 18.9 | 6.1 |
| Temp. Max. | 32.4 | 38.6 | 48.5 | 62.8 | 74.0 | 84.0 | 91.1 | 88.9 | 78.7 | 66.0 | 47.7 | 35.2 |
| Temp. Avg. | 18.7 | 24.4 | 34.9 | 48.5 | 59.6 | 69.5 | 75.7 | 73.5 | 63.2 | 51.1 | 35.2 | 22.4 |

| <u>Climate Station</u> | <u>Location</u> | <u>From</u> | <u>To</u> |
|------------------------|-----------------|-------------|-----------|
| NE1990 | Creighton, NE | 1961 | 1990 |
| NE1365 | Butte, NE | 1961 | 1990 |
| SD9367 | Winner, SD | 1961 | 1990 |
| SD0778 | Bonesteel, SD | 1961 | 1990 |
| SD3452 | Gregory, SD | 1961 | 1990 |
| SD7992 | Stephan, SD | 1961 | 1990 |
| SD4516 | Kennebec, SD | 1961 | 1990 |

Soil Interpretations

This group consists mostly of very deep, well drained, medium to moderately fine textured soils formed mostly from wind and water deposited materials. Available water capacity is high and permeability is moderately slow to moderate.

| | | | |
|---|-----------------|----|--------------|
| Drainage Class: | Well drained | To | Well drained |
| Permeability Class: (0 - 40 inches) | Moderately slow | To | Moderate |
| Frost Action Class: | Low | To | High |

| | <u>Minimum</u> | <u>Maximum</u> |
|---|----------------|----------------|
| Depth: | 40 | 0 |
| Surface Fragments >3" (% Cover): | 0 | 3 |
| Organic Matter (percent): (surface layer) | 0.5 | 4.0 |
| Electrical Conductivity (mmhos/cm): (0 - 24 inches) | 0 | 2 |
| Sodium Absorption Ratio: (0 - 12 inches) | 0 | 10 |
| Soil Reaction (1:1) Water (pH): (0 - 12 inches) | 5.6 | 8.4 |
| Available Water Capacity (inches): (0 - 60 inches) | 10 | 13 |
| Calcium Carbonate Equivalent (percent): (0 - 12 inches) | 0 | 18 |

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

| | | | |
|----------|----------------|--------|----------|
| Agar | Grigston | Hord | Paka |
| Big Bend | Hall | Lowry | Ree |
| Coly | Haverson | Moody | Reliance |
| Crofton | Haynie | Nimbro | Uly |
| Eltree | Haynie variant | Nora | |

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 | G | NS | Alfalfa | MESA | G | G |
| Green needlegrass | NAVI4 | G | NS | Birdsfoot trefoil | LOCO6 | F | G |
| Intermediate wheatgrass | THIN6 | G | G | Canada milkvetch | ASCAC6 | F | NS |
| Meadow brome | BRBI2 | G | G | Cicer milkvetch | ASCI4 | G | F |
| Orchardgrass | DAGL | G | G | Illinois bundleflower | DEIL | F | NS |
| Pubescent wheatgrass | THIN6 | G | G | Purple prairieclover | DAPUP | F | NS |
| Russian wildrye | PSJU3 | G | NS | Red clover | TRPR2 | F | G |
| Smooth brome | BRINI2 | G | G | White prairieclover | DACAC | F | NS |
| Tall wheatgrass | THPO7 | G | NS | | | | |
| Western wheatgrass | PASM | G | NS | | | | |
| <u>Warm Season Grasses</u> | | | | | | | |
| Big bluestem | ANGE | G | G | | | | |
| Indiangrass | SONU2 | G | G | | | | |
| Little bluestem | SCSC | G | NS | | | | |
| Prairie sandreed | CALO | F | NS | | | | |
| Sand bluestem | ANHA | 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. 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. 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> (lbs/ac) | <u>Low</u> (lbs/ac) | <u>High</u> (lbs/ac) | <u>Low</u> (lbs/ac) |
| Alfalfa | 9100 | 3400 | | |
| Alfalfa/Intermediate wheatgrass | 8600 | 3400 | 17100 | 10300 |
| Alfalfa/Smooth brome grass | 8600 | 3400 | 17100 | 10300 |
| Big bluestem | 6900 | 3400 | | |
| Intermediate wheatgrass | 5700 | 2900 | 14300 | 8600 |
| Smooth brome grass | 5100 | 2900 | 14300 | 8600 |
| Switchgrass | 6900 | 3400 | | |

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, MLRA's 107, 102B, 63B, 66, 65

Percent Production by Month

| <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, statewide

Percent Production by Month

| <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, statewide

Percent Production by Month

| <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, statewide

Percent Production by Month

| <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

These soils have few limitations to the production of climatically adapted forage crops. On steeper slopes, water erosion is a potential problem during establishment, when renovating stands, and in thin established stands. Livestock trail erosion is a potential problem in established stands.

Management Interpretations

Incorporating erosion control practices during the establishment period and including sod forming grass species in stands, especially on steeper slopes, will reduce the potential for sheet and rill erosion. 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 FSG's:****FSG ID**

G063BY120S

FSG Narrative

Droughty Loam soils are shallower or coarser textured resulting in lower available water capacity and lower production potential.

G063BY500S

Overflow soils receive additional moisture due to a favorable landscape position resulting in a higher production potential.

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 South Dakota and Nebraska counties in MLRA 63B

NRCS Nebraska Field Office Technical Guides and South Dakota Technical Guide

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: Nebraska and South Dakota

Forage Suitability Group Approval:

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Original Date: 4/3/02

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Approval Date: 9/28/04