Ecological site R058CY092ND
Wet Meadow

Last updated: 10/31/2018
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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

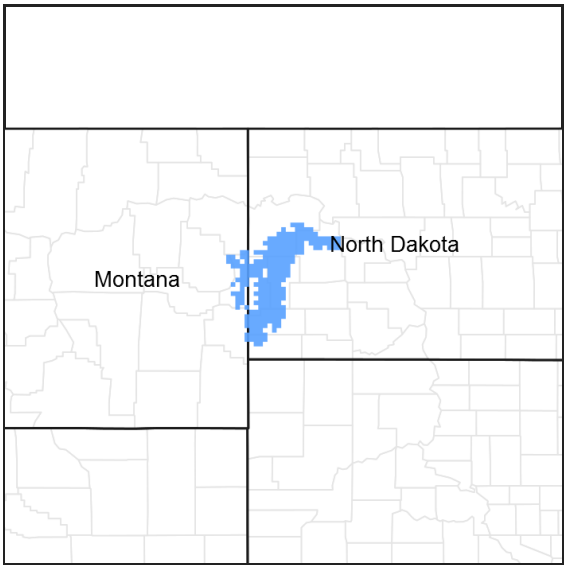


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

MLRA notes

Major Land Resource Area (MLRA): 058C–Northern Rolling High Plains, Northeastern Part

MLRA 58C covers 2,780 square miles and encompasses approximately 1.8 million acres. MLRA 58C spans two states with 96% of the area in North Dakota and 4% in Montana. The acreage inside MLRA 58C is 56% privately owned and 44% federal land. The federal land consists of the Fort Berthold Indian Reservation, Little Missouri National Grasslands, and Theodore Roosevelt National Park. MLRA 58C landscape is characterized by steeply sloping, dissected badlands along the Little Missouri River and its tributaries. Tertiary marine shale, siltstone, and sandstone sediments are the most common soil parent materials in this MLRA. Primary land uses are rangeland for grazing and wildlife habitat. Micro-climates inherent in badlands landscapes influence both variety and abundance of vegetation in MLRA 58C. South- and west-facing exposures are dry, hot, and sparsely vegetated. More humid and cooler north- and east-facing exposures are favorable for abundant forage and woody vegetation.

Classification relationships

MLRA 58C - Northern Rolling High Plains, Northeastern Part.

Ecological site concept

The Wet Meadow ecological site is located on floodplains and stream terraces. These sites are characterized by soils having a seasonal or perennial high water table less than 1.5 feet from the surface. Wet Meadows are poorly drained and typically located in drainageways, on low terraces, and in abandoned oxbows.

Associated sites

R058CY089ND	**Sandy Terrace** The Sandy Terrace ecological site has well drained soils on river or stream terraces that will flood occasionally (once in ten years) to rarely (1 to 5 times in 100 years). These floodplain steps generally have a water table that fluctuates with the depth of the water in the river or stream channel. The soils are very deep and have moderately coarse textures with stratified layers in the subsoil below the surface layer. These landforms receive periodic deposition from occasional flooding events, so carbonates may or may not be present at or near the surface. The Wet Meadow ecological sites occurs below the Sandy Terrace ecological sites. The Sandy Terrace sites are typically closer to the associated river or stream and on a similar or slightly lower elevation than the Loamy Terrace. The Sandy Terrace site is downslope from Limy Residual, Badland Fan, Loamy, Sandy, Clayey, and Sands ecological sites. The site is upslope from Saline Lowland and Loamy Overflow ("Riparian Complex") ecological sites. Indicator species are prairie sandreed evenly mixed with sand bluestem, some Canada wildrye, penstemon, and leadplant and/or western snowberry, silver sage, and possibly trees. The Sandy Terrace site has more production then the Sandy ecological site, which occurs on a different landform position, and has no flooding hazard. Also, the Sandy Terrace site has more silver sagebrush and/or western snowberry with sporadic trees than the Sandy ecological site.
R058CY090ND	**Saline Lowland** Soils on Saline Lowland ecological sites are very deep, poorly drained, saline soils that are often high in sodium. On floodplain steps in MLRA 58C, Saline Lowland sites are typically in the shallow concave drainageways that cross the floodplains and accumulate sediments eroded from the surrounding sodium-affected uplands. A contributing factor to these sites are seep areas that surface at the base of the uplands. The water of the seeps accumulate high amounts of salts/sodium from the upland parent material and drain onto the lowlands. The Saline Lowland sites are lower on the landform than the surrounding Loamy Terrace, Sandy Terrace, and Limy Residual sites. Saline Lowland sites are on slightly higher landscape positions than the poorly or very poorly drained Wet Meadow and Wetland ecological sites. The poorly drained soils on Saline Lowland sites have visible salts, gypsum crystals, and redoximorphic features at or near the surface. The Saline Lowland ecological site receives additional moisture from runoff and has a seasonal high water table. Indicator species include inland saltgrass, Nuttall alkaligrass, sandberg bluegrass, western wheatgrass, and slender wheatgrass.
R058CY091ND	**Loamy Terrace** Loamy Terrace soils are well drained soils on level to nearly level floodplain steps of rivers and streams. These floodplain steps that are occasionally flooded generally have a water table that fluctuates with the depth of the water in the river or stream channel. They have a flooding hazard that ranges from occasional (once in ten years) to rare (1 to 5 times in 100 years). The Loamy Terrace ecological site receives additional moisture due to occasional flooding events, and so has higher production than the Loamy site. The Loamy Terrace site soils have higher water-holding capacity, so the Loamy Terrace site has slightly higher production than the Sandy Terrace site. The Loamy Terrace site is on the same elevation or slightly higher in elevation than the Sandy Terrace site. These landforms receive periodic deposition from occasional flooding events, so carbonates may or may not be present at or near the surface. The Wet Meadow ecological sites occurs below the Loamy Terrace ecological sites. Loamy Terrace ecological sites are downslope from Limy Residual, Badland Fan, Loamy, Sandy, Clayey, and Sands sites. The site is upslope from Saline Lowland and Loamy Overflow ("Riparian Complex") ecological sites. Indicator species include western wheatgrass evenly mixed with green needlegrass, American vetch, and/or western snowberry, silver sagebrush, and with possible trees. This site has less western wheatgrass and blue grama, more green needlegrass, big bluestem, western snowberry, and silver sage brush than is found in the Loamy site.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

MLRA 58C is known as the Little Missouri Badlands, which formed when the Little Missouri River was diverted along a shorter, steeper course by Pleistocene glaciers. Due to the resulting increased gradient after its eastward diversion by the glaciers, the Little Missouri River began rapidly downcutting into the soft, calcareous sedimentary shale, siltstone, and sandstone of the Fort Union and Hell Creek geological formations. This rapid downcutting eroded and carved the Badlands of MLRA 58C. This cycle of erosion and deposition continues today.

Most of the soils in MLRA 58C developed from residuum weathered in place. As a result of constant erosion and deposition, the majority of soils in MLRA 58C are Entisols and Inceptisols. Mollisols have formed on the high, stable drainage divides and plateaus above the steeper, dissected hillslopes and fans that define the Badlands. Elevation ranges from 1,838 feet (560 meters) to 3,430 feet (1,045 meters). The Little Missouri River flows through the entire length of MLRA 58C and empties into Lake Sakakawea that was formed by the Garrison Dam on the Missouri River.

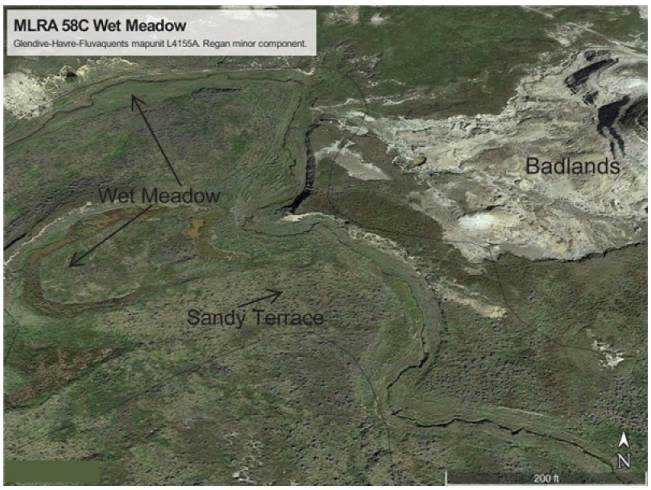


Figure 2. MLRA 58C ecological site landform positions.

Table 2. Representative physiographic features

Landforms	(1) Drainageway (2) Flood plain
Flooding duration	Brief (2 to 7 days) to long (7 to 30 days)
Flooding frequency	Occasional to frequent
Ponding duration	Brief (2 to 7 days) to long (7 to 30 days)
Ponding frequency	Occasional to frequent
Elevation	1,838–3,430 ft
Slope	0–2%
Ponding depth	0–12 in
Water table depth	0–18 in
Aspect	Aspect is not a significant factor

Climatic features

MLRA 58C is considered to have a continental climate with cold winters and hot summers, low humidity, light rainfall, and much sunshine. Extremes in temperature are common and characteristic of MLRA 58C. The continental climate is the result of this MLRA's location in the geographic center of North America. There are few natural barriers on the northern Great Plains, so air masses move unobstructed across the plains and account for rapid changes in temperature.

Annual precipitation ranges from 14 to 17 inches per year. The normal average annual temperature is about 41° F. January is the coldest month with an average temperature of about 17° F. July is the warmest month with an average temperature of about 70° F. The range of normal average monthly temperatures between the coldest and warmest months is 53° F. This large temperature range attests to the continental nature of MLRA 58C's climate.

Daytime wind speeds are generally stronger than nighttime wind speeds, and occasional strong storms may bring brief periods of high winds with gusts to more than 50 miles per hour.

Growth of native cool-season plants begins in late March and continues to early to mid-July. Native warm-season plants begin growth in mid-May and continue to the end of August. Green-up of cool-season plants can occur in September and October when adequate soil moisture is present.

Table 3. Representative climatic features

Frost-free period (average)	106 days
Freeze-free period (average)	131 days
Precipitation total (average)	16 in

Climate stations used

- (1) MEDORA [USC00325813], Medora, ND
- (2) GRASSY BUTTE 2ENE [USC00323705], Grassy Butte, ND
- (3) TROTTERS 3 SSE [USC00328812], Beach, ND
- (4) WATFORD CITY 14S [USC00329246], Grassy Butte, ND
- (5) FAIRFIELD [USC00322809], Fairfield, ND

Influencing water features

The Wet Meadow ecological site is located in a receiving position from runoff water. The kinds and amounts of vegetation existing on this site are influenced by the amount and timing of precipitation events as well as the duration of flooding and ponding.

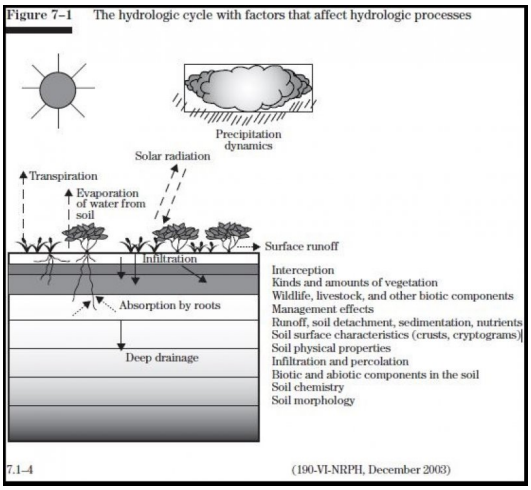


Figure 7. Fig.7-1 from National Range and Pasture Handbook.

Soil features

The soil series making up this ecological site consists of very deep, poorly drained soils formed in alluvium. These soils are on drainageways, low terraces, and abandoned oxbows in river valleys and have slopes of 0 to 2 percent.

Common surface textures for this site range from loamy fine sands to silty clay loam. The subsoil and underlying layers may be stratified with textures ranging from loamy fine sand to clay. The surface soil is generally dark colored and ranges from 2 to 9 inches thick. The soils of this site generally are calcareous at or near the surface, but in some soils carbonates may be deeper in the soil profile. These soils have a rapid to very slow infiltration rate.

This site should show no evidence of rills, wind-scoured areas, or pedestalled plants. The soil surface is stable and intact. Sub-surface soil layers are non-restrictive to water movement and root penetration.

These soils are not susceptible to water erosion. Flooding conditions and slow permeability strongly influence the soil-water-plant relationship. Loss of the soil surface layer can result in a shift in species composition and/or production.

Major soil series correlated to this ecological site include Lallie and Regan.

The following soil properties listed in the table below represent the soil profile from the surface of the soil to a depth of 40 inches (100 cm).

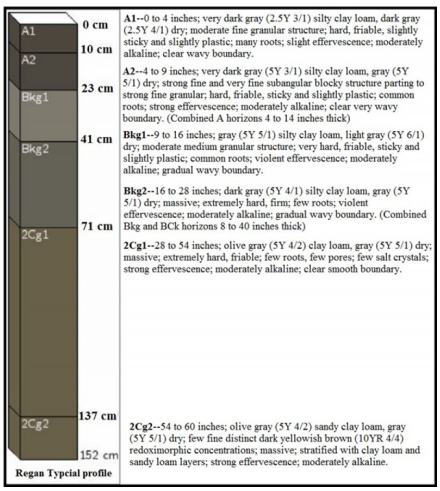


Figure 8. Regan soil series typical profile.

Table 4. Representative soil features

Surface texture	(1) Loamy fine sand (2) Silty clay loam
Family particle size	(1) Clayey
Drainage class	Poorly drained
Permeability class	Moderately slow to very slow
Soil depth	60–80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	5–15.99 in
Calcium carbonate equivalent (0-40in)	0–35%
Electrical conductivity (0-40in)	0–9 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5
Soil reaction (1:1 water) (0-40in)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

The site developed under Northern Great Plains climatic conditions, and included natural influence of large

herbivores and occasional fire. Changes will occur in the plant communities due to climatic conditions and/or management actions. Due to the nature of the soils, the site is considered quite stable. Under continued adverse impacts, a slow decline in vegetative vigor and composition will occur. Under favorable vegetative management treatments the site can quickly return to the Reference Plant Community.

The plant community upon which interpretations are primarily based is the Reference Plant Community. The Reference Plant Community has been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been used. Subclimax plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience.

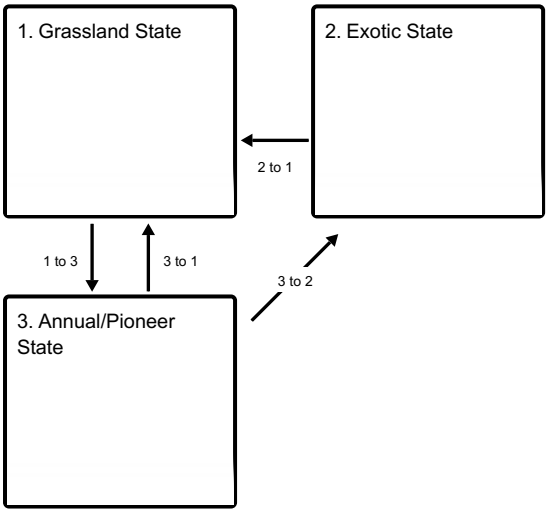
Ecological changes occur on this site primarily because of the hydrologic functions of the site. Changes will also occur due to continuous grazing without adequate recovery opportunities between grazing events, and over rest or non-use and lack of fire. Continuous grazing will cause species such as spikerush, Baltic rush, and native bluegrass to increase. Introduced species such as Kentucky bluegrass will begin to invade and dominate. Grasses such as prairie cordgrass and northern reedgrass will decrease in frequency and production and can eventually be removed from the site. Non-use (extended rest over years) or lack of fire will cause litter levels and plant decadence/mortality to increase.

Due to a general invasion of exotic species (such as Kentucky bluegrass and smooth bromegrass) across the MLRA within this site, returning to the 1.1 Prairie Cordgrass/Northern Reedgrass Plant Community Phase may not be possible.

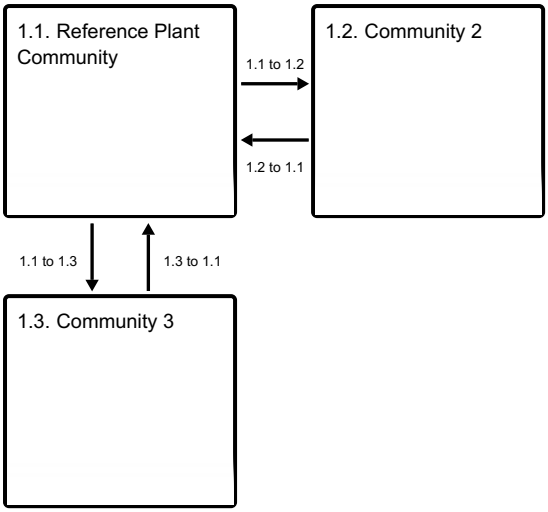
Following the state-and-transition diagram are narratives for each of the described states and community phases. These may not represent every possibility, but they are the most prevalent and repeatable states/community phases. The plant composition tables shown below have been developed from the best available knowledge at the time of this revision. As more data are collected, some of these community phases and/or states may be revised or removed, and new ones may be added. The main purpose for including the descriptions here is to capture the current knowledge and experience at the time of this revision.

State and transition model

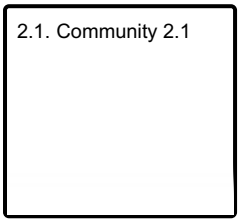
Ecosystem states



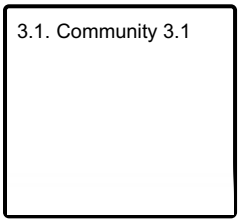
State 1 submodel, plant communities



State 2 submodel, plant communities



State 3 submodel, plant communities



State 1
Grassland State

The Grassland State is supported by empirical data, historical data, local expertise, and photographs. This state is defined by three native plant communities that are a result of periodic fire, drought, and grazing. These events are part of the natural disturbance regime and climatic process. The Reference Plant Community consists of both warm- and cool-season, tall- and midgrasses, forbs, and shrubs. Plant Community 2 consists of warm-season tallgrass and grass-likes. Plant Community 3 consists of decadent plants or excessive litter, and few remnant native grasses and forbs.

Community 1.1
Reference Plant Community

This is the interpretive plant community and is considered to be the Reference Plant Community. This plant community evolved with grazing by large herbivores and is well suited for grazing by domestic livestock. It can be found on grazed areas, where grazed plants receive adequate periods of rest during the growing season in order to recover. Historically, fires occurred infrequently. The potential vegetation is about 55% grasses, 40% grass-likes, and 5% forbs by air-dry weight. Prairie cordgrass is the dominant tall warm-season grass occupying this plant community. Northern reedgrass is the dominant tall cool-season species. A variety of sedges and rushes occur throughout this community as well as switchgrass and fowl bluegrass. Key forbs include Maximillian sunflower, Canada goldenrod, and cinquefoil. This plant community is diverse, stable, and productive, and is well adapted to the Northern Great Plains. The high water table supplies much of the moisture for plant growth. Community dynamics, nutrient cycle, water cycle, and energy flow are functioning properly. Plant litter is properly distributed with very little movement off-site and natural plant mortality is very low. The diversity in plant species allows for the variability of both the fluctuations of water table and reoccurring flooding. This is a sustainable plant community in

terms of soil stability, watershed function, and biologic integrity.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	3096	3456	3816
Forb	104	144	184
Total	**3200**	**3600**	**4000**

Community 1.2
Community 2

Without adequate recovery periods between each grazing event during the growing season, this plant community will slowly develop from the adverse effects of continuous grazing. Recognition of this plant community will enable the land user to implement key management decisions before a significant ecological threshold is crossed. Prairie cordgrass has been reduced in this plant community, but still persists in fair amounts. Kentucky bluegrass and western wheatgrass are the dominant species. Spikerush and Baltic rush as well as other grass-likes have increased. Northern reedgrass has been significantly reduced. Switchgrass may be removed at this stage. Creeping meadow foxtail can typically invade along drainageways if an upstream seed source is present. Forb species would include asters, goldenrod, and cinquefoil as well as a possible invasion of Canada thistle. Plant production and frequency have been reduced. The water cycle, nutrient cycle, and energy flow are slightly reduced but continue to adequately function.

Community 1.3
Community 3

This plant community develops after an extended period (10 to 20 years or more) of non-use or exclusion of fire. Eventually litter levels become high enough to reduce native grass vigor, diversity, and density. Years of accumulated litter will tend to make this community wetter. Baltic rush and bulrush will increase. Hydrophytic forbs will also increase. Bluegrasses such as fowl bluegrass and Kentucky bluegrass, as well as creeping meadow foxtail, can flourish in this environment and will become major components of this plant community. This plant community is resistant to change without prescribed grazing and fire. The combination of both grazing and fire is most effective in moving this plant community towards the Reference Plant Community. Soil erosion is low. Runoff is similar to that of the Reference Plant Community. Once this plant community is reached, time and external resources will be necessary to see any immediate recovery.

Pathway 1.1 to 1.2
Community 1.1 to 1.2

Continuous grazing without adequate recovery periods between grazing events will shift this plant community to the Spikerush/Baltic Rush/Prairie Cordgrass Plant Community.

Pathway 1.1 to 1.3
Community 1.1 to 1.3

Non-use and no fire will move this plant community to the Decadent Plants/Excessive Litter Plant Community.

Pathway 1.2 to 1.1
Community 1.2 to 1.1

Prescribed grazing that includes adequate recovery opportunities will shift this plant community back to the Prairie Cordgrass/Northern Reedgrass Plant Community.

Conservation practices

Prescribed Grazing

Pathway 1.3 to 1.1
Community 1.3 to 1.1

Prescribed grazing or prescribed burning followed by prescribed grazing will move this plant community toward the Prairie Cordgrass/Northern Reedgrass Plant Community. This would require long-term management with prescribed grazing and/or prescribed burning under controlled conditions.

Conservation practices

Prescribed Burning
Prescribed Grazing

State 2
Exotic State

The Exotic State is supported by empirical data, historical data, local expertise, and photographs. This state represents a plant community change, as well as changes to the energy flow and nutrient cycling processes. This state is defined by one plant community.

Community 2.1
Community 2.1

This plant community developed with heavy continuous grazing without adequate recovery periods between grazing events. Various bluegrasses, spikerush, and Baltic rush dominate the community. Kentucky bluegrass will invade on drier portions of the community. Prairie cordgrass will tend to persist in trace amounts, greatly reduced in vigor. Goldenrod, dogbane, and cinquefoil have increased. A significant amount of production and diversity has been lost when compared to the Reference Plant Community. Loss or reduction of native cool- and warm-season grasses and the forb component have negatively impacted energy flow and nutrient cycling. It will take an extended period of time to restore this plant community back to the Reference Plant Community with improved management. Renovation in most cases would not be practical as well as very costly.

State 3
Annual/Pioneer State

The Annual/Pioneer State is supported by empirical data, historical data, local expertise, and photographs. This state represents a plant community change as well as changes to the energy flow and nutrient cycling processes. This state is defined by one plant community.

Community 3.1
Community 3.1

This plant community develops under severe disturbance and/or excessive defoliation. This can result from heavy livestock or wildlife concentration, or cropping abandonment (go-back land). The dominant vegetation includes pioneer annual grasses, forbs, invaders, and early successional biennial and perennial species. Grasses may include inland saltgrass, foxtail barley, barnyardgrass, quackgrass, fowl bluegrass, Kentucky bluegrass, Baltic rush, sedges, and western wheatgrass. The dominant forbs include curlycup gumweed, Canada thistle, and other early successional species. Plant species from adjacent ecological sites may become minor components of this plant community. The community also is susceptible to invasion of other non-native species due to severe soil disturbances and relatively high percentage of bare ground. This plant community is resistant to change, as long as soil disturbance or severe vegetation defoliation persists, thus holding back secondary plant succession. Soil erosion is potentially high. Reduced surface cover, low plant density, low plant vigor, loss of root biomass, and soil compaction all contribute to decreased water infiltration, increased runoff, and accelerated erosion rates. Significant economic inputs, management, and time would be required to move this plant community toward a higher successional stage and a more productive plant community. Secondary succession is highly variable, depending upon availability and diversity of a viable seed bank of higher successional species within the existing plant community and neighboring plant communities. This plant community can be renovated to improve the production

capability, but management changes would be needed to maintain the new plant community. The total annual production ranges from 500 to 1,500 lbs./ac. (air-dry weight) depending upon growing conditions.

Transition 1 to 3
State 1 to 3

Excessive defoliation (e.g., areas of heavy animal concentration) or cropped go-back land with continuous grazing will convert the plant community to the Annual/Pioneer Perennial Plant Community.

Restoration pathway 2 to 1
State 2 to 1

Long-term prescribed grazing with adequate recovery periods following each grazing event and proper stocking, over long periods of time, will move this plant community toward the Spikerush/Baltic Rush/Prairie Cordgrass Plant Community. This plant community may eventually return to the Reference Plant Community or associated successional communities, assuming an adequate seed/vegetative source is available. This process may take greater than 20 years.

Conservation practices

Prescribed Grazing

Restoration pathway 3 to 1
State 3 to 1

Under long-term prescribed grazing and/or removal of disturbance, including adequate rest periods, this plant community will move through the successional stages, and may eventually lead to a plant community resembling the Prairie Cordgrass/Northern Reedgrass Plant Community. Depending on the slope, aspect, and size, and if adequate perennial plants exist, this change can occur more rapidly. This process will likely take a long period of time (20+ years). Range seeding after removal of disturbance with deferment and prescribed grazing can convert this to a plant community resembling the Prairie Cordgrass/Northern Reedgrass Plant Community.

Conservation practices

Prescribed Grazing

Transition 3 to 2
State 3 to 2

Heavy, continuous grazing after removal of disturbance will direct this plant community towards the Bluegrass/Spikerush/Baltic Rush Plant Community.

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Grasses**			1620–1980	
	prairie cordgrass	SPPE	*Spartina pectinata*	720–1080	–
	northern reedgrass	CASTI3	*Calamagrostis stricta ssp. inexpansa*	360–540	–
	American mannagrass	GLGR	*Glyceria grandis*	180–360	–
	American sloughgrass	BESY	*Beckmannia syzigachne*	180–360	–
	western wheatgrass	PASM	*Pascopyrum smithii*	72–180	–
	switchgrass	PAVI2	*Panicum virgatum*	108–180	–
	fowl bluegrass	POPA2	*Poa palustris*	36–72	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	36–72	–
	rough bentgrass	AGSC5	*Agrostis scabra*	36–72	–
2	**Grass-likes**			720–1440	
	shortbeak sedge	CABR10	*Carex brevior*	180–360	–
	Sartwell's sedge	CASA8	*Carex sartwellii*	180–360	–
	woolly sedge	CAPE42	*Carex pellita*	144–288	–
	clustered field sedge	CAPR5	*Carex praegracilis*	180–288	–
	spikerush	ELEOC	*Eleocharis*	108–180	–
	flatsedge	CYPER	*Cyperus*	36–72	–
Forb					
3	**Forbs**			108–180	
	Canada goldenrod	SOCA6	*Solidago canadensis*	36–72	–
	dogbane	APOCY	*Apocynum*	36–72	–
	Maximilian sunflower	HEMA2	*Helianthus maximiliani*	36–72	–
	Rydberg's sunflower	HENUR	*Helianthus nuttallii ssp. rydbergii*	36–72	–
	mint	MENTH	*Mentha*	36–72	–
	cinquefoil	POTEN	*Potentilla*	0–36	–
	western dock	RUAQ	*Rumex aquaticus*	0–36	–
	blue-eyed grass	SISYR	*Sisyrinchium*	0–36	–
	Flodman's thistle	CIFL	*Cirsium flodmanii*	0–36	–
	showy prairie gentian	EUEXR	*Eustoma exaltatum ssp. russellianum*	0–36	–

Animal community

Grazing Interpretations:

This site is well adapted to managed grazing by domestic livestock. The predominance of herbaceous plants across all plant community phases best lends these sites to grazing by cattle, but other domestic grazers with differing diet preferences may also be a consideration depending upon management objectives. Often, the current plant community does not entirely match any particular plant community (as described in the ecological site description). Because of this, a resource inventory is necessary to document plant composition and production. Proper interpretation of this inventory data will permit the establishment of a safe initial stocking rate for the type and class of animals and level of grazing management. More accurate stocking rate estimates should eventually be calculated using actual stocking rate information and monitoring data.

Hydrological functions

Water ponding is the principal factor limiting herbage production on this site. The site is dominated by soils in hydrologic groups B and D. Infiltration varies from moderate to slow and runoff potential for this site is negligible. In many cases, areas with greater than 75% ground cover have the greatest potential for high infiltration and lower runoff. An exception would be where shortgrasses form a dense sod and dominate the site. Areas where ground cover is less than 50% have the greatest potential to have reduced infiltration and higher runoff (refer to Section 4, NRCS National Engineering Handbook for runoff quantities and hydrologic curves).

Recreational uses

This site provides hunting opportunities for upland game species. The wide variety of plants which bloom from spring until fall have an esthetic value that appeals to visitors.

Wood products

No appreciable wood products are present on the site.

Other products

Seed harvest of native plant species can provide additional income on this site

Other information

Site Development and Testing Plan:

Chris Tecklenburg (Natural Resource Specialist, Ecological Sites, Kansas NRCS) assumed responsibilities for development of provisional ESDs in MLRA 58C on 8-17-2017. Most information for the provisional Wet Meadows ecological site comes from adjacent MLRA 54 wet meadows site.

This site is going through the Provisional ESD process. It contains information above and beyond what is required of a provisional due to foundational work completed in adjacent MLRA 54 during the early 2000s. This site is scheduled to go through the approval process fiscal year 2021.

Inventory data references

Chris Tecklenburg (Ecologist, Kansas NRCS) was assigned responsibilities for the development of provisional ESDs in MLRA 58C on 8-17-2017.

NRCS individuals involved in developing the Wet Meadows PESD in 2017 include: Mark Hayek, Jeff Printz, Steve Sieler, John Kempenich, Jody Forman, Mike Gerbig, and Jeanne Heilig from North Dakota, Rick Peterson from South Dakota, Chad Prosser and Jack Dahl from the Forest Service in North Dakota, and Chad Sexton from the National Park Service in North Dakota.

Foundational information for the provisional Wet Meadows ecological site in MLRA 58C originates from the adjacent MLRA 54 Wet Meadows site.

Information from the MLRA 54 Wet Meadows site is derived from NRCS clipping and other inventory data. Also, field knowledge of range-trained personnel was used. All descriptions were peer reviewed and/or field tested by various private, state, and federal agency specialists.

NRCS individuals involved in developing MLRA 54 Wet Meadows ecological site description include: Dennis Froemke, Jeff Printz, Stan Boltz, Darrell Vanderbusch, L. Michael Stirling, Josh Saunders, Jody Forman, David Dewald, and Brad Podoll.

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Approval

David Kraft, 10/31/2018

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The ecological site development process is a collaborative effort, conceptual in nature, dynamic, and is never considered complete.

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	Chris Tecklenburg Revision of this reference sheet derived from MLRA 54 Wet Meadow on 9/25/2017. J. Printz, S. Boltz, R. Kilian, D. Froemke, M. Rasmusson original authors 5/24/2017.
Contact for lead author	Mark Hayek, USDA-NRCS, State Rangeland Management Specialist, Bismarck, ND. Mark.Hayek@nd.usda.gov
Date	05/24/2011
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills should not be present.

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2. **Presence of water flow patterns:** None.

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3. **Number and height of erosional pedestals or terracettes:** Non-existent.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is zero to trace.

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5. **Number of gullies and erosion associated with gullies:** Active gullies should not be present.

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6. **Extent of wind scoured, blowouts and/or depositional areas:** None.

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7. **Amount of litter movement (describe size and distance expected to travel):** Little to no plant litter movement. Plant litter remains in place and is not moved by erosional forces.

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Plant cover and litter is at 95% or greater of soil surface and maintains soil surface integrity. Stability class

anticipated to be 5 or greater.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Use soil series description for depth, color, and structure of A-horizon.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** High grass canopy and basal cover and small gaps between plants should reduce raindrop impact and slow overland flow, providing increased time for infiltration to occur. Healthy, deep-rooted native grasses and grass-likes enhance infiltration and reduce runoff.

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** No compaction layer should be evident.

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant: Tall, rhizomatous warm-season grasses = grass-likes >

    Sub-dominant: None

    Other: mid, cool-season rhizomatous grasses > annual grasses > forbs > short, cool-season grasses

    Additional: Due to differing root structure and distribution, Kentucky bluegrass and smooth bromegrass do not fit into Reference Plant Community F/S groups.

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very low.

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14. **Average percent litter cover (%) and depth (in):** Litter cover is in contact with soil surface.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Representative value = 3600 lbs/ac with a range of 3200 lbs/ac to 4000 lbs/ac (air dry weight) depending upon growing conditions.

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** State and local noxious, quackgrass, creeping foxtail, reed canarygrass, smooth bromegrass, Kentucky bluegrass

17. **Perennial plant reproductive capability:** All species are capable of reproducing.