Ecological site F094BY006MI
Moist Sandy Lowland

Last updated: 11/16/2023
Accessed: 05/10/2025

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): 094B–Michigan Eastern Upper Peninsula Sandy Glacial Deposits

The Michigan Eastern Upper Peninsula MLRA (94B) corresponds closely with the Northwestern Sands Ecological Landscape. Some of the following brief overview is borrowed from the Wisconsin Department of Natural Resources ecological landscape publication (2015).

The Michigan Eastern Upper Peninsula MLRA is in northeast Wisconsin on the border of the Upper Peninsula of Michigan, with a very small portion on the Lake Michigan coast disjoined from the rest of the MLRA. The Wisconsin portion of the MLRA is a bit shy of 1.1 million acres (1,668 square miles). This region, which was covered entirely by the Green Bay Lobe in Wisconsin's most recent glaciation, has a unique glacial landscape defined by intermingled loamy moraines and sandy heads-of-outwash. Extensive pitted outwash plains dominate the region, with significant glaciolacustrine sediments in the southeast portion of this region.

A prominent landform in this MLRA is the hummocky ridges of intermingled loamy moraines and sandy heads-of-outwash that protrude from extensive pitted outwash plains. These north-south trending, loamy morainal ridges were deposited as the Green Bay Lobe was stagnant—the rate of melting was relatively equal to the rate of advancement. This stagnation allowed the deposition of a ridge of sandy loam materials. Supraglacial till was deposited unevenly, and buried ice blocks melted and collapsed the surface to form hummocky topography on the moraines. The heads-of-outwash formed while the ice was melting and thinning rapidly. Large amounts of sand and gravel outwash materials, and some till and loamy debris-flow sediment, were deposited on top of the thin edge of ice. They, too, have hummocky topography resulting from the collapse of buried ice. The topographically similar appearances of the moraines and heads-of-outwash make them difficult to distinguish superficially, but they are formed in different-textured materials and the vegetation divergence is often evident. These moraines and heads-of-outwash mark the western extent of the Green Bay Lobe and are sometimes referred to as the Athelstane Moraines.

As the Green Bay Lobe receded, meltwaters carried sand and gravel outwash sediments to lower-lying areas. The outwash buried broken ice that melted, collapsed the surface, and created extensive pitted outwash plains that occur between the high elevation moraines and heads-of-outwash. More than 50% of this land region is covered in outwash sediments, and most of the outwash is pitted or collapsed.

The southeast portions of this MLRA are dominated by glacial lake sediments. Glacial Lake Oshkosh covered a portion of this MLRA when it was at its largest extent (1.4 million acres). The lake deposited silts and clays along the southeast portion of the inland section of this MLRA. Beach terraces, ridges, and dunes were also formed by the lake. In the Lake Michigan coastal section of this MLRA, Glacial Lake Nipissing deposited a level lake plain full of sandy lacustrine material that overlies dolomite and limestone bedrock. Glacial Lake Nipissing was a postglacial lake that occurred in the Lake Michigan Basin as the Lake Michigan Lobe was receding. Wetlands are abundant in this area of the MLRA. In the north section, Glacial Lake Dunbar formed when ice dams impounded glacial meltwater between the Athelstane Moraine and the Inner Athelstane Moraine. This glacial lake deposited small areas of level sandy lacustrine materials.

The northeast section of this MLRA is a till plain that formed in later advances of the Green Bay Lobe. Some pitted outwash is present, but the till plain is much more exposed here than elsewhere in the MLRA. The till deposited throughout 94B is primarily sandy, dolomitic till. The dolomite was scraped off the Niagara Escarpment as the Green Bay Lobe moved across it. In some areas, the carbonates are deeply leached.

Historically, this MLRA was dominated by a mixture of northern hardwood forests, Jack pine-scrub oak barrens, and forested coniferous wetlands at 30%, 29%, and 20%, respectively. White pine (Pinus strobus) and red pine (Pinus resinosa) were dominant tree species and covered an estimated 15% of the area. Northern hardwood forests were dominated by eastern white pine, eastern hemlock (Tsuga canadensis), and American beech (Fagus grandifolia). The Jack pine-scrub oak barrens were dominant in the sandy portions of this MLRA. Forested coniferous wetlands were occupied by norther white-cedar (Thuja occidentalis), black spruce (Picea mariana), and tamarack (Larix laricina).

Classification relationships

Relationship to Established Framework and Classification Systems:

Habitat Types of N. Wisconsin (Kotar, 2002): Acer-Abies/Vaccinium-Coptis (ArAbVC), Tsuga/Maianthemum-Coptis (TMC)

Biophysical Settings (Landfire, 2014): Laurentian-Acadian Alkaline Conifer-Hardwood Swamp, Laurentian-Acadian Northern Hardwoods Forest, Laurentian-Acadian Sub-boreal Mesic Balsam Fir-Spruce Forest, Laurentian-Acadian Sub-boreal Mesic Balsam Fir-Spruce Forest

WDNR Natural Communities (WDNR, 2015): Northern Mesic Forest

Hierarchical Framework Relationships:

Major Land Resource Area (MLRA): Michigan Eastern Upper Peninsula MLRA (94B)

USFS Subregions: Athelstane Sandy Outwash and Moraines (212Tc), Green Bay Sandy Lake Plain (212Te)

Wisconsin DNR Ecological Landscapes: Northeast Sands, Northern Lake Michigan Coastal

Ecological site concept

The Moist Sandy Lowland ecological site accounts for approximately 63,000 acres in MLRA 94B, or about 6% of total land area. It is found in depressions and drainageways primarily on outwash plains throughout the MLRA. This site is characterized by very deep, somewhat poorly drained, sandy soils formed in outwash deposits, sometimes underlain by finer-textured till or lacustrine deposits. Precipitation, runoff from adjacent uplands, and groundwater discharge are the primary sources of water. Soils are extremely acid to neutral.

Associated sites

F094BY004MI	**Wet Sandy Lowland** Wet Sandy Lowland are wetland sites that occupy landscape depressions in sandy landscapes, often sandy pitted outwash plains. They are poorly drained. They are found in lower, wetter positions along the same drainage sequence as Moist Sandy Lowland.
F094BY008MI	**Sandy Upland** Sandy Upland are found in upland landscape positions on outwash plains, stream terraces, sandy lake plains, and moraines. They are moderately well to somewhat excessively drained. They are found in higher, drier positions along the same drainage sequence as Moist Sandy Lowland. They are often found directly adjacent to Moist Sandy Lowland.
F094BY011MI	**Dry Upland** Dry Upland are found in upland landscape positions on outwash plains and stream terraces. They are excessively drained. They are found in the highest, driest positions along the same drainage sequence as Moist Sandy Lowland.

Similar sites

F094BY007MI	**Moist Loamy Lowland** Moist Loamy Lowland are found in lower landscape positions on moraines, lake plains, or outwash plains. They are somewhat poorly drained. They are very similar to Moist Sandy Lowland except they have finer textures and a higher nutrient status.

Table 1. Dominant plant species

Tree	(1) *Acer rubrum* (2) *Abies balsamea*
Shrub	(1) *Corylus* (2) *Amelanchier*
Herbaceous	(1) *Maianthemum canadense* (2) *Pteridium aquilinum*

Physiographic features

This site is predominantly found on outwash plains but may also occur on stream terraces, sandy lake plains, and sandy moraines in lower landscape positions. It is especially common in the flat glacial lake plains bordering Lake Michigan in southeast Marinette county. Slopes range from 0 to 3 percent.

This site is subject to neither flooding nor ponding. The soils have an apparent seasonally-high water table (endosaturation) between 5 and 13 inches from the soil surface. The water table may drop in dry conditions. Runoff potential is very low to low.

Table 2. Representative physiographic features

Hillslope profile	(1) Footslope
Slope shape across	(1) Concave
Slope shape up-down	(1) Linear
Landforms	(1) Depression (2) Drainageway (3) Lake plain (4) Outwash plain (5) Moraine (6) Flat (7) Stream terrace
Runoff class	Very low to low
Flooding frequency	None
Ponding frequency	None
Elevation	685–972 ft
Slope	0–3%
Water table depth	5–13 in
Aspect	Aspect is not a significant factor

Climatic features

The continental climate of the Michigan Eastern Upper Peninsula MLRA is typical of northern Wisconsin: cooler summers, colder winters, and shorter growing seasons.

Table 3. Representative climatic features

Frost-free period (characteristic range)	106-114 days

Freeze-free period (characteristic range)	131-145 days
Precipitation total (characteristic range)	31-32 in
Frost-free period (actual range)	100-123 days
Freeze-free period (actual range)	123-150 days
Precipitation total (actual range)	30-33 in
Frost-free period (average)	114 days
Freeze-free period (average)	138 days
Precipitation total (average)	32 in

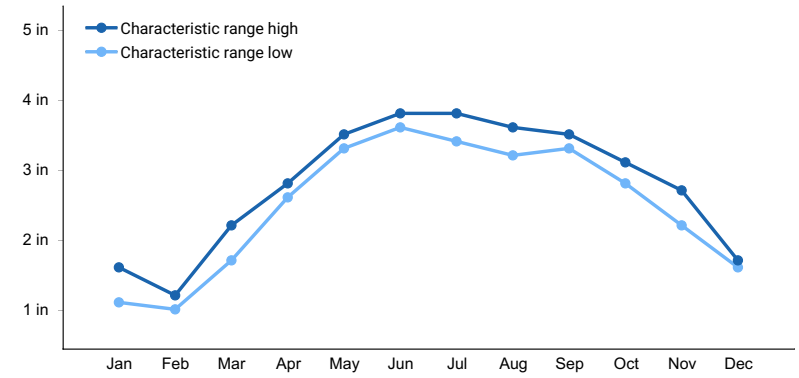


Figure 1. Monthly precipitation range

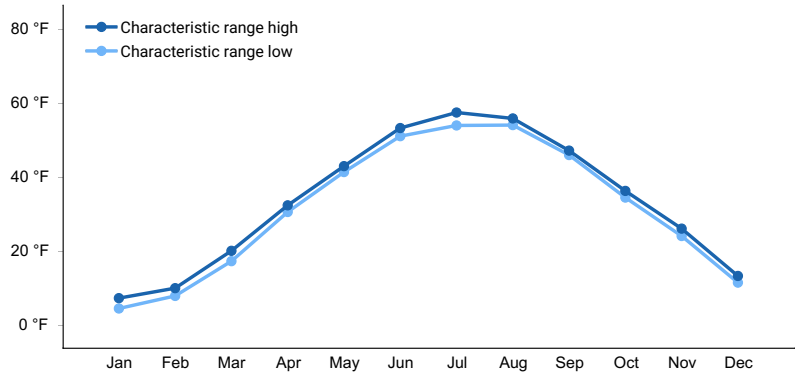


Figure 2. Monthly minimum temperature range

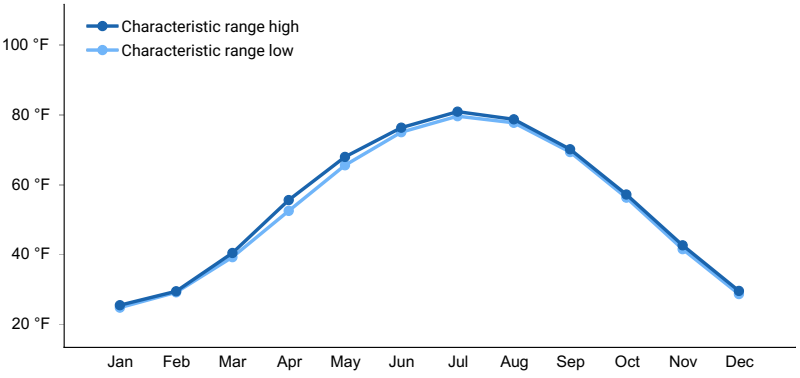


Figure 3. Monthly maximum temperature range

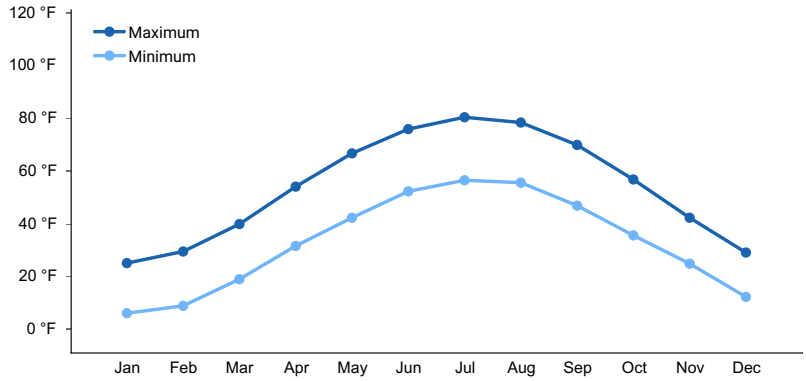


Figure 4. Monthly average minimum and maximum temperature

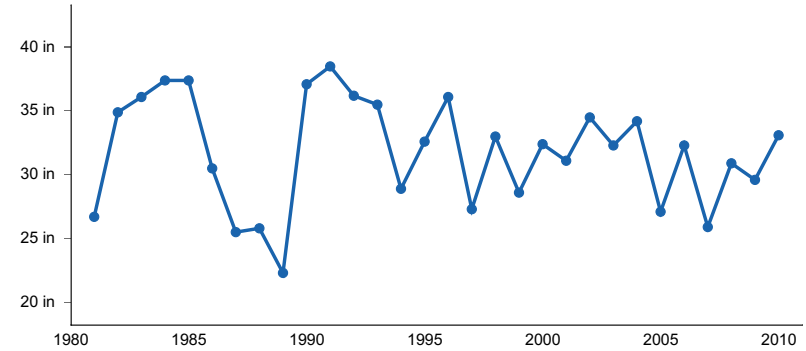


Figure 5. Annual precipitation pattern

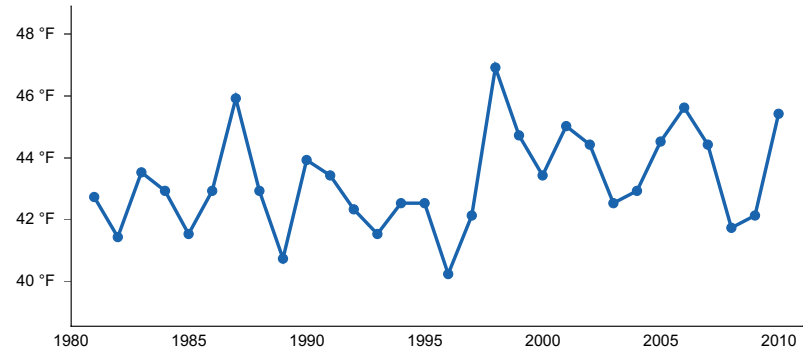


Figure 6. Annual average temperature pattern

Climate stations used

- (1) CRIVITZ HIGH FALLS [USC00471897], Crivitz, WI
- (2) MARINETTE [USC00475091], Menominee, WI
- (3) PESHTIGO [USC00476510], Peshtigo, WI
- (4) OCONTO 4 W [USC00476208], Oconto, WI
- (5) SURING [USC00478376], Suring, WI
- (6) BREED 6 SSE [USC00471044], Suring, WI

Influencing water features

Water is received through precipitation, runoff from adjacent uplands, and groundwater discharge. Water levels are greatly influenced by precipitation rates and runoff from upland sites. Water leaves the site primarily through runoff, evapotranspiration, and groundwater recharge.

Wetland description

Permeability of these sites is slow to rapid, or impermeable where the subsoil texture is fine enough to cause perching of the water table (episaturation).

Hydrologic Group: B, A/D, B/D, C/D
Hydrogeomorphic Wetland Classification: None
Cowardin Wetland Classification: None

Soil features

The soils of this site are represented by the Allendale, Au Gres, Iosco, Wainola, and Wormet soil series. These soils are all classified as Typic Endoaquods except for Allendale, an Alfic Epiaquod, and Iosco, an Argic Endoaquod. Typic Endoaquods constitute 96% of the acreage of this site.

These sites primarily form in sandy outwash. Some sites have a veneer of loamy outwash. A small number of sites in northwestern Marinette county and eastern Florence county are underlain by clayey lacustrine deposits or loamy till. Soils lack bedrock contact within two meters of the surface. They are somewhat poorly drained and do not meet hydric soil requirements.

The surfaces of these soils are sand to sandy loam. Subsurfaces are generally sand to sandy loam but may also be loam to silty clay. Small fragments (gravels) may occupy up to 25 percent volume of the substratum. Soils are extremely acid to neutral. Sites with finer-textured materials in the substratum may have secondary carbonates occupying up to 5 percent volume starting as high as 27 inches from the soil surface.

Figure 7. Au Gres soil series photograph courtesy of UWSP taken on 6/17/2020 in Marinette County, WI.

Table 4. Representative soil features

Parent material	(1) Till (2) Outwash (3) Lacustrine deposits
Surface texture	(1) Sand (2) Loamy sand (3) Sandy loam
Drainage class	Somewhat poorly drained
Permeability class	Very slow to rapid
Soil depth	80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-60in)	4–8 in
Calcium carbonate equivalent (0-40in)	0–5%

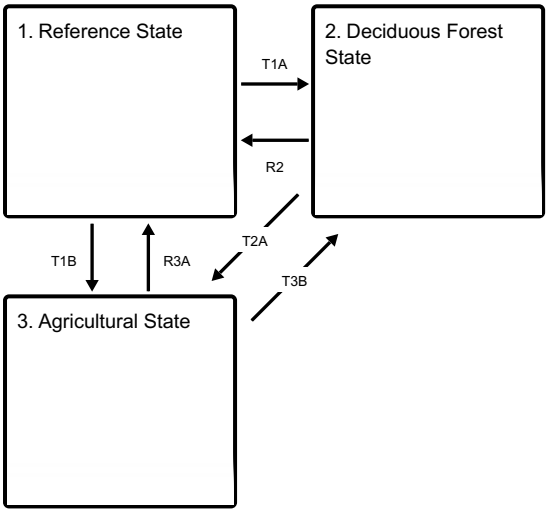
Soil reaction (1:1 water) (0-40in)	4.2–7.3
Subsurface fragment volume <=3" (Depth not specified)	1–25%
Subsurface fragment volume >3" (Depth not specified)	0–3%

Ecological dynamics

In pre-European settlement time wildfire was the main controlling factor of forest community dynamics. Following a severe, stand-replacing fire, any of the species present on the landscape could become established, depending on seed source availability and specific conditions of post-fire seedbed. The newly established young stands of any species were easily eliminated by recurring fires, but differences in fire-resisting properties among the species began to play a role in any species' survival success. Many pine and oak species were dominant in the region because of their fire-resistant properties and successful regeneration post-fire. With clear cutting and continued fire suppression, many of these species adapted to fire and intolerant of shade, are replaced by other species. Species such as white pine and red oak are still common on the landscape based on their tolerance to some shade; these species to establish under a canopy, and in time, may become a component of the canopy. Red maple is sensitive to fire, but in its absence, it has the ability to dominate sites based on its shade tolerance and prolific seed production.

State and transition model

Ecosystem states



T1A - Stand replacing disturbance that includes fire.

T1B - Removal of forest cover and tilling for agricultural crop production.

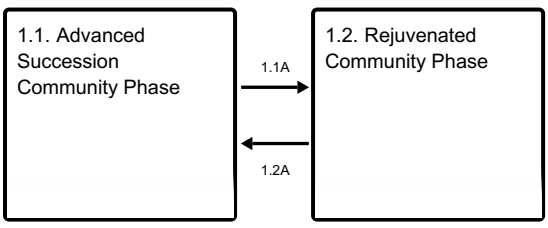
R2 - Deciduous forest community is slowly invaded by conifers.

T2A - Removal of forest cover and tilling for agricultural crop production.

R3A - Cessation of agricultural practices leads to natural reforestation, or site is replanted.

T3B - Cessation of agricultural practices leads to natural reforestation, or site is replanted.

State 1 submodel, plant communities



1.1A - Light to moderate intensity fires, blow-downs, ice storms.

1.2A - Disturbance-free period for 30+ years.

State 2 submodel, plant communities

2.1. Deciduous Forest Phase

State 3 submodel, plant communities

3.1. Agricultural Phase

State 1
Reference State

Reference state is a forest community dominated by red maple (*Acer rubrum*) and balsam fir (*Abies balsamea*). Depending on history of disturbance, two community phases can be distinguished largely by differences in dominance of tree species and community age structure.

Community 1.1
Advanced Succession Community Phase

In the absence of major disturbance—particularly fire—these sites are dominated by a canopy of balsam fir and red maple. Red oak (*Quercus rubra*) may be present, but has low coverage and is only able to regenerate in gaps.

Hemlock may be present on some sites, but is not common. The shrub layer is not well developed and dominated by red maple saplings and beaked hazelnut (*Corylus cornuta*) and service berry (Amelanchier spp). The ground layer is dominated by Canada mayflower (*Maianthemum canadense*), bracken fern (Pteridium aquillinum), and American starflower (*Trientalis borealis*) . Other common herbs include bluebead lily (*Clintonia borealis*), and wintergreen (*Gaultheria procumbens*).

Dominant plant species

- red maple (*Acer rubrum*), tree
- balsam fir (*Abies balsamea*), tree
- beaked hazelnut (*Corylus cornuta*), shrub
- serviceberry (*Amelanchier*), shrub
- Canada mayflower (*Maianthemum canadense*), other herbaceous
- brackenfern (*Pteridium*), other herbaceous
- starflower (*Trientalis borealis*), other herbaceous

Community 1.2
Rejuvenated Community Phase

Figure 8. Photo courtesy of UWSP taken on 6/17/2020 in Marinette County, WI.

The canopy of the rejuvenated community is still dominated by original species, but the understory now also includes a well-established younger cohort and perhaps a few additional seedlings and saplings of less shade tolerant species. Red oak is common on sites, but has moderate shade tolerance and require canopy breaks to regenerate. Red oak is unable to compete with red maple and balsam fir to maintain a co-dominant position in the canopy in advanced succession, but individuals may be maintained.

Dominant plant species

- red maple (*Acer rubrum*), tree
- balsam fir (*Abies balsamea*), tree

- beaked hazelnut (*Corylus cornuta*), shrub
- serviceberry (*Amelanchier*), shrub
- mayflower (*Maianthemum*), other herbaceous
- brackenfern (*Pteridium*), other herbaceous
- starflower (*Trientalis borealis*), other herbaceous

Pathway 1.1A
Community 1.1 to 1.2

Light intensity fires, crown breakage from ice and snow and small scale blow-downs create canopy openings, releasing advance regeneration and stimulating new seedling establishment. Some additional less shade tolerant species such as red oak may be able to enter the community.

Pathway 1.2A
Community 1.2 to 1.1

A long period without major canopy disturbance allows gradual replacement of oldest canopy trees by younger cohorts. Small scale disturbances may still occur periodically, but once second or third canopies are established there is minimal new regeneration taking place and the forest gradually returns to mature state.

State 2
Deciduous Forest State

Post disturbance pioneer community of aspen and paper birch with mixtures of other species from available seed sources.

Community 2.1
Deciduous Forest Phase

Figure 9. Photo courtesy of UWSP taken on 6/30/2020 in Marinette County, WI.

Pure, or mixed, aspen – paper birch community replaces the reference state community. If seed source is present, red maple and young cohorts of balsam fir readily becomes member of this community.

Dominant plant species

- quaking aspen (*Populus tremuloides*), tree
- European white birch (*Betula pendula*), tree
- red maple (*Acer rubrum var. rubrum*), tree
- balsam fir (*Abies balsamea var. balsamea*), tree
- beaked hazelnut (*Corylus cornuta*), shrub
- Canada mayflower (*Maianthemum canadense*), other herbaceous
- brackenfern (*Pteridium*), other herbaceous

State 3
Agricultural State

Indefinite period of applying agricultural practices.

Community 3.1
Agricultural Phase

Indefinite period of applying agricultural practices. Crops likely include alfalfa, corn, soybeans, and hay or pasture. It is possible that some areas are or have been in ginseng production as well.

Transition T1A
State 1 to 2

Reference State **Deciduous Forest State**

Stand replacing disturbance that must include fire to create conditions for aspen and paper birch to colonize the site.

Transition T1B
State 1 to 3

Removal of forest cover and tilling for agricultural crop production.

Restoration pathway R2
State 2 to 1

Deciduous Forest State | Reference State

Deciduous forest community is slowly invaded by conifers.

Transition T2A
State 2 to 3

Removal of forest cover and tilling for agricultural crop production.

Restoration pathway R3A
State 3 to 1

Cessation of agricultural practices leads to natural reforestation, or site is replanted.

Transition T3B
State 3 to 2

Cessation of agricultural practices leads to natural reforestation, or site is replanted.

Additional community tables

Inventory data references

Plot and other supporting inventory data for site identification and community phases is located on a NRCS North Central Region shared and one drive folder. University Wisconsin-Stevens Point described soils, took photographs, and inventoried vegetation data at community phases within the reference state. The data sources include WI ESD Plot Data Collection Form - Tier 2, Releve Method, NASIS pedon description, NRCS SOI 036, photographs, and Kotar Habitat.
Habitat Types of N. Wisconsin (Kotar, 2002): Acer-Abies/Vaccinium-Coptis (ArAbVC), Tsuga/Maianthemum-Coptis (TMC)
Biophysical Settings (Landfire, 2014): Laurentian-Acadian Alkaline Conifer-Hardwood Swamp, Laurentian-Acadian Northern Hardwoods Forest, Laurentian-Acadian Sub-boreal Mesic Balsam Fir-Spruce Forest, Laurentian-Acadian Sub-boreal Mesic Balsam Fir-Spruce Forest
WDNR Natural Communities (WDNR, 2015): Northern Mesic Forest

Other references

Cleland, D.T.; Avers, P.E.; McNab, W.H.; Jensen, M.E.; Bailey, R.G., King, T.; Russell, W.E. 1997. National Hierarchical Framework of Ecological Units. Published in, Boyce, M. S.; Haney, A., ed. 1997. Ecosystem Management Applications for Sustainable Forest and Wildlife Resources. Yale University Press, New Haven, CT. pp. 181-200.

County Soil Surveys from St. Croix, Polk, Barron, Rusk, Chippewa, Clark, Marathon, Taylor, Price, Sawyer, Burnett, Washburn, Douglas, Bayfield, Ashland, Lincoln, Oneida, Langlade, Shawano, Menominee, Forest, Florence, Marinette, and Pierce Counties.

Curtis, J.T. 1959. Vegetation of Wisconsin: an ordination of plant communities. University of Wisconsin Press, Madison. 657 pp.

Davis, R.B. 2016. Bogs and Fens, A Guide to the Peatland Plants of Northeastern United States and Adjacent

Canada. University Press of New England, Hanover and London. 296 pp.

Finley, R. 1976. Original vegetation of Wisconsin. Map compiled from U.S. General Land Office notes. U.S. Forest Service, North Central Forest Experiment Station, St. Paul, Minnesota.

Hvizdak, David. Personal knowledge and field experience.

Jahnke, J. and Gienccke, A. 2002. MLRA 92 Clay Till Field Investigations. Summary of field day investigations by Region 10 Soil Data Quality Specialists.

Kotar, J. 1986. Soil – Habitat Type relationships in Michigan and Wisconsin. J. For. and Water Cons. 41(5): 348-350.

Kotar, J., J.A. Kovach and G. Brand. 1999. Analysis of the 1996 Wisconsin Forest Statistics by Habitat Type. U.S.D.A. For. Serv. N.C. Res. Stn. Gen. Tech. Rept. NC-207.

Kotar, J., J.A. Kovach and T. L. Burger. 2002. A Guide to Forest Communities and Habitat Types of Northern Wisconsin. University of Wisconsin-Madison, Department of Forest Ecology and Management, Madison.

Kotar, J., and T. L. Burger. 2017. Wetland Forest Habitat Type Classification System for Northern Wisconsin: A Guide for Land Managers and landowners. Wisconsin Department of Natural Resources, PUB-FR-627 2017, Madison.

Martin, L. 1965. The physical geography of Wisconsin. Third edition. The University of Wisconsin Press, Madison.

McNab, W.H. and P.W. Avers. 1994. Ecological Subregions of the United States: Section Descriptions. USDA For. Serv. Pun. WO-WSA-5, Washington, D.C.

NatureServe. 2018. International Ecological Classification Satandard: Terrestrial Ecological Classifications. NautreServe Centreal Databases. Arlington, VA. U.S.A. Data current as of 28 August 2018.

Radeloff, V.C., D.J. Mladenoff, H.S. He and M.S. Boyce. 1999. Forest landscape change in Northwestern Wisconsin Pine Barrens from pre-European settlement to the present. Can. J. For. Res. 29: 1649-1659.

Schulte, L.A., and D.J. Mladenoff. 2001. The original U.S. public land survey records: their use and limitations in reconstructing pre-European settlement vegetation. Journal of Forestry 99:5–10.

Schulte, L.A., and D.J. Mladenoff. 2005. Severe wind and fire regimes in northern forests: historical variability at the regional scale. Ecology 86(2):431–445.

Soil Survey Staff. Input based on personal experience. Tim Miland, Scott Eversoll, Ryan Bevernitz, and Jason Nemecek.

Stearns, F. W. 1949. Ninety years change in a northern hardwood forest in Wisconsin. Ecology, 30: 350-58.

United States Department of Agriculture, Forest Service. 1989. Proceedings – Land Classification Based on Vegetation: Applications for Management. Gen. Tech. Report INT-527.

United States Department of Agriculture, Forest Service. 1990. Silvics of North America, Vol. 1, Hardwoods. Agricultural Handbook 654, Washington, D.C.

United States Department of Agriculture, Forest Service. 1990. Silvics of North America, Vol. 2, Conifers. Agricultural Handbook 654, Washington, D.C.

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land Resource and Major Land Resource Areas of the United Sates, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.

United States Department of Agriculture, Natural Resources Conservation Service. 2008. Hydrogeomorphic Wetland Classification System: An Overview and Modification to Better Meet the Needs of the Natural Resources Conservation Service. Technical Note No. 190-8-76. Washington D.C.

Wilde, S.A. 1933. The relation of soil and forest vegetation of the Lake States Region. Ecology 14: 94-105.

Wilde, S.A. 1976. Woodlands of Wisconsin. University of Wisconsin Cooperative Extension, Pub. G2780, 150 pp.

Wisconsin Department of Natural Resources. 2015. The ecological landscapes of Wisconsin: An assessment of ecological resources and a guide to planning sustainable management. Wisconsin Department of Natural Resources, PUB-SS-1131 2015, Madison.

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Approval

Suzanne Mayne-Kinney, 11/16/2023

Acknowledgments

NRCS contracted UWSP to write ecological sites in MLRA 94B, completed in 2021.

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	05/10/2025
Approved by	Suzanne Mayne-Kinney
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

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):**

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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):**

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:**