

FORAGE SUITABILITY GROUP

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

FSG No.: G058AK025MT

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.

The Sandy FSG is most often located on flood plains, hills, 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>
Elevation (feet):	1600	5000
Slope (percent):	1	3
Flooding:		
Frequency:	None	Occasional
Duration:	None	Brief
Ponding:		
Depth (inches):		
Frequency:	None	None
Duration:	None	None
Runoff Class:	Negligible	Very low

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):

Growing Degree Days (50 deg):

Mean annual precipitation (inches): 15 19

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: 0.64 0.48 0.90 1.56 2.71 2.58 1.77 1.36 1.43 1.17 0.68 0.62

Temp. Min.

Temp. Max.

Temp. Avg. 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>
MT2689	Ekalaka, MT	1971	2000
MT5596	Melstone, MT	1971	2000
MT9033	Winifred, MT	1971	2000
MT6862	Rapelje 4 S, MT	1971	2000

Soil Interpretations

This FSG contains moderately deep to very deep, somewhat excessively drained to excessively drained soils formed in eolian sands or alluvium from sandstone. Electrical conductivity is <4 mmhos/cm, sodium absorption ratio is <13, and calcium carbonate equivalent is <15 percent.

Drainage Class:	Somewhat excessively drained	To	Excessively drained
Permeability Class: (0 - 40 inches)	Moderately rapid	To	Rapid
Frost Action Class:	Low	To	

	<u>Minimum</u>	<u>Maximum</u>
Depth:	40	72
Surface Fragments >3" (% Cover):		
Organic Matter (percent): (surface layer)	0.0	2.0
Electrical Conductivity (mmhos/cm): (0 - 24 inches)	0	4
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	12
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. 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>
Beardless wheatgrass (N)	PSSPI	YES	YES
Big bluegrass (N)	POSE	YES	YES
Canada wildrye (N)	ELCA4	YES	YES
Creeping meadow foxtail (I)	ALAR	NO	YES
Hybrid wheatgrass (I)	ELHO3	YES	NO
Indian ricegrass (N)	ACHY	YES	NO
Orchardgrass (I)	DAGL	YES	YES
Pubescent wheatgrass (I)	THIN6	YES	YES
Thickspike wheatgrass (N)	ELMA7	YES	NO
Western wheatgrass (N)	PSAM	YES	YES

<u>Warm Season Grasses</u>	<u>Scientific Symbol</u>	<u>Dryland</u>	<u>Irrigated</u>
Little bluestem (N)	SCSC	YES	NO
Prairie sandreed (N)	CALO	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.

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	1200	2800		

Dryland sorghum-sudan hybrids	3500	7000		
Lentils	700	2400		
Pubescent wheatgrass	600	3000	3700	5700
Warm season natives	1400	2800		

Pasture	<u>Dryland</u>		<u>Irrigated</u>	
	<u>Low</u> (AUMs/ac)	<u>High</u> (AUMs/ac)	<u>Low</u> (AUMs/ac)	<u>High</u> (AUMs/ac)
Cool season natives	0.4	0.9		
Dryland sorghum-sudan hybrids	1.1	2.3		
Lentils	0.2	0.8		
Pubescent wheatgrass	0.2	1.0	1.2	1.9
Warm season natives	0.5	0.9		

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

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
- "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:

MT

Forage Suitability Group Approval:

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

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Pastureland and Hayland Interpretations
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