

## **FORAGE SUITABILITY GROUP**

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

**FSG No.:** G058AK024MT

**Major Land Resource Area:** 058A -Northern Rolling High Plains, Northern Part

#### **Physiographic Features**

In general the Forage Suitability Group sites in MLRA 58A can occur on nearly level to 15% slopes. Site elevations range from approximately 1600 feet to over 5000 feet. Typical of the diversity of the rolling high plains terrain, physiographic features vary widely. Semi-arid steppe occupies vast areas of the MLRA but is often dissected with naturally occurring ephemeral gullies, creek beds and Yellowstone or Missouri river tributaries. Land breaks near these tributaries and southern areas of the MLRA can be intermittently wooded with pine and some hardwoods. Knobs, buttes and other land features of resistant materials generally mark the landscape.

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>	1600	5000
<b>Slope (percent):</b>	0	15
<b>Flooding:</b>		
<b>Frequency:</b>	Rare	Occasional
<b>Duration:</b>	Extremely Brief	Brief
<b>Ponding:</b>		
<b>Depth (inches):</b>		
<b>Frequency:</b>	None	None
<b>Duration:</b>		
<b>Runoff Class:</b>	Low	High

#### **Climatic Features**

This forage suitability group (FSG) lies amidst a semi-arid northern grass prairie environment. Typical continental climate conditions exist with extremes in both temperature and rainfall intensity expected. Vast daily temperature fluctuations and desiccating winds can create rigorous evapotranspiration conditions and a severe over-winter environment for all vegetation communities and agronomic crop species selected as forages.

The Rocky Mountains to the west are distant enough so true chinook conditions are rare but down slope winds, gulf moisture and Canadian storm fronts often collide causing severe summer thunder storms, intense short duration rain events and hail.

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. Growing conditions that significantly affect the choice and establishment of forage species in this FSG are temperature extremes and lack of dependable insulating winter snow cover. The MLRA lies in USDA Plant Hardiness Zones 3a, 3b, 4a, 4b, and 5a.

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 58A 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 100 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):** 95 116  
 (9 years in 10 at least)

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

**Annual Minimum Temperature:** -37 -29

**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>	0.64	0.48	0.90	1.56	2.71	2.58	1.77	1.36	1.43	1.17	0.68	0.62
<b>Temp. Min.</b>												
<b>Temp. Max.</b>												
<b>Temp. Avg.</b>	21.3	27.1	35.0	44.7	54.2	63.2	69.5	68.9	58.0	46.6	32.2	23.6

<u>Climate Station</u>	<u>Location</u>	<u>From</u>	<u>To</u>
MT6862	Rapelje 4 S, MT	1971	2000
MT9033	Winifred, MT	1971	2000
MT2689	Ekalaka, MT	1971	2000
MT5596	Melstone, MT	1971	2000

**Soil Interpretations**

The Loamy-Moderately Saline FSG generally consists of moderately deep to very deep, well drained soils that formed in alluvium or residuum loamy sedimentary beds. Sodium absorption ratio is <13, and calcium carbonate equivalent is <15 percent.

**Drainage Class:** Moderately well drained To Well drained

**Permeability Class:** Slow To Moderate  
 (0 - 40 inches)  
**Frost Action Class:** Low To Moderate

	<u>Minimum</u>	<u>Maximum</u>
<b>Depth:</b>	20	72
<b>Surface Fragments &gt;3" (% Cover):</b>		
<b>Organic Matter (percent):</b> (surface layer)	0.5	3.0
<b>Electrical Conductivity (mmhos/cm):</b> (0 - 24 inches)	4	16
<b>Sodium Absorption Ratio:</b> (0 - 12 inches)	0	13
<b>Soil Reaction (1:1) Water (pH):</b>	5.5	8.5
<b>Available Water Capacity (inches):</b> (0 - 60 inches)	3	10
<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. In the central area of MLRA 58A the adaptability of warm season native grasses diminishes.

<u>Cool Season Grasses</u>	<u>Scientific Symbol</u>	<u>Dryland</u>	<u>Irrigated</u>
Altai wildrye (I) 1/	LEAN3	YES	NO
Basin wildrye (N)	LECI4	YES	NO
Beardless wheatgrass (N)	PSSPI	YES	YES
Beardless wildrye (N) 1/	LETR5	YES	NO
Crested wheatgrass (I)	AGCR	YES	NO
Hybrid wheatgrass (I) 1/	ELHO3	YES	NO
Intermediate wheatgrass (I) 1/	THIN6	YES	YES
Pubescent wheatgrass (I) 1/	THIN6	YES	YES
Russian wildrye (I) 1/	PSJU3	YES	NO
Slender wheatgrass (N) 1/	ELTR7	YES	YES
Streambank wheatgrass (N) 1/	ELLA3	YES	NO
Tall fescue (N) 2/	LOAR10	YES	YES
Tall wheatgrass (I) 1/	THPO7	YES	YES
Thickspike wheatgrass (N) 1/	ELMA7	YES	NO
Western wheatgrass (N) 1/	PASM	YES	YES

<u>Warm Season Grasses</u>	<u>Scientific Symbol</u>	<u>Dryland</u>	<u>Irrigated</u>
Big bluestem (N)	ANGE	YES	NO
<u>Legumes</u>	<u>Scientific Symbol</u>	<u>Dryland</u>	<u>Irrigated</u>
Birdsfoot trefoil (I)	LOCO6	YES	YES
Cicer milkvetch (I)	ASCI4	YES	YES
<u>Other Perennial Forbs</u>	<u>Scientific Symbol</u>	<u>Dryland</u>	<u>Irrigated</u>
Maximilian sunflower (N)*	HEMA2	YES	NO
Winterfat (N)* 1/	KRLA2	YES	NO
<u>Annual Species</u>	<u>Scientific Symbol</u>	<u>Dryland</u>	<u>Irrigated</u>
Hay/feed barley (I)	HORDE	YES	YES
Hay/feed oats (I)	AVENA	YES	YES
Rye, wheat, spelt, triticale (I)	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/ Recommended for higher EC levels (8-16 mmhos/cm)

2/ Endophyte-free

## 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.

<u>Forage Crop</u>	<u>Dryland</u>		<u>Irrigated</u>	
	<u>Low</u> (lbs/ac/yr)	<u>High</u> (lbs/ac/yr)	<u>Low</u> (lbs/ac/yr)	<u>High</u> (lbs/ac/yr)
Cool season natives	1600	2200		
Crested wheatgrass	1100	1700		
Intermediate/pubescent wheatgrass	1100	1500	1900	3600
Russian wildrye	800	2200		
Warm season natives	1000	1500		

**Pasture**

**Dryland**

**Irrigated**

	<u>Low</u> (AUMs/ac)	<u>High</u> (AUMs/ac)	<u>Low</u> (AUMs/ac)	<u>High</u> (AUMs/ac)
Cool season natives	0.5	0.7		
Crested wheatgrass	0.4	0.6		
Intermediate/pubescent wheatgrass	0.4	0.5	0.6	1.2
Russian wildrye	0.3	0.7		
Warm season natives	0.3	0.5		

1 AUM = 915 lbs air-dry

**Forage Growth Curves**

**Growth Curve Number:** MT58AK03

**Growth Curve Name:** 15-19" dryland legumes, 1 cutting (trefoil, sainfoin, clover)

**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	25	20	10	15	15	0	0	0

**Growth Curve Number:** MT58AK05

**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	15	30	25	10	5	15	0	0	0

**Growth Curve Number:** MT58AK08

**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	40	40	10	0	5	0	0	0

**Growth Curve Number:** MT58AK09

**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	5	25	25	25	5	0	15	0	0	0

**Growth Curve Number:** MT58AK10  
**Growth Curve Name:** 15-19" dryland crested and Siberian wheatgrass  
**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	5	30	40	20	0	0	5	0	0	0

**Soil Limitations**

The Loamy, Saline FSG has a primary limitation of salinity. The high salinity levels can limit species selection and production potential. Some soils within this FSG have a lower AWC (3-6"), which may decrease production of deep-rooted perennials by approximately 25%.

**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**

G058AK017MT

**FSG Narrative**

Loamy soils are not limited by elevated salinity levels in the 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 Sodcity 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:

MT

**Forage Suitability Group Approval:**

Original Author: Loretta Metz, Walter Lujan, Steven VanFossen, Gregory Snell, Marshall Haferkamp, Roger Hybner, Robert Kilian, Sarah Stevens

Original Date: 10/26/2005

Approval by: Loretta J. Metz

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