FORAGE SUITABILITY GROUP
LIMY UPLAND

FSG No.: G063AY400SD

Major Land Resource Area: 63A - Northern Rolling Pierre Shale Plains

Physiographic Features
The soils in this group are found on upland slopes.

	Minimum	Maximum
Elevation (feet):	1300	2950
Slope (percent):	0	15
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		
Depth (inches):		
Frequency:	None	None
Duration:	None	None
Runoff Class:	Low	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 63A. Average annual precipitation for all climate stations listed below is about 17 inches. About 77 percent of that occurs during the months of April through September. On average, there are about 25 days with greater than .1 inches of precipitation during that same time period.

Average annual snowfall ranges from 24 inches at Midland to 48 inches at Milesville. Snow cover at depths greater than 1 inch range from 27 days at Midland to 82 days at Timber Lake.

Average July temperatures across the MLRA are about 75^0F and average January temperatures are about 17^0F. Recorded temperature extremes in the MLRA during the years 1961 to 1990 are a low of -37 at Kennebec and a high of 114 at both Kennebec and Midland. The MLRA lies in USDA Plant Hardiness Zones 4a, 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.

Freeze-free period (28 deg) (days):	129	162
(9 years in 10 at least)		
Last Killing Freeze in Spring (28 deg):	May 20	May 04
(1 year in 10 later than)		
Last Frost in Spring (32 deg):	May 31	May 16
(1 year in 10 later than)		
First Frost in Fall (32 deg):	Sep 09	Sep 24
(1 year in 10 earlier than)		
First Killing Freeze in Fall (28 deg):	Sep 17	Oct 01
(1 year in 10 earlier than)		
Length of Growing Season (32 deg) (days):	110	139
(9 years in 10 at least)		
Growing Degree Days (40 deg):	4442	5149
Growing Degree Days (50 deg):	2517	3083
Annual Minimum Temperature:	-30	-15
Mean annual precipitation (inches):	16	18

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	0.10	0.09	0.31	0.82	1.44	1.55	0.90	0.64	0.41	0.30	0.08	0.16
Precip. More Than	0.60	0.79	2.37	3.46	3.82	4.55	3.58	2.46	1.98	2.06	1.07	0.91
Monthly Average:	0.30	0.42	1.20	1.99	2.86	3.06	2.23	1.80	1.31	1.12	0.48	0.45
Temp. Min.	3.9	9.7	20.0	32.9	44.0	53.9	59.6	57.3	46.4	35.5	20.8	7.9
Temp. Max.	32.8	38.6	48.3	63.1	74.1	83.8	92.2	90.6	79.3	66.4	48.4	35.9
Temp. Avg.	17.1	22.9	33.0	46.7	58.0	68.0	75.0	73.0	61.7	49.6	33.5	20.5

Climate Station	Location	From	To
SD5691	Mobridge SD	1961	1990
SD8307	Timber Lake SD	1961	1990
SD6170	Oahe Dam SD	1961	1990
SD5506	Midland SD	1961	1990
SD5544	Milesville SD	1961	1990
SD6552	Philip SD	1961	1990
SD5891	Murdo SD	1961	1990
SD4516	Kennebec SD	1961	1990

Soil Interpretations

This group consists of very deep, well drained, medium textured soils formed in calcareous glacial till, glacial drift, or loess. Permeability is moderately slow to moderate.

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

	Minimum	Maximum
Depth:	72	
Surface Fragments >3" (% Cover):	0	3
Organic Matter (percent):	0.5	4.0
(surface layer)		
Electrical Conductivity (mmhos/cm):	0	4
(0 - 24 inches)		
Sodium Absorption Ratio:	0	2
(0 - 12 inches)		
Soil Reaction (1:1) Water (pH):	6.6	8.4
(0 - 12 inches)		
Available Water Capacity (inches):	9	12
(0 - 60 inches)		
Calcium Carbonate Equivalent	0	23
(0 - 12 inches)		

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 at http://plants.usda.gov/.

Cool Season Grasses	
Crested wheatgrass	G
Green needlegrass	F
Intermediate wheatgrass	F
Meadow bromegrass	F
Newhy Hybrid wheatgrass	F
Pubescent wheatgrass	G
Russian wildrye	F
Slender wheatgrass	F
Western wheatgrass	F

Warm Season Grasses	
Big bluestem	F
Little bluestem	G
Prairie sandreed	F
Sideoats grama	G
Legumes	
AlfalfaF	
Cicer milkvetch	G
Purple prairieclover	G
Sainfoin	F
Sweetclover	F
White prairieclover	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. 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	Management Intensity	
	High	Low
	(lbs/ac)	(lbs/ac)
Alfalfa/Crested wheatgrass	4600	2000
Alfalfa/Intermediate	4600	2300
Crested wheatgrass	4200	2100
Green needlegrass	2900	1400
Intermediate wheatgrass	4000	2100
Little bluestem	4000	2100
Western wheatgrass	2900	1200

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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

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 to the soils in this group is the high lime content close to the soil surface. The lime reduces the availability of some plant nutrients. This reduces species choices and yield potential. Also, because most of these are sloping soils, they are subject to water and wind erosion, especially when establishing or renovating stands. They also tend to be droughty.

Management Interpretations

The impact on yields can be reduced by selecting forage species that are tolerant of the high lime levels inherent to these soils, and also to droughty conditions. Including sod forming grass species in stands, especially on steeper slopes, will reduce the potential for sheet and rill erosion. Incorporate both wind and water erosion control practices during the establishment period. 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	FSG Narrative
G063AY100SD	Loamy soils do not have as high a lime content near the surface and are 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) for soil surveys in South Dakota counties in MLRA 63A
South Dakota NRCS South Dakota Technical Guides
NRCS National Range and Pasture Handbook
Various South Dakota 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: South Dakota

Forage Suitability Group Approval

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