Ecological site F103XY032MN
Loamy Floodplains

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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): 103X–Central Iowa and Minnesota Till Prairies

MLRA 103 is in Minnesota (56 percent) and Iowa (44 percent) and consists of approximately 18 million acres. It is in the Western Lake Section of the Central Lowland Province of the Interior Plains in an area known as the "Des Moines Lobe" of the Wisconsin-age ice sheet. The MLRA is mostly on a young, nearly level to gently rolling, glaciated till plain that has moraines and glacial lake plains in some areas. The plain is covered with glacial till, outwash, and glacial lake deposits. Recent alluvium consisting of clay, silt, sand, and gravel fill the bottoms of most of the major river valleys. Paleozoic bedrock sediments, primarily shale and limestone, underlie the glacial deposits in most of the area. The annual precipitation increases from northwest to southeast. Most of the rainfall occurs as high-intensity, convective thunderstorms during the summer. Two-thirds or more of the precipitation falls during the freeze-free period. Snowfall is common in winter. Ground water supplies are adequate for the domestic, livestock, municipal, and industrial needs. Nearly all of this area is farmland, and about four-fifths is cropland.

Classification relationships

Major Land Resource Area (MLRA): Central Iowa and Minnesota Till Prairies (103) (USDA Handbook 296, 2006) USFS Subregions: North Central Glaciated Plains Section (251B); Upper Minnesota River-Des Moines Lobe (251BA) and Southern Des Moines Lobe (251Be) Subsections (Cleland et al. 2007) International Vegetation Classification Hierarchy Class: 1. Forest & Woodland Subclass: 1.B. Temperate & Boreal Forest & Woodland Formation: 1.B.3. Temperate Flooded & Swamp Forest Division: 1.B.3.Na. Eastern North American-Great Plains Flooded & Swamp Forest The reference community exhibits similarities with Minnesota Department of Natural Resource FFs59 Southern Terrace Forest and FFs68 Southern Floodplain Forest.

Ecological site concept

The Loamy Floodplains ecological site occurs in floodplains along rivers and drainageways throughout MLRA 103. This site is characterized by loamy-textured soils and a hydrologic interaction with the adjacent river or stream. Soils are somewhat poorly drained to moderately well drained. Flooding may be long-term in some areas. Anthropogenic influences such as ditching, draining, and land clearing have altered the historic flooding regime in most watershed. Many areas are now in agricultural production.

Associated sites

F103XY031MN	**Sandy Floodplains** The Sandy Floodplains ecological site is located on sandy-textured Mollisol soils in floodplains and drainageways throughout MLRA 103. Soils drainage class ranges from moderately well drained to excessively drained. Brief flooding may occur on areas within this ecological site.
F103XY033MN	**Wet Floodplains** The Wet Floodplains ecological site occurs in both floodplains and depressions and is extensive throughout MLRA 103. Soils include both Mollisols and Entisols, and soil drainage class is very poorly drained to poorly drained. Areas within this site flood frequently, and some areas may incur very long periods of flooding (over 30 days).

R103XY034MN	**Floodplain Marsh** The Floodplain Marsh ecological site is located on floodplains and depressions. Soils are fine or medium textured and very poorly drained. Flooding on this site ranges from none to frequent with some areas flooding up to 30 days. Ponding is also variable (none to frequent) with areas inundated longer than 30 days. Herbaceous plant communities typically dominate.
R103XY035MN	**Organic Floodplain Marsh** The Organic Floodplain Marsh ecological site is located on floodplains and depressions primarily in the northern portion of MLRA 103. Soils are very poorly drained and derived from organic parent materials. This site both floods and ponds frequently for long periods of time. Herbaceous plant communities usually dominate.
R103XY003MN	**Sandy Upland Prairies** The Sandy Upland Prairie ecological site is located on uplands including outwash plains and valley trains along modern river valleys. Soils are formed from sandy and course loamy outwash and loamy-mantled outwash. Sites do not flood or pond. The reference state vegetation is mesic to dry mesic prairie.
R103XY004MN	**Loamy Upland Prairies** The Loamy Upland Prairies ecological site is located on uplands throughout MLRA 103. Soils are somewhat poorly drained to well drained and are formed from fine loamy till and medium textured lacustrine materials. This site does not flood or pond. The historic vegetative community was fire dependent and included native warm season grassland, brush prairie, and open savanna.
R103XY006MN	**Bedrock Controlled Upland Prairies** The Bedrock Controlled Upland Prairies ecological site is characterized by shallow to moderately deep soils that are influenced by bedrock and have a low available water capacity (1-7 inches).
R103XY011MN	**Footslope/Drainageway Prairies** The Footslope/Drainageway Prairies ecological site is located mainly on footslopes, toeslopes, and upland drainageways. The most common drainage class is moderately well-drained. The site incurs frequent to occasional extremely brief and very brief flooding.
R103XY013MN	**Calcareous Fens** The Calcareous Fens ecological site is characterized by a high water table (i.e. endosaturated) and is usually ponded. Soils are rich in organic matter, very poorly drained, and have high calcium carbonate levels.
R103XY010MN	**Bedrock Controlled Wet Prairies** The Bedrock Controlled Wet Prairies ecological site generally occurs near larger rivers where glacial meltwaters scoured the valley leaving areas of bedrock occurring as strath terraces above the floodplain. Soils are poorly drained and the water table is usually at or near the soil surface in wet spring months. Occasional flooding may occur on some areas within this ecological site.

Similar sites

F103XY031MN	**Sandy Floodplains** The Sandy Floodplains ecological site is located on sandy-textured soils in floodplains and drainageways throughout MLRA 103. Soils drainage class ranges from moderately well drained to excessively drained. Brief flooding may occur on areas within this ecological site.

Table 1. Dominant plant species

Tree	(1) *Ulmus americana* (2) *Fraxinus*
Shrub	(1) *Celtis occidentalis*
Herbaceous	(1) *Laportea canadensis*

Physiographic features

The Loamy Floodplains ecological site is on floodplains throughout MRLA 103. Landscape positions include backslopes, summits, shoulders and linear to slightly convex segments on floodplains. This site is influenced by a hydrological relationship with the adjacent river or stream, and the depth of soil saturation will fluctuate based on the river or stream level. Flooding regimes ranging from no flooding to frequent flooding. Some areas within this ecological site may incur long term flooding of 7-30 days.

Figure 1. Block diagrams of the representative Loamy Floodplains and associated ecological sites.

Figure 2. An alluvial setting with multiple different ecological sites. The Loamy Floodplains ecological site is between the road and the open marsh in the upper part of the photograph. (The location and photographer are unknown.)

Figure 3. Distribution of the Loamy Floodplains ecological site within MLRA 103. In many cases, the data set is not spatially consistent across political boundaries due to the method by which soils were mapped; e.g. due to county subsets.

Table 2. Representative physiographic features

Hillslope profile	(1) Backslope (2) Summit (3) Shoulder
Landforms	(1) Flood plain
Runoff class	Negligible to medium
Flooding duration	Long (7 to 30 days)
Flooding frequency	None to frequent
Elevation	210 − 560 m

Slope	0 – 10 %
Water table depth	20 – 200 cm
Aspect	Aspect is not a significant factor

Climatic features

The soil temperature regime of MLRA 103 is classified as “mesic” (i.e., mean annual soil temperature between 46 and 59°F). The average freeze-free period of this ecological site is 156 days, while the average frost-free period is 127 days. The average mean annual precipitation total (average) is 36 inches. Cold air drainage, and the fact that wet soils are generally colder than dry soils, make this site colder than upslope ecological sites. As a result, snow and frost remain longer in the spring resulting in shorter growing seasons than the adjacent uplands.

Table 3 Representative climatic features

Frost-free period (characteristic range)	130-130 days
Freeze-free period (characteristic range)	150-160 days
Precipitation total (characteristic range)	890-940 mm
Frost-free period (actual range)	130-130 days
Freeze-free period (actual range)	150-160 days
Precipitation total (actual range)	860-970 mm
Frost-free period (average)	130 days
Freeze-free period (average)	160 days
Precipitation total (average)	910 mm

- (1) BOONE [USC00130807], Boone, IA
- (2) OWATONNA [USC00216287], Owatonna, MN

Influencing water features

The Loamy Floodplains ecological site is located on soils that are classified as endosaturated. With natural hydrology intact, the site is influenced by the level of the adjacent river or stream. The water table can be above the soil surface during flood events, but then drop to as low as 6 or more feet during dry periods. Flooding is highly variable and ranges from none to frequent. Flooding duration ranges from very brief to long.

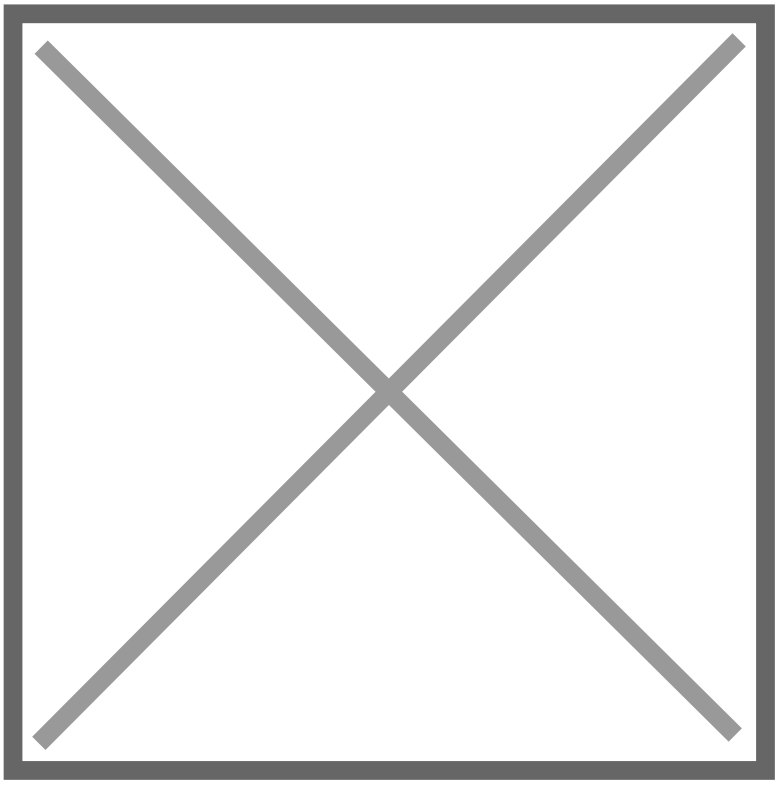

Figure 10. Representation of hydrological factors in a typical area of the Loamy Floodplains and associated ecological sites on the Des Moines Lobe (MLRA 103).

Soil features

The Loamy Floodplains ecological site is located on Ankeny, Bearden, Chaska, Dorchester, Du Page, Hanlon, Klum, La Prairie, Lawler, Lomax, McIntosh, Minneiska, Spillville, Turlin, and Wiota soil series. Soil parent material is alluvium. The surface textures include loam, silt loam, sandy loam, and fine sandy loam. Drainage class ranges from somewhat poorly drained to moderately well drained. There are two basic subdivisions of soil taxonomy -Mollisols and Entisols. The Mollisols have thick mollics (dark layer in the soil profile) due to slope wash and alluvial deposition rather than development under prairie vegetation. The Entisols have a much thinner epipedon. The soils are alluvial materials derived mostly from original Des Moines lobe materials, except in locations where a river or stream crosses the MLRA boundary from an adjacent one.

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Loam (2) Silt loam (3) Sandy loam (4) Fine sandy loam
Family particle size	(1) Fine-loamy (2) Coarse-loamy (3) Fine-silty (4) Coarse-silty

Drainage class	Somewhat poorly drained to moderately well drained
Permeability class	Moderately slow to very rapid
Soil depth	200 cm
Available water capacity (0-152.4cm)	15.24 – 33.02 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 40 %
Soil reaction (1:1 water) (0-101.6cm)	5.1 – 8.4
Subsurface fragment volume <=3" (0-101.6cm)	0 – 30 %
Subsurface fragment volume >3" (0-101.6cm)	0 – 10 %

Ecological dynamics

The Loamy Floodplains ecological site has three states: the Reference State, the Disturbed Forest State, and the Tillage State which includes row crop production and seeded grasses.
The Reference State is a riverine deciduous forest with variable co-dominants canopy species and a diverse herbaceous ground layer. This ecological site can be affected by multiple natural triggers (disturbance processes) including flooding, fire, insects, and windstorms. The composition, age, and structure of the plant community will vary and be determined by the flooding regime.

The Tillage State is characterized by tillage and agricultural crop production. The two communities under this state are the Row Crop Community and the Seeded Grassland Community. Management inputs within this state include preparing the site, seeding, fertilizing, controlling weeds and brush, and harvesting.

The Disturbed Forest State is a wooded site that has undergone plant community changes due to human disturbance. Triggers include hydrological modifications, logging/clearing, invasive plants, and unmanaged grazing. Common species include cottonwood, hackberry, maple, ash, and elm. These sites do have some soil, water, and wildlife benefits, but do not have the ecological stability or native plant diversity of a reference state.

The most common trigger on this ecological site is modified hydrology and site clearing transitioning to agricultural. Once a high-quality reference state has been transitioned to a tillage field, the reversibility class is considered irreversible.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

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

Table 6. Community 2.1 plant community composition

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

Table 7. Community 2.2 plant community composition

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

Table 8. Community 3.1 plant community composition

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

Other references

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Approval

Suzanne Mayne-Kinney, 10/04/2023

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	07/10/2026
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):**

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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:**

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

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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):**

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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:**
