

USDA icon Natural Resources Conservation Service

Ecological site F088XY002MN

Marsh

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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): 088X–Northern Minnesota Glacial Lake Basins

MLRA 88 consists of the lake beds of glacial Lakes Agassiz, Upham, and Aitkin. These vast glacial lake beds were formed by meltwaters associated with the last glaciation of the Wisconsin age. The large, flat, wet landscapes are filled with lacustrine lake sediments, wave-washed glacial till, and vast expanses of organic soils. This area is entirely in Minnesota and makes up about 11,590 square miles (30,019 square kilometers). The western boundary of MLRA 88 with MLRA 56B is gradual. MLRA 56B is a portion of the Red River Valley that was formed by glacial Lake Agassiz and is dominantly prairie. The southern boundary of MLRA 88 with MLRA 57 consists of distinct moraines that formed from the glacial drift sediments of Late Wisconsin age. The eastern and southeastern boundaries are with portions of MLRAs 90A and 93A. These MLRAs are in a distinct glaciated region of sediments of the Rainy and Superior Lobes, and much of MLRA 93A is bedrock controlled (USDA-Ag Handbook 296, 2022).

Classification relationships

Relationship to Other Established Classifications: MN DNR Native Plant Community (MN DNR, 2003); the reference community of this Provisional Ecological Site is most similar to: MRn83 Northern Mixed Cattail Marsh MRn93 Northern Bulrush-Spikerush Marsh Cowardin: Palustrine, Emergent Wetland Persistent (PEMC) United States Army Corps of Engineers (USACE) Wetland Plant Community: G; Shallow Marshes Hydrogeomorphic System (USDA, 2008): DEPRESSION (discharge)

Ecological site concept

Marsh sites typically occurs on slightly concave landscape positions in closed depressions and drainage ways; and adjacent to open water along lakeshore, ponds, and near streams. Soil surface textures are typically peat, muck, or mucky-modified surface layers over variable parent materials. Soils are typically saturated on all horizons, frequently ponded, and inundated with water for very long duration, at least 7 out of 12 months.

Associated sites

F088XY007MN	Wet Depressional Forest Wet Depressional Forest occurs in shallow wetland basins, closed depressions, and generally in narrow transition zones between mineral uplands and peatlands. Soil surface layers are typically mucky-modified surface textures or muck less than 8" thick over variable parent materials.
F088XY003MN	Open Peatland Open Peatland occurs on level to gently sloping surfaces. Soils have greater than 16" of organic material and soil pH values are greater than 4.5. This site has a high water table that remain near the surface throughout the growing season, preventing the establishment of significant tree cover.

Similar sites

F088XY003MN	Open Peatland Open Peatland occurs on level to gently sloping surfaces. Soils have greater than 16" of organic material and soil pH values are greater than 4.5. This site has a high water table that remain near the surface throughout the growing season, preventing the establishment of significant tree cover.
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Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Typha latifolia</i> (2) <i>Calamagrostis canadensis</i>

Physiographic features

This site occurs in depressions adjacent to open water along lakeshore, ponds, and near streams. These sites are subject to frequent ponding throughout the year. The ponding duration is long with possible depths over 150 cm above the surface. These sites have a stable water level and do not change seasonally, but the water table may drop during dry conditions or changes in drainage conditions. Runoff is negligible.

Table 2. Representative physiographic features

Slope shape across	(1) Linear
Slope shape up-down	(1) Linear
Landforms	(1) Depression (2) Lake plain > Drainageway (3) Lake plain > Depression
Runoff class	Negligible
Flooding frequency	None
Ponding duration	Long (7 to 30 days)
Ponding frequency	Frequent
Elevation	180 – 620 m
Slope	0 %

Ponding depth	10 – 30 cm
Water table depth	0 cm
Aspect	Aspect is not a significant factor

Climatic features

The average annual precipitation is 24 to 28 inches (610 to 711 millimeters). Most of the rainfall comes from convective thunderstorms during the growing season. Snowfall generally occurs from October through April. The average annual temperature is 43 to 46 degrees F (6 to 8 degrees C).

The mean frost free period ranges from 84 to 110 days, with the mean freeze-free period ranging from 117 to 135 days.

Table 3 Representative climatic features

Frost-free period (characteristic range)	80-110 days
Freeze-free period (characteristic range)	120-140 days
Precipitation total (characteristic range)	640-710 mm
Frost-free period (actual range)	80-110 days
Freeze-free period (actual range)	110-140 days
Precipitation total (actual range)	610-710 mm
Frost-free period (average)	100 days
Freeze-free period (average)	130 days
Precipitation total (average)	660 mm

- (1) WARROAD [USC00218679], Warroad, MN
- (2) BAUDETTE INTL AP [USW00094961], Baudette, MN
- (3) CAMP NORRIS DNR [USC00211250], Beltrami Isl State for, MN
- (4) WASKISH 4NE [USC00218700], Big Falls, MN
- (5) RED LAKE INDIAN AGCY [USC00216795], Ponemah, MN
- (6) BIG FALLS [USC00210746], Big Falls, MN
- (7) LITTLEFORK 10 SW [USC00214809], Big Falls, MN
- (8) INTL FALLS INTL AP [USW00014918], International Falls, MN
- (9) LEECH LAKE [USC00214652], Bena, MN
- (10) POKEGAMA DAM [USC00216612], Cohasset, MN
- (11) GRAND RPDS FOREST LAB [USC00213303], Grand Rapids, MN
- (12) SANDY LAKE DAM LIBBY [USC00217460], McGregor, MN

- (13) FLOODWOOD 3 NE [USC00212842], Floodwood, MN
- (14) HIBBING CHISHOLM HIBBING AP [USW00094931], Hibbing, MN
- (15) EVELETH WWTP [USC00212645], Eveleth, MN

Influencing water features

Water is received through precipitation, runoff from adjacent uplands, and groundwater. Water levels are greatly influenced by ground water, precipitation rates and runoff from upland sites. Water leaves the site primarily through evapotranspiration and groundwater recharge. These sites are wetlands. The hydrology of Marsh sites significantly impacts their ecological development.

Wetland description

Under the Cowardin System of Wetland Classification, or National Wetlands Inventory (NWI), the wetlands can be classified as:

1) Palustrine, emergent, persistent, saturated or

Under the Hydrogeomorphic Classification System (HGM), the wetlands can be classified as:

1) Depressional, forested/organic, or

Permeability of the soil is very slow.
 Hydrologic Group: A/D, B/D, C/D
 Hydrogeomorphic Wetland Classification: Depressional, forested/organic, or
 Cowardin Wetland Classification: PEM1B

Soil features

The Marsh ecological site typically occurs in a basin or closed depression, and receives water directly from precipitation and groundwater discharge. Soils are very poorly drained and formed in organic material. Permeability is very slow and the site will be ponded most of the year. The central concept soil series are Rifle, Greenwood, Lupton, and Cathro. Ponded water conditions and very slow permeability strongly influences the soil-water-plant relationship.

Table 4. Representative soil features

Parent material	(1) Organic material (2) Glaciolacustrine deposits (3) Till
Surface texture	(1) Peat (2) Mucky peat (3) Muck
Drainage class	Very poorly drained
Permeability class	Moderately rapid to rapid
Depth to restrictive layer	Not specified
Soil depth	200 cm
Surface fragment cover <=3"	Not specified

Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	44.96 – 57.4 cm
Subsurface fragment volume <=3" (0-101.6cm)	Not specified
Subsurface fragment volume >3" (0-101.6cm)	Not specified

Ecological dynamics

Marsh sites typically occurs on level or slightly concave landscape positions in closed depressions, shallow wetland basins, drainage ways; and adjacent to open water along lakeshore, ponds, and near streams. Soils are typically endosaturated, frequently ponded, and inundated with water for very long duration, at least 7 out of 12 months. Vegetation can be found rooting on floating mats (MNDNR 2003). Water sources include precipitation, surface flow, lateral flow, and groundwater discharge. The fluctuation of water levels on site are fairly stable (due to groundwater influences) and do not change seasonally, but can vary with drought or changes to drainage across the watershed.

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 (%)
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Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 10. Community 2.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 11. Community 3.1 plant community composition

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

Information presented was derived from Minnesota Department of Natural Resources Field Guide to the Native Plant Communities of Minnesota, USDA-NRCS soil survey information, and USDA Plants Database.

Other references

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Contributors

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Approval

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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	08/12/2024
Approved by	
Approval date	

Composition (Indicators 10 and 12) based on	Annual Production
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Indicators

- 1. Number and extent of rills:

- 2. Presence of water flow patterns:

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

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

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

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

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

- 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):

- 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):

- 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:

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

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):

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:

17. Perennial plant reproductive capability:
