

FORAGE SUITABILITY GROUP

LOAMY, SALINE, 10-14" ppt/ >90 Freeze Free Days

FSG No.: G058AG024MT

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 soils representing this FSG are on flood plains, alluvial fans, terraces and sedimentary plains. Salinity can affect forage selection for this FSG.

| | <u>Minimum</u> | <u>Maximum</u> |
|--------------------------|----------------|----------------|
| Elevation (feet): | 1600 | 5000 |
| Slope (percent): | 0 | 15 |
| Flooding: | | |
| Frequency: | None | Occasional |
| Duration: | None | Brief |
| Ponding: | | |
| Depth (inches): | | |
| Frequency: | None | Rare |
| Duration: | None | Brief |
| Runoff Class: | Low | Very 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): 90 148
 (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): 79 130
 (9 years in 10 at least)

Growing Degree Days (40 deg):

Growing Degree Days (50 deg):

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

| <u>Climate Station</u> | <u>Location</u> | <u>From</u> | <u>To</u> |
|------------------------|--------------------------|-------------|-----------|
| 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 |
| 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 |

Soil Interpretations

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

| | | | |
|---|-------------------------|----|--------------|
| Drainage Class: | Moderately well drained | To | Well drained |
| Permeability Class: (0 - 40 inches) | Moderately slow | To | Moderate |
| Frost Action Class: | Low | To | Moderate |

| | <u>Minimum</u> | <u>Maximum</u> |
|---|----------------|----------------|
| Depth: | 20 | 72 |
| Surface Fragments >3" (% Cover): | | |
| Organic Matter (percent): (surface layer) | 0.5 | 3.0 |
| Electrical Conductivity (mmhos/cm): (0 - 24 inches) | 4 | 16 |
| Sodium Absorption Ratio: | 0 | 13 |

| | | |
|--|-----|-----|
| (0 - 12 inches) | | |
| Soil Reaction (1:1) Water (pH): | 5.5 | 8.5 |
| (0 - 12 inches) | | |
| Available Water Capacity (inches): | 3 | 10 |
| (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.

| <u>Cool Season Grasses</u> | <u>Scientific Symbol</u> | <u>Dryland</u> | <u>Irrigated</u> |
|-----------------------------------|--------------------------|----------------|------------------|
| Altai wildrye (I) 1/ 2/ | LEAN3 | YES | NO |
| Basin wildrye (N) | LECI4 | YES | NO |
| Beardless wheatgrass (N) | PSSPI | YES | YES |
| Hybrid wheatgrass (I) 1/ 2/ | ELHO3 | YES | NO |
| Intermediate wheatgrass (I) 1/ 2/ | THIN6 | YES | YES |
| Pubescent wheatgrass (I) 1/ 2/ | THIN6 | YES | YES |
| Russian wildrye (I) 2/ | PSJU3 | YES | NO |
| Slender wheatgrass (N) 2/ | ELTR7 | YES | YES |
| Streambank wheatgrass (N) 2/ | ELLA3 | YES | NO |
| Tall fescue (I) 3/ | LOAR10 | NO | YES |
| Tall wheatgrass (I) 2/ | THPO7 | YES | YES |
| Thickspike wheatgrass (N) 2/ | ELMA7 | YES | NO |
| Western wheatgrass (N) 2/ | PASM | YES | YES |
| <u>Warm Season Grasses</u> | <u>Scientific Symbol</u> | <u>Dryland</u> | <u>Irrigated</u> |
| Little bluestem (N) | SCSC | YES | NO |
| Sideoats grama (N) | BOCU | YES | NO |
| <u>Legumes</u> | <u>Scientific Symbol</u> | <u>Dryland</u> | <u>Irrigated</u> |
| Birdsfoot trefoil (I) | LOCO6 | NO | YES |
| Cicer milkvetch (I) | ASCI4 | NO | YES |
| <u>Other Perennial Forbs</u> | <u>Scientific Symbol</u> | <u>Dryland</u> | <u>Irrigated</u> |
| Maximilian sunflower (N)* | HEMA2 | YES | NO |
| Winterfat (N)* 2/ | 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 recommended only as a component of native mixtures.

- 1/ Recommended only for upper end of 10-14" precipitation zone
- 2/ Recommended for higher EC levels (8-16 mmhos/cm)
- 3/ 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.

| 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) |
| Altai wildrye | 900 | 1200 | | |
| Barley | 1550 | 3100 | 2000 | 4000 |
| Birdsfoot trefoil, clovers (adapted) | | | 1500 | 2500 |
| Crested wheatgrass | 800 | 1100 | | |
| Newhy hybrid wheatgrass | 1600 | 2200 | | |
| Russian wildrye | 800 | 1100 | | |

| 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) |
| Altai wildrye | 0.3 | 0.4 | | |
| Barley | 0.5 | 1.0 | 0.7 | 1.3 |
| Birdsfoot trefoil, clovers (adapted) | | | 0.5 | 0.8 |
| Crested wheatgrass | 0.3 | 0.4 | | |
| Newhy hybrid wheatgrass | 0.5 | 0.7 | | |
| Russian wildrye | 0.3 | 0.4 | | |

1 AUM = 915 lbs air-dry

Forage Growth Curves

Growth Curve Number: MT58AG03

Growth Curve Name: 10-14" 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 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Growth Curve Number: MT58AG05

Growth Curve Name: 10-14" 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 | 20 | 30 | 15 | 10 | 5 | 20 | 0 | 0 | 0 |

Growth Curve Number: MT58AG08

Growth Curve Name: 10-14" 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 | 10 | 45 | 35 | 5 | 0 | 5 | 0 | 0 | 0 |

Growth Curve Number: MT58AG09

Growth Curve Name: 10-14" 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 | 35 | 25 | 0 | 0 | 10 | 0 | 0 | 0 |

Soil Limitations

The Loamy, Saline FSG is limited by salinity (electrical conductivity of 4 to 16 mmhos/cm), which can cause reduced available water holding capacity levels. 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 high saline levels 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.

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

G058AG017MT

FSG Narrative

Loamy soils have lower levels of salinity in the soil profile.

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:

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Approval Date: 1/1/2006

