

## FORAGE SUITABILITY GROUP

### Shallow

FSG No.: G106XY003NE

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

#### Physiographic Features

The soils in this group are found on upland positions underlain by bedrock material.

	<u>Minimum</u>	<u>Maximum</u>
<b>Elevation (feet):</b>	1000	1650
<b>Slope (percent):</b>	5	15
<b>Flooding:</b>		
<b>Frequency:</b>	None	None
<b>Duration:</b>	None	None
<b>Ponding:</b>		
<b>Depth (inches):</b>		
<b>Frequency:</b>	None	None
<b>Duration:</b>	None	None
<b>Runoff Class:</b>	Very high	Very high

#### 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> (9 years in 10 at least)	162	201
<b>Last Killing Freeze in Spring (28 deg):</b> (1 year in 10 later than)	Apr 29	Apr 15
<b>Last Frost in Spring (32 deg):</b> (1 year in 10 later than)	May 10	Apr 22
<b>First Frost in Fall (32 deg):</b> (1 year in 10 earlier than)	Sep 20	Oct 15
<b>First Killing Freeze in Fall (28 deg):</b> (1 year in 10 earlier than)	Oct 01	Oct 26
<b>Length of Growing Season (32 deg)(days):</b> (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 shallow, well to somewhat excessively drained, moderately fine to moderately coarse textured soils formed in residuum of sandstone, limestone, and shale. Permeability is moderate to moderately rapid, and available water capacity is low.

<b>Drainage Class:</b>	Well drained	To	Somewhat excessively drained
<b>Permeability Class:</b> (0 - 40 inches)	Moderate	To	Moderately rapid
<b>Frost Action Class:</b>	Moderate	To	Moderate

	<u>Minimum</u>	<u>Maximum</u>
<b>Depth:</b>	10	20
<b>Surface Fragments &gt;3" (% Cover):</b>	0	15
<b>Organic Matter (percent):</b> (surface layer)	0.5	4.0
<b>Electrical Conductivity (mmhos/cm):</b> (0 - 24 inches)	0	0
<b>Sodium Absorption Ratio:</b> (0 - 12 inches)	0	0
<b>Soil Reaction (1:1) Water (pH):</b> (0 - 12 inches)	5.1	8.4
<b>Available Water Capacity (inches):</b> (0 - 60 inches)	2	4
<b>Calcium Carbonate Equivalent (percent):</b> (0 - 12 inches)	0	15

### Soil Series

Basehor	Opal	Vinland
Hedville	Sogn	

### 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>	
Intermediate wheatgrass	THIN6	F
Pubescent wheatgrass	THIN6	F
Smooth brome grass	BRINI2	F
Tall fescue	LOAR10	F
<u>Warm Season Grasses</u>		
Big bluestem	ANGE	G
Indiangrass	SONU2	G
Little bluestem	SCSC	G
Sideoats grama	BOCU	G
Switchgrass	PAVIV	F
<u>Legumes</u>		
Red clover	TRPR2	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. A 70% 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% for lower management intensity to 50% for the highest.

Forage Crop	Management Intensity	
	Low (lbs/ac)	High (lbs/ac)
Big bluestem	2300	8600
Indiangrass	2300	8600
Little bluestem	2000	6900
Sideoats grama	1800	5500
Smooth brome grass	2600	6000
Switchgrass	2000	6900
Tall fescue	2300	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:** 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

**Soil Limitations**

Available water capacity

- Shallow soils result in low available water capacity limiting species selection and plant growth during periods of moisture deficit.

Water erosion

- The shallowness of these soils results in high runoff potential. Water erosion is a potential problem during establishment, and in thin, open established stands

Livestock trail erosion

- A potential problem in established stands.

Wind erosion

- A potential problem during stand establishment and in heavy use areas on moderately coarse textured soils.

**Management Interpretations**

Available water capacity

- When establishing new stands select forage species that are highly tolerant to periods of drought and inadequate soil moisture.

Wind and water erosion

- Include sod forming grass species in new seedings on steeper slopes to reduce sheet and rill erosion. Incorporate both wind and water erosion control practices during the establishment period.

Livestock trail erosion

- Locate fences, lanes, water developments, and mineral areas to reduce livestock trailing perpendicular to steeper slopes.

**FSG Documentation**

**Similar FSGs:**

**FSG ID**

G106XY130NE

**FSG Narrative**

Very droughty loam soils are deeper with greater water holding capacity.

**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: 4/12/01

Approval by:

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State Range Management Specialist

\_\_\_\_\_  
Date

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State Range Management Specialist

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Date