USDA Natural Resources Conservation Service

Ecological site R102AY001SD
Shallow Marsh

Accessed: 05/18/2024

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.

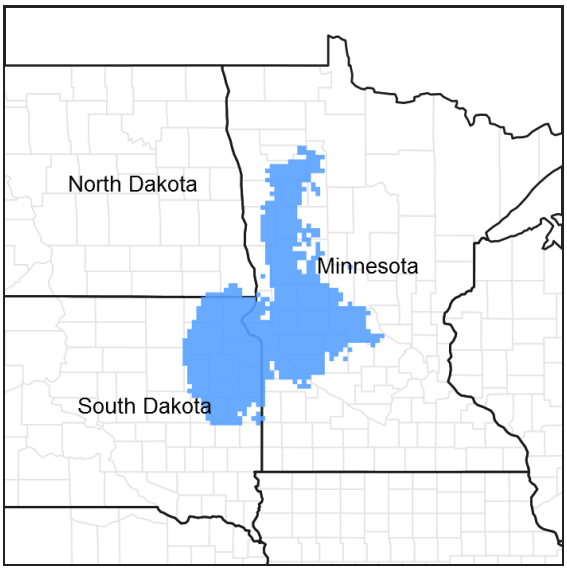


Figure 1. Mapped extent

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.

MLRA notes

Major Land Resource Area (MLRA): 102A–Rolling Till Prairie

For further information on this Ecological Site Description (ESD), view on South Dakota Electronic Field Office Technical Guide (EFOTG), contact the NRCS State Office in Huron, SD, or MLRA Soil Survey Office in Redfield, SD.

Classification relationships

Level IV Ecoregions of the Conterminous United States: 46e – Tewaukon Dead Ice Moraine, 46k – Prairie Coteau, 46l – Prairie Coteau Escarpment, 46m – Big Sioux Basin, 46o – Minnesota River Prairie, 47b – Des Moines Lobe, 48d – Lake Agassiz Plain, 51j – Alexandria Moraines and Detroit Lakes Outwash Plain.

Associated sites

R102AY002SD	**Linear Meadow**
R102AY003SD	**Subirrigated**
R102AY004SD	**Wet Meadow**

Similar sites

R102AY004SD	**Wet Meadow** (R102AY004SD) – Wet Meadow [more prairie cordgrass; lower production]

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Scolochloa festucacea* (2) *Carex atherodes*

Physiographic features

This site occurs on nearly level to concave depressions on uplands.

Table 2. Representative physiographic features

Landforms	(1) Pothole
Ponding duration	Long (7 to 30 days) to very long (more than 30 days)
Ponding frequency	Occasional to frequent
Elevation	305–610 m
Slope	0–1%
Ponding depth	0–61 cm
Water table depth	0–56 cm
Aspect	Aspect is not a significant factor

Climatic features

MLRA 102A 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 21 to 27 inches per year. The average annual temperature is about 43°F. January is the coldest month with average temperatures ranging from about 5°F (Mahnomen 1 W, Minnesota (MN)), to about 14°F (Tracy, MN). July is the warmest month with temperatures averaging from about 69°F (Mahnomen 1 W, MN), to about 73°F (Tracy, MN). The range of normal average monthly temperatures between the coldest and warmest months is about 62°F. This large annual range attests to the continental nature of this area's climate. Hourly winds are estimated to average about 11 miles per hour (mph) annually, ranging from about 13 mph during the spring to about 10 mph 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 mph.

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. Greenup 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)	136 days
Freeze-free period (average)	159 days
Precipitation total (average)	610 mm

Influencing water features

Soil features

The common features of soils in this site are the silty clay loam to clay-textured subsoil and slopes of zero to one percent. The soils in this site are very poorly drained and formed in alluvium. The silty clay loam surface layer is 10 to 18 inches thick. The soils have a 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. Subsurface soil layers are nonrestrictive to water movement and root penetration. These soils are not susceptible to water erosion. Ponded water conditions and very slow permeability strongly influences the soil-water-plant relationship.

Access Web Soil Survey (http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm) for specific local soils information.

Table 4. Representative soil features

Surface texture	(1) Silty clay loam
Family particle size	(1) Clayey
Drainage class	Poorly drained
Permeability class	Very slow
Soil depth	203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	15.24–17.78 cm
Calcium carbonate equivalent (0-101.6cm)	0–20%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–1
Soil reaction (1:1 water) (0-101.6cm)	6.1–7.8
Subsurface fragment volume <=3" (Depth not specified)	0–2%
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 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 Whitetop/Slough Sedge Plant Community Phase (1.1). 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.

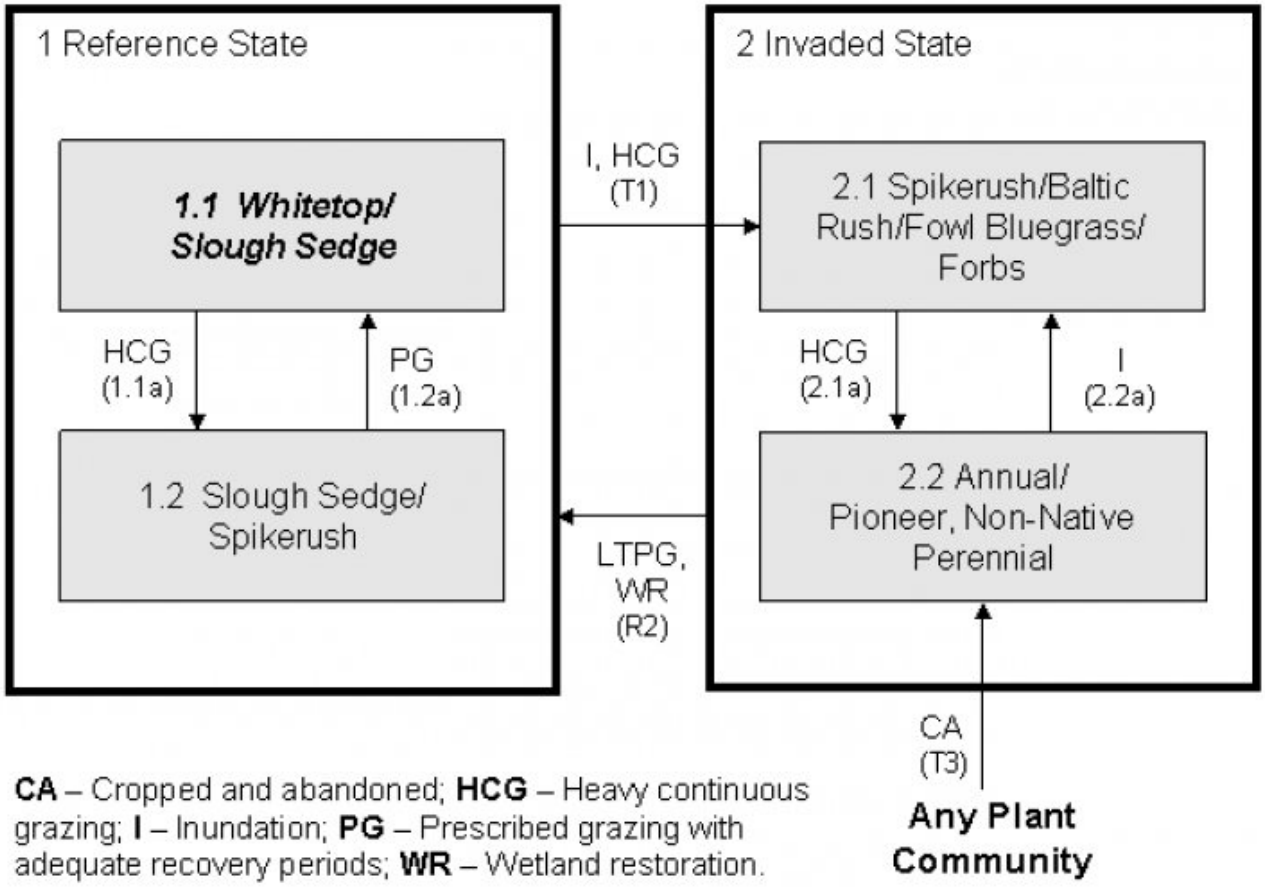
This ecological site (ES) has been grazed by domestic livestock since introduced into the area. The introduction of domestic livestock and the use of fencing and reliable water sources have changed the disturbance regime of this site. Heavy continuous grazing without adequate recovery periods following each grazing occurrence causes this

site to depart from the Reference State. Species such as fowl bluegrass, spikerush, and Baltic rush will initially increase. Whitetop and slough sedge will decrease in frequency and production. Continued heavy grazing eventually causes a dominance by spikerush, rushes, and unpalatable forbs such as curly dock.

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.

The following is a diagram that illustrates the common plant community phases that can occur on the site and the transition and community pathways between them. The ecological processes will be discussed in more detail in the plant community descriptions following the diagram.

State and transition model



State 1
Reference

This state represents the natural range of variability that dominates the dynamics of this ES. This state is typically dominated by cool-season grass and grass-like species. Before European settlement, the primary disturbance mechanisms for this site in the reference condition included periodic fire, grazing by large herding ungulates, and fluctuations in the water table and ponding frequency and duration. 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 from a lack of fire, concentrated livestock grazing, and weather fluctuations. Species that are desirable for livestock and wildlife can decline and a corresponding increase in less desirable species will occur.

Community 1.1
Whitetop/Slough Sedge Plant Community Phase

Interpretations are based primarily on the 1.1 Whitetop/Slough Sedge Plant Community Phase (this is also considered to be climax). This plant community evolved with grazing by large herbivores, infrequent wild fires, and periodic flooding events and is suited for grazing by domestic livestock. This plant community can be found on areas that are grazed and where the grazed plants receive adequate periods of rest during the growing season in order to recover. Historically, fires occurred infrequently. The potential vegetation is about 45 percent grasses, 40 percent grass-likes, and 15 percent forbs. The major grasses and grass-likes include whitetop, slough sedge, woolly sedge, American mannagrass, prairie cordgrass, Sartwell's sedge, Nebraska sedge, and spikerush. Key forbs include smartweeds, western dock, and white panicle aster. 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. 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	6181	6860	7588
Forb	319	762	1154
Total	**6500**	**7622**	**8742**

Figure 7. Plant community growth curve (percent production by month). SD0206, Rolling Till Prairie, lowland cool-season dominant.. Cool-season dominant, lowland..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	6	15	20	26	17	9	4	3	0	0

Community 1.2
Slough Sedge/Spikerush Plant Community Phase

This plant community will slowly develop from the adverse effects of continuous grazing, without adequate recovery periods between each grazing event during the growing season. When compared to the 1.1 Whitetop/Slough Sedge Plant Community Phase, whitetop, prairie cordgrass, American mannagrass, and reedgrasses have decreased. The grass-like species, such as slough sedge, spikerush, woolly sedge, Sartwell's sedge, Nebraska sedge, and rushes, have increased and tend to dominate this plant community. The abundant production and proximity to water make this plant community important for livestock and wildlife such as birds, mule deer, and antelope. The plant community is stable and protected from excessive erosion. The biotic integrity of this plant community is usually intact. The watershed is usually functioning.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	4780	5394	6210
Forb	263	771	1076
Total	**5043**	**6165**	**7286**

Figure 9. Plant community growth curve (percent production by month). SD0206, Rolling Till Prairie, lowland cool-season dominant.. Cool-season

dominant, lowland..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	6	15	20	26	17	9	4	3	0	0

Pathway 1.1a
Community 1.1 to 1.2

Heavy continuous grazing which includes herbivory at moderate to heavy levels at the same time of year each year without adequate recovery periods, or during periods of below normal precipitation when grazing frequency and intensity increases on these sites due to limited forage availability on adjacent upland sites will shift this community to the 1.2 Slough Sedge/Spikerush Plant Community Phase.

Pathway 1.2a
Community 1.2 to 1.1

Prescribed grazing (alternating season of use and providing adequate recovery periods) or periodic light to moderate grazing possibly including periodic rest will convert this plant community to the 1.1 Whitetop/Slough Sedge Plant Community Phase. This pathway could also occur with a return to more normal precipitation levels and frequencies.

Conservation practices

Prescribed Grazing

State 2
Invaded

This state is characterized by the increase in bare ground due to trampling caused by excessive use or by inundation for extended periods which causes a temporary shift in the plant composition and cover. This allows for the invasion of nonnative species, which, with continued heavy grazing, can increase to eventual dominance. Loss or reduction of native cool- and warm-season species can negatively impacted energy flow and nutrient cycling. Infiltration will be reduced and native plant mortality will increase. As the disturbance level increases, native plant density decreases even more, giving way to annual species and invasive perennial species, as well as, a further increase in bare ground.

Community 2.1
Spikerush/Baltic Rush/Fowl Bluegrass/Forbs Plant Community Phase

This plant community developed with heavy continuous grazing without adequate recovery periods between grazing events and/or inundation during periods of extended above-average precipitation. Spikerush, Baltic rush, bulrush, and other less desirable grass-likes, along with grasses such as fowl bluegrass and American sloughgrass, dominate the community. Quackgrass, creeping meadow foxtail, Kentucky bluegrass, and other nonnative species can invade on drier portions of the community. Whitetop, slough sedge, other sedges, prairie cordgrass, and reedgrasses will be virtually eliminated from the plant community. Smartweeds, dock, and cinquefoil have increased. Areas of bare ground can be present throughout the site. A significant amount of production and diversity has been lost when compared to the 1.1 Whitetop/Slough Sedge Plant Community Phase. Loss or reduction of native grasses, grass-likes, and forbs has negatively impacted energy flow and nutrient cycling. It will take a long time to restore this plant community with improved management or return of more normal precipitation patterns.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	2163	2869	3576
Forb	303	717	1132
Total	**2466**	**3586**	**4708**

Figure 11. Plant community growth curve (percent production by month). SD0206, Rolling Till Prairie, lowland cool-season dominant.. Cool-season dominant, lowland..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	6	15	20	26	17	9	4	3	0	0

Community 2.2
Annual/Pioneer, Non-native Perennial Plant Community Phase

This plant community develops under severe disturbance, typically abandonment after cropping. The dominant vegetation includes pioneer annual or perennial grasses, forbs, invaders, and early successional biennial and perennial species. Grasses may include foxtail barley, barnyardgrass, quackgrass, fowl bluegrass, Kentucky bluegrass, Baltic rush, and sedges. The dominant forbs include knotweed, Canada thistle, and other early successional species. The community is susceptible to invasion of nonnative species due to severe soil disturbances and relatively high percent 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. Significant economic inputs, management, and time would be required to move this plant community toward a higher successional stage. Secondary succession is highly variable, depending upon availability and diversity of a viable reproductive source of higher successional species. This plant community may 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 1,000 to 1,500 lbs./ac. (air-dry weight) depending upon growing conditions. No growth curve has been assigned to this plant community phase due to the highly variable nature of the plant community.

Pathway 2.1a
Community 2.1 to 2.2

Heavy continuous grazing which includes herbivory at moderate to heavy levels at the same time of year each year without adequate recovery periods, or during periods of below normal precipitation when grazing frequency and intensity increases on these sites due to limited forage availability on adjacent upland sites will shift this community to the 2.2 Annual/Pioneer, Non-native Perennial Plant Community Phase.

Transition T1
State 1 to 2

Heavy continuous grazing (stocking levels well above carrying capacity for extended portions of the growing season and often at the same time of year each year), and/or inundation for extended periods beyond normal ponding and drying patterns will eventually cause a shift over a threshold leading to the 2.1 Spikerush/Baltic Rush/Fowl Bluegrass/Forbs Plant Community Phase within the Invaded State (State 2). Grazing repeatedly in the early growing season can expedite this shift by causing mechanical disturbance due to trampling.

Transition T4
State 1 to 2

Cropping followed by abandonment may lead this plant community phase over a threshold to the Invaded State (State 2) and more specifically to the 2.2 Annual/Pioneer, Non-native Perennial Plant Community Phase.

Transition T4
State 1 to 2

Cropping followed by abandonment may lead this plant community phase over a threshold to the Invaded State (State 2) and more specifically to the 2.2 Annual/Pioneer, Non-native Perennial Plant Community Phase.

Restoration pathway R2
State 2 to 1

Long-term prescribed grazing (moderate stocking levels coupled with adequate recovery periods, or other grazing systems such as high-density, low-frequency intended to treat specific species dominance, or periodic light to moderate stocking levels possibly including periodic rest) may lead this plant community phase over a threshold to the Reference State (State 1). Wetland restoration techniques may be necessary to restore biotic integrity and plant diversity and productivity.

Conservation practices

Prescribed Grazing

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Tall Cool-season Grasses**			1524–3049	
	common rivergrass	SCFE	*Scolochloa festucacea*	1143–2668	–
	American mannagrass	GLGR	*Glyceria grandis*	381–762	–
2	**Grass-likes**			1524–3049	
	wheat sedge	CAAT2	*Carex atherodes*	762–2287	–
	bottlebrush sedge	CAHY4	*Carex hystericina*	152–762	–
	smoothcone sedge	CALA12	*Carex laeviconica*	76–762	–
	woolly sedge	CAPE42	*Carex pellita*	152–762	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–762	–
	spikerush	ELEOC	*Eleocharis*	152–762	–
	mountain rush	JUARL	*Juncus arcticus ssp. littoralis*	76–610	–
	green bulrush	SCAT2	*Scirpus atrovirens*	76–610	–
	rush	JUNCU	*Juncus*	0–381	–
	flatsedge	CYPER	*Cyperus*	0–381	–
3	**Tall Warm-season Grasses**			152–762	
	prairie cordgrass	SPPE	*Spartina pectinata*	152–762	–
	spiked muhly	MUGL3	*Muhlenbergia glomerata*	0–381	–
4	**Reedgrasses**			0–381	
	bluejoint	CACA4	*Calamagrostis canadensis*	0–381	–
	northern reedgrass	CASTI3	*Calamagrostis stricta ssp. inexpansa*	0–381	–
	slimstem reedgrass	CASTS5	*Calamagrostis stricta ssp. stricta*	0–381	–
5	**Other Native Grasses**			381–762	
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	152–610	–
	American sloughgrass	BESY	*Beckmannia syzigachne*	152–610	–
Forb					
6	**Forbs**			381–1143	
	Forb, native	2FN	*Forb, native*	76–305	–
	bur-reed	SPARG	*Sparganium*	76–305	–
	New England aster	SYNO2	*Symphyotrichum novae-angliae*	76–152	–
	pale dock	RUAL4	*Rumex altissimus*	0–152	–

	western dock	RUAQ	*Rumex aquaticus*	76–152	–
	northern water plantain	ALTR7	*Alisma triviale*	76–152	–
	Canadian anemone	ANCA8	*Anemone canadensis*	76–152	–
	Indianhemp	APCA	*Apocynum cannabinum*	0–152	–
	Flodman's thistle	CIFL	*Cirsium flodmanii*	76–152	–
	Rydberg's sunflower	HENUR	*Helianthus nuttallii ssp. rydbergii*	0–152	–
	knotweed	POLYG4	*Polygonum*	76–152	–
	Pennsylvania smartweed	POPE2	*Polygonum pensylvanicum*	76–152	–
	giant goldenrod	SOGI	*Solidago gigantea*	76–152	–
	broadleaf cattail	TYLA	*Typha latifolia*	0–152	–
	cinquefoil	POTEN	*Potentilla*	0–76	–
	Macoun's buttercup	RAMA2	*Ranunculus macounii*	0–76	–
	smooth horsetail	EQLA	*Equisetum laevigatum*	0–76	–
	hemlock waterparsnip	SISU2	*Sium suave*	0–76	–
	blue-eyed grass	SISYR	*Sisyrinchium*	0–76	–
	marsh arrowgrass	TRPA28	*Triglochin palustris*	0–76	–
	white panicle aster	SYLA6	*Symphyotrichum lanceolatum*	0–76	–

Table 9. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Tall Cool-season Grasses**			0–493	
	common rivergrass	SCFE	*Scolochloa festucacea*	0–308	–
	American mannagrass	GLGR	*Glyceria grandis*	0–185	–
2	**Grass-likes**			2466–4624	
	wheat sedge	CAAT2	*Carex atherodes*	925–2466	–
	spikerush	ELEOC	*Eleocharis*	616–1849	–
	mountain rush	JUARL	*Juncus arcticus ssp. littoralis*	308–925	–
	woolly sedge	CAPE42	*Carex pellita*	308–925	–
	flatsedge	CYPER	*Cyperus*	0–616	–
	bottlebrush sedge	CAHY4	*Carex hystericina*	0–616	–
	smoothcone sedge	CALA12	*Carex laeviconica*	0–616	–
	rush	JUNCU	*Juncus*	0–616	–
	green bulrush	SCAT2	*Scirpus atrovirens*	0–616	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–493	–
3	**Tall Warm-season Grasses**			0–308	
	prairie cordgrass	SPPE	*Spartina pectinata*	0–308	–
4	**Reedgrasses**			0–123	
	northern reedgrass	CASTI3	*Calamagrostis stricta ssp. inexpansa*	0–123	–
	slimstem reedgrass	CASTS5	*Calamagrostis stricta ssp. stricta*	0–123	–
5	**Other Native Grasses**			0–308	
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	0–308	–

	American sloughgrass	BESY	*Beckmannia syzigachne*	0–308	–
6	**Non-Native Grasses**			62–308	
	barnyardgrass	ECCR	*Echinochloa crus-galli*	62–308	–
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	0–185	–
Forb					
7	**Forbs**			308–1233	
	broadleaf cattail	TYLA	*Typha latifolia*	62–247	–
	Forb, introduced	2FI	*Forb, introduced*	0–247	–
	Forb, native	2FN	*Forb, native*	62–247	–
	Pennsylvania smartweed	POPE2	*Polygonum pensylvanicum*	62–247	–
	giant goldenrod	SOGI	*Solidago gigantea*	62–185	–
	bur-reed	SPARG	*Sparganium*	0–185	–
	curly dock	RUCR	*Rumex crispus*	62–185	–
	knotweed	POLYG4	*Polygonum*	62–185	–
	narrowleaf cattail	TYAN	*Typha angustifolia*	62–185	–
	hemlock waterparsnip	SISU2	*Sium suave*	0–123	–
	white panicle aster	SYLA6	*Symphyotrichum lanceolatum*	0–123	–
	New England aster	SYNO2	*Symphyotrichum novae-angliae*	0–123	–
	pale dock	RUAL4	*Rumex altissimus*	0–123	–
	Indianhemp	APCA	*Apocynum cannabinum*	0–123	–
	Flodman's thistle	CIFL	*Cirsium flodmanii*	0–123	–
	splitlip hempnettle	GABI3	*Galeopsis bifida*	0–123	–
	Rydberg's sunflower	HENUR	*Helianthus nuttallii ssp. rydbergii*	0–62	–
	smooth horsetail	EQLA	*Equisetum laevigatum*	0–62	–
	northern water plantain	ALTR7	*Alisma triviale*	0–62	–
	Canadian anemone	ANCA8	*Anemone canadensis*	0–62	–
	western dock	RUAQ	*Rumex aquaticus*	0–62	–
	cinquefoil	POTEN	*Potentilla*	0–62	–
	marsh arrowgrass	TRPA28	*Triglochin palustris*	0–62	–

Table 10. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Grass-likes**			897–1973	
	spikerush	ELEOC	*Eleocharis*	359–1076	–
	mountain rush	JUARL	*Juncus arcticus ssp. littoralis*	179–717	–
	wheat sedge	CAAT2	*Carex atherodes*	179–538	–
	rush	JUNCU	*Juncus*	0–359	–
	woolly sedge	CAPE42	*Carex pellita*	0–287	–
	flatsedge	CYPER	*Cyperus*	0–287	–
	bottlebrush sedge	CAHY4	*Carex hystericina*	0–179	–
	smoothcone sedge	CALA12	*Carex laeviconica*	0–179	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–179	–

	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–179	–
	green bulrush	SCAT2	*Scirpus atrovirens*	0–108	–
2	**Other Native Grasses**			0–359	
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	0–359	–
	American sloughgrass	BESY	*Beckmannia syzigachne*	0–359	–
3	**Non-Native Grasses**			72–538	
	creeping meadow foxtail	ALAR	*Alopecurus arundinaceus*	0–359	–
	barnyardgrass	ECCR	*Echinochloa crus-galli*	36–287	–
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	0–287	–
	quackgrass	ELRE4	*Elymus repens*	0–215	–
Forb					
4	**Forbs**			359–1076	
	Forb, introduced	2FI	*Forb, introduced*	36–359	–
	curly dock	RUCR	*Rumex crispus*	72–359	–
	narrowleaf cattail	TYAN	*Typha angustifolia*	36–287	–
	broadleaf cattail	TYLA	*Typha latifolia*	36–287	–
	Pennsylvania smartweed	POPE2	*Polygonum pensylvanicum*	36–287	–
	giant goldenrod	SOGI	*Solidago gigantea*	36–251	–
	Forb, native	2FN	*Forb, native*	36–215	–
	knotweed	POLYG4	*Polygonum*	36–215	–
	splitlip hempnettle	GABI3	*Galeopsis bifida*	0–143	–
	white panicle aster	SYLA6	*Symphyotrichum lanceolatum*	0–143	–
	New England aster	SYNO2	*Symphyotrichum novae-angliae*	0–143	–
	hemlock waterparsnip	SISU2	*Sium suave*	0–108	–
	Indianhemp	APCA	*Apocynum cannabinum*	0–108	–
	smooth horsetail	EQLA	*Equisetum laevigatum*	0–72	–
	cinquefoil	POTEN	*Potentilla*	0–72	–
	bur-reed	SPARG	*Sparganium*	0–72	–
	marsh arrowgrass	TRPA28	*Triglochin palustris*	0–36	–
	pale dock	RUAL4	*Rumex altissimus*	0–36	–
	Flodman's thistle	CIFL	*Cirsium flodmanii*	0–36	–

Animal community

Animal Community – Grazing Interpretations
The following table lists annual, suggested initial stocking rates with average growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of conservation planning. Often, the current plant composition does not entirely match any particular plant community (as described in this ES description). Because of this, a resource inventory is necessary to document plant composition and production. More accurate carrying capacity estimates should eventually be calculated using the following stocking rate information along with animal preference data and actual stocking records, particularly when grazers other than cattle are involved. With consultation of the land manager, more intensive grazing management may result in improved harvest efficiencies and increased carrying capacity.

Whitetop/Slough Sedge (1.1)
Average Anuual Production (lbs./acre, air-dry): 6800

Stocking Rate* (AUM/acre): 1.86

Slough Sedge/Spikerush (1.2)
Average Annual Production (lbs./acre, air-dry): 5500
Stocking Rate* (AUM/acre): 1.51

Spikerush/Baltic Rush/Fowl Bluegrass/Forbs (2.1)
Average Annual Production (lbs./acre, air-dry): 3200
Stocking Rate* (AUM/acre): 0.88

Annual/Pioneer, Non-Native Perennial (2.2)
Average Annual Production (lbs./acre, air-dry): 1600
Stocking Rate* (AUM/acre): 0.44

*Based on 912 lbs./acre (air-dry weight) per Animal Unit Month (AUM), and on 25 percent harvest efficiency (refer to United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), National Range and Pasture Handbook).

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage. During the dormant period, the forage for livestock will likely be lacking protein to meet livestock requirements and added protein will allow ruminants to better utilize the energy stored in grazed plant materials. A forage quality test (either directly or through fecal sampling) should be used to determine the level of supplementation needed.

Hydrological functions

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic groups C and D. Infiltration is typically slow to very slow and runoff is negligible due to the concave shape of the landform that this site occupies.

Recreational uses

This site provides hunting, hiking, photography, bird watching, and other opportunities. The wide varieties of plants that bloom from spring until fall have an esthetic value that appeals to visitors.

Wood products

No appreciable wood products are typically present on this site.

Other products

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

Inventory data references

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range-trained personnel were also used. Those involved in developing this site include: Stan Boltz, Range Management Specialist, NRCS; and Bruce Kunze, Soil Scientist, NRCS.

Other references

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728. (http://www.hprcc.unl.edu/)
USDA, NRCS. National Water and Climate Center, 101 SW Main, Suite 1600, Portland, OR 97204-3224. (http://www.wcc.nrcs.usda.gov)
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USDA, NRCS. National Soil Information System, Information Technology Center, 2150 Centre Avenue, Building A,

Fort Collins, CO 80526. (http://soils.usda.gov/technical/nasis/)
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Contributors

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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)	David Schmidt, Tim Nordquist, Stan Boltz
Contact for lead author	
Date	12/04/2007
Approved by	Stan Boltz
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

2. **Presence of water flow patterns:** Barely observable.

3. **Number and height of erosional pedestals or terracettes:** Essentially, non-existent.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground less than 5% and less than 2 inches in diameter.

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

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

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.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Stability class 6. Typically high root content, and organic matter. Soil surface is very resistant to erosion.

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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 and color 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:** Healthy, deep rooted native grasses 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 cool-season rhizomatous grass > mid & tall cool-season rhizomatous grass-like

    Sub-dominant: > tall warm-season rhizomatous grass > forb

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very little to no evidence of decadence or mortality.

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14. **Average percent litter cover (%) and depth (in):** 85-90%, roughly 1-2 inches. 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):** 6200 – 7400 lbs./acre air-dry weight, average 6,800 lbs./acre air-dry weight

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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:** Refer to State and Local Noxious Weed List, also reed canarygrass.

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