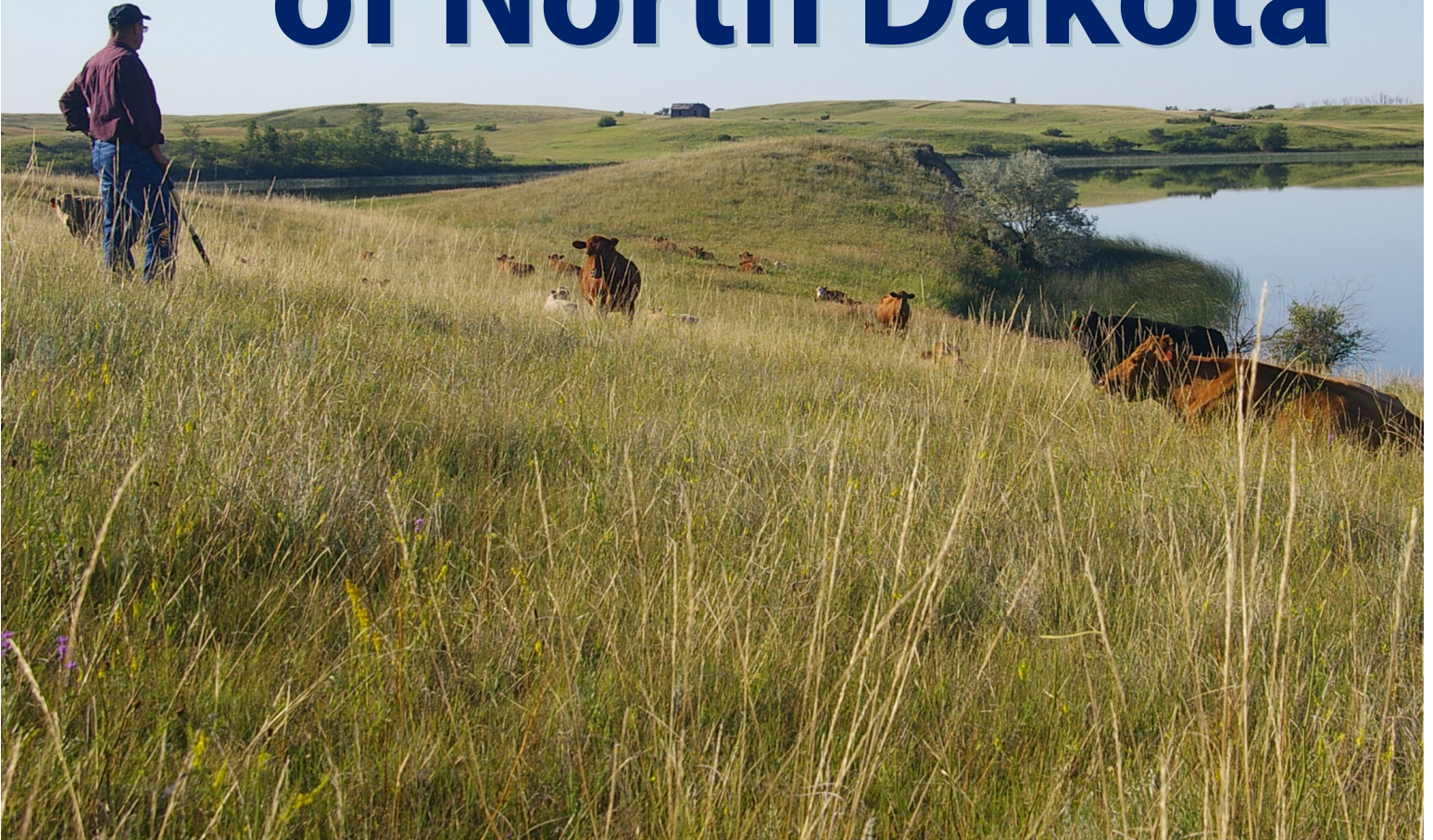


R1556 (Revised April 2021)

Ecological Sites of North Dakota



A PICTORIAL GUIDE OF ECOLOGICAL SITES COMMON TO NORTH DAKOTA

Kevin Sedivec

Extension Rangeland Management Specialist,
NDSU, Fargo

Mark Hayek

Rangeland Management Specialist,
U.S. Department of Agriculture-Natural Resources
Conservation Service, Bismarck, N.D.

Jeffrey Printz

Retired Rangeland Management Specialist,
U.S. Department of Agriculture-Natural Resources
Conservation Service, Bismarck, N.D.

Steven Sieler

Retired Soil Scientist, U.S. Department of Agriculture-
Natural Resources Conservation Service, Bismarck, N.D.

NDSU | EXTENSION

North Dakota State University
Fargo, North Dakota



Natural Resources
Conservation Service

Contents

■ Major Land Resource Areas (MLRAs).....	4
■ Ecological Site Plant Community Dynamics.....	6
■ Using the Ecological Site Description Guide	7
Determining Carrying Capacity and Stocking Rate	
Wildlife Habitat	
■ Wildlife Habitat.....	7
■ High Water Table Group	7
Closed Depression	
Limy Subirrigated	
Saline Lowland	
Subirrigated	
Wet Meadow	
Shallow Marsh	
■ Shallow and Very Shallow Group	12
Shallow Clayey	
Shallow Gravel	
Shallow Loamy	
Shallow Sandy	
Very Shallow	
■ Claypan Group.....	16
Claypan	
Thin Claypan	
Sandy Claypan	
■ Sandy Ecological Group.....	19
Sandy	
Sandy Terrace	
Sands	
Limy Sands	
Subirrigated Sands	
Choppy Sands	
■ Clayey Group.....	24
Clayey	
Upland Hardwood Forest	
■ Loamy Group.....	26
Badland Fan	
Flat Bottom Wooded Area	
Limy Residual	
Loamy	
Loamy Overflow	
Loamy Savannah	
Loamy Terrace	
Steep Sided Wooded Draw	
Thin Loamy	

An ecological site is a distinctive kind of land

with specific soil and physical characteristics that differ from other kinds of land in its ability to produce a distinctive kind and amount of vegetation and its ability to respond similarly to management actions and natural disturbances.

Source: NRCS FOTG

Herbage production will vary by ecological site within an area or between areas of a state due to differences in soil, water and topographical relationship.

These areas are categorized by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) as major land resource areas (MLRA). Major ecological site factors that influence

kinds of plants and amounts of forage produced include:

- Surface soil depth
- Soil texture
- Available soil moisture
- Land slope and exposure
- Precipitation
- Organic matter
- Soil chemical properties – depth to calcium carbonate, soluble salts and sodium

The kind and amount of vegetation produced on an ecological site will vary within an area due to soil type differences and topography or location on the landscape (**Figure 1**). Vegetation production differences are due primarily to plant and soil moisture relationships.

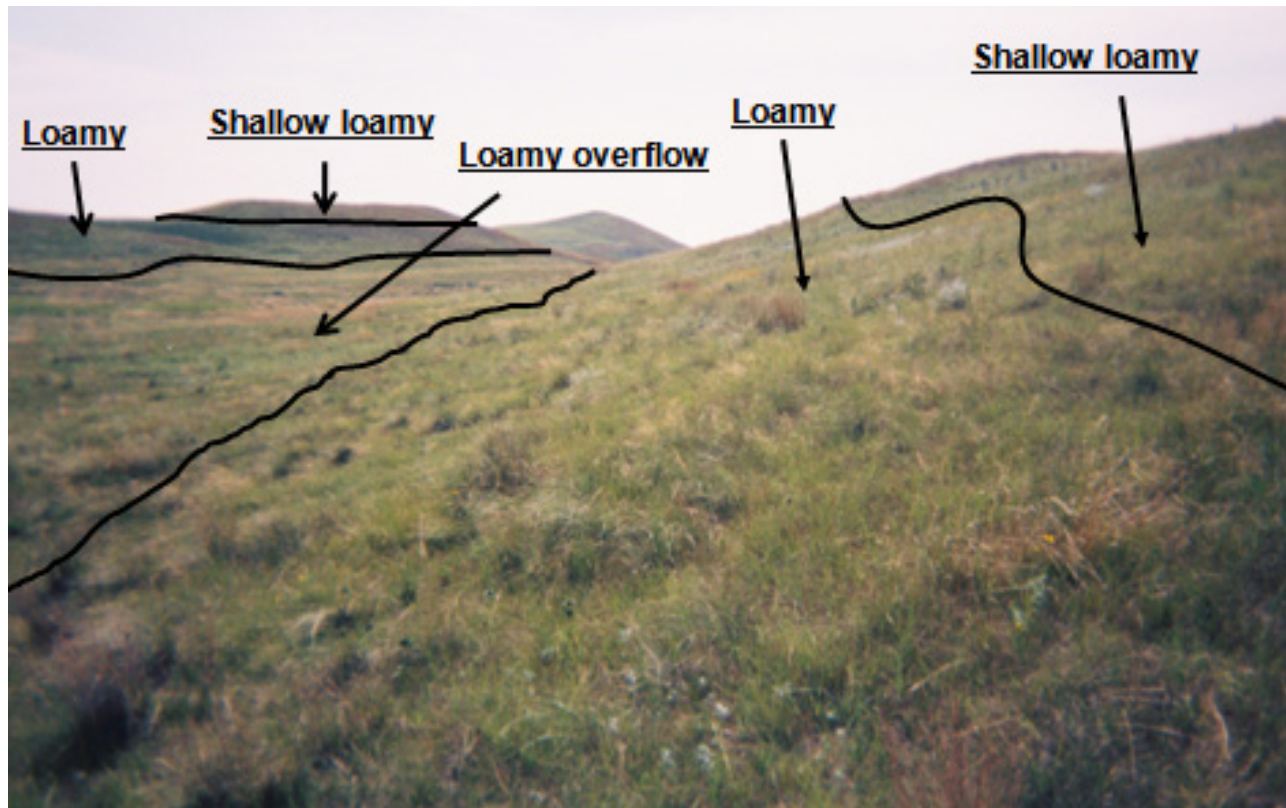


Figure 1. An example photo showing ecological site positions on the landscape.

(Photo by Kevin Sedivec)

Major Land Resource Areas (MLRAs)

Major land resource areas (MLRAs) are geographically associated land resource units. Identification of these large areas is important in statewide agricultural planning and has value in interstate, regional and national planning. The NRCS has recognized 278 MLRAs that are designated and identified by a descriptive geographic name.

An MLRA is a broad geographic area that is characterized by a unique pattern of soils, climate, water resources, vegetation and land use. Although 11 MLRAs are found in North Dakota, eight represent the majority of the state (Figure 2).

Each MLRA consists of numerous ecological sites due to this broad pattern of soils, vegetation and water

resources. However, not all ecological sites described in this publication will be found in every MLRA or region of the state. Refer to Table 1 (Page 5) for a list of ecological sites found in North Dakota and the MLRA with which they may be associated.



Figure 2. Major land resource areas of North Dakota.

(USDA-NRCS 2010)

Table 1. Ecological site descriptions (ESD) identified in North Dakota by major land resource area (MLRA), the accepted abbreviation for the ecological site and the correlation to the previous range site name. The ESDs are not completed for all MLRAs.

Ecological Site (abbreviation)	MLRA ¹								Original Range Site Name
	53A	53B	54	55A	55B	56	58C	58D	
Badlands Fan (BaF)	no	no	yes	no	no	no	yes	no	Thin Upland
Choppy Sands (CS)	yes	yes	yes	yes	yes	yes	yes	yes	Thin Sands
Clayey (Cy)	yes	yes	yes	yes	yes	yes	yes	yes	Clayey
Clayey Terrace (CyT)	no	no	no	no	no	no	yes	no	Clayey
Claypan (Cp)	yes	yes	yes	yes	yes	yes	yes	yes	Claypan
Closed Depression (CD)	yes	yes	yes	no	yes	no	yes	yes	Closed Depression
Flat Bottom Draw (FBD)	no	no	yes	no	no	no	yes	no	None
Limy Residual (LR)	no	no	yes	no	no	no	yes	no	Thin Upland
Limy Sands (LSa)	no	no	yes	no	no	no	yes	yes	Sands
Limy Subirrigated (LSb)	yes	yes	no	yes	yes	yes	no	no	Limy Subirrigated
Linear Meadow (LrM)	no	yes	no	no	yes	no	no	no	None
Loamy (Ly)	yes	yes	yes	yes	yes	yes	yes	yes	Silty
Loamy Overflow (LyOv)	yes	yes	yes	yes	yes	yes	yes	yes	Overflow
Loamy Savannah (LySv)	no	no	no	yes	no	no	no	no	Savannah
Loamy Terrace (LyT)	no	no	yes	no	no	no	yes	yes	Overflow
Saline Overflow (SOv)	no	no	no	no	no	no	no	yes	None
Saline Lowland (SL)	yes	yes	yes	yes	yes	yes	yes	yes	Saline Lowland
Saline Subirrigated (SSb)	yes	no	no	no	no	no	no	no	None
Sands (Sa)	yes	yes	yes	yes	yes	yes	yes	yes	Sands
Sandy (Sy)	yes	yes	yes	yes	yes	yes	yes	yes	Sandy
Sandy Claypan (SyCp)	yes	yes	yes	yes	yes	yes	yes	yes	Sandy Claypan
Sandy Terrace (SyT)	no	no	yes	no	no	no	yes	yes	Sandy
Shallow Clayey (SwCy)	no	no	yes	no	yes	no	yes	yes	Shallow
Shallow Loamy (SwLy)	no	yes	yes	no	no	no	yes	yes	Shallow
Shallow Sandy (SwSy)	no	no	yes	no	no	no	yes	yes	Shallow
Shallow Gravel (SwG)	yes	yes	yes	yes	yes	yes	yes	no	Shallow to Gravel
Shallow Marsh (SwM)	no	yes	no	no	yes	no	no	no	Wetland
Steep Sided Woody Draw (SSWD)	no	no	yes	no	no	no	yes	no	None
Stony Hills (SH)	no	no	no	no	no	no	no	yes	None
Subirrigated (Sb)	yes	yes	yes	yes	yes	yes	no	no	Subirrigated
Subirrigated Sands (SbSa)	no	no	no	yes	yes	yes	no	no	Subirrigated Savannah
Thin Clayey (TCy)	no	no	no	no	no	no	yes	no	Thin Claypan
Thin Claypan (TCp)	yes	yes	yes	yes	yes	yes	yes	yes	Thin Claypan
Thin Loamy (TLy)	yes	yes	yes	yes	yes	yes	yes	yes	Thin Upland
Upland Hardwood Forest (UHF)	no	no	yes	yes	no	no	no	no	None
Very Shallow (VS)	yes	yes	yes	yes	yes	yes	yes	yes	Very Shallow
Wet Land (WL)	yes	yes	yes	yes	yes	yes	no	yes	Wetland
Wet Meadow (WM)	yes	yes	yes	yes	yes	yes	yes	no	Wet Meadow

¹ Yes indicates ecological site has the potential to occur in the MLRA; a no indicates it does not.
Not all ecological site descriptions are complete to date but are planned to be completed in the future.

■ Ecological Site Plant Community Dynamics

The plant communities occupying an ecological site are dynamic and highly variable. Their composition changes in response to weather patterns and management inputs. Historically (prior to European occupation), weather, precipitation, fire and grazing by free-roaming herbivores were the primary disturbances that shaped the composition of the plant communities. For example, prolonged periods of drought would have shifted the plant communities to shorter-statured, more drought-tolerant species of grasses and forbs.

Ecological site descriptions attempt to describe the composition and function of these “historic” plant communities in what is termed the “Reference State.” One of the plant communities that would have occurred within the reference state is termed the “Reference Plant Community.”

The reference plant community describes the plant community that would have occupied the site under the average historic disturbance regime. This is the plant community that would have had the highest ecological function in terms of hydrology, species diversity and nutrient cycling.

The composition of the reference plant community is described based upon species composition data collected from sites that were determined to best represent this historic condition. Additional information is gathered from other reference sources that describe the plant communities occupying the region prior to settlement when the natural disturbance regime would have occurred.

Since settlement, the natural disturbance regime has been altered. Fire, as a primary disturbance, essentially has been eliminated from the ecosystem. Grazing disturbances

have been altered from intensive and infrequent to intensive and frequent. In other cases, fire and grazing have been eliminated entirely.

Additionally, exotic plant species (non-native) such as Kentucky bluegrass, smooth brome grass, crested wheatgrass and sweet clover have invaded sites. Depending upon the degree of invasion, species diversity, hydrology and nutrient cycling may be altered significantly. Invasion by these species is occurring regardless of management, especially during a wet cycle period (for example, Kentucky bluegrass encroachment throughout much of the northern Plains during the wet cycle starting in 1993).

However, management intensity may limit their spread and prevent the plant community from crossing an ecological threshold. Once a threshold is crossed, major management changes and dollar investments are required for restoration. In some cases, restoration may not be ecologically or financially possible.

Complete versions of ecological site and forage suitability group descriptions are available on the web at
<https://edit.jornada.nmsu.edu/catalogs/esd>.

If the ecological site descriptions for your area of interest are not available on this website, contact your local Natural Resources Conservation Service county office.

Ecological site maps for your area of interest are available via Web Soil Survey
<https://efotg.sc.egov.usda.gov/#/details>.

Using the Ecological Site Description Guide

The following is a pictorial guide of ecological sites common to North Dakota. Some sites are represented by a series of photos depicting a very simplified state and transition model describing the ecological dynamics of the site as explained in the previous section. Other sites are represented by a single photo, while still others (generally minor components) are described without pictorial images.

This guide is intended to assist in identification of ecological sites when developing management plans for rangeland and aid when teaching or conducting range judging activities.

Determining Carrying Capacity and Stocking Rate

Ecological sites play a major role in herbage and subsequent forage production of the plant community. This production and the ecological dynamics of the sites have a direct impact on the carrying capacity of the land (pasture unit).

To further understand how to determine stocking rate and carrying capacity, see the publication "Determining Carrying Capacity and Stocking Rates for Range and Pasture in North Dakota" <https://www.ag.ndsu.edu/publications/livestock/determining-carrying-capacity-and-stocking-rates-for-range-and-pasture-in-north-dakota/r1810.pdf>.

Wildlife Habitat

Rangeland provides all life requisites for various wildlife species. The potential wildlife habitat for these species can be predicated using ecological site descriptions and state and transition models. Habitat quality is a reliable indicator of presence and/or absence of species.

Habitat quality is based on plant community species composition and management of that plant community. The combination of management inputs, weather and plant species composition within an ecological site description and state and transition model provides the needed information to predicate wildlife responses.

Wildlife interpretations contained in the ecological site descriptions and state and transition models provide information that predicts the direct and indirect cumulative impacts of various management actions on vegetation composition and structure. Therefore, wildlife habitat quality is directly related to these various management actions.

Ecological site descriptions, along with state and transition models, enable land managers and scientists to assess potential and current wildlife habitat suitability. Ecological site descriptions also enable managers to predict potential responses of wildlife populations to vegetation dynamics based on the ecological potential of the site.

To use the information found in ecological site descriptions and state and transitional models accurately, a manager needs to complete a good inventory of current plant species composition. Utilizing this inventory with the ecological site descriptions and an understanding of the habitat needs of the wildlife species of interest, the manager has the necessary background information to make sound resource management decisions.

Subsequent monitoring of plant community and wildlife population changes as management is applied provides the feedback necessary to implement an effective adaptive management plan.



Example of a closed depression ecological site.

(USDA-NRCS Stock Photo)



Example of a limy subirrigated ecological site.

(USDA-NRCS Stock Photo)

■ High Water Table Group

Closed Depression

These sites are poorly drained and occur in closed upland depressions and are associated with residual soils (non-glaciated). The subsoil layer exhibits claypan characteristics and forms a 2-inch or longer ribbon (silty clay to clay). These sites are most common in MLRA 54 and may occur in MLRA 53B. Salinity is not allowed in this site.

These areas may pond water but do not flood. Major species found in the reference plant community phase include western wheatgrass, slender wheatgrass, prairie cordgrass, smartweed, curly-top knotweed, alkali plantain, American licorice and pursh seepweed. Herbage production

ranges from 3,500 pounds per acre in the east to 2,000 to 2,400 pounds per acre in the west.

Overgrazing will shift this community to one dominated by inland saltgrass, foxtail barley, curly dock, pepperweed and curlycup gumweed. Extended periods of nonuse will shift this plant community to one dominated by western wheatgrass and a variety of forbs.

Limy Subirrigated

These sites are somewhat poorly drained and have strong to violent effervescence throughout the subsoil. They are on flood plains, drainage ways and around or between depressions. Carbonates occur within 16 inches of the surface. Soil texture is not a criterion.

Major species found in the reference plant community phase include little bluestem, big bluestem, sideoats grama, porcupine grass, green needlegrass, sedges, American licorice, Indianhemp dogbane, goldenrods, Maximilian sunflower and western snowberry. Herbage production will range from 3,800 to 4,000 pounds per acre.

With overgrazing, the tall and mid-statured warm-season grasses and mid-statured cool-season bunchgrasses decline and are replaced by grazing-tolerant forbs and Kentucky bluegrass. With extended periods of nonuse, these sites tend to become dominated by Kentucky bluegrass, smooth brome grass and shrubs.

Saline Lowland

These sites are moderately well to poorly drained and moderately to strongly saline.

The subsoil forms a ribbon up to 2 inches in length. Salinity can be observed in the surface and/or subsoil layers.

Claypan is allowed in this site if poorly drained.



Heavy, continuous,
season-long grazing

Long-term
prescribed grazing



Long-term
nonuse



Plant Community 1

Major species found in this reference phase include western wheatgrass, Nuttall's alkaligrass, inland saltgrass, sedges and western dock.

Herbage production will range from 3,700 to 4,000 pounds per acre in the east and 2,000 to 2,500 pounds per acre in the west.

This plant community can be maintained utilizing good prescribed grazing management practices.

Practices include: 1) grazing rotation with proper recovery times between grazing events, 2) season-of-use changes and 3) proper stocking rates adjusted annually to reflect growing conditions.

Plant Community 2

This plant community phase results from long-term, heavy, continuous grazing and may be compounded by moderate to severe drought.

Nuttall's alkaligrass will decrease while western wheatgrass and inland saltgrass initially increase. With continued overgrazing, western wheatgrass will decline, while inland saltgrass, foxtail barley, forbs and bare ground increase.

Due to a lack of plant cover and increased bare ground, soil surface salinity may increase. Higher levels of salinity and loss of Nuttall's alkaligrass may limit the manager's ability to return to Phase 1.

Adoption of a prescribed grazing management practice that incorporates 1) proper recovery periods, 2) proper stocking rates and 3) season-of-use change will result in this plant community phase shifting toward Phase 1 if a threshold has not been crossed.

Plant Community 3

Extended periods of nonuse will result in a plant community dominated by Nuttall's alkaligrass, western wheatgrass, foxtail barley, curly dock, other forbs and possibly smooth brome grass and Kentucky bluegrass, depending upon salinity levels.

The lack of disturbance (grazing or fire) allows dead plant material to increase, shading the crowns of grass plants, reducing sunlight needed for plant growth and shifting the competitive advantage to more shade-tolerant grass and forb species.

(USDA-NRCS Stock Photo)

Subirrigated

These sites are somewhat poorly drained and are on flood plains, drainage ways and alluvial areas. The upper part of the subsoil immediately below the surface layer does not contain carbonates. Redoximorphic features are visible from 18 to 30 inches. Soil texture is not a criteria.



Example of a subirrigated reference plant community.

(USDA-NRCS Stock Photo)



Example showing a fence line contrast of two different plant community phases occupying the same wet meadow ecological site.

(Photo by Jeffrey Printz)

Major species found in the reference plant community phase include big bluestem, switchgrass, northern reedgrass, Canada wildrye, sedges, American licorice, Canada goldenrod, Maximilian sunflower, western yarrow, western snowberry, and scattered patches of chokecherry and plum. Herbage production will range from 4,700 to 5,100 pounds per acre

in the east and 4,000 to 4,300 pounds per acre in the west.

Overgrazing of these sites will result in a decrease in the big bluestem, switchgrass and northern reedgrass, with a corresponding increase in arctic rush, sedges and forbs. If present, Kentucky bluegrass will increase, resulting in a Kentucky bluegrass, rush, sedge, black medic, white clover and forb-dominated plant community.

Extended periods of nonuse will result in the site becoming dominated by Kentucky bluegrass, smooth brome grass and western snowberry. Shrubs such as chokecherry also may increase, resulting in a shrub-dominated plant community with scattered trees such as green ash.

Wet Meadow

These sites are poorly drained and in depressions or flood plains.

Major species found in the reference plant community phase include prairie cordgrass, northern reedgrass, switchgrass, clustered field sedge, fescue sedge, woolly sedge, Indian hemp dogbane, goldenrods, buttercup species and Rydberg's sunflower. Herbage production will range from 6,500 pounds per acre in the east to 4,500 pounds per acre in the west. Although production of biomass is high, the palatability is generally low, so stocking rates should be lower than the production would indicate.

Overgrazing of this site will result in a decrease in prairie cordgrass, northern reedgrass and sedges, with fowl bluegrass, arctic rush, Baltic rush and forbs increasing. Nonuse of this site will reduce prairie cordgrass and switchgrass, increasing western wheatgrass, fowl bluegrass and the invasive grasses quackgrass and Kentucky bluegrass.

Shallow Marsh

These sites are very poorly drained.

Major species found in the reference plant community phase include slough sedge, whitetop, American sloughgrass, water smartweed, bur-reed, northern water plantain and waterparsnip. Herbage production will range from 6,000 to 6,500 pounds per acre in the east to 4,500 to 5,900 pounds per acre in the west.



Example of a shallow marsh ecological site.

(USDA-NRCS Stock Photo)

Although production of biomass is high, the palatability is generally low, so stocking rates should be lower than the production would indicate.

Overgrazing of this site will result in a decline in the amount of whitetop and slough sedge and increase the amount of smartweed, arctic rush and Baltic rush. Sedimentation into these sites will result in a dominance of reed canarygrass, smartweed, Baltic rush and cattail.

Shallow and Very Shallow Group Shallow Clayey

These sites are shallow (10 to 20 inches) to weathered bedrock, shale or strongly cemented silicrete. The subsoil or substratum (not including the weathered bedrock) forms a greater than 2-inch ribbon (silty clay loam to clay). The surface layer is from 1 to 6 inches thick.

Major species in the reference plant community phase include western wheatgrass, green needlegrass, plains muhly, little bluestem, sideoats grama, dotted gayfeather, Missouri goldenrod, prairie coneflower, Lambert crazyweed, western yarrow, winterfat, fringed sagewort and broom snakeweed. Herbage production will range from 1,900 to 2,200 pounds per acre in the east and 1,200 to 1,400 pounds per acre in the west.

Overgrazing will shift this plant community to one dominated by blue grama, western wheatgrass, Sandberg bluegrass, red threeawn, cudweed sagewort, silverleaf scurfpea, western yarrow, fringed sagewort and broom snakeweed. Extended periods of nonuse will shift this plant community to one dominated by western wheatgrass, Sandberg bluegrass, red threeawn, Kentucky bluegrass, cudweed sagewort, prairie coneflower, silverleaf scurfpea and fringed sagewort.



Example of a shallow clayey ecological site.

(USDA-NRCS Stock Photo)



Example of a shallow gravel ecological site.

(USDA-NRCS Stock Photo)

Shallow Gravel

These sites are shallow (14 to 20 inches) to sand and gravel. The substratum contains up to 60% gravel and/or 25% to 75% sand. Drainage classes include moderately well to excessively well-drained.

Major species in the reference plant community phase include needle and thread, blue grama, western wheatgrass, plains muhly, threadleaf sedge, cudweed sagewort, cutleaf ironplant, green sagewort, Missouri goldenrod, prairie coneflower, fringed sagewort and rose. Herbage production will range from 1,800 to 2,000 pounds per acre in the east and 1,300 to 1,600 pounds per acre in the west.

Overgrazing will reduce the amount of needle and thread and western wheatgrass, while blue grama, sedges, red threeawn, gumweed, western salsify and fringed sagewort increase. Nonuse will result in reduction in the warm-season grass component of the plant community and an increase in the sedges and invasion of Kentucky bluegrass and smooth brome grass.

Shallow Loamy

These sites are shallow (10 to 20 inches) to weathered bedrock, siltstone, mudstone, shale or strongly cemented silcrete. Surface and subsoil layers form a 1- to 2-inch ribbon (silt loam to clay loam). These sites do not feel very gritty when excessively wet.

Major species in the reference plant community phase include little bluestem, sideoats grama, porcupine grass, needle and thread, plains muhly, prairie coneflower, purple coneflower, scurfpea, fringed sagewort and leadplant. Herbage production is 1,400 pounds per acre in the west.

Overgrazing of this site will decrease the sideoats grama, plains muhly and porcupine grass, while blue grama, needle and thread, sedges and fringed sagewort will increase. With long-term overgrazing, needle and thread will decrease. Nonuse of these sites will result in a decline in plant vigor and a decrease in the warm-season grasses such as sideoats grama and little bluestem, with invaders such as Kentucky bluegrass and smooth bromegrass increasing.

Shallow Sandy

Surface and substratum layers may form a ribbon of less than an inch or form a ball, feeling very gritty when excessively wet. These soils are shallow (10 to 20 inches) to weathered sandstone bedrock.

Major species in the reference plant community phase include prairie sandreed, needle and thread, sand bluestem, blue grama, sedges, dotted gayfeather, green sagewort, prairie clover, stiff sunflower, purple coneflower, winterfat, rose and broom snakeweed. Herbage production ranges from 1,300 to 1,400 pounds per acre in the west.

Overgrazing will shift this plant community to one dominated by sedges, blue grama, needle and thread, American pasqueflower, cutleaf ironplant, hairy goldaster, Lambert crazyweed, scarlet globemallow, broom snakeweed

and fringed sagewort. Extended periods of nonuse will shift this to one dominated by needle and thread, sedges, Kentucky bluegrass, American vetch, stiff sunflower, prairie coneflower, western yarrow, fringed sagewort, cactus and rose.



Example of shallow loamy ecological site.

(USDA-NRCS Stock Photo)



Example of a shallow sandy ecological site.

(USDA-NRCS Stock Photo)

Very Shallow

These soils are very shallow (less than 10 inches) to soft weathered bedrock, very shallow (less than 14 inches) to sand and gravel, or shallow (10 to 20 inches) to porcellanite (commonly referred to as scoria).

Major species in the reference plant community phase include needle and thread, blue grama, threadleaf sedge,

western wheatgrass, green sagewort, prairie coneflower, cutleaf ironweed, fringed sagewort and wild prairie rose, and bluebunch wheatgrass in the southwest. Rocky Mountain juniper and ponderosa pine naturally occur on this site in the Badlands zone (MLRA 58C). Herbage production will range from 1,400 to 1,700 pounds per acre in the east to 800 pounds per acre in the west.

Overgrazing will result in a decrease in needle and thread and an increase in blue grama, sedges, red threeawn, curlycup gumweed, western salsify and fringed sagewort. Due to the shallow nature of these sites, the plant community does not shift significantly with extended periods of nonuse, although if Kentucky bluegrass, smooth brome grass and creeping juniper are present, they will increase and may dominate the site.



Example of a very shallow ecological site.

(USDA-NRCS Stock Photo)

Claypan Group

All claypan ecological site characteristics include a thin leached horizon (E) above columnar structure, which is a dense clay layer.

Claypan

The surface layer ranges from 6 to 14 inches. The subsoil layers exhibit claypan characteristics and form a ribbon (loam to clay) greater than 1 inch in length. Salinity is evident at depths greater than 16 inches.



Heavy, continuous,
season-long grazing

Long-term
prescribed grazing



Extended
nonuse



Plant Community 1 (Reference Plant Community)

Major species in the reference plant community include western wheatgrass, blue grama, green needlegrass, threadleaf sedge, cudweed sagewort, heath aster, goldenrod, silverleaf scurfpea, fringed sagewort and rose. Reference plant community production will range from 2,000 to 2,300 pounds per acre in the east and 1,400 to 1,500 pounds in the west. This site often occurs in conjunction with thin claypan sites, giving the prairie an undulating appearance as the taller vegetation (claypan sites) grades into the shorter vegetation (thin claypan sites). This plant community can be maintained or enhanced utilizing good prescribed grazing management practices, which include a grazing rotation with proper recovery times between grazing events, season-of-use changes and proper stocking rates adjusted annually to reflect growing conditions.

Plant Community 2

This plant community results from long-term, heavy, continuous grazing and may be compounded by moderate to severe drought. Overgrazing of this site will result in the community shifting to one dominated by blue grama, inland saltgrass, sedges, cudweed sagewort, curlycup gumweed and fringed sagewort. If present, Kentucky bluegrass also will increase. Overall production will be reduced due to the loss of western wheatgrass, green needlegrass and overall plant vigor. Adoption of a prescribed grazing management, which incorporates proper recovery periods following a grazing event, proper stocking rates and season-of-use change, will result in this plant community shifting toward plant community 1.

Plant Community 3

Extended periods of nonuse will shift this plant community to one dominated by invaders such as Kentucky bluegrass and smooth brome grass, and possibly crested wheatgrass. Overall productivity may increase initially, but plant community diversity will be decreased, reducing the plant community's resilience to drought and other disturbances. Once a threshold is crossed by the invasion of these non-native species, the manager's ability to return to plant community 1 will be limited.

(USDA-NRCS Stock Photos)

Thin Claypan

The surface layer ranges from 0 to 6 inches. The subsoil layer exhibits claypan characteristics and salinity is likely at depths less than 16 inches. In some areas, salinity may be less evident at depths of less than 16 inches.



Heavy, continuous, season-long grazing

Long-term prescribed grazing



Extended nonuse



Plant Community 1 (Reference Plant Community)

Major species in the reference plant community include western wheatgrass, blue grama, threadleaf sedge, heath aster, scarlet globemallow, scurfpea, western yarrow, wild parsley, broom snakeweed and fringed sagewort. Reference plant community production will range from 1,300 to 1,600 pounds per acre in the east and 800 to 900 pounds per acre in the west. This site often occurs in conjunction with claypan sites, giving the prairie an undulating appearance as the taller vegetation (claypan sites) grades into the shorter vegetation (thin claypan sites). This plant community can be maintained or enhanced utilizing good prescribed grazing management practices, which include a grazing rotation with proper recovery times between grazing events, season-of-use changes and proper stocking rates adjusted annually to reflect growing conditions.

Plant Community 2

This plant community results from long-term, heavy, continuous grazing and may be compounded by moderate to severe drought. Overgrazing of this site will result in the community shifting to one dominated by the short-statured grasses such as blue grama, buffalograss (in the west), inland saltgrass, and forbs such as western yarrow and curlycup gumweed. Further disturbance results in a plant community dominated by blue grama, buffalo grass and fragile cactus (brittle pricklypear). Soil surface temperatures will be elevated due to lack of vegetative cover. Overall production will be reduced due to the loss of western wheatgrass and overall plant vigor. Adoption of a prescribed grazing management, which incorporates proper recovery periods following a grazing event, proper stocking rates and season-of-use change, will result in this plant community shifting toward community 1.

Plant Community 3

Extended periods of nonuse will shift this plant community to one dominated by western wheatgrass, sedges, bluegrasses, heath aster and fringed sagewort. Due to soil chemistry, few invasive species are adapted to this site. So, invasion by non-natives such as Kentucky bluegrass or smooth brome grass is generally not an issue. However, crested wheatgrass has been observed invading onto these sites, which will alter the dynamics and shift the plant community to a predominantly cool-season grass and forb community. Overall productivity may increase, depending upon the depth of the restrictive layer. Once a threshold is crossed, a manager's ability to return to community 1 will be limited.

(USDA-NRCS Stock Photos)

Sandy Claypan

These sites have a surface layer ranging from 6 to 16 inches.

The subsoil layer exhibits claypan characteristics and forms a ribbon of less than 1 inch (fine sandy loam). Salinity may be evident at depths of more than 16 inches. Sandy soils that exhibit claypan characteristics greater than 16 inches from the surface are assigned to the sandy ecological site.

Major species in the reference plant community phase include western wheatgrass, prairie sandreed, needle and thread, sedges, scurfpea, stiff sunflower, western wallflower, fringed sagewort and rose. Herbage production will range from 2,400 to 2,600 pounds per acre in the east and 1,600 to 2,000 pounds per acre in the west.

Overgrazing of this site will result in the community shifting to one dominated by blue grama, sedges, cudweed sagewort, green sagewort, western yarrow and fringed sagewort. Extended periods of nonuse will shift this plant community to one dominated by species such as Kentucky bluegrass, smooth brome-grass, sedges, cudweed sagewort, goldenrod, heath aster, scurfpea, fringed sagewort and western yarrow.



Example of a sandy claypan ecological site.

(USDA-NRCS Stock Photo)

Sandy Ecological Group

Sandy

Surface and subsoil layers form a ribbon of less than 1 inch that feels very gritty when excessively wet (fine sandy loam or sandy loam). These sites occur on uplands.



Heavy, continuous,
season-long grazing

Long-term
prescribed grazing



Extended
nonuse



Plant Community 1 (Reference Plant Community)

Major species in the reference plant community phase include prairie sandreed, needle and thread, western wheatgrass, blue grama, cudweed sagewort, scurfpea, green sagewort, prairie coneflower, western ragweed, leadplant, rose and fringed sagewort. Herbage production will range from 2,800 to 3,000 pounds per acre in the east and 1,800 to 2,400 pounds per acre in the west. This plant community can be maintained or enhanced utilizing good prescribed grazing management practices, which include a grazing rotation with proper recovery times between grazing events, season-of-use changes and proper stocking rates adjusted annually to reflect growing conditions.

Plant Community 2

This plant community results from long-term, heavy, continuous grazing and may be compounded by moderate to severe drought. Overgrazing of this site will result in the community shifting to one dominated by needle and thread, blue grama, sedges, green sagewort, western ragweed and fringed sagewort. If present, Kentucky bluegrass also will increase. Adoption of prescribed grazing management, which incorporates proper recovery periods following a grazing event, proper stocking rates and season-of-use change, will result in this plant community shifting toward plant community 1.

Plant Community 3

Extended periods of nonuse will shift this plant community to one dominated by Kentucky bluegrass, needle and thread, sedges, western ragweed, cudweed sagewort, scurfpea, green sagewort and fringed sagewort. Overall productivity initially may increase, but plant community diversity will be decreased, reducing the plant community's resilience to drought and other disturbances. Once a threshold is crossed by the invasion of these non-native species, the manager's ability to return to plant community 1 will be limited.

Sandy Terrace

Surface and subsoil layers form a less than 1-inch ribbon and feel very gritty when excessively wet (fine sandy loam or sandy loam). These sites are on low terraces or flood plains and rarely to occasionally flood.

Major species in the reference plant community phase include prairie sandreed, sand bluestem, needle and thread, western wheatgrass, goldenrod, penstemon, green sagewort, cudweed sagewort, prairie coneflower, leadplant, western snowberry, chokecherry, and possibly scattered cottonwood and green ash. Herbage production will range from 2,500 to 3,000 pounds per acre.

Overgrazing of this site will result in the community shifting to one dominated by needle and thread, blue grama, sedges, western ragweed, western salsify and fringed sagewort or Kentucky bluegrass when present. Extended periods of nonuse may shift this plant community to one dominated by Kentucky bluegrass, smooth brome grass, sedges, goldenrod, prairie coneflower, hairy goldaster, western snowberry and green ash.



Example of a sandy terrace ecological site.

(USDA-NRCS Stock Photo)

Sands

Surface and subsoil layers do not form a ribbon but may form a ball when squeezed (loamy fine sand to fine sand). These sites occur on uplands. Hummocks and dunes greater than 15% slope are excluded from this ecological site description (see choppy sands ecological site description).



Heavy, continuous, season-long grazing



Long-term prescribed grazing



Extended nonuse



Plant Community 1 (Reference Plant Community)

Major species in the reference plant community phase include prairie sandreed, needle and thread, sand bluestem, sedges, green sagewort, goldenrod, cudweed sagewort, western ragweed, sunflower, leadplant, western snowberry and rose. Herbage production will range from 2,600 to 2,800 pounds per acre in the east and 1,900 to 2,500 pounds per acre in the west. This plant community can be maintained or enhanced utilizing good prescribed grazing management practices, which include a grazing rotation with proper recovery times between grazing events, season-of-use changes and proper stocking rates adjusted annually to reflect growing conditions.

Plant Community 2

This plant community results from long-term, heavy, continuous grazing and may be compounded by moderate to severe drought. Overgrazing of this site will result in the community shifting to one dominated by needle and thread, sand dropseed, blue grama, sedges, green sagewort, cudweed sagewort, western ragweed and fringed sagewort. If present, Kentucky bluegrass also will increase. Overall production will be reduced due to the loss of sand bluestem, prairie sandreed and plant vigor. Adoption of prescribed grazing management, which incorporates proper recovery periods following a grazing event, proper stocking rates and season-of use-change, will result in this plant community shifting toward plant community 1.

Plant Community 3

Extended periods of nonuse will shift this plant community to Kentucky bluegrass, smooth brome grass, cudweed sagewort, green sagewort, sunflower and rose. Overall productivity initially may increase, but plant community diversity will be decreased, reducing the plant community's resilience to drought and other disturbances. Once a threshold is crossed by the invasion of these non-native species, the manager's ability to return to plant community 1 will be limited.

Notes

Other soils that should be included with the sands ecological site are 1) fine sandy loam if a-horizon is 10 inches thick or less, 2) if sand surface is over a loamy substratum and surface texture is loamy sand or loamy fine sand, and 3) handle coarse sandy loam such as a loamy sand and loamy coarse sand-like sand.

Limy Sands

Surface and subsoil layers form a less than 1-inch ribbon or form a ball when squeezed (fine sandy loam to fine sand). These sites usually contain carbonates throughout the soil profile (slight to strong effervescence) and are on uplands.

Major species in the reference plant community phase include prairie sandreed, little bluestem, sand bluestem, sideoats grama, porcupine grass, sedges, scurfpea, American pasqueflower, Lambert crazyweed,

penstemon, fringed sagewort, lead-plant and rose. Herbage production is about 1,800 pounds per acre.

Overgrazing of this site will shift the plant community to one dominated by blue grama, sedges, sand dropseed, green sagewort, western ragweed, fringed sagewort and Kentucky bluegrass. Extended periods of nonuse will shift this plant community to one dominated by needle and thread, prairie sandreed, sedges, Kentucky bluegrass, hairy goldaster, prairie coneflower, western ragweed, fringed sagewort and creeping juniper.



Example of a limy sands ecological site.

(USDA-NRCS Stock Photo)

Subirrigated Sands

The surface layer may form a less than 1-inch ribbon or may form a ball when squeezed (fine sandy loam to coarse sand), and subsoil layers do not form a ribbon and may form a ball when squeezed (loamy fine sand to coarse sand). These sites are moderately well-drained and occur on uplands. Redoximorphic features are visible between 30 and 40 inches.

Major species in the reference plant community phase include big bluestem, sand bluestem, prairie sandreed, porcupine grass, little bluestem, sideoats grama, sedges, goldenrods, heath aster, bracted spiderwort, Maximilian sunflower, purple prairie clover, silky prairie clover, prairie willow and rose. Herbage production is about 3,200 pounds per acre.

Overgrazing of this site will shift the plant community to one dominated by needle and thread, blue grama, sand dropseed, sedges, goldenrods, western ragweed and rose or Kentucky bluegrass when present. Extended periods of nonuse will shift this plant community to one dominated by Kentucky bluegrass, smooth brome grass, goldenrods, prairie willow and western snowberry.

Choppy Sands

Surface and subsoil layers do not form a ribbon and may form a ball when squeezed (loamy fine sand to fine sand). These sites are on flood plains, lake plains, outwash plains, residual plains and terraces. Typical landforms are hummocks and dunes. Slopes are greater than 15%.

Major species in the reference plant community phase include sand bluestem, little bluestem, prairie sandreed, needle and thread, porcupine grass, blue grama, sedges, bracted spiderwort, dotted gayfeather, goldenrods, green sagewort, penstemon and leadplant. Herbage production ranges from 1,900 pounds per acre in the east to 1,600 pounds per acre in the west.

Overgrazing of this site will shift the plant community to one dominated by needle and thread, blue grama, sand dropseed, sedges, western ragweed, green sagewort, goldenrods and fringed sagewort or Kentucky bluegrass when present. Excessive, localized disturbance may lead to blowouts. Extended periods of nonuse will shift this plant community to one dominated by Kentucky bluegrass, sedges, goldenrods, horsetail, scurfpea, western ragweed and fringed sagewort.



Example of a choppy sands ecological site.

(USDA-NRCS Stock Photo)

■ Clayey Group

Clayey

The subsoil layers form a 2-inch or greater ribbon (silty clay to clay).

Major species in the reference plant community phase include western wheatgrass, green needlegrass, porcupine grass, sedges, American vetch, cudweed sagewort, dotted

gayfeather, heath aster, purple prairie clover, wavyleaf thistle, western yarrow and lead plant. Herbage production ranges from 2,400 to 3,000 pounds per acre in the east and 1,900 to 2,100 pounds per acre in the west.

Overgrazing of this site will shift the plant community to one dominated by blue grama, western wheatgrass,

sedges, goldenrod, western yarrow and fringed sagewort or Kentucky bluegrass when present. Extended periods of nonuse will shift this plant community to one dominated by Kentucky bluegrass, smooth brome grass, goldenrods, scurfpea, cudweed sagewort and western snowberry.



Example of a clayey ecological site.

(USDA-NRCS Stock Photo)

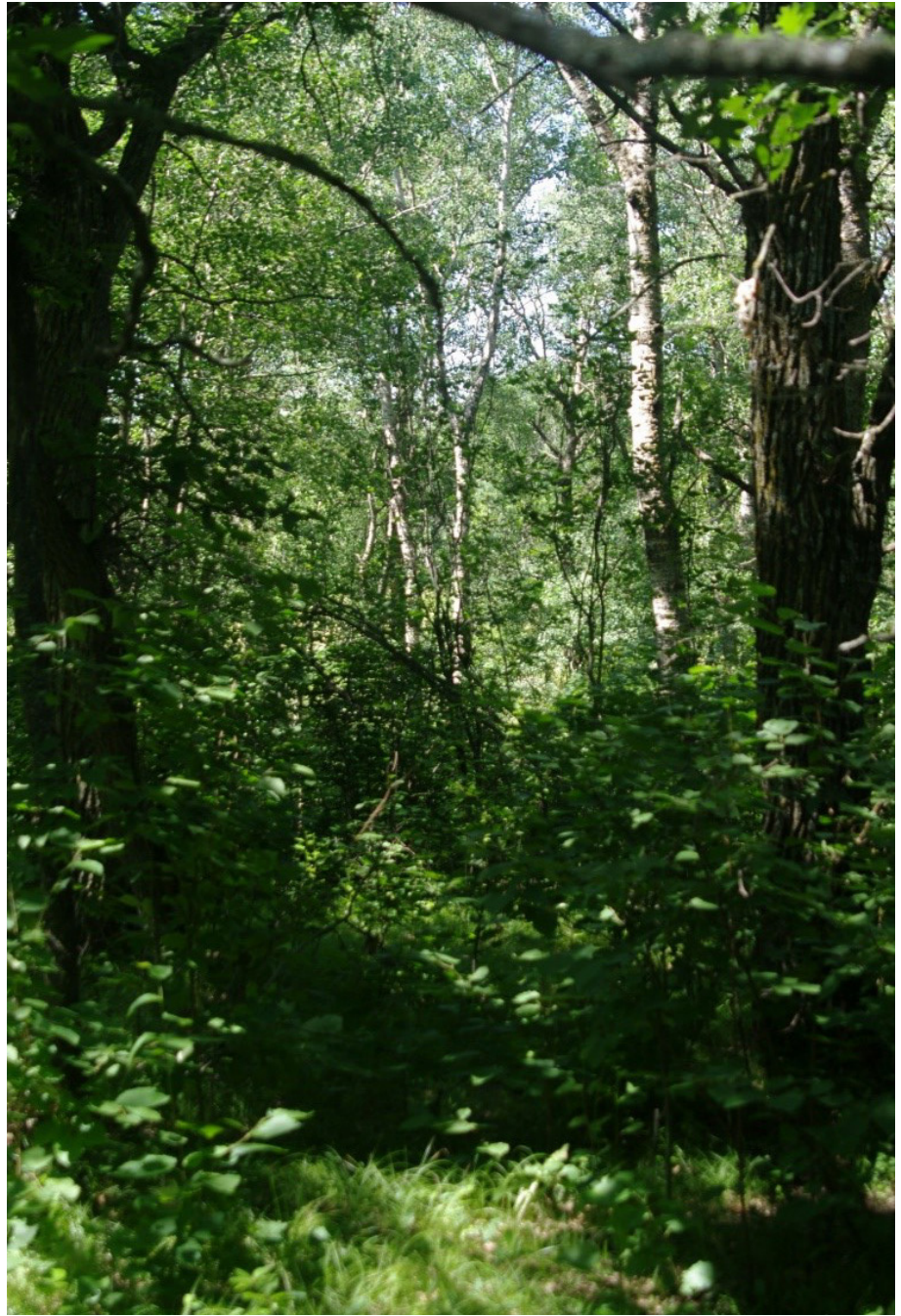
Upland Hardwood Forest

These sites are on backslopes and rises of moraines or flats of ice-walled lake plains within the Killdeer Mountains, Pembina Hills and Turtle Mountains. These soils developed under forested conditions and exhibit a grayish subsurface layer (E-horizon) immediately below the surface layer.

The grayish color of the subsurface layer is caused by clays being leached, leaving behind a high concentration of clean sand grain. The surface and subsurface layers form a ribbon (silty clay loam, clay loam, loam, silt loam, sandy loam). The subsoil layer forms a ribbon (sandy loam, clay loam, silty clay, clay). Slopes range from 0% to 25%.

This site is dominated by quaking aspen with a dense understory of beaked hazel. Other associated trees included green ash and boxelder, with bur oak reaching its maximum importance on south-facing slopes and paper birch reaching its greatest importance on north-facing slopes. Chokecherry, Saskatoon serviceberry, nannyberry, highbush cranberry, downy arrowwood and prickly wild rose are commonly associated shrubs.

Graminoids common to this state are limited largely to Sprengel's sedge and rough ricegrass. Common forbs include wild sarsaparilla, agrimony, anise-root, black snakeroot, veiny meadow-rue, starry false lily of the valley, mayflower, golden zizia, bedstraws and violets. Herbage production will range from 985 to 2,070 pounds per acre. Tree and shrub canopy cover is a major factor controlling herbage production.



Example of an upland hardwood forest grazed lightly too moderately.

(USDA-NRCS Stock Photo)

■ Loamy Group

Badland Fan

This ecological site forms on alluvium from adjacent steep badland areas. This site occupies the foot-slope and toe-slope of areas immediately adjacent to the badland areas.

Some sites contain coarse fragments and/or porcelanite material. The surface and subsoil form a 1- to 2-inch ribbon (silt loam,

loam, silty clay loam). Carbonates range from none in the upper 10 inches to slight to strong in all layers.

Cool-season grasses dominate the site, but warm-season shortgrasses are also prevalent. Western wheatgrass is the dominant grass in the reference plant community phase.

Other grasses and grasslike plants occurring on the site include blue

grama, needle and thread, green needlegrass, buffalograss, Sandberg bluegrass, inland saltgrass and sedges. Significant forbs include scarlet globemallow, prairie coneflower, black samson, common sunflower and blazingstar. Shrubs may include silver sagebrush, winterfat, big sagebrush, prairie rose and fringed sagewort. Herbage production ranges from 800 to 1,600 pounds per acre.



Example of a badland fan in the 1.2 phase of the state and transitional model (model not shown).

(USDA-NRCS Stock Photo)

Flat Bottom Wooded Draw

These sites are on wooded toe slopes of alluvial fans in badlands. The surface layer forms a less than 2-inch ribbon (loam to silty clay loam). The subsoil has stratified layers that form a less than 2-inch ribbon (fine sandy loam to silty clay).

Carbonates are common in the subsoil and may be present in the surface layer. Buried surface horizons usually are noted in the subsoil or substratum and may have the presence of charcoal from past fire events. Slopes are 0% to 6%.

Major species in the reference plant community phase include multi-aged deciduous trees such as green ash, American elm and boxelder, and

shrubs such as chokecherry, plum, western snowberry and Juneberry. Depending upon the degree of canopy cover, a diverse herbaceous understory would include Canada wildrye, western wheatgrass, green needlegrass, Virginia wildrye, Sprengel's sedge, northern bedstraw and blue lettuce.

Herbaceous production is highly variable depending upon canopy cover.



Example of a flat bottom wooded draw in the 2.2 phase of the state and transitional model (model not shown).

(USDA-NRCS Stock Photo)

Limy Residual

This ecological site occurs only on alluvial fans and backslopes of hills in residual (nonglaciated) soils. The surface layer forms a 1- to 2-inch ribbon (silt loam, loam, silty clay loam). Subsoil layers form a 1- to 2-inch ribbon (silt loam to clay loam).

These soils are slightly too strongly effervescent in the surface layer and subsoil. Some areas have no reaction from the surface to a depth of 4 inches. These sites are moderately deep to very deep to bedrock.

Major species in the reference plant community phase are dominated by cool-season grasses such as western wheatgrass and needle and thread. Other needlegrasses (green needlegrass and porcupine grass) and sedges, as well as small amounts of warm-season grasses such as blue grama, red threeawn and possibly little bluestem, also are present.

A variety of leguminous and nonleguminous perennial forbs are present, but only in slight amounts.

Forbs included blue lettuce, dotted gayfeather, prairie coneflower, silverleaf scurfpea, scarlet beeblossom and stiff sunflower. Shrubs include fringed sagewort, plains prickly pear and prairie rose.

Herbage production ranges from 1,400 to 2,100 pounds per acre. Physical disturbance of the site (for example, roads, pipelines) will result in an increase of little bluestem.



Example of a limy residual in the 2.1 phase of the state and transitional model (model not shown).

(USDA-NRCS Stock Photo)

Loamy

The loamy ecological site is the most dominant site in North Dakota. The surface layer forms a ribbon of less than 2 inches (loam, clay loam, fine sandy loam to silty clay loam) and subsoil a 1- to 2-inch ribbon, but textures are limited to silt loam to silty clay loam. Carbonates are not allowed in the upper 8 inches of the soil profile, which include the surface layer and upper part of the subsoil. These sites are on uplands.



Heavy, continuous, season-long grazing

Long-term prescribed grazing



Extended nonuse



Plant Community 1 (Reference Plant Community)

Major species in the reference plant community include green needlegrass, western wheatgrass, porcupine grass, prairie Junegrass, big bluestem, American vetch, heath aster, prairie coneflower, purple prairie clover, stiff sunflower and lead plant. Reference plant community production ranges from 2,600 to 3,200 pounds per acre in the east and 2,050 to 2,400 pounds per acre in the west. This plant community can be maintained or enhanced utilizing good prescribed grazing management practices, which include a grazing rotation with proper recovery times between grazing events, season-of-use changes and proper stocking rates adjusted annually to reflect growing conditions.

Plant Community 2

This plant community results from long-term, heavy, continuous grazing and may be compounded by moderate to severe drought. Overgrazing of this site will shift the plant community to one dominated by blue grama, western wheatgrass, sedges, western yarrow, goldenrods and fringed sagewort. If present, Kentucky bluegrass also will increase. Overall production may be reduced due to the loss of grass vigor and shift to less productive grasses. Forbs will constitute a greater proportion of the production. Infiltration rates will be less due to the loss or reduction in bunchgrasses. Adoption of prescribed grazing management, which incorporates proper recovery periods following a grazing event, proper stocking rates and season-of-use change, will result in this plant community shifting toward plant community 1.

Plant Community 3

Extended periods of nonuse will shift any plant community to one dominated by Kentucky bluegrass, smooth brome grass, cudweed sagewort, scurfpea, goldenrods and western snowberry. The lack of disturbance (grazing or fire) allows dead plant material to increase. This old material shades the crowns of the grass plants, reducing the amount of sunlight available for plant growth. This shifts the competitive advantage to the more shade-tolerant grasses such as Kentucky bluegrass and/or smooth brome grass. Due to the loss of the dominant native grass species, this community has crossed a threshold and a simple change in management will not return it to plant community 1.

(USDA-NRCS Stock Photos)

Loamy Overflow

The surface layer forms a ribbon of less than 2 inches (fine sandy loam or loam). The subsoil layer forms a ribbon of less than 2 inches (fine sandy loam to clay loam).

Carbonates are not allowed in the upper 8 inches of the soil profile, which include the surface layer and upper part of the subsoil. These sites are in flood plains or swale positions of complex map units on slopes of

less than 6% and include soils that are flooded frequently.

Major species in the reference plant community include big bluestem, switchgrass, green needlegrass, porcupine grass, western wheatgrass, American licorice, Maximilian sunflower, prairie coneflower, heath aster, western snowberry, leadplant and scattered patches of chokecherry, northern hawthorn and green ash. Reference plant community production ranges from 3,700 to 3,900 pounds

per acre in the east and 2,800 to 3,200 pounds per acre in the west.

Overgrazing of this site will shift the plant community to one dominated by blue grama, sedges, western wheatgrass, western yarrow, goldenrods and fringed sagewort or Kentucky bluegrass when present. Extended periods of nonuse will shift this plant community to one dominated by Kentucky bluegrass, smooth brome grass, western snowberry, chokecherry and green ash.



Example: Reference plant community



Example: Shrub-dominated loamy overflow plant community in the absence of fire



**Example:
Overgrazed loamy
overflow plant community**

(USDA-NRCS Stock Photos)

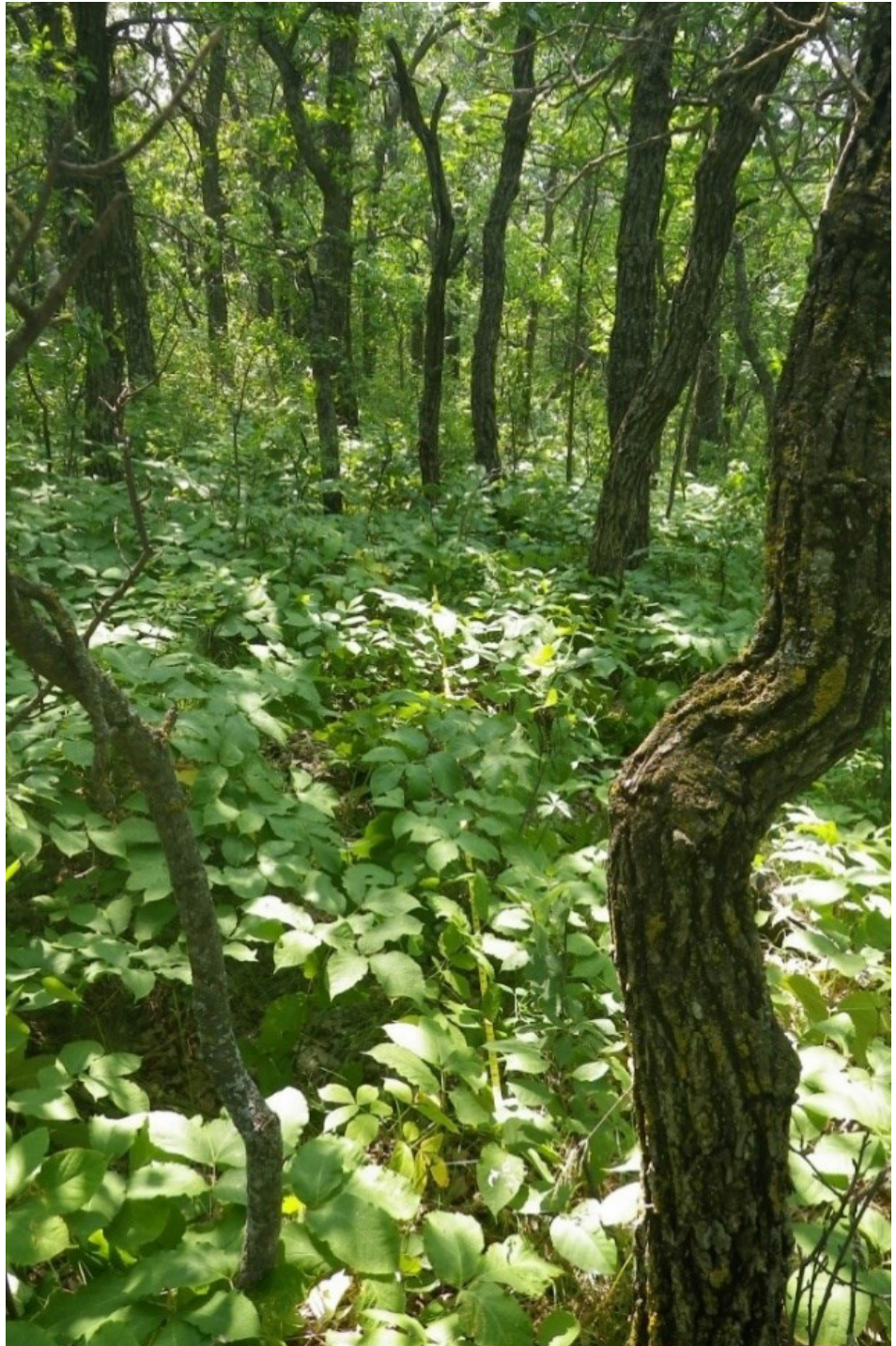
Loamy Savannah

This site is on backslopes of moraines and till plains. It is mixed woodland and grasslands that occur on the outer edge of the Turtle Mountains and on the rain shadow of Devils Lake (southeast side). The surface layer forms a less than 2-inch ribbon (loam, silt loam).

The subsoil forms a less than 2-inch ribbon (clay loam, silty clay loam). Clean sand grains are frequently present in the upper part of the subsoil and/or a subsurface layer (E-horizon) is present. Slopes range from 3% to 45%.

Vegetation may be described as an oak savanna consisting of bur oak and open grassland with perhaps scattered patches of woody vegetation. Associated trees and shrubs would include green ash, quaking aspen, American and beaked hazel, western snowberry, rose, chokecherry and Saskatoon serviceberry.

Major species in the reference plant community are predominantly cool-season, including western wheatgrass, green needlegrass, and needle and thread, along with other cool-season graminoids such as prairie Junegrass, Canada wildrye, bearded wheatgrass and sedges. Warm-season grasses included little and big bluestem, and blue grama. American vetch, veiny pea, Canada anemone, candle anemone, northern bedstraw and black-eyed Susan are common associated forbs. Herbaceous production ranges from 1,290 to 2,550 pounds per acre and is highly correlated to tree/shrub canopy cover.



Example of a loamy savannah ecological site in the 2.1 phase of the state and transitional model (model not shown).

(USDA-NRCS Stock Photo)

Loamy Terrace

The surface layer forms a <2-inch ribbon (silt loam or loam). The subsoil layer forms a <2-inch ribbon (silt loam to clay loam). These sites are on low terraces or flood plains and rarely to occasionally flood.

Major species in the reference plant community include western wheatgrass, green needlegrass, big bluestem, blue grama, needle and thread,

sedges, American vetch, cudweed sagewort, Maximilian sunflower, prairie coneflower, western wallflower, silver sagebrush, western snowberry, chokecherry and plum, and scattered cottonwood, green ash and boxelder. Reference plant community production ranges from 2,500 to 2,900 pounds per acre.

Overgrazing of this site will shift the plant community to one dominated

by silver sagebrush with an understory of blue grama, western wheatgrass, needle and thread, sedges, western yarrow, cudweed sagewort and fringed sagewort. Extended periods of nonuse will shift this plant community to one dominated by silver sagebrush (western North Dakota), smooth brome, annual bromes, western snowberry, chokecherry and possibly green ash and boxelder.



Example of a loamy terrace ecological site in western North Dakota.

(Photo by Jeffrey Printz)

Steep Sided Wooded Draw

These sites are on backslopes of steep draws in badlands and sedimentary plains. The surface layer is very dark brown and forms a less than 2-inch ribbon (loam, silt loam). Clean sand grains are visible on ped faces in the upper part of the subsoil and/or a subsurface layer (E-horizon) is present.

The subsoil forms a less than 2-inch ribbon (clay loam, silty clay loam). Buried surface horizons are common in the subsoil. Slopes are 9% to 50%.

Major herbaceous understory species in the reference plant community phase include Sprengel's sedge, Torrey's sedge, Assiniboia sedge, littleseed ricegrass, Virginia wildrye, false Solomon's seal, wood and wild strawberry, and northern bedstraw. Herbaceous production varies greatly depending upon the amount of tree/shrub canopy cover.



Example of steep sided wooded draw in the 1.2 phase of the state and transitional model (model not shown).

(USDA-NRCS Stock Photo)

Thin Loamy

The surface layer forms a <2-inch ribbon (silt loam or loam). The subsoil layer forms a <2-inch ribbon (silt loam to clay loam). These soils have strong to violent effervescence immediately below the surface layer. These sites occur on shoulder slopes and summits on glacial till uplands. Thin loamy ecological sites may be used on glacial till soils in all MLRAs.



Heavy, continuous,
season-long grazing

Long-term
prescribed grazing



Extended
nonuse



Plant Community 1 (Reference Plant Community)

Major species in the reference plant community include little bluestem, porcupine grass, sideoats grama, green needlegrass, plains muhly, blue grama, sedges, purple coneflower, American vetch, cut leaf ironweed, leadplant and fringed sagewort. Reference plant community production ranges from 2,200 to 2,700 pounds per acre in the east and 1,400 to 1,700 pounds per acre in the west. This plant community can be maintained or enhanced utilizing good prescribed grazing management practices, which include a grazing rotation with proper recovery times between grazing events, season-of-use changes and proper stocking rates adjusted annually to reflect growing conditions.

Plant Community 2

This plant community results from long-term, heavy, continuous grazing and may be compounded by moderate to severe drought. Overgrazing of this site will shift the plant community to one dominated by blue grama, needle and thread, sedges, goldenrods, purple coneflower, western yarrow, rose pussytoes, fringed sagewort and broom snakeweed. If present, Kentucky bluegrass also will increase. Overall production will be reduced due to the loss of grass vigor and shift to less productive grasses. Infiltration rates will be less due to the loss of mid-statured bunchgrasses. Adoption of prescribed grazing management, which incorporates proper recovery periods following a grazing event, proper stocking rates and season-of-use change, will result in this plant community shifting toward plant community 1.

Plant Community 3

Extended periods of nonuse will shift any plant community to one dominated by Kentucky bluegrass, smooth brome, scurfpea, western yarrow, western snowberry and rose. The lack of disturbance (grazing or fire) allows dead plant material to increase. This old material shades the crowns of the native grass plants, reducing the amount of sunlight available for plant growth. This shifts the competitive advantage to the more shade-tolerant grasses such as Kentucky bluegrass and/or smooth brome. Due to the loss of the dominant native grass species, this community has crossed a threshold, and a simple change in management will not return it to plant community 1.

(USDA-NRCS Stock Photos)

The U.S. Department of Agriculture (USDA) prohibits discrimination in all of its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex (including gender identity and expression), marital status, familial status, parental status, religion, sexual orientation, political beliefs, genetic information, reprisal, or because all or part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.)

Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD)."

Cover photo by Jeffrey Printz

For more information on this and other topics, see www.ag.ndsu.edu

NDSU encourages you to use and share this content, but please do so under the conditions of our Creative Commons license. You may copy, distribute, transmit and adapt this work as long as you give full attribution, don't use the work for commercial purposes and share your resulting work similarly. For more information, visit www.ag.ndsu.edu/agcomm/creative-commons.

County commissions, North Dakota State University and U.S. Department of Agriculture cooperating. NDSU does not discriminate in its programs and activities on the basis of age, color, gender expression/identity, genetic information, marital status, national origin, participation in lawful off-campus activity, physical or mental disability, pregnancy, public assistance status, race, religion, sex, sexual orientation, spousal relationship to current employee, or veteran status, as applicable. Direct inquiries to Vice Provost for Title IX/ADA Coordinator, Old Main 201, NDSU Main Campus, 701-231-7708, ndsu.eoa@ndsu.edu. This publication will be made available in alternative formats for people with disabilities upon request, 701-231-7881.