Introduction

Forest habitat type classification system is a site classification system, based on repeatable patterns in the composition of understory vegetation. The habitat types are developed independent of the current tree species composition and can be applied to most forest stands.

Field identification of a habitat type provides a convenient label (habitat type name) for a given site and places that site in the context of a larger group of sites that share similar ecological characteristics.

In contrast to upland forests, our understanding of wetland forest ecosystems is still limited and silvicultural techniques to manage wetland forest communities are not well developed. This project was undertaken in order to address these issues that apply to an estimated 2.7 million acres of the State's wetland forest.

Wetland forest habitat type classification is an effort to complete the ecological classification of Wisconsin's forest ecosystems, using the methods and interpretations similar to those used in the development of the forest habitat type classification system for upland forests *(A Guide to Forest Communities and Habitat Types, Kotar, Kovach, Burger, 2002).*

Wetland forests differ from their upland counterparts in several significant ways. Substrate can be mineral or organic and is always under the influence of a fluctuating water table. Typically, saturated conditions are found within the upper two to three feet of the soil profile. Seasonal, or yearly fluctuations in depth to saturation zone can be considerable. The number of tree species that play a dominant role across all wetland habitat types is relatively small. Stands typically are dominated by some mixture of the following: **balsam fir, northern white cedar, black ash, red maple, white spruce, black spruce** and **tamarack**. A number of associates occur sporadically. Most forest cover types comprised of these species can be found on either mineral or organic substrate. The principal physical factor differentiating wetland habitat types is nutrient availability.

Factors controlling nutrient availability on these habitat types are far more variable and complex than is the case of upland systems. First, organic substrate varies in degree of decomposition, which results in differences in nutrient availability. Secondly, regional and local hydrology is a strong modifying factor. Nutrient availability in organic substrates is modified by groundwater flow, or runoff, that originates on uplands of differing geology and soils. For this reason organics of similar appearance can be low, or relatively high in nutrient availability. In general, nutrient status of wetland habitat types varies from very poor to medium.

However, these are very general categories based on vegetation as determined by the synecological coordinates method. The fact that several different habitat types often occupy the same position on a moisture-nutrient grid does not mean that nutrient regimes are identical. In wetland soils, availability of specific nutrients is strongly controlled (or modified) by water chemistry. We have no practical way of measuring these differences directly, but the habitat types are differentiated by variations in floristic composition reflected in the many soil regimes.

There are also great differences in **successional** processes between upland and lowland systems. There appears to be no "relay floristics" type of succession as is common on upland habitat types. Tree species that dominate wetland communities are moderately to very tolerant of understory conditions and tend to replace themselves, subject to variation in environmental conditions, that favor a particular species. In order to effectively manage forests on different wetland habitat types, we need to learn the specific conditions that favor individual tree species.

For general descriptions of forested wetlands, consult *Forested Wetlands – Functions, Benefits and the Use of Best Management Practices* (Wisconsin DNR Publication Number NA-PR-01-95).

(Photo from Kemp Natural Resources Station Archives)

Organization and Application of this Guide

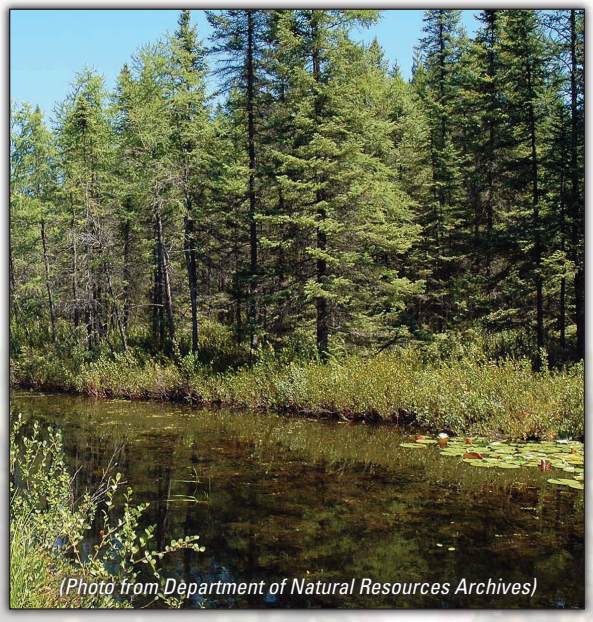
Although aimed primarily as a forest management tool, this basic ecological classification system of northern Wisconsin's forested wetlands is intended to serve diverse users and purposes. Following the introduction and table of contents, you will find field instructions for identifying forest habitat types.

This guide is divided into five independent components:

- **Five Regions (Sections 2, 3, 4, 5 and 6)**
  This component contains identification keys and detailed descriptions for all five habitat type regions for the 19 wetland forest habitat types.
- **Management Implications (Section 7)**
  This component discusses management implications of relative productivity groups for the 19 wetland forest habitat types that occur across the five regions. The five relative productivity groups include: very poor, poor, poor to medium, medium, and medium to rich.
- **Plant Identification (Section 8)**
  This component provides descriptions, illustrations and graphs of position on the moisture/nutrient gradient of most species referred to in this guide.
- **Methodology (Section 9)**
  This component describes the methodology classification system and a historic overview of the research project.
- **Appendices (Section 10)**
  This component includes maps of the Wisconsin ecological landscapes and the Natural Heritage Inventory of forested wetland types. Also included is a plant species checklist for use in field identification of wetland forest habitat types.

(Photo from Kemp Natural Resources Station Archives)

Using the information contained in this guide, natural resource managers can further assess site productivity or wildlife habitat quality, choose feasible management alternatives, and more accurately predict the effectiveness of potential silvicultural treatments. The system is also well suited for prioritizing and directing management activities in wetland forests with emphasis on water quality and the advancing threat of emerald ash borer infestation and other forest health threats.



(Photo from Department of Natural Resources Archives)

Table of Contents

Region 3

Region 4

Region 5

Management Implications

Plant Identification

Methodology of System Development

Appendices

Field Procedure for Identifying Habitat Types

What is a Wetland Forest?

In some cases, it may be difficult to decide whether to use the keys for mesic to wet mesic habitat types in the upland field guide *(A Guide to Forest Communities and Habitat Types, Kotar, Kovach, Burger, 2002)*, or the keys in this guide. Most of the typically "wet site species" listed in the "key to keys" in the upland field guide that lead us to the wet mesic group, also occur on wetland types described in this guide, but usually with higher constancy and/or coverage. On a moisture continuum, the types treated in this guide are distinctly more poorly drained than those described in the upland guide which are characterized as only "somewhat poorly drained."

Some General Clues

- A wetland forest consists of any peatland, bog (with trees) or "swampy" site.
- Cover types dominated by any mixture of: black ash, red maple, northern white cedar, black spruce, white spruce, balsam fir and tamarack. Many other tree species may occur as "off-site" associates, with aspen and birch particularly common.
- Common presence of some of these understory species: Sphagnum Mosses *(Sphagnum* spp.*)*, Cinnamon Fern *(Osmunda cinnamomea)*, Red-osier Dogwood *(Cornus stolonifera)*, speckled alder *(Alnus rugosa)*, Sensitive Fern *(Onoclea sensibilis)*, Dwarf Raspberry *(Rubus pubescens)*, Spotted Touch-me-not *(Impatiens capensis)*, Bunchberry *(Cornus canadensis)*, Goldthread *(Coptis groenlandica)*.

Follow These Steps

1) Before leaving for the field, make copies of the Species Checklist found on pages 9-7 (Scientific Name) or 9-8 (Common Name). You will need one checklist for each location to be habitat typed. ***At the time of this guide's publication, species scientific names were the most current; however, note that some scientific names may now differ.***

2) Determine that you are in an area of a stand that is representative of the habitat as a whole. This can be difficult if the terrain is irregular, which is often the case in lowland stands (e.g., mounds, ridges, slopes). In such cases, more than one habitat type may be present and one must decide whether all or only the most extensive portion will be considered.

3) Outline an area of approximately one-half to one acre (140' x 140' to 200' x 200'). Walk over the area slowly and systematically and fill out the species present on your checklist. Exclude extreme microsites such as rotten logs, stumps, small ridges or plateaus, mounds, and rock outcrops.

   For each present species, enter a "coverage value" of one to four as defined on the checklist. As an alternative to the checklist, you can prepare your own list of all species you encounter.

4) Using the completed checklist, proceed to the keys for your region.

5) Using your species checklist carefully consider statements in the top box and make a "yes" or "no" choice to proceed down the key. **Always start with the top box and do not skip forward without making a decision.** You will be asked to make a "yes" or "no" decision on a statement in a single box, or to chose the more accurate statement comparing two boxes.

6) Carefully read descriptions of potential habitat types in the "Habitat Type Description." You may also want to read descriptions of similar types (adjacent in the key) before deciding on final identification.

7) If the identification cannot be made from the observation of a representative plot because the understory vegetation is sparse, it will be necessary to walk around a larger area of the stand to come up with a cumulative assessment of species presence and relative abundance. Experienced users nearly always follow this method.

8) **Borderline cases.** Each plant association described in this guide represents a central concept of floristic composition for a range of sites known collectively as a habitat type. No specific criteria have been defined to recognize exact boundaries between related habitat types. Some stands will occupy intermediate positions. In this case, a stand can be assigned to the habitat type it most closely resembles or it can be labeled as an intermediate, e.g., ThAbFnC/AbThArAsp.