

USDA icon Natural Resources Conservation Service

# Ecological site R055CY040SD

## Loamy Floodplain

Last updated: 2/01/2024  
Accessed: 09/01/2026

### 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.

### MLRA notes

Major Land Resource Area (MLRA): 055C–Southern Black Glaciated Plains

The Southern Black Glaciated Plains (55C) is located within the Northern Great Plains Region. It is entirely within South Dakota encompassing about 10,835 square miles (Figure 1). The elevation ranges from 1,310 to 1,970 square feet. The MLRA is on nearly level to undulating glacial till plains interrupted by steeper slopes adjacent to streams and moraines. The James River is an under-fit stream. Its valley was carved by floodwaters draining glacial Lake Dakota and is filled with glacial outwash and alluvial deposits. (USDA-NRCS, 2006). The dominant soil order in this MLRA is Mollisols. The soils in the area dominantly have a mesic soil temperature regime, an ustic soil moisture regime, and mixed or smectitic mineralogy. They generally are very deep, well drained to very poorly drained, and clayey or loamy. This area supports natural prairie vegetation characterized by western wheatgrass (*Pascopyrum smithii*), green needlegrass (*Nassella viridula*), needle and thread (*Hesperostipa comata*), and porcupinegrass (*Hesperostipa spartea*) with Prairie cordgrass (*Spartina pectinata*), and reed canarygrass (*Phalaris arundinacea*) as the dominant vegetation on the poorly drained soils. (USDA-NRCS, 2006).

### Classification relationships

Major Land Resource Area (MLRA): Southern Black Glaciated Plains (55C) (USDA-NRCS, 2006) USFS Subregions: North Central Glaciated Plains Section (251B); Yankton Hills and Valleys Subsection (251Bf); Western Glaciated Plains Section (332B); James River Lowland Subsection (332Bb); North Central Great Plains Section (332D); Southern Missouri Coteau Slope Subsection (332Dd); Southern Missouri Coteau Subsection (332De) - (Cleland et al., 2007) US EPA Level IV Ecoregion: Southern Missouri Coteau (42e); Southern Missouri Coteau Slope (42f); James River Lowland (46n) - (USEPA, 2013)

### Ecological site concept

The Loamy Floodplain ecological site occurs in high floodplain areas. Soils are moderately well drained. Water flows into and over or through the site, which is subject to occasional to frequent flooding. Vegetation in the Reference State is dominated by warm season grasses including big bluestem, switchgrass, and Indiangrass. Trees may also be occur, species include Plains Cottonwood and Green ash. Common shrubs include American plum and western snowberry. Non-native grasses such as smooth bromegrass and Kentucky may invade due to shifts in disturbance regime.

### Associated sites

|             |                                                                                                                                                                                                                                                                                                                                                                  |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| R055CY002SD | <b>Linear Meadow</b><br><br>These sites occur on lower floodplain area. Soils are poorly to very poorly drained with a water table within two feet of the soil surface that persists longer than the wettest part of the growing season, typically until the month of August. The central concept soil series are Arlo and Clamo, but other series are included. |
| R055CY003SD | <b>Subirrigated</b><br><br>These sites occur in drainageways. Soils are somewhat poorly drained with a water table within two to five feet of the soil surface that persists longer than the wettest part of the growing season, typically until the month of August. The central concept soil series is Lamo, but other series are included.                    |

## Similar sites

|             |                                                                                                                                                                                                                                                                                             |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| R055CY020SD | <b>Loamy Overflow</b><br><br>The Loamy Overflow site occurs in upland swales. Soils are moderately well drained, which indicates water flow into and over/through the site. The Loamy Overflow site will have more green needlegrass and western wheatgrass than the Loamy Floodplain site. |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Table 1. Dominant plant species

|            |                                                                 |
|------------|-----------------------------------------------------------------|
| Tree       | Not specified                                                   |
| Shrub      | Not specified                                                   |
| Herbaceous | (1) <i>Andropogon gerardii</i><br>(2) <i>Sorghastrum nutans</i> |

## Physiographic features

Figure 1. Distribution Map for the Loamy Floodplain site in MLRA 55C.

Table 2. Representative physiographic features

|                    |                          |
|--------------------|--------------------------|
| Landforms          | (1) Plains > Flood plain |
| Flooding duration  | Brief (2 to 7 days)      |
| Flooding frequency | Rare to frequent         |
| Elevation          | 400 – 600 m              |
| Slope              | 0 %                      |
| Water table depth  | 80 – 200 cm              |

## Climatic features

MLRA 55C is considered to have a continental climate with cold winters and hot summers, low humidity, light rainfall, and much sunshine. Extremes in temperature may also abound. The climate is the result of this MLRA's location near the geographic center of North America. There are few natural barriers on the Northern Great Plains and air masses move freely across the plains and account for rapid changes in temperature.

Annual precipitation typically ranges from 19 to 25 inches per year. The average annual temperature is about 47°F. January is the coldest month with average temperatures ranging from about 15°F (Howard, South Dakota (SD)), to about 20°F (Wagner, SD). July is the warmest month with temperatures averaging from about 73°F (Howard, SD), to about 77°F (Wagner, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 58°F. This large annual range attests to the continental nature of this area's climate. Hourly winds are estimated to average about 12 miles per hour (mph) annually, ranging from about 13 mph during the spring to about 11 mph during the summer. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 mph.

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

**Table 3 Representative climatic features**

|                                            |              |
|--------------------------------------------|--------------|
| Frost-free period (characteristic range)   | 120-130 days |
| Freeze-free period (characteristic range)  | 140-150 days |
| Precipitation total (characteristic range) | 560-660 mm   |
| Frost-free period (actual range)           | 110-130 days |
| Freeze-free period (actual range)          | 130-150 days |
| Precipitation total (actual range)         | 530-690 mm   |
| Frost-free period (average)                | 130 days     |
| Freeze-free period (average)               | 140 days     |
| Precipitation total (average)              | 610 mm       |

- (1) FAULKTON 1 NW [USC00392927], Faulkton, SD
- (2) MILLER [USC00395561], Miller, SD
- (3) REDFIELD [USC00397052], Redfield, SD
- (4) HURON RGNL AP [USW00014936], Huron, SD
- (5) DE SMET [USC00392302], De Smet, SD
- (6) HOWARD [USC00394037], Howard, SD
- (7) ALEXANDRIA [USC00390128], Alexandria, SD
- (8) MARION [USC00395228], Marion, SD
- (9) MENNO [USC00395481], Menno, SD
- (10) TYNDALL [USC00398472], Tyndall, SD
- (11) WAGNER [USC00398767], Wagner, SD
- (12) ACADEMY 2NE [USC00390043], Platte, SD

### **Influencing water features**

This section is under construction.

### **Wetland description**

This section is under construction.

### **Soil features**

The common soil features of soils in this site are the loam subsoil and slopes zero to two percent. The soils in this site are moderately drained and formed in alluvium. The loam surface layer is eight to 20 inches thick. The soils have a moderate infiltration rate. The central

concept soil series is Bon, but others are included. The soils show no evidence of rills, wind scoured areas, or pedestalled plants. The soil surface is stable and intact. Subsurface soil layers are nonrestrictive to water movement and root penetration. These soils are not susceptible to water erosion. Flooding frequency strongly influences the soil-water-plant relationship.

**Table 4. Representative soil features**

|                                                         |                         |
|---------------------------------------------------------|-------------------------|
| Surface texture                                         | (1) Loam                |
| Family particle size                                    | (1) Fine-loamy          |
| Drainage class                                          | Moderately well drained |
| Permeability class                                      | Moderate                |
| Soil depth                                              | 0 – 200 cm              |
| Surface fragment cover ≤3"                              | Not specified           |
| Surface fragment cover >3"                              | Not specified           |
| Available water capacity<br>(0-101.6cm)                 | 0.46 – 0.56 cm          |
| Calcium carbonate equivalent<br>(0-101.6cm)             | 0 – 10 %                |
| Electrical conductivity<br>(0-101.6cm)                  | Not specified           |
| Sodium adsorption ratio<br>(0-101.6cm)                  | Not specified           |
| Soil reaction (1:1 water)<br>(0-101.6cm)                | 6.6 – 7.8               |
| Subsurface fragment volume ≤3"<br>(Depth not specified) | Not specified           |

|                                                         |               |
|---------------------------------------------------------|---------------|
| Subsurface fragment volume >3"<br>(Depth not specified) | Not specified |
|---------------------------------------------------------|---------------|

**Ecological dynamics**

The information in this Ecological Site Description, including the state-and-transition model (STM), was developed based on historical data, current field data, professional experience, and a review of the scientific literature. As a result, all possible scenarios or plant species may not be included. Key indicator plant species, disturbances, and ecological processes are described to inform land management decisions.

The site, which is located in the Southern Black Glaciated Plains, developed under Northern Great Plains climatic conditions and included natural influence of large herding herbivores and occasional fire. Changes will occur in the plant communities due to weather fluctuations and management actions. Under adverse impacts, a relatively rapid decline in vegetative vigor and composition can occur. Under favorable conditions the site has the potential to resemble the Reference State. Interpretations for this site are based primarily on the 1.1 Big Bluestem-Switchgrass-Indiangrass Plant Community Phase. This community phase and the Reference State have been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been considered.

This ecological site (ES) has been grazed by domestic livestock since they were introduced into the area. The removal of fire, the introduction of invasive species, and the introduction of domestic livestock and the use of fencing and reliable water sources have changed the ecological dynamics of this site. Continuous grazing without adequate recovery periods following each grazing occurrence over several years and lack of fire frequency cause this site to depart from the interpretive plant community. Trees and shrubs are a minor but consistent component in the reference state occurring as scattered individuals or patches. The establishment of plains cottonwood (*Populus deltoides*) results from severe flooding events where scouring or sediment deposition allow for seed germination and establishment. Not a frequently occurring plant community, but rather unique and dependent upon the combination of flooding, bare soils, seed dispersal, and germination. Other shrub and tree species often establish as a result of high litter levels or bare ground opportunities and the lack of fire, all of which favor woody plant establishment. Species such as green ash (*Fraxinus pennsylvanica*), and plains cottonwood initially increase. Big bluestem and switchgrass will decrease in frequency and production. Increased woody and tree species and heavy, continuous grazing causes shade-tolerant species like Kentucky bluegrass (*Poa pratensis*) to increase and eventually develop into a sod-bound condition. The significant increase in invasive cool-season grasses, specifically Kentucky bluegrass and smooth brome grass (*Bromus inermis*), on this site is the result of several factors including typically cold wet springs coupled with spring grazing deferment, high tolerance of grazing, shade tolerance, severe defoliation of native grasses in the growing season, and the elimination of fire from the system. Due to the spread of these species, the interpretive plant community no longer exist. Extended periods of non-use and no fire will result in a plant community of mature green ash or plains cottonwood with a shaded understory of Kentucky bluegrass creating a park-like appearance.

Mechanical removal, catastrophic fire, or inundation of woody species due to flooding with very long duration (greater than 30 days) beyond normal ponding and drying patterns will create a community dominated by big bluestem, switchgrass, and Indiangrass (*Sorghastrum nutans*), which will be invaded with lesser amounts of non-native species such as Kentucky bluegrass and smooth brome grass.

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 and community phases. The associated plant composition tables 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 states may be revised or removed, and new ones may be added. The main purpose for including the descriptions here is to capture the current knowledge and experience at the time of this revision.

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

**State and transition model**

Figure 8. State-And-Transition Model.

Figure 9. Legend

Figure 10. Matrix

**Additional community tables**

Table 5. Community 1.1 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|-------|-------------|--------|-----------------|----------------------|------------------|
|-------|-------------|--------|-----------------|----------------------|------------------|

Table 6. Community 1.2 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|-------|-------------|--------|-----------------|----------------------|------------------|
|-------|-------------|--------|-----------------|----------------------|------------------|

Table 7. Community 1.3 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|-------|-------------|--------|-----------------|----------------------|------------------|
|-------|-------------|--------|-----------------|----------------------|------------------|

Table 8. Community 2.1 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|-------|-------------|--------|-----------------|----------------------|------------------|
|-------|-------------|--------|-----------------|----------------------|------------------|

Table 9. Community 2.2 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|-------|-------------|--------|-----------------|----------------------|------------------|
|-------|-------------|--------|-----------------|----------------------|------------------|

Table 10. Community 2.3 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|-------|-------------|--------|-----------------|----------------------|------------------|
|-------|-------------|--------|-----------------|----------------------|------------------|

Table 11. Community 3.1 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|-------|-------------|--------|-----------------|----------------------|------------------|
|-------|-------------|--------|-----------------|----------------------|------------------|

Table 12. Community 3.2 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|-------|-------------|--------|-----------------|----------------------|------------------|
|-------|-------------|--------|-----------------|----------------------|------------------|

Table 13. Community 4.1 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|-------|-------------|--------|-----------------|----------------------|------------------|
|-------|-------------|--------|-----------------|----------------------|------------------|

Table 14. Community 4.2 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|-------|-------------|--------|-----------------|----------------------|------------------|
|-------|-------------|--------|-----------------|----------------------|------------------|

Table 15. Community 4.3 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|-------|-------------|--------|-----------------|----------------------|------------------|
|-------|-------------|--------|-----------------|----------------------|------------------|

Table 16. Community 5.1 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|-------|-------------|--------|-----------------|----------------------|------------------|
|-------|-------------|--------|-----------------|----------------------|------------------|

## Other information

Ecological Site Correlation Issues and Questions: • NOTE: In Gregory County (SD053) the (Bb) Bon loam, 0 to 2 percent slopes, rarely flooded (national symbol 2wkpm) was included in a MLRA map unit that covered more than one MLRA. This map unit is located in MLRA 66 and should be split correlated in future projects. • NOTE: In Gregory County (SD053) the (Bc) Bon loam, channeled, 0 to 2 percent slopes, frequently flooded (national symbol 2wkpn) was included in a MLRA map unit that covered more than one MLRA. This map unit is located in MLRA 66 and should be split correlated in future projects. • Reference and alternative states within the state-and-transition model are not be fully documented and may require additional field sampling for refinement.

## Inventory data references

There is no NRCS clipping data and other inventory currently available for this site. Information presented here has been derived using field observations from range-trained personnel. Those involved in developing this site include Jason Hermann, Area Rangeland Management Specialist, USDA-NRCS, Redfield, SD. Data Source Sample Period State County NONE

## Other references

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## Approval

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## Acknowledgments

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## Rangeland health reference sheet

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

|                                             |                   |
|---------------------------------------------|-------------------|
| Author(s)/participant(s)                    |                   |
| Contact for lead author                     |                   |
| Date                                        | 02/01/2024        |
| Approved by                                 |                   |
| Approval date                               |                   |
| Composition (Indicators 10 and 12) based on | Annual Production |

## Indicators

**1. Number and extent of rills:**

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

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

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

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**5. Number of gullies and erosion associated with gullies:**

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**6. Extent of wind scoured, blowouts and/or depositional areas:**

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7. Amount of litter movement (describe size and distance expected to travel):

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

---

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

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10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:

---

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

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

Dominant:

Sub-dominant:

Other:

Additional:

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

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14. Average percent litter cover (%) and depth ( in):

---

15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):

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

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17. Perennial plant reproductive capability:

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