FORAGE SUITABILITY GROUP
LOAMY, MODERATELY SALINE, 10-14" ppt/ >90 Freeze Free Days

FSG No.: **G052XG023MT**

Major Land Resource Area: 052X - Brown Glaciated Plain

Physiographic Features

MLRA 52 is characterized by gentle to rolling glaciated plains, with steep slopes bordering the larger rivers. Elevation ranges from 1900 to 4600 feet, with an increase from east to west. The Milk River has extensive flood plains, but other streams usually have narrow, discontinuous flood plains.

The Loamy, moderately saline FSG occurs on glacial till plains, alluvial fans and stream terraces.

	Minimum	Maximum
Elevation (feet):	1900	4600
Slope (percent):	0	4
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		
Depth (inches):		
Frequency:	None	None
Duration:	None	None
Runoff Class:	Medium	High

Climatic Features

MLRA 52 lies in a semi-arid, temperate climate. Annual precipitation ranges from 10 to 14 inches, with most rainfall occurring in spring to early summer. Summer thunderstorms are common and can bring added precipitation. Precipitation in the winter falls as snow.

Average annual snowfall ranges from 4.5" at Chester to 49.7" at Fort Benton. Snow cover depths greater than 1 inch range from 1 day at Port of Morgan to 68 days at Simpson.

Average July temperatures are about 68 degrees F., and average January temperatures are about 17 degrees F. Recorded temperature extremes in the MLRA during the years 1971 to 2000 are a low of -52 at Chester, and a high of 109 at Malta 35 SE.

Irrigation occurs out of the Milk River, but most of the area depends on precipitation for water. Precipitation is the main limiting factor in production for this area, with extreme temperatures being the second most limiting factor. MLRA 52 lies in USDA Plant Hardiness Zones 3a and 3b. Growth of native cool season plants begins in early April and continues to about the first of July depending on the year. Native warm season plants begin growth about mid-May and continue to mid-August. Adapted introduced grass and legume species can expand on native vegetation growing season windows to some degree. Some "green up" of cool season plants may occur in September and October of most years when moisture is present.

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 52 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.

More than 50 climate stations are located within this MLRA. 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)**	90	120
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)**	75	101
Growing Degree Days (40 deg):		
Growing Degree Days (50 deg):		
Annual Minimum Temperature:	-36	-31
Mean annual precipitation (inches):	10	14

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:	0.41	0.28	0.56	0.92	2.11	2.29	1.61	1.31	1.17	0.63	0.46	0.40
Temp. Min.												
Temp. Max.												
Temp. Avg.	17.1	23.5	33.4	44.6	54.4	62.4	67.8	67.1	56.3	45.3	29.8	20.2

Climate Station	**Location**	**From**	**To**
MT0770	Big Sandy, MT	1971	2000
MT3113	Fort Benton, MT	1971	2000
MT8021	Sun River 4 S, MT	1971	2000
MT1974	Conrad, MT	1971	2000
MT1692	Chester, MT	1971	2000
MT7620	Simpson 6 NW, MT	1971	2000
MT3929	Harlem 4 W, MT	1971	2000
MT5340	Malta 35 S, MT	1971	2000
MT6672	Port of Morgan, MT	1976	2000
MT1722	Chinook, MT	1971	2000

Soil Interpretations

The Loamy, Moderately Saline FSG generally consists of very deep, well drained soils that formed in alluvium. Sodium absorption ratio is <13, and calcium carbonate equivalent is <15 percent.

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

	Minimum	Maximum
Depth:	60	72
Surface Fragments >3" (% Cover):		
Organic Matter (percent): (surface layer)	0.5	1.0
Electrical Conductivity (mmhos/cm): (0 - 24 inches)	4	8
Sodium Absorption Ratio: (0 - 12 inches)	0	13
Soil Reaction (1:1) Water (pH): (0 - 12 inches)	5.5	8.5
Available Water Capacity (inches): (0 - 60 inches)	6	10
Calcium Carbonate Equivalent (percent): (0 - 12 inches)	0	15

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
Canada wildrye (N)	ELCA4	NO	YES
Crested wheatgrass (I)	AGCR	YES	NO
Green needlegrass (N)	NAVI4	YES	YES
Hybrid wheatgrass (I) 1/	ELHO3	YES	NO
Intermediate wheatgrass (I) 1/	THIN6	YES	YES
Pubescent wheatgrass (I) 1/	THIN6	YES	YES
Russian wildrye (I)	PSJU3	YES	NO
Slender wheatgrass (N)	ELTR7	YES	YES
Streambank wheatgrass (N)	ELLA3	YES	YES

Tall wheatgrass (I)	THPO7	YES	YES
Thickspike wheatgrass (N)	ELLAL	YES	YES
Western wheatgrass (N)	PASM	YES	YES
Warm Season Grasses	**Scientific Symbol**	**Dryland**	**Irrigated**
Little bluestem (N)	SCSC	YES	NO
Legumes	**Scientific Symbol**	**Dryland**	**Irrigated**
Birdsfoot trefoil (I)	LOCO6	NO	YES
Cicer milkvetch (I)	ASCI4	NO	YES
Other Perennial Forbs	**Scientific Symbol**	**Dryland**	**Irrigated**
Winterfat (N)*	KRLA2	YES	NO
Annual Species	**Scientific Symbol**	**Dryland**	**Irrigated**
Hay/feed barley (I)	HORDE	YES	YES
Hay/feed oats (I)	AVENA	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.

*This specie recommended only as component of native mixture.

1/ Recommended for upper end of 10-14" precipitation zone

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)
Introduced cool season grasses	1000	1600	1300	2000
Legumes	1500	2100	2000	3500
Legumes/ cool season grass mix	1500	2100	2000	3500
Native cool season grasses	500	1400		

Warm season grasses	500	900

Pasture	Dryland		Irrigated	
	Low (AUMs/ac)	High (AUMs/ac)	Low (AUMs/ac)	High (AUMs/ac)
Introduced cool season grasses	0.3	0.5	0.4	0.7
Legumes	0.5	0.7	0.7	1.1
Legumes/ cool season grass mix	0.5	0.7	0.7	1.1
Native cool season grasses	0.2	0.5		
Warm season grasses	0.2	0.3		

1 AUM = 915 lbs air-dry

Forage Growth Curves

Growth Curve Number: MT52XY03
Growth Curve Name: 10-19" 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: MT52XG05
Growth Curve Name: 10-14"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: MT52XG08
Growth Curve Name: 10-14" 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: MT52XY09
Growth Curve Name: 10-19" 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: MT52XG10
Growth Curve Name: 10-14" dryland crested and Siberian wheatgrass
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, Moderately Saline FSG has a primary limitation of salinity. The salinity can limit species selection and production potential, and can also cause available water holding capacity to decrease. It is also limited by restricted permeability and wind erosion.

Management Interpretations

The impact on yields can be reduced by selecting species adapted to the saline conditions of these soils when establishing new stands or renovating stands. 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.

The solution to salinity problems lies in the prevention of upward salt movement, which includes utilizing existing moisture, preventing additional water moving into the system, and/or site drainage. Using deep-rooted perennial crops will also slow or prevent moisture movement into affected areas. Irrigation water management is critical on irrigated sites. Timing, duration, and wastewater disposal all influence the movement of salts.

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:

Similar FSG's:

FSG ID	FSG Narrative
G052XG017MT	Loamy soils do not have the limiting salinity content in the soil profile and are more productive.

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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