

Ecological site R106XY065NE

Wet Subirrigated

Last updated: 8/20/2026
Accessed: 10/06/2026

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): 106X–Nebraska and Kansas Loess-Drift Hills

Named the “Nebraska and Kansas Loess-Drift Hills,” Major Land Resource Area (MLRA) 106 is divided almost evenly between southeastern Nebraska (52%), and northeastern Kansas, (48%). The northern border is located on the north end of Saunders County, Nebraska, and the MLRA stretches into Douglas County, Kansas in the south. The Nebraska cities of Beatrice and Lincoln are the major population centers in the north, while Topeka and Lawrence in Kansas are the primary cities in the south. The approximately seven-million-acre landscape covers all or parts of thirty counties between the two states. The Platte, Little Nemaha, and the North Fork of the Big Nemaha Rivers flow through the Nebraska side of the MLRA, while the Black Vermillion, the Soldier, and the Delaware Rivers are the major waterways on the Kansas side. The Big Blue River runs through both states, while The Salt Creek hydrologic system located near Lincoln, Nebraska provides habitat for the only known population of the Federally listed endangered Salt Creek Beetle. This dissected glacial drift plain primarily consists of broad, smooth ridgetops, and slopes ranging from nearly level to steep. The elevation in MLRA 106 decreases from west to east, and ranges from nearly 1,650 feet to less than 790 feet above sea level. Stream valleys in this landscape are narrow and bordered by steep hills, with 10 to 20 feet of local relief. The river valleys are broader and may drop up to over 160 feet below the adjacent hilltops. The uplands are primarily comprised of glacial drift underlying a mantle of loess, while alluvial deposits are found in the stream and river valleys. Limestone and shale quarries are also located in MLRA 106. The predominant soil orders in this MLRA are mesic, udic, Mollisols, Alfisols, and Entisols. Loams and clays are the primary soil textures in this landscape. Sixty-two percent of the land in this MLRA has been broken out of native prairie and farmed, while only 23 percent of the grasslands remain intact. Livestock grazing, primarily by cattle, is the main industry on these remnants. Corn, wheat, soybeans, and grain sorghum are the primary commodity crops, but a significant number of acres are also planted to alfalfa for harvest as hay. With annual precipitation averaging from 40 inches in the southeast, to 28 inches in the northwest, irrigation for crop production is not a critical factor in most years. The historical matrix vegetation type is Tallgrass Prairie, and big bluestem, little bluestem, switchgrass, Indiangrass, sideoats grama, and blue grama make up the bulk of the warm-season species. Historically, western wheatgrass was the dominant cool-season grass but today the dominant cool-season grasses are introduced grasses, smooth brome in the north and tall fescue in the south. Large and small patch vegetative communities are found primarily along the riparian zones, and on both upland and lowland saline sites. Woodlands make up about six percent of MLRA 106, consisting primarily of green ash, oak, hackberry, boxelder, and maple trees. Wildlife flourishes in this combination of crop and grassland environments. In a landscape historically occupied by bison herds, white-tailed deer are now the most abundant wild ungulates. A variety of smaller species, including coyote, raccoon, opossum, porcupines, muskrat, beaver, squirrel, and mink thrive in the region, as do several upland bird species. Native grassland bird populations are limited by the lack of contiguous native prairie and the fragmented habitat created by the farmland. The rivers, streams, and lakes harbor excellent fisheries, and migrating and local waterfowl use the wetland complexes. These complexes provide ideal habitat for wading and shore bird species as well. This landscape serves as a backdrop for a disturbance driven ecosystem, evolving under the influences of herbivory, fire, and variable climate. Historically, these processes created a heterogeneous mosaic of plant communities and structure heights across the region. Any given site in this landscape experienced fire every three to four years. The fires were caused by lightning strikes and were also set by Native Americans, who used fire for warfare, signaling, and to refresh the native grasses. The Indigenous inhabitants understood the value of fire as a tool and that the highly palatable growth following a fire provided excellent forage for their horses and attracted grazing game animals such as bison and elk. Land use patterns by post European settlers have fragmented the native grasslands through conversion to cropland, transportation corridors, and other developments. This has significantly altered the natural fire regime allowing encroachment by native and introduced shrubs and trees into the native prairie remnants throughout the MLRA. Aggressive fire suppression policies have exacerbated this process to the point that shrub and tree encroachment is a major ecological threat in the majority of both native and reseeded grasslands. Introduction of eastern red cedar as a windbreak species further facilitates invasion by this species. While eastern red cedar is native to the landscape, the historic population in MLRA 106 was limited to isolated pockets in rugged river drainageways that were protected from fire. Widespread plantings of windbreaks with eastern red cedar as a primary component have provided a seed source for the aggressive woody plant. The ensuing encroachment into the native grasslands degrades the native wildlife habit and causes significant forage loss for domestic livestock. Since it does not sprout from the roots, eastern red cedar is very susceptible to fire when under six feet tall. Management with prescribed fire is exceedingly effective if applied before this stage. Larger

eastern red cedars can also be controlled with fire, but successful application requires the use of specifically designed ignition and holding techniques.

Classification relationships

?USDA-NRCS (2022)? Land Resource Region – M, Central Feed Grains and Livestock Region Major Land Resource Area (MLRA) – 106
?Fenneman (1916) Physiographic Regions ? Division – Interior Plains Province – Central Lowland Section – Dissected Till Plains ?
USDA-USFS (2007) Ecoregions? Domain – Humid Temperate Division – Prairie Province – Prairie Parkland (Temperate) Section – Central Dissected Till Plains (251C) ?EPA Ecoregions (Omernik 1997)? I – Great Plains (9) II – Temperate Prairies (9.2) III – Western Corn Belt Plains (9.2.3) IV – Loess and Glacial Drift Hills (47i) ?Associated Counties? Nebraska: Butler, Cass, Gage, Jefferson, Johnson, Lancaster, Nemaha, Otoe, Pawnee, Richardson, Saline, Saunders, Seward Kansas: Atchison, Brown, Doniphan, Douglas, Franklin, Jackson, Jefferson, Johnson, Leavenworth, Marshall, Nemaha, Osage, Pottawatomie, Shawnee, Wabaunsee, Washington, Wyandotte

Ecological site concept

The Wet Subirrigated ecological site occupies a run-on landscape position in floodplains and drainageways. The slope typically ranges from 0 to 2 percent. The depth to the seasonably high-water table ranges from the surface to 18 inches. Soils are very deep (60 inches or more) with surface textures of silt loam, silty clay, and silty clay loam. These poorly to very poorly drained soils are formed in silty and clayey alluvium. The vegetation of the Reference Community occurs in two zones based upon the depth to the water table. Where the water table is at or near the surface, the wet meadow zone vegetation is dominated by cool-season grasses and grass-like. In the tall grass moist meadow zone, where the water table is lower but within 18 inches of the surface, the dominant grasses are prairie cordgrass, big bluestem, Indiangrass, and switchgrass. The site is susceptible to invasion of non-native, cool-season grasses, especially reed canary grass.

Associated sites

R106XY067NE	Saline Subirrigated The Loamy Terrace ecological site often is adjacent to but higher on the landscape than the Wet Subirrigated ecological site.
R106XY068NE	Loamy Floodplain The Loamy Floodplain ecological site often is adjacent to the Wet Subirrigated ecological site
R106XY032NE	Subirrigated The Subirrigated ecological site often is adjacent to and slightly higher on the landscape than the Wet Subirrigated ecological site.

Similar sites

R106XY032NE	Subirrigated The Subirrigated ecological site often is adjacent to Wet Subirrigated ecological sites but the depth to the seasonal water table is 18 to 36 inches on Subirrigated sites compared to at the surface to 18 inches on Wet Subirrigated sites. The vegetation on Subirrigated ecological sites is not adapted to inundation.
R106XY067NE	Saline Subirrigated The Saline Subirrigated ecological site has a seasonal high water table that may reach the surface but it has visible surface salts and that plant community is dominated by salt-tolerant species.

Figure 1. Block diagram for the Wet Subirrigated Site in MLRA 106.

Table 2. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Spartina pectinata</i> (2) <i>Calamagrostis canadensis</i>

Physiographic features

The Wet Subirrigated ecological site is found on very deep, poorly drained and very poorly drained soils formed in alluvium. These soils occur on flood plains, and depressions on low stream terraces in river valleys and in drainageways on uplands. The slopes typically range from 0 to 2 percent.

Table 3. Representative physiographic features

Landforms	(1) Valley > Flood plain (2) River valley > Depression (3) Upland > Drainageway (4) Valley > Flood-plain step
Runoff class	Negligible to low
Flooding duration	Brief (2 to 7 days)
Flooding frequency	None to frequent
Ponding duration	Brief (2 to 7 days) to long (7 to 30 days)
Ponding frequency	None to frequent
Elevation	220 – 460 m
Slope	0 %
Ponding depth	20 – 60 cm
Water table depth	0 – 50 cm
Aspect	Aspect is not a significant factor

Climatic features

Like most Great Plains landscapes, the climate in this MLRA is under the sway of the continental effect. This creates a regime of extremes, with summer highs often in the triple digits and winter lows plunging well below zero. Blizzards can occur anytime between early fall and late spring, dropping the temperature more than 50 degrees in just a few hours. These events can pile up several feet of snow, often driven by winds in excess of 50 miles an hour. The resulting huge snow drifts can cause serious hardship for livestock, wildlife, and humans. Winters can be open, with bare ground for most of the season, or closed, with several feet of snow persisting until March. Most winters have a number of warm days interspersed with dropping temperatures, usually associated with approaching cold fronts. Spring brings violent thunderstorms, hail, and high winds. Tornadoes occur frequently.

About three-fourths of the precipitation falls as high intensity, convective thunderstorms from late spring through early autumn. The average annual precipitation gradient trends higher from northwest (28") to southeast (40"), and the average annual temperature gradient trends higher from north (50°F) to south (55°F). Daily winds range from an average of 14 miles per hour during the spring to 11 miles per hour during the late summer. Occasional strong storms may bring brief periods of high winds with gusts to more than 80 miles per hour.

Native cool season plants begin growth in early April and continue to about mid-June. Native warm season plants begin growth in early June and continue to early August. Green up of cool season plants may occur in September and October.

Table 4 Representative climatic features

Frost-free period (characteristic range)	140-140 days
Freeze-free period (characteristic range)	160-170 days
Precipitation total (characteristic range)	790-840 mm
Frost-free period (actual range)	130-150 days
Freeze-free period (actual range)	150-180 days
Precipitation total (actual range)	740-860 mm
Frost-free period (average)	140 days
Freeze-free period (average)	160 days
Precipitation total (average)	810 mm

- (1) BEATRICE 1N [USC00250622], Beatrice, NE
- (2) WEEPING WATER [USC00259090], Weeping Water, NE
- (3) CRETE [USC00252020], Crete, NE
- (4) FALLS CITY BRENNER FLD [USW00094957], Falls City, NE
- (5) ASHLAND NO 2 [USC00250375], Ashland, NE
- (6) MEAD 6S [USC00255362], Ithaca, NE
- (7) RAYMOND 2NE [USC00257055], Raymond, NE
- (8) TABLE ROCK 4 N [USC00258410], Table Rock, NE
- (9) LINCOLN MUNI AP [USW00014939], Lincoln, NE
- (10) SYRACUSE [USC00258395], Syracuse, NE
- (11) LINCOLN UNIV PWR PLT [USW00014971], Lincoln, NE
- (12) TECUMSEH 1S [USC00258465], Tecumseh, NE
- (13) PAWNEE CITY [USC00256570], Pawnee City, NE
- (14) AUBURN 5 ESE [USC00250435], Auburn, NE

- (15) VIRGINIA [USC00258875], Virginia, NE
- (16) WAHOO [USC00258905], Wahoo, NE

Influencing water features

The Wet Subirrigated ecological site is directly influenced by the water table which may be from the surface to 18 inches. While the proximity of the root zone to water ensures adequate hydration during the growing season, the duration of saturation also limits the plant community to more water tolerant species.

Wetland description

Wetland Description (Cowardin System)

System Subsystem Class
Palustrine N/A Emergent Wetland

Soil features

The soils associated with the Wet Subirrigated ecological site are located on floodplains, low stream terraces, and upland drainageways. Slopes range from 0 to 2 percent. Soils are very deep (60 inches or more) with surface textures of silty clay, silty clay loam, and silt loam and are approximately 16 inches thick. The depth to the water table ranges from the surface to approximately 18 inches. These poorly drained soils were formed in silty and clayey alluvium.

Kezan, Kiro, and Wabash are the predominant soil series correlated to this ecological site. Additional information can be found in the various soil survey reports. Contact the local USDA Service Center for soil survey reports that include more detail specific to your location or visit Web Soil Survey (<https://websoilsurvey.sc.egov.usda.gov>).

Figure 7. Wabash Series Profile in MLRA 106.

Table 5. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Silty clay loam (2) Silty clay (3) Silt loam
Drainage class	Very poorly drained to poorly drained
Permeability class	Very slow to moderate
Soil depth	200 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	10.16 – 20.32 cm

Calcium carbonate equivalent (0-101.6cm)	0 – 10 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	5.6 – 8.4
Subsurface fragment volume <=3" (0-101.6cm)	0 – 20 %
Subsurface fragment volume >3" (0-101.6cm)	0 – 10 %

Ecological dynamics

The Wet Subirrigated site developed under Central Great Plains climatic conditions, light to severe grazing by bison and other large herbivores, sporadic natural or man caused wildfires, and other biotic and abiotic factors which typically influence soil/site development. This continues to be a disturbance driven site, by herbivory, fire, local hydrology, and variable climate. Changes occur in the plant communities due to weather variations, changes in the local hydrological cycle, impacts of native and/or exotic plant and animal species, and management actions.

The majority of this site has been impacted agricultural practices, both through soil disturbance and the accumulation of chemically contaminated runoff. A significant portion of the remaining acres have been degraded by season long continuous grazing by domestic livestock. This management practice causes the repeated removal of the growing point and excessive defoliation of the leaf area of individual warm-season, tall grasses. The resulting reduction of the ability of the plants to harvest sunlight depletes the root reserves, subsequently decreasing the root mass. This negatively impacts the ability of the plants to compete for life sustaining nutrients, resulting in declining vigor and eventual mortality. The space created in the vegetative community is then occupied by a species that evades the negative grazing impacts by a growing season adaptation such as a cool season, shorter structure, or a reduced palatability mechanism.

The State and Transition Model (STM) is depicted below and includes a Reference State (1), a Native/Invaded Grass State (2), a Sod-busted State (3), and an Invaded Woody State (4). Each state represents the crossing of a major ecological threshold due to alteration of the functional dynamic properties of the ecosystem. The main properties observed to determine this change are the soil and vegetative communities and the hydrological cycle. The STM illustrates the common plant communities that can occur on the site and the transition pathways between communities (Bestelmeyer, 2010). The ecological processes will be discussed in more detail in the plant community descriptions following the diagram.

Each state may have one or more vegetative communities which fluctuate in species composition and abundance within the normal parameters of the state. Within each state, communities may degrade or recover in response to natural and man caused disturbances such as variation in the degree and timing of herbivory, presence or absence of fire, and climatic and local fluctuations in the precipitation regime.

Interpretations are primarily based on the Reference State and 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 have been interpreted from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts. Plant communities, states,

transitional pathways, and thresholds have been determined through similar studies and experience.

In Nebraska, the native vegetative cover is a herbaceous wetland community commonly inhabited with sedges (*Carex emoryi*, *C. laeviconica*, *C. pellita*, *C. vulpinoidea*,) flat stem sprikerush (*Eleocharis compressa*), Kentucky bluegrass (*Poa pratensis*), prairie cordgrass (*Spartina pectinata*). Source: Terrestrial Ecological Systems and Natural Communities of Nebraska, Version IV. S. B. Rolfsmeier and G. Steinauer. Nebraska Natural Heritage Program, Nebraska Game and Parks Commission, 2010.

State and transition model

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 1.4 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 10. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 11. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 12. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 13. Community 3.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 14. Community 3.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 15. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Animal community

Animal Community LIVESTOCK – GRAZING INTERPRETATIONS: Grazing by domestic livestock is one of the major income producing industries in the area. Rangeland in this area may provide yearlong forage for cattle, sheep, or horses. During the dormant period, the protein levels of the forage may be lower than the minimum needed to meet livestock (primarily cattle and sheep) requirements. The following table lists suggested stocking rates for cattle under continuous season long grazing under normal growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of the conservation planning process. Often, the current plant composition does not entirely match any particular plant community (as described in this ecological site description). Because of this, a field visit is recommended, in all cases, to document plant composition and production. More precise carrying capacity estimates should eventually be calculated using this information along with animal preference data, particularly when grazers other than cattle are involved. With consultation of the land manager, more intensive grazing management may result in improved harvest efficiencies and increased carrying capacity. Production and Carrying Capacity* Community 1.1, Reference Community (North): 4,000 lbs/acre, 1.27 AUM/acre Community 1.1, Reference Community (North): 8,000 lbs/acre, 2.52 AUM/acre *Based upon the following conditions: continuous season long grazing with cattle under average growing conditions, 25 percent harvest efficiency. Air dry forage requirements are based on 3 percent of animal body weight or 790 lbs per animal unit (AU) per month (M). An AU is generally one mature cow of

approximately 1,000 pounds and a calf as old as 6 months or their equivalent. WILDLIFE INTERPRETATIONS: Major Land Resource Area (MLRA) 106 lies primarily within the tall grass prairie ecosystem. Prior to European settlement, this area consisted of diverse grassland habitats interspersed with varying densities of depressional wetlands and limited woody riparian corridors. These habitats provided critical life cycle components for the grassland birds, prairie dogs, and herds of roaming bison, elk, and pronghorn that historically occupied this landscape. Diverse populations of small mammals and insects provided a bountiful prey base for raptors and omnivores such as coyotes, foxes, raccoons, and opossums. Bobcats, wolves, and mountain lions occupied the apex predator niche. In addition, a wide variety of reptiles and amphibians thrived in this landscape. The tall grass prairie was a disturbance driven ecosystem with fire, herbivory, and climate functioning as the primary disturbances. Following European settlement of North America, elimination of fire, widespread conversion to cropland, and other sources of habitat fragmentation significantly altered the appearance and functionality of the entire ecosystem. The reduced stability of the system is reflected by major changes in the composition and abundance of the native flora and fauna. Introduced and invading species further degrade the ecological integrity of the plant and animal communities. Bison and prairie dogs were historically keystone species, but free roaming bison herds and nearly all prairie dogs have been extirpated from this ecological site. The loss of bison and fire as ecological drivers greatly influenced the character of the remaining native grasslands and the habitats they provide. In addition to free ranging bison, extirpated species include pronghorn and wolves. Historically, an ecological mosaic of the sites provided habitat for species requiring unfragmented grasslands. Important habitat features and components found commonly or exclusively on modern day remnants include upland nesting habitat for grassland birds and game birds; nesting and escape cover for waterfowl; forbs and insects for brood rearing habitat; and a forage source for small and large herbivores. Fragmentation has reduced habitat quality for numerous area sensitive species, as highlighted by the decline of the greater prairie chicken. Grassland nesting bird populations, such as dickcissel and Henslow's sparrow, are also declining. In this fragmented landscape, native grassland bird populations face increasing competition from the opportunistic European starlings and house sparrows and are subject to nest parasitism from brown headed cowbirds. Tree encroachment creates habitat that favors generalist species such as American robin and mourning dove, and provides perches for raptors, increasing the predation mortality. Introduced species such as smooth brome grass, reed canarygrass, Kentucky bluegrass, tall fescue, nodding plumelless (musk) thistle, and Canada thistle further degrade the biological integrity of many of these remnant prairies. 1. REFERENCE STATE: The predominance of tall grasses and forbs in this community makes it ideal for grazers and mixed feeders. Pollinating insects play a significant role in maintaining the forb community and provide a food source for grassland birds and other grassland dependent species. The vegetative structural diversity provides habitat for reptiles, amphibians, and a wide array of native and introduced bird species. The abundant prey base supports populations of Swainson's hawk, short eared and great horned owls, and other grassland raptors. The grasses, forbs, and shrubs provide high nutrition levels for small and large herbivores including moles, mice, ground squirrels, and white-tailed deer. The structure of this plant community provides suitable thermal, protective, and escape cover for small herbivores and grassland birds. Many wide-ranging predators utilize this plant community, including coyote, badger, red fox, and least and long tailed weasels. As the plant community degrades to more mid grasses and fewer tall grasses, less winter and escape cover are provided. It also provides less cover for predators.

Hydrological functions

The deep, poorly and very poorly drained soils of the Wet Subirrigated site place it in classes C and D of the hydrologic rating scale. The proximity of groundwater to the rooting zone during the growing season provides an abundance of water for the vegetative community. Production can be very high, but the degree of soil saturation can somewhat limit species diversity.

Recreational uses

The Wet Subirrigated ecological site provides hunting for upland game species and white-tailed deer, along with hiking, photography, and bird watching. The wide varieties of plants blooming from spring until fall have an aesthetic value that appeals to visitors.

Wood products

In the southern portion of MLRA 106, the Wet Subirrigated ecological sites often have scattered populations of deciduous trees, including cottonwoods. These stands can provide firewood, select hardwood finishing lumber, and in some cases, the cottonwoods can be used to make pallets.

Other products

None of significance.

Other information

Site Development and Testing Plan: Future work is needed to validate the information in this Provisional Ecological Site Description. Additional data collection and evaluation may also be needed to develop this ESD to the Approved, then Correlated level. This could include field activities to collect low, medium, and high intensity sampling, soil correlations, and analysis of that data. Field reviews of the project plan should be done by soil scientists and vegetation specialists. A final field review, peer review, quality control, and quality assurance reviews of the ESD will be needed to produce the final document.

Inventory data references

Information presented here has been derived from field observations by trained and experienced range and soils personnel.

Other references

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Contributors

Nadine Bishop
Doug Whisenhunt

Approval

Jamin Johanson, 8/20/2026

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)	Original Authors: Joseph May and Doug Whisenhunt Version V Authors: Anna Ferguson, Aaron Hird, JustinLinder, Dusty Schwandt, Doug Spencer, Chris Tecklenburg, Nadine Bishop, Jeff Nichols
Contact for lead author	jeffrey.nichols@usda.gov
Date	11/30/2024
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. Number and extent of rills: None. Rills are not expected on this site.

2. Presence of water flow patterns: None. Water flow patterns are not expected on this site.

3. Number and height of erosional pedestals or terracettes: None. Pedestals and terracettes are not expected to occur on this site.

4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground): Bare ground is 5 percent or less. Bare ground is exposed mineral soil that is not covered by vegetation (basal and/or foliar canopy), litter, standing dead vegetation, gravel/rock, and visible biological crust (e.g., lichen, mosses, algae).

5. Number of gullies and erosion associated with gullies: None. Gullies are not expected on this site.

6. Extent of wind scoured, blowouts and/or depositional areas: None. Wind scoured and/or depositional areas should not be present.

7. Amount of litter movement (describe size and distance expected to travel): Litter movement from wind and runoff is not expected. However, litter movement caused by flooding events may be fairly extensive.

8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values): Soil stability ratings will be 5 to 6, typically 6. Surface organic matter adheres to the soil surface. Soil surface fragments will typically retain structure indefinitely when dipped in distilled water.

9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): The surface horizon (A) typically ranges from 16 to 40 inches thick but may be thicker. Soil colors in the surface horizon are typically very dark grayish brown, very dark brown, very dark gray, or black (hue: 10YR, value: 2 or 3, chroma: 1 or 2) when moist and dark gray, gray, dark grayish brown, very dark gray, or grayish brown, black (hue: 10YR, value: 2 to 5, chroma: 1 or 2) when dry. Soil structure in the upper horizon ranges from weak medium granular, moderate medium granular, moderate fine granular parting to weak fine granular, or moderate medium subangular blocky parting to moderate medium granular. See Official Soils Descriptions (OSD) for additional details. The major soils correlated to the Loamy Terrace ecological site include Ezan, Kiro, and Wabash. Colo, Obert, and Zook

10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: Plant community composition is approximately 70 to 85 percent grasses or grass-like plants, 5 to 15 percent forbs, and 0 to 5 percent shrubs which optimizes infiltration on the site. The perennial grass and grass-like component is made up of warm-season (C4), tall grasses; warm-season (C4), mid grasses; cool-season (C3) grasses; and grass-likes. The functional/structural groups provide a combination of rooting depths and structure which positively influences infiltration. Invasion of introduced cool season grasses such as reed canarygrass, creeping foxtail, or phragmites may negatively impact infiltration. Tree encroachment will also adversely impact infiltration.

11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): None. No compaction layers occur naturally on this site.

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: Phase 1.1: 1. Native, perennial, warm-season, tall grass (4 species minimum): big bluestem, switchgrass, Indiangrass, prairie cordgrass. Phase 1.2: 1. Native, perennial, cool-season grass (2 species minimum): western wheatgrass, reed canary grass, porcupinegrass, foxtail barley, prairie junegrass, prairie wedgescale, needleandthread, Scribner's rosette grass. 2. Grass-likes (3 species minimum): sedges, broom sedge, awlfruit sedge, rush, cloaked bulrush, common three-square. Phase 1.3: 1. Native, perennial, cool-season grass (2 species minimum): western wheatgrass, reed canary grass, porcupinegrass, foxtail barley, prairie junegrass, prairie wedgescale, needleandthread, Scribner's rosette grass. 2. Grass-likes (3 species minimum): sedges, broom sedge, awlfruit sedge, rush, cloaked bulrush, common three-square.

Sub-dominant: Phase 1.1: 1. Native, perennial, cool-season grass (2 species minimum): western wheatgrass, reed canary grass, porcupinegrass, foxtail barley, prairie junegrass, prairie wedgescale, needleandthread, Scribner's rosette grass. 2. Grass-likes (3 species minimum): sedges, broom sedge, awlfruit sedge, rush, cloaked bulrush, common three-square. 3. Native forbs: Forbs present vary from location to location. Phase 1.2: 1. Native, perennial, warm-season, tall grass (3 species minimum): big bluestem, switchgrass, Indiangrass, prairie cordgrass.

Other: Minor - Phase 1.1: 1. Native, perennial, warm-season, mid grass: little bluestem, sideoats grama. 2. Shrubs: shrubs present will vary from location to location. Minor - Phase 1.2: 1. Native forbs: forbs present vary from location to location. 2. Native, perennial, warm-season, mid grass: sideoats grama, little bluestem. 3. Shrubs: shrubs present will vary from location to location. Minor - Phase 1.3: 1. Native, perennial, warm-season, tall grass (4 species minimum): big bluestem, switchgrass, Indiangrass, prairie cordgrass. 2. Non-native, cool-season grass: Reed canary grass, tall fescue, creeping foxtail, phragmites. 3. Native forbs: forbs present vary from location to

location. 4. Native, perennial, warm-season, mid grass: little bluestem, sideoats grama. 5. Shrubs: shrubs present vary from location to location. Trace - Phase 1.2: 1. Non-native, cool-season grass: reed canary grass, tall fescue, creeping foxtail, phragmites.

Additional: The Reference Community (1.1) includes six F/S groups. These groups in order of abundance are native, perennial, warm-season, tall grass; native, perennial, cool-season grass; grass-likes; forbs; native, perennial, warm-season, mid grass; shrubs. The Degraded Native Grass Community (1.2) includes seven F/S groups. These groups in order of relative abundance include native, perennial, cool-season grass; grass-likes; native, perennial, warm-season, tall grass; forbs; native, perennial, warm-season, mid grass; shrubs; non-native, cool-season grass. The At-Risk Community (1.3) includes seven F/S groups. These groups in order of relative abundance include native, perennial, cool-season grass; grass-likes; native, perennial, warm-season, tall grass; non-native, cool-season grass; forbs; native, perennial, warm-season, mid grass; shrubs.

13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): There is a diverse mixture of age classes among the plants. A few (less than 3 percent) dead centers may occur in bunch grasses. Shrubs and trees may show some dead branches (less than 5 percent) as plants age.
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14. Average percent litter cover (%) and depth (in): Plant litter cover is evenly distributed throughout the site and is expected to be 80 to 90 percent and at a depth of approximately 0.5 to 1.0 inch (1.3 to 2.5 cm).
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15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production): Northern portion of MLRA Representative Value (RV) = 6,000 pounds per acre Low production years = 4,800 pounds per acre High production years = 7200 pounds per acre Southern portion of MLRA Representative Value (RV) = 8,000 pounds per acre Low production years = 6,400 pounds per acre High production years = 9,600 pounds per acre
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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: No non-native invasive species are present. Reed canary grass, tall fescue, phragmites, cottonwood, honey locust, green ash, mulberry, maple, willows, dogwood, false indigo bush, cattails, Canada thistle, musk thistle, leafy spurge, and sericea lespedeza are known invasives that have the potential to become dominant or co-dominant on the site. Note: species that become dominant for only one to several years (e.g., short term response to drought or wildfire) are not invasive plants.
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17. Perennial plant reproductive capability: All perennial species exhibit high vigor relative to climatic conditions. Perennial grasses should have vigorous rhizomes or tillers; vegetative and reproductive structures are not stunted. All perennial species should be capable of reproducing annually.
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