

FORAGE SUITABILITY GROUP

SUBIRRIGATED, SALINE, 15-19" ppt/ 90-120 Freeze Free Days

FSG No.: G052XK033MT

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.

Subirrigated, Saline FSGs occur on nearly level flood plains and low stream terraces. Usually flat terrain and salinity affect these areas, resulting in limited forage production potential.

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	1900	4600
Slope (percent):	0	4
Flooding:		
Frequency:	None	Rare
Duration:	None	Brief
Ponding:		
Depth (inches):		
Frequency:	None	None
Duration:	None	None
Runoff Class:	Negligible	Very low

Climatic Features

MLRA 52 lies in a semi-arid, temperate climate. Annual precipitation ranges from 10 to 14 inches, but 15 to 19 inches in some areas, 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 27.1" at Hinsdale to 58.9" at Great Falls WSCMO AP. Snow cover depths greater than 1 inch range from 9 days at Hinsdale to 60 days at Great Falls WSCMO AP.

Average July temperatures are about 69 degrees F., and average January temperatures are about 19 degrees F. Recorded temperature extremes in the MLRA during the years 1971 to 2000 are a low of -42 at Geraldine, and a high of 108 at Geraldine.

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): 90 138
 (9 years in 10 at least)

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): 94 123
 (9 years in 10 at least)

Growing Degree Days (40 deg):

Growing Degree Days (50 deg):

Annual Minimum Temperature:

Mean annual precipitation (inches):

Monthly precipitation (inches) and temperature (F):

2 years in 10: Precip. Less Than Precip. More Than	<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>
Monthly Average:	0.64	0.48	0.87	1.36	2.75	2.90	1.59	1.48	1.30	0.87	0.62	0.60
Temp. Min.												
Temp. Max.												
Temp. Avg.	19.6	25.5	33.5	44.3	54.1	62.4	68.8	68.1	57.4	46.6	32.1	23.0

<u>Climate Station</u>	<u>Location</u>	<u>From</u>	<u>To</u>
MT4180	Hinsdale 4 SW, MT	1971	2000
MT3751	Great Falls WSCMO Airport, MT	1971	2000
MT3445	Geraldine, MT	1971	2000
MT8455	Ulm 8 SE Truly, MT	1971	2000

Soil Interpretations

This FSG consists of deep to very deep, somewhat poorly drained to moderately well drained soils formed in alluvium and have a water table which affects plant species selection and growth habits. Sodium absorption ratio is <13, and calcium carbonate equivalent is <15 percent.

Drainage Class:	Somewhat poorly drained	To	Moderately well drained
Permeability Class: (0 - 40 inches)	Slow	To	Moderately slow
Frost Action Class:	Moderate	To	High

	<u>Minimum</u>	<u>Maximum</u>
Depth:	40	60
Surface Fragments >3" (% Cover):		
Organic Matter (percent): (surface layer)	3.0	5.0
Electrical Conductivity (mmhos/cm): (0 - 24 inches)	8	16
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)	3	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.

<u>Cool Season Grasses</u>	<u>Scientific Symbol</u>	<u>Dryland</u>	<u>Irrigated</u>
Altai wildrye (I)	LEAN3	YES	NO
Beardless wildrye (I)	LETR5	YES	NO
Hybrid wheatgrass (I)	ELHO3	YES	NO
Intermediate wheatgrass (I)	THIN6	YES	NO
Pubescent wheatgrass (I)	THIN6	YES	NO
Russian wildrye (I)	PSJU3	YES	NO
Slender wheatgrass (N)	ELTR7	YES	NO
Streambank wheatgrass (N)	ELLA3	YES	NO
Tall wheatgrass (I)	THPO7	YES	NO
Thickspike wheatgrass (N)	ELLAL	YES	NO
Western wheatgrass (N)	PASM	YES	NO

<u>Legumes</u>	<u>Scientific Symbol</u>	<u>Dryland</u>	<u>Irrigated</u>
Birdsfoot trefoil (I)	LOCO6	YES	NO
Cicer milkvetch (I)	ASCI4	YES	NO

<u>Other Perennial Forbs</u>	<u>Scientific Symbol</u>	<u>Dryland</u>	<u>Irrigated</u>
Winterfat (N)*	KRLA2	YES	NO

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.

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	<u>Dryland</u>		<u>Irrigated</u>	
	<u>Low</u>	<u>High</u>	<u>Low</u>	<u>High</u>
	(lbs/ac/yr)	(lbs/ac/yr)	(lbs/ac/yr)	(lbs/ac/yr)
Introduced cool season grasses	1700	2600		
Legumes	2200	3900		
Legumes/ cool season grass mix	2200	3900		
Native cool season grasses	1300	2500		

Pasture	<u>Dryland</u>		<u>Irrigated</u>	
	<u>Low</u>	<u>High</u>	<u>Low</u>	<u>High</u>
	(AUMs/ac)	(AUMs/ac)	(AUMs/ac)	(AUMs/ac)
Introduced cool season grasses	0.6	0.9		
Legumes	0.7	1.3		
Legumes/ cool season grass mix	0.7	1.3		

Native cool season grasses 0.4 0.8
 1 AUM = 915 lbs air-dry

Forage Growth Curves

Growth Curve Number: MT52XK01
Growth Curve Name: 15-19" subirrigated
Growth Curve Description:

Percent Production by Month

<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	0	10	35	30	20	5	0	0	0

Growth Curve Number: MT52XY03
Growth Curve Name: 10-19" dryland legumes, 1 cutting
Growth Curve Description: (trefoil, sainfoin, clover)

Percent Production by Month

<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	0	20	30	20	10	20	0	0	0

Growth Curve Number: MT52XK05
Growth Curve Name: 15-19" dryland legume, 1 cutting with cool season grass
Growth Curve Description: (trefoil, sainfoin, clover + cool season grasses)

Percent Production by Month

<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	0	35	25	20	5	15	0	0	0

Growth Curve Number: MT52XK08
Growth Curve Name: 15-19" dryland intermediate/ pubescent wheatgrass/Altai wildrye
Growth Curve Description:

Percent Production by Month

<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	25	40	15	5	10	0	0	0

Growth Curve Number: MT52XY09
Growth Curve Name: 10-19" dryland Russian wildrye
Growth Curve Description:

Percent Production by Month

<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	10	25	40	5	5	15	0	0	0

Soil Limitations

The Subirrigated, Saline FSG is limited primarily by higher levels of salts in the soils (electrical conductivity 8 to 16 mmhos/cm). This limitation will reduce species selection and may cause difficulty in stand establishment. Potential production may also be affected. Limited available water holding capacity due to the effect of salts and sodium will also affect production.

Management Interpretations

Soils in this group are prone to flooding, which can negatively impact plant growth if it occurs in the spring or during growing season. Flooding duration, or how long the plant is under water, will have a greater impact on the plant than flooding frequency. Machinery and livestock also need to be excluded during these times to prevent wheel ruts, soil compaction, and trampling. 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, saline tolerant 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

G052XK032MT

FSG Narrative

Subirrigated, moderately saline soils have lower salinity levels in the soil profile.

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:

Original Author: Sarah Stevens, Jon Siddoway, Loretta Metz, Rick Bandy,
Greg Snell

Original Date: 1/30/2006

Approval by: Loretta J. Metz

Approval Date: 8/16/2006