

Ecological site R056AY102ND

Wet Meadow

Accessed: 05/03/2024

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.

Classification relationships

Level IV Ecoregions of the Conterminous United States: 48a Glacial Lake Agassiz Basin; 48b Beach Ridges and Sand Deltas; 48c Saline Area; 48d Lake Agassiz Plains.

Associated sites

R056AY087ND	Limy Subirrigated
R056AY095ND	Subirrigated
R056AY096ND	Subirrigated Sands
R056AY101ND	Shallow Marsh

Similar sites

R056AY101ND	Shallow Marsh
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Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Carex pellita</i> (2) <i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>

Physiographic features

This site occurs on concave shallow swales or depressions

Table 2. Representative physiographic features

Landforms	(1) Pothole (2) Swale
Flooding frequency	None
Ponding duration	Brief (2 to 7 days) to very long (more than 30 days)
Ponding frequency	Occasional to frequent

Elevation	198–305 m
Slope	0–3%
Ponding depth	0–46 cm
Water table depth	15–46 cm
Aspect	Aspect is not a significant factor

Climatic features

MLRA 56 is considered to have a continental climate – cold winters and relatively hot summers, low to moderate humidity, light rainfall, and much sunshine. Extremes in temperature may also abound. The climate is the result of this MLRA's location near the geographic center of North America. There are few natural barriers on the northern Great Plains and air masses move freely across the plains and account for rapid changes in temperature.

Annual precipitation typically ranges from 18 to 23 inches per year. The average annual temperature is about 40°F. January is the coldest month with average temperatures ranging from about 1°F (Pembina, North Dakota (ND)) to about 11°F (Wheaton, Minnesota (MN)). July is the warmest month with temperatures averaging from about 68°F (Pembina, ND) to about 73°F (Wheaton, MN). The range of normal average monthly temperatures between the coldest and warmest months is about 65°F. This large annual range attests to the continental nature of this area's climate. Winds are estimated to average about 13 miles per hour annually, ranging from about 15 miles per hour during the spring to about 11 miles per hour during the summer. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 miles per hour.

Growth of cool season plants begins in early to mid March, slowing or ceasing in late June. Warm season plants begin growth about mid May and continue to early or mid September. Green up of cool season plants may occur in September and October when adequate soil moisture is present.

Table 3. Representative climatic features

Frost-free period (average)	143 days
Freeze-free period (average)	162 days
Precipitation total (average)	584 mm

Influencing water features

Soil features

These are very deep, poorly drained, moderately coarse to fine textured soils. Saturated hydraulic conductivity is moderate to very slow and available water capacity is low to high. Salinity and sodicity are typically none to slight. Water tables on this site range from the surface to 1.5 feet below the surface sometime during the period March through July. The site normally receives additional water from surface runoff and/or subsurface flow. This site occurs in flats and slight depressions on floodplains, lake plains and till plains. Slope ranges from 0 to 3 percent. This site should show no evidence of rills, wind scoured areas or pedestalled plants. The soil surface is stable and intact. In some soils sub-surface soil layers are non-restrictive to water movement. Pondered water conditions and saturated soils strongly influence the soil-water-plant relationship.

Major soil series correlated to this ecological site can be found in Section II of the Natural Resources Conservation Service Field Office Technical Guide or the following web site:

<http://www.nrcs.usda.gov/technical/efotg/>

Table 4. Representative soil features

Surface texture	(1) Silt loam (2) Silty clay loam (3) Loam
Family particle size	(1) Loamy
Drainage class	Poorly drained
Permeability class	Slow to rapid
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0–2%
Available water capacity (0-101.6cm)	7.62–20.32 cm
Calcium carbonate equivalent (0-101.6cm)	0–30%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–2
Soil reaction (1:1 water) (0-101.6cm)	5.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–15%
Subsurface fragment volume >3" (Depth not specified)	0–3%

Ecological dynamics

The site developed under Northern Great Plains climatic conditions, and included natural influence of large herding herbivores and occasional fire. Changes will occur in the plant communities due to weather fluctuations and/or management actions. Under adverse impacts, a relatively rapid decline in vegetative vigor and composition can occur. Under favorable conditions the site has the potential to resemble the Reference State. Interpretations for this site are based primarily on the Sedge/Northern Reedgrass Plant Community Phase. This community phase and the Reference State 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 considered. Community phases, community pathways, states, transitions, thresholds and restoration pathways have been determined through similar studies and experience.

The natural disturbance regime consisted of frequent fires caused both by natural and Native American ignition sources. These fires occurred during any season of the year, but were concentrated in late summer or early fall. Lightning fires occurred most frequently in July and August while fires started by Native Americans occurred in September and October. Large ungulate grazing was heavy and occurred often, but usually for short durations. Grazing may have been severe when occurring after a fire event. Hydrology and climatic variations, primarily several years of above or below normal precipitation, coupled with grazing and fire interaction, set up the dynamics discussed and displayed in the following state and transition diagram and descriptions.

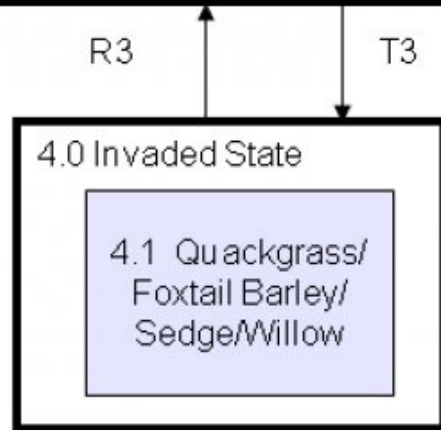
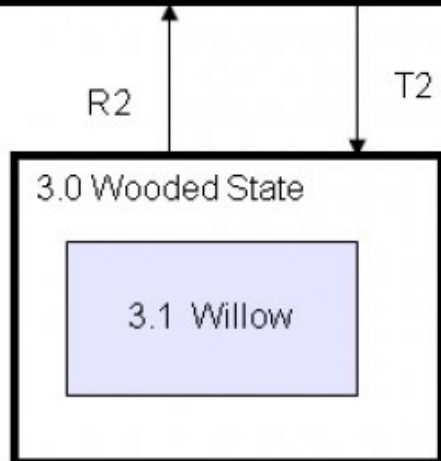
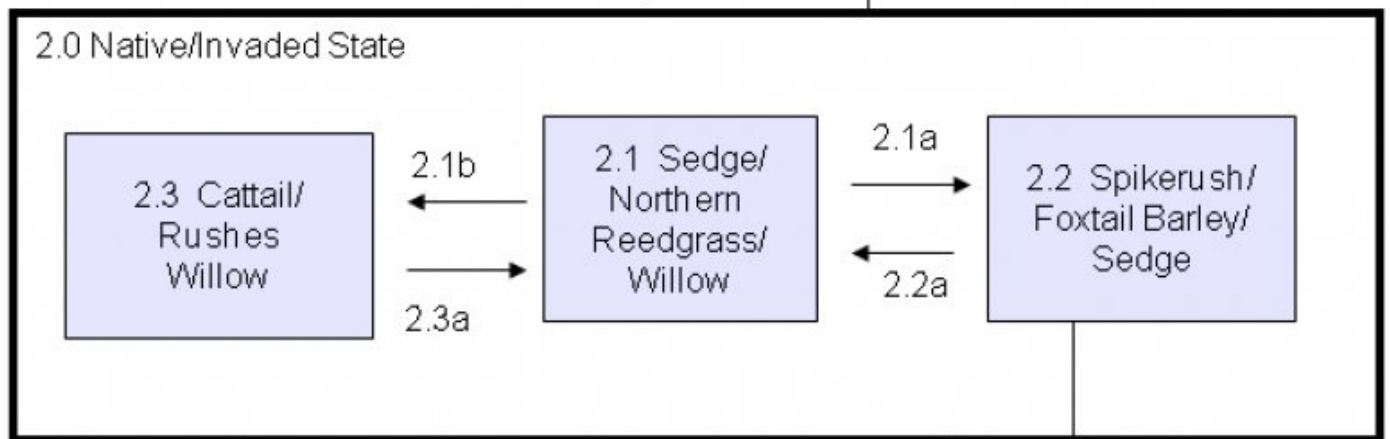
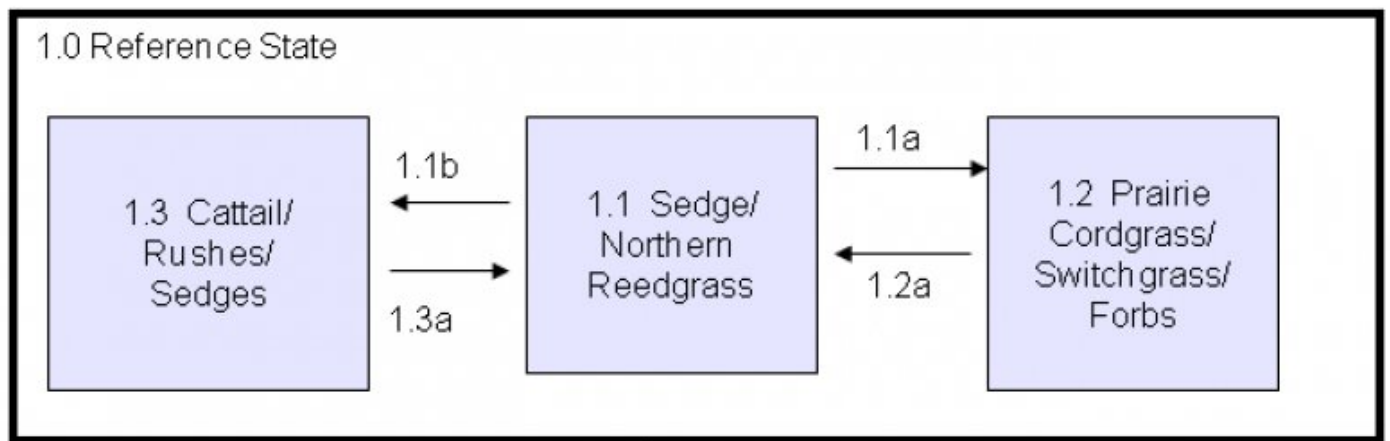
Vegetatively, several years of above or below normal precipitation can have a dramatic impact on this ecological site. This site has been observed to support vegetative communities associated with wet land ecological site during periods of above normal precipitation. During periods of drought, a shift to a vegetative community associated with subirrigated sites has been observed.

This ecological site has been grazed by domestic livestock since introduced into the area. The introduction of domestic livestock, use of fencing and reliable water sources, and changes to fire frequency, have changed the disturbance regime of this site.

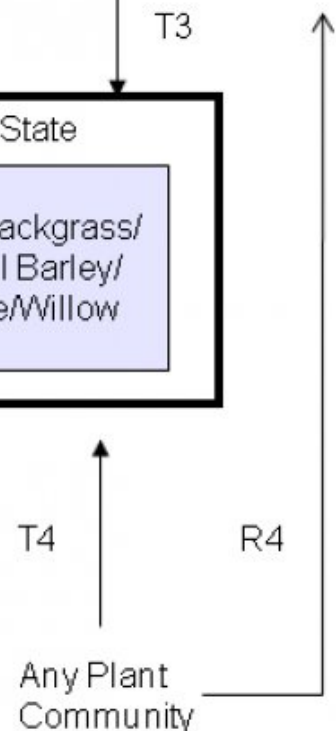
Heavy season-long grazing causes this site to depart from the Reference State primarily due to the physical impact the grazing animals have on the saturated soils. This disturbance causes species such as fowl bluegrass, spikerush, and Baltic rush to initially increase. Prairie cordgrass and northern reedgrass will decrease in frequency and production. Continued disturbance will eventually cause quackgrass, foxtail barley, Kentucky bluegrass, spikerush and disturbance tolerant forbs such as curly dock and sow thistle to increase and dominate.

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



1.1a – Prolonged drought ; **1.2a, 1.3a, 2.2a, 2.3a** – Return to normal precipitation and historic disturbance regime; **1.1b, 2.1b** – Prolonged periods of above normal precipitation; **2.1a** – Prolonged drought and increased grazing pressure and/or mechanical disturbance; **T1** – Removal of fire, introduction of non-native species; **R1** – Prescribed fire and/or mechanical brush control; **R2** – Mechanical brush control and prescribed fire; **T2** – Increase in extent and size of willow; **T3** – Increase in extent of non-native invasive species; **R3, R4** – Range seeding with prescribed grazing and prescribed fire; **T4** – Cropped go-back



State 1 Reference

This state represents the natural range of variability that dominates the dynamics of this ecological site. This state is typically dominated by cool-season grass-likes and grasses with minor amounts of warm-season grasses. Prior to European settlement, the primary disturbance mechanisms for this site in the reference condition included periodic fire, grazing by herding ungulates and shifting precipitation patterns. Timing of fires and grazing coupled with weather events dictated the dynamics that occurred within the natural range of variability. Today the primary disturbance is a lack of fire, physical impacts of livestock grazing, mechanical harvest, and precipitation. In some instances, the mechanical harvest of these sites has similar impacts on the willows as fire, limiting their size and extent within the plant community.

Community 1.1 Sedge/Northern Reedgrass



This community evolved with grazing by large herbivores, occasional prairie fires and relatively frequent ponding events and can be found on areas that are properly managed with grazing and/or prescribed burning, and sometimes on areas receiving occasional short periods of rest. The potential vegetation is about 45 percent grass-likes, 40 percent grasses, 15 percent forbs, and 1 percent shrubs by air-dry weight. Woolly sedge is typically the dominant grass-like species, while prairie cordgrass is the dominant tall warm-season grass occupying this plant community. Northern reedgrass is the dominant mid cool-season species. A variety of sedges and rushes occur throughout this community as well as switchgrass and fowl bluegrass. Key forbs include rough bugleweed, western dock, American germander, and mints. This plant community phase 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. Bare ground is less than 1%. The diversity in plant species allows for the variability of both the fluctuations of water table and reoccurring ponding. 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 (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	4461	4808	5912
Forb	247	874	729
Shrub/Vine	—	146	308
Total	4708	5828	6949

Figure 5. Plant community growth curve (percent production by month).
ND5606, Red River Valley of the North, lowland cool-season dominant..
Cool-season dominant, lowland..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	10	37	35	5	2	8	0	0	0

Community 1.2 Prairie Cordgrass/Switchgrass/Forbs

This plant community phase is characterized by a shift from the mid-statured grass-likes and grasses such as woolly sedge and Northern reedgrass to species which would more often associated with slightly drier sites such as prairie cordgrass, switchgrass, and mat muhly. Forbs would include black-eyed Susan, goldenrods, Canada anemone, ragworts and hoary verbena. Spike rush and Baltic rush are the dominant grass-likes.

Community 1.3 Cattail/Rushes/Sedges



This plant community phase is characterized by an increase in the more flood tolerant species such as cattail and rushes. Dominant species would include broadleaf cattail, American bulrush, softstem bulrush, creeping spikerush, duckweed, smartweed, and bladderwort. Woolly sedge and northern reedgrass are still present but in reduced amounts scattered across the site. Sandbar willow and other willow species would also be present and growing in association with the northern reedgrass and woolly sedge. Small areas of open water may also be present. Continued expansion of the willow may lead to the crossing of an ecological threshold.

Pathway 1.1a Community 1.1 to 1.2

This community pathway is initiated during periods of prolonged below normal precipitation which lowers the available water table, drying out the site, and shifting the plant community to one resembling a subirrigated site. Under these drier conditions, fire frequency would have increased. Grazing frequency also increases.

Pathway 1.2a Community 1.2 to 1.1

This community pathway is initiated by a return to normal precipitation and normal water table levels. Rising water table, favors expansion of sedges, northern reedgrass, and other hydrophilic species.

Pathway 1.2b Community 1.2 to 1.3

This plant community pathway is initiated during several years of above normal precipitation which raises the water table and increases ponding frequency and duration. Reduced fire frequency due to wetter conditions would also favor an increase in the willow component of the plant community

Pathway 1.3a Community 1.3 to 1.1



Cattail/Rushes/Sedges



Sedge/Northern Reedgrass

This pathway is initiated by a return to normal or below normal precipitation regime over a period of several years. Reduced ponding duration and frequency shifts the plant community to the sedge/ northern reedgrass dominants. Drier site conditions also permits a return to historic fire intervals. Due to the fire tolerance of willows, a return to the historic fire regime (three to five year interval) is necessary to reduce the willow component to that resembling the reference plant community. Without this fire frequency, the willow component may increase, initiating the transition to Plant Community Phase 2.0.

State 2 Native/Invaded

This State is characterized by the presence of minor amounts of non-native species and/or a significant increase in the amount and extent of willow species.

Community 2.1 Sedge/Northern Reedgrass/Willow



This community phase is very similar in appearance and function to Phase 1.1 with the exception of the presence of trace amounts of non-native species such as redtop, Kentucky bluegrass, field sowthistle and Canada thistle. Sandbar willow increases in extent and size beyond what is expected in the reference state. Productivity of this plant community phase is very similar to community phase 1.1, consisting of about 45 percent grass-likes, 40 percent grasses, 10 percent forbs, and 5 percent shrubs by air-dry weight. Woolly sedge remains the dominant grass-like species, while prairie cordgrass is still the dominant tall warm-season grass and Northern reedgrass is still the dominant mid cool-season grass occupying this plant community. A variety of other sedges and rushes occur throughout this community as well as switchgrass and fowl bluegrass. Key forbs include rough bugleweed, western dock, American germander, and mints. Energy capture, infiltration rates and nutrient cycling are all functioning at levels similar to the reference plant community. Bare ground would be less than 1%.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	4909	4808	5464
Forb	247	874	729
Shrub/Vine	–	146	308
Total	5156	5828	6501

Figure 7. Plant community growth curve (percent production by month).
 ND5606, Red River Valley of the North, lowland cool-season dominant..
 Cool-season dominant, lowland..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	10	37	35	5	2	8	0	0	0

Community 2.2 Spikerush/Foxtail Barley/Sedge

This plant community phase is characterized by an increase in disturbance tolerant species such as spikerush, foxtail barley, muhly, Baltic rush, curly dock, verbena and annual forbs. Sedges and northern reedgrass are still present but in reduced amounts. Willows, if present, may be more visible due to reduced standing herbaceous biomass. Redtop, if present, will increase within this phase. Increased livestock and/or mechanical impacts results in increased amounts of bare ground over what would be observed in Plant Community Phase 2.1.

Community 2.3 Cattail/Rushes/Willow

This plant community phase is characterized by an increase in the more flood tolerant species such as cattail and rushes. Dominant species would include broadleaf cattail, American bulrush, softstem bulrush, creeping spikerush, duckweed, smartweed, and bladderwort. Non-native species such as narrow-leaf cattail and hybrid cattail are also present. Woolly sedge and northern reedgrass are still present but in reduced amounts scattered across the site. Sandbar willow and other willow species would also be present and growing in association with the northern reedgrass and woolly sedge. Small areas of open water may also be present.

Pathway 2.1a Community 2.1 to 2.2

This community pathway is initiated during periods of prolonged below normal precipitation which lowers the available water table, shifting the plant community to those species more often associated with a subirrigated ecological site. This shift may be further compounded by an increase in grazing intensity and frequency due to the decline in available forage on adjacent upland sites. The shift in the plant community is driven as much by the actual physical impact (e.g. root shearing, trampling) of the grazing animals as it is from the grazing of the vegetation. This pathway can also be initiated on smaller areas by the physical disturbance of motorized vehicle traffic or concentrated livestock activities (i.e. creep feeders).

Pathway 2.2a Community 2.2 to 2.1

A return to normal precipitation regime, the application of prescribed grazing which includes adequate recovery periods after each grazing event and prescribed burning will shift this plant community towards Plant Community Phase 2.1.

Conservation practices

Prescribed Burning
Prescribed Grazing

Pathway 2.2b

Community 2.2 to 2.3

This plant community pathway is initiated during several years of above normal precipitation which raises the water table and increases ponding frequency and duration. This shifts the plant community to the more flood tolerant species. Reduced fire frequency due to wetter conditions also favors an increase in the willow component of the plant community

Pathway 2.3a

Community 2.3 to 2.1

This pathway is initiated by a return to normal or below normal precipitation regime over a period of several years. Reduced ponding duration and frequency shifts the plant community to the sedge/ northern reedgrass dominants.

State 3

Wooded

This state is characterized by a dominance of non-native invasive species such as quackgrass, redtop, Canada thistle, leafy spurge and Kentucky bluegrass and/or an increase in aggressive native species such as reed canarygrass. Species diversity is reduced as compared to the Reference State (State 1) and Native/Invaded State (State 2).

Community 3.1

Willow



This plant community phase is dominated by sandbar and Bebb's willow. Other shrubs species may include white meadowsweet and possibly dogwood. Herbaceous production is greatly reduced due to shading, with various sedges and rushes still dominating the remnant herbaceous community. Willow height may exceed six feet. As willows mature, herbaceous production may decline to less than 500 pounds per acre. Bare ground is minimal (less than 2%) due to plant litter accumulation from willow leaves. Functional/structural groups have been altered from a dominance of herbaceous grass-likes to shrubs. Once established, this plant community is very resilient and resistant to change. The lack of fine fuels in the understory and high degree of shading makes the application of prescribed fire very difficult if not impossible without some type of mechanical pretreatment a year to two prior to the burn. Some type of treatment which would reduce the willow canopy and allow the remnant herbaceous community to produce adequate fine fuel loads to permit the repeated application of prescribed fire may begin to shift the plant community toward the Native/Invaded State.

State 4

Invaded

This state is characterized by a dominance (both visually and in production) of willow species and a greatly reduced herbaceous understory. Remnant sedges still dominate the herbaceous portion of the state but shade tolerant invasives such as Kentucky bluegrass and/or redtop may also be present.

Community 4.1

Quackgrass/Foxtail Barley/Sedge/Willow

This plant community phase is characterized by an increase in disturbance tolerant non-native invasive species such as quackgrass, reedtop, Canada thistle, leafy spurge and Kentucky bluegrass. Reed canarygrass may also increase and become the dominant species. If soil salinity increases due to lack of plant cover and increased bare ground, foxtail barley may be a major component. Native species such as sedges, spikerush, muhly, Baltic rush, curly dock, and other native and introduced forbs will be present.

Transition T1

State 1 to 2

Transition from Reference State (State 1) to the Native/Invaded State (State 2) This represents the transition from the native sedge dominated reference state to a state that has been invaded by introduced species. When propagules of non-native species such as reedtop, Canada thistle, field sowthistle are present, this transition occurs as management actions, or soil disturbance, favor a decline in the composition of the sedges and other grass-like species. These species may occupy functional/structural groups not present in the Reference State. This transitional pathway may be compounded by a reduction or elimination of fire which serves to maintain the willow as a minor component in the Reference State. Without this frequency of disturbance, the willow component exceeds the point where a return to the normal fire disturbance regime will reduce the willow component to Reference State conditions. The historic impacts of fire on the shrub component may be mimicked by regular mechanical clipping of the site.

Transition T4

State 1 to 4

Transition from Any Plant Community to Invaded State (State 4) This transition is a result of abandonment following cropping.

Restoration pathway R1

State 2 to 1

R1 Restoration from Native/Invaded State (State 2) to the Reference State (State 1) In the absence of invasive species, an increase in fire frequency alone, or in combination with, mechanical treatment and/or herbicide treatment would reduce the willow component to Reference State levels. This restoration pathway is not applicable when non-native invasive species are present in the plant community.

Conservation practices

Brush Management
Prescribed Burning
Herbaceous Weed Control

Transition T2

State 2 to 3

The complete removal of fire or, very infrequent fire, allows willow species to increase in both size and extent. This lack of disturbance (fire and/or mechanical) may be facilitated by periods of above normal precipitation. Sporadic attempts to shift the plant community back to the Reference State either through the use of prescribed burning and/or mechanical treatment causes the willow to re-sprout with multiple stems and ultimately, may hasten the shift to Plant Community Phase 3.1. Experience would indicate the threshold occurs when willow attain a height of greater than 30 inches and become multi-stemmed. At this point, the willows begin to reduce herbaceous production and limit fire intensity. At this stage, if fire occurs, it does not generate adequate heat to kill the willow or, if it does top kill the willow, re-sprouting results in an even thicker stand of willow.

Transition T4

State 2 to 4

Transition from Any Plant Community to Invaded State (State 4) This transition is a result of abandonment following cropping.

Transition T3

State 2 to 4

Transition from Plant Community Phase 2.2 to the Invaded State (State 4) Continued excessive animal impact and/or mechanical disturbance coupled with drier soil conditions will favor the expansion of non-native invasive species such as quackgrass, redtop, field sowthistle, and Canada thistle. Native species such as reed canarygrass and foxtail barley may also expand to form monocultures.

Restoration pathway R2

State 3 to 2

Restoration from Wooded State (State 3) to the Native/Invaded State (State 2) The use of mechanical brush control treatments and possible application of the proper herbicides coupled with repeated prescribed burns may result in a shift towards the herbaceous dominated communities of the Native/Invaded State. Remnant native herbaceous species will need to be present in adequate amounts (root stock) to re-establish so seeding is not needed. The potential would exist for invasives (e.g. redtop) to dominate the site following this treatment regime if they are present initially.

Conservation practices

Brush Management
Prescribed Burning
Herbaceous Weed Control

Restoration pathway R4

State 3 to 2

Restoration from Any Plant Community to the Native/Invaded State (State 2) Restoration efforts which include a properly prepared seedbed, control of competing vegetation using appropriate herbicides, seeding adapted native species, and managing the resulting plant community with prescribed burning and prescribed grazing may result in a plant community which resembles Plant Community Phase 2.1 in appearance.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing
Herbaceous Weed Control

Restoration pathway R4

State 3 to 2

Restoration from Any Plant Community to the Native/Invaded State (State 2) Restoration efforts which include a properly prepared seedbed, control of competing vegetation using appropriate herbicides, seeding adapted native species, and managing the resulting plant community with prescribed burning and prescribed grazing may result in a plant community which resembles Plant Community Phase 2.1 in appearance.

Conservation practices

Brush Management

Prescribed Burning
Prescribed Grazing
Herbaceous Weed Control

**Transition T4
State 3 to 4**

Transition from Any Plant Community to Invaded State (State 4) This transition is a result of abandonment following cropping.

**Restoration pathway R3
State 4 to 2**

Restoration from Invaded State (State 4) to the Native/Invaded State (State 2) Restoration efforts which include destroying the invasive and other competing vegetation using appropriate herbicides, seeding adapted native species, and managing the resulting plant community with prescribed burning and prescribed grazing may result in a plant community which resembles Plant Community Phase 2.1 in appearance and function.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing
Herbaceous Weed Control

**Restoration pathway R4
State 4 to 2**

Restoration from Any Plant Community to the Native/Invaded State (State 2) Restoration efforts which include a properly prepared seedbed, control of competing vegetation using appropriate herbicides, seeding adapted native species, and managing the resulting plant community with prescribed burning and prescribed grazing may result in a plant community which resembles Plant Community Phase 2.1 in appearance.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing
Herbaceous Weed Control

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Grass-likes			2331–2914	
	woolly sedge	CAPE42	<i>Carex pellita</i>	1749–2331	–
	wheat sedge	CAAT2	<i>Carex atherodes</i>	874–1457	–
	shortbeak sedge	CABR10	<i>Carex brevior</i>	874–1457	–
	limestone meadow sedge	CAGR3	<i>Carex granularis</i>	58–291	–

	bottlebrush sedge	CAHY4	<i>Carex hystericina</i>	58–291	–
	smoothcone sedge	CALA12	<i>Carex laeviconica</i>	58–291	–
	Bicknell's sedge	CABI3	<i>Carex bicknellii</i>	58–291	–
	water sedge	CAAQ	<i>Carex aquatilis</i>	58–291	–
	Sartwell's sedge	CASA8	<i>Carex sartwellii</i>	58–291	–
	upright sedge	CAST8	<i>Carex stricta</i>	58–291	–
	rigid sedge	CATE6	<i>Carex tetanica</i>	58–291	–
	fox sedge	CAVU2	<i>Carex vulpinoidea</i>	58–291	–
2	Cool-Season Grasses			1457–2040	
	northern reedgrass	CASTI3	<i>Calamagrostis stricta ssp. inexpansa</i>	874–1749	–
	fowl bluegrass	POPA2	<i>Poa palustris</i>	58–291	–
	prairie wedgescale	SPOB	<i>Sphenopholis obtusata</i>	0–175	–
	Grass, native	2GN	<i>Grass, native</i>	0–175	–
	American sloughgrass	BESY	<i>Beckmannia syzigachne</i>	0–117	–
	reed canarygrass	PHAR3	<i>Phalaris arundinacea</i>	0–117	–
3	Warm-Season Grasses			291–874	
	prairie cordgrass	SPPE	<i>Spartina pectinata</i>	58–291	–
	switchgrass	PAVI2	<i>Panicum virgatum</i>	58–175	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–117	–
	Mexican muhly	MUME2	<i>Muhlenbergia mexicana</i>	0–58	–
	marsh muhly	MURA	<i>Muhlenbergia racemosa</i>	0–58	–
	mat muhly	MURI	<i>Muhlenbergia richardsonis</i>	0–58	–
4	Other Grass-likes			58–291	
	mountain rush	JUARL	<i>Juncus arcticus ssp. littoralis</i>	58–175	–
	spikerush	ELEOC	<i>Eleocharis</i>	58–175	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–117	–
	Dudley's rush	JUDU2	<i>Juncus dudleyi</i>	0–58	–
	Torrey's rush	JUTO	<i>Juncus torreyi</i>	0–58	–
	spikesedge	KYLLI2	<i>Kyllinga</i>	0–58	–
	American water-willow	JUAM	<i>Justicia americana</i>	0–58	–
	cloaked bulrush	SCPA8	<i>Scirpus pallidus</i>	0–58	–
	common threesquare	SCPUB	<i>Schoenoplectus pungens var. badius</i>	0–58	–
Forb					
5	Forbs			583–1166	
	Forb, native	2FN	<i>Forb, native</i>	58–117	–
	Canadian anemone	ANCA8	<i>Anemone canadensis</i>	58–117	–
	flat-top goldentop	EUGRG	<i>Euthamia graminifolia var. graminifolia</i>	58–117	–
	hempnettle	GALEO	<i>Galeopsis</i>	58–117	–
	American water horehound	LYAM	<i>Lycopus americanus</i>	58–117	–
	rough bugleweed	LYAS	<i>Lycopus asper</i>	58–117	–
	wild mint	MEAR4	<i>Mentha arvensis</i>	58–117	–
	northern bog violet	VINE	<i>Viola nephrophylla</i>	58–117	–

	water knotweed	POAM8	<i>Polygonum amphibium</i>	58–117	–
	white panicle aster	SYLAL4	<i>Symphyotrichum lanceolatum</i> ssp. <i>lanceolatum</i> var. <i>lanceolatum</i>	58–117	–
	Canada germander	TECA3	<i>Teucrium canadense</i>	58–117	–
	broadleaf cattail	TYLA	<i>Typha latifolia</i>	0–58	–
	swamp verbena	VEHA2	<i>Verbena hastata</i>	0–58	–
	tall cinquefoil	POAR7	<i>Potentilla arguta</i>	0–58	–
	swamp smartweed	POHY2	<i>Polygonum hydropiperoides</i>	0–58	–
	alkali buttercup	RACY	<i>Ranunculus cymbalaria</i>	0–58	–
	western dock	RUAQ	<i>Rumex aquaticus</i>	0–58	–
	blue skullcap	SCLA2	<i>Scutellaria lateriflora</i>	0–58	–
	hedgenettle	STACH	<i>Stachys</i>	0–58	–
	Great Plains white fringed orchid	PLPR4	<i>Platanthera praeclara</i>	0–58	–
	dogbane	APOCY	<i>Apocynum</i>	0–58	–
	swamp milkweed	ASIN	<i>Asclepias incarnata</i>	0–58	–
	smooth horsetail	EQLA	<i>Equisetum laevigatum</i>	0–58	–
Shrub/Vine					
7	Shrubs			0–291	
	Shrub, other	2S	<i>Shrub, other</i>	0–58	–
	Bebb willow	SABE2	<i>Salix bebbiana</i>	0–58	–
	narrowleaf willow	SAEX	<i>Salix exigua</i>	0–58	–
	willow	SALIX	<i>Salix</i>	0–58	–
	meadow willow	SAPE5	<i>Salix petiolaris</i>	0–58	–
	white meadowsweet	SPAL2	<i>Spiraea alba</i>	0–58	–

Table 8. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Grass-likes			2331–2914	
	woolly sedge	CAPE42	<i>Carex pellita</i>	1749–2331	–
	wheat sedge	CAAT2	<i>Carex atherodes</i>	874–1457	–
	shortbeak sedge	CABR10	<i>Carex brevior</i>	874–1457	–
	limestone meadow sedge	CAGR3	<i>Carex granularis</i>	58–291	–
	bottlebrush sedge	CAHY4	<i>Carex hystericina</i>	58–291	–
	smoothcone sedge	CALA12	<i>Carex laeviconica</i>	58–291	–
	Bicknell's sedge	CABI3	<i>Carex bicknellii</i>	58–291	–
	water sedge	CAAQ	<i>Carex aquatilis</i>	58–291	–
	Sartwell's sedge	CASA8	<i>Carex sartwellii</i>	58–291	–
	upright sedge	CAST8	<i>Carex stricta</i>	58–291	–
	rigid sedge	CATE6	<i>Carex tetanica</i>	58–291	–
	fox sedge	CAVU2	<i>Carex vulpinoidea</i>	58–291	–
2	Cool-Season Grasses			1457–2040	
	northern reedgrass	CASTI3	<i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>	874–1749	–

	fowl bluegrass	POPA2	<i>Poa palustris</i>	58–291	–
	prairie wedgescale	SPOB	<i>Sphenopholis obtusata</i>	0–175	–
	American sloughgrass	BESY	<i>Beckmannia syzigachne</i>	0–117	–
	reed canarygrass	PHAR3	<i>Phalaris arundinacea</i>	0–117	–
	quackgrass	ELRE4	<i>Elymus repens</i>	0–58	–
	redtop	AGGI2	<i>Agrostis gigantea</i>	0–58	–
3	Warm-Season Grasses			291–874	
	prairie cordgrass	SPPE	<i>Spartina pectinata</i>	58–291	–
	switchgrass	PAVI2	<i>Panicum virgatum</i>	58–175	–
	Grass, native	2GN	<i>Grass, native</i>	0–117	–
	Mexican muhly	MUME2	<i>Muhlenbergia mexicana</i>	0–58	–
	marsh muhly	MURA	<i>Muhlenbergia racemosa</i>	0–58	–
	mat muhly	MURI	<i>Muhlenbergia richardsonis</i>	0–58	–
4	Other Grass-likes			58–291	
	spikerush	ELEOC	<i>Eleocharis</i>	58–175	–
	mountain rush	JUARL	<i>Juncus arcticus ssp. littoralis</i>	58–175	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–117	–
	American water-willow	JUAM	<i>Justicia americana</i>	0–58	–
	Dudley's rush	JUDU2	<i>Juncus dudleyi</i>	0–58	–
	Torrey's rush	JUTO	<i>Juncus torreyi</i>	0–58	–
	spikesedge	KYLLI2	<i>Kyllinga</i>	0–58	–
	cloaked bulrush	SCPA8	<i>Scirpus pallidus</i>	0–58	–
	common threesquare	SCPUB	<i>Schoenoplectus pungens var. badius</i>	0–58	–
Forb					
5	Forbs			583–1166	
	Canadian anemone	ANCA8	<i>Anemone canadensis</i>	58–117	–
	flat-top goldentop	EUGRG	<i>Euthamia graminifolia var. graminifolia</i>	58–117	–
	hempnettle	GALEO	<i>Galeopsis</i>	58–117	–
	American water horehound	LYAM	<i>Lycopus americanus</i>	58–117	–
	rough bugleweed	LYAS	<i>Lycopus asper</i>	58–117	–
	wild mint	MEAR4	<i>Mentha arvensis</i>	58–117	–
	water knotweed	POAM8	<i>Polygonum amphibium</i>	58–117	–
	northern bog violet	VINE	<i>Viola nephrophylla</i>	58–117	–
	white panicle aster	SYLAL4	<i>Symphotrichum lanceolatum ssp. lanceolatum var. lanceolatum</i>	58–117	–
	Canada germander	TECA3	<i>Teucrium canadense</i>	58–117	–
	narrowleaf cattail	TYAN	<i>Typha angustifolia</i>	0–58	–
	broadleaf cattail	TYLA	<i>Typha latifolia</i>	0–58	–
	swamp verbena	VEHA2	<i>Verbena hastata</i>	0–58	–
	alkali buttercup	RACY	<i>Ranunculus cymbalaria</i>	0–58	–
	western dock	RUAQ	<i>Rumex aquaticus</i>	0–58	–
	blue skullcap	SCLA2	<i>Scutellaria lateriflora</i>	0–58	–
	field sowthistle	SOAR2	<i>Sonchus oleraceus</i>	0–58	–

	Field Scientific	Code	Common Name	0-58	-
	hedgenettle	STACH	<i>Stachys</i>	0-58	-
	tall cinquefoil	POAR7	<i>Potentilla arguta</i>	0-58	-
	swamp smartweed	POHY2	<i>Polygonum hydropiperoides</i>	0-58	-
	Forb, introduced	2FI	<i>Forb, introduced</i>	0-58	-
	Forb, native	2FN	<i>Forb, native</i>	0-58	-
	Great Plains white fringed orchid	PLPR4	<i>Platanthera praeclara</i>	0-58	-
	dogbane	APOCY	<i>Apocynum</i>	0-58	-
	swamp milkweed	ASIN	<i>Asclepias incarnata</i>	0-58	-
	Canada thistle	CIAR4	<i>Cirsium arvense</i>	0-58	-
	smooth horsetail	EQLA	<i>Equisetum laevigatum</i>	0-58	-
	leafy spurge	EUES	<i>Euphorbia esula</i>	0-58	-
Shrub/Vine					
6	Shrubs			0-291	
	narrowleaf willow	SAEX	<i>Salix exigua</i>	58-291	-
	willow	SALIX	<i>Salix</i>	0-58	-
	meadow willow	SAPE5	<i>Salix petiolaris</i>	0-58	-
	white meadowsweet	SPAL2	<i>Spiraea alba</i>	0-58	-
	Shrub, other	2S	<i>Shrub, other</i>	0-58	-
	Bebb willow	SABE2	<i>Salix bebbiana</i>	0-58	-

Animal community

Animal Community – Grazing Interpretations

This site is adapted to managed grazing by domestic livestock provided caution is exercised when soils are saturated. The predominance of herbaceous plants across most 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

--Under development--

Recreational uses

--Under development--

Wood products

None.

Other products

None.

Inventory data references

Information presented here has been derived from NRCS and other federal/state agency clipping and 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. Those involved in developing this site description include: Stan Boltz, NRCS State Rangeland Management Specialist; Bernadette Braun, USFS Rangeland Management Specialist; Stacey Swenson, USFS Rangeland Management Specialist; Jeff Printz, NRCS State Rangeland Management Specialist; Dr. Kevin Sedivec, Extension Rangeland Management Specialist; Dr. Shawn Dekeyser, North Dakota State University; Rob Self, The Nature Conservancy; Lee Voigt, NRCS Area Rangeland Management Specialist; Dr. Mark Gonzales, USFS Hydrologist; David Dewald, NRCS State Biologist; Keith Anderson, NRCS Soil Scientist, Fred Aziz; NRCS Area Resource Soil Scientist; and Steve Sieler, NRCS Soil Scientist.

Other references

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Contributors

Jeff Printz

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)	Bernadette Braun, Lee Voigt, Jeff Printz
Contact for lead author	Jeff.printz@nd.usda.gov 701-530-2080
Date	02/07/2012
Approved by	Jeff Printz
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None.

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

3. **Number and height of erosional pedestals or terracettes:** None.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 1% or less.

5. **Number of gullies and erosion associated with gullies:** None.

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

7. **Amount of litter movement (describe size and distance expected to travel):** None.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil aggregate stability averages 5.5 to 6.

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

series description for depth, structure and color of A horizon.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Healthy deep rooted native grasses and grass-likes enhance infiltration and reduce run-off.
-

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None.
-

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: Grass-like >

Sub-dominant: tall and mid, cool-season grasses > forbs > warm-season grasses >

Other: shrubs

Additional: Due to differing root structure and distribution, Kentucky bluegrass and smooth brome grass do not fit into reference plant community F/S groups.

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** None.
-

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

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Ranges from 4200 to 6200 lbs/ac air dry depending upon growing conditions with a representative value (RV) of 5200 lbs./acre air dry.
-

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 weeds. Reed canary, Kentucky bluegrass, quackgrass, redtop, narrow-leaf cattail, hybrid cattail
-

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