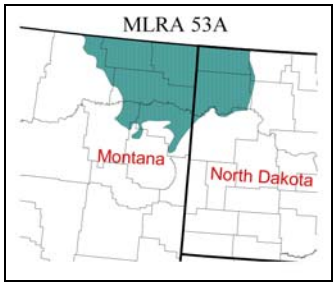
FORAGE SUITABILITY GROUP

DROUGHTY LOAM

FSG No.: **G053AY120MT**

Major Land Resource Area: 053A - Northern Dark Brown Glaciated Plains

Physiographic Features



The soils in this group are found on flood plains, terraces, alluvial fans, till plains, drainageways, hills, sedimentary plains and outwash plains.

	Minimum	Maximum
Elevation (feet):	2000	3000
Slope (percent):	0	15
Flooding:		
Frequency:	None	Occasional
Duration:	None	Brief
Ponding:		
Depth (inches):		
Frequency:	None	None
Duration:	None	None
Runoff Class:	Negligible	Low

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 53A. Average annual precipitation for all climate stations listed below is about 13 inches. About 80 percent of that occurs during the months of April through September. On average there are about 22 days with greater than 0.1 inches of precipitation during the 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 9 inches at Redstone, MT to 42 inches at Ophiem 16 SE, MT. Snow cover at depths greater than 1 inch range from 16 days at Ophiem 10 N, MT to 97 days at Bredette, MT.

Average July temperatures are about 69 degrees F., and average January temperatures are about 9 degrees F. Recorded temperature extremes in the MLRA during the years 1961 to 1990 are a low of -52 at Redstone, MT, and a high of 110 at 3 Montana locations. The average dates of last and first frost (32 deg) for the listed stations are May 18 and September 14 for an average growing season length of 118 days. The MLRA lies in USDA Plant Hardiness Zones 3b and 4a.

At Williston, ND the average annual wind speeds are about 10 MPH. The highest wind speeds occur during March though June, but average monthly wind speeds do not vary significantly throughout the year. It is cloudy about 160 days a year with the lowest incidence of cloudiness occurring during the summer months. Average morning relative humidity in June is about 81 percent and average afternoon humidity is 54 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.

	From	To
Freeze-free period (28 deg)(days): (9 years in 10 at least)	89	139
Last Killing Freeze in Spring (28 deg): (1 year in 10 later than)	Jun 06	May 13
Last Frost in Spring (32 deg): (1 year in 10 later than)	Jun 28	May 27
First Frost in Fall (32 deg): (1 year in 10 earlier than)	Aug 09	Sep 07
First Killing Freeze in Fall (28 deg): (1 year in 10 earlier than)	Aug 23	Sep 15
Length of Growing Season (32 deg)(days): (9 years in 10 at least)	52	126
Growing Degree Days (40 deg):	3216	4334
Growing Degree Days (50 deg):		
Annual Minimum Temperature:	-40	-25
Mean annual precipitation (inches):	12	15

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	0.14	0.10	0.20	0.42	0.90	1.23	0.88	0.48	0.51	0.20	0.13	0.19
Precip. More Than	0.64	0.53	0.82	1.69	3.20	3.55	2.99	2.40	2.12	1.18	0.54	0.65
Monthly Average:	0.39	0.31	0.51	1.10	2.13	2.47	2.02	1.53	1.38	0.69	0.34	0.42
Temp. Min.	-1.8	5.0	16.5	29.5	40.8	49.7	53.9	51.1	40.6	30.2	15.4	3.8
Temp. Max.	19.2	26.5	39.3	55.9	68.5	77.8	84.2	82.3	69.5	56.8	36.8	24.7
Temp. Avg.	8.7	15.8	27.9	42.7	54.7	63.7	69.0	66.7	55.1	43.5	26.1	14.2

Climate Station	Location	From	To
MT1088	Bredette, MT	1961	1990
MT2122	Culbertson, MT	1961	1990
MT5285	Lustre, MT	1961	1990
MT5572	Medicine Lake 3 SE, MT	1961	1990
MT6236	Ophiem 10 N, MT	1961	1990
MT6238	Ophiem 16 SE, MT	1961	1990
MT6660	Poplar 2E, MT	1961	1990
MT6893	Raymond Border Stn, MT	1961	1990
MT6927	Redstone, MT	1961	1990
MT7424	Scobey, MT	1961	1990
MT8777	Westby, MT	1961	1990
ND1871	Crosby, ND	1961	1990
ND3196	Fortuna, ND	1964	1990
ND3736	Grenora, ND	1961	1990
ND8737	Tioga, ND	1961	1990
ND9400	Wildrose, ND	1961	1990
ND9425	Williston WSO AP, ND	1961	1990
ND9430	Williston Exp Farm, ND	1961	1990

Soil Interpretations

The Droughty Loam group of soils is made up very deep, well drained soils with moderately coarse surface textures formed in wind and water deposited materials. Permeability is moderately rapid and available water capacity is moderate.

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

	Minimum	Maximum
Depth (inches):	72	
Surface Fragments >3" (% Cover):	0	0
Organic Matter (percent): (surface layer)	1.0	3.0
Electrical Conductivity (mmhos/cm):	0	2
Sodium Absorption Ratio: (0 - 12 inches)	0	0
Soil Reaction (1:1) Water (pH): (0 - 12 inches)	6.1	8.4
Available Water Capacity (inches): (0 - 60 inches)	6	8
Calcium Carbonate Equivalent (percent): (0 - 12 inches)	0	8

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/.

Cool Season Grasses	**Symbol**	**Dryland**	**Irrigated**
Altai wildrye	LEAN3	F	NS
Basin wildrye	LECI4	F	NS
Bluebunch/Quackgrass Hybrid		G	G
Canada wildrye	ELCA4	G	NS
Crested wheatgrass	AGCR	G	NS
Green needlegrass	NAVI4	G	NS
Intermediate wheatgrass	THIN6	F	G
Meadow bromegrass	BRBI2	F	G
Pubescent wheatgrass	THIN6	F	G
Russian wildrye	PSJU3	F	NS
Slender wheatgrass	ELTR7	G	NS
Smooth bromegrass	BRINI2	F	G
Tall wheatgrass	THPO7	F	NS
Western wheatgrass	PASM	G	NS
Warm Season Grasses	**Symbol**	**Dryland**	**Irrigated**
Big bluestem	ANGE	F	G
Indiangrass	SONU2	F	G
Little bluestem	SCSC	G	NS
Prairie sandreed	CALO	G	NS
Sand bluestem	ANHA	G	G
Sideoats grama	BOCU	G	NS
Switchgrass	PAVIV	F	NS
Legumes	**Symbol**	**Dryland**	**Irrigated**
Alfalfa	MESA	G	G
Canada milkvetch	ASCAC6	F	NS
Cicer milkvetch	ASCI4	G	F
Purple prairieclover	DAPUP	G	NS
Sandfoin	ONVI	G	NS

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 – Not suited

Production Estimates

Production estimates listed here should only be used for making general management recommendations. On site production information should always be sued 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	Dryland Management Intensity		Irrigated Management Intensity	
	Low (lbs/ac)	High (lbs/ac)	Low (lbs/ac)	High (lbs/ac)
Alfalfa	3000	6600	8600	14300
Alfalfa/Crested wheatgrass	2200	4800	6900	11400
Alfalfa/Intermediate wheatgrass	2500	5100	6900	11400
Alfalfa/Smooth bromegrass	2500	5100	6900	11400
Big bluestem	2000	5100	0	0
Crested wheatgrass	2100	4400	6900	11400
Green needlegrass	1500	3100	0	0
Intermediate wheatgrass	2300	4700	6900	11400
Smooth bromegrass	2300	4700	6900	11400
Switchgrass	2000	5800	0	0
Western wheatgrass	1400	3100	0	0

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: MT0004
Growth Curve Name: Alfalfa 2 Cuttings Dry
Growth Curve Description: Dryland, 2 Cuttings For Hay Then Graze Aftermath

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	35	30	15	5	5	0	0	0

Growth Curve Number: MT0005
Growth Curve Name: 3 Cutting Irrigated Alfalfa
Growth Curve Description: Irrigated 3 Cuttings for Hay Graze Aftermath

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	25	25	20	20	10	0	0	0

Growth Curve Number: MT0001
Growth Curve Name: Cool Season Grass Irrigated
Growth Curve Description: Irrigated Cool Season Grass

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	35	30	20	10	10	0	0	0

Growth Curve Number: MT0002
Growth Curve Name: Cool Season Grass Dryland
Growth Curve Description: Dryland Cool Season Grass

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	40	40	10	0	5	0	0	0

Growth Curve Number: MT0003
Growth Curve Name: Warm Season Grass Dryland
Growth Curve Description: Dryland Warm Season Grass

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	10	30	40	20	0	0	0	0

Soil Limitations

The primary limitation for these soils is their moderate available water capacity which limits plant growth during periods of moisture deficit. On steeper slopes water erosion is a potential problem during stand establishment, and livestock trail erosion is a potential problem on established stands. Also, wind erosion is a potential problem during stand establishment on moderately coarse textured soils.

Management Interpretations

The impact on yields of the moderate available water capacity of these soils can be reduced by selecting forage species that are tolerant to periods of drought and inadequate soil moisture. 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.

Pasture and hayland can include considerations for wildlife. Delaying grazing on portions of the pasture or rotating pastures will allow nest initiation of grassland nesting birds or species of concern. Nest initiation of most grassland nesting birds occurs from April 15 to June 1. Delaying haying until after July 15 allows for most species to fledge their young. Consider planting species with later maturity to allow for harvesting after nests have fledged. Avoid mowing around the field. Mow back and forth or from the inside to the outside of the field. Consider using flushing bars on swathers and mowers.

FSG Documentation

Similar FSGs:

FSG ID	FSG Narrative
G053AY100MT	Loamy soils have greater available water capacity and greater production potential.
G053AY130MT	Very Droughty Loams have lower available water capacity and lower 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 (NASIS) for soil surveys in Montana and North Dakota counties in MLRA 53A
- Montana and North Dakota NRCS Field Office Technical Guides
- 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: Montana and North Dakota

Forage Suitability Group Approval:

Original Author: Tim Nordquist
Original Date: 9/29/200
Approval by: Loretta J. Metz (MT) and Jeff Printz (ND)
Approval Date: March 2005