

# Ecological site F094DY015WI Wet Loamy-Mantled Depressions

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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.



Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

## MLRA notes

Major Land Resource Area (MLRA): 094D–Northern Highland Sandy Pitted Outwash

The Wet Loamy-Mantled Depressions ecological site occupies about 10,000 acres in MLRA 94D.

## Classification relationships

The wetland forest Habitat Type developed by Kotar and Burger (2009) for sites similar to this site is AbFnThAs (Abies-Fraxinus-Thuja/Arisaema). However, this ecological site is much more variable in species composition than the Habitat Type would indicate, however Habitat Types apply to the forested condition and this site has non-forested states and phases as well as forested ones.

## Ecological site concept

**ATTENTION:** This ecological site meets the NESH 2014 requirements for PROVISIONAL. A provisional ecological site is established after broad ecological site concepts are identified and an initial state-and-transition model is drafted. Following quality control and quality assurance reviews of the ecological site concepts, an identification number and name for the provisional ecological site are entered into ESIS. A provisional ecological site may include literature reviews, land use history information, some soils data, legacy data, ocular estimates for canopy and/or species composition by weight, and even some line-point intercept information. A provisional ecological site does not meet the NESH 2014 standards for an Approved ESD, but does provide the conceptual framework of soil-site

correlation for the development of the ESD. For more information about this ecological site, please contact your local NRCS office.

The Wet Loamy-Mantled Depression ecological site has poorly drained soils that have a brief periods of ponding and a thin muck surface layer. These sites often occur along the margins of large peatlands or in closed depressions in uplands. These are wetland sites with plant communities contain both obligate and facultative hydrophytes.

## Associated sites

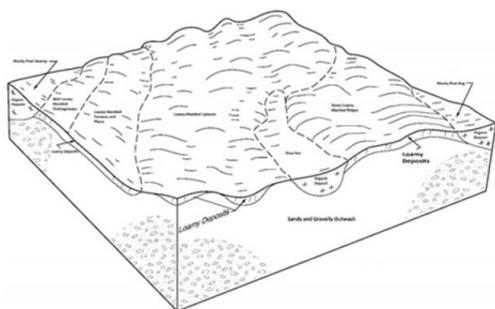
F094DY014WI	<b>Wet Loamy-Mantled Drainageways</b> Wet Loamy-Mantled Depressions are often adjacent to and hydrologically connected to Wet Loamy-Mantled Drainageways.
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**Table 1. Dominant plant species**

Tree	(1) <i>Fraxinus nigra</i> (2) <i>Acer rubrum</i>
Shrub	(1) <i>Alnus incana</i> (2) <i>Acer spicatum</i>
Herbaceous	(1) <i>Impatiens capensis</i> (2) <i>Calamagrostis canadensis</i>

## Physiographic features

These sites often occur along the margins of large peatlands or in closed depressions in loamy mantled uplands on outwash plains, especially pitted outwash. Loamy sediments were washed into these depressions as buried remnants of the glaciers melted. The low-lying position and concave shape of these sites leads to nearly continuous high water tables ( 0 to 12 inches deep), plus the potential long duration ponding in spring and after heavy rains, and thus the accumulation of a thin (<17 inches) muck surface layer due to anaerobic conditions.



**Figure 2. Wet Loamy-Mantled Depressions**

**Table 2. Representative physiographic features**

Landforms	(1) Outwash plain (2) Outwash terrace (3) Lake plain
Ponding duration	Long (7 to 30 days)
Ponding frequency	Frequent
Elevation	1,175–1,860 ft
Slope	0–2%

Ponding depth	0–6 in
Aspect	Aspect is not a significant factor

## Climatic features

The climate is humid continental with very cold winters and warm summers. As is common across northern Wisconsin, two-thirds of the precipitation falls as rain during the relatively short growing season of late May to early September. Most of the rainfall is transpired by plants. Snow cover is likely in the months of November through April. Snow cover prevents deep frost penetration which promotes groundwater recharge.

**Table 3. Representative climatic features**

Frost-free period (average)	96 days
Freeze-free period (average)	123 days
Precipitation total (average)	34 in

## Climate stations used

- (1) LONG LAKE DAM [USC00474829], Eagle River, WI
- (2) NORTH PELICAN [USC00476122], Rhinelander, WI
- (3) REST LAKE [USC00477092], Manitowish Waters, WI
- (4) WILLOW RSVR [USC00479236], Hazelhurst, WI

## Influencing water features

This is a wetland site.

## Soil features

This ecological site has hydric soils that are subject to frequent ponding. These soils are members of the Minocqua series and other similar soils. Minocqua has a mucky surface layer of less than 8 inches, which is indicative of the poorly drained condition. The mineral layers beneath the organic surface layer, especially the loamy mantle, are strongly gleyed, again indicating anaerobic conditions.

**Table 4. Representative soil features**

Surface texture	(1) Mucky sandy loam (2) Loam (3) Fine sandy loam
Family particle size	(1) Sandy
Drainage class	Poorly drained
Permeability class	Moderate to moderately rapid
Soil depth	80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	4–8 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0–2 mmhos/cm

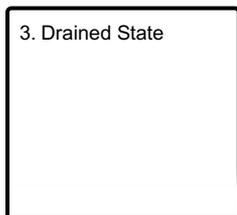
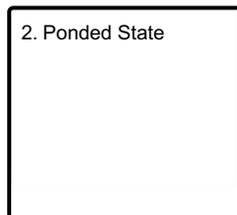
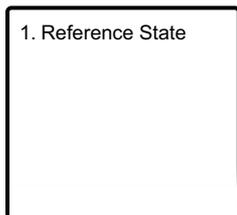
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	4.9-6.1
Subsurface fragment volume <=3" (Depth not specified)	5-15%
Subsurface fragment volume >3" (Depth not specified)	0-3%

## Ecological dynamics

The Wet Loamy-Mantled Depressions ecological site is a forested wetland characterized by hydrophytic vegetation, hydric soils, and saturated soil conditions throughout most of the growing season. As such, tree growth and the species present are restricted by the extended hydroperiod. On the other hand, there is some soil aeration which is necessary to facilitate tree growth, but most often trees are limited to microsites that are slightly elevated above the persistent high water table. The concave areas within the site are covered by shrub and herbaceous species that are more water tolerant. Alder is the most common shrub and sedges, reeds, and grasses dominate the herbaceous layer. The number of species found on these is variable; micro-topography is the key to increased diversity. Micro-relief is produced by windthrow, where fallen logs produce both a mound of soil at the root clump and the log itself provides habitat for tree seedlings to sprout and grow as a so-called "nurse log". Trees that initially colonize the site are tamarack, black ash and balsam fir. Yellow birch, hemlock, white cedar, white and black spruce, and white pine will take root on nurse logs and stumps and other areas that have a slightly more aerated root zone. Areas that pond more frequently and with longer duration are often sparsely vegetated. But these ephemeral ponds are important breeding habitat for reptiles and amphibians. Broadleaf herbaceous species include, spotted jewelweed, marsh marigold, bugleweed or water horehound, water hemlock and goldthread. A variety of interesting ferns, fern allies and mosses also occupy this site. These include royal fern, cinnamon fern and maidenhair fern, horsetails, feather mosses and polytrichum mosses, and the suite of Sphagnum moss species which have adapted to richer sites. The reference state is still relatively common on this site, especially in remote areas, and also as small relatively undisturbed sites within the otherwise highly manipulated upland matrix.

## State and transition model

### Ecosystem states



### State 1 submodel, plant communities

1.1. Sedge-Alder  
Phase

1.2. Black Ash-Alder  
Phase

1.3. Lowland Conifer-  
Alder Phase

### State 2 submodel, plant communities

2.1. Open Water  
Phase

2.2. Standing Dead  
Timber Phase

### State 3 submodel, plant communities

3.1. Developed Phase

3.2. Abandoned Phase

## State 1 Reference State

The Reference State has three main phases that are a response to hydroperiod and disturbance regime. The hydroperiod gradient ranges permanently ponded to an aerated root zone sufficient for facultative tree species. The disturbance regimes are mainly excess wetness and windthrow and these are mainly random occurrences but some sites more susceptible than others.

### Community 1.1 Sedge-Alder Phase

This phase is the result of the wettest conditions on this site short of permanent or semi-permanent ponding. Graminoids are dominant, speckled alder is common and often forms dense thickets. Alder is a N-fixing plant which is a highly useful adaptation to a site that is prone to denitrification due to the bacteria that thrive in anaerobic conditions.

### Community 1.2 Black Ash-Alder Phase

Black ash will can become a dominant tree species on sites that too wet for most other tree species. Black ash is also moderately shade tolerant and will reproduce in closed canopy stands. If ash trees are lost on these sites expect the water table to rise, because this species will transpire a great deal of moisture.

### Community 1.3

## **Lowland Conifer-Alder Phase**

Conifers will often become dominant on sites that have infrequent major disturbance and frequent minor disturbances to the point where microsites for germination and seedling are common. Nurse logs from downed are especially beneficial to conifer (white cedar, balsam fir and hemlock) forest development.

### **State 2 Ponded State**

This site is subject to permanent or semi-permanent ponding from a variety of natural or artificial sources. Temporary ponding in spring is common, and the Reference State vegetation is adapted to this regular occurrence. However, more permanent ponding due to extreme precipitation or man-made changes in drainage patterns will cause a state transition to open water with emergent vegetation (e.g. cattails, bulrushes). Alternatively, the ponding may persist long enough to kill trees and then subside leaving the Standing Dead Timber Phase.

#### **Community 2.1 Open Water Phase**

This phase resembles a marsh habitat. Given enough time the vegetation will reflect this new moisture regime. Under more or less permanently ponded conditions, emergent (cattails, bulrushes, pond lily) and submergent (bladderworts, pondweeds, milfoils) vegetation will colonize the site.

#### **Community 2.2 Standing Dead Timber Phase**

The Standing Dead Timber Phase indicates a major increase in wetness that may or may not persist. However, the standing dead timber will remain for years before breaking up. The dead trees are a valuable resource for birds, providing nesting and perching habitat for numerous species.

### **State 3 Drained State**

The Drained State is a man-made condition that typically is incidental or inadvertent. Meaning that drainage is not the primary goal but drainage may be necessary for road construction or result from nearby construction activities.

#### **Community 3.1 Developed Phase**

Roads are the common conversion practice on this site. Water is diverted from the roadbed area to stabilize that area. Culverts are usually required to remove surface water.

#### **Community 3.2 Abandoned Phase**

Abandoned phase sites are subject to invasive species such as reed canary grass, phragmites or purple loosestrife. Abandonment in this case means the site is not managed to prevent such invasion.

## **Additional community tables**

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## Contributors

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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	
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):**
- 
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:**
-