FORAGE SUITABILITY GROUP
LOAMY, 12-16" ppt/ >90 Freeze Free Days

FSG No.: **G053AY017MT**

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

Physiographic Features

MLRA 53A is characterized by gently undulating to rolling till plains including areas of prairie pot holes, kames, and moraines. Adjacent to major stream valleys are strongly rolling and steep slopes. Elevation ranges from 1600 to 3600 feet, increasing gradually from southeast to northwest. The Missouri River is the largest river flowing through MLRA 53A.

The Loamy FSG occurs on glacial till, outwash, sedmentary, and lake plains; and on moraines, alluvial fans, and stream terraces.

	Minimum	Maximum
Elevation (feet):	1600	3600
Slope (percent):	0	15
Flooding:		
Frequency:	None	Occasional
Duration:	None	Brief
Ponding:		
Depth (inches):		
Frequency:	None	None
Duration:	None	None
Runoff Class:	Negligible	Very high

Climatic Features

This FSG 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. Precipitation in the winter falls as snow.

Average annual snowfall ranges from 9 inches at Redstone to 42 inches at Opheim 16 SE. Snow depths greater than 1 inch range from 16 days at Opheim 10 N to 97 days at Bredette.

Average July temperatures are about 68 degrees F., and average January temperatures are about 9 degrees F. Recorded temperature extremes in the MLRA during the years 1971 to 2000 are a low of -52 at Redstone, and a high of 110 at three Montana locations. The MLRA lies in USDA Plant Hardiness Zones 3b and 4a.

In most years, moisture is inadequate for maximum crop production. The Missouri River is the only dependable source of water for irrigation; therefore, only a small acreage is irrigated. Ground water is in limited supply.

Detailed information, which describes the physiography, groundwater, soils drainage and climate is available by referring to

the local USDA-NRCS County Soil Survey. Site specific climatic data within MLRA 53A can be found at the following web site; http://www.wrcc.sage.dri.edu/ OR http://www.wcc.nrcs.usda.gov/cgibin/state.pl?state=mt.

With such wide variations in climate information, the user should access the station closest to the site being evaluated.

Freeze-free period (28 deg)(days): **(9 years in 10 at least)**	96	113
Last Killing Freeze in Spring (28 deg): **(1 year in 10 later than)**		
Last Frost in Spring (32 deg): **(1 year in 10 later than)**		
First Frost in Fall (32 deg): **(1 year in 10 earlier than)**		
First Killing Freeze in Fall (28 deg): **(1 year in 10 earlier than)**		
Length of Growing Season (32 deg)(days): **(9 years in 10 at least)**	55	124
Growing Degree Days (40 deg):		
Growing Degree Days (50 deg):		
Annual Minimum Temperature:	-41	-33
Mean annual precipitation (inches):	12	16

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												
Precip. More Than												
Monthly Average:	0.36	0.27	0.48	0.88	1.90	2.80	2.10	1.48	1.24	0.68	0.36	0.36
Temp. Min.												
Temp. Max.												
Temp. Avg.	8.8	16.1	27.1	42.2	54.0	62.8	68.4	67.3	55.8	44.1	26.8	14.2

Climate Station	**Location**	**From**	**To**
MT6236	Opheim 10 N, MT	1971	2000
MT6238	Opheim 16 SE, MT	1971	2000
MT2122	Culbertson, MT	1971	2000
MT6927	Redstone, MT	1971	2000
MT5572	Medicine Lake 3 SE, MT	1971	2000
MT6660	Poplar 2 E, MT	1971	2000
MT6893	Raymond Border Stn, MT	1971	2000
MT7424	Scobey, MT	1971	2000
MT8777	Westby, MT	1971	2000
MT5285	Lustre 4 NNW, MT	1971	2000
MT1088	Bredette, MT	1971	2000

Soil Interpretations

This FSG consists of moderately deep to very deep, normally well-drained fertile soils formed in glacial till and alluvium. These soils have properties that are generally very favorable for plant growth. Electrical conductivity is <4 mmhos/cm, and sodium absorption ration is <13. Calcium carbonate equivalent is normally <15 percent, but some soils within this FSG can have CCEs ranging from 15 to 50 percent.

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

	Minimum	Maximum
Depth:	20	72
Surface Fragments >3" (% Cover):		
Organic Matter (percent): (surface layer)	0.5	4.0
Electrical Conductivity (mmhos/cm): (0 - 24 inches)	0	4
Sodium Absorption Ratio: (0 - 12 inches)	0	13
Soil Reaction (1:1) Water (pH): (0 - 12 inches)	5.5	9
Available Water Capacity (inches): (0 - 60 inches)	3	11
Calcium Carbonate Equivalent (percent): (0 - 12 inches)	0	50

Adapted Species List

The following forage species have been separated by common grouping methods which relate to principle growth period or taxonomic differences. Within these categories a further subdivision has been provided denoting whether the plant is native (N) or introduced (I) and recommended for dryland or irrigated conditions. Since some forages can be valuable when grown under dryland conditions but provide enhanced yield or additional cuttings when irrigated they may appear under both categories. Some species are more or less exclusive to only one management system and are represented as such.

Cool Season Grasses	Scientific Symbol	Dryland	Irrigated
Altai wildrye (I) 1/	LEAN3	YES	NO
Basin wildrye (N)	LECI4	YES	NO
Big bluegrass (N)	POSE	YES	YES
Canada wildrye (N) 1/	ELCA4	YES	NO
Creeping meadow foxtail (I) 2/	ALAR	NO	YES
Crested wheatgrass (I)	AGCR	YES	NO
Green needlegrass (N)	NAVI4	YES	NO
Hybrid wheatgrass (I) 1/	ELHO3	YES	NO
Intermediate wheatgrass (I) 1/	THIN6	YES	YES

Meadow bromegrass (I)	BRBI2	NO	YES
Pubescent wheatgrass (I) 1/	THIN6	YES	YES
Russian wildrye (I)	PSJU3	YES	NO
Slender wheatgrass (N)	ELTR7	YES	YES
Tall wheatgrass (I)	THPO7	YES	YES
Thickspike wheatgrass (N)	ELLAL	YES	NO
Western wheatgrass (N)	PASM	YES	YES

Warm Season Grasses	**Scientific Symbol**	**Dryland**	**Irrigated**
Big bluestem (N)	ANGE	YES	NO
Little bluestem (N)	SCSC	YES	NO
Prairie sandreed (N)	CALO	YES	NO
Sideoats grama (N)	BOCU	YES	NO
Switchgrass (N)	PAVI2	YES	NO

Legumes	**Scientific Symbol**	**Dryland**	**Irrigated**
Alfalfa (I)	MESA	YES	YES
Alsike clover (I)	TRHY	NO	YES
Cicer milkvetch (I)	ASCI4	NO	YES
Sainfoin (I)	ONVI	YES	YES

Other Perennial Forbs	**Scientific Symbol**	**Dryland**	**Irrigated**
Lewis flax (N)*	LILE3	YES	NO
Maximilian sunflower (N)*	HEMA2	YES	NO
Purple/white prairieclover (N)*	DAPU5	YES	NO
Winterfat (N)*	KRLA2	YES	NO

Annual Species	**Scientific Symbol**	**Dryland**	**Irrigated**
Field peas	PISAA2	YES	NO
Hay/ feed barley	HORDE	YES	YES
Hay/feed oats	AVENA	YES	YES
Lentils	LENS	YES	NO
Peas/small grains	LATHY	YES	YES
Rye, wheat, spelt, triticale	TRITI	YES	YES

Adaptation of forages to this Forage Suitability Group (FSG) covers a relatively wide range of potentials from highly adapted to moderately well adapted. Since various cultivars within a specie can be more or less productive on a particular site within this FSG the species in general will be listed if it will thrive on one or more of these sites. It is up to the FSG (user) to determine the appropriate scope of adaptation the listed species (or their cultivars) have which will lead to their successful establishment and acceptable yields.

*These species only recommended for components of native mixtures.

1/ Recommended only for upper end of 10-14" precipitation zone
2/ Can be grown on dryland if site is subirrigated

Production Estimates

The following data represents "best available estimates" from many sources on representative species adapted to this FSG. In time and as documented data acquisition allows, specific plot, field trial or field clipping information will be incorporated into this document.

All pasture production estimates are determined as initial stocking rates and developed by multiplying a predicted forage yield times an expected harvest efficiency of 30%, then dividing that value by 1 animal unit month's "consumption" (915 lbs air dry).

Production estimates represent total annual production.

Forage Crop	Dryland		Irrigated	
	Low (lbs/ac/yr)	High (lbs/ac/yr)	Low (lbs/ac/yr)	High (lbs/ac/yr)
Alfalfa	2700	6600	9860	11460
Alfalfa / cool season grass mix	2300	5400	7000	11460
Introduced cool season grasses	730	1900	1400	3500
Native cool season grasses	685	1180		
Warm season grass mix	700	850		

Pasture	Dryland		Irrigated	
	Low (AUMs/ac)	High (AUMs/ac)	Low (AUMs/ac)	High (AUMs/ac)
Alfalfa	0.9	2.2	3.2	3.8
Alfalfa / cool season grass mix	0.8	1.8	2.3	3.8
Introduced cool season grasses	0.2	0.6	0.5	1.1
Native cool season grasses	0.2	0.4		
Warm season grass mix	0.2	0.3		

1 AUM = 915 lbs air-dry

Forage Growth Curves

Growth Curve Number: MT53AY02
Growth Curve Name: 12-15" dryland alfalfa, 1 cutting
Growth Curve Description:

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	10	25	20	20	10	15	0	0	0

Growth Curve Number: MT53AY03
Growth Curve Name: 12-15" dryland legumes, 1 cutting
Growth Curve Description: (trefoil, sainfoin, clover)

Percent Production by Month

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

Growth Curve Number: MT53AY04
Growth Curve Name: 12-15" dryland alfalfa (0-25%) with cool season grass (.75%)
Growth Curve Description:

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	30	25	15	5	20	0	0	0

Growth Curve Number: MT53AY05
Growth Curve Name: 12-15" dryland legume, 1 cutting with cool season grass
Growth Curve Description: (trefoil, sainfoin, clover + cool season grasses

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	10	30	20	20	5	15	0	0	0

Growth Curve Number: MT53AY08
Growth Curve Name: 12-15" dryland intermediate/pubescent wheatgrass/Altai wildrye
Growth Curve Description:

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	25	45	10	5	10	0	0	0

Growth Curve Number: MT53AY09
Growth Curve Name: 12-15" dryland Russian wildrye
Growth Curve Description:

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	10	25	40	5	5	15	0	0	0

Growth Curve Number: MT53AY10
Growth Curve Name: 12-15" dryland crested and Siberian wheatgrasses
Growth Curve Description:

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	15	40	35	0	0	5	5	0	0

Soil Limitations

The Loamy FSG's have some of the more productive soils in the MLRA. Over the years however, soil organic matter reduction and loss from wind and water erosion have depleted their inherent fertility. Susceptibility to these erosive forces should be protected against during periods of tillage or forage stand establishment. Some soils within this FSG have a lower AWC (3-6"), which may decrease production of deep-rooted perennials, such as alfalfa, by approximately 25%.

Management Interpretations

To reduce the potential for sheet and rill erosion, especially on steeper slopes, include sod forming grass species in stands. Integrate both wind and water erosion control practices during the establishment period. Facilitating practices such as salting, water developments, fencing, trails, and herding can often be used effectively to change livestock behavior and use patterns.

Management can include considerations for wildlife. Timing of haying and livestock grazing can avoid peak nesting and fawning periods. Consider planting species with later maturity to allow nests to fledge before harvesting. Avoid mowing around the field; mow back and forth or from the inside to the outside of the field.

For detailed descriptions of management guidelines, refer to the NRCS Prescribed Grazing (528), and Pasture and Hay Planting (512) specifications.

Site Documentation

Similar Sites:

Inventory Data References:

Inventory Data References:

-Agriculture Handbook 296 - Land Resource Regions and Major Land Resource Areas
-Natural Resources Conservation Service (NRCS) National Water and Climate Center
-National Soil Survey Information System (NASIS) for soil surveys in Montana
-NRCS National Range and Pasture Handbook
-NRCS Field Office Technical Guides
-Various Agricultural Research Service, Cooperative Extension Service, and NRCS research
trials for plant adaptation and production
-"Dryland Pastures in Montana and Wyoming" Species and Cultivars, Seeding Techniques and
Grazing Management, Montana State University, EB19
-"Salinity and Sodicity and North Dakota Soils", North Dakota State University, EB57

-USDA Plant Hardiness Zone Maps

State Correlation:
This site has been correlated with the following states:

Forage Suitability Group Approval:

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Approval by:	Loretta J. Metz
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