FORAGE SUITABILITY GROUP

SUBIRRIGATED, MODERATE SALINE, 10-14" ppt/ >90 Freeze Free Days

FSG No.: **G046XG032MT**

Major Land Resource Area: 046X - Northern Rocky Mountain Foothills

Physiographic Features

MLRA 46, Northern Rocky Mountain Foothills, is characterized by rugged hills and low mountains cut by many narrow valleys that have steep gradients. A few of the major rivers are bordered by broad flood plains and fans. Elevation ranges from 3600 to 5900 feet in the north and gradually increases to 5900 to 7800 feet in the south. About one-fifth of this area is federally owned and the remainder of it is in farms or ranches. Many of the valleys are irrigated, but they make up only 1 or 2 percent of the total area. Grain and livestock forage are the main crops, but potatoes, sugar beets, peas, and other crops are grown in the warmer valleys.

Subirrigated, Moderate Saline FSGs occur on flood plains.

	Minimum	Maximum
Elevation (feet):	3600	7800
Slope (percent):	0	4
Flooding:		
Frequency:	Rare	Occasional
Duration:	Brief	Long
Ponding:		
Depth (inches):		
Frequency:	None	None
Duration:	None	None
Runoff Class:	Medium	High

Climatic Features

MLRA 46 lies in a semi-arid temperate climate. Annual precipitation ranges from 11 to 20 inches, but can be as much as 29 inches in the highest elevations and as little as 9 inches in some basins. In the north minimum precipitation is in spring, and in the south it is early in summer. Winter precipitation is snow. Precipitation is too low for good growth of crops in some parts of the area, but in others it is adequate for growing small grains and forage. Most of the water for irrigation is supplied by the major rivers, with some small streams providing local supplies.

Average annual snowfall ranges from 8" at Augusta to 66" at Del Bonita. Snow cover depths greater than 1 inch range from 13 days at Blackleaf to 66 days at Cut Bank airport.

Average July temperatures are about 64 degrees F., and average January temperatures are about 22 degrees F. Recorded temperature extremes in the MLRA during the data years are a low of -47 at Augusta, and a high of 103 at Cut Bank airport.

MLRA 46 lies in USDA Plant Hardiness Zones 3b, 4a, and 4b.

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 46X 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.

Numerous 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)**	60	104
Growing Degree Days (40 deg):		

Annual Minimum Temperature:	-34	-25
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	0.34	0.59	1.05	2.35	2.42	1.54	1.65	1.21	0.61	0.44	0.38
Temp. Min.												
Temp. Max.												
Temp. Avg.	21.7	26.2	33.1	42.3	51.2	58.7	64.4	64.0	54.8	45.2	31.3	24.0

Climate Station	Location	From	To
MT2173	Cut Bank FAA Airport, MT	1971	2000
MT2301	Del Bonita, MT	1971	2000
MT0364	Augusta, MT	1971	2000
MT0877	Blackleaf, MT	1971	2000
MT1737	Choteau Airport, MT	1971	2000
MT2857	Fairfield, MT	1971	2000

Soil Interpretations

This FSG consists of very deep, poorly drained soils that formed in alluvium or calcareous clayey alluvium, and are negatively impacted by a water table and salinity. Sodium absorption ratio is <13, and calcium carbonate equivalent is <15 percent.

Drainage Class:	Poorly drained	To	Poorly drained
Permeability Class: (0 - 40 inches)	Slow	To	Slow
Frost Action Class:	High	To	High

	Minimum	Maximum
Depth:	60	72
Surface Fragments >3" (% Cover):		
Organic Matter (percent): (surface layer)	1.0	2.0
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)	7.4	9
Available Water Capacity (inches): (0 - 60 inches)	6	8
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)	LEAN3	YES	NO
Basin Wildrye (N)	LECI4	YES	NO
Beardless wheatgrass (N)	PSSPI	YES	NO
Bluebunch Wheatgrass (N)	PSSPS	YES	NO
Canada Wildrye (N)	ELCA4	YES	NO
Crested Wheatgrass (I)	AGCR	YES	NO
Green Needlegrass (N)	NAVI4	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
Western Wheatgrass (N)	PASM	YES	NO

Legumes	**Scientific Symbol**	**Dryland**	**Irrigated**
Birdsfoot trefoil (I)	LOCO6	YES	NO
Cicer milkvetch (I)	ASCI4	YES	NO

Other Perennial Forbs	**Scientific Symbol**	**Dryland**	**Irrigated**
Winterfat (N)* 1/	KRLA2	YES	NO

Annual Species	**Scientific Symbol**	**Dryland**	**Irrigated**
Hay/feed barley (I)	HORDE	YES	NO
Hay/feed oats (I)	AVENA	YES	NO
Rye, wheat, triticale	TRITI	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.

*These species only recommended for components of native mixtures.

1/ Recommended for higher EC levels (8-16 mmhos/cm)

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	1700	4600	0	0
Lentils	650	1200	0	0
Native cool season grasses	1800	4000	0	0
Oats	1300	2200	0	0

Pea grain	700	2200	0	0
Warm season grasses	900	1500	0	0

Pasture	**Dryland**		**Irrigated**	
	Low (AUMs/ac)	**High (AUMs/ac)**	**Low (AUMs/ac)**	**High (AUMs/ac)**
Introduced cool season grasses	0.6	1.5	0.0	0.0
Lentils	0.2	0.4	0.0	0.0
Native cool season grasses	0.6	1.3	0.0	0.0
Oats	0.4	0.7	0.0	0.0
Pea grain	0.2	0.7	0.0	0.0
Warm season grasses	0.3	0.5	0.0	0.0

1 AUM = 915 lbs air-dry

Forage Growth Curves

Growth Curve Number: MT46XY01
Growth Curve Name: 10-19" subirrigated
Growth Curve Description:

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	20	40	20	10	5	0	0	0

Growth Curve Number: MT46XG08
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	45	35	10	0	5	0	0	0

Growth Curve Number: MT46XG09
Growth Curve Name: 10-14" 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	5	45	35	10	0	5	0	0	0

Soil Limitations

The Subirrigated, Saline FSG is limited primarily by higher levels of salts in the soils (electrical conductivity 4 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:

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
-Central Agri. Research Center, Moccasin MTProduction and Yeild Trials
-"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, John Oiestad, Kirt Walstad
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Approval by:	Loretta J. Metz
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