15180

North-Central Interior Wet Flatwoods

BpS Model/Description Version: Aug. 2020

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| **Modelers** |  | **Reviewers** |  |
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| None | None | None | None |
| None | None | None | None |

Vegetation Type

Forest and Woodland

Map Zones

43, 47, 49, 52, 62, 63, 64, 65

Geographic Range

This small-patch system is found throughout the northern glaciated Midwest ranging east into Lower New England (NatureServe 2008).

Biophysical Site Description

The North-Central Interior Wet Flatwoods occurs primarily on glacial lakeplain and sometimes on poorly drained uplands or depressions on tillplains or outwash plains. The community is restricted or nearly restricted to regions impacted by the Wisconsinan glaciation.

Soils are imperfectly to poorly drained and aerated, and an impermeable clay layer is often present, leading to seasonal ponding in the spring and drought in the summer. Plants characteristic of this BpS are adapted to fluctuating water tables. In addition, plants are often limited by light where dense forest canopies have developed.

Vegetation Description

Sites are characterized by a closed to partially open canopy dominated primarily by pin oak (Quercus palustris) and swamp white oak (Q. bicolor), but a variety of lowland and upland trees can be occasional to locally important or dominant, including red maple (Acer rubrum), silver maple (A. saccharinum), sugar maple (A. saccharum), bur oak (Quercus macrocarpa), red oak (Q. rubra), Shumard’s oak (Q. shumardii), white oak (Q. alba), chinquapin oak (Q. muhlenbergii), beech (Fagus grandifolia), green ash (Fraxinus pennsylvanica), pumpkin ash (F. profunda), white ash (F. americana), black ash (F. nigra), sour-gum (Nyssa sylvatica), American elm (Ulmus americana), shagbark hickory (Carya ovata), bitternut hickory (C. cordiformis), tulip-tree (Liriodendron tulipifera), and basswood (Tilia americana). Near the southern boundary of this BpS, sweetgum (Liquidambar styraciflua) may occur. Fluctuating water levels allow the coexistence of upland and lowland trees. The shrub layer is characterized by saplings of the canopy species, in addition to winterberry (Ilex verticillata), spicebush (Lindera benzoin), musclewood (Carpinus caroliniana), prickly ash (Zanthoxylum americanum), buttonbush (Cephalanthus occidentalis), and maple-leaved viburnum (Viburnum acerifolium) (Andreas 1980, Schneider and Cochrane 1998, Fike 1999, Mack 2004, NatureServe 2007).

The ground flora is often sparse or patchy due to seasonal inundation, and composition can vary widely across the range of the BpS. Characteristic species may include wood reedgrass (Cinna arundinacea), sedges (Carex blanda, C. grayi, C. laxiculmis, C. lupulina, C. muskingumensis, C. rosea), riverbank wild-rye (Elymus riparius), VA wild-rye (E. virginicus), spring cress (Cardamine bulbosa), Pennsylvania bitter cress (C. pensylvanica), spring beauty (Claytonia virginica), fowl manna grass (Glyceria striata), mayapple (Podophyllum peltatum), violet wood-sorrel (Oxalis violacea), partridge berry (Mitchella repens), Canada mayflower (Maianthemum canadense), jack-in-the-pulpit (Arisaema triphyllum), clearweed (Pilea pumila), bedstraws (Galium spp.), poison ivy (Toxicodendron radicans), arrow-leaved tear-thumb (Polygonum sagittatum), halberd-leaved tear-thumb (P. arifolium), and cinnamon fern (Osmunda cinnamomea). (Andreas 1980, Schneider and Cochrane 1998, Fike 1999, Mack 2004, NatureServe 2007).

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| QUPA2 | *Quercus palustris* | Pin oak |
| QUBI | *Quercus bicolor* | Swamp white oak |
| ACRU | *Acer rubrum* | Red maple |
| ACSA2 | *Acer saccharinum* | Silver maple |
| ACSA3 | *Acer saccharum* | Sugar maple |
| QUMA2 | *Quercus macrocarpa* | Bur oak |
| FRPE | *Fraxinus pennsylvanica* | Green ash |
| FAGR | *Fagus grandifolia* | American beech |

Species names are from the NRCS PLANTS database. Check species codes at http://plants.usda.gov.

Disturbance Description

Fire Regime V characterizes this system, dominated by high-intensity, low-frequency fires that occur in greater than 1000yr intervals. Low-intensity surface fires may have been more frequent, particularly in stands adjacent to fire-prone lakeplain prairie and savanna types. Return interval for light surface fires is unknown.

Historically, this forest type was likely most often disturbed by fire during periods following catastrophic wind events or extreme drought. Seasonal ponding and flooding, followed by summer drought, are the predominant disturbance factors for this BpS.

Spring flooding restricts seed germination and diversity of shrubs and ground layer species. Summer drought is an additional stressor. Shallowly rooted trees are subject to windthrow, but are typically rooted in mineral soils, which have greater structural stability than organic soils.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 972 | 100 |  |  |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 972 | 100 |  |  |

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is the central tendency modeled. Percent of all fires is the percent of all fires modeled in that severity class. Minimum and Maximum FIs show the relative range of fire intervals as estimated by model contributors, if known.

Scale Description

This system typically occurs as small to large patches, the largest patches occurring on glacial clay and sand-clay lakeplain.

Adjacency or Identification Concerns

Historically, elm was a canopy component within flatwoods. However, this species has been largely eliminated from this system due to Dutch elm disease. American elm (Ulmus americana) is now generally only present in the understory and midstory in contemporary forests, whereas historically it would have been the occasional canopy dominant.

Uncharacteristic conditions in this setting include infestation by exotic earthworms of European species that have affected or begun to affect soil conditions, herb/forb species representation, and tree regeneration (Hale et al. 1999).

Issues or Problems

Native Uncharacteristic Conditions

Strong dominance by red maple may indicate previous disturbance (grazing or pasturing, hydrologic alteration, beaver flooding, etc.).

Comments

Succession Classes

**Mapping Rules**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Upper Layer Lifeform** | **Height (m)** | **Canopy Cover (%)** | | | | | | | | | |
| **0-10** | **11-20** | **21-30** | **31-40** | **41 - 50** | **51-60** | **61-70** | **71-80** | **81-90** | **91-100** |
| Herb | 0-0.5 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Herb | 0.5-1.0 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Herb | >1.0 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 0-0.5 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 0.5-1.0 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 1.0-3.0 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | >3.0 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 0-5 | A | A | A | UN | UN | UN | UN | UN | UN | UN |
| Tree | 5-10 | A | A | A | UN | UN | UN | UN | UN | UN | UN |
| Tree | 10-25 | UN | UN | UN | B | B | B | B | B | B | B |
| Tree | 25-50 | UN | UN | UN | UN | UN | UN | C | C | C | C |
| Tree | >50 | UN | UN | UN | UN | UN | UN | C | C | C | C |

Succession class letters A-E are described in the Succession Class Description section. Some classes use a leafform distinction where a qualifier is added to the class letter: Brdl (broadleaf), Con (conifer), or Mix (mixed conifer and broadleaf). UN refers to uncharacteristic native or a combination of height and cover that would not be expected under the reference condition. NP refers to not possible or a combination of height and cover which is not physiologically possible for the species in the BpS.

**Description**

Class A 11 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| POTR5 | Populus tremuloides | Quaking aspen | Upper |
| TIAM | Tilia americana | American basswood | Upper |
| QURU | Quercus rubra | Northern red oak | Upper |
| QUPA2 | Quercus palustris | Pin oak | Upper |

Description

This stage is an early successional stand following flooding or a rare stand-replacing fire. Shrubs increase in dominance over time, although open grass- and sedge-dominated wet meadow may be dominant for the first 10yrs+, particularly in areas in which existing shrubs were flood-killed. Open to dense thicket dominated by species such as Ilex verticillata (winterberry), Vaccinium corymbosum (highbush blueberry), Lindera benzoin (spicebush), Viburnum spp., Alnus rugosa (speckled alder) Cephalanthus occidentalis (buttonbush), Corylus cornuta (hazelnut), Salix spp.(willows), and Cornus spp. (dogwoods).

This stage results from major disturbance, including stand-replacement fire, flooding, or windthrow.

*Maximum Tree Size Class*  
Pole 5-9" DBH

Class B 16 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QURU | Quercus rubra | Northern red oak | Upper |
| FAGR | Fagus grandifolia | American beech | Upper |
| QUPA2 | Quercus palustris | Pin oak | Upper |
| QUBI | Quercus bicolor | Swamp white oak | Upper |

Description

Scattered tree canopy develops from seedlings that establish under shrubs. Typical species include silver maple (Acer saccharinum), red maple (Acer rubrum), green ash (Fraxinus pennsylvanica), black ash (Fraxinus nigra), American elm (Ulmus americana), pin oak (Quercus palustris), swamp white oak (Quercus bicolor), sycamore (Platanus occidentalis), cottonwood (Populus deltoides), and a variety of other canopy associates. General appearance is of a shrub-dominated system with an open tree canopy, grading into forested wetland at the end of this period.

As with all stages of this system, seasonal annual spring flooding, would occur. This natural process was not explicitly modeled but it should be assumed that it is occurring annually and maintaining the swamp forest instead of allowing it to succeed to drier forest type.

*Maximum Tree Size Class*  
Medium 9-21"DBH

Class C 73 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ACSA3 | Acer saccharum | Sugar maple | Upper |
| FAGR | Fagus grandifolia | American beech | Upper |
| QUPA2 | Quercus palustris | Pin oak | Upper |
| QUBI | Quercus bicolor | Swamp white oak | Upper |

Description

This stage is dominated by the same tree species as class B although the shrub layer is greatly reduced.

As with all stages of this system, seasonal annual spring flooding, would occur. This natural process was not explicitly modeled but it should be assumed that it is occurring annually and maintaining the swamp forest instead of allowing it to succeed to drier forest type.

*Maximum Tree Size Class*  
Large 21-33"DBH

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Mid1:CLS | 29 |
| Mid1:CLS | 30 | Late1:CLS | 79 |
| Late1:CLS | 80 | Late1:CLS | 999 |

Probabilistic Transitions

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Disturbance Type** | **Disturbance occurs In** | **Moves vegetation to** | **Disturbance Probability** | **Return Interval (yrs)** | **Reset Age to New Class Start Age After Disturbance?** | **Years Since Last Disturbance** |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.001 | 1000 | Yes | 0 |
| Wind or Weather or Stress | Early1:ALL | Early1:ALL | 0.003 | 333 | No | 0 |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.001 | 1000 | Yes | 0 |
| Wind or Weather or Stress | Mid1:CLS | Early1:ALL | 0.003 | 333 | Yes | 0 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.001 | 1000 | Yes | 0 |
| Wind or Weather or Stress | Late1:CLS | Early1:ALL | 0.003 | 333 | Yes | 0 |

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