FORAGE SUITABILITY GROUP
WET, 10-14" ppt/ >90 Freeze Free Days

FSG No.: **G058AG034MT**

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 Wet FSGs occur mainly on floodplains and overflow areas.

	Minimum	Maximum
Elevation (feet):	1600	5000
Slope (percent):	0	4
Flooding:		
Frequency:	None	Frequent
Duration:	None	Long
Ponding:		
Depth (inches):	0	6
Frequency:	None	Frequent
Duration:	None	Long
Runoff Class:	Negligible	Medium

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 dessicating 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): **(9 years in 10 at least)**	90	148
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)**	79	130
Growing Degree Days (40 deg):		

Annual Minimum Temperature:	-41	-24
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:	0.51	0.36	0.70	1.32	2.27	2.33	1.58	1.15	1.26	1.08	0.55	0.46
Temp. Min.												
Temp. Max.												
Temp. Avg.	19.3	25.9	34.9	45.3	55.2	64.4	70.6	69.6	58.3	46.7	31.7	22.0

Climate Station	Location	From	To
MT0466	Barber, MT	1971	2000
MT0802	Billings Water Plant, MT	1971	2000
MT0807	Billings WSO, MT	1971	2000
MT0819	Birney, MT	1971	1999
MT1084	Brandenberg, MT	1971	2000
MT1127	Broadus, MT	1971	2000
MT1169	Brockway 3 WSW, MT	1971	2000
MT1297	Busby, MT	1971	2000
MT1758	Circle, MT	1971	2000
MT1905	Colstrip, MT	1971	2000
MT3013	Flatwillow 4 ENE, MT	1971	2000

MT3581	Glendive, MT	1971	2000
MT3915	Hardin, MT	1971	2000
MT3939	Harlowton, MT	1971	2000
MT4345	Huntley Experiment Stn, MT	1971	2000
MT4358	Hysham, MT	1971	2000
MT4364	Hysham 25 SSE, MT	1971	2000
MT4522	Jordan, MT	1971	2000
MT4715	Knobs, MT	1971	2000
MT5303	MacKenzie, MT	1971	2000
MT5690	Miles City FAA Airport, MT	1971	2000
MT5754	Mizpah 4 NNW, MT	1971	2000
MT5870	Moorhead 9 NE, MT	1971	2000
MT5872	Mosby 2 ENE, MT	1971	2000
MT6601	Plevna, MT	1971	2000
MT6691	Powderville 8 NNE, MT	1971	2000
MT7136	Rock Springs, MT	1971	2000
MT7214	Roundup, MT	1971	2000
MT7234	Roy 24 NE Mobridge, MT	1971	1993
MT7263	Ryegate 18 NNW, MT	1971	2000
MT7728	Roy 8 NE, MT	1971	2000
MT7740	Sonnette 2 WNW, MT	1971	2000
MT8165	Terry, MT	1971	2000
MT8169	Terry 21 NNW, MT	1971	2000
MT8607	Volborg, MT	1971	2000

Soil Interpretations

This FSG consists of deep to very deep, poorly drained, medium to moderately fine textured soils on flood plains and along drainage ways. They are ponded during a portion of the year or have a seasonal water table at or near the surface during part of the growing season. Sodium absorption ratio is <13, and calcium carbonate equivalent is <15 percent. Electrical conductivity ranges anywhere from 0 to 16 mmhos/cm

Drainage Class:	Poorly drained	To	Somewhat poorly drained
Permeability Class: (0 - 40 inches)	Very slow	To	Moderate
Frost Action Class:	Moderate	To	High

	Minimum	Maximum
Depth:	40	72
Surface Fragments >3" (% Cover):		
Organic Matter (percent): (surface layer)	0.5	8.0
Electrical Conductivity (mmhos/cm): (0 - 24 inches)	0	16
Sodium Absorption Ratio:	0	13

(0 - 12 inches)		
Soil Reaction (1:1) Water (pH):	4.5	8.5
(0 - 12 inches)		
Available Water Capacity (inches):	3	11
(0 - 60 inches)		
Calcium Carbonate Equivalent (percent):	0	15
(0 - 12 inches)		

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.

Cool Season Grasses	Scientific Symbol	Dryland	Irrigated
Creeping meadow foxtail (I)	ALAR	YES	NO
Tall wheatgrass (I) 1/	THPO7	YES	NO
Western wheatgrass (N) 1/	PASM	YES	NO
Warm Season Grasses	**Scientific Symbol**	**Dryland**	**Irrigated**
Switchgrass (N)	PAVI2	YES	NO
Legumes	**Scientific Symbol**	**Dryland**	**Irrigated**
Alsike clover (I)	TRHY	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.

1/ Recommended for higher levels of EC (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).

Forage Crop	Dryland		Irrigated	
	Low (lbs/ac/yr)	High (lbs/ac/yr)	Low (lbs/ac/yr)	High (lbs/ac/yr)
Creeping meadow foxtail	3400	7300		

Pasture	Dryland		Irrigated	
	Low (AUMs/ac)	High (AUMs/ac)	Low (AUMs/ac)	High (AUMs/ac)
Creeping meadow foxtail	1.1	2.4		

1 AUM = 915 lbs air-dry

Forage Growth Curves

Growth Curve Number: MT58AG01
Growth Curve Name: 10-14" subirrigated
Growth Curve Description:

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	25	30	20	15	5	0	0	0

Soil Limitations

The primary limitation for these soils is wetness, which may severely limit species selection, delay planting and harvesting of forage crops, or result in wheel ruts or livestock hoof marks. This could result in soil compaction, plant injuries, poor soil aeration affecting plant growth, and problems moving livestock and machinery. Many of the soils in this group are subject to to flooding or ponding that will adversely impact forage production if it occurs during the growing season. The time frame plants are under water and the soil temperature while it occurs can affect the survival of forage crops. Elevated salinity levels may also be present in the soil profile, which will greatly limit species selection and production potentials.

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. When establishing new stands or renovating older ones, select plant species that are tolerant of poorly drained soils. Machinery and livestock also need to be excluded during these times to prevent wheel ruts, soil compaction, and trampling. 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
-"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:

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