

## **FORAGE SUITABILITY GROUP**

### **SANDY, 15-19" ppt/ >90 Freeze Free Days**

**FSG No.:** G046XK025MT

**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.

The Sandy FSG is most often located on flood plains, hills, uplands, and stream terraces. Some phases of this group are also located on terraces, fans, and dune-like land forms and can be unstable.

	<u>Minimum</u>	<u>Maximum</u>
<b>Elevation (feet):</b>	3600	7800
<b>Slope (percent):</b>	0	6
<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>	Very low	Low

#### **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/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):** 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):**

**Growing Degree Days (50 deg):**

**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**

This FSG contains very deep, well drained soils formed mainly in alluvium. Electrical conductivity is <4 mmhos/cm, sodium absorption ratio is <13, and calcium carbonate equivalent is <15 percent.

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

	<u>Minimum</u>	<u>Maximum</u>
<b>Depth:</b>	60	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)	0	4
<b>Sodium Absorption Ratio:</b> (0 - 12 inches)	0	0
<b>Soil Reaction (1:1) Water (pH):</b> (0 - 12 inches)	6.6	8.4
<b>Available Water Capacity (inches):</b> (0 - 60 inches)	6	0
<b>Calcium Carbonate Equivalent (percent):</b> (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>
Beardless wheatgrass (N)	PSSPI	YES	YES
Big bluegrass (N)	POSE	YES	NO
Blue wildrye (N) 2/	ELGL	YES	NO
Bluebunch wheatgrass (N)	PSSPS	YES	NO
Canada wildrye (N)	ELCA4	YES	YES
Creeping meadow foxtail (I) 2/	ALAR	YES	YES
Hybrid wheatgrass (I)	ELHO3	YES	NO
Hybrid wheatgrass (I)	ELHO3	YES	NO

Idaho Fescue (N) 1/	FEID	YES	NO
Mountain bromegrass (N)	BRMA4	YES	NO
Orchardgrass (I)	DAGL	YES	YES
Pubescent wheatgrass (I)	THIN6	YES	YES

<u>Warm Season Grasses</u>	<u>Scientific Symbol</u>	<u>Dryland</u>	<u>Irrigated</u>
Prairie sandreed (N)	CALO	YES	NO
Sideoats grama	BOCU	YES	NO

<u>Legumes</u>	<u>Scientific Symbol</u>	<u>Dryland</u>	<u>Irrigated</u>
Birdsfoot trefoil (I)	LOCO6	YES	YES
Sainfoin (I)	ONVI	YES	YES
Small burnet (I)	SAMI3	YES	NO

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

<u>Annual Species</u>	<u>Scientific Symbol</u>	<u>Dryland</u>	<u>Irrigated</u>
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/ Requires at least 130 frost free days

2/ Upper end of 15-19" 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	<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)
Alfalfa	2650	3350	3550	6150
Introduced cool season grasses	2050	4850	2150	4950
Lentils	900	1450	0	0
Native cool season grasses	2150	4350	0	0
Oats	1650	2550	0	0
Pea grain	1050	2550	0	0
Warm season grasses	1250	1850	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)
Alfalfa	0.9	1.2	1.2	2.0
Introduced cool season grasses	0.7	1.6	0.7	1.6
Lentils	0.3	0.5	0.0	0.0
Native cool season grasses	0.7	1.4	0.0	0.0
Oats	0.5	0.8	0.0	0.0
Pea grain	0.3	0.7	0.0	0.0
Warm season grasses	0.4	0.6	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:** MT46XG06  
**Growth Curve Name:** 10-14" grazable forest/woodland with cool season understory  
**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	35	40	10	0	5	0	0	0

**Growth Curve Number:** MT46XK07  
**Growth Curve Name:** 15-19" dryland bluegrass  
**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	35	45	15	0	5	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

**Soil Limitations**

The Sandy FSG has several limiting factors. The soil texture makes it susceptible to wind erosion. Somewhat excessive to excessive drainage, as well as low to moderate available water holding capacity will limit species selection and potential production. Stand establishment and future management will need to take into account the erosive nature of the soils in this FSG. Some soils within this FSG have a lower AWC (3-6"), which may decrease production of deep-rooted perennials by approximately 25%. Also, low natural fertility is another limitation.

**Management Interpretations**

The impact on yields can be reduced by selecting species adapted to the droughty conditions and coarse textures inherent to these soils. 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
- 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:**

Original Author: Sarah Stevens, Jon Siddoway, Loretta Metz, Rick Bandy,  
Greg Snell, John Oiestad, Kirt Walstad

Original Date: 1/30/2006

Approval by: Loretta J. Metz

Approval Date: 9/1/2006