USDA Natural Resources Conservation Service

Ecological site R058CY090ND
Saline Lowland

Last updated: 10/31/2018
Accessed: 05/12/2025

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.

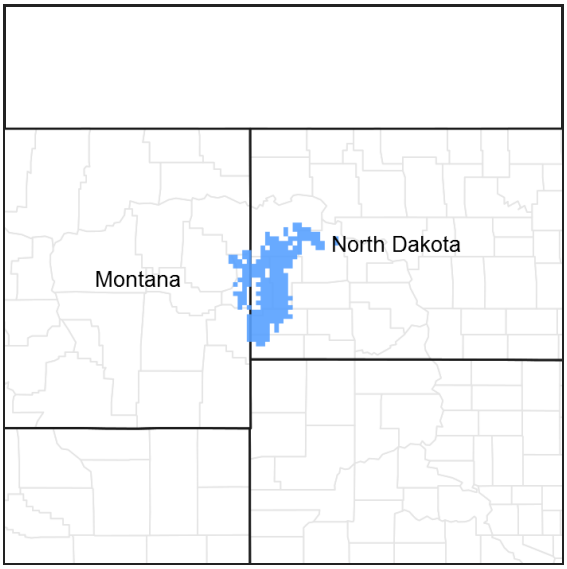


Figure 1. Mapped extent

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 percent of the area in North Dakota and 4 percent in Montana. The acreage inside MLRA 58C is 56 percent privately owned and 44 percent 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. Microclimates 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

Major land resource area (MLRA): 058C-Northern Rolling High Plain Northeastern Part

Ecological site concept

The Saline Lowland site is comprised of alluvial soils in drainageways and on floodplains. This site has soils with high concentrations of salts and sodium. Typically, the soils for this site have carbonates and visible salts or gypsum crystals at depths of 4 to 11 inches, but they can be found throughout the soil profile.

Associated sites

R058CY092ND	**Wet Meadow** Soils on the Wet Meadow ecological site are poorly drained. This site is typically located in drainageways, on low terraces, and in abandoned oxbows. The Wet Meadow site has a seasonal or perennial high water table within 1.5 feet from the surface, with little or no evidence of salts. There are evident redoximorphic features within 6 inches of the soil surface or immediately below the organic soil layer. This site is found upslope from the Wetland ecological site and on the same landform or downslope of the Saline Lowland ecological site. Indicator species include prairie cordgrass, northern reedgrass, and no shrubs. This site has more production, far less western wheatgrass, and far more prairie cordgrass than the Saline Lowland ecological site.
R058CY072ND	**Clayey** The Clayey ecological site is commonly located adjacent to and upslope from the Saline Lowland site. These are heavy-textured, well drained or moderately well drained soils on upland landforms that do not receive additional moisture from runoff. Soils on Clayey ecological sites are upslope to soils on Saline Lowland ecological sites. Clayey sites are also upslope from Claypan and Thin Claypan ecological sites and are downslope from Shallow Loamy and Shallow Clayey sites. Clayey sites can be on associated landscape positions as Claypan ecological sites. Soils on Clayey sites will form a ribbon greater than 2 inches long due to the high content of clay in these soils. Clayey sites that are influenced by the hydrology and parent materials that formed the soils on adjacent Claypan sites may exhibit some of the characteristics of sodium-affected soils on Claypan sites. Indicator species: dominated by of western wheatgrass and green needlegrass. Clayey sites produce better than Claypan sites with more green needlegrass and western wheatgrass, and less blue grama.
R058CY073ND	**Claypan** The Claypan ecological site is commonly located adjacent to or in coordination and upslope from Saline Lowland site. These are heavy-textured, well drained or moderately well drained soils on upland landforms that do not receive additional moisture from runoff. Soils on Claypan sites are sodium-affected. Those soils have a dense, root-limiting subsoil layer (called the "claypan") that is of heavy silty clay loam ranging to clay, and will form a ribbon greater than 2 inches long. The heavy-textured, sodium-affected Claypan is typically below 6 inches of the soil surface, and has columnar structure with visible salts and gypsum crystals below 16 inches. Sodium-affected landscapes in MLRA 58C exhibit the shallow microrelief that is evident in the pockmarked appearance of the ground surface. The Saline Lowland site occurs in the drainageways below the Claypan sites that are on the microhighs and Thin Claypan sites are in the microlows. Indicator species are western wheatgrass with an understory of blue grama, heath aster, and western yarrow along with a few shrubs of fringed sagewort and Nuttall’s saltbush.
R058CY081ND	**Thin Claypan** The Thin Claypan ecological site is commonly located adjacent to or in coordination with the Saline Lowland site. These are heavy-textured, well drained or moderately well drained soils on upland landforms that do not receive additional moisture from runoff. Soils on Thin Claypan sites are severely sodium-affected. They have a dense, root-limiting subsoil (claypan) layer that ranges from heavy silty clay loam to clay, and will form a ribbon greater than 2 inches long. The heavy-textured, sodium-affected claypan is typically within 6 inches of the soil surface and has columnar structure with visible salts and gypsum crystals above 16 inches deep. Sodium-affected landscapes in MLRA 58C exhibit the shallow microrelief that is evident in the pockmarked appearance of the ground surface. The Saline Lowland sites occur in drainageways below the Thin Claypan sites in the microlows and Claypan sites on microhighs. Another soil type is also included with this ecological site: it has all the same traits as the soil list above except the claypan is absent and it has carbonates at or near the soil surface. This included soil formed in slope alluvium on fans from the nearby sparsely-vegetated, very steep, soft, sedimentary bedrock, (i.e. Badlands). The soil is weakly developed with stratified layers of sediments apparent just below the surface layer. Indicator species are western wheatgrass and sandberg bluegrass with an understory of blue grama and buffalograss. Also present are heath aster, cudweed sagewort, and western yarrow, along with a few shrubs of fringed sagewort, cactus, and Gardner's saltbush.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified

Herbaceous	(1) *Pascopyrum smithii* (2) *Puccinellia nuttalliana*

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.

The Saline Lowland sites are on low-lying terraces, drainageways, and bottomlands along streams. The slopes range from 0 to 2 percent.

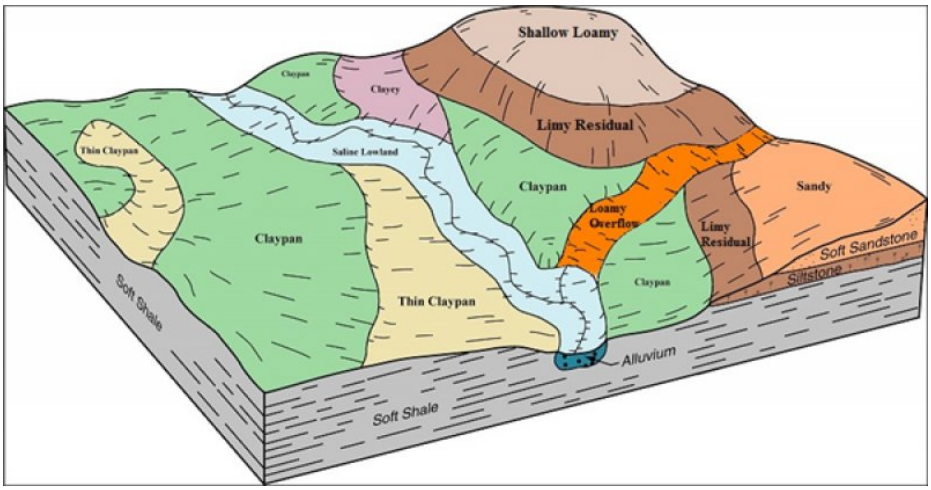


Figure 2.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Drainageway
Runoff class	Negligible to medium
Flooding duration	Very brief (4 to 48 hours) to long (7 to 30 days)
Flooding frequency	Rare to occasional
Ponding frequency	None to occasional
Elevation	560–1,045 m
Slope	0–2%
Ponding depth	0–15 cm
Water table depth	0–46 cm
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 MLRAs 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 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)	406 mm

Climate stations used

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

Influencing water features

A seasonal water table, (approximately greater than 6 feet) and adjacent perennial water table have influence on the kinds and amounts of vegetation on this site.

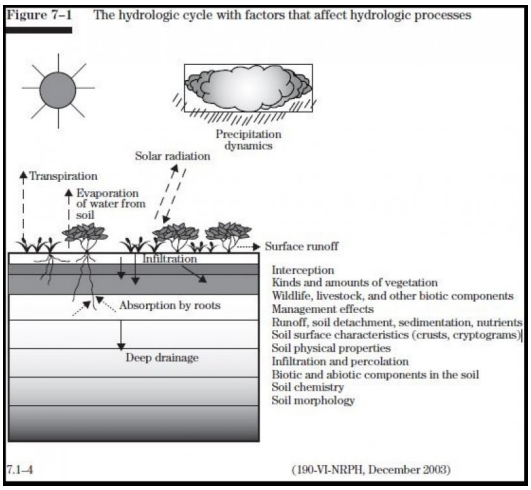


Figure 5.

Soil features

This site consists of very deep saline and sodic soils. The high concentration of salts and sodium affects both the kind and amount of vegetation present. Generally, a seasonal high water table is at or near the surface during the spring and early summer months. The surface soil ranges from 2 to 5 inches thick. The color of the soil is very dark to dark gray. Texture of the top 2 inches of soil is usually loam, followed by clay loam to 18 inches. The underlying

material is lighter colored than the surface soil, and has redoximorphic concentrations present. This underlying soil ranges widely in texture. The soils in this site are commonly calcareous at or near the surface. The excessive salts and sodium present affect other soil properties such as available water capacity, soil structure, infiltration and permeability. Soils in this site generally have low to moderate organic matter content.

Eroded areas with high levels of salt and sodium at the surface are barren of vegetation. These areas are typical of this site and are intermingled with areas of vegetation.

Rills and gullies should not typically be present. Water flow patterns should be barely discernible, if at all present. Pedestals are only slightly apparent in association with bunchgrasses such as Nuttall's alkali grass and slender wheatgrass. Litter typically accumulates in place, and signs of movement and translocation are not common. Chemical and physical crusts on the soil surface are common. Cryptogamic crusts occasionally occur on the soil surface. Typically, the interpretive plant community will have good cover of perennial grasses with areas of bare ground and salt crusts.

These soils are susceptible to wind and water erosion. The hazard of water erosion increases on areas that are denuded of vegetation. Stream channels are intact with occasional water pockets scattered throughout. 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 Harriet and Floweree strongly saline.

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).

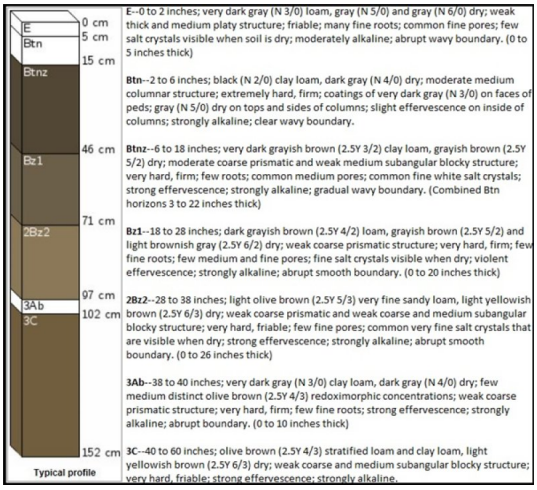


Figure 6. Typical profile of Harriet soil series.

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Loam (2) Silt
Family particle size	(1) Clayey
Drainage class	Poorly drained
Permeability class	Very slow to slow
Soil depth	152–203 cm
Available water capacity (0-101.6cm)	10.16–15.24 cm
Calcium carbonate equivalent (0-101.6cm)	1–25%
Electrical conductivity (0-101.6cm)	4–32 mmhos/cm

Sodium adsorption ratio (0-101.6cm)	2–25
Soil reaction (1:1 water) (0-101.6cm)	6.6–9
Subsurface fragment volume <=3" (Depth not specified)	0–3%

Ecological dynamics

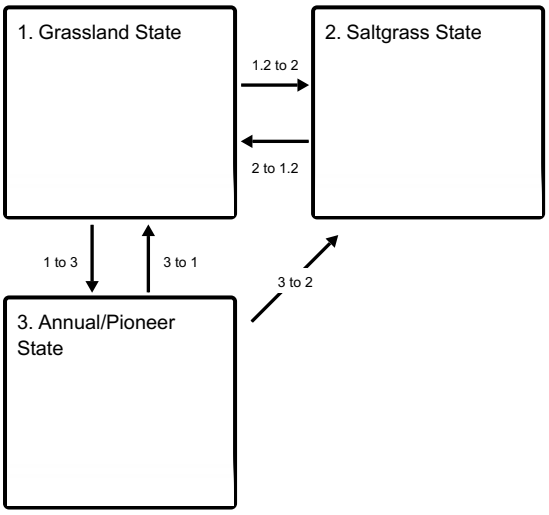
The site developed under Northern Great Plains climatic conditions, and included natural influence of large herbivores and occasional fire. Changes will occur in the plant communities due to climatic conditions and/or management actions. Due to the nature of the soils, the site is considered quite stable. 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.

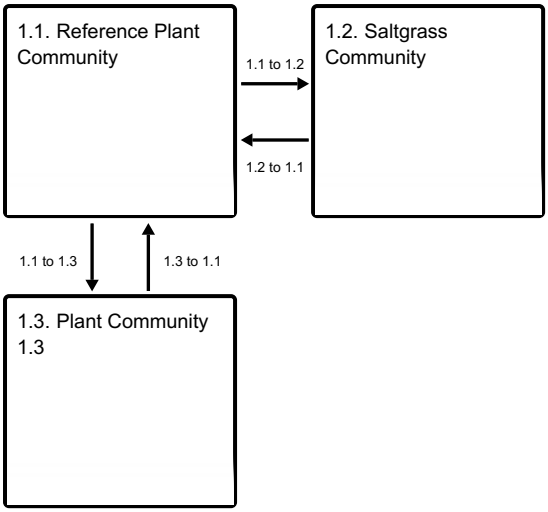
Following the state and transition diagram are narratives for each of the described states and community phases. These may not represent every possibility, but they are the most prevalent and repeatable states/community phases. The plant composition tables shown below have been developed from the best 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

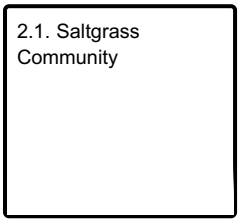
Ecosystem states



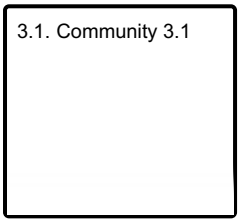
State 1 submodel, plant communities



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. The saltgrass plant community consists of warm- and cool-season salt-tolerant grasses and grasslikes. 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 community evolved with grazing by large herbivores, occasional prairie fires and periodic flooding 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 90 percent grasses and grass-like plants, 5 percent forbs and 5 percent shrubs. The major grasses include western wheatgrass, Nuttall’s alkaligrass, and alkali and prairie cordgrass. Other grasses present include slender wheatgrass, inland saltgrass, and foxtail barley. Salt tolerant forbs such as alkali plantain, western dock, and seepweed are common. The shrub that may occur on this site is Nuttall’s saltbush. This plant community is diverse, stable, productive, and well adapted to both saline soils and the Northern Great Plains climatic conditions. Community dynamics, nutrient and water cycle, and energy flow are functioning properly. Litter is properly distributed with very little movement off-site and natural plant mortality is very low. This community is resistant to many disturbances except continuous grazing, tillage, and/or development into urban or other uses. The diversity in plant species allows for both the fluctuation of flooding as well as large

variations in climate.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1883	2292	2634
Shrub/Vine	22	73	123
Forb	67	101	123
Total	**1972**	**2466**	**2880**

Community 1.2
Saltgrass Community

This community develops with short-term heavy use, longer-term continuous grazing with lack of adequate recovery periods during the growing season, and/or annual early spring seasonal grazing. Lack of litter and reduced plant heights result in higher soil temperatures, poor water infiltration rates, high evapotranspiration, and increased percolation of the high water table, which increases salt concentrations on the surface. This gives inland saltgrass and other salt-tolerant species a competitive advantage over less tolerant species. Nuttall's alkaligrass, slender wheatgrass, and alkali cordgrass have decreased while western wheatgrass and inland saltgrass will initially increase in composition. Mat muhly, foxtail barley, silverleaf cinquefoil, dock, and plantain will also increase in composition. As long as the herbaceous component remains intact, the plant community tends to be resilient. However, species composition can be further altered through long-term heavy, continuous grazing. With loss of Nuttall alkaligrass, cordgrasses, slender wheatgrass, and much of the western wheatgrass, inland saltgrass becomes the dominant species. This plant community is relatively stable and well adapted to increased salinity. Plant vigor, litter, plant density, and production have decreased. The biological integrity and water and nutrient cycles of this plant community are becoming impaired.

Community 1.3
Plant Community 1.3

This plant community occurs when grazing is removed for long periods of time (rest) in the absence of fire. Plant composition is similar to the Reference Plant Community, however, individual species production and frequency will be lower. Much of the nutrients are tied up in excessive litter. Standing dead plant residues that are not in contact with a moist soil surface results in a slow nutrient recycling process. Aboveground litter also limits sunlight from reaching plant crowns. Tall warm-season grasses (cordgrasses) die off or reduce in density and vigor and typically develop into small but dense colonies. Thick litter and absence of grazing animals (animal impact) or fire reduces seed germination and establishment. This plant community develops after an extended period of 10 or more years of non-use by herbivores and exclusion of fire. This plant community is resistant to change without prescribed grazing or fire. The combination of both grazing and fire is most effective in moving this plant community toward the Reference Plant Community. The hazard of soil erosion is low. Runoff is similar to the Reference Plant Community. Once this plant community is reached, time and external resources will be required to see any immediate recovery in diversity.

Pathway 1.1 to 1.2
Community 1.1 to 1.2

Heavy, continuous grazing or continuous seasonal (i.e. spring) grazing will convert the plant community to the Inland Saltgrass/Western Wheatgrass 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 Low Plant Density, Excessive Litter Plant Community.

Pathway 1.2 to 1.1

Community 1.2 to 1.1

Prescribed grazing that includes changing season of use and allowing adequate recovery periods following each grazing event and proper stocking will shift this plant community back to the Western Wheatgrass/Nuttall's Alkaligrass/Cordgrass 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 Western Wheatgrass/Nuttall's Alkaligrass/Cordgrass. This would require long-term management with prescribed grazing and/or prescribed burning under controlled conditions.

Conservation practices

Prescribed Burning
Prescribed Grazing

State 2
Saltgrass State

The Saltgrass 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
Saltgrass Community

This plant community developed with heavy continuous grazing where adequate recovery periods between grazing events were not allowed. Patches of inland saltgrass sod are typical and foxtail barley is well distributed throughout the community. Nuttall's alkaligrass and western wheatgrass have been greatly reduced and may persist in remnant amounts, reduced in vigor. Bare ground may develop in microlows where salt concentrations are highest. A white salt crust is common on the surface. Only a few very salt-tolerant annuals, such as glasswort and seepweed, can survive. This plant community is resistant to change due to the grazing tolerance of inland saltgrass and increased surface salts. A significant amount of production and diversity has been lost when compared to the Reference Plant Community. Loss of key cool-season grasses and increased bare ground has negatively impacted energy flow and nutrient cycling. Water infiltration is reduced significantly due to the massive shallow root system ("root pan") characteristic of inland saltgrass, and increased bare ground. It will take a long time to bring this plant community back to the Reference Plant Community with management alone. Renovation (mechanical and/or chemical inputs) is not recommended due to the high content of salt in the soil and the persistence of saltgrass.

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, and cropping abandonment (go-back land). The dominant vegetation includes

pioneer annual grasses, forbs, invaders, and early successional biennial and perennial species. Grasses may include foxtail barley, which will dominate along with fowl bluegrass, Nuttall's alkaligrass, annual brome, and western wheatgrass. The dominant forbs include curly dock, kochia, and other early successional salt-tolerant species. Plant species from adjacent ecological sites may become minor components of this plant community. The community is susceptible to invasion of non-native 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. The potential for soil erosion is high in this plant community. 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 and management 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.

Transition 1.2 to 2
State 1 to 2

Heavy, continuous grazing without adequate recovery opportunity between grazing events or continuous, seasonal (i.e. spring) grazing will move this plant community across an ecological threshold to the Inland Saltgrass Sod, Foxtail Barley, *Bare Ground* Plant Community.

Transition 1 to 3
State 1 to 3

Excessive defoliation (i.e., 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 1.2
State 2 to 1

Long-term prescribed grazing with adequate recovery periods between grazing events and proper stocking will shift this plant community toward the Inland Saltgrass/Western Wheatgrass Plant Community, and eventually to the Reference Plant Community or associated successional plant community stages, assuming an adequate seed/vegetative source is available. This transition may take up to 40 years or more to accomplish, depending on the degree of degradation.

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 Western Wheatgrass/Nuttall's Alkaligrass/Cordgrass Plant Community. This process will take a long period of time (25+ years). Range seeding into mulch followed with prescribed grazing can be used to convert this plant community to one that may resemble the Reference Plant Community.

Conservation practices

Prescribed Grazing

Transition 3 to 2
State 3 to 2

Heavy, continuous grazing will result in a shift towards the inland saltgrass sod/foxtail barley/bare ground plant community.

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Wheatgrass**			616–863	
	western wheatgrass	PASM	*Pascopyrum smithii*	616–863	–
2	**Alkaligrass**			247–370	
	Nuttall's alkaligrass	PUNU2	*Puccinellia nuttalliana*	247–370	–
3	**Cordgrass**			247–370	
	alkali cordgrass	SPGR	*Spartina gracilis*	123–185	–
	prairie cordgrass	SPPE	*Spartina pectinata*	123–185	–
4	**Other Native Perennials**			370–493	
	saltgrass	DISP	*Distichlis spicata*	174–247	–
	slender wheatgrass	ELTRT	*Elymus trachycaulus ssp. trachycaulus*	73–123	–
	plains bluegrass	POAR3	*Poa arida*	50–73	–
	fowl bluegrass	POPA2	*Poa palustris*	22–50	–
	little bluestem	SCSC	*Schizachyrium scoparium*	0–50	–
	foxtail barley	HOJU	*Hordeum jubatum*	22–50	–
	scratchgrass	MUAS	*Muhlenbergia asperifolia*	22–50	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	22–50	–
5	**Grass-Likes**			73–123	
	cosmopolitan bulrush	BOMA7	*Bolboschoenus maritimus*	0–123	–
	sedge	CAREX	*Carex*	73–123	–
	rush	JUNCU	*Juncus*	50–73	–
Forb					
6	**Forbs**			73–123	
	western dock	RUAQ	*Rumex aquaticus*	50–73	–
	silver cinquefoil	POAR8	*Potentilla argentea*	22–50	–
	little hogweed	POOL	*Portulaca oleracea*	0–22	–
	Carelessweed	CYXA2	*Cyclachaena xanthiifolia*	0–22	–
	povertyweed	IVAX	*Iva axillaris*	0–22	–
	redwool plantain	PLER	*Plantago eriopoda*	0–22	–
	seepweed	SUAED	*Suaeda*	0–22	–
	Pursh seepweed	SUCA2	*Suaeda calceoliformis*	0–22	–
Shrub/Vine					
7	**Shrubs**			22–123	
	Nuttall's saltbush	ATNU2	*Atriplex nuttallii*	0–101	–

Animal community

Grazing Interpretations
Calculating safe stocking rates: Proper stocking rates should be incorporated into a grazing management strategy that protects the resource, maintains, or improves rangeland health, and is consistent with management objectives. In addition to usable forage, safe stocking rates should consider ecological condition, trend of the site, past grazing use history, season of use, stock density, kind and class of livestock, forage digestibility, forage nutritional value, variation of harvest efficiency based on desirability preference of plant species, and/or grazing system and site grazability factors (such as steep slopes, site inaccessibility, or distance to drinking water).

Often the current plant community does not entirely match any particular community phase as described in this ecological site description. Because of this, a resource inventory is necessary to document plant composition and production. Proper interpretation of inventory data will permit the establishment of a safe initial stocking rate.

No two years have exactly the same weather conditions. For this reason, year-to-year and season-to season fluctuations in forage production are to be expected on grazing lands. Livestock producers must make timely adjustments in the numbers of animals or in the length of grazing periods to avoid overuse of forage plants when production is unfavorable, and to make advantageous adjustments when forage supplies are above average.

Initial stocking rates should be improved through the use of vegetation monitoring and actual use records that include number and type of livestock, the timing and duration of grazing, and utilization levels. Actual use records over time will assist in making stocking rate adjustments based on the variability factors.

Average annual production must be measured or estimated to properly assess usable forage production and stocking rates.

Hydrological functions

Water is the principal factor limiting forage production on this site. Infiltration is moderate to slow, and runoff potential for this site varies from moderate to high depending on soil hydrologic group and ground cover. In many cases, areas with greater than 75 percent ground cover have the greatest potential for high infiltration and lower runoff. An example of an exception would be where shortgrasses form a strong sod and dominate the site. Areas where ground cover is less than 50 percent have the greatest potential to have reduced infiltration and higher runoff. (Refer to NRCS Section 4, National Engineering Handbook (NEH-4) for runoff quantities and hydrologic curves.)

Recreational uses

This site offers open space and opportunity for intermittent viewing and/or hunting of a few wildlife species.

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 (Ecologist, Kansas NRCS) assumed responsibilities for development of provisional ESDs in MLRA 58C on 8-17-2017. Information for this provisional ecological site originates from the adjacent MLRA 54 Wet Meadows site.

This site is going through the Provisional ESD process. The information within the sections is additional to what is required of a provisional as a result of foundational ESD work completed in adjacent MLRA 54 during the early 2000s. This site is scheduled to go through the approval process in fiscal year 2021.

Future work (for the approved ESD) includes field visits to verify ecological site concepts with field staff. Field staff include but not limited to project office leader, area soil scientist, state soil scientist, ecological site specialist, state rangeland conservationist, area rangeland management specialist, and local field personnel. This site should include collaboration between North Dakota and Montana. Field visits are to be determined by spatial extent of the site as well as personal knowledge of the site. Activity during field visits will include but not be limited to: identifying the soil, landform, and plant community, and verifying existing site concepts. Data collection will be determined by the MLRA 58C technical team.

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 employees involved in developing the Saline Lowland 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; Chad Sexton from the National Park Service in North Dakota.

Information presented here has been 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.

Information for the provisional Saline Lowland ecological site originates from adjacent MLRA 54 Saline Lowland site.

NRCS individuals involved in developing the MLRA 54 Saline Lowland ecological site description include: Dennis Froemke, Dean Chamrad, Jeff Printz, L. Michael Stirling, Stan Boltz, Josh Saunders, Darrell Vanderbusch, David Dewald, and Brad Podoll; and Michael D. Brand, State Land Dept. Director Surface Management.

Ocular estimates 4 1993 – 2001 ND Dunn, Morton

Other references

High Plains Regional Climate Center, Weather data, web site http://hprcc.unl.edu. Available online. Accessed 9/25/2017.

National Water and Climate Center. https://www.wcc.nrcs.usda.gov/ Available online. Accessed 9/25/2017.

National Range and Pasture Handbook, USDA-NRCS, Chapter 7, Rangeland and Pastureland Hydrology and Erosion. September 1997.

National Soil Information System, USDA-NRCS, Information Technology Center, https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/geo/?cid=nrcs142p2_053552. Available online. Accessed 9/25/2017.

PLANTS Database, USDA-NRCS, http://plants.usda.gov. Available online. Accessed 9/25/2017.

USDA-Natural Resources Conservation Service—Soil Surveys and Web Soil Survey. Available online. Accessed 9/25/2017.

Contributors

Chris Tecklenburg

Approval

David Kraft, 10/31/2018

Acknowledgments

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)	Jeff Printz
Contact for lead author	mark.hayek@nd.usda.gov
Date	04/10/2012
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):** Bare ground is < 5%.

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):** Stability class 3 or greater.

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/surface layer.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Combination of shallow and deep rooted species (short-, mid-, and tall rhizomatous and tufted perennial cool- and warm-season grasses) with fine and coarse roots positively influences infiltration.

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: Mid, cool-season rhizomatous grass

    Sub-dominant: Short, warm-season bunchgrasses

    Other: Mid, cool-season bunchgrasses forbs shrubs

    Additional: Due to differing root structure and distribution, Kentucky bluegrass and smooth brome 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):** Representative value (RV) is 2200 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, Kentucky bluegrass, smooth bromegrass, Russian olive

17. **Perennial plant reproductive capability:** All species exhibit high vigor relative to climatic conditions. Do not rate based solely on seed production. Perennial grasses should have vigorous rhizomes or tillers.