

Ecological Site Description—Rangeland

Subirrigated (Sb), 11–14" MAP

MLRA: 58AC – Sedimentary Plains, Central
R058AC044MT



1. Physiographic features: This ecological site occurs on terraces and high floodplain steppes, near springs or seeps, or other areas having a permanent water table close enough to the surface (typically within 3 feet) to influence plant composition and production. These areas are rarely or non-flooded. Rare flooding indicates that flooding is unlikely, but possible under unusual weather conditions (0–5% chance in any year). These are also considered to be “lentic” (standing water) riparian/wetland areas.

Elevation (feet): 2,250–4,500

Landform: terrace, hill slope (when near spring or seep), floodplain steppes

Slope (percent): 0–2, except can be greater when this site occurs on hill slope near a spring/seep

Depth to Water Table (inches): mainly about 36

Influencing water features:

<u>WETLAND DESCRIPTION:</u> (Cowardin System)	<u>SYSTEM</u>	<u>SUBSYSTEM</u>	<u>CLASS</u>
	Palustrine	N/A	Emergent

2. Soils: These soils are non-hydric. They are mainly deep to very deep (>40”) with a permanent water table within about three feet of the surface. They are generally in the aquic moisture regime or aquic intergrade. Surface textures will vary—mainly loam, sandy loam, clay loam.

Available Water Capacity to 40" (inches): free water occurs within about 36" of the surface

Drainage Class: somewhat poorly

Surface Reaction (pH) (1:1 water): neutral to moderately alkaline (6.6–8.4)

3. Associated sites: Overflow, Wet Meadow, Silty, Clayey,

4. Similar sites: Wet Meadow, Saline Subirrigated, Overflow, Riparian Subirrigated, Stream Terrace.

The Wet Meadow site differs mainly by being wet to at or near the surface for most of the growing season.

The Saline Subirrigated site differs mainly by being salt affected.

The Overflow site differs mainly by being associated with ephemeral streams and having no permanent water table.

The Riparian Subirrigated site differs mainly by being adjacent to perennial or intermittent streams and being frequently flooded.

The Stream Terrace site may have a permanent water table, but it usually is at a deeper depth.

5. Major Plant Community Types: The physical aspect of this site in Historical Climax (HCPC) is that of a level grassland dominated by cool and warm season grasses, sedges, and rushes with forbs occurring in smaller percentages. A few woody species, such as willows may be present. Approximately 50–60% of the annual production by weight is from grasses, 20–30% is from sedges and rushes, 5% is from forbs, and 5–10% may be from shrubs. Generally, willows that are present are mature plants, with very little reproduction except vegetative root sprouting.

Plant Community 1: Tall and Medium Grasses and Sedges / Forbs: This is the interpretive plant community and is considered to be the Historic Climax Plant Community (HCPC) for this ecological site. The major species include **basin wildrye, bluejoint and northern reedgrass, prairie cordgrass, slender and bearded wheatgrass, tufted hairgrass, Nebraska sedge,** and various **rush** species. There are several forbs that will occur in small amounts, including **Northwest cinquefoil, leafy aster, and blue-eyed grass.**

This plant community is well adapted to the Northern Great Plains climatic conditions as well as the presence of a permanent water table. The diversity in plant species allows for drought tolerance. Individual species can vary greatly in production depending on growing conditions (timing and amount of precipitation, depth to the water table, and temperature). Plants on this site have strong, healthy root systems that allow production to increase significantly with favorable moisture conditions. Abundant plant litter is available for soil building and moisture retention. The

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presence of available water throughout the growing season provides a very favorable soil-water-plant relationship. This plant community provides for soil stability and a functioning hydrologic cycle.

Plant Community 2: Medium Grasses and Sedges/ Rushes/ Forbs: Slight disturbances to the site will tend to change the community to one dominated by medium height grasses (**northern reedgrass, tufted hairgrass**) and sedges (**smallwing sedge, clustered field sedge**). Most of the taller, more palatable grasses and sedges (basin wildrye, bluejoint reedgrass, prairie cordgrass, Nebraska sedge) will still be common, but in smaller percentages. Desirable and nutritious forbs will be replaced by less desirable and more aggressive species (**Rocky Mountain iris, goldenpea**). Short plants such as **Baltic rush, meadow barley, and mat muhly** will become more common.

Grass biomass production and litter become reduced in Community 2 as the taller grasses become less prevalent, increasing evaporation, and reducing moisture retention. Additional open space in the community can result in undesirable invader species. This plant community provides for moderate soil stability.

Plant Community 3: Rushes/ Medium and Short Grasses and Sedges/ Shrubs/ Invasive Forbs: As disturbance to the site increases, the community will tend to become dominated by **Baltic rush** and **western wheatgrass, meadow barley, mat muhly, clustered field sedge**. The taller grasses and sedges may still be present, but in much smaller amounts. **Wood's rose and western snowberry** often become more abundant. Non-native grasses and forbs such as **Kentucky or Canada bluegrass, redtop, Canada thistle, and dandelion** often become more common. The non-native species will also be present if the water table lowers, such as during a prolonged drought.

Plant Community 3 is much less productive than Plant Communities 1 or 2, and has lost many of the attributes of a healthy rangeland. The loss of deep perennial root systems reduces total available moisture for plant growth. Invasive species are often aggressive and competitive with seedlings of perennial plants. This community can respond positively to improved grazing management but it will take additional inputs to move it towards a community similar in production and composition to that of Plant Community 1 or 2.

Plant Community 4: Rushes/ Non-Native Grasses/ Invasive Forbs: With continued heavy disturbance, the community becomes dominated by **Baltic rush**. Non-native grasses and forbs (**Kentucky/Canada bluegrass, redtop, smooth brome, Canada thistle, and dandelion**) will become dominant especially if the water table has lowered. There may still be small, remnant amounts of the taller grasses and sedges present. Nebraska sedge can often be persistent because of its extensive system of roots and rhizomes. **Wood's rose and western snowberry** will continue to be abundant.

Plant community 4 has extremely reduced production of native plants (< 600 lbs. / acre). This community has lost many of the attributes of a healthy rangeland, including good infiltration, minimal erosion and runoff, nutrient cycling and energy flow. Significant economic inputs and time would be required to move this plant community towards a higher successional stage and a more productive plant community.

This site is often seeded to introduced species for hay or pasture because of its productivity potential and level landscape. Reed canarygrass and "Garrison" creeping foxtail, often along with a legume such as clover or alfalfa, are common components. This plant community is often as productive as the HCPC but is no longer managed as rangeland. Once converted to introduced species, this community will take additional inputs (reseeding) to move it towards a community similar in production and composition to that of Plant Community 1 or 2.

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

COVER TYPE	BASAL COVER (%)	CANOPY COVER (%)	AVERAGE HEIGHT (inches)
Cryptogams	0–5	0–5	0.25
Grasses / sedges	15–25	80–90	30
Forbs	1–5	1–10	12
Shrubs	1–4	0–5	24
Litter	55–80		
Coarse fragments	0–5		
Bare ground	1–5		

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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 80–90%					3150-3545	3280-3690	3410-3835	3535-3980
Prairie cordgrass	SPPE	14	10-20		395-790	410-820	425-850	440-885
Nebraska sedge	CANE2	6	1-10		39-395	41-410	43-425	44-440
Basin wildrye	LECI4	2	20-35		790-1380	820-1435	850-1490	885-1545
Slender or Bearded wheatgrass	ELTR7 ELCA11	2	10-20	20	395-790	410-820	425-850	440-885
Canada wildrye	ELCA	2	0-5		0-195	0-205	0-215	0-220
Short awn foxtail	ALAE	6	0-5		0-195	0-205	0-215	0-220
Tufted hairgrass	DECE	2	5-15		195-590	205-615	215-640	220-665
Northern or Bluejoint reedgrass	CASTI3 CACA4	6	15-30		590-1180	615-1230	640-1280	665-1325
Western wheatgrass	PASM	14	1-5}	5	0-195 No more than 195 for any one	0-205 No more than 205 for any one	0-215 No more than 215 for any one	0-220 No more than 220 for any one
Meadow barley	HOBR2	14	0-5}					
Mat muhly	MURI	12	0-5}					
Clustered field sedge	CAPR5	16	0-5}					
Baltic rush	JUBA	14	1-5}					
Other native grasses	2GP		0-5}					
Other sedges & rushes	2GL		0-5}					
Foxtail barley	HOJU	10	0-T	T	0-T	0-T	0-T	0-T
Forbs 1–5%					39-195	41-205	43-215	44-220
American licorice	GLLE3	19	0-5}	5	0-195	0-205	0-215	0-220
Golden pea	THMO	20	0-5}					
Goldenrod spp.	SOLID	19	0-5}					
Western yarrow	ACMI2	19	0-5}					
Northwest cinquefoil	POGR9	24	0-5}					
Silverweed cinquefoil	POAN5	20	0-5}					
Cow parsnip	HELA4	22	0-5}					
Horsemint	MOFI	17	0-5}					
Bedstraw spp.	GALIU	19	0-5}					
Cudweed sagewort	ARLU	19	0-5}					
Rocky mountain iris	IRMI	20	0-5}					
Field mint	MEAR4	20	0-5}					
Leafy Aster	ASFO	20	0-5}					
Blue lettuce	LATA	19	0-5}					
Blue-eyed grass	SISA4	28	0-5}					
Elephanthead	PEGR2	28	0-5}					
Arrowgrass *	TRMA4	20	0-5}					
Curly dock	RUCR	24	0-5}					
Other native forbs	2FP		0-5}					
Shrubs and Half-shrubs T–10%					T–395	T–410	T–425	T–440
Wood's Rose	ROWO	38	1-5}	5	40-195	41-205	43-215	44-220
Snowberry spp.	SYMPH	37	1-5}					
Gooseberry spp.	RIBES	37	0-5}					
Golden currant	RIAU	37	0-5}	5	0-195	0-205	0-215	0-220
Silver buffaloberry	SHAR	36	0-5}					
American plum	PRAM	37	0-5}					
Chokecherry	PRVI	37	0-5}					
Other native shrubs	2SB		0-5}					
Total Annual Production (lbs./ac):			100%		3940	4100	4260	4420

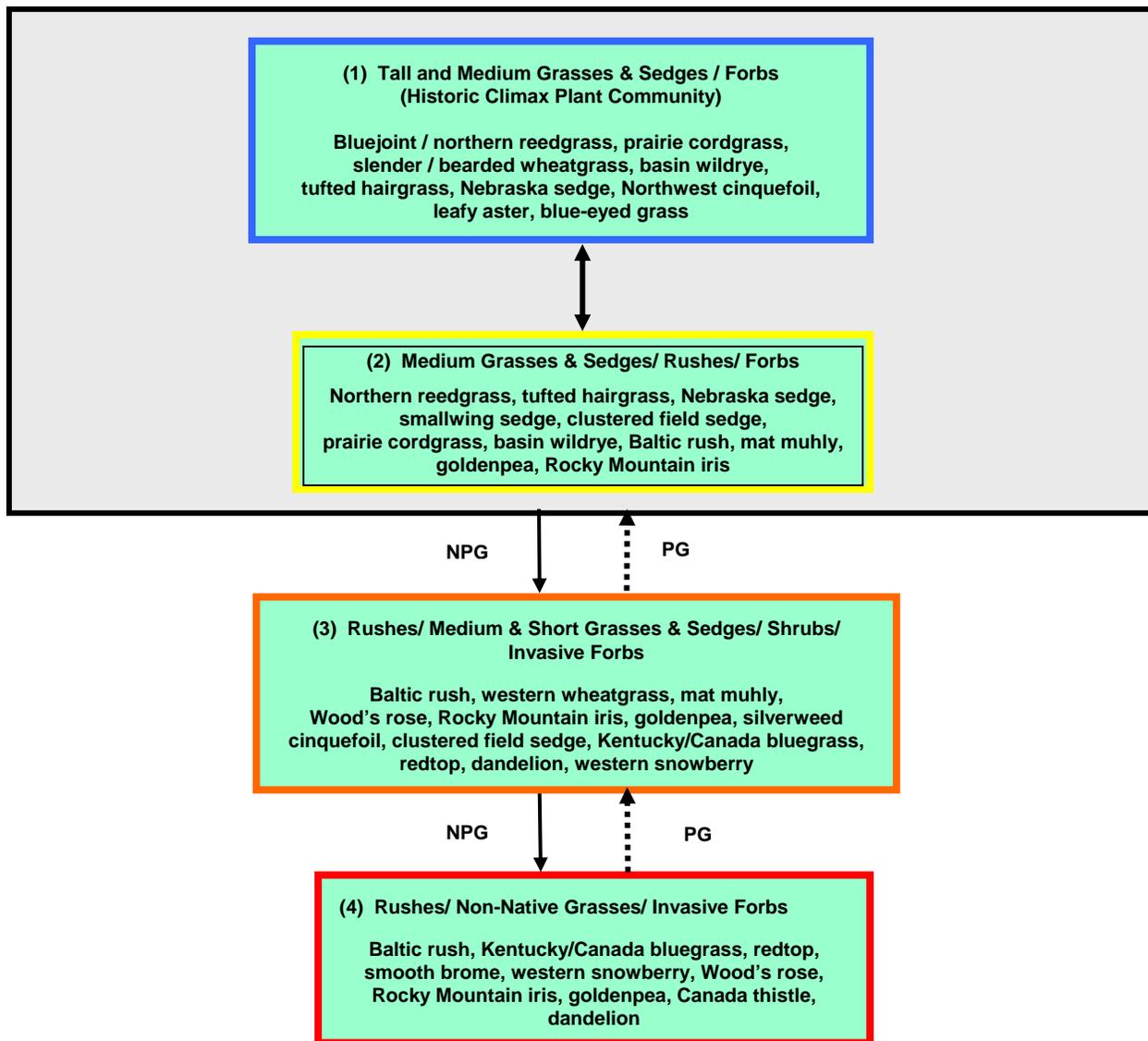
* This plant can be poisonous to some grazing animals during at least a part of its life cycle

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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 must be managed carefully on adjoining sites with less production to be sure livestock drift onto the Subirrigated 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.

Grazing this site when the upper part of the soil is wet can cause compaction. Hummocking (frost heaving) is often a feature of this site. The hummocking can be exacerbated if grazing impact becomes excessive.

Whenever Plant Community 2 (medium and short 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 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, the presence of non-native grasses and undesirable plants will make it 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, smooth brome, and Canada thistle are stable and very difficult to remove by grazing alone. The potential for using seeding or mechanical treatment to improve site health can be limited, depending on the depth to the water table.

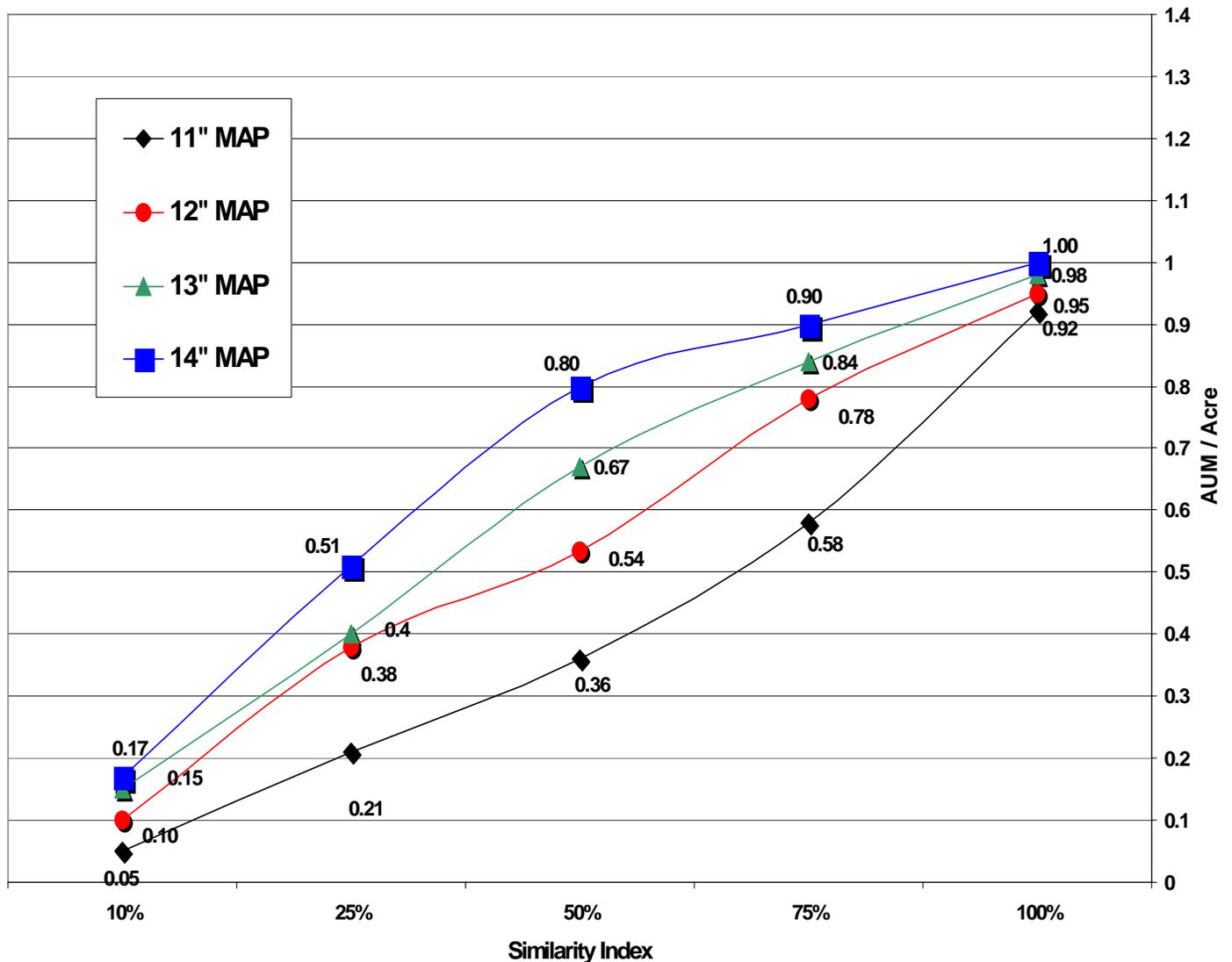
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6a. Guide to Safe Stocking Rates: The following charts provide guidance for determining an initial safe stocking rate. Animal Unit Month (AUM) figures are based on averages of forage production from data collected for this site over several years. 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 that effect livestock grazing behavior.

Stocking Rate Guide (Cattle)
Subirrigated 11-14" MAP



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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 and Medium Grasses & Sedges/ Forbs (HCPC) <i>Northern reedgrass, tufted hairgrass, Nebraska sedge, prairie cordgrass, basin wildrye, Baltic rush</i> (S.I. >75%)	13–14"	4250–4420	3600–3975+	.98–1.1	.90–1.0	3400–3750+	.93–1.0	1.0–1.1
	11–12"	3940–4100	3350–3700+	.92–1.0	1.0–1.1	3150–3475+	.86–.95	1.1–1.2
2. Medium Grasses & Sedges/ Rushes/ Forbs <i>Northern reedgrass, tufted hairgrass, Nebraska sedge, smallwing sedge, clustered field sedge, prairie cordgrass, basin wildrye, Baltic rush, mat muhly, goldenpea, Rocky Mountain iris</i> (S.I. 40–75%)	13–14"	2340–3755	1525–3375	.42–.92	1.1–2.4	1400–3200	.38–.87	1.1–2.6
	11–12"	2170–3485	1400–3150	.38–.86	1.2–2.6	1300–2950	.36–.81	1.2–2.8
3. Rushes/ Medium & Short Grasses & Sedges/ Shrubs/ Invasive Forbs <i>Baltic rush, western wheatgrass, mat muhly, Wood's rose, Rocky Mountain iris, goldenpea, silverweed cinquefoil, clustered field sedge, Kentucky/Canada bluegrass, redtop, dandelion</i> (S.I. 20–40%)	13–14"	1700–3095	850–1850	.23–.51	2.0–4.3	1025–2175	.28–.59	1.7–3.6
	11–12"	1575–2870	775–1725	.21–.47	2.1–4.7	950–2000	.26–.55	1.8–3.9
4. Rushes/ Non-Native Grasses/ Invasive Forbs <i>Baltic rush, Kentucky/Canada bluegrass, redtop, western snowberry, Wood's rose, Rocky Mountain iris, goldenpea, Canada thistle, dandelion</i> (S.I. < 20%)	13–14"	790–1770	200–625	.05–.17	5.9–18.3	250–700	.07–.19	5.2–14.6

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 Subirrigated ecological site is important for enhancing biodiversity within an otherwise semi-arid environment. Although surface water is rarely present, the high water table allows growth of tall herbaceous and woody plants that provide habitat structure, food and cover for diverse wildlife species. The Historic Climax Plant Community (HCPC) was used by large herds of grazing ungulates, migrating shorebirds and waterfowl, flocks of sage grouse and many songbird species. Uncontrolled livestock grazing has greatly simplified this plant community in many areas. Livestock are attracted to the subirrigated site because of the availability of palatable, succulent forage when upland vegetation is dry. Invasive plants, including Canada thistle, Kentucky bluegrass, redtop and dandelion compete with native vegetation and degrade habitat for many wildlife species. Prescribed grazing strategies can maintain healthy wildlife habitat and promote vegetative productivity on this site. The proximity of uplands, subirrigated sites, riparian habitat and open water creates an exceptionally diverse habitat complex for a wide variety of wildlife.

Plant Community 1: Tall and Medium Grasses and Sedges / Forbs (HCPC): The mesic environment and abundance of forbs support diverse insect and invertebrate populations ranging from grasshoppers and spiders to dragonflies and pollinating bees. Amphibians, such as Woodhouse's toad, and reptiles, such as garter snakes, rely on this community for migration and over-wintering habitat. Amphibians can be considered a "keystone species" because of their value as indicators of environmental degradation. The HCPC supports a diverse bird population because of the mix of tall and medium grasses and sedges and abundant forbs. Northern harriers hunt over, and nest in, this community. Shorebirds such as the common snipe and upland sandpiper nest here. LeConte's sparrow and the savanna sparrow are examples of songbird species using this plant community. Sage grouse broods find abundant insect foods here and adults select succulent forbs. The predominance of grasses and sedges in the HCPC favors grazers and mixed feeders like bison, elk and pronghorn. Thermal and escape cover are limited because of the low shrub coverage. Small mammals, such as the meadow vole, are common and abundant.

Plant Community 2: Medium Grasses and Sedges / Rushes/ Forbs: Loss of tall grasses and sedges along with a change in the forb component represents a decrease in habitat structural diversity. Insect populations may still be abundant but are less diverse. Amphibian habitat is degraded by a reduction in surface litter and moisture. Breeding bird populations are less diverse as habitat structure is simplified. Common snipes will still use this community for nesting and feeding. Sage grouse broods continue to select this habitat for critical insect foods during their fast growth period follow hatching. Small mammal populations may shift away from dominance by voles to seedeaters like deer mice as ground cover decreases. Forage value for big game declines with the loss of a diverse mix of warm and cool season grasses.

Plant Community 3: Rushes / Medium and Short Grasses and Sedges / Shrubs / Invasive Forbs: Insect populations decline in abundance and diversity with the loss of succulent forbs and increase in invasive weeds. Amphibians are negatively affected by a further loss of litter cover and an increasingly drier ground surface. Bird species diversity declines as habitat structural complexity is lost. Some species characteristic of drier habitats may increase. For ground-nesting birds, an increase in snowberry and rose cover may partially compensate for the sparser ground cover. Ungulate species will still find palatable forage (i.e., Kentucky bluegrass) but the forage diversity and length of green feed period have declined significantly.

Plant Community 4: Rushes / Non-Native Grasses/ Invasive Forbs: Insects may be abundant during population highs but species diversity is considerably reduced. Amphibian and reptile habitat is degraded with the drying of the soil surface. Ground-nesting bird habitat is poor following loss of ground cover although an increase in snowberry and rose, if it occurs, partially compensates for duck nesting. Ungulate species find succulent forage but for a shorter period of time compared to higher successional stages. Small mammal species composition further declines.

8. Hydrology Data: The runoff potential for this site is low. Runoff curve numbers generally range from 61 to 79. The soils associated with this ecological site are generally in Hydrologic Soil Group B. The infiltration rates for these soils will normally be moderate.

A drop in the water table elevation, such as a result of several years of drought conditions will result in a change in the plant community to more drought tolerant species (often non-native).

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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): 3

BLM–Soil & Vegetation Inventory Method (SVIM) Data: 5

NRCS–Range Condition Record (ECS-2): 5

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

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Subirrigated, 11–14" MAP
Sedimentary Plains, central
Plant Community 1, HCPC



Subirrigated, 11–14" MAP,
Sedimentary Plains, central
Plant Community 1, HCPC



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Sedimentary Plains, central
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