

Ecological Site Description—Rangeland

Wet Meadow (WM), 11–14" MAP

MLRA: 58AC – Sedimentary Plains, Central
R058AC043MT



1. Physiographic features: This ecological site typically occurs on nearly level to slightly concave areas that have free water at or near the surface throughout the growing season. It can also occur around the margins of ponds. This site is too wet and poorly aerated (anaerobic) for most plants and cultivated crops, but not wet enough for true aquatics such as cattails. These sites are also called “lentic” (standing water) wetland/riparian areas.

Landform: fen, marsh, bog

Elevation (feet): 2,250–4,500

Slope (percent): 0–1

Depth to Water Table (inches): 0 to 24

Flooding: Rare

Ponding: Depth (inches): 1–4

Frequency: occasional to frequent (>5% chance in any year)

Duration (days): up to 30

Aspect: not significant

Influencing water features:

NON-STREAM

CHARACTERISTICS:
(Cowardin System)

SYSTEM
Lacustrine

SUBSYSTEM
Littoral

CLASS
Unconsolidated
Shoreline

SUBCLASS
Permanently,
Semi-Permanently,
or Seasonally Flooded

Palustrine

N/A

Persistent
Emergent Wetland

Permanently,
Semi-Permanently,
or Seasonally Flooded,
or Saturated

Stream Characteristics: None

2. Soils: These are deep soils that often have organic (Histic) surfaces or organic profiles. They normally will have free water within 2 feet of the surface keeping the upper part of the soil very moist or saturated for most of the growing season. These soils are non-saline and non-sodic, but may be calcareous or acidic.

Hydric: yes

Surface texture: variable, mainly loamy, sometimes clayey

Surface texture modifiers: mucky, peaty

Depth (inches): greater than 40

Soil surface permeability (inches per hour): mainly moderate (0.6–2.0) to moderately slow (0.2–0.6)

Drainage class: poorly or very poorly

Saline or sodic: no

Reaction (pH), (0.01M CaCl₂): slightly acid to slightly alkaline (6.1–7.8)

3. Associated sites: Subirrigated, Riparian Meadow, Overflow.

This site can be associated with most sites, including upland sites.

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4. **Similar sites:** Subirrigated, Riparian Meadow.

The water table of a Subirrigated site will be at a deeper depth, and the water is very seldom at or near the surface. If there is surface water, it will be present for only a short time. The plant community composition will tend to have more grasses and fewer sedges.

The Riparian Meadow site will be associated with a flowing water (lotic) system.

5. **Major Plant Community Types:** The physical aspect of this site in Historical Climax (HCPC) is that of a meadow dominated by sedges, rushes, and grasses with a few forbs. Typically, few willows or other shrubs occur on this site.

Approximately 45% of the annual production is from sedges and other grass-like plants, 45% is from grasses, and 5% is from forbs. A trace amount up to 5% may be from shrubs. The following are descriptions of several plant communities that may occupy this site:

Plant Community 1: Tall Sedges/ Tall and Medium Grasses/Forbs: This is the interpretive plant community and is considered to be the Historic Climax Plant Community (HCPC) for this site. This plant community contains a diversity of tall sedges (**beaked, Nebraska, and water**) and tall and medium height grasses (**bluejoint or slimstem reedgrass, prairie cordgrass, American and fowl mannagrass, bearded/ slender wheatgrass**). There are a variety of forbs that occur in smaller percentages, such as **field mint** and **northwest cinquefoil**. Sedges and rushes will become more dominant on wetter phases of this site. Once well established, they provide significant competition, often restricting the establishment of other species.

This plant community is well adapted to the Northern Great Plains climatic conditions. The diversity in plant species allows for drought tolerance. Individual species can vary greatly in production depending on soil properties (depth to permanent water table) and growing conditions (timing and amount of precipitation, temperature). Plants on this site have strong, healthy root systems that allow production to respond with favorable moisture conditions. This plant community provides for soil stability and a functioning hydrologic cycle. Plant litter is available for soil building and moisture retention. Plant litter is properly distributed with very little movement off-site and natural plant mortality is very low. This site, because of the permanent water table present, provides a very good soil-water-plant relationship. Maintaining good plant cover is necessary for successful management and production.

Plant Community 2: Medium and Short Grasses and Sedges/ Rushes: Slight degradation in the Historic Climax Plant Community, including a beginning response to non-prescribed grazing, will tend to change the HCPC/PPC to a community represented by an increase in plants such as **Baltic rush, clustered field sedge, meadow barley, and mat muhly** and forbs such as **silverweed cinquefoil, golden pea, asters, and Rocky Mountain iris**. The medium and tall sedges (**beaked, Nebraska, and water**) and grasses (**bluejoint/northern reedgrass, prairie cordgrass, American and fowl mannagrass, bearded/slender wheatgrass**) will still be present, sometimes still in relatively large amounts.

Biomass production and litter become reduced on the site as the taller sedges and grasses disappear, increasing evaporation and reducing moisture intake and retention. Additional open space in this community can result in undesirable invader species. This plant community provides for moderate soil stability.

Plant Community 3: Rushes/ Forbs/ Short Grasses and Sedges: With continued heavy disturbance, the site will become dominated by **Baltic rush** and some forbs, provided the hydrology of the site remains somewhat stable. Short grasses and sedges such as **meadow barley, clustered field sedge, and mat muhly** can also become common. Some climax species such as **Nebraska sedge** will still be relatively abundant. The taller grasses (**bluejoint/northern reedgrass, bearded/slender wheatgrass, American/fowl mannagrass, and prairie cordgrass**) will still be present, but in much smaller amounts. Palatable forbs will be mostly absent. Non-native grasses such as **Kentucky or Canada bluegrass, fowl bluegrass, redtop, quackgrass, and reed canarygrass** tend to become more common.

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Plant Community 4: Rushes/ Non-Native Grasses/ Invasive Forbs: If heavy disturbance continues and the water table lowers, making the site drier, the plant community can deteriorate to one primarily composed of non-native species such as **Kentucky/Canada/fowl bluegrass, redtop, quackgrass, reed canarygrass** and short grasses (**meadow barley and mat muhly**) with **Baltic rush** being the major remaining wetland species. There may be some other plants normally associated with drier conditions, such as **pussytoes and cudweed sagewort** present. There will be little of some of the more desirable species such as Nebraska sedge present. **Foxtail barley, Canada thistle, and dandelion** can be common invaders. **Purple loosestrife** is potentially a serious invader on this site.

Plant communities 3 and 4 are significantly less productive than Plant Communities 1 or 2. The lack of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and high evaporation, thus eventually favoring species that are more adapted to drier conditions. These communities have lost many of the attributes of a healthy rangeland, including good infiltration, minimal erosion and runoff, nutrient cycling and energy flow.

In many locations, this ecological site, because of its favorable moisture and topography, has been seeded to introduced species such as reed canarygrass or “Garrison” creeping foxtail for hay and/or pasture. Once these species have been established, they form a stable, long-lived stand that is extremely difficult and often expensive to restore to previous conditions.

5a. Cover and structure (Historic Climax Plant Community)

COVER TYPE	BASAL COVER (%)	CANOPY COVER (%)	AVERAGE HEIGHT (inches)
Cryptogams	1–5	0–5	0.25
Grasses/ sedges	15–25	80–95	30
Forbs	1–5	1–10	12
Shrubs	T–1	0–1	24
Litter	50–80		
Coarse fragments	0–T		
Bare ground	0–1		

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5b. Major Plant Species Composition - Historical Climax Plant Community

Common Name	Plant Symbol	Plant Group	Percent Comp.	Group Max. %	Mean Annual Precipitation (inches)				
					11	12	13	14	
					(lbs./acre)	(lbs./acre)	(lbs./acre)	(lbs./acre)	
Grasses and Sedges 40–45%					2880	2925	2970	3015	
Prairie cordgrass	SPPE	5	5-20		320-1280	325-1300	330-1320	335-1340	
Bearded wheatgrass	ELCA11	2	0-5		0-320	0-325	0-330	0-335	
Slender wheatgrass	ELTR7								
Bluejoint reedgrass	CACA4	6	5-10		320-640	325-650	330-660	335-670	
Slimstem reedgrass	CANE	6	5-10		320-640	325-650	330-660	335-670	
American mannagrass	GLGR	6	10-30		640-1920	650-1950	660-1980	670-2010	
Fowl mannagrass	GLST	6	5-10		320-640	325-650	330-660	335-670	
Tufted hairgrass	DECE	2	10-15		640-960	650-975	660-990	670-1005	
American sloughgrass	BESY	Annual	10-20		640-1280	650-1300	660-1320	640-1340	
Western wheatgrass	PASM	14	0-5}	10	64-640 No more than 320 for any one	65-650 No more than 325 for any one	66-660 No more than 330 for any one	67-670 No more than 335 for any one	
Mat muhly	MURI	16	0-5}						
Brookgrass	CAAQ2	6	1-5}						
Meadow barley	HOB2	10	1-5}						
Other grasses	2GP		0-5}						
Foxtail barley	HOJU	12	0-T	T	T	T	T	T	
Sedges & Rushes					40-45%	2880	2925	2970	3015
Beaked sedge	CAUT	6	25-40		1600-2560	1625-2600	1650-2640	1675-2680	
Nebraska sedge	CANE2	6	10-30		640-1920	650-1950	660-1980	670-2010	
Water sedge	CAAQA4	6	15-25		960-1600	975-1625	990-1650	1005-1675	
Clustered field sedge	CAPR5	16	1-5		64-320	65-325	66-330	67-335	
Woolly sedge	CALA30	6	5-10	5	320-640	325-650	330-660	335-670	
Wool fruit sedge *	CALA11								
Brevior sedge	CABR10	2	1-5		64-320	65-325	66-330	67-335	
Smallwing sedge	CAMI7	10	1-5	5	64-320	65-325	66-330	67-335	
Other sedges	CAREX		0-5		0-320	0-325	0-330	0-335	
Baltic rush	JUBA	14	1-5}	5	64-320	65-325	66-330	67-335	
Slender rush	JUTE	2	0-5}						
Torrey's rush	JUTO	6	0-5}						
Tuberous rush	JUNO2	6	0-5}						
Other rushes	JUNCUS		0-5}						
Forbs T–5%					T-320	T-325	T-330	T-335	
Field mint	MEAR4	23	1-5}	5	T-320	T-325	T-330	T-335	
Northwest cinquefoil	POGR9	24	1-5}						
Aster spp.	ASTER	23	1-5}						
Willow herb spp.	EPILOB	20	1-5}						
Goldenpea	THMO	20	0-5}						
Rocky Mountain iris	IRMI	20	0-5}						
Cudweed sagewort	ARLU	19	0-5}						
Bedstraw spp.	GALIU	19	1-5}						
Silverweed cinquefoil	POAN5	20	1-5}						
Horsemint	MOFI	24	1-5}						
Western dock	RUOC	21	1-5}						
Other native forbs	2FP		0-5}						
Shrubs T–5%									T-320
Silver buffaloberry	SHAR	36	0-T}	5	T-320	T-325	T-330	T-335	
Willows spp. **	SALIX	36	0-T}						
Bog birch	BEGL	38	0-T}						
Wood's rose	ROWO	38	0-T}						
Other native shrubs	2SB		0-T}						
Total Annual Production (lbs./ac):			100%		6400	6500	6600	6700	

* Woolly sedge typically occurs on mineral soils, woolfruit sedge typically occurs on organic soils.

** See the Riparian Subirrigated ecological site description for this MLRA and precipitation zone for a more detailed listing of willow species that may occur on this site.

See Field Office Technical Guide Section II-D-7 for wetland indicator status of individual plant species.

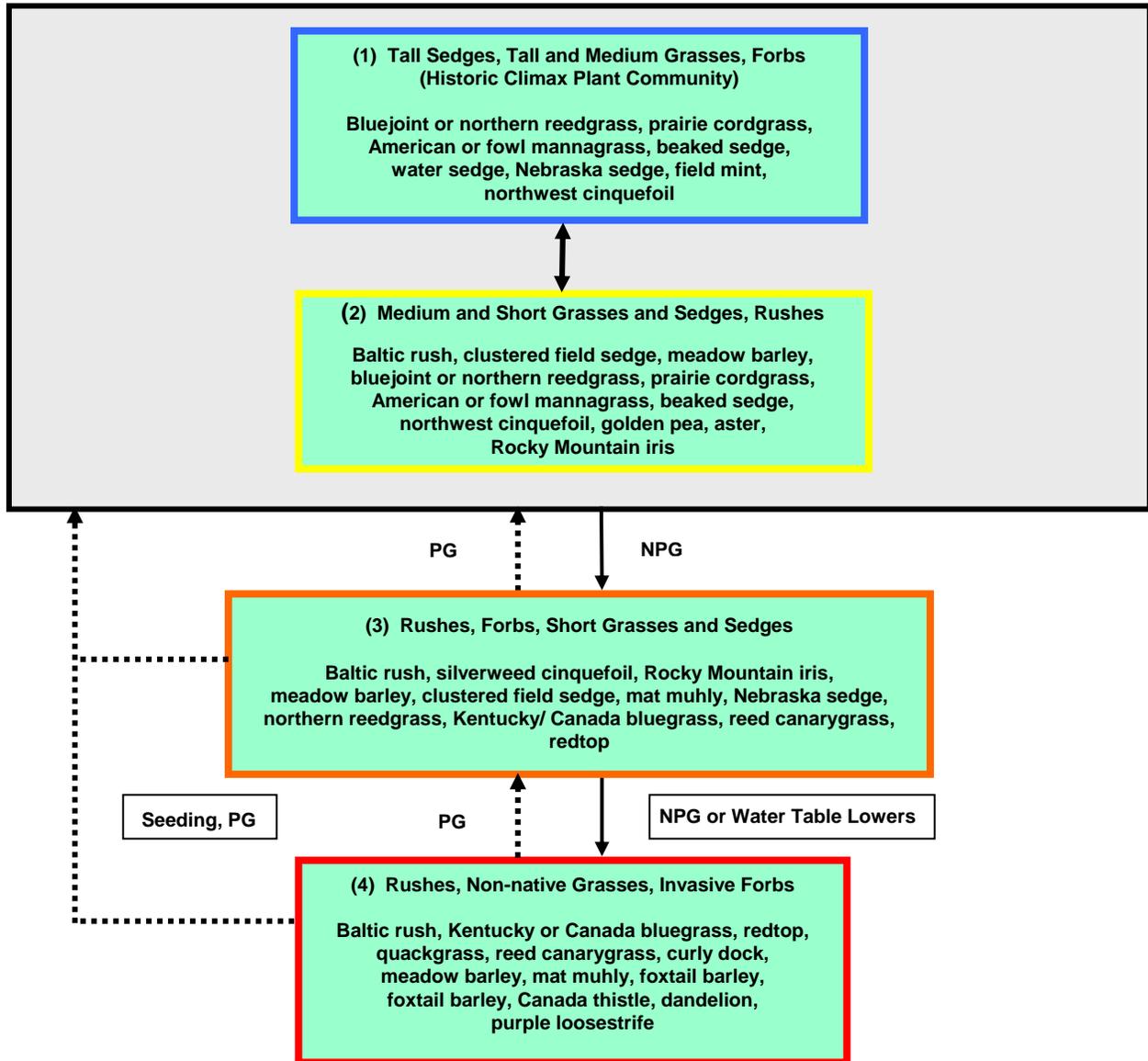
Trees: Trees seldom occur on this ecological site.

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5c. Plant Communities and Transitional Pathways (diagram)



Smaller boxes within a larger box indicate that these communities will normally shift among themselves with slight variations in precipitation and other disturbances. Moving outside the larger box indicates the community has crossed a threshold (heavier line) and will require intensive treatment to return to Community 1 or 2. Dotted lines indicate a reduced probability for success. Yellow boxes indicate caution that the community may be in danger of crossing a threshold. Orange boxes represent communities that have crossed over thresholds from the HCPC and may be difficult to restore with grazing management alone. Red boxes represent communities that have severely shifted away from the HCPC and probably cannot be restored without mechanical inputs.

NOTE: Not all species present in the community are listed in this table. Species listed are representative of the plant functional groups that occur in the community.

PG = Prescribed Grazing: Use of a planned grazing strategy to balance animal forage demand with available forage resources. Timing, duration, and frequency of grazing are controlled and some type of grazing rotation is applied to allow for plant recovery following grazing.

NPG = Non-Prescribed Grazing: Grazing which has taken place that does not control the factors as listed above, or animal forage demand is higher than the available forage supply.

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6. Livestock Grazing Interpretations: Managed livestock grazing is suitable on this site as it has the potential to produce an abundance of high quality forage. This is often a preferred site for grazing by livestock due to the succulent forage, and animals tend to congregate in these areas. In order to maintain the productivity of this site, stocking rates and a grazing plan must be managed carefully on adjoining sites with less production to be sure livestock drift onto the Wet Meadow site is not excessive. Management objectives should include maintenance or improvement of the plant community. Shorter grazing periods and adequate re-growth after grazing are recommended for plant maintenance and recovery. Heavy stocking and season-long use of this site can be detrimental and will alter the plant community composition and production over time.

This site is extremely sensitive to trampling damage. Grazing this site when soils are wet can cause soil compaction, possibly also contributing to excessive hummocking. Grazing should occur after soils have dried, unless the amount of time the livestock spend on this site can be managed. Grazing a pasture early in the season can be accomplished when upland vegetation is green and high quality, and the meadow area is often colder. Shorter grazing periods and allowing adequate re-growth after grazing are recommended for plant recovery and to reduce damage from excess hummocking or soil compaction.

Using this site as the primary water source can lead to foot problems for the livestock if they have to spend too much time standing in mud to get a drink. Several studies and practical experience have shown that providing off-site water will significantly reduce the amount of time spent at this site for drinking.

Vegetation is important for this site to maintain its function. A good vegetative cover will help maintain water infiltration, thus maintaining the ground water hydrology. Vegetation around the perimeter acts as a filter for sediment and nutrients that may be carried by surface runoff from the surrounding uplands. For sites that may be surrounding an open water area, good vegetative cover reduces erosion of the shorelines.

Whenever Plant Community 2 (medium grasses and sedges) occurs, grazing management strategies need to be implemented to avoid further deterioration. This community is still stable, productive, and healthy provided it receives proper management. This community will respond fairly quickly to improved grazing management including increased growing season rest of key forage plants. Grazing management alone can usually move this community back to one more similar to potential since a good seed source of the taller sedges and grasses should still exist.

Plant Communities 3 and 4 have severely reduced forage production, and contain a high percentage of non-palatable species. Once this site is occupied by these communities, it will be significantly more difficult to restore it to a community that resembles the potential with grazing management alone. Additional growing season rest is often necessary for re-establishment of the desired species and to restore the stability and health of the site.

Once established, plants such as Kentucky bluegrass, reedtop, reed canarygrass, and Canada thistle are very difficult to remove by grazing alone. The potential for using mechanical treatment to improve site health can be limited, depending on the depth to the water table.

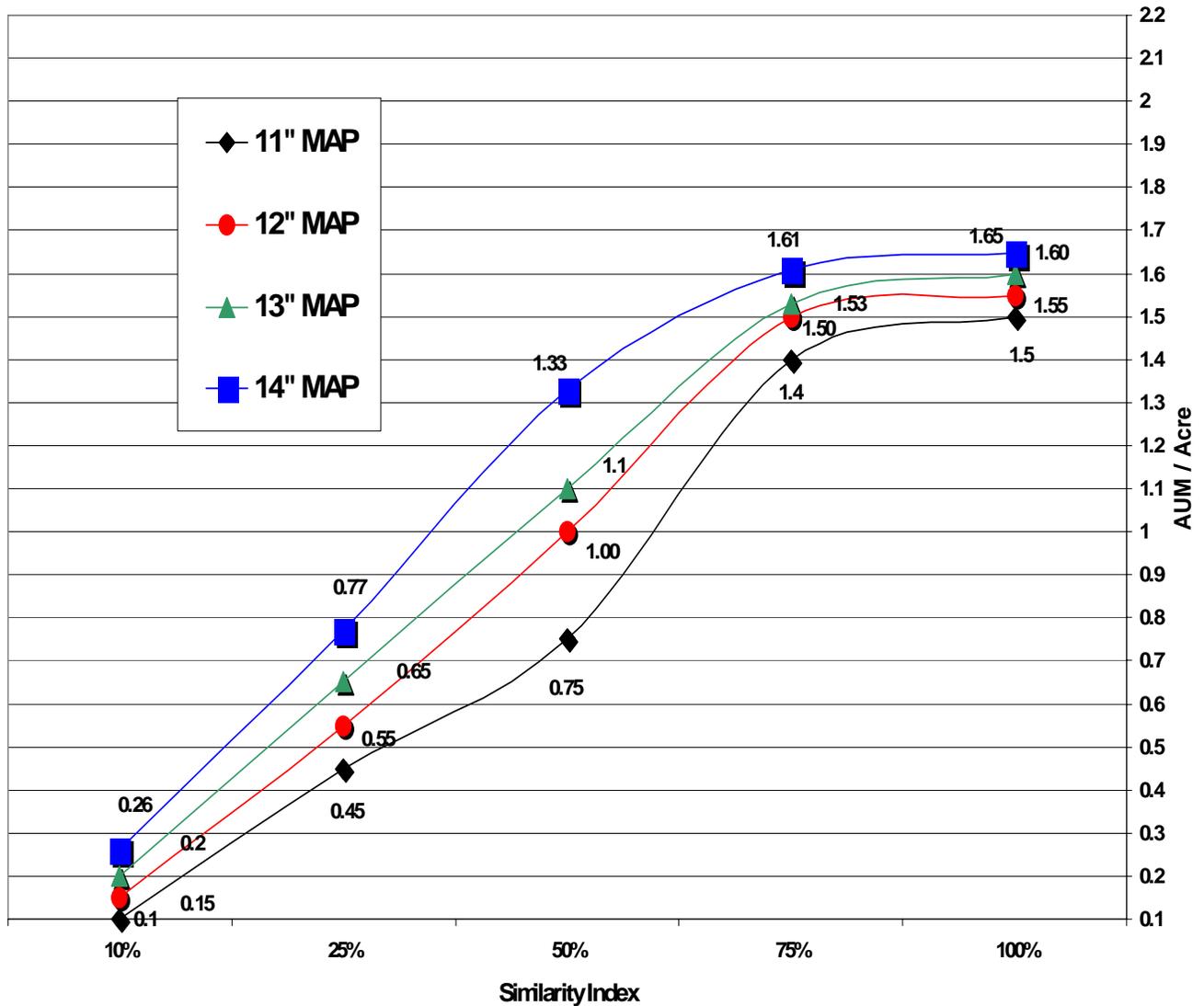
6a. Guide to Safe Stocking Rates: The following charts provide guidance for determining an initial safe stocking rate. Animal Unit Month (AUM) figures are based on averages of forage production from data collected for this site over several years. The characteristic plant communities and production values listed may not accurately reflect the productivity of a specific piece of land. These tables should not be used without on-site information collected to determine the average forage productivity of the site. Adjustments to stocking rates for each range unit must be made based on topography, slope, distance to livestock water, and other factors, which effect livestock grazing behavior.

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Stocking Rate Guide (Cattle)
Wet Meadow 11-14" 58AC



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6b. Stocking Rate Guide:

Major Plant Community Dominant Plant Species	MAP	Total Production (pounds/ac)	Cattle			Sheep		
			Forage Production	AUM/ac	Ac/AUM	Forage Production	AUM/ac	Ac/AUM
1. Tall Sedges, Tall and Medium Grasses, Forbs (HCPC) <i>Bluejoint or northern reedgrass, prairie cordgrass, American or fowl mannagrass, beaked sedge, water sedge, Nebraska sedge, field mint, silverweed cinquefoil</i> (S.I. >70%)	13–14"	6600-6700	5600-6025+	1.53-1.65+	.60-.70+	4950-5350+	1.35-1.46+	.70-.70+
	11–12"	6400-6500	5450-5850+	1.49-1.60+	.60-.70+	4800-5200+	1.31-1.42	.70-.80+
2. Medium & Short Grasses and Sedges, Rushes <i>Baltic rush, clustered field sedge, meadow barley, bluejoint or northern reedgrass, prairie cordgrass, American or fowl mannagrass, beaked sedge, silverweed cinquefoil, aster, golden pea, Rocky Mountain iris</i> (S.I. 40–70%)	13–14"	3630-5695	2175-4850	.59-1.33	.80-1.7	2000-4550	.55-1.24	.80-1.8
	11–12"	3520-5525	2100-4700	.57-1.28	.80-1.7	1925-4425	.53-1.21	.80-1.9
3. Rushes, Forbs, Short Grasses and Sedges <i>Baltic rush, silverweed cinquefoil, Rocky Mountain iris, meadow barley, clustered field sedge, mat muhly, Nebraska sedge, northern reedgrass, Kentucky/Canada bluegrass, reed canarygrass, redtop</i> (S.I. 20–40%)	13–14"	2640-4690	1325-2825	.36-.77	1.3-2.8	1450-3275	.40 –.89	1.1-2.5
	11–12"	2560-4550	1275-2725	.35-.74	1.3-2.9	1400-3175	.38 –.87	1.2-2.6
4. Rushes, Non-native Grasses, Invasive Forbs <i>Baltic rush, Kentucky/Canada bluegrass, redtop, quackgrass, reed canarygrass, curly dock, meadow barley, mat muhly, foxtail barley, foxtail barley, Canada thistle, dandelion, purple loosestrife</i> (S.I. < 20%)	13–14"	1280-2680	325-950	.09-.26	3.9-11.3	375-1075	.10 –.29	3.4-9.8

Stocking rates are calculated from average forage production values using a 25% Harvest Efficiency factor for preferred and desirable plants, and 10% Harvest Efficiency for less desirable species. AUM calculations are based on 915 pounds per animal unit month (AUM) for a 1,000-pound cow with calf up to 6 months. No adjustments have been made for site grazability factors, such as steep slopes, site inaccessibility, or distance to drinking water.

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7. Wildlife Interpretations: The Wet Meadow ecological site provides wildlife habitat benefits out of proportion to its minor occurrence on the overall landscape. Saturated soil conditions throughout much of the growing season support at least three times the vegetative production found on adjacent semi-arid uplands. The resulting structural diversity, cover value, food supply, and moist environment support a wide variety of wildlife species including animals restricted to the wet meadow environment and mobile species using a complex of habitats throughout the year. Historically, this site was used by large herds of migratory ungulates, waterfowl and other wetland-dependent species. Since livestock are attracted to this ecological site by abundant, green forage, the HCPC has often been altered by continuous grazing practices to more simplified, less productive plant communities which support fewer wildlife species. Kentucky bluegrass, redtop and Canada thistle are common invasive species which now dominate many wet meadow sites and reduce biodiversity.

Plant Community 1: Tall Sedges/ Tall and Medium Grasses/ Forbs: The moist environment and abundance of forbs support a diverse assemblage of insects and other invertebrates, which feed a wide variety of wildlife species. Amphibians, a “keystone species” group because of their value as indicators of environmental disturbance, are represented by species such as the northern leopard frog and Woodhouse’s toad. Three species of garter snakes and, in the northeast corner of the state, the smooth green snake, are representative reptiles. The dense herbaceous cover attracts a number of breeding birds including the upland sandpiper, common snipe, savanna sparrow and LeConte’s sparrow. Sage grouse find succulent forbs and insects when surface water is not present. Northern harriers and short-eared owls hunt this site for meadow voles and other small mammals including the western jumping mouse and common shrew. The predominance of grasses and sedges favors grazers and mixed feeders like bison and elk.

Plant Community 2: Medium and Short Grasses and Sedges/ Rushes: Structural habitat diversity declines with the reduction/elimination of tall grasses and sedges. Insects and other invertebrates may still be abundant but less diverse. Amphibians preferring tall, dense vegetation, such as the northern leopard frog, are less common than in the HCPC/PPC. Nesting birds are more susceptible to predation as the plant canopy opens up. Small mammals are also more vulnerable to predators and species diversity declines. Cover and forage value for big game animals declines with loss of tall, warm and cool season grasses and sedges.

Plant Community 3: Rushes/ Forbs/ Short Grasses & Sedges: At this stage, wildlife habitat values have significantly declined. The loss of many desirable native forbs reduces insect species diversity considerably, although dandelion, Canada thistle and other forbs still host some species. Loss of ground cover and warmer surface temperatures inhibit amphibians. This community is still used for feeding by a number of bird species but nesting cover quality is very poor for all but a few. Killdeer, for example, will nest in this community. Small mammal species diversity declines significantly with the loss of plant and litter cover. The seed-eating deer mouse may increase. Big game habitat quality is poor because palatable, nutritious grass and sedge species have been removed and the green feed period shortened.

Plant Community 4: Rushes/ Non-Native Grasses/ Invasive Forbs: This community has very limited value for all but a few wildlife species. Insect and other invertebrate populations are much less diverse compared to later successional stages. Amphibians are represented by fewer individuals and species. Leopard frogs are probably absent. Disturbance-tolerant breeding birds are more numerous, including the killdeer and, possibly, the piping plover (especially if the site is somewhat saline). Sage grouse may continue to seek insects and succulent forbs (i.e. dandelion) here but cover value is low and predators may take a heavy toll. Small mammal populations are less diverse, shifting to more seed-eating species compared to a predominance of herbaceous voles present in higher seral stages. Big game cover value is almost non-existent and forage value is limited and shorter in duration.

8. Hydrology Data: The soils associated with this ecological site are generally in Hydrologic Soil Group C. The infiltration rates for these soils will generally be moderate. The runoff potential for this site is low. Runoff curve numbers generally range from 64 to 89.

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9. Site Documentation:

Authors: Original: NRCS, 1983 Revised: MJR, REL, RSN, POH, 2003

Supporting Data for Site Development:

NRCS–Production & Composition Record for Native Grazing Lands (Range-417): 2

BLM–Soil & Vegetation Inventory Method (SVIM) Data: 3

NRCS–Range Condition Record (ECS-2): 10

NRCS–Range/Soil Correlation Observations & Soil 232 Notes: 10

Field Offices where this site occurs within the state:

Big Sandy	Columbus	Harlowton	Roundup
Big Timber	Crow Agency	Joliet	Stanford
Billings	Fort Belknap	Lewistown	White Sulphur Springs
Chinook	Hardin	Malta	Winnett

Site Approval: This site has been reviewed and approved for use:

Loretta J. Metz
State Rangeland Management Specialist

10/22/2004
Date