

## **FORAGE SUITABILITY GROUP**

### **LOAMY-MODERATELY SALINE, 15-19" ppt/ 90-120 Freeze Free Days**

**FSG No.:** G046XK023MT

**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.

This FSG is common on sedimentary plains, flood plains, hills, stream terraces and/or alluvial fans.

	<u>Minimum</u>	<u>Maximum</u>
<b>Elevation (feet):</b>	3600	7800
<b>Slope (percent):</b>	0	4
<b>Flooding:</b>		
<b>Frequency:</b>	None	None
<b>Duration:</b>	None	None
<b>Ponding:</b>		
<b>Depth (inches):</b>		
<b>Frequency:</b>	None	None
<b>Duration:</b>	None	None
<b>Runoff Class:</b>	Medium	Medium

#### **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 23" at Babb to 96" at Nye. Snow cover depths greater than 1 inch range from 0 days at Judith Gap to 93 days at Lewistown FAA airport.

Average July temperatures are about 65 degrees F., and average January temperatures are about 24 degrees F. Recorded temperature extremes in the MLRA during the data years are a low of -50 at Denton, and a high of 107 at Yellowtail Dam.

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/cgi-bin/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):** 90 120  
 (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):** 54 131  
 (9 years in 10 at least)

**Growing Degree Days (40 deg):**

**Annual Minimum Temperature:** -36 -23

**Mean annual precipitation (inches):** 15 19

**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>
<b>Monthly Average:</b>	0.69	0.52	1.05	1.63	2.92	2.74	1.84	1.59	1.49	1.17	0.71	0.68
<b>Temp. Min.</b>												
<b>Temp. Max.</b>												
<b>Temp. Avg.</b>	23.7	27.9	34.1	42.7	51.4	59.3	65.4	65.1	55.3	45.6	32.7	25.4

<u>Climate Station</u>	<u>Location</u>	<u>From</u>	<u>To</u>
MT1552	Cascade 5 S, MT	1971	2000
MT0392	Babb 6 NE, MT	1971	2000
MT2347	Denton 1 NNE, MT	1948	2005
MT7864	Stanford, MT	1971	2000
MT7159	Rogers Pass 9 NNE, MT	1964	2005
MT6190	Nye 2, MT	1971	2000
MT5603	Melville 4 W, MT	1971	2000
MT0780	Big Timber, MT	1971	2000
MT4545	Judith Gap 13 E, MT	1971	2000
MT5761	Moccasin Experiment Station, MT	1971	2000
MT9240	Yellowtail Dam, MT	1971	2000
MT3727	Grass Range, MT	1971	2000
MT4985	Lewistown FAA AP, MT	1971	2000

MT6747

Pryor, MT

1971

2000

### Soil Interpretations

The Loamy-Moderately Saline FSG generally consists of deep to very deep, moderately deep to well drained soils that formed in clayey alluvium or residuum on foot slopes and swales on terraces and uplands. Sodium absorption ratio is <13, electrical conductivity is 4-8 mmhos/cm.

<b>Drainage Class:</b>	Moderately well drained	To	Moderately well drained
<b>Permeability Class:</b> (0 - 40 inches)	Slow	To	Slow
<b>Frost Action Class:</b>	Moderate	To	Moderate

	<u>Minimum</u>	<u>Maximum</u>
<b>Depth:</b>	40	72
<b>Surface Fragments &gt;3" (% Cover):</b>		
<b>Organic Matter (percent):</b> (surface layer)	2.0	4.0
<b>Electrical Conductivity (mmhos/cm):</b> (0 - 24 inches)	4	8
<b>Sodium Absorption Ratio:</b> (0 - 12 inches)	0	13
<b>Soil Reaction (1:1) Water (pH):</b> (0 - 12 inches)	6.1	7.8
<b>Available Water Capacity (inches):</b> (0 - 60 inches)	6	0
<b>Calcium Carbonate Equivalent (percent):</b> (0 - 12 inches)	0	0

### 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	YES
Basin Wildrye (N)	LECI4	YES	NO
Beardless wheatgrass (N)	PSSPI	YES	YES
Beardless Wildrye (N)	LETR5	YES	YES
Bluebunch Wheatgrass (N)	PSSPS	YES	NO
Canada Wildrye (N)	ELCA4	YES	NO
Crested Wheatgrass (I)	AGCR	YES	NO
Green Needlegrass (N)	NAVI4	YES	NO



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	4500	1900	4800
Native cool season grasses	1800	4000	0	0
Warm season grasses	900	1500	0	0

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	1.5	0.6	1.6
Native cool season grasses	0.6	1.3	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:** MT46XK03  
**Growth Curve Name:** 15-19" 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:** MT46XK05  
**Growth Curve Name:** 15-19" dryland legume, 1 cutting with cool season grass  
**Growth Curve Description:** (treefoil, 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:** MT46XK08  
**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:** MT46XK10  
**Growth Curve Name:** 15-19" dryland cersted and Siberian wheatgrasses  
**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	15	40	35	0	0	10	0	0	0

**Growth Curve Number:** MT46XK09  
**Growth Curve Name:** 15-19" 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

**Growth Curve Number:** MT46XK10  
**Growth Curve Name:** 15-19" dryland cersted and Siberian wheatgrasses  
**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	15	40	35	0	0	10	0	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.

**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 Table xyz.1, Hayland Management Guidelines, and Table xyz.2, Pasture Management Guidelines.

## **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 MT Production and Yield 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:**

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