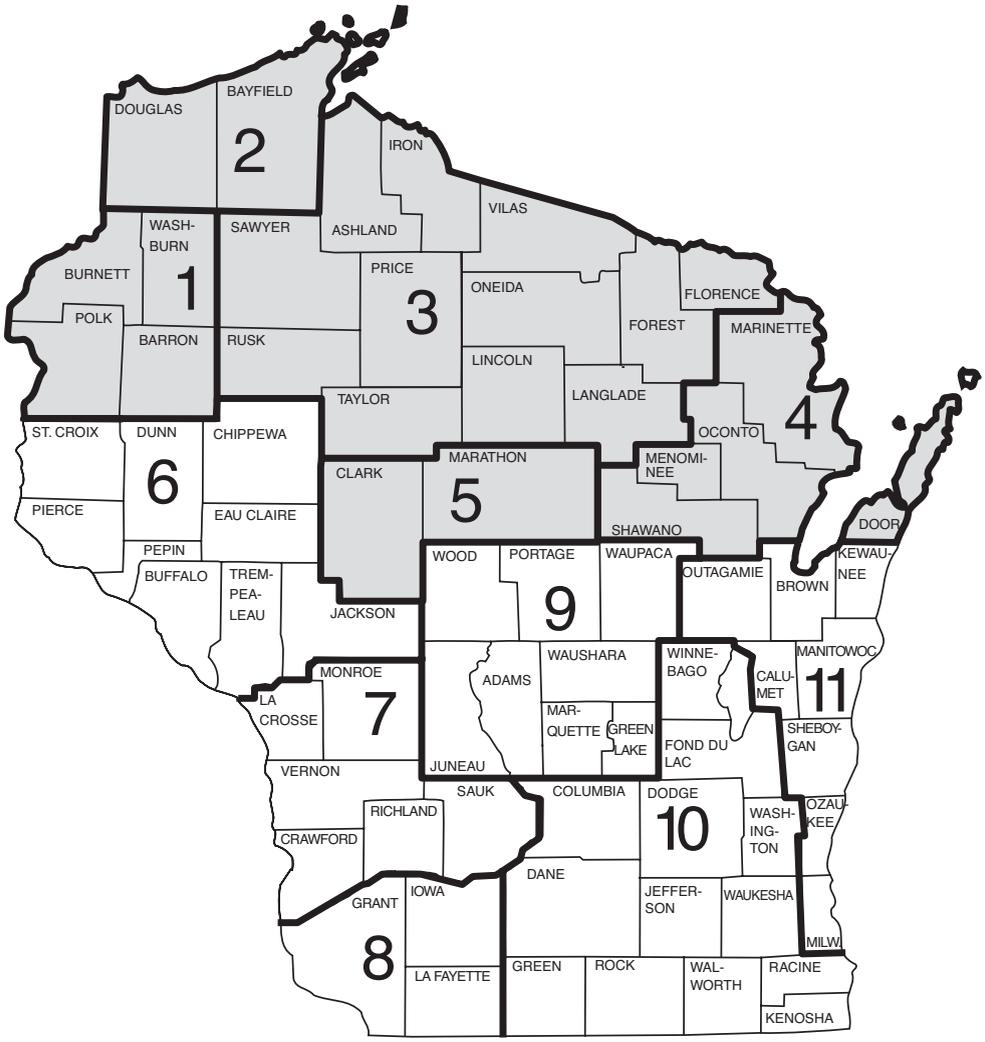




A Guide to
**Forest Communities
and Habitat Types**
of
Northern Wisconsin
Second Edition



**A Guide to
Forest Communities
and Habitat Types
of Northern Wisconsin**

Second Edition

By
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J. Kotar
April, 2002

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ACaCi	Acer saccharum / Caulophyllum thalictroides - Circaea spp.	3-70
ACal	Acer saccharum / Caulophyllum thalictroides - Impatiens capensis	3-80
ACl	Acer saccharum / Clintonia borealis	3-40
AFAAd	Acer saccharum - Fagus grandifolia / Adiantum pedatum	3-66
AFAI	Acer saccharum - Fagus grandifolia / Allium tricoccum	3-68
AFVb	Acer saccharum - Fagus grandifolia / Viburnum acerifolium	3-50
AH	Acer saccharum / Hydrophyllum virginianum	3-74
AHI	Acer saccharum / Hydrophyllum virginianum - Impatiens capensis	3-78
AHVb	Acer saccharum / Hydrophyllum virginianum - Viburnum acerifolium	3-64
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PARVAm	Pinus strobus - Acer rubrum / Vaccinium angustifolium - Amphicarpa bracteata	3-18
PARVAo	Pinus strobus - Acer rubrum / Vaccinium angustifolium - Apocynum androsaemifolium	3-12
PARVHa	Pinus strobus - Acer rubrum / Vaccinium angustifolium - Hamamelis virginiana	3-20
PARVPo	Pinus strobus - Acer rubrum / Vaccinium angustifolium - Polygonatum pubescens	3-26
PARVRh	Pinus strobus - Acer rubrum / Vaccinium angustifolium - Rubus hispidus	3-102
PQE	Pinus strobus - Quercus rubra / Epigaea repens	3-4
PQG	Pinus strobus - Quercus spp. / Gaultheria procumbens	3-6

PQGCe	<i>Pinus strobus</i> - <i>Quercus</i> spp. / <i>Gaultheria procumbens</i> - <i>Ceanothus americanus</i>	3-8
QAp	<i>Quercus</i> spp. / <i>Amorpha canescens</i>	3-14
TFAa	<i>Tsuga canadensis</i> - <i>Fagus grandifolia</i> / <i>Aralia nudicaulis</i>	3-34
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Application and Organization of this Guide

The Forest Habitat Type Classification System is a **site classification** system based on the identification of repeatable patterns in the composition of the understory vegetation. The habitat types are developed independently from the current tree species composition and condition, and can be applied to most upland forest stands. In the Introduction (**Tab 1**) basic concepts and methods are discussed.

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 traits. Included in this section are step-by-step instructions of how to accurately determine habitat types in the field with the use of the keys and tables for each of the five regions of northern Wisconsin. In the Regions section (**Tab 2 and subtabs**), habitat type keys and comparison tables are provided to guide field identification. Plant identification is a skill critical to successful habitat type identification, therefore photographs and drawings of important understory plants are displayed in the section Plant Identification (**Tab 6**).

Forest managers are often charged with the challenging task of assessing site potential when developing management prescriptions for forest stands. When the stand under consideration is filled with vigorously growing stems of desired species and superior form, the assessment of site potential for those species is easy. However, the issue is clouded in stands that are degraded, dominated by less tolerant or undesirable species, or in stands that lack quality stems altogether. Also, the potentials for managing species either not present or poorly represented usually are not clear. In each case, separating the effects of past disturbance from true site capability is often difficult. The habitat type classification system was developed to improve the process of assessing site potential, and to provide a tool to help evaluate management alternatives.

The field determination of habitat types, using the keys and tables included in this guide, is important, but it is not the main use of this guide. Any classification of sites is of marginal value to forest managers unless the classification units are interpreted ecologically. This guide includes

detailed ecological information pertaining to individual habitat types, groups of similar habitat types, and regional associations. Included in the section Habitat Type Descriptions (**Tab 3**) are detailed descriptions of each habitat type in terms of distribution, landforms and soils, common cover types, development of understory features, disturbance history, successional patterns, and management implications. In the Management Implications section (**Tab 4**) similar habitat types are grouped, and each group is discussed in terms of occurrence and distribution, site characteristics (landforms, soils, and moisture and nutrient availability), tree species occurrence and growth potentials, cover type occurrence, advanced reproduction, disturbance and succession, and general management considerations. Regional characteristics, local habitat type occurrence, and relative site quality (moisture and nutrient availability) are addressed in the Regions section (Tab 2). Also included in this section, in addition to identification keys and comparison tables, are a number of summary tables and graphs of frequency of occurrence of understory species and tree species (including advanced reproduction), current cover type occurrence, and tree growth potential. Useful maps displaying ecological trends are included in the Appendix (**Tab 5**).

Using the information contained in this guide, land managers will be better able to assess site potential of current stands, assess feasible management alternatives, choose appropriate management objectives, and more accurately predict the effectiveness of possible silvicultural treatments.

Field Procedure for Identifying Habitat Types

Follow the instructions below:

1. Before leaving for the field make copies of the species checklist found at the end of this Guide. You will need one sheet for each location to be habitat typed.
2. Determine that you are in an area of a stand that is representative of the habitat as a whole. This is sometimes difficult if the terrain is irregular (e.g. mounds and depressions, or ridges, plateaus and slopes). In such cases it is likely that several habitat types are present and one must decide whether all or only the most extensive ones will be considered.
3. Outline an area of approximately 1/2 to 1 acre (140' x 140' to 200' x 200'). Walk over the area slowly and systematically and fill out the species presence checklist. Exclude extreme micro sites

such as rotten logs, stumps, small wet areas and rock outcrops.

For each present species enter a “coverage value” 1-4 as defined on the checklist. You may use a template for estimating coverage, found at the end of the Field Guide. *[Coverage is the area covered by the gross outline (vertical projections) of an individual plant or collectively covered by all individuals of a species within a designated reference area].*

Also write down the species that are not on the list.

4. Using the filled out check list proceed to the keys for your Region. These keys are constructed in a flow chart format so that habitat types at the bottom of the chart are arranged on a relative moisture-nutrient gradient from dry, low-nutrient, on the left, to moist, nutrient-rich, on the right.
5. Again, using your checklist compare the statements in the two boxes joined by a horizontal line. Make your choice, and proceed down the flow chart to the next pair of boxes. **Always start with the top pair of boxes and never skip a box pair.**

The statement in the key “**group below better represented than group on the left/right**” refers to the number of species of the groups

that are present and **not** the total collective coverage.

6. It must also be remembered that the keys are based on relative frequency of occurrence of species on various habitat types. This means that stands may not contain some of the species listed in the keys. In such cases consult **paired comparison tables**.

Following each key are several tables of **paired comparisons**. The tables list only those species whose constancy percentages differ significantly between the types being compared. If the average coverage values also are significantly different, they are shown as a second value, separated from the constancy value by a comma.

The species on your checklist should match the probability of occurrence (the higher constancy values) on one type, more closely than that on the other.

7. Carefully read descriptions of potential habitat types in the “habitat type description” section (**Tab 3**). You may also want to read descriptions of similar types in the same region before deciding on final identification.
8. Sometimes the identification cannot be made from observation of a representative plot because the understory vegetation is fragmented for

various, but not always obvious reasons. In such cases it is necessary to walk around a larger area of the stand to come up with cumulative assessment of species presence and relative abundance. Experienced users almost always follow this method.

9. If a stand has been disturbed continuously over a long period of time, or is a plantation, the habitat type can best be determined from observations in the nearest "undisturbed" stand occupying a similar site in terms of topography and soil.

10. **Borderline cases.** It must be remembered that each plant association described in this Field 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. Many stands will indeed occupy intermediate positions. In such cases, depending on management objectives, a stand can be assigned to the habitat type it resembles most closely, or it can be labeled as an intermediate, e.g., AOCa/AH.

Index to Habitat Types of Northern Wisconsin

Habitat Type Name	Previous Names	Habitat Type Group	Primary Regions	Number of Study Plots	Page No.
PQE	QAE	1 (VD-D)	3	18	3-4
PQG	QA, AQT	1	2	49	3-6
PQGCe	QGCe	1	1	61	3-8
PArV	AQV	1	3	62	3-10
PArV-U	AQV-S	1	2	40	3-10
PArVAo	QV	1	4	50	3-12
QAp	QAp	1	1	19	3-14
PArVAm	PAm, PAm(A)	2 (D-DM)	1	59	3-18
PArVHa	PVHa	2	5	62	3-20
PArVAa	PMV	2	3	114	3-22
PArVAa-Vb	PMV(Vib)	2	4	56	3-22
PArVAa-Po	PMV-P	2	2	13	3-22
PArVPo	PMV(Q)	2	4	12	3-26
AVVb	AVVib	3 (DM)	3	48	3-30
AVCI	AC-V	3	2	24	3-32
TFAa	FArAa	3	Door	9	3-34
AVDe	AVDe	3	1	51	3-36
AVb-V	AQVib-V	3	5	10	3-38
ACI	AC	3	2	27	3-40
AVb	AQVib, AVib	3	3,4,5	62	3-42
AAAt	AA	3	1	62	3-44
ATFPo	AFTPo	3	Door	17	3-46
AFVb	AFVib	4 (M)	4	26	3-50
ATM	ATM	4	2,3,4,5	230	3-52
ATFSt	AFSt	4	Door	8	3-54
ATFD	ATFD, AFD	4	4	15	3-56
AAAs	AAr	4	2	22	3-58
ATD	ATD	4	3	72	3-60
ATDH	ATDH	4	4	22	3-62
AHVb	AHVib	4	5	9	3-64
AFAd	AFAd	4	4	12	3-66
AFAl	AFAl	4	Door	13	3-68
ACaCi	ACaCi, ACaCi(H)	4	1	28	3-70
AOCa	AViO, AViO(Ca)	4	3	186	3-72
AH	AH, AH(Ci)	4	3,4,5	97	3-74
AHI	AH(I)	5 (M-WM)	3,4,5	47	3-78
ACal	AViO(I), ATD(I)	5	3	58	3-80
ASal	ACaCi(I)	5	1	17	3-82
ATAtOn	ATM-As	5	3,4,5	85	3-84
ASnMi	AASM	5	2	29	3-86
AAtRp		5	2	14	3-88
TMC	TMC, TMC(D)	5	3,4,5	202	3-90
ArAbCo		5	3	83	3-92
ArAbSn	AArS	5	2	69	3-94
ArVRp		5	1	10	3-96
ArAbVCo	ArC	5	2	17	3-98
ArAbVC	TMC(V)	5	3,4	95	3-100
PArVRh	PVRh	5	5	16	3-102

Habitat Type Scientific Names for Northern Wisconsin

Abbrev.	Grp	Habitat Type	Full Scientific Name
PQE	1	Pinus strobus - Quercus rubra / Epigaea repens	
PQG	1	Pinus strobus - Quercus spp. / Gaultheria procumbens	
PQGCe	1	Pinus strobus - Quercus spp. / Gaultheria procumbens - Ceanothus americanus	
PARv	1	Pinus strobus - Acer rubrum / Vaccinium angustifolium	
PARv-U	1	Pinus strobus - Acer rubrum / Vaccinium angustifolium, Uvularia sessilifolia variant	
PARVAo	1	Pinus strobus - Acer rubrum / Vaccinium angustifolium - Apocynum androsaemifolium	
QAp	1	Quercus spp. / Amorpha canescens	
PARVAm	2	Pinus strobus - Acer rubrum / Vaccinium angustifolium - Amphicarpa bracteata	
PARVHa	2	Pinus strobus - Acer rubrum / Vaccinium angustifolium - Hamamelis virginiana	
PARVAa	2	Pinus strobus - Acer rubrum / Vaccinium angustifolium - Aralia nudicaulis	
PARVAa-Vb	2	Pinus strobus - Acer rubrum / Vaccinium angustifolium - Aralia nudicaulis, Viburnum acerifolium variant	
PARVAa-Po	2	Pinus strobus - Acer rubrum / Vaccinium angustifolium - Aralia nudicaulis, Polygonatum pubescens variant	
PARVPo	2	Pinus strobus - Acer rubrum / Vaccinium angustifolium - Polygonatum pubescens	
AVVb	3	Acer saccharum / Vaccinium angustifolium - Viburnum acerifolium	
AVCI	3	Acer saccharum / Vaccinium spp. - Clintonia borealis	
TFAa	3	Tsuga canadensis - Fagus grandifolia / Aralia nudicaulis	
AVDe	3	Acer saccharum / Vaccinium angustifolium - Desmodium glutinosum	
AVb-V	3	Acer saccharum / Viburnum acerifolium, Vaccinium angustifolium variant	
ACI	3	Acer saccharum / Clintonia borealis	
AVb	3	Acer saccharum / Viburnum acerifolium	
AAt	3	Acer saccharum / Athyrium filix-femina	
ATFPo	3	Acer saccharum - Tsuga canadensis - Fagus grandifolia / Polygonatum pubescens	
AFVb	4	Acer saccharum - Fagus grandifolia / Viburnum acerifolium	
ATM	4	Acer saccharum - Tsuga canadensis / Maianthemum canadense	
ATFSt	4	Acer saccharum - Tsuga canadensis - Fagus grandifolia / Streptopus roseus	
ATFD	4	Acer saccharum - Tsuga canadensis - Fagus grandifolia / Dryopteris spinulosa	
AAs	4	Acer saccharum / Arisaema atrorubens	
ATD	4	Acer saccharum - Tsuga canadensis / Dryopteris spinulosa	
ATDH	4	Acer saccharum - Tsuga canadensis / Dryopteris spinulosa - Hydrophyllum virginianum	
AHVb	4	Acer saccharum / Hydrophyllum virginianum - Viburnum acerifolium	
AFAd	4	Acer saccharum - Fagus grandifolia / Adiantum pedatum	
AFAI	4	Acer saccharum - Fagus grandifolia / Allium tricoccum	
ACaCi	4	Acer saccharum / Caulophyllum thalictroides - Circaea spp.	
AOCa	4	Acer saccharum / Osmorhiza claytoni - Caulophyllum thalictroides	
AH	4	Acer saccharum / Hydrophyllum virginianum	
AHI	5	Acer saccharum / Hydrophyllum virginianum - Impatiens capensis	
ACal	5	Acer saccharum / Caulophyllum thalictroides - Impatiens capensis	
ASal	5	Acer saccharum / Sanguinaria canadensis - Impatiens capensis	
ATAIOn	5	Acer saccharum - Tsuga canadensis / Athyrium filix-femina - Onoclea sensibilis	
ASnMi	5	Acer saccharum / Sanicula spp. - Mitchella repens	
AAtRp	5	Acer saccharum / Athyrium filix-femina - Rubus pubescens	
TMC	5	Tsuga canadensis / Maianthemum canadense - Coptis groenlandica	
ArAbCo	5	Acer rubrum - Abies balsamea / Cornus canadensis	
ArAbSn	5	Acer rubrum - Abies balsamea / Sanicula spp.	
ArVRp	5	Acer rubrum / Vaccinium spp. - Rubus pubescens	
ArAbVCo	5	Acer rubrum - Abies balsamea / Vaccinium spp. - Cornus canadensis	
ArAbVC	5	Acer rubrum - Abies balsamea / Vaccinium spp. - Coptis groenlandica	
PARVRh	5	Pinus strobus - Acer rubrum / Vaccinium angustifolium - Rubus hispidus	

Foreword to the Second Edition

The 1988 publishing of the *Field Guide to Forest Habitat Types of Northern Wisconsin* was a summary of the information we had up to that date. Many habitat types were based on work done in the Upper Peninsula of Michigan as well as scattered yet geographically inconsistent sampling in northern Wisconsin. Samples in some areas of northern Wisconsin were under-represented.

Since the publication of the 1988 Guide, additional sampling was carried out on the Menominee Indian Reservation and in Oconto, Douglas, Bayfield, Marathon, and Door Counties. Through cooperation of the NRCS soil scientists, we also obtained valuable information from Marinette and Clark Counties. This work led to the delineation of many additional habitat types.

A significant opportunity to expand our database, classification, and knowledge of northern Wisconsin habitat types came with the last cycle of the Forest Inventory and Analysis (FIA). As part of the 1994-96 inventory, approximately 5600 forest land ground plots were classified by

habitat type. The analysis of the 1996 forest statistics by habitat type yielded a wealth of new information, such as the extent and distribution of individual habitat types, the composition of current stands, timber volumes, and relative growth of various species on different habitat types. Much of this information is summarized in the North Central Research Station General Technical Report NC 207.

As part of the FIA habitat type identification project, complete species lists were obtained for all plots. This information enabled us to greatly expand our floristic databases for individual habitat types. It also facilitated the systematic examination of wet-mesic sites (which previously had been poorly sampled). Several wet-mesic habitat types were redefined, and several new types were delineated. This resulted in a few habitat types and poorly defined phases being replaced by thirteen comprehensive and well defined wet-mesic habitat types representing about two million acres of northern forest land.

With this new information also came the need for redefining the

five northern habitat type Regions and renaming some of the habitat types. Because we now have a more complete picture of the floristic variation across the state we were able to apply consistent criteria in the habitat type nomenclature. We realize that old users

of the system might find these changes cumbersome at first, but we believe that we have produced a more logical, consistent and ecologically sound classification system.

John Kotar
March, 2002

Introduction

Rationale for plant community and site classification

In order to effectively manage forest resources, classification systems are needed. Traditionally, resource classifications have been developed only for specific uses. Forest cover type, for example, traditionally a standard classification unit for forest management, has serious limitations as ecological basis for developing management prescriptions. Forest cover types are based entirely on current dominant, and most often successional, tree species. Thus, stands of a given cover type encompass a wide range of environmental conditions, and therefore have different productivity potentials, and respond differently to same management techniques. Similarly, systems that classify or map landscapes based entirely on physical factors (e.g. physiographic maps or soil surveys) are inadequate for management if they do not include ecological interpretations of communities (e.g. composition, growth, dynamics) that are associated with individual physical landscape units. For example, the hundreds of soil map units in Wisconsin clearly do not represent

individual or distinct ecological, nor management units. In order to be useful for management interpretations they must be grouped into ecologically meaningful categories and must be accompanied by pertinent ecological interpretation.

If we desire to place management on an ecological foundation, a system that delineates and explains some basic ecological units is needed. The **habitat type classification** system uses natural vegetation (potential as well as current) to recognize ecologically equivalent vegetation communities and landscape units.

The habitat type system is a natural classification system for both, forest communities, and the sites on which they develop. It serves the following basic functions:

1. Communication - It provides managers and researchers with a common language for describing forest communities and sites.
2. Research - It provides a framework for systematic gathering and interpretation of research data and empirical knowledge.
3. Management interpretation- It enables resource managers to develop long-term management objectives

and specific prescriptions for manipulating vegetation based on knowledge of ecological potential of the land.

The Habitat Type Concept

The habitat type concept has its origins in the works of European ecologists in the early part of this century. They first discovered that, although no two plant communities are ever identical in terms of their floristic composition, plants are nevertheless found in recognizable assemblages. These assemblages later became known as “plant associations”. While it became obvious that some assemblages reflect various disturbance regimes, it was also shown that other floristic patterns reflect differences in site itself.

In the United States Rexford Daubenmire demonstrated that climax communities on similar sites showed the strongest resemblance to each other. He named these communities “climax associations” and the site they represent he referred to as “habitat type” (Daubenmire 1966). In subsequent use the term habitat type has been applied to both, the plant association and the corresponding site type (Coffman et al. 1980, Kotar et al. 1988, Pfister and Arno 1989).

A “habitat type” includes all sites, or areas, capable of producing similar mature plant communities.

Because it is the long-term result of plant succession and community development, the climax, or late-successional plant community reflects the most meaningful integration of those environmental factors that affect vegetation. Each recognizable habitat type represents a relatively narrow segment of environmental variation that is characterized by certain potential for vegetation development. Although, at any given time, a habitat type supports a variety of disturbance-induced, or seral plant communities, the ultimate product of succession, anywhere within the habitat type, is presumed to be a similar climax community.

Daubenmire originally characterized and named habitat types by species characteristic of climax communities. Habitat type name included the name of the tree species most capable of perpetuating itself in the absence of disturbance, and a name of a characteristic understory species of that site type (Daubenmire and Daubenmire 1968). Most tree species have a wide ecological amplitude (i.e. they occur over a wide range of environmental conditions) as members of successional communities, but have capacity to persist in

the absence of disturbance, only within a portion of the gradient.

For example, in Wisconsin, white pine occurs on dry sandy soils as well as on rich moist soils. However, only on dry and dry-mesic soils, where moisture and nutrient demanding species, such as sugar maple, do not occur, can white pine persist in mature communities. Such sites would be classified as "white pine habitat types".

On all other sites, white pine would gradually be replaced by shade-tolerant species through a successional process. The range of sites where white pine successfully competes can further be subdivided into very dry and dry-mesic segments. These segments can be recognized by presence and absence of certain understory plants.

For example, on dry-mesic sites we may find tick trefoil, but blueberries are absent or poorly represented, whereas on the drier sites blueberries tend to dominate and tick trefoil is absent. We could now distinguish between Pine/blueberry and Pine/tick trefoil habitat types. For this classification we have taken advantage of understory species whose ecological amplitude (range of environments) is not as wide as that of white pine.

Although habitat types were originally defined in terms of floristic composition of presumed

climax communities, subsequent studies in various parts of the world, including Wisconsin and Minnesota, have shown that following a disturbance, the understory vegetation progresses more rapidly toward floristic mixtures resembling mature communities than does the succession in the tree layer. In other words, floristic composition, if not the relative dominance, of the understory becomes relatively stable soon after the canopy closes (Coffman and Willis 1977). Even before this stabilization occurs it is often possible to identify the diagnostic species among the temporary dominants.

Most pioneering species are intolerant of shade and are easily identified. For stands of early successional stages, the habitat type can often be identified by comparing understory floristic composition with that of adjacent, more mature stands, having similar topographic and soil features.

The habitat type system is a method of site classification that uses the floristic composition of plant community (understory species as well as trees) as an integrated indicator of those environmental factors that affect species reproduction, growth, competition, and therefore, community development.

Distinction Between Indicator Species, Ecological Species Groups and Differential or Diagnostic Species

It must be emphasized that habitat types are characterized by defined abstract plant **associations** (species combinations) and not by individual “indicator species.” If this distinction is overlooked it can lead to misidentification of the habitat type and possibly to mismanagement of the site.

No single species has been found, that by itself indicates a particular habitat type. Nevertheless, some species are useful as indicators of relatively narrow segments of environmental gradient or groups of similar habitat types. For example, a common occurrence of blueberries or wintergreen, indicates a site low in nutrients, while blue cohosh or bloodroot reflect sites relatively rich in nutrients. These species can therefore be used as indicators of relatively infertile or relatively fertile sites in general.

Within a given climatic region, species that behave similarly in respect to a particular environmental factor (e.g. moisture, or nutrient level) are often grouped into “ecological species groups”. Presence of any member of the group can be used to draw conclusions regarding the relative status of a particular environ-

mental factor. However, single indicator species or ecological species groups are generally not adequate for identification of specific habitat types. To do this, we must apply the concept of “differential” or “diagnostic” species.

Differential or diagnostic species have meaning only in the context of specific habitat types being compared. Thus, a differential species is one that occurs with a high degree of constancy (i.e., was present in a large number of reference stands that made up a given type) or has high coverage on one habitat type, but is absent, occurs with low constancy, or has low coverage, on another (Mueller-Dombois and Egler 1974). However, the same species may also occur on several other habitat types where it has no diagnostic value for distinguishing among them.

Thus, **in applying this classification one must never assume that the species that appear in the habitat type name automatically identify the type.** One also cannot reliably identify habitat types by randomly searching for presumed “indicator” species. Instead, one should follow the steps outlined in the “How to use this guide” section of this book.

Habitat Type Relationships to Soils and Topography

Within a given climatic region, soils and topography are the primary factors responsible for site differences in terms of vegetation composition, growth and development. Throughout most of the Lake States local topography is not very pronounced and soil differences are the main cause of variation in potential climax communities and thus habitat type differentiation. However, soil map units delineated in soil surveys (conducted by Natural Resource Conservation Service - NRCS), usually do not coincide exactly with a given habitat type, although strong relationships often exist (Kotar 1986).

The reasons for the lack of direct correlations are found in the concepts of soil taxonomy and soil mapping methodology. Soil properties that affect habitat type differentiation are those that affect conditions of plant growth, such as moisture and nutrients. Soil taxonomy, however, is not based directly on such functional properties, but rather on morphological features that can more readily be measured and classified (e.g. type of horizon, color, structure and texture). These soil taxonomy parameters may or may not have a direct bearing on plant growth. Various combinations of soil properties that are used to delineate differ-

ent soil map units often have the same net effect on vegetation and therefore numerous map units represent the same habitat type.

This is why, for example, there are more than one hundred times as many soil map units delineated in Wisconsin than there are habitat types. However, in spite of their high number, soil map units often do not distinguish between ecologically important properties or combinations of properties. As a result, two or more distinct habitat types may be associated with the same soil map unit.

Because soil surveys were intended for a wide range of uses, map unit interpretations have to be made for each specific use. Traditionally, heavy emphasis has been on interpretation of suitability for growing various agricultural crops. This is relatively easily accomplished because direct measurements of annual yields of agricultural crops can be rapidly collected.

However, interpretations in terms of tree growth and development of forest communities are much more difficult and have not been attempted. Nevertheless, the increasing desire by society to manage forests on a more ecological basis is generating a need to provide ecological interpretation of soil surveys.

Relationship of the Habitat Type System to Other Site and Plant Community Classifications in Wisconsin

The National Hierarchy of Ecological Units (NHFEU)

The habitat type system is best suited for interpreting the ecological potential of various sites and the expected development of existing forest communities. However, habitat types often do not directly reflect potential operational limitations of the site, or the significance of a particular site in the context of larger landscapes. Direct field mapping of habitat types also tends to be time consuming and expensive.

To delineate landscape units of similar overall capability and to facilitate habitat type mapping it is best to establish habitat type relationships with physical features that are easier to map, or have already been mapped. Physiographic landforms and soils are well suited for this purpose and are being used as a basis for site classification by the U.S. Forest Service. Although, specific approaches vary, all National Forests follow the same basic concepts. The system, known as "The National Hierarchy of Ecological Units" (NHFEU), is based on the nesting of smaller, more homogeneous land units within progres-

In Wisconsin, the NRCS is accomplishing this by developing relationships between soil map units and habitat types. In ongoing soil surveys habitat type identifications are made in the field as soil map units are delineated. In this way relative frequencies of different habitat type occurrence on each soil map unit is being established. In counties where surveys have already been completed, sub-sampling of major soil map units is being conducted to develop probabilities of habitat type association.

In general, we find that each soil map unit is associated with only one or two closely related habitat types. Because no more than five to ten habitat types normally occur in a given county, where more than a hundred soil map units may be recognized, the soil survey interpretation for forest management is considerably simplified. Large numbers of soil map units are combined into a small number of groups according to habitat types they represent. The NRCS is rapidly computerizing this information and is making it available to users in various forms, including Geographic Information Systems (GIS).

sively larger, less homogeneous units (McNab and Avers 1994). The lowest unit of the hierarchy is an Ecological Land Type (ELT), or Ecological Land Type Phase (ELTP). These units are recognized as combinations of specific landform elements (e.g. topographic position, slope, aspect, etc.), and specific soil. If ELTs or ELTPs are homogeneous enough to support only one potential mature association (i.e. one habitat type) they can be considered to represent ecosystem units with similar biological potential and similar response to given management practices.

Although the NHFEU, to the ELT level, currently exists only on some National Forests, there are distinct advantages to having both systems available. The habitat type system provides information on community composition, growth potential of individual species and community dynamics, while the NHFEU provides spatial information, identifies physical limitations of a site, and aids in ecological interpretation of landscape patterns.

Relationship to forest community types of Curtis

The "Vegetation of Wisconsin" (Curtis 1959) remains the single most comprehensive treatment of the range of Wisconsin's plant communities. However, Curtis' classification of forest communi-

ties is rather general. He divided Wisconsin into two floristic regions: northern and southern. The southern region roughly corresponds to the area treated in this guide.

For each of the two regions Curtis constructed an abstract moisture gradient (also called compositional gradient) based on relative importance of various tree species in sampled stands. As reference species, he used sugar maple for the mesic, and bur oak for the dry end of the gradient. He divided this gradient into five segments, labeled: wet, wet-mesic, mesic, dry-mesic and dry. A key, based on species composition of the tree layer is provided to assign a community to one of the five segments.

Plant associations, or habitat types, delineated in this guide generally correspond to Curtis' moisture gradient segments, but because they are developed for smaller geographic areas, they better describe composition of actual communities. There are, however, situations where the two approaches lead to different classifications. For example, an oak-pine dominated community is always assigned to the dry forest segment by Curtis' method (based on tree species composition only), whereas the habitat type approach, based on floristic composition of the understory, may find the community

to be dry, dry-mesic, or mesic. The reason being, that current dominance by xeric tree species could either be the result of recent disturbance of a dry-mesic or mesic site, or it could be representing a relatively stable condition on a xeric site. In general, understory composition more accurately reflects site conditions than do the trees. For further discussion of this topic see Kotar et al. 1988.

Plant Identification: Scientific versus Common Names

It should be noted that scientific names are universal and exclusive (i.e. the name assigned to a species is governed by strict international rules), whereas common names are neither. One species usually has several unrelated common names (e.g., blue-bead lilly or yellow beادلilly, for *Clintonia borealis*), or one common name can apply to several different species. For example, spiknard is used for *Aralia racemosa* (Sarsaparilla family) and *Smilacina racemosa* (Lily family).

In addition, same common name is often applied to many species of the same genus that are ecologically very different from one another. For example, buttercup, wild geranium, and goldenrod each apply to dozens of species in the Ranunculus,

Geranium, and Solidago genera, respectively.

Although we have included common names in this guide, bear in mind the pitfalls described above. The use of scientific names is encouraged. Scientific names need not be as intimidating as is often supposed. Pronunciation is not important as long as the name can be understood. Our experience shows that individuals without formal training in botany quickly learn to at least recognize scientific names in print and can make good use of the field guide.

Methods

Field procedures

The classification is based on systematic sampling of closed-canopy forest stands across a range of landforms and soils within a relatively small, climatically homogeneous region. Although we attempted to include as many landform-soil combinations as possible the most extreme sites where productive forests apparently do not develop were excluded (e.g. narrow ridges or steep south-facing slopes with thin soils). Sample stands were free of large canopy gaps, skid roads or other recent disturbances. In each stand a 21-m x 14-m (approximately 300 square meters) macro plot was laid out. The plot was further

subdivided into six 7 m x 7 m subplots.

Within each of the subplots all plant species, with the exception of grasses, sedges and mosses, were identified and their abundance estimated according to six coverage classes: 1, <1%; 2, 1-5%; 3, 5-25%; 4, 25-50%; 5, 50-75%; 6, >75%. Plants were divided into the following categories: trees (large trees, poles, saplings, seedlings), shrubs and herbs. Species coverage values for the six subplots were later averaged to obtain one value for the macroplot. Basic soil characteristics (depth, texture) and other site characteristics (slope position, aspect) were also recorded.

Delineation of ecological floristic groups or abstract associations

Vegetation analysis forms the basis for the classification. The first step in this process is to produce an ordered association table. Such a table consists of rows and columns, where rows are species and columns are sample plots. The columns and rows are sorted in such ways that sample plots, which share most species in common, are grouped together. A computer program TWINSPLAN (Hill, 1979) was used to produce the first approximation. The grouping of plots by this program does not

necessarily represent ecological groupings or associations. Interpretation of these computer-generated groups and final delineation of associations involves comparisons with databases from other regions and information on habitat preferences of various species accumulated through previous studies.

Relationship of floristic associations to environment

The ecological relationships among delineated floristic groups were examined through the Synecological Coordinates ordination (Bakuzis 1959, Bakuzis and Kurmis 1978, Gutierrez-Espeleta 1996). On the basis of extensive studies in Minnesota, Bakuzis assigned each forest species (trees, shrubs and ground flora) a value of 1-5 to indicate the species' requirements (for optimal growth and survival) under competitive conditions) for each of four site factors: moisture, nutrients, light and heat. He termed these values "synecological coordinates." For example, a species with a moisture index of 5 occurs primarily in very wet environments, while another, with an index of 1, occurs primarily on droughty sites.

Using Bakuzis' list of synecological coordinates values, an estimate of environmental conditions of a given site is obtained by

calculating a mean index from the individual indices of all species present on that site.

We used the moisture and nutrient indices to calculate and plot the means for all sample plots in our data sets. The plots representing floristic groups delineated in a given region formed clusters with varying degree of overlap among the most similar groups. The circular or oval fields in the moisture/nutrient graphs presented in this field guide were drawn so that they include at least 90% of the plots representing each floristic group (habitat type). Descriptive terms (e.g., dry, dry-mesic, mesic and poor, medium, rich) were arbitrarily assigned to segments of moisture and nutrient axes to provide more visual interpretation of the physical environment of various habitat types.

Naming the Habitat Types

Because plant associations described above reflect particular site conditions (i.e. segments of environmental gradient) they are considered as habitat type indicators. Thus, the association's name refers to both the diagnostic plant assemblage and the site type (habitat type).

Habitat type names, although somewhat arbitrary, are based on ecological criteria. Each type

is named, in part, after a tree species that shows strongest tendency to dominate a community on that site type in the absence of disturbance. This is usually the most shade tolerant species that the site type is capable of supporting. For example, sugar maple is one of the most shade tolerant trees in the Lake States, but its ecological amplitude is restricted to mesic and dry-mesic nutrient-rich sites. On drier and less fertile sites it grows poorly or not at all and other, less moisture and nutrient requiring species such as white pine or red maple assume potential dominance.

Throughout the Lake States, sugar maple (*Acer saccharum*) is the potential dominant climax species on all mesic and some dry mesic site types. In some regions, beech (*Fagus grandifolia*) is a common associate of sugar maple; thus the habitat types contain both names e.g. **Acer-Fagus/Adiantum** For convenience the name is abbreviated **AFAd**. The second part of the name, in this case **Ad** - for **Adiantum pedatum** (maidenhair fern), is one of the characteristic understory species of a mesic sugar maple - beech association. It is used to distinguish this association (or habitat type) from other mesic sugar maple-beech types e.g. **AFAl** (**Acer-Fagus/ Allium**).

In a few instances, a habitat type that occurs across a wide geographic area displays minor regional floristic differences. In such cases we recognize geographic **variants**. Habitat type variants are presumed to represent similar if not identical ecological characteristics, but are recognized separately in order to customize regional identification keys and to provide opportunity for further study of potential ecological differences among them.

Regional Division

Although habitat types representing same segments of moisture-nutrient gradient in various parts of the State may not differ significantly in terms of basic management implications, sufficient regional floristic variation exists to warrant the delineation of region-specific floristic groupings (or abstract associations). This approach leads to the identification of a greater

number of species with high constancy values for each habitat type than would be possible if only one generalized association were delineated for a large geographic region. Ultimately, this approach allows for the construction of more reliable floristic identification keys and more precise descriptions of habitat type characteristics.

The five regions included in this field guide were based on such factors as physiography, soils, climate and composition of plant communities. The exact boundaries between these regions cannot be precisely delineated because soils, climate and flora boundaries are always gradual and they probably never coincide. For convenience, counties were grouped into regions in such a way that each region could be characterized by at least one major natural feature. (See specific descriptions for each region).

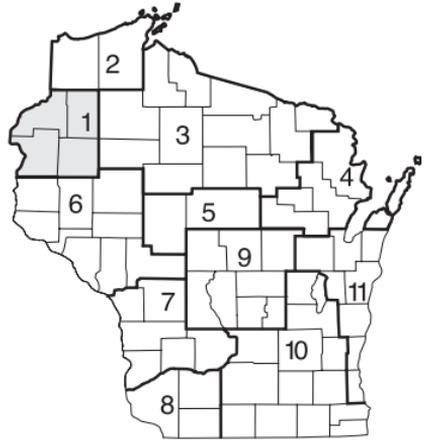
Region 1 - Habitat Type Distribution

Habitat Type	Occurrence in the Region	Primary Landforms and Soils	Page No.
PQGCe	Very common in Burnett and Washburn Counties, and uncommon in Polk and Barron Counties.	Deep, excessively drained, outwash sands.	3-8
QAp	Occurs in NW Polk and SW Burnett Counties.	Deep, excessively drained, outwash sands.	3-14
PARVAm	Common in Burnett and Washburn Counties, and minor in Polk and Barron Counties.	Sandy outwash soils, but also water worked sands on lake plains and moraines.	3-18
AVDe	Common in Washburn and Barron Counties, and minor in Polk and Burnett Counties.	Well drained sandy loams and loamy sands on rolling moraines and outwash.	3-36
AAAt	Common in Washburn, Barron, and Polk Counties, and minor in Burnett County.	Well drained loamy till and loess.	3-44
ACaCi	Very common in Barron and Polk Counties, and minor in southern Washburn and Burnett Counties.	Well drained loamy till and loess.	3-70
ASal	Scattered in Polk and Barron Counties, and uncommon in southern Washburn and Burnett Counties.	Somewhat poorly drained loamy till and loess.	3-82
ArVRp	Scattered in Burnett County, and uncommon in the other three counties.	Somewhat poorly drained outwash sands, but also water worked sands on lake plains and moraines.	3-96

Region 1

Extent, topography, geology and soils

Region 1 encompasses Burnett, Washburn, Polk and Barron Counties. The greater part of the Region was glaciated during the Wisconsin Glacial Period, only the southern fringe of Barron County is blanketed by older till. The most extensive glacial feature is the level to rolling pitted outwash plain that covers much of Burnett and Washburn counties and extends NE into Region 2. Typical soils are podzolized sands. The rest of the region is covered by till and loess deposits. An undulating to hilly end moraine system extends from SW Polk through NW Barron into southern Washburn County. Extensive recessional and end moraine systems also occur along the eastern boundary of the Region. Podzolized stony loams are principal soils. The soils of the level to undulating ground moraine predominant in Barron County are mostly slowly permeable loams and silt loams. Silt loam soils developed in silt caps deposited on till or outwash are most common in Polk and Barron Counties. All habitat type groups from very dry to wet-mesic are nearly equally represented in the Region. See maps of the Natural Divisions of



Wisconsin (Hole and Germaine 1994) and Sections and Subsections of Wisconsin (WI DNR 2001) for further characterizations of the region.

Forest vegetation

At the time of European settlement, the entire outwash plain region was dominated by pines (jack, red, white). Communities ranged from barrens to savanna to closed canopy forests, depending largely on the type of fire regime. Within Region 1, Jack pine was the dominant species along the northern half of the outwash plain, while red and white pine dominated communities were more prevalent in the southern and eastern portions. White and red pines were greatly reduced by logging, and jack pine communities also are

less abundant. Currently, pine plantations, aspen, oaks (pin, red, bur, white), and red maple dominate most communities. (See Radeloff et al. 1999 for discussion of ecological history of this area).

On the morainic landscapes mixed deciduous-coniferous forests were most common. Irregular mixtures of sugar maple, basswood, oaks (white and red), and pines (white and red) were characteristic. Proximity to the outwash plains and prairies, and the drier climate facilitated more frequent fires than is typical of other morainic

systems in northern Wisconsin. Towards the SW, fires occurred with increasing frequency resulting in greater representation of oaks, aspen, pines, brush, and prairies. Another important characteristic of forests of this region is the general absence of hemlock. Current forests typically are mixtures of all of the species mentioned above, but pines are much less well represented and oaks, aspen, red maple and sugar maple are better represented than they were in presettlement time.

Region 1 Key to Habitat Types

- 1 Soil somewhat poorly drained. Two or more present: *Cornus canadensis* / bunchberry (c), *Rubus pubescens* / dwarf raspberry (c), *Rubus hispidus* / swamp dewberry, *Alnus rugosa* / speckled alder, *Oxalis montana* / wood sorrel, *Onoclea sensibilis* / sensitive fern, *Equisetum spp.* / horsetails, *Impatiens capensis* / jewelweed

go to Key A

- 1 Soil moderately well drained to excessively drained. Species listed in 1 above rarely present

go to Key B

Terms used in keys:

common (c): >1% coverage

well represented (w): >5% coverage

better represented: more species are present (does not refer to coverage)

Region 1 Transitions to Adjoining Regions:

1. In extreme northeastern Washburn County, use Region 3 mesic and wet-mesic habitat types.
2. In extreme northwestern Burnett County (NW of the St. Croix river), compare with Region 2. The following habitat types can occur: AVCI, ACI, AAs, AAtRp, and ArAbVCo.
3. Undefined habitat types occur along the seepage slopes of the St. Croix spillway.
4. In extreme southern Polk and Barron Counties, Region 6 habitat types could occur.

Region 1 - Key A to Habitat Types (Scientific Names)

Group below better represented than group on right:	
Cornus canadensis (c)	Vaccinium spp.
Rubus pubescens (c)	Gaultheria procumbens
Rubus hispidus	Lysimachia quadrifolia
Lycopodium spp .	Diervilla lonicera (c)

ArVRp
3-96

Region 1 - Key A to Habitat Types (Common Names)

Group below better represented than group on right:	
Bunchberry (c)	Blueberries
Dwarf raspberry (c)	Wintergreen
Swamp dewberry	Whorled loosestrife
Clubmosses	Bush honeysuckle (c)

ArVRp
3-96

Group below better represented than group on left:

Sanguinaria canadensis

Hydrophyllum virginianum

Hepatica acutiloba

Adiantum pedatum

Arisaema atrorubens

Impatiens capensis

Circaea spp.

Sanicula spp.

ASal
3-82

Group below better represented than group on left:

Bloodroot

Virginia waterleaf

Sharp-lobed hepatica

Maidenhair fern

Jack-in-the-pulpit

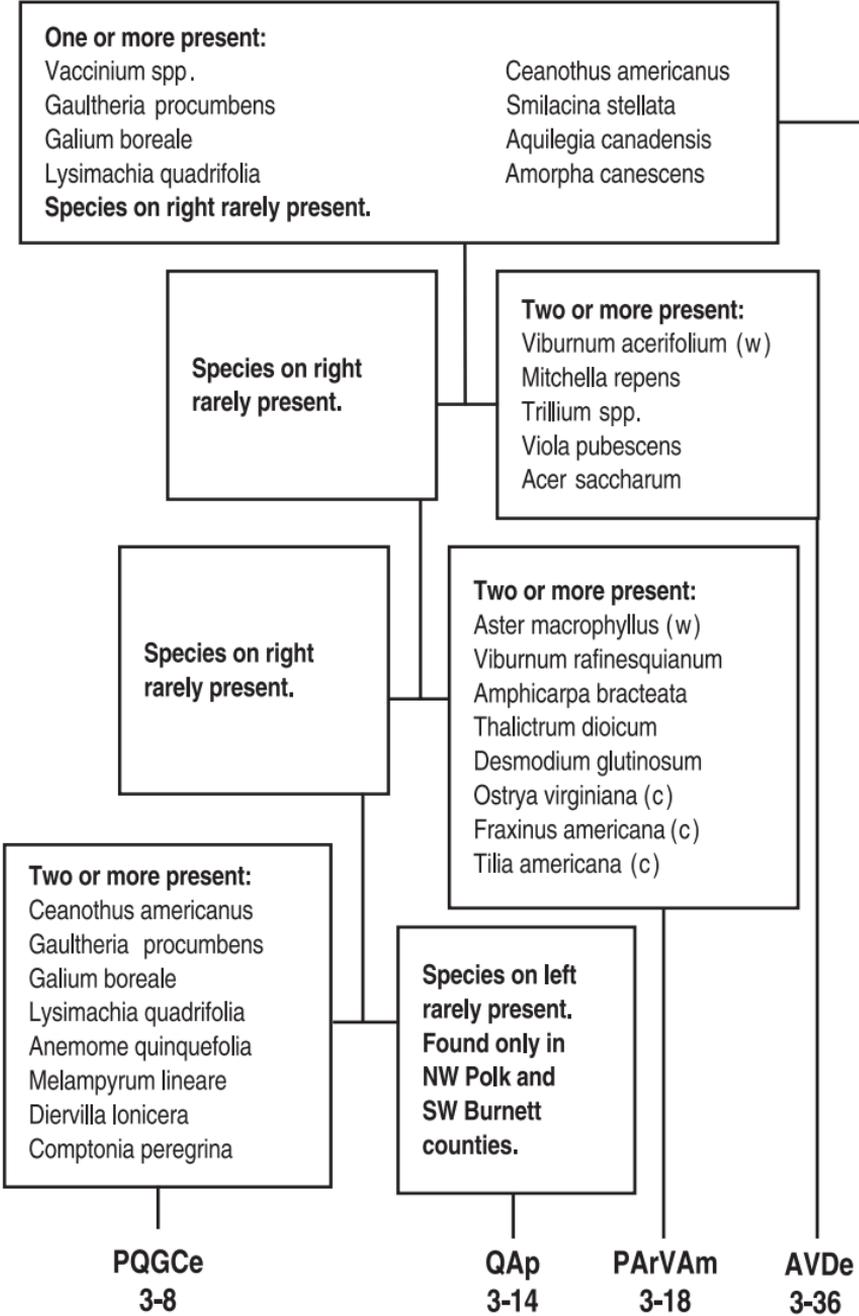
Jewelweed

Enchanter's nightshades

Snakeroot

ASal
3-82

Region 1 - Key B to Habitat Types (Scientific Names)



Two or more present or one well represented:

Actaea spp.

Osmorhiza claytoni

Solidago flexicaulis

Athyrium filix-femina

Species on left rarely present.

Botrychium virginianum

Adiantum pedatum

Circaea spp.

Caulophyllum thalictroides

**Species on right
rarely present.**

Two or more present:

Caulophyllum thalictroides

Sanguinaria canadensis

Hydrophyllum virginianum

Hepatica acutiloba

Arisaema atrorubens

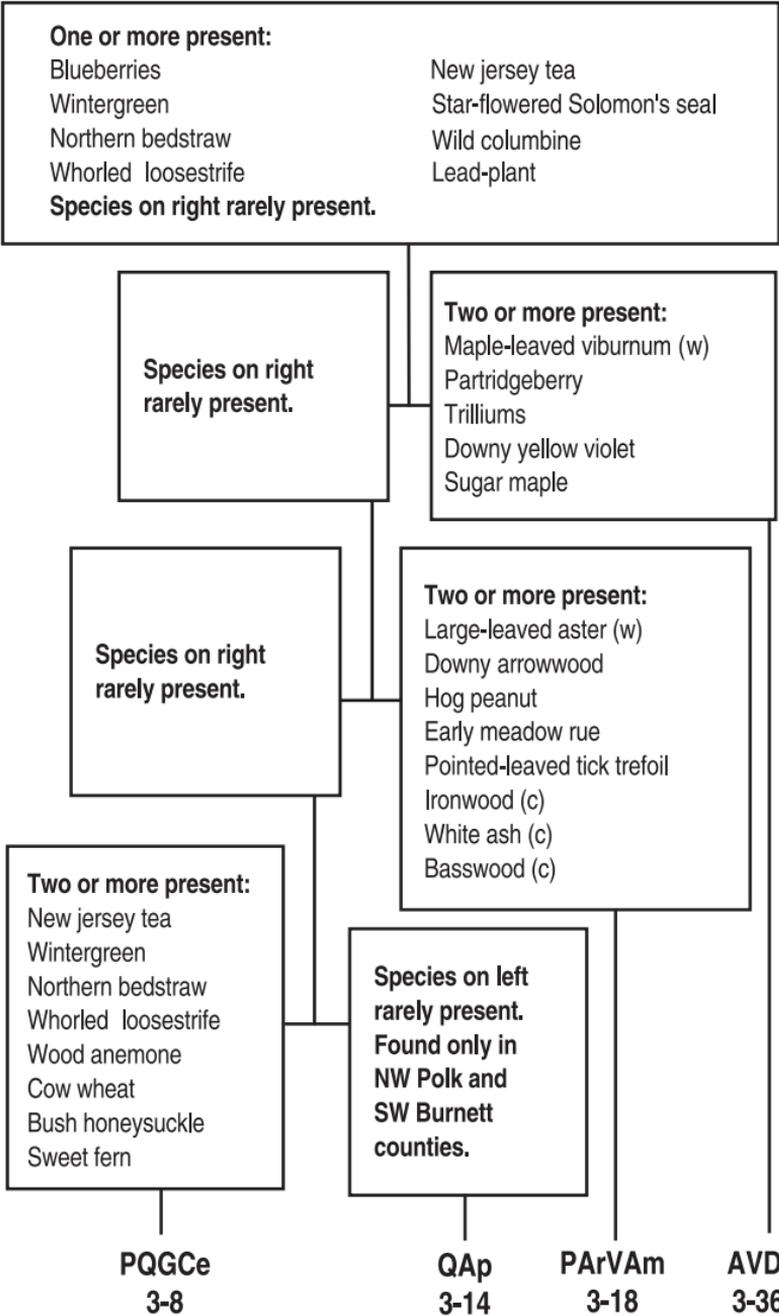
Circaea spp.

Sambucus pubens

**AAt
3-44**

**ACaCi
3-70**

Region 1 - Key B to Habitat Types (Common Names)



Two or more present or one well represented:

Baneberries

Sweet cicely

Zigzag goldenrod

Lady fern

Species on left rarely present .

Rattlesnake fern

Maidenhair fern

Enchanter's nightshades

Blue cohosh

**Species on right
rarely present.**

Two or more present:

Blue cohosh

Bloodroot

Virginia waterleaf

Sharp-lobed hepatica

Jack-in-the-pulpit

Enchanter's nightshades

Red-berried elder

**AAt
3-44**

**ACaCi
3-70**

Comparison of Major Floristic Differences Between Various Habitat Types of Region 1

The following tables may be used to identify habitat types when identification through keys is inconclusive. The tables list only those species whose constancy percentages differ significantly between the types being compared. If the average coverage values also are significantly different, they are shown as a second value, separated from the constancy value by a back slash.

The species found in a stand should better match the list of species either above (h.t. in left column) or below (h.t. in right column) the horizontal line.

(Constancy / Average coverage; * = <10% constancy)

		<u>PQGCe</u>	<u>QAp</u>
<i>Galium boreale</i>	Northern bedstraw	82	11
<i>Gaultheria procumbens</i>	Wintergreen	67	*
<i>Anemone quinquefolia</i>	Wood anemone	57	*
<i>Lysimachia quadrifolia</i>	Whorled loosestrife	52	*
<i>Diervilla lonicera</i>	Bush honeysuckle	46	11
<i>Achillea millefolium</i>	Yarrow	38	11
<i>Ceanothus americanus</i>	New jersey tea	30	11
<i>Rhus radicans</i>	Poison ivy	25/3	84/7
<i>Amorpha canescens</i>	Leadplant	16	74
<i>Cornus racemosa</i>	Gray dogwood	26	63
<i>Campanula rotundifolia</i>	Bluebell	*	53
<i>Ribes spp.</i>	Gooseberries	*	37
<i>Parthenocissus quinq.</i>	Virginia creeper	*	37
<i>Coreopsis spp.</i>	Coreopsis	*	32

		<u>PQGCe</u>	<u>PARVAm</u>
<i>Smilacina stellata</i>	Star-flowered solomon's seal	43	*
<i>Achillea millefolium</i>	Yarrow	38	10
<i>Ceanothus americanus</i>	New jersey tea	30	*
<i>Cladonia rangiferina</i>	Cladonia rangiferina	28	*
<i>Aster macrophyllus</i>	Large-leaved aster	23/1	92/14
<i>Amphicarpa bracteata</i>	Hog peanut	15	68
<i>Aralia nudicaulis</i>	Wild sarsaparilla	23/1	56/5
<i>Geranium maculatum</i>	Wild geranium	*	47
<i>Viburnum rafinesquianum</i>	Downy arrowwood	*	46
<i>Desmodium glutinosum</i>	Pointed-leaved tick trefoil	*	44
<i>Thalictrum dioicum</i>	Early meadow rue	*	24

		QAp	PARVAm
<i>Rhus radicans</i>	Poison ivy	84/7	36/2
<i>Smilacina stellata</i>	Star-flowered solomon's seal	84	*
<i>Amorpha canescens</i>	Leadplant	74	*
<i>Campanula rotundifolia</i>	Bluebell	53	*
<i>Ribes spp.</i>	Gooseberries	37	*
<i>Coreopsis spp.</i>	Coreopsis	32	*
<i>Aster macrophyllus</i>	Large-leaved aster	*	92
<i>Diervilla lonicera</i>	Bush honeysuckle	11	71
<i>Galium boreale</i>	Northern bedstraw	11	69
<i>Amphicarpa bracteata</i>	Hog peanut	21	68
<i>Anemone quinquefolia</i>	Wood anemone	*	68
<i>Aralia nudicaulis</i>	Wild sarsaparilla	11/<1	56/5
<i>Geranium maculatum</i>	Wild geranium	*	47
<i>Lysimachia quadrifolia</i>	Whorled loosestrife	*	46
<i>Viburnum rafinesquianum</i>	Downy arrowwood	*	46
<i>Desmodium glutinosum</i>	Pointed-leaved tick trefoil	*	44
<i>Gaultheria procumbens</i>	Wintergreen	*	44
<i>Thalictrum dioicum</i>	Early meadow rue	*	24

		PARVAm	AVDe
<i>Vaccinium spp.</i>	Blueberries	92/4	80/<1
<i>Galium boreale</i>	Northern bedstraw	69	20
<i>Cornus racemosa</i>	Gray dogwood	47	12
<i>Lysimachia quadrifolia</i>	Whorled loosestrife	46	12
<i>Rosa spp.</i>	Roses	44	12
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	14/<1	90/9
<i>Osmunda claytoniana</i>	Interrupted fern	*	53
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	17	51
<i>Hepatica americana</i>	Round-lobed hepatica	17	49
<i>Trillium spp.</i>	Trilliums	*	47
<i>Viola pubescens</i>	Downy yellow violet	*	39
<i>Mitchella repens</i>	Partridgeberry	*	35

		AVDe	AAt
<i>Vaccinium spp.</i>	Blueberries	80	11
<i>Gaultheria procumbens</i>	Wintergreen	47	10
<i>Osmorhiza claytoni</i>	Sweet cicely	18/<1	76/2
<i>Athyrium filix-femina</i>	Lady fern	29	66
<i>Solidago flexicaulis</i>	Zigzag goldenrod	*	45
<i>Ribes spp.</i>	Gooseberries	*	44
<i>Actaea spp.</i>	Baneberries	*	37
<i>Adiantum pedatum</i>	Maidenhair fern	*	37
<i>Botrychium virginianum</i>	Rattlesnake fern	12	29

Continued on next page.

		AAt	ACaCi
<i>Pteridium aquilinum</i>	Bracken fern	61	*
<i>Diervilla lonicera</i>	Bush honeysuckle	44	11
<i>Viburnum rafinesquianum</i>	Downy arrowwood	40	18
<i>Circaea spp.</i>	Enchanter's nightshades	11	71
<i>Parthenocissus quinq.</i>	Virginia creeper	23	64
<i>Caulophyllum thalictroides</i>	Blue cohosh	18	61
<i>Sanguinaria canadensis</i>	Bloodroot	*	50
<i>Mitella diphylla</i>	Miterwort	18	46
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	10	39
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	*	36
<i>Sambucus pubens</i>	Red-berried elder	*	32
<i>Laportea canadensis</i>	Wood nettle	*	25

		ArVRp	PARVAm
<i>Rubus pubescens</i>	Dwarf raspberry	90	*
<i>Cornus canadensis</i>	Bunchberry	70	*
<i>Rubus hispidus</i>	Swamp dewberry	50	*
<i>Athyrium filix-femina</i>	Lady fern	50	*
<i>Osmunda claytoniana</i>	Interrupted fern	50	*
<i>Onoclea sensibilis</i>	Sensitive fern	40	*
<i>Lycopodium obscurum</i>	Ground-pine	30	10
<i>Galium boreale</i>	Northern bedstraw	20	69
<i>Amphicarpa bracteata</i>	Hog peanut	30/<1	68/7
<i>Smilacina racemosa</i>	False solomon's seal	*	53
<i>Viburnum rafinesquianum</i>	Downy arrowwood	10	46
<i>Desmodium glutinosum</i>	Pointed-leaved tick trefoil	*	44
<i>Rosa spp.</i>	Roses	20	44

		ArVRp	AVDe
<i>Rubus pubescens</i>	Dwarf raspberry	90	12
<i>Cornus canadensis</i>	Bunchberry	70	*
<i>Rubus hispidus</i>	Swamp dewberry	50	*
<i>Onoclea sensibilis</i>	Sensitive fern	40	*
<i>Lysimachia quadrifolia</i>	Whorled loosestrife	40	12
<i>Cornus racemosa</i>	Gray dogwood	30	12
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	10	90
<i>Amphicarpa bracteata</i>	Hog peanut	30/<1	80/5
<i>Desmodium glutinosum</i>	Pointed-leaved tick trefoil	*	73
<i>Thalictrum dioicum</i>	Early meadow rue	10	67
<i>Smilacina racemosa</i>	False solomon's seal	*	65
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	10	51
<i>Hepatica americana</i>	Round-lobed hepatica	*	49
<i>Trillium spp.</i>	Trilliums	20	47
<i>Viola pubescens</i>	Downy yellow violet	*	39

		ASal	AAI
<i>Impatiens capensis</i>	Jewelweed	76	*
<i>Onoclea sensibilis</i>	Sensitive fern	71	*
<i>Sanguinaria canadensis</i>	Bloodroot	65	*
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	65	10
<i>Parthenocissus quinq.</i>	Virginia creeper	59	23
<i>Circaea spp.</i>	Enchanter's nightshades	53	11
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica	53	*
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	47	*
<i>Aralia nudicaulis</i>	Wild sarsaparilla	29	76
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	*	68
<i>Polygonatum pubescens</i>	Hairy solomon's seal	18	55
<i>Smilacina racemosa</i>	False solomon's seal	24	48
<i>Diervilla lonicera</i>	Bush honeysuckle	12	44

		ASal	ACaCi
<i>Impatiens capensis</i>	Jewelweed	76/9	21/<1
<i>Onoclea sensibilis</i>	Sensitive fern	71	*
<i>Cornus racemosa</i>	Gray dogwood	35	*
<i>Caulophyllum thalictroides</i>	Blue cohosh	24	61
<i>Smilacina racemosa</i>	False solomon's seal	24	50
<i>Polygonatum pubescens</i>	Hairy solomon's seal	18	46
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	*	43
<i>Botrychium virginianum</i>	Rattlesnake fern	12	36
<i>Uvularia grandiflora</i>	Large-flowered bellwort	12	32
<i>Sambucus pubens</i>	Red-berried elder	12	32

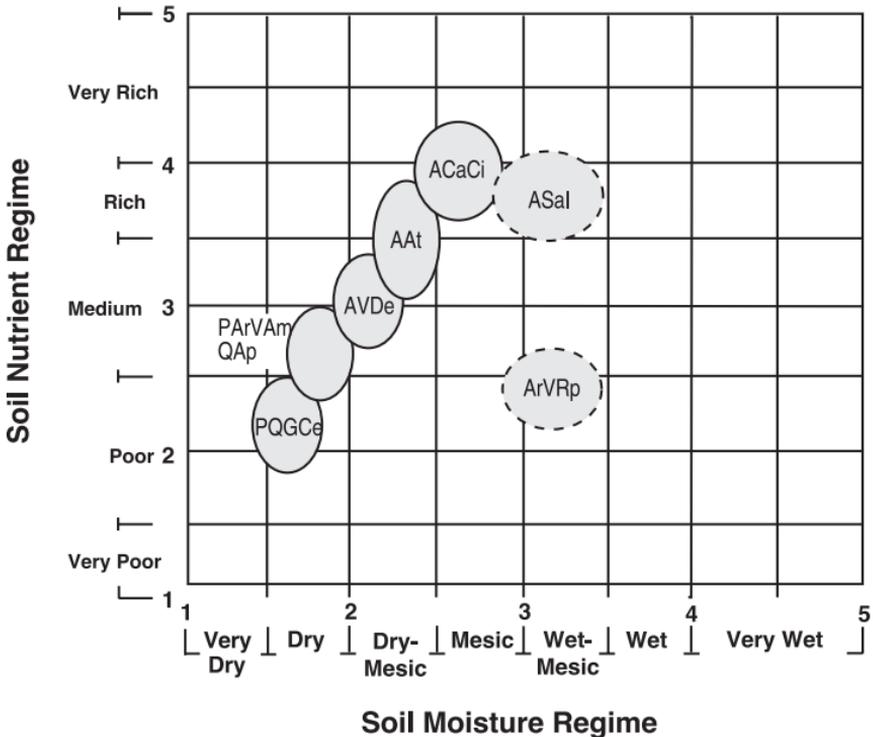
		ArVRp	ASal
<i>Rubus pubescens</i>	Dwarf raspberry	90	18
<i>Cornus canadensis</i>	Bunchberry	70	12
<i>Amelanchier spp.</i>	Juneberry	70	*
<i>Vaccinium spp.</i>	Blueberries	60	*
<i>Diervilla lonicera</i>	Bush honeysuckle	60	12
<i>Rubus hispidus</i>	Swamp dewberry	50	*
<i>Apocynum andro.</i>	Spreading dogbane	40	*
<i>Lysimachia quadrifolia</i>	Whorled loosestrife	40	*
<i>Gaultheria procumbens</i>	Wintergreen	30	*
<i>Lycopodium obscurum</i>	Ground-pine	30	*
<i>Lycopodium spp.</i>	Clubmosses	30	*
<i>Thalictrum dioicum</i>	Early meadow rue	10	82
<i>Impatiens capensis</i>	Jewelweed	*	76
<i>Sanguinaria canadensis</i>	Bloodroot	*	65

Continued on next page.

continued

		ArVRp	ASal
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	*	65
<i>Adiantum pedatum</i>	Maidenhair fern	*	53
<i>Circaea spp.</i>	Enchanter's nightshades	*	53
<i>Sanicula spp.</i>	Snakeroot	*	53
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica	*	53
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	*	47
<i>Viola pubescens</i>	Downy yellow violet	*	47
<i>Actaea spp.</i>	Baneberries	*	41
<i>Solidago flexicaulis</i>	Zigzag goldenrod	*	41
<i>Desmodium glutinosum</i>	Pointed-leaved tick trefoil	*	41

Relationship of Habitat Types to Soil Moisture and Nutrient Regimes in Region 1



Frequency of Occurrence of Tree Species Across Habitat Types of Region 1

		Very Dry-Dry		Dry-Dry Mesic		Dry Mesic		Mesic		Mesic-Wet Mesic	
		Poor		Medium		Rich		Poor			
PQGCe	QAp	PArVAm	AVDe	AAAt	ACaCi	ASal	ArVRp				
			10	Sugar Maple							Inadequate Data
		10	Ironwood (Hophornbeam)								
			9	Basswood							
	8		Red Maple								
			7	Yellow Birch							
			7	White Ash							
			7	Black Ash							
	6		White Pine								
	6		Black Cherry								
6		White Oak									
					6	American Elm					
5				N. Red Oak							
5			White Birch								
2		Red Pine									
2			Bigtooth Aspen								
2			Trembling Aspen								
2	Bur Oak										
2	N. Pin Oak										
1	Jack Pine										

2-15

% presence 10-25 26-50 51-75 >75

Relative Growth Potential for Major Tree Species Across Habitat Types of Region 1

(Only those habitat types where the species occurs naturally are considered.)

Numbers in front of bars are relative shade tolerance values with 1 as least tolerant and 10 as most tolerant.

[Very Dry-Dry]] [Dry-Dry Mesic]		Dry Mesic]] [Mesic]] [Mesic-Wet Mesic]	
Poor]		Medium]		Rich]		Poor]			
PQGCe	QAp	PArVAm	AVDe	AAt	ACaCi	ASal	ArVRp		
			10	Sugar maple					
			9	Basswood					
	8		Red maple						
			7	Yellow birch					
			7	White ash					
						7 Black ash			
6			White pine						
6			White oak						
5				Oak (red, white, bur)					
5		White birch							
2		Red pine							
2	N. Pin oak								
2				Aspen					
1	Jack pine								

Very good
 Good
 Fair
 Poor

Occurrence of Tree Species on Habitat Types of Region 1

Numbers in parentheses are number of study plots. Size classes: SA - saplings, MT - medium trees (4-10" dbh), LT - large trees (>10" dbh).

Numbers are frequency of occurrence classes: 1, 10-25%; 2, 26-50%; 3, 51-75%; 4, 76-100%.

Letters are abundance classes representing average stems per acre when present:

For saplings: A, <100; B, 100-200; C, 201-400; D, >400. for trees: A, <10; B, 10-20; C, 21-40; D, >40

	PQGCe (27)			QAp (19)			*PArVAm (28)			AVDe (26)			AAAt (37)			ACaCi (18)			ASal (12)			ArVRp	
	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT		
Jack Pine	3C	3D	2B	1A	3B	2B	1C	1A														Inadequate Data	
Red Pine	2B	2D	1C					1B			1A												
White Pine				1A				1B	1C	1A	1D	1B					1A				1A		
N. Pin Oak	1C	2D	1B	2B	3C	3C		1D	1B									1A					
N. Red Oak	2B	2D	2C				1A	2C	2C	1A	3C	3C		2C	4C		1C	3B	1A	2B	2B		
White Oak	1A	1B		2B	1B	1B	1A	2C	1A	1A	2C	2B		2C	2B		2C	2B		1C	2A		
Bur Oak	2B	1C		2B	3C	1A	1A	1C	1A					1C		1A	1C	2A	2A	2C	2A		
Bigtooth Aspen	2D	1D	1B	1A	1B		2D	2D	2C	2D	2D	1C	1D	1C	2B				1A	1A			
Trembling Aspen	2D	1D			1C		2D	2D	2B	2D	2C	2A	2C	1D	1B	2D	2B	2B	1A	3D	2B		
White Birch	2A						1A	1C	1A	1A	1C		1A	1B	1A	2A	2C	2A	1A				
Yellow Birch														1A								1A	
Red Maple				1C			3B	2D	1A	4B	3D	2A	3A	3D	2B	2A	2C	2B	3B	3C	3A		
Sugar Maple										2B	1D		3C	3C	2B	3C	2D	2C	2B	1B	1C		
Basswood										1A	1D		2A	2C	2A	2B	1C	2B	2A	2B	2A		
White Ash										1A			1A	2B	1A	1A	1C	1A					
Green Ash										1A									1A	1B	2A		
Black Ash										1A			1A				1C		2C	1B	2A		
American Elm																2A	1B	1A	2A				
Bitternut Hickory																1A	1B						
Butternut																	1C						
Black Cherry				2A			2A			1A			1A			2A	2B	1A	1A				
Ironwood (Hophornbeam)							1A			2A			2B			4B	1B		3B				
Musclewood (Hornbeam)							1A			2A			2B			2A			3B				

* Data from first edition plus unpublished field study. Letters are abundance classes representing average crown coverage when present: A, <5%; B, 5-15%; C, 16-35%; D, >35%.

Current Relative Importance of Common Forest Cover Types on Habitat Types of Region 1

••• - Dominant: >50%; •• - Common: 10-50%; • - Minor: <10% of all cover types observed on that habitat type.

Cover Type	PQGGe	QAp	PARVAm	AVDe	AAt	ACaCi	ASal	ArVRp
Jack Pine - Oak*	••	••	•					•
Jack Pine	••	••	•					•
Red Pine	••	•	•	•				•
Aspen - Pine*	•	•	••	•				••
Aspen	••	•	••	••	•	••	••	••
Aspen - Oak*	•	•	••	••	••	•	••	•
Oak*	••	••	••	••	••	••	••	•
White Pine - Red Pine			•	•				•
White Pine - Oak*			•	•	•	•	•	•
White Pine			•	•	•	•	•	•
White Pine - Red Maple			•	•			•	•
Aspen - Red Maple			•	•	•		••	••
Aspen - White Birch			•	•	•	•	•	•
White Birch			•	•	•	•	•	•
Oak - Red Maple*			••	••	••	•	••	•
Red Maple			•	•	•	•	•	••
Basswood - Oak*				•	••	••	•	
Sugar Maple - Oak*				•	••	••	•	
Sugar Maple - Red Maple				•	•	•	•	
Sugar Maple				•	•	••	•	
Sugar Maple - Basswood - Ash*					•	••	•	

* Oak is any mix of red, white, bur, and pin oaks.

Pine is any mix of white, red, and jack pines.

Ash is predominantly white ash on mesic sites, and white, green, and black ashes on mesic to wet-mesic sites.

Occurrence of Understory Species Across the Habitat Types of Region 1

Numbers represent frequency of occurrence classes: • 10-25%; 1, 26-50%; 2, 51-75%; 3, 76-100%.
 Letters are coverage classes: A<1%; B 1-5%; C 6-15%; D>15%. Numbers of study plots in parentheses.

Scientific name	Common name	PQGCe (61)	QAp* (19)	PARVAm (59)	AVDe (51)	AAt (62)	ACaCi (28)	ASal (17)	ArVRp (10)
Shrubs									
<i>Comptonia peregrina</i>	Sweetfern	•							
<i>Prunus pennsylvanica</i>	Pin cherry	•	•						
<i>Ceanothus americanus</i>	New jersey tea	1A	•						
<i>Rosa</i> spp.	Roses	3A	2B	1A	•	•		•	•
<i>Cornus racemosa</i>	Gray dogwood	1C	2B	1B	•	•		1C	1D
<i>Prunus virginiana</i>	Chokecherry	1B	3B	1A	•	•	•		
<i>Vaccinium</i> spp.	Blueberries	3C	3D	3B	3A	•			2A
<i>Amelanchier</i> spp.	Juneberry	3B	3B	3B	1A	1A	•		2B
<i>Diervilla lonicera</i>	Bush honeysuckle	1B	•	2B	2B	1B	•	•	2B
<i>Corylus</i> spp.	Hazels	3D	3D	3D	2C	2B	1B	1D	1B
<i>Rubus</i> spp.	Blackberry/raspberry	2C	1B	2B	2C	1C	1C	1C	1D
<i>Rhus radicans</i>	Poison ivy	•	3C	1B	•	•		•	
<i>Viburnum rafinesquianum</i>	Downyarrowwood			1B	1A	1B	•	•	
<i>Lonicera canadensis</i>	American fly honeysuckle		•		1B	1B	•	•	
<i>Viburnum acerifolium</i>	Maple-leaved viburnum			•	3C	2B	1B		
<i>Hamamelis virginiana</i>	Witch hazel				•	•			
<i>Cornus alternifolia</i>	Alternated-leaved dogwood		•	•	2B	2A	1B	1C	
<i>Ribes</i> spp.	Gooseberries		1B			1A	2B	2C	
<i>Dirca palustris</i>	Leatherwood					•	•		
<i>Sambucus pubens</i>	Red-berried elder						1B	•	
<i>Xanthoxylum americanum</i>	Prickly ash		1A	•			•	1D	
<i>Rubus pubescens</i>	Dwarf raspberry				•	•	•	•	3B
<i>Rubus hispidus</i>	Swamp dewberry								1B
Ferns, Allies, Lichens, Mosses									
<i>Cladonia rangiferina</i>	Reindeer moss	1A							
<i>Pteridium aquilinum</i>	Bracken fern	3D	1D	3C	3C	2B		1C	2C
<i>Lycopodium</i> spp.	Clubmosses	•		•					1A
<i>Lycopodium obscurum</i>	Ground-pine clubmoss			•	•	•	•		1A
<i>Osmunda claytoniana</i>	Interrupted fern				2B	2B	1C	2D	1D
<i>Athyrium filix-femina</i>	Lady fern				1B	2B	2C	2D	1B
<i>Dryopteris spinulosa</i>	Spinulose shield fern				•	•	1B	1C	•
<i>Rattleychium virginianum</i>	Rattlesnake fern				•	1A	1B	•	
<i>Adiantum pedatum</i>	Maidenhair fern					1B	2B	2B	
<i>Onoclea sensibilis</i>	Sensitive fern							2B	1B
Forbs and Subshrubs									
<i>Epigaea repens</i>	Trailing arbutus	•							
<i>Melampyrum lineare</i>	Cow wheat	•							
<i>Chimaphilla umbellata</i>	Pipsissewa	•							
<i>Convulvulus spithameus</i>	Hedge bindweed	1A							
<i>Achillea millefolium</i>	Yarrow	1A	•	•					
<i>Arctostaphylos uva-ursi</i>	Bearberry	•	•						
<i>Lithospermum arvense</i>	Corn gromwell	•	•						
<i>Monarda fistulosa</i>	Wild bergamot	•	•						
<i>Asclepias</i> spp.	Milkweeds	•	•						
<i>Smilacina stellata</i>	Star-flowered solomon's seal	1A	3B						
<i>Amorpha canescens</i>	Leadplant	•	2B						
<i>Campanula rotundifolia</i>	Bluebell		2A						
<i>Coreopsis</i> spp.	Coreopsis		1A						
<i>Helianthus</i> spp.	Sunflowers	•	1A	•					•
<i>Aquilegia canadensis</i>	Wild columbine	1A	2B	1B					
<i>Lysimachia quadrifolia</i>	Whorled loosestrife	2A		1A	•				1A
<i>Galium boreale</i>	Northern bedstraw	3B	•	2A	•	•		•	•
<i>Vicia</i> spp.	Vetches	1A	•	•					1A
<i>Lathyrus</i> spp.	Wild peas (vetchlings)	1A	•	1A	•	•	•		
<i>Gaultheria procumbens</i>	Wintergreen	2B		1A	1B	•			1A

Continued on next page.

Scientific name	Common name	PQGCe	QAp*	PARVAm	AVDe	AAt	ACaCi	ASaI	ArVRp
<i>Apocynum androsaemifolium</i>	Spreading dogbane	2A	1B	1A	1A	•			1A
<i>Fragaria</i> spp.	Strawberries	2A	2B	2A	1A	•	•	1A	1B
<i>Smilacina racemosa</i>	False solomon's seal	1A	1B	2A	2B	1B	2B	•	
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	3B	3B	3A	2A	1B	1A	2B	3B
<i>Trientalis borealis</i>	Starflower	1A	1B	1A	2A	2A	1A	1A	2A
<i>Uvularia sessifolia</i>	Sessile-leaved bellwort	2A	3A	2A	2B	3B	2B	2B	2B
<i>Anemone quinquefolia</i>	Wood anemone	2A		2A	1A	1B	2B	2C	1A
<i>Aster macrophyllus</i>	Large-leaved aster	•		3D	3C	3C	3C	2D	2C
<i>Aralia nudicaulis</i>	Wild sarsaparilla	•	•	2B	3B	3B	1B	1B	2B
<i>Amphicarpa bracteata</i>	Hog peanut	•	•	2C	3B	3B	2C	2D	1A
<i>Desmodium glutinosum</i>	Pointed-leaved tick trefoil			1B	2B	2B	1B	1C	
<i>Geranium maculatum</i>	Wild geranium			1B	1B	2B	3B	2D	1A
<i>Prenanthes alba</i>	White lettuce	•		•	•	•	1A	1B	•
<i>Galium triflorum</i>	Sweet-scented bedstraw	•	•		•	•	•	1C	•
<i>Galium asprellum</i>	Cleavers					•	1B	1B	
<i>Clintonia borealis</i>	Yellow beadlilly			•	1B	•	•		•
<i>Mitchella repens</i>	Partridgeberry				1A	1A	•		
<i>Polygonatum pubescens</i>	Hairy solomon's seal			•	1A	2A	1A	•	•
<i>Parthenocissus quinquefolia</i>	Virginia creeper		1B	•		•	2B	2D	1A
<i>Smilax herbacea</i>	Carrion flower		•			•	•	1B	
<i>Smilax tamnoides</i>	Bristly greenbrier			•	1A	2B	1B	1B	1A
<i>Streptopus roseus</i>	Rosey twisted stalk			•	1A	1A	1A	1A	
<i>Hepatica americana</i>	Round-lobed hepatica			•	1A	2B	1B	1C	
<i>Thalictrum dioicum</i>	Early meadow rue			•	2B	3B	3B	3B	
<i>Viola pubescens/pennsylvanica</i>	Downy/smooth yellow violet				1A	2A	2B	1B	
<i>Trillium</i> spp.	Trilliums				1A	3B	3B	2C	•
<i>Aralia racemosa</i>	Spikenard				•	1A	•		
<i>Osmorhiza claytoni</i>	Sweet cicely				•	3B	3B	2D	•
<i>Sanicula</i> spp.	Snakeroots		•		•	1B	2B	2C	
<i>Solidago flexicaulis</i>	Zigzag goldenrod					1B	2B	1B	
<i>Actaea</i> spp.	Baneberries					1A	2B	1B	
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit					•	1B	2B	
<i>Circaea</i> spp.	Enchanter's nightshades					•	2B	2D	
<i>Uvularia grandiflora</i>	Large-flowered bellwort					•	1B	•	
<i>Mitella diphylla</i>	Miterwort					•	1A		
<i>Caulophyllum thalictroides</i>	Blue cohosh					•	2A	•	
<i>Sanguinaria canadensis</i>	Bloodroot						2B	2B	
<i>Hydrophyllum virginianum</i>	Virginia waterleaf						1B	1C	
<i>Allium tricoccum</i>	Wild leek						•	•	
<i>Laportea canadensis</i>	Wood nettle						•	•	
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica						•	2B	
<i>Impatiens capensis</i>	Jewelweed						•	3C	
<i>Cornus canadensis</i>	Bunchberry							•	2B

* Data from first edition plus unpublished field study.

Region 2 - Habitat Type Distribution

Habitat Type	Occurrence in the Region	Primary Landforms and Soils	Page No.
PQG	Common in Douglas County and minor in Bayfield County, on the Bayfield Sand Plains.	Driest, most nutrient poor outwash sands.	3-6
PARV-U	Common in Bayfield County and minor in Douglas County, on the Bayfield Sand Plains.	Deep, excessively drained outwash sands.	3-10
PARVAa-Po	Common in Bayfield County.	Sandy outwash soils, but also water worked sands on moraines and lake plains.	3-22
AVCI	Common within Mille Lacs Uplands in Douglas County.	Moderately well drained sandy loams and loamy sands on rolling moraines.	3-32
ACI	Common within Mille Lacs Uplands in Douglas County.	Well drained sandy loams on rolling moraines.	3-40
ATM	Scattered on the Bayfield Peninsula.	Well to moderately well drained loamy soils on moraines and water worked till.	3-52
AAs	Common within Mille Lacs Uplands in Douglas County.	Well to moderately well drained loams (sl, l, sil) on rolling moraines.	3-58
AAtRp	Common within Mille Lacs Uplands in Douglas County.	Somewhat poorly drained loams (sl, l, sil) on rolling moraines.	3-88
ASnMi	Common on the Superior Clay Plain in Bayfield and Douglas Counties.	Somewhat poorly to moderately well drained soils, typically with more than one foot of sand over clay. On water worked till and lacustrine deposits.	3-86
ArAbSn	The predominant type on the Superior Clay Plain in Douglas and Bayfield Counties. Less common on the Bayfield Peninsula.	Somewhat poorly drained clay on lacustrine deposits and water worked till.	3-94
ArAbVCo	Common within Mille Lacs Uplands in Douglas County, and uncommon elsewhere.	Somewhat poorly drained loamy sands and sands on rolling moraines and outwash.	3-98

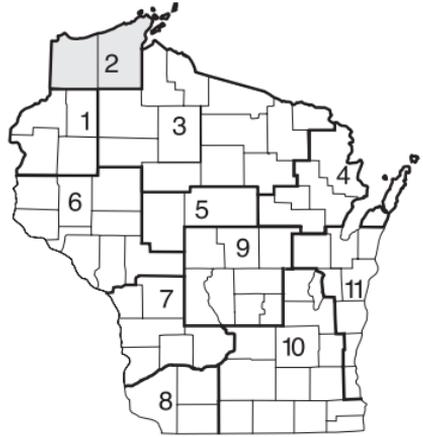
Region 2

Extent, topography, geology and soils

Region 2 encompasses Douglas and Bayfield counties. The entire region was glaciated during the last part of the Wisconsin Glaciation. It can be characterized by four distinct zones:

Superior Clay Plain: Bordering Lake Superior and extending inland to a maximum of about 15 miles is a region of lake modified moraines (till) and lacustrine deposits dominated by calcareous, unbedded red clays and intermixed pink sands. On the Bayfield peninsula, soils are somewhat more loamy. The landscape ranges from level to hilly and includes many wetlands.

Bayfield Sand Plains: Extending across the Region from SW to NE is a belt of pitted outwash dominated by podzolized sands and gravels. The landscape is level to rolling and includes many lakes and bogs. There is also a gradient in soil moisture and nutrient regimes from higher in the NE to lower toward the SW of the Region. **Mille Lacs Uplands:** West of the pitted outwash (in Douglas County) is a zone of podzolized stony loams over till, outwash, and bedrock.



The landscape is level to rolling with extensive areas of impeded drainage.

Southern Bayfield County: East of the pitted outwash (in Bayfield County) is a mixture of till, outwash, and loess deposits, and bedrock controlled areas. Typical soils are podzolized stony loams. The landscape is rolling to hilly, and swamps are common.

The maps of the Natural Divisions of Wisconsin (Hole and Germaine 1994) and Sections and Subsections of Wisconsin (WI DNR 2001) provide good characterizations of the region. Within this Region, three habitat type groups are predominant: very dry to dry, mesic to wet-mesic, and wet-mesic to wet.

Forest vegetation

Most of the Region is densely forested. Historic, as well as present, forest vegetation strongly reflects the patterns of disturbance and landform and soil of the Region.

At the time of European settlement, the forests of the "clay belt" were characterized by complex mixtures of white pine, white spruce, white birch, balsam fir, aspen, and red pine. Cedar, tamarack, and black spruce also were common. Current forests are dominated by aspen. Other common trees include white birch, red maple, and balsam fir.

At the time of European arrival, the outwash plains were dominated by pine forests and barrens. Jack pine was the most widely occurring species and was best represented within the central portion of the outwash plain. In the northern and southern extremes, red and white pine dominated. Combination of site and fire regime differences controlled this pattern. White and

red pines were greatly reduced by logging, but jack pine communities are also less abundant. Aspen, oaks (red, pin, bur), white birch and red maple currently dominate many sites formerly occupied by pines. (See Radeloff et al. 1999 for discussion of "pine barrens").

Historic and current forest composition on till dominated landscapes is similar to that described for other habitat type regions. Sugar maple, basswood, yellow birch and hemlock forests were most common in presettlement time (except in Douglas county where hemlock is absent and yellow birch is less common than it is further to the east). White pine, and to a lesser extent red pine, also occurred where disturbance and local substrate were favorable. Current forests are dominated by mesic hardwoods (sugar maple, red maple, basswood, yellow birch), with aspen, white birch, and red oak also very common.

Region 2 Key to Habitat Types

- 1 Soil somewhat poorly drained. Two or more present: *Cornus canadensis* / bunchberry (c), *Coptis groenlandica* / goldthread, *Onoclea sensibilis* / sensitive fern, *Equisetum* spp. / horsetails, *Petasites palmatus* / sweet coltsfoot, *Impatiens capensis* / jewelweed, *Cornus stolonifera* / red-osier dogwood, *Alnus rugosa* / speckled alder

go to Key B

- 1 Soil moderately well drained to excessively drained. Species listed in 1 above rarely present

go to Key A

If located in southern Bayfield County (south or east of Bayfield Sand Plains and Superior Clay Plain) use key and data for Region 3.

Terms used in keys:

common (c): >1% coverage

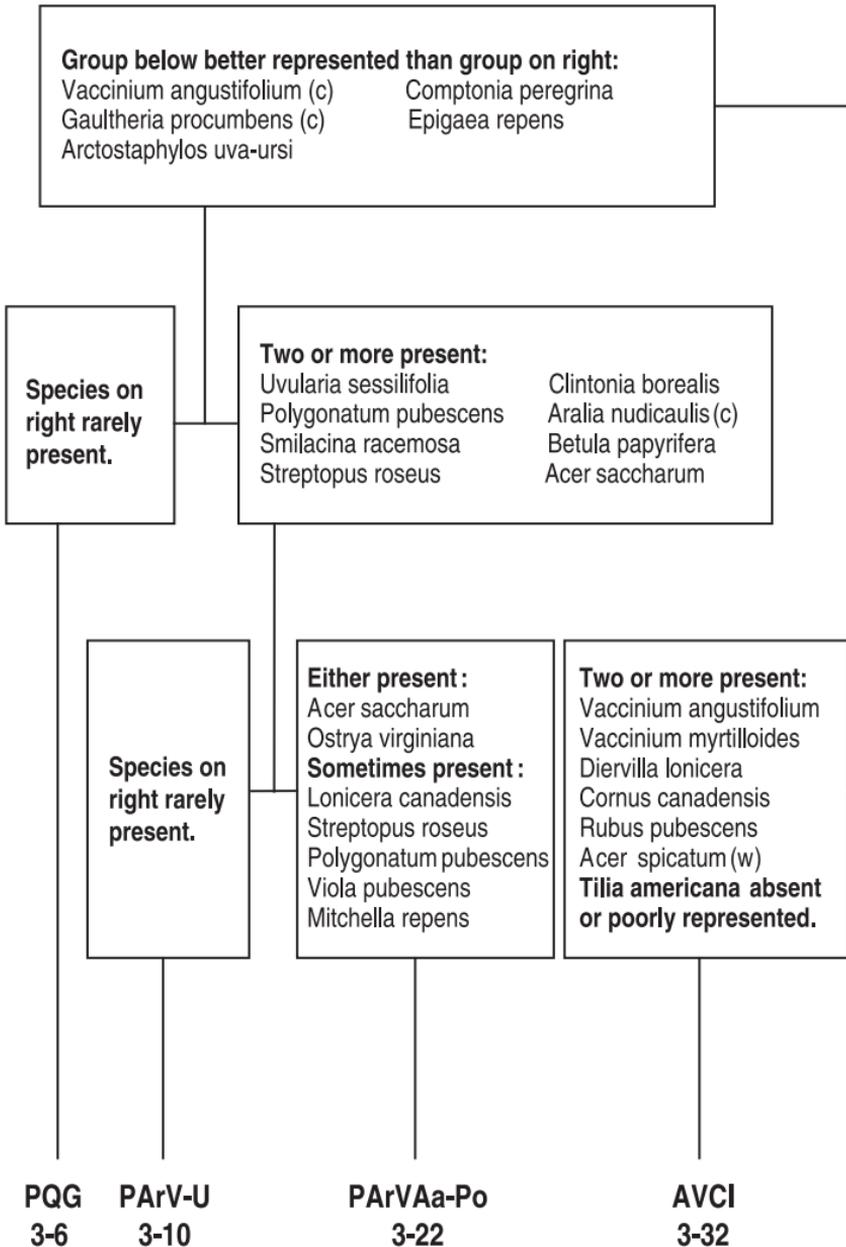
well represented (w): >5% coverage

better represented: more species are present (does not refer to coverage)

Region 2 Transitions to Adjoining Regions:

1. In the southern one-half of Bayfield County and the extreme southeastern corner of Douglas County (S of the Superior Clay Plain and SE of the Bayfield Sand Plain), use Region 3 habitat types.
2. On the Bayfield Peninsula, if Region 2 habitat types do not adequately characterize some sites, try Region 3 habitat types. The following habitat types can occur: ATM, TMC, and AVVb. In addition, some undefined habitat types occasionally occur.
3. On the Superior Clay Plain, undefined habitat types occasionally occur, particularly in some steep ravines and along the southern transitional edge of the clay plain.

Region 2 - Key A to Habitat Types (Scientific Names)



Group below better represented than group on left:

Dryopteris spinulosa
Athyrium filix-femina
Osmorhiza claytoni
Actaea spp.

Trillium spp.
Cornus alternifolia
Acer spicatum
Tilia americana

**Species on
right rarely
present.**

Two or more present:

Athyrium filix-femina
Dryopteris disjuncta
Arisaema atrorubens
Trillium spp.

Osmorhiza claytoni(c)
Caulophyllum thalictroides
Allium tricoccum
Tsuga canadensis

**Species on left
rarely present.
Tilia americana
sometimes
well represented**

**Tsuga canadensis
present, or
located within
range of Tsuga
(generally E 2/3
of Bayfield Co.)**

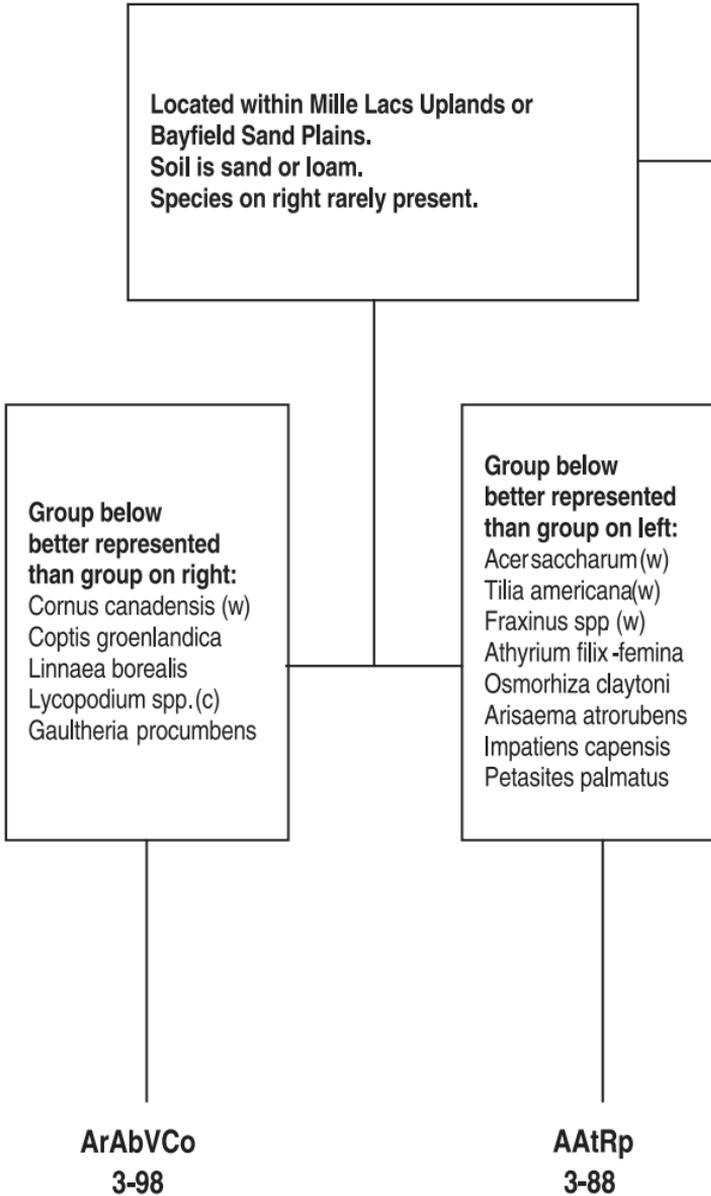
**Tsuga canadensis
not present, and
not located within
range of Tsuga**

**ACI
3-40**

**ATM
3-52**

**AAs
3-58**

Region 2 - Key B to Habitat Types (Scientific Names)



Located within Lake Superior Clay Plain.

Soil usually clay or sand over clay.

Two or more usually present:

Viburnum rafinesquianum

Cornus stolonifera

Rosa spp.

Agrimonia spp.

Mitella nuda

**Species on right
rarely present.**

**Surface soil
usually clay.**

Two or more present:

Acer saccharum

Tilia americana

Fraxinus americana

Arisaema atrorubens

Osmorhiza claytoni

Viola pubescens

Mitchella repens

**Surface soil usually sand,
often more than one foot thick,
over clay.**

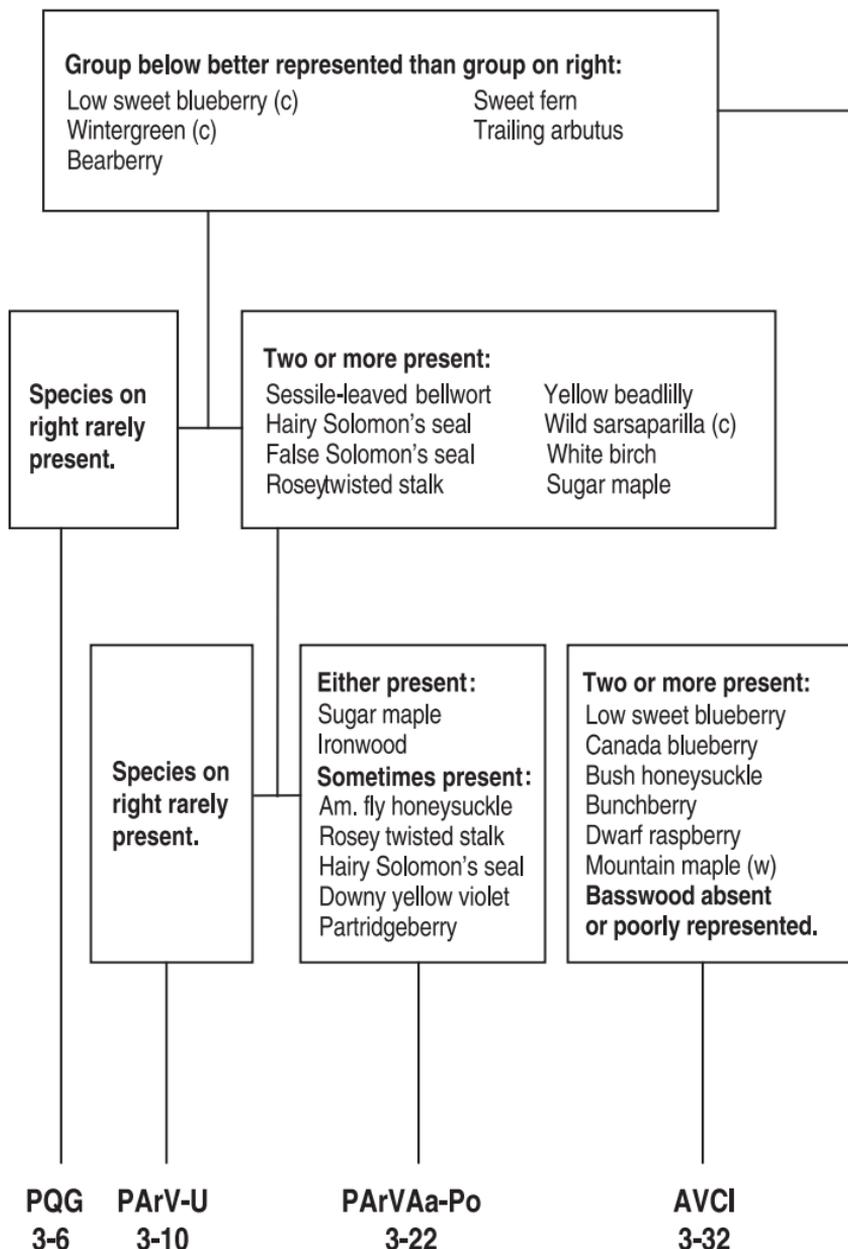
ArAbSn

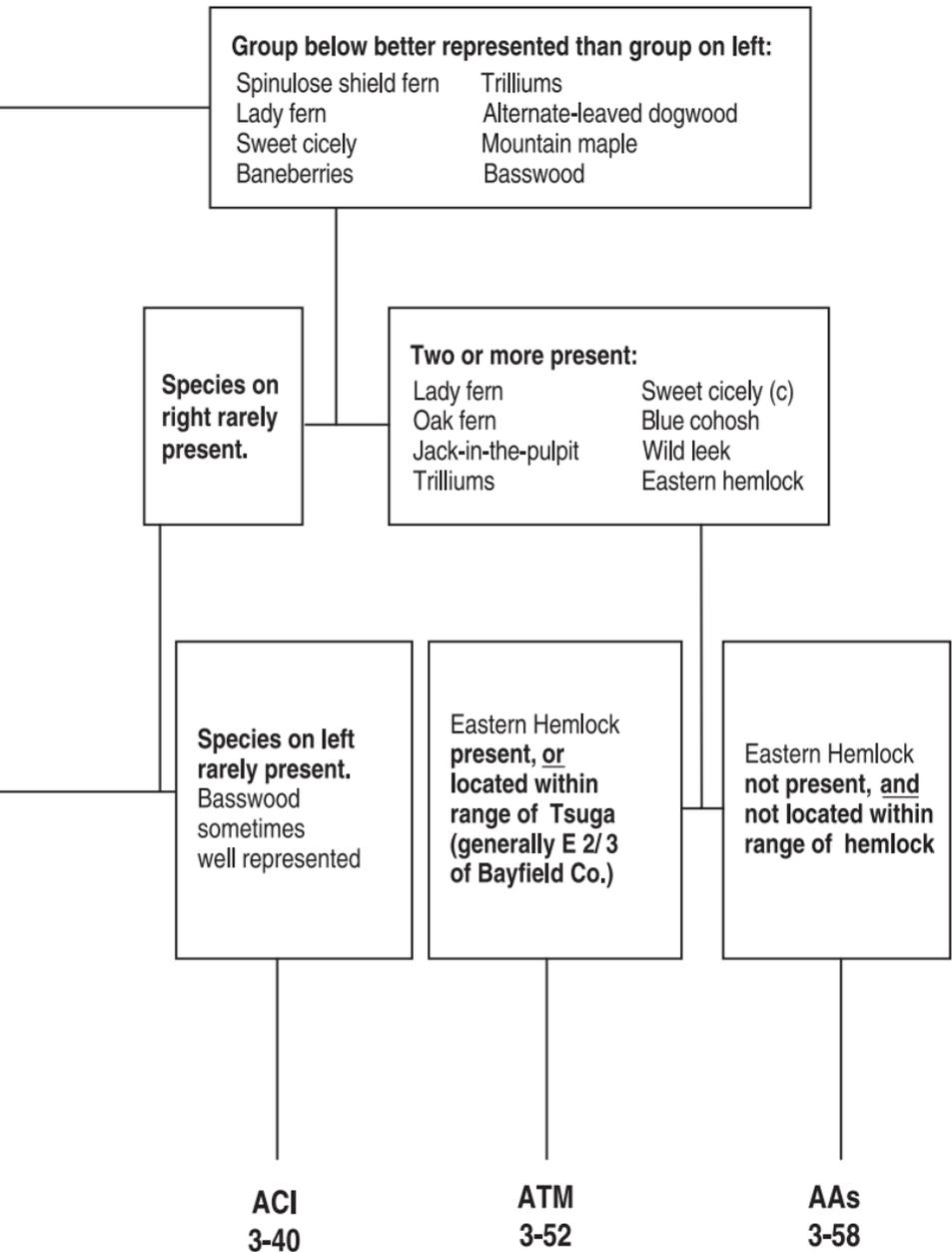
3-94

ASnMi

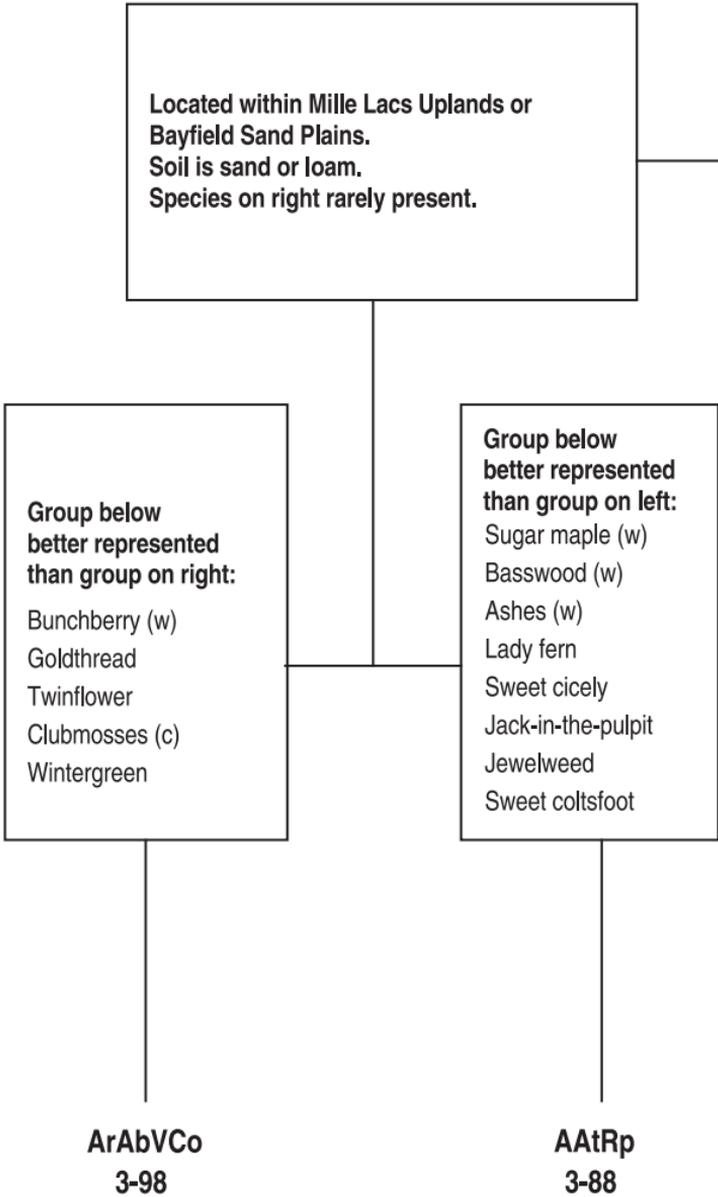
3-86

Region 2 - Key A to Habitat Types (Common Names)





Region 2 - Key B to Habitat Types (Common Names)



**Located within Lake Superior Clay Plain.
Soil usually clay or sand over clay.
Two or more usually present:**

Downy arrowwood
Red-osier dogwood
Roses
Agrimony
Naked miterwort

**Species on right
rarely present.
Surface soil
usually clay.**

Two or more present:

Sugar maple
Basswood
White ash
Jack-in-the-pulpit
Sweet cicely
Downy yellow violet
Partridgeberry

**Surface soil usually sand,
often more than one foot thick,
over clay.**

**ArAbSn
3-94**

**ASnMi
3-86**

Comparison of Major Floristic Differences Between Various Habitat Types of Region 2

The following tables may be used to identify habitat types when identification through keys is inconclusive. The tables list only those species whose constancy percentages differ significantly between the types being compared. If the average coverage values also are significantly different, they are shown as a second value, separated from the constancy value by a back slash.

The species found in a stand should better match the list of species either above (h.t. in left column) or below (h.t. in right column) the horizontal line.

(Constancy / Average coverage; * = <10% constancy)

		PQG	PARV-U
<i>Rosa</i> spp.	Roses	61	13
<i>Corylus americana</i>	Hazel-nut	53/12	20/4
<i>Arctostaphylos uva-ursi</i>	Bearberry	47	*
<i>Lithospermum</i> spp.	Gromwells	39	*
<i>Corylus cornuta</i>	Beaked hazelnut	43/4	93/17
<i>Aster macrophyllus</i>	Large-leaved aster	37/4	93/10
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	24	78
<i>Aralia nudicaulis</i>	Wild sarsaparilla	16/<1	73/3
<i>Smilacina racemosa</i>	False solomon's seal	*	45

		PARV-U	PARVAa-Po
<i>Comptonia peregrina</i>	Sweet fern	50	*
<i>Lonicera canadensis</i>	American fly honeysuckle	10	54
<i>Lycopodium obscurum</i>	Ground-pine	15	54
<i>Streptopus roseus</i>	Rosey twisted stalk	18	38
<i>Mitchella repens</i>	Partridgeberry	*	31
<i>Polygonatum pubescens</i>	Hairy solomon's seal	*	23
<i>Viola pubescens</i>	Downy yellow violet	*	23

		PARVAa-Po	AVCI
<i>Gaultheria procumbens</i>	Wintergreen	100/4	33/<1
<i>Rubus flagellaris/hispidus</i>	Dewberry/swamp dewberry	69	*
<i>Epigaea repens</i>	Trailing arbutus	31	*
<i>Acer spicatum</i>	Mountain maple	15	87
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	*	75
<i>Dryopteris spinulosa</i>	Spinulose shield fern	*	70
<i>Galium triflorum</i>	Sweet-scented bedstraw	15	66

<i>Cornus canadensis</i>	Bunchberry	15	45
<i>Rubus pubescens</i>	Dwarf raspberry	15	41
<i>Actaea spp.</i>	Baneberries	*	41
<i>Osmorhiza claytoni</i>	Sweet cicely	*	25

		PArVAa-Po	ATM
<i>Vaccinium spp.</i>	Blueberries	100	*
<i>Gaultheria procumbens</i>	Wintergreen	100	*
<i>Smilacina racemosa</i>	False solomon's seal	85	26
<i>Rubus flagellaris/hispidus</i>	Dewberry/swamp dewberry	69	*
<i>Epigaea repens</i>	Trailing arbutus	31	*
<i>Dryopteris spinulosa</i>	Spinulose shield fern	*	69
<i>Trillium spp.</i>	Trilliums	*	64
<i>Athyrium filix-femina</i>	Lady fern	*	60
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	*	52
<i>Galium triflorum</i>	Sweet-scented bedstraw	15	51
<i>Actaea spp.</i>	Baneberries	*	50
<i>Hepatica americana</i>	Round-lobed hepatica	*	40
<i>Osmorhiza claytoni</i>	Sweet cicely	*	37
<i>Ribes spp.</i>	Gooseberries	*	29

		AVCI	ACI
<i>Corylus cornuta</i>	Beaked hazelnut	100/9	85/3
<i>Pteridium aquilinum</i>	Bracken fern	91/6	46/2
<i>Acer spicatum</i>	Mountain maple	87/3	46/<1
<i>Diervilla lonicera</i>	Bush honeysuckle	75	21
<i>Anemone quinquefolia</i>	Wood anemone	66	28
<i>Vaccinium angustifolium</i>	Low sweet blueberry	50	25
<i>Cornus canadensis</i>	Bunchberry	45	10
<i>Vaccinium myrtilloides</i>	Canada blueberry	41	*
<i>Rubus pubescens</i>	Dwarf raspberry	41	*
<i>Fragaria spp.</i>	Strawberries	37	14

		AVCI	AAAs
<i>Corylus cornuta</i>	Beaked hazelnut	100/9	83/4
<i>Pteridium aquilinum</i>	Bracken fern	91/6	29/<1
<i>Vaccinium angustifolium</i>	Low sweet blueberry	50	*
<i>Cornus canadensis</i>	Bunchberry	45	16
<i>Vaccinium myrtilloides</i>	Canada blueberry	41	*
<i>Smilacina racemosa</i>	False solomon's seal	41	20
<i>Apocynum andro.</i>	Spreading dogbane	37	*
<i>Gaultheria procumbens</i>	Wintergreen	33	*
<i>Viola pubescens</i>	Downy yellow violet	33	87

Continued on next page.

<i>Osmorhiza claytoni</i>	Sweet cicely	25	83
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	12	75
<i>Athyrium filix-femina</i>	Lady fern	16	70
<i>Trillium spp.</i>	Trilliums	*	66
<i>Aralia racemosa</i>	Spikenard	*	45
<i>Osmunda claytoniana</i>	Interrupted fern	12	41
<i>Hepatica americana</i>	Round-lobed hepatica	*	37
<i>Ribes spp.</i>	Gooseberries	12	33
<i>Dryopteris disjuncta</i>	Oak fern	*	29

		ACI	AAs
<i>Smilacina racemosa</i>	False solomon's seal	78	20
<i>Viola pubescens</i>	Downy yellow violet	25	87
<i>Anemone quinquefolia</i>	Wood anemone	28	87
<i>Osmorhiza claytoni</i>	Sweet cicely	32	83
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	*	75
<i>Athyrium filix-femina</i>	Lady fern	14	70
<i>Trillium spp.</i>	Trilliums	21	66
<i>Rubus pubescens</i>	Dwarf raspberry	*	62
<i>Aralia racemosa</i>	Spikenard	17	45
<i>Diervilla lonicera</i>	Bush honeysuckle	21	45
<i>Osmunda claytoniana</i>	Interrupted fern	17	41
<i>Hepatica americana</i>	Round-lobed hepatica	14	37
<i>Ribes spp.</i>	Gooseberries	10	33
<i>Dryopteris disjuncta</i>	Oak fern	10	29

		AVCI	ATM
<i>Acer spicatum</i>	Mountain maple	87	19
<i>Vaccinium angustifolium</i>	Low sweet blueberry	50	*
<i>Vaccinium myrtilloides</i>	Canada blueberry	41	*
<i>Rubus pubescens</i>	Dwarf raspberry	41	*
<i>Gaultheria procumbens</i>	Wintergreen	33	*
<i>Trillium spp.</i>	Trilliums	*	64
<i>Athyrium filix-femina</i>	Lady fern	16	60
<i>Ribes spp.</i>	Gooseberries	12	50
<i>Hepatica americana</i>	Round-lobed hepatica	*	40
<i>Dryopteris disjuncta</i>	Oak fern	*	26
<i>Dirca palustris</i>	Leatherwood	*	25

		ACI	ATM
<i>Smilacina racemosa</i>	False solomon's seal	78	26
<i>Acer spicatum</i>	Mountain maple	46	19
<i>Dryopteris spinulosa</i>	Spinulose shield fern	57/<1	69/4
<i>Trillium spp.</i>	Trilliums	21	64

<i>Athyrium filix-femina</i>	Lady fern	14	60
<i>Diervilla lonicera</i>	Bush honeysuckle	21/<1	57/5
<i>Ribes spp.</i>	Gooseberries	10	50
<i>Hepatica americana</i>	Round-lobed hepatica	14	40
<i>Cornus canadensis</i>	Bunchberry	10	31
<i>Dryopteris disjuncta</i>	Oak fern	10	26

		ATM	AAs
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	22	75
<i>Acer spicatum</i>	Mountain maple	19	75
<i>Rubus pubescens</i>	Dwarf raspberry	*	62
<i>Aralia racemosa</i>	Spikenard	*	45

		ArAbVCo	PArVAa-Po
<i>Cornus canadensis</i>	Bunchberry	100	15
<i>Lycopodium obscurum</i>	Ground-pine	88/8	54/<1
<i>Galium triflorum</i>	Sweet-scented bedstraw	83	15
<i>Dryopteris spinulosa</i>	Spinulose shield fern	72	*
<i>Coptis groenlandica</i>	Goldthread	61	*
<i>Acer spicatum</i>	Mountain maple	55	15
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	50	*
<i>Rubus pubescens</i>	Dwarf raspberry	50	15
<i>Linnaea borealis</i>	Twinflower	38	*
<i>Osmunda claytoniana</i>	Interrupted fern	38	*
<i>Smilacina racemosa</i>	False solomon's seal	*	85
<i>Rubus flagellaris/hispidus</i>	Dewberry/swamp dewberry	*	69
<i>Epigaea repens</i>	Trailing arbutus	*	31

		ArAbVCo	AVCI
<i>Cornus canadensis</i>	Bunchberry	100/2	45/<1
<i>Coptis groenlandica</i>	Goldthread	61	16
<i>Osmunda claytoniana</i>	Interrupted fern	38	12
<i>Linnaea borealis</i>	Twinflower	38	*
<i>Polygonatum pubescens</i>	Hairy solomon's seal	16	79
<i>Smilacina racemosa</i>	False solomon's seal	*	41
<i>Viola pubescens</i>	Downy yellow violet	*	33

		ArAbSn	AVCI
<i>Rosa spp.</i>	Roses	82	*
<i>Cornus stolonifera</i>	Red-osier dogwood	77	*
<i>Equisetum spp.</i>	Horsetails	72	*
<i>Petasites palmatus</i>	Sweet coltsfoot	70	*
<i>Sanicula spp.</i>	Snakeroot	68	*

Continued on next page.

<i>Rubus pubescens</i>	Dwarf raspberry	68/10	41/<1
<i>Viburnum rafinesquianum</i>	Downy arrowwood	65	*
<i>Alnus rugosa</i>	Speckled alder	65	*
<i>Cornus canadensis</i>	Bunchberry	52/2	45/<1
<i>Agrimonia spp.</i>	Agrimony	46	*
<i>Athyrium filix-femina</i>	Lady fern	46	16
<i>Ribes spp.</i>	Gooseberries	45	12
<i>Rubus flagellaris/hispidus</i>	Dewberry/swamp dewberry	41	*
<i>Mitella nuda</i>	Naked miterwort	38	*
<i>Lycopodium obscurum</i>	Ground-pine	*	87
<i>Polygonatum pubescens</i>	Hairy solomon's seal	*	79
<i>Smilacina racemosa</i>	False solomon's seal	*	41
		ArAbSn	ATM
<i>Rosa spp.</i>	Roses	82	*
<i>Fragaria spp.</i>	Strawberries	81	21
<i>Cornus stolonifera</i>	Red-osier dogwood	77	*
<i>Equisetum spp.</i>	Horsetails	72	*
<i>Petasites palmatus</i>	Sweet coltsfoot	70	*
<i>Rubus pubescens</i>	Dwarf raspberry	68	*
<i>Sanicula spp.</i>	Snakeroot	68	*
<i>Viburnum rafinesquianum</i>	Downy arrowwood	65	*
<i>Alnus rugosa</i>	Speckled alder	65	*
<i>Agrimonia spp.</i>	Agrimony	46	*
<i>Rubus flagellaris/hispidus</i>	Dewberry/swamp dewberry	41	*
<i>Mitella nuda</i>	Naked miterwort	38	*
<i>Lycopodium obscurum</i>	Ground-pine	*	64
<i>Mitchella repens</i>	Partridgeberry	22	47
<i>Osmorhiza claytoni</i>	Sweet cicely	*	37
<i>Polygonatum pubescens</i>	Hairy solomon's seal	*	36
		ASnMi	ATM
<i>Fragaria spp.</i>	Strawberries	73	21
<i>Petasites palmatus</i>	Sweet coltsfoot	72	*
<i>Equisetum spp.</i>	Horsetails	69	*
<i>Rubus pubescens</i>	Dwarf raspberry	59	*
<i>Viburnum rafinesquianum</i>	Downy arrowwood	52	*
<i>Sanicula spp.</i>	Snakeroot	48	*
<i>Rubus flagellaris/hispidus</i>	Dewberry/swamp dewberry	45	*
<i>Cornus stolonifera</i>	Red-osier dogwood	38	*
<i>Agrimonia spp.</i>	Agrimony	31	*
<i>Alnus rugosa</i>	Speckled alder	28	*
<i>Mitella nuda</i>	Naked miterwort	28	*
<i>Lycopodium obscurum</i>	Ground-pine	14	65
<i>Polygonatum pubescens</i>	Hairy solomon's seal	17	36

		ASnMi	AAs
<i>Petasites palmatus</i>	Sweet coltsfoot	72	*
<i>Equisetum spp.</i>	Horsetails	69	*
<i>Cornus canadensis</i>	Bunchberry	66	16
<i>Rubus pubescens</i>	Dwarf raspberry	59/8	62/<1
<i>Viburnum rafinesquianum</i>	Downy arrowwood	52	12
<i>Sanicula spp.</i>	Snakeroot	48	12
<i>Rubus flagellaris/hispidus</i>	Dewberry/swamp dewberry	45	*
<i>Cornus stolonifera</i>	Red-osier dogwood	38	*
<i>Agrimonia spp.</i>	Agrimony	31	*
<i>Alnus rugosa</i>	Speckled alder	28	*
<i>Mitella nuda</i>	Naked miterwort	28	*
<i>Polygonatum pubescens</i>	Hairy solomon's seal	17	79
<i>Lycopodium obscurum</i>	Ground-pine	14	75
<i>Aralia racemosa</i>	Spikenard	*	45
<i>Lycopodium spp.</i>	Clubmosses	14	37

		AAAtRp	AVCI
<i>Osmunda claytoniana</i>	Interrupted fern	93	12
<i>Athyrium filix-femina</i>	Lady fern	79	16
<i>Ribes spp.</i>	Gooseberries	79	12
<i>Equisetum spp.</i>	Horsetails	71	*
<i>Alnus rugosa</i>	Speckled alder	43	*
<i>Petasites palmatus</i>	Sweet coltsfoot	43	*
<i>Cornus racemosa</i>	Gray dogwood	36	*
<i>Impatiens capensis</i>	Jewelweed	36	*
<i>Onoclea sensibilis</i>	Sensitive fern	29	*
<i>Sanicula spp.</i>	Snakeroot	29	*
<i>Lycopodium obscurum</i>	Ground-pine	29	87
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	29	79
<i>Polygonatum pubescens</i>	Hairy solomon's seal	*	79
<i>Smilacina racemosa</i>	False solomon's seal	*	41
<i>Viola pubescens</i>	Downy yellow violet	14	33
<i>Gaultheria procumbens</i>	Wintergreen	*	3

		AAAtRp	AAs
<i>Equisetum spp.</i>	Horsetails	71	*
<i>Cornus canadensis</i>	Bunchberry	57	16
<i>Petasites palmatus</i>	Sweet coltsfoot	43	*
<i>Alnus rugosa</i>	Speckled alder	43	*
<i>Vaccinium spp.</i>	Blueberries	43	*
<i>Cornus racemosa</i>	Gray dogwood	36	*
<i>Impatiens capensis</i>	Jewelweed	36	*

Continued on next page.

<i>Onoclea sensibilis</i>	Sensitive fern	29	*
<i>Coptis groenlandica</i>	Goldthread	29	*
<i>Viola pubescens</i>	Downy yellow violet	14	87
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	29	83
<i>Polygonatum pubescens</i>	Hairy solomon's seal	*	79
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	21	75
<i>Lycopodium obscurum</i>	Ground-pine	29	75
<i>Trillium spp.</i>	Trilliums	29	66
<i>Mitchella repens</i>	Partridgeberry	14	50
<i>Aralia racemosa</i>	Spikenard	*	45

		ArAbVCo	AAtRp
<i>Cornus canadensis</i>	Bunchberry	100/2	57/<1
<i>Lycopodium obscurum</i>	Ground-pine	88/8	29/<1
<i>Lycopodium spp.</i>	Clubmosses	72/3	21/<1
<i>Coptis groenlandica</i>	Goldthread	61	29
<i>Linnaea borealis</i>	Twinflower	38	*
<i>Gaultheria procumbens</i>	Wintergreen	33	*
<i>Athyrium filix-femina</i>	Lady fern	11	79
<i>Ribes spp.</i>	Gooseberries	27	79
<i>Osmorhiza claytoni</i>	Sweet cicely	11	43
<i>Petasites palmatus</i>	Sweet coltsfoot	11	43
<i>Impatiens capensis</i>	Jewelweed	*	36
<i>Cornus racemosa</i>	Gray dogwood	*	36
<i>Trillium spp.</i>	Trilliums	11	29

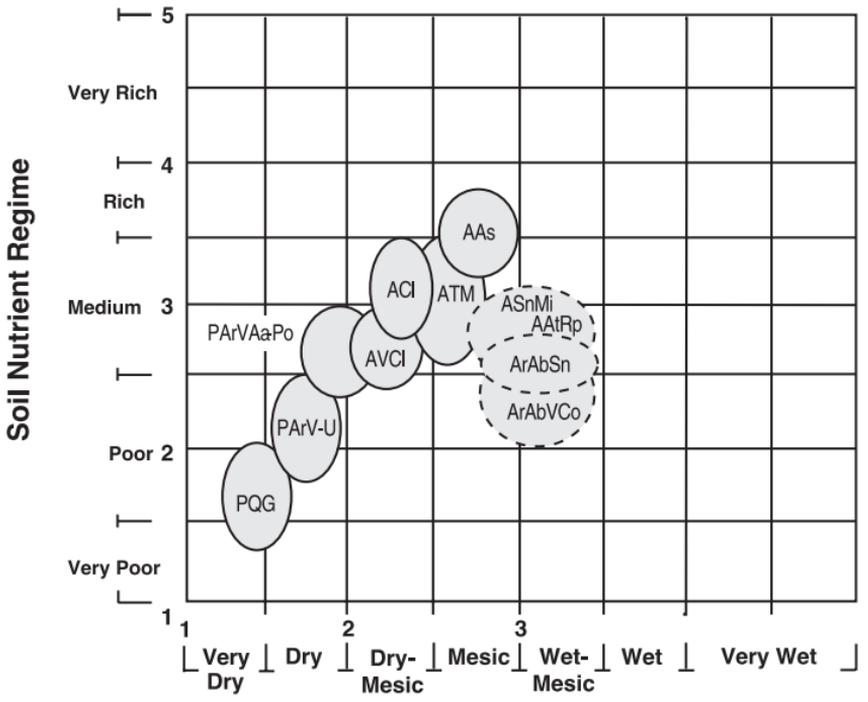
		ArAbVCo	ArAbSn
<i>Lycopodium obscurum</i>	Ground-pine	88	*
<i>Coptis groenlandica</i>	Goldthread	61	*
<i>Osmunda claytoniana</i>	Interrupted fern	38	12
<i>Rosa spp.</i>	Roses	*	82
<i>Cornus stolonifera</i>	Red-osier dogwood	*	77
<i>Petasites palmatus</i>	Sweet coltsfoot	11	70
<i>Sanicula spp.</i>	Snakeroot	11	68
<i>Rubus pubescens</i>	Dwarf raspberry	50/1	68/10
<i>Viburnum rafinesquianum</i>	Downy arrowwood	*	65
<i>Agrimonia spp.</i>	Agrimony	*	46
<i>Rubus flagellaris/hispidus</i>	Dewberry/swamp dewberry	*	41
<i>Mitella nuda</i>	Naked miterwort	*	38
<i>Ilex verticillata</i>	Winterberry	*	33
<i>Waldsteinia fragarioides</i>	Barren strawberry	*	32

		AAtRp	ASnMi
<i>Impatiens capensis</i>	Jewelweed	36	17

<i>Cornus racemosa</i>	Gray dogwood	36	*
<i>Corylus cornuta</i>	Beaked hazelnut	93/3	93/12
<i>Aster macrophyllus</i>	Large-leaved aster	86/3	93/24
<i>Mitchella repens</i>	Partridgeberry	14	66
<i>Viburnum rafinesquianum</i>	Downy arrowwood	*	52
<i>Viola pubescens</i>	Downy yellow violet	14	41
<i>Cornus stolonifera</i>	Red-osier dogwood	*	38
<i>Smilacina racemosa</i>	False solomon's seal	*	34
<i>Agrimonia spp.</i>	Agrimony	14	31

		ArAbSn	ASnMi
<i>Mitchella repens</i>	Partridgeberry	22	66
<i>Osmunda claytoniana</i>	Interrupted fern	12	45
<i>Viola pubescens</i>	Downy yellow violet	20	41
<i>Osmorhiza claytoni</i>	Sweet cicely	*	34
<i>Smilacina racemosa</i>	False solomon's seal	*	34
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	*	31

Relationship of Habitat Types to Soil Moisture and Nutrient Regimes in Region 2



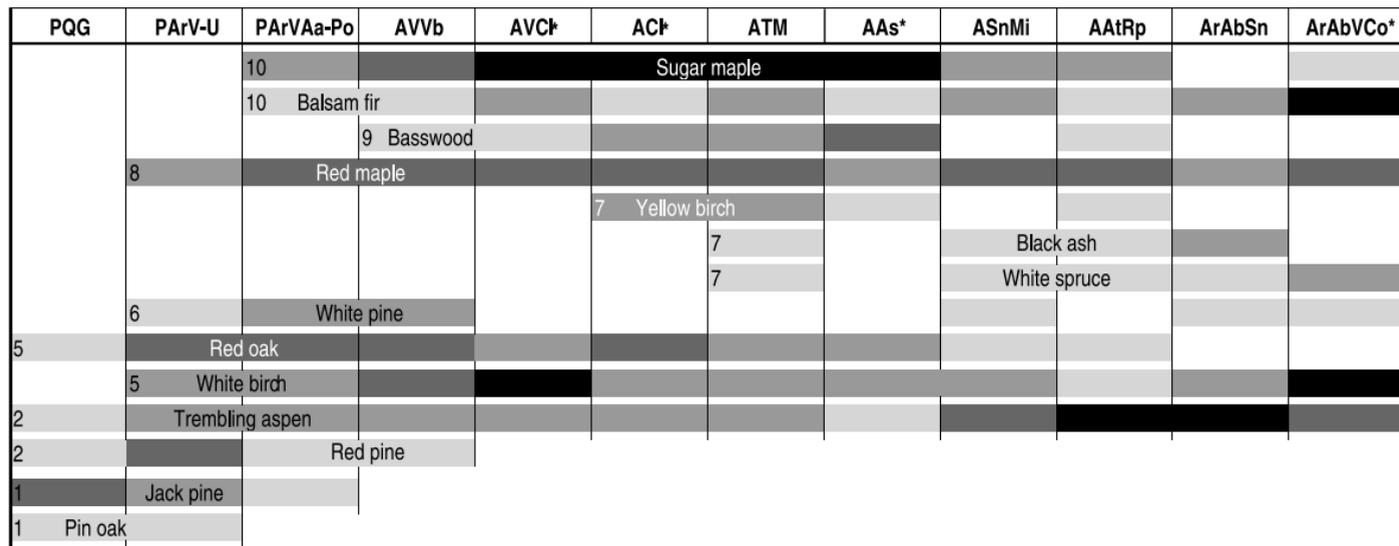
Occurrence of Tree Species Across Habitat Types of Region 2

(Data from 1996 FIA)

Numbers in front of bars are relative shade tolerance values: 1, least tolerant; 10, most tolerant

[Very Dry-Dry] [D-DM] [Dry Mesic] [Mesic] [Mesic-Wet Mesic]

[Poor] [Medium] [Rich] [Medium] [Poor]



2-40

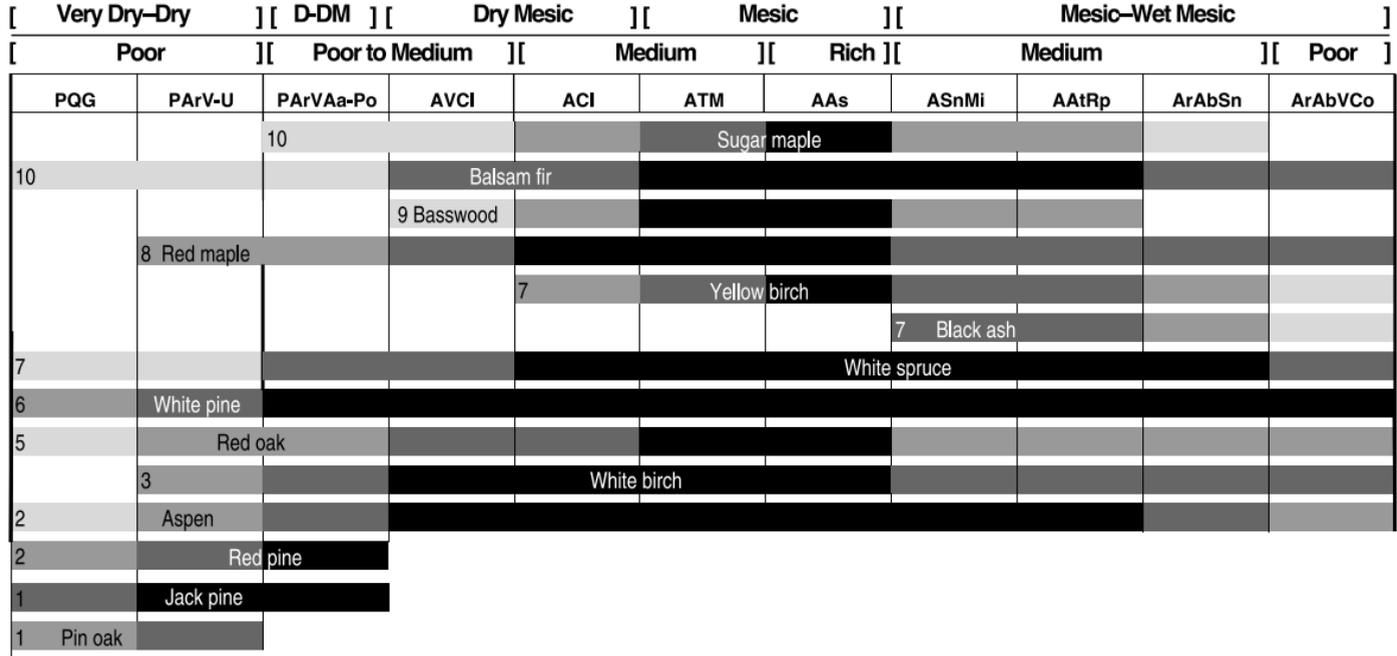
% presence 10-25 26-50 51-75 >75

* FIA data inadequate for these habitat types. Data taken from study in Douglas, Bayfield and Iron Counties in 1992.

Relative Growth Potential for Major Tree Species Across Habitat Types of Region 2

(Only those habitat types where the species occurs naturally are considered)
 Numbers in front of bars are relative shade tolerance values: 1, least tolerant; 10, most tolerant

2-41



Very good
 Good
 Fair
 Poor

Current Relative Importance of Common Forest Cover Types on Habitat Types of Region 2

••• - Dominant: >50%; •• - Common: 10-50%; • - Minor: <10% of all cover types observed on that habitat type.

Cover Type	PQG	PARV-U	PARVAa-Po	AVCI	ACI	ATM	AAs	AAtRp	ASnMi	ArAbSn	ArAbVCo
Pin Oak - Red Oak	••	•									
Jack Pine - Oak*	••	•	•								
Jack Pine	•••	•	•								
Red Pine	••	••	••								
Aspen - Pine*	•	•	•	•		•			•	•	•
Aspen - Oak*	•	•	•	•	•	•					
Red Oak	•	••	••	•	••	•	•				
Aspen	•	••	••	••	•	••	•	••	••	••	••
White Pine - Oak*		•	•								
White Pine - Red Pine		•	•						•	•	•
White Pine - Red Maple		•	•						•	•	•
White Pine		•	•	•		•			•	•	•
Oak - Red Maple*		••	••	••	••	•					
Red Maple		•	•	•	•	•		••	••	•	•
Aspen - Red Maple		•	•	•	•	•		••	••	••	••
Aspen - White Birch		••	••	••	••	•	•	••	••	••	••
White Birch		•	•	••	•	•	•	•	•	•	••
Aspen - Balsam Fir			•	•	•	•		•	••	••	••
Balsam Fir - Red Maple			•	•	•	•		•	••	••	••
Balsam Fir - White Spruce			•	•	•	•	•	•	••	••	••
Sugar Maple - Red Maple			•	••	••	••	••	••	•		
Sugar Maple - Red Oak			•	••	••	•	••	•	•		
Sugar Maple				•	••	••	•••	••	•		
Sugar Maple - Basswood					•	••	••	•	•		
Sugar Maple - Basswood - Ash - Yellow Birch*					•	•	•	•	•		
Sugar Maple - Hemlock - Yellow Birch - Red Maple						•					
Hemlock						•					

* Oak is any mix of red, white, bur, and pin oaks.

Pine is any mix of white, red, and jack pines.

Ash is predominantly white ash on mesic sites, and white, green, and black ashes on mesic to wet-mesic sites.

Occurrence of Understory Species Across the Habitat Types of Region 2

Numbers represent frequency of occurrence classes: • 10-25%; 1, 26-50%; 2, 51-75%; 3, 76-100%.
 Letters are coverage classes: A<1%; B 1-5%; C 6-15%; D>15%. Numbers of study plots in parentheses.

Scientific names	Common names	PQG (49)	PARV-U (40)	PARVAa -Po (13)	AVCI* (24)	ACI* (27)	ATM (230)	AA* (22)	AATRp (14)	ASnMi (29)	ArAbSn (69)	ArAb VCo* (17)
Shrubs												
Rosa spp.	Roses	2B	•							1B	3B	
Comptonia peregrina	Sweetfern	3B	1B									
Rubus flagellaris/hispidus	Dewberry/swamp dewberry	1B	1B	1B					•	1B	2C	•
Vaccinium spp.	Blueberries	3D	3C	3B	2A	•			1A	•	1B	2B
Rubus spp.	Blackberry/raspberry	1B	1B	1A			1C	•	2B	1C	•	•
Amelanchier spp.	Juneberry	3B	3C	3B	3A	2A	1B	2A	2B	2B	2C	3A
Diervilla lonicera	Bush honeysuckle	1B	1B	3B	2A	•	2B	1A	3A	2C	2C	3A
Corylus americana	Hazel-nut	2D	•						1A		•	•
Corylus cornuta	Beaked hazelnut	1B	3D	3D	3C	3B	3C	3B	3B	3D	3D	3C
Lonicera canadensis	American fly honeysuckle	•	•	2B	3B	3B	2B	3A	1A	3B	1B	3A
Prunus virginiana	Chokecherry	•	•		1A	1A	1B	2A	1A	•	1B	1A
Viburnum acerifolium	Maple-leaved viburnum			•			•			•	•	
Viburnum rafinesquianum	Downyarrowwood			•				•		2C	2C	
Rubus parviflorus	Thimbleberry			•		•				1C	•	•
Rubus pubescens	Dwarf raspberry			•	1A			2A	3A	2C	2C	1B
Acer spicatum	Mountain maple			•	3B	1A	•	2B	1A	•		2B
Dirca palustris	Leatherwood					1B	•			•		
Cornus alternifolia	Alternated-leaved dogwood				2A	2A	2B	3A	1A	1A	•	1A
Ribes spp.	Gooseberries				•	•	2B	1A	3A	2A	1B	1A
Cornus racemosa	Gray dogwood								1A		•	
Cornus stolonifera	Red-osier dogwood									1B	3C	
Alnus rugosa	Speckled alder								1B	1C	2D	•
Ilex verticillata	Winterberry								•	•	1B	•
Ferns, Allies, Lichens, Mosses												
Pteridium aquilinum	Bracken fern	3D	3D	3D	3C	1B	2C	1A	3B	3D	3D	3C
Lycopodium obscurum	Ground-pine clubmoss		•	2A	3B	2A	2B	2A	1A	•		3C
Lycopodium spp.	Clubmosses		•	•	1A	1A	•	1A	•	•	•	2B
Dryopteris spinulosa	Spinulose shield fern				2B	2A	2B	3B	2A	1A	•	2B
Athyrium filix-femina	Lady fern				•	•	2B	2B	3B	2C	1B	•
Osmunda claytoniana	Interrupted fern				•	•	1B	1A	3A	1B	•	1B
Dryopteris disjuncta	Oak fern					•	1B	1A		•		•
Onoclea sensibilis	Sensitive fern								1A	•	•	•
Equisetum spp.	Horsetails								2A	2B	2B	•
Forbs and Subshrubs												
Arctostaphylos uva-ursi	Bearberry	1B										
Lithospermum spp.	Gromwells	1A										
Epigaea repens	Trailing arbutus	•	•	1A								
Gaultheria procumbens	Wintergreen	3B	3C	3B	1A	•				•	•	1A
Apocynum androsaemifolium	Spreading dogbane	2A	1A	1A	1A	•	1B		1A	1A	2B	1A
Fragaria spp.	Strawberries	1A	1A	1A	1A	•	•	1A	2A	2B	3B	1A
Maianthemum canadense	Wild lily-of-the-valley	3B	3B	3A	3B	3B	3B	3A	3A	3A	2A	3B
Aster macrophyllus	Large-leaved aster	1B	3C	3D	3C	3C	2D	3C	3B	3D	3D	3D
Trientalis borealis	Starflower	1B	2B	3B	3B	3B	3B	3A	2A	2A	1A	3A
Anemone quinquefolia	Wood anemone	1B	1B	2A	2A	1A	2B	3A	2A	2A	1A	2A
Aralia nudicaulis	Wild sarsaparilla	•	2B	3B	3C	3C	3C	3C	3B	3B	2B	3C
Uvularia sessifolia	Sessile-leaved bellwort	•	3B	3B	3A	3B	2B	3B	3A	3B	1A	2A
Smilacina racemosa	False solomon's seal		1B	3B	1A	3A	1B	•		1A		
Streptopus roseus	Rosey twisted stalk		•	1A	3B	3A	1B	3A	2A	2A	1A	3A
Polygonatum pubescens	Hairy solomon's seal		•	1A	3A	3A	1B	3A		•		•
Clintonia borealis	Yellow beadlilly		•	2B	3B	3B	2B	3B	3A	2B	1B	3C
Cornus canadensis	Bunchberry		•	•	1A	•	1B	•	2A	2B	2B	3B
Mitchella repens	Partridgeberry			1A	1A	2A	1B	1A	•	2B	•	1B
Galium triflorum	Sweet-scented bedstraw		•	2A	1A	2B	2A	2A	2A	3A	2A	3A
Viola pubescens/pennsylvanica	Downy/smooth yellow violet		•	1A	•	1B	3A	•	1A	•	•	•

Continued on next page.

Scientific names	Common names	PQG (49)	PARV-U (40)	PARVAa -Po (13)	AVCI* (24)	ACI* (27)	ATM (230)	AA* (22)	AAIRp (14)	ASnMi (29)	ArAbSn (69)	ArAb VCo* (17)
<i>Prenanthes alba</i>	White lettuce			•	1A	1A	•	•	1A	1A	1A	1A
<i>Waldsteinia fragarioides</i>	Barren strawberry									1D	1D	
<i>Thalictrum dioicum</i>	Early meadow rue						•		•	1A	•	
<i>Actaea</i> spp.	Baneberries				1A	1A	1B	2A	1A	1B	1A	1A
<i>Hepatica americana</i>	Round-lobed hepatica						•	1B	1A	1A	1A	•
<i>Trillium</i> spp.	Trilliums						•	2B	2A	1A	•	•
<i>Osmorhiza claytoni</i>	Sweet cicely				•	1A	1B	3A	1A	1A		•
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit				•		•	2A	•	1A		
<i>Aralia racemosa</i>	Spikenard						•	1A				
<i>Caulophyllum thalictroides</i>	Blue cohosh						•	•			•	
<i>Impatiens capensis</i>	Jewelweed								1A	•		•
<i>Mitella nuda</i>	Naked miterwort									1B	1A	
<i>Agrimonia</i> spp.	Agrimony								•	1A	1B	
<i>Sanicula</i> spp.	Snakeroots							•	1A	1B	2B	•
<i>Petasites palmatus</i>	Sweet coltsfoot								1A	2A	2B	•
<i>Coptis groenlandica</i>	Goldthread				•				1A	•		2A
<i>Linnaea borealis</i>	Twinflower									•	•	1C
<i>Prunella vulgaris</i>	Selfheal				•			•		3A	2A	1A

* Data from "Supplement to the Field Guide to Forest Habitat Types of Northern Wisconsin: Douglas County and Northern Bayfield and Ashland Counties."

Region 3 - Habitat Type Distribution

Habitat Type	Occurrence in the Region	Primary Landforms and Soils	Page No.
PQE	Uncommon, occurring only in Vilas and Oneida Counties.	Driest, most nutrient poor outwash sands	3-4
PARV	Common in Vilas and Oneida Counties. In eastern Florence County, transitional to PARVAo (Region 4). Uncommon elsewhere.	Deep, excessively drained, outwash sands.	3-10
PARVAa	Common in Vilas and Oneida Counties. Scattered throughout the rest of the region.	Sandy outwash soils, but also occurs on other landforms where water worked sands have accumulated.	3-22
AVVb	Scattered throughout the region. Most common in Oneida, Vilas, Sawyer, and southern Bayfield Counties.	Well drained sandy loams and loamy sands on rolling moraines and pitted outwash.	3-30
AVb	Scattered only in the eastern counties of Langlade (most common), Florence, Forest, and Lincoln.	Well drained sandy loams and loamy sands on rolling moraines.	3-42
ATM	Common throughout the region.	Occurs on most landforms and various soils, but most common on well drained sandy loams on moraines.	3-52
ATD	Scattered throughout all counties in the northern half of the region. Common in Forest County. Generally, doesn't occur in Rusk, Taylor, Lincoln, or Langlade Counties.	Well drained loamy till and loess.	3-60
AOCa	Common throughout the region. Particularly abundant in Forest and Florence Counties. Southward within the region, it grades to AH.	Well drained loamy till and loess.	3-72
AH	Common in Langlade, Taylor, and Rusk Counties, and scattered in Lincoln and southern Price and Forest Counties. This represents the northernmost extension of AH, where it becomes transitional to AOCa.	Well drained loamy till and loess.	3-74
AHI	Scattered throughout Rusk, Taylor, Lincoln, Langlade, and southern Price and Forest Counties. Becomes transitional to the more northerly ACal.	Somewhat poorly drained loamy till and loess.	3-78

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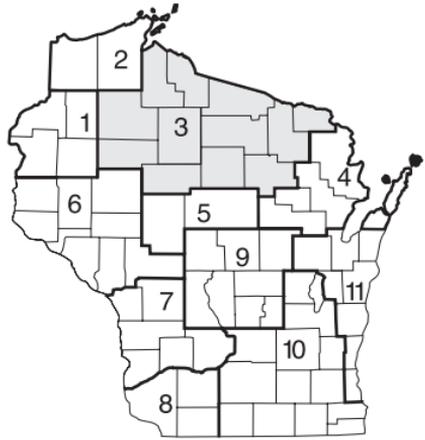
ACal	Scattered throughout the region. Most common in Price and Ashland Counties. Southward within the region, it grades to AHI.	Somewhat poorly drained loamy till and loess.	3-80
ATAtOn	Uncommon and scattered occurrence within this region.	Somewhat poorly drained loamy till, loess, and residuum.	3-84
ArAbCo	Common in Price, Sawyer, and Rusk Counties. Also scattered in adjoining counties within the region.	Somewhat poorly drained silt loams on loess plains and till plains.	3-92
TMC	Common throughout the region.	Somewhat poorly drained soils on most landforms. Most common on sandy loams on moraines.	3-90
ArAbVC	Scattered throughout the region. Most common in Oneida and Vilas Counties.	Somewhat poorly drained sands. Occurs on most landforms, but most common on pitted outwash.	3-100

Region 3

Extent, topography, geology and soils

Region 3 encompasses 12 counties (Ashland, Iron, Vilas, Sawyer, Price, Oneida, Forest, Florence, Rusk, Taylor, Lincoln and Langlade) and represents the major portion of the northern forest. It is the largest region in Wisconsin and contains the most forest land, with about 36% of the total forest land area of Wisconsin. The other four regions in the north, although also part of the northern forest, are treated separately because they represent zones of gradual climatic transition and, in some cases, also contain significantly different geologic substrata.

Nearly the entire region was glaciated during the Wisconsin Glaciation. A pronounced end moraine system crosses the region near the southern edge. Other smaller, often discontinuous, areas of end and recessional moraines also occur. Large areas are covered by ground moraine, outwash, and loess. Typical soil materials are loamy stony till, sandy outwash, and silty loess. Bogs and lakes are common. Lacustrine, alluvial, and residual soils are of minor occurrence. Two minor areas of note, in the extreme northwestern corner of the region, are the



Lake Superior Clay Plain and the Penokee-Gogebic Iron Range. Most of the region is rolling to nearly level. The maps of the Natural Divisions of Wisconsin (Hole and Germaine 1994) and Sections and Subsections of Wisconsin (WI DNR 2001) provide good characterizations of the region.

Forest vegetation

This Region supports a great diversity of forest types. Nineteen relatively common tree species make up a wide range of upland forest types. In broadest terms we can group forest types into those of dry to dry-mesic, mesic, and wet-mesic habitat types. (wet, lowland sites have not been classified into habitat types).

The dry to dry-mesic habitat types are characterized by mixtures of pines, oaks, aspen, white birch, and red maple. The stands of the mesic sites typically are dominated by sugar maple and basswood, and sometimes by aspen. Important associates include white ash, ironwood, red maple, yellow birch and hemlock. The wet-mesic habitat types are characterized by mixtures of red maple, balsam fir, white spruce, aspen, and white birch, although

on richer sites ashes, basswood, and sugar maple are well represented. On mesic and wet-mesic sites, hemlock and yellow birch were much better represented in the presettlement forests than they are today. At the time of settlement, the predominant upland forest types in the region were comprised of mesic hardwoods, hemlock and white pine. Currently, the predominant upland forest types are comprised of mesic hardwoods and aspen.

Region 3

Transitions to Adjoining Regions:

1. In northern Ashland County and extreme northwestern Iron County, on the Superior Clay Plain, ArAbSn and ASnMI from Region 2 are predominant.
2. In the western one-third of Rusk County and southwestern one-fifth of Sawyer County, compare with Region 1. The following habitat types can occur: PArVAm, AVDe, AAt, ACaCi, and ASaI.
3. In southeastern Langlade County, extreme southeastern Forest County, and eastern Florence County, compare with Region 4. The following habitat types can occur: PArVAo and PArVAa-Vb in Florence, and AFVb, ATFD, ATDH, and AFAd in Langlade and Forest Counties.

Region 3 Key to Habitat Types

1 Soil somewhat poorly drained. Two or more present:

Cornus canadensis / bunchberry (c), *Rubus pubescens* / dwarf raspberry (c), *Coptis groenlandica* / goldthread, *Linnaea borealis* / twinflower, *Oxalis montana* / wood sorrel, *Equisetum* spp. / horsetails, *Onoclea sensibilis* / sensitive fern, *Impatiens capensis* / jewelweed, *Circaea* spp. / enchanter's nightshades (c), *Cornus stolonifera* / red-osier dogwood, *Alnus rugosa* / speckled alder

go to Key C

1 Soil moderately well drained to excessively drained.

Species listed in 1 above rarely present

go to 2

2 Two or more present: *Dryopteris spinulosa* / spinulose shield fern and *Athyrium filix-femina* / lady fern together are well-represented, *Dryopteris disjuncta* / oak fern, *Cornus alternifolia* / alternate-leaved dogwood, *Actaea* spp. / baneberries, *Osmorhiza claytoni* / sweet cicely, *Arisaema atrorubens* / jack-in-the-pulpit, *Solidago flexicaulis* / zigzag goldenrod, *Caulophyllum thalictroides* / blue cohosh, *Sanguinaria canadensis* / bloodroot.

Species listed in 2 below rarely present

go to Key B

2 Two or more present: *Vaccinium* spp. / blueberries, *Gaultheria procumbens* / wintergreen, *Comptonia peregrina* / sweetfern, *Waldsteinia fragarioides* / barren strawberry, *Chimaphilla umbellata* / pipsissewa, *Polygala paucifolia* / fringed polygala, *Viburnum acerifolium* / maple-leaved viburnum (c), *Hamamelis virginiana* / witch hazel, *Desmodium glutinosum* / pointed-leaved tick trefoil.

Species listed in 2 above rarely present

go to Key A

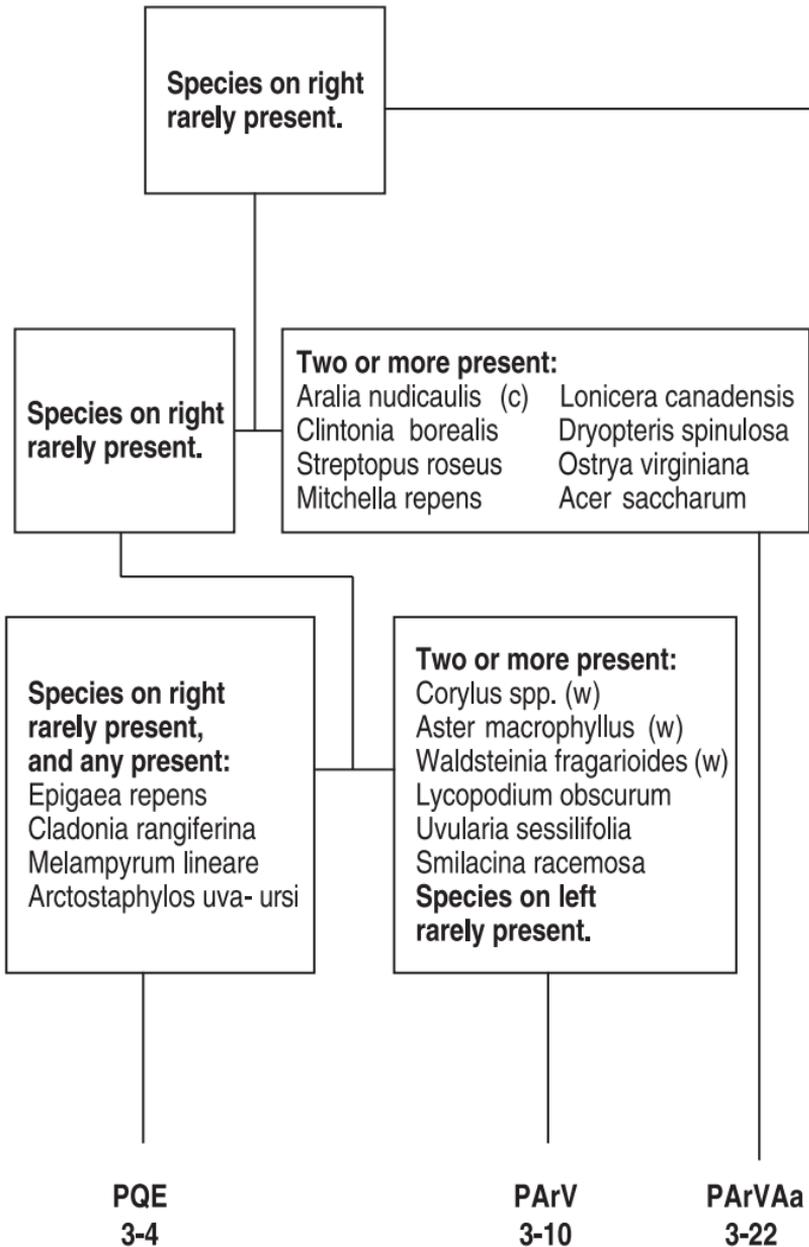
Terms used in keys:

common (c): >1% coverage

well represented (w): >5% coverage

better represented: more species are present (does not refer to coverage)

Region 3 - Key A to Habitat Types (Scientific Names)



Two or more present:

Viburnum acerifolium (w)
Hamamelis virginiana
Amphicarpa bracteata
Athyrium filix-femina

Dirca palustris
Trillium spp.
Viola pubescens

Two or more present:

Vaccinium spp.
Gaultheria procumbens
Waldsteinia fragarioides
Streptopus roseus
Dirca palustris

**Species on right
rarely present.**

Two or more present:

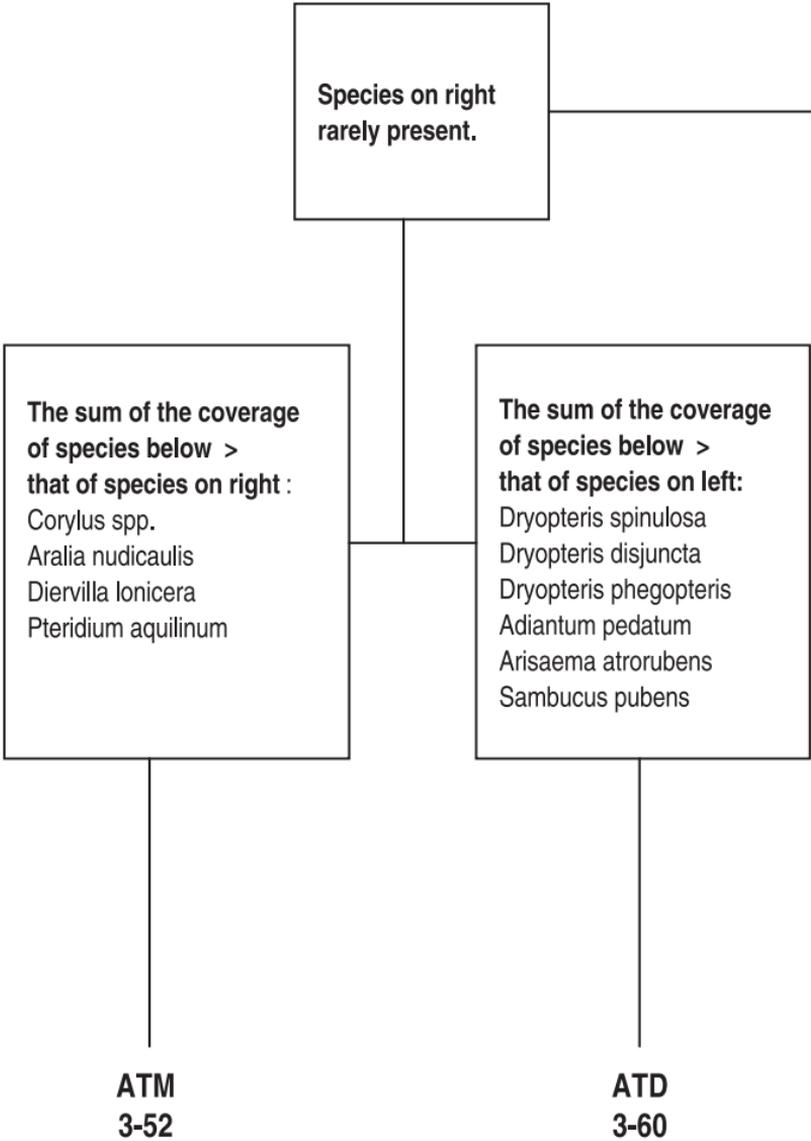
Hamamelis virginiana
Desmodium glutinosum
Amphicarpa bracteata
Uvularia grandiflora
Trillium spp.

**Species on left
rarely present.**

**AVVb
3-30**

**AVb
3-42**

Region 3 - Key B to Habitat Types (Scientific Names)



Two or more present:

Osmorhiza claytoni (w)
Sambucus pubens (c)
Caulophyllum thalictroides (c)
Hydrophyllum virginianum

Sanguinaria canadensis
Adiantum pedatum
Allium tricoccum
Laportea canadensis

**Species on right
rarely present,
and any present:**

Trientalis borealis
Clintonia borealis
Lonicera canadensis
Hepatica americana
Lycopodium spp.
Dryopteris disjuncta

Two or more present:

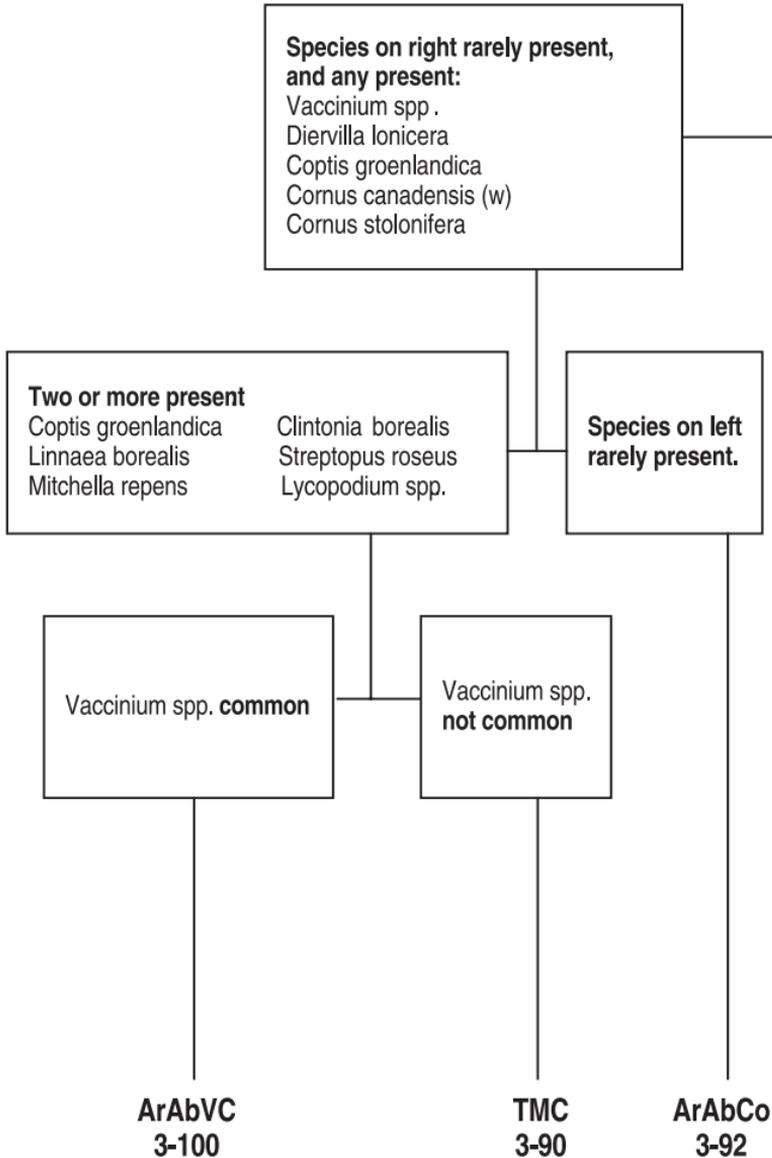
Hydrophyllum virg. (w)
Hepatica acutiloba
Laportea canadensis
Thalictrum dioicum
Amphicarpa bracteata
Geranium maculatum
Carya cordiformes (c)

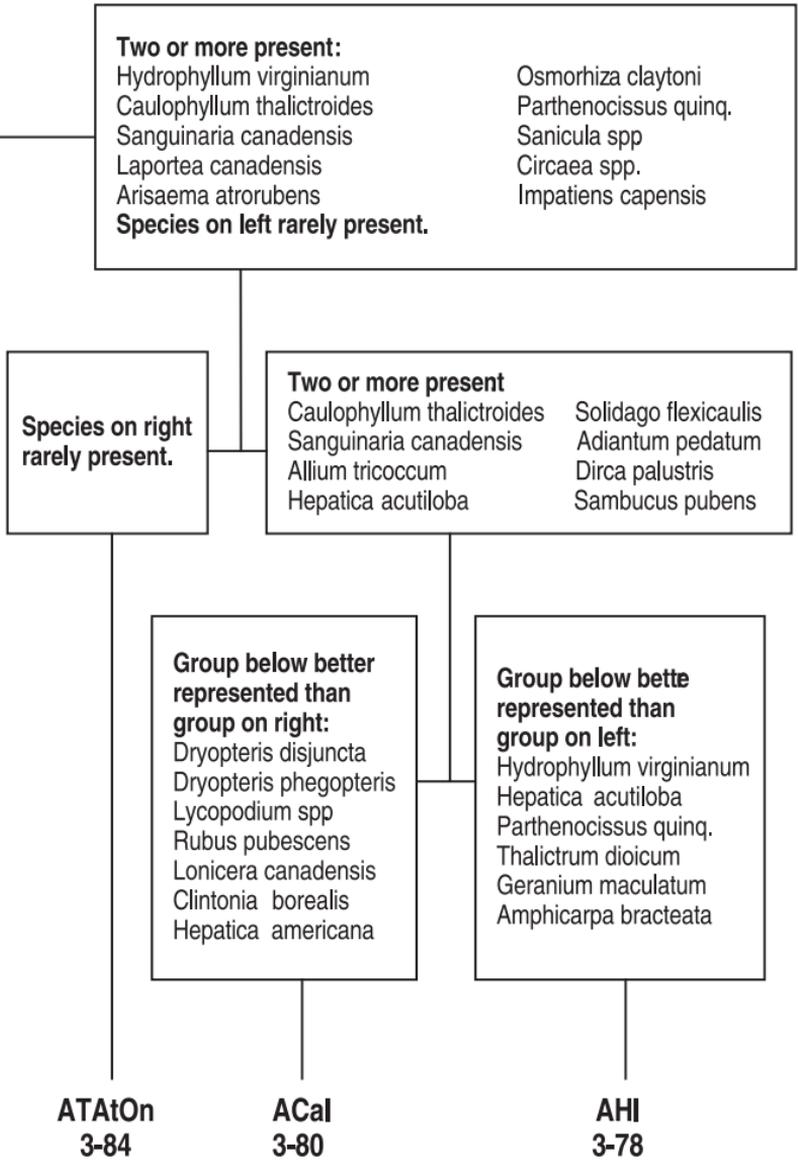
**Species on left
rarely present.**

AOCa
3-72

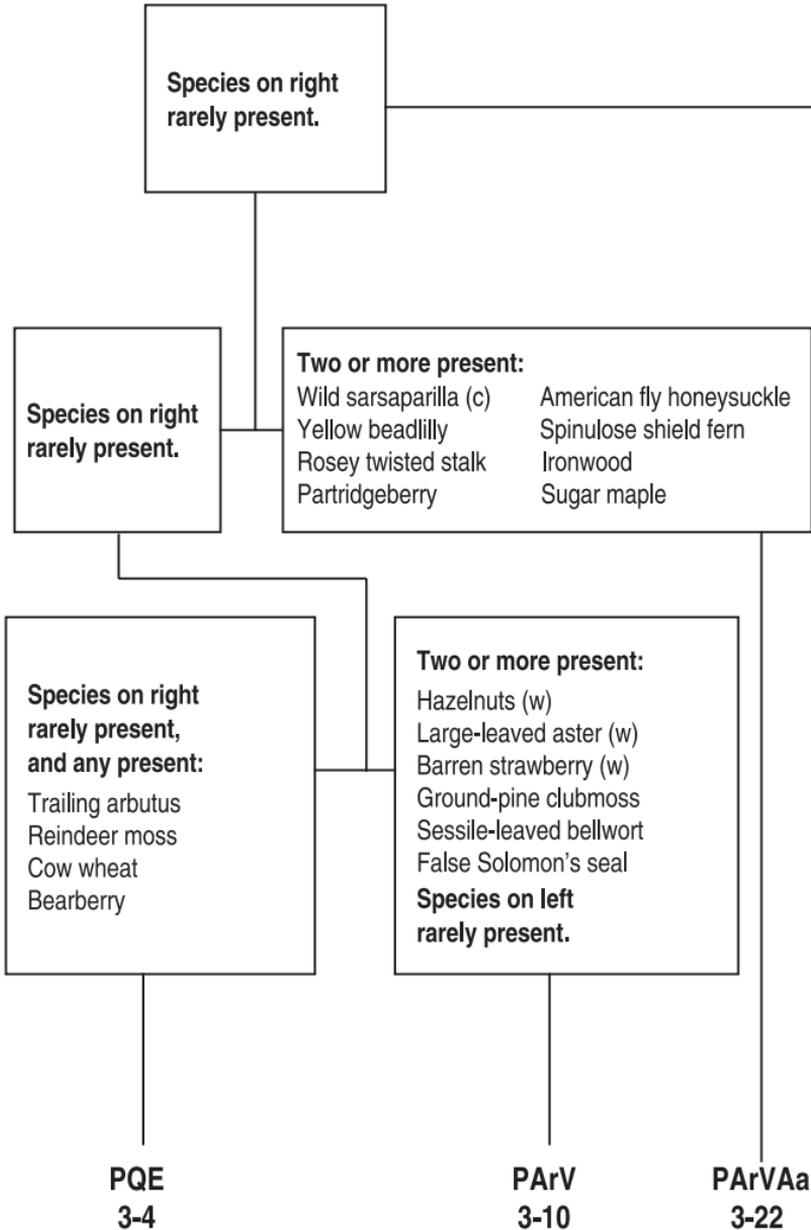
AH
3-74

Region 3 - Key C to Habitat Types (Scientific Names)





Region 3 - Key A to Habitat Types (Common Names)



Two or more present:
Maple-leaved viburnum (w) Leatherwood
Witch hazel Trilliums
Hog peanut Downy yellow violet
Lady Fern

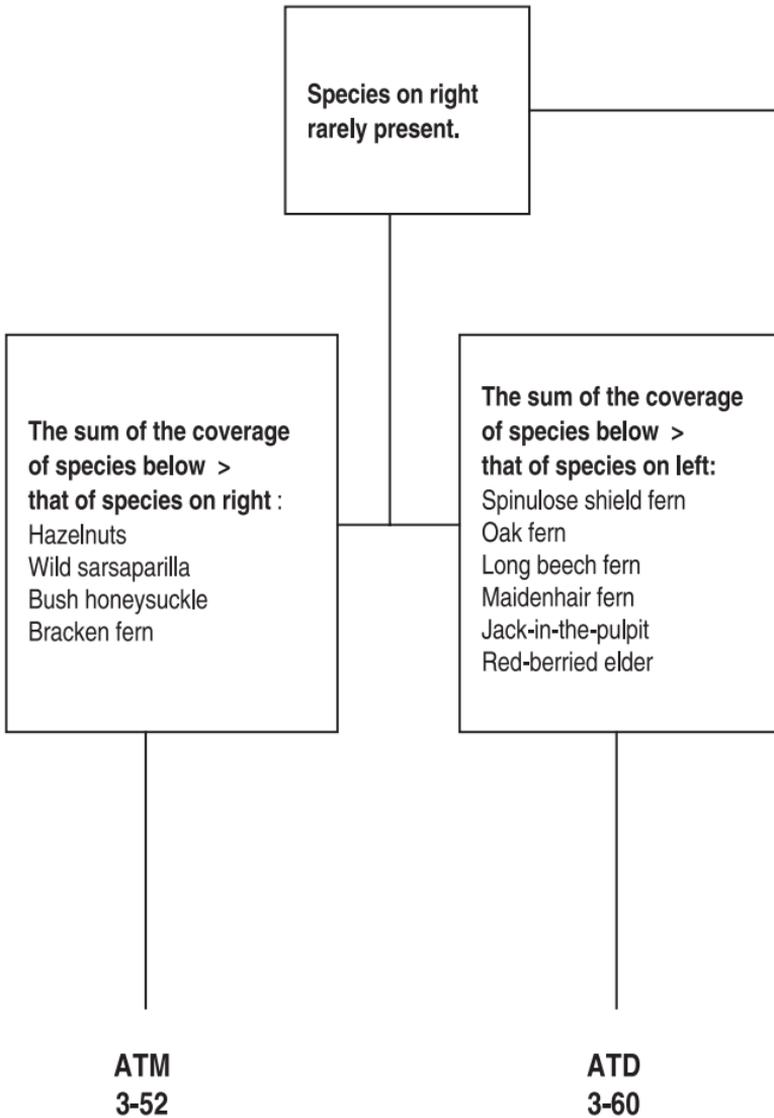
Two or more present:
Blueberries
Wintergreen
Barren strawberry
Rosey twisted stalk
Leatherwood
**Species on right
rarely present.**

Two or more present:
Witch hazel
Pointed-leaved tick trefoil
Hog peanut
Large-flowered bellwort
Trilliums
**Species on left
rarely present.**

**AVVb
3-30**

**AVb
3-42**

Region 3 - Key B to Habitat Types (Common Names)



Two or more present:

Sweet cicely (w)
Red-berried elder (c)
Blue cohosh (c)
Virginia waterleaf

Bloodroot
Maidenhair fern
Wild leek
Wood nettle

**Species on right
rarely present,
and any present:**

Starflower
Yellow beadlilly
American fly
honeysuckle
Round-lobed hepatica
Clubmosses
Oak fern

Two or more present:

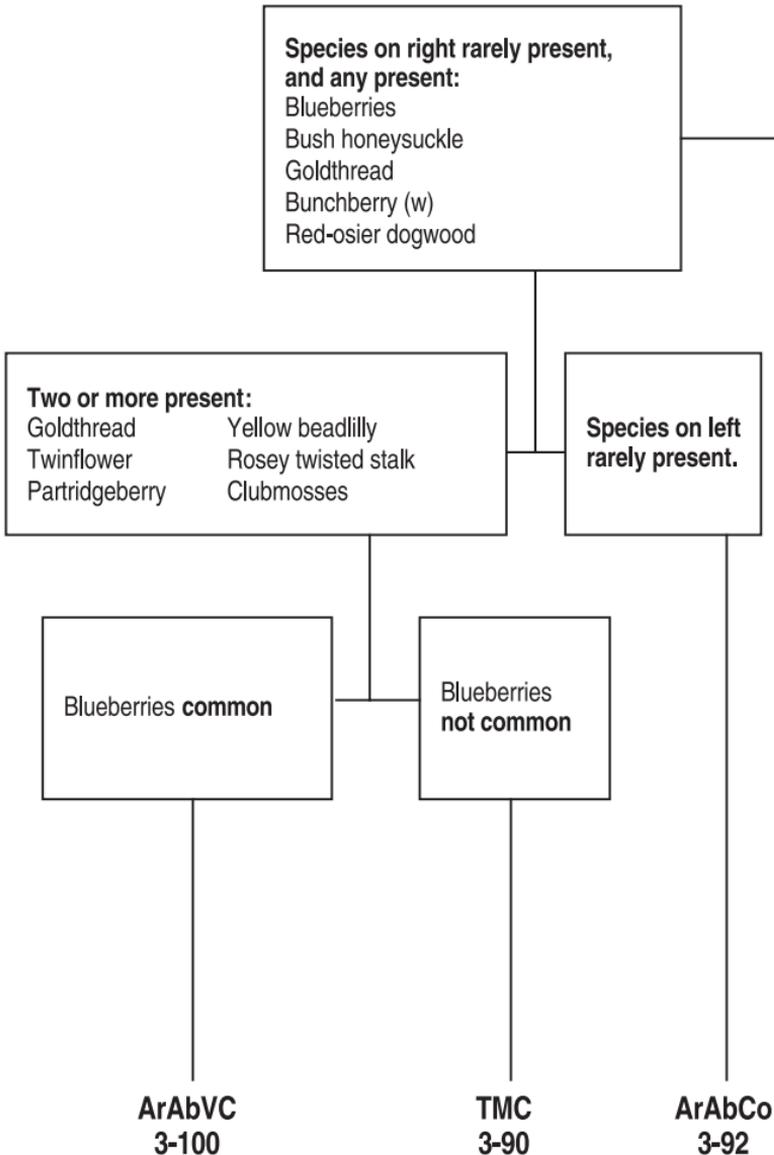
Virginia waterleaf (w)
Sharp-lobed hepatica
Wood nettle
Early meadow rue
Hog peanut
Wild geranium
Bitternut hickory (c)

**Species on left
rarely present.**

**AOCa
3-72**

**AH
3-74**

Region 3 - Key C to Habitat Types (Common Names)



Two or more present :

Virginia waterleaf Sweet cicely
Blue cohosh Virginia creeper
Bloodroot Snakeroots
Wood nettle Enchanter's nightshades
Jack-in-the-pulpit Jewelweed

Species on left rarely present.

**Species on right
rarely present.**

Two or more present :

Blue cohosh Zigzag goldenrod
Bloodroot Maidenhair fern
Wild leek Leatherwood
Round-lobbed hepatica Redberried elder

**Group below better
represented than
group on right:**

Oak fern
Long beech fern
Clubmosses
Dwarf raspberry
American fly honeysuckle
Yellow beadlilly
Round-lobbed hepatica

**Group below better
represented than
group on left:**

Virginia waterleaf
Sharp-lobed hepatica
Virginia creeper
Early meadow rue
Wild geranium
Hog peanut

**ATAtOn
3-84**

**ACal
3-80**

**AHI
3-78**

Comparison of Major Floristic Differences Between Various Habitat Types of Region 3

The following tables may be used to identify habitat types when identification through keys is inconclusive. The tables list only those species whose constancy percentages differ significantly between the types being compared. If the average coverage values also are significantly different, they are shown as a second value, separated from the constancy value by a back slash.

The species found in a stand should better match the list of species either above (h.t. in left column) or below (h.t. in right column) the horizontal line.

(Constancy / Average coverage; * = <10% constancy)

		PQE	PARv
<i>Epigaea repens</i>	Trailing arbutus	95/6	*
<i>Melampyrum lineare</i>	Cow wheat	74	*
<i>Cladonia rangiferina</i>	Cladonia rangiferina	40	*
<i>Corylus spp.</i>	Hazelnuts	15	90/10
<i>Rubus spp.</i>	Blackberries/raspberries	15	77
<i>Waldsteinia fragarioides</i>	Barren strawberry	15	76/12
<i>Aster macrophyllus</i>	Large-leaved aster	24	68
<i>Lycopodium obscurum</i>	Ground-pine	*	52
<i>Anemone quinquefolia</i>	Wood anemone	15	45
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	*	37
<i>Aralia nudicaulis</i>	Wild sarsaparilla	*	32

		PARv	PARVAa
<i>Comptonia peregrina</i>	Sweet fern	63	18
<i>Aralia nudicaulis</i>	Wild sarsaparilla	32	72
<i>Clintonia borealis</i>	Yellow beadlilly	*	59
<i>Cornus canadensis</i>	Bunchberry	18	52
<i>Lonicera canadensis</i>	American fly honeysuckle	*	45
<i>Streptopus roseus</i>	Rosey twisted stalk	*	41
<i>Polygala paucifolia</i>	Fringed polygala	*	32
<i>Mitchella repens</i>	Partridgeberry	*	26
<i>Polygonatum pubescens</i>	Hairy solomon's seal	*	25
<i>Dryopteris spinulosa</i>	Spinulose shield fern	*	25

		PArVAa	AVVb
<i>Vaccinium spp.</i>	Blueberries	86/5	46/1
<i>Cornus canadensis</i>	Bunchberry	52	21
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	11	77/6
<i>Mitchella repens</i>	Partridgeberry	26	54
<i>Dirca palustris</i>	Leatherwood	*	40
<i>Viola pubescens</i>	Downy yellow violet	*	35
<i>Amphicarpa bracteata</i>	Hog peanut	*	25
<i>Athyrium filix-femina</i>	Lady fern	*	23

		PArVAa	ATM
<i>Vaccinium spp.</i>	Blueberries	85	*
<i>Gaultheria procumbens</i>	Wintergreen	64	*
<i>Waldsteinia fragarioides</i>	Barren strawberry	54	*
<i>Polygala paucifolia</i>	Fringed polygala	32	16
<i>Dryopteris spinulosa</i>	Shield fern	25/<1	69/4
<i>Trillium spp.</i>	Trilliums	11	64
<i>Athyrium filix-femina</i>	Lady fern	*	60
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	10	52
<i>Actaea spp.</i>	Baneberry	*	50
<i>Ribes spp.</i>	Gooseberries	*	50
<i>Hepatica americana</i>	Round-lobbed hepatica	14	40
<i>Osmorhiza claytoni</i>	Sweet cicely	*	37
<i>Viola pubescens</i>	Downy yellow violet	*	33

		AVVb	AVb
<i>Gaultheria procumbens</i>	Wintergreen	60	31
<i>Streptopus roseus</i>	Rosey twisted stalk	52	18
<i>Waldsteinia fragarioides</i>	Barren strawberry	48	13
<i>Lonicera canadensis</i>	American fly honeysuckle	46	16
<i>Dirca palustris</i>	Leatherwood	40	18
<i>Viola pubescens</i>	Downy yellow violet	35	11
<i>Hamamelis virginiana</i>	Witch hazel	*	77
<i>Trillium spp.</i>	Trilliums	21	76
<i>Amphicarpa bracteata</i>	Hog peanut	25	61
<i>Desmodium glutinosum</i>	Pointed-leaved tick trefoil	*	27

		AVVb	ATM
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	77	13
<i>Gaultheria procumbens</i>	Wintergreen	60	*
<i>Waldsteinia fragarioides</i>	Barren strawberry	48	*
<i>Vaccinium spp.</i>	Blueberries	46	*
<i>Polygala paucifolia</i>	Fringed polygala	33	16

Continued on next page.

<i>Dryopteris spinulosa</i>	Spinulose shield fern	23	69
<i>Trillium spp.</i>	Trilliums	21	64
<i>Athyrium filix-femina</i>	Lady fern	23	60
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	21	52
<i>Actaea spp.</i>	Baneberries	21	50
<i>Osmorhiza claytoni</i>	Sweet cicely	*	37
<i>Dryopteris disjuncta</i>	Oak fern	*	26
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	*	22

		AVb	ATM
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	85	13
<i>Hamamelis virginiana</i>	Witch hazel	77	*
<i>Amphicarpa bracteata</i>	Hog peanut	61	11
<i>Smilacina racemosa</i>	False solomon's seal	61	26
<i>Vaccinium spp.</i>	Blueberries	34	*
<i>Gaultheria procumbens</i>	Wintergreen	31	*
<i>Polygala paucifolia</i>	Fringed polygala	31	16
<i>Desmodium glutinosum</i>	Pointed-leaved tick trefoil	27	*
<i>Dryopteris spinulosa</i>	Spinulose shield fern	23	69
<i>Clintonia borealis</i>	Yellow beadlilly	27	68
<i>Athyrium filix-femina</i>	Lady fern	19	60
<i>Lonicera canadensis</i>	American fly honeysuckle	16	59
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	19	52
<i>Actaea spp.</i>	Baneberries	*	50
<i>Streptopus roseus</i>	Rosey twisted stalk	18	49
<i>Osmorhiza claytoni</i>	Sweet cicely	*	37
<i>Dryopteris disjuncta</i>	Oak fern	*	26
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	*	22

		ATM	ATD
<i>Aralia nudicaulis</i>	Wild sarsaparilla	82/7	69/2
<i>Corylus spp.</i>	Hazelnuts	80/10	39/2
<i>Aster macrophyllum</i>	Large-leaved aster	74/11	54/4
<i>Pteridium aquilinum</i>	Bracken fern	68/8	*
<i>Diervilla lonicera</i>	Bush honeysuckle	57/5	14/1
<i>Mitchella repens</i>	Partridgeberry	47	21
<i>Amelanchier spp.</i>	Juneberry	45	15
<i>Cornus canadensis</i>	Bunchberry	31	*
<i>Dryopteris spinulosa</i>	Spinulose shield fern	69/3	94/6
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	22	67
<i>Dryopteris disjuncta</i>	Oak fern	26	61
<i>Dryopteris phegopteris</i>	Long beech fern	13	43
<i>Caulophyllum thalictroides</i>	Blue cohosh	18	40
<i>Sambucus pubens</i>	Red-berried elder	*	35
<i>Adiantum pedatum</i>	Maidenhair fern	*	21

		ATM	AOCa
<i>Pteridium aquilinum</i>	Bracken fern	68/8	27/4
<i>Diervilla lonicera</i>	Bush honeysuckle	57	28
<i>Mitchella repens</i>	Partridgeberry	47	*
<i>Amelanchier spp.</i>	Juneberry	45	13
<i>Cornus canadensis</i>	Bunchberry	31	*
<i>Caulophyllum thalictroides</i>	Blue cohosh	18	91
<i>Osmorhiza claytoni</i>	Sweet cicely	37/1	76/5
<i>Sanguinaria canadensis</i>	Bloodroot	*	69
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	22	67
<i>Adiantum pedatum</i>	Maidenhair fern	*	53
<i>Dirca palustris</i>	Leatherwood	25	51
<i>Uvularia grandiflora</i>	Large-flowered bellwort	11	48
<i>Solidago flexicaulis</i>	Zigzag goldenrod	20	45
<i>Sambucus pubens</i>	Red-berried elder	*	44
<i>Botrychium virginianum</i>	Rattlesnake fern	*	33
<i>Viola canadensis</i>	Canada violet	*	32
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	*	32

		ATM	AH
<i>Trientalis borealis</i>	Starflower	87	25
<i>Clintonia borealis</i>	Yellow beadlilly	68	15
<i>Pteridium aquilinum</i>	Bracken fern	68/8	*
<i>Lycopodium obscurum</i>	Ground-pine	65	*
<i>Lonicera canadensis</i>	American fly honeysuckle	59	19
<i>Diervilla lonicera</i>	Bush honeysuckle	57	11
<i>Mitchella repens</i>	Partridgeberry	47	*
<i>Amelanchier spp.</i>	Juneberry	45	12
<i>Hepatica americana</i>	Round-lobed hepatica	40	14
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	*	88
<i>Sanguinaria canadensis</i>	Bloodroot	*	82
<i>Caulophyllum thalictroides</i>	Blue cohosh	18	81
<i>Osmorhiza claytoni</i>	Sweet cicely	37/1	70/5
<i>Adiantum pedatum</i>	Maidenhair fern	*	60
<i>Uvularia grandiflora</i>	Large-flowered bellwort	11	53
<i>Thalictrum dioicum</i>	Early meadow rue	12	52
<i>Allium tricoccum</i>	Wild leek	*	47
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica	*	47
<i>Solidago flexicaulis</i>	Zigzag goldenrod	20	45
<i>Laportea canadensis</i>	Wood nettle	*	43

		ATD	AOCa
<i>Dryopteris phegopteris</i>	Long beech fern	43	16

Continued on next page.

<i>Caulophyllum thalictroides</i>	Blue cohosh	40	91
<i>Aralia nudicaulis</i>	Wild sarsaparilla	69/2	78/7
<i>Osmorhiza claytoni</i>	Sweet cicely	56/1	76/5
<i>Sanguinaria canadensis</i>	Bloodroot	10	69
<i>Corylus spp.</i>	Hazelnuts	39/2	67/6
<i>Adiantum pedatum</i>	Maidenhair fern	21	53
<i>Uvularia grandiflora</i>	Large-flowered bellwort	19	48
<i>Solidago flexicaulis</i>	Zigzag goldenrod	17	45
<i>Botrychium virginianum</i>	Rattlesnake fern	10	33
<i>Viola canadensis</i>	Canada violet	15	32
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	*	32
<i>Mitella diphylla</i>	Miterwort	10	30
		AOCa	AH
<i>Trientalis borealis</i>	Starflower	62	25
<i>Lonicera canadensis</i>	American fly honeysuckle	51	19
<i>Hepatica americana</i>	Round-lobed hepatica	42	14
<i>Clintonia borealis</i>	Yellow beadlilly	42	15
<i>Dryopteris disjuncta</i>	Oak fern	40	15
<i>Lycopodium obscurum</i>	Ground-pine	33	*
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	32/3	88/8
<i>Thalictrum dioicum</i>	Early meadow rue	17	52
<i>Allium tricoccum</i>	Wild leek	19	47
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica	*	47
<i>Laportea canadensis</i>	Wood nettle	11/1	43/9
<i>Amphicarpa bracteata</i>	Hog peanut	12	38
<i>Geranium maculatum</i>	Wild geranium	*	21
		ArAbVC	PARVAa
<i>Cornus canadensis</i>	Bunchberry	98/13	52/4
<i>Coptis groenlandica</i>	Goldthread	64	*
<i>Lycopodium spp.</i>	Clubmosses	54	22
<i>Dryopteris spinulosa</i>	Spinulose shield fern	52	25
<i>Linnaea borealis</i>	Twinflower	34	*
<i>Osmunda claytoniana</i>	Interrupted fern	26	*
<i>Rubus pubescens</i>	Dwarf raspberry	20	*
<i>Waldsteinia fragarioides</i>	Barren strawberry	24	54
<i>Uvularia sesilifolia</i>	Sessile-leaved bellwort	18	42
		ArAbVC	AVVb
<i>Cornus canadensis</i>	Bunchberry	98/13	21/1
<i>Vaccinium spp.</i>	Blueberries	96/10	46/1
<i>Coptis groenlandica</i>	Goldthread	64	*
<i>Lycopodium spp.</i>	Clubmosses	54	23
<i>Dryopteris spinulosa</i>	Spinulose shield fern	52	23

<i>Linnaea borealis</i>	Twinflower	34	*
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	*	77
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	18	56
<i>Waldsteinia fragarioides</i>	Barren strawberry	24	48
<i>Polygonatum pubescens</i>	Hairy solomon's seal	*	42
<i>Dirca palustris</i>	Leatherwood	*	40
<i>Smilacina racemosa</i>	False solomon's seal	*	38
<i>Viola pubescens</i>	Downy yellow violet	*	35

		TMC	ATM
<i>Cornus canadensis</i>	Bunchberry	88	31
<i>Coptis groenlandica</i>	Goldthread	58	*
<i>Vaccinium spp.</i>	Blueberries	41	*
<i>Rubus pubescens</i>	Dwarf raspberry	36	*
<i>Equisetum spp.</i>	Horsetails	31	*
<i>Trillium spp.</i>	Trilliums	27	64
<i>Osmorhiza claytoni</i>	Sweet cicely	10	37
<i>Polygonatum pubescens</i>	Hairy solomon's seal	17	37
<i>Dirca palustris</i>	Leatherwood	*	25

		TMC	ATD
<i>Cornus canadensis</i>	Bunchberry	88	*
<i>Pteridium aquilinum</i>	Bracken fern	70	*
<i>Diervilla lonicera</i>	Bush honeysuckle	59	14
<i>Coptis groenlandica</i>	Goldthread	58	*
<i>Amelanchier spp.</i>	Juneberry	46	15
<i>Mitchella repens</i>	Partridgeberry	46	21
<i>Vaccinium spp.</i>	Blueberries	41	*
<i>Rubus pubescens</i>	Dwarf raspberry	36	*
<i>Equisetum spp.</i>	Horsetails	31	*
<i>Trillium spp.</i>	Trilliums	27	68
<i>Arisaema atropurpureum</i>	Jack-in-the-pulpit	17	67
<i>Polygonatum pubescens</i>	Hairy solomon's seal	17	67
<i>Actaea spp.</i>	Baneberries	26	63
<i>Dryopteris disjuncta</i>	Oak fern	26	61
<i>Osmorhiza claytoni</i>	Sweet cicely	10	56
<i>Caulophyllum thalictroides</i>	Blue cohosh	*	40
<i>Dirca palustris</i>	Leatherwood	*	35
<i>Sambucus pubens</i>	Red-berried elder	*	35

		ArAbCo	ATM
<i>Cornus canadensis</i>	Bunchberry	88	31
<i>Equisetum spp.</i>	Horsetails	58	*

Continued on next page.

<i>Fragaria spp.</i>	Strawberries	51	21
<i>Rubus pubescens</i>	Dwarf raspberry	48	*
<i>Vaccinium spp.</i>	Blueberries	38	*
<i>Cornus stolonifera</i>	Red-osier dogwood	30	*
<i>Onoclea sensibilis</i>	Sensitive fern	30	*
<i>Alnus rugosa</i>	Speckled alder	23	*
<i>Impatiens capensis</i>	Jewelweed	21	*
<i>Clintonia borealis</i>	Yellow beadlelily	23	68
<i>Lycopodium obscurum</i>	Ground-pine	*	65
<i>Trillium spp.</i>	Trilliums	29	64
<i>Lonicera canadensis</i>	American fly honeysuckle	24	59
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	26	56
<i>Actaea spp.</i>	Baneberries	13	50
<i>Streptopus roseus</i>	Rosey twisted stalk	*	49
<i>Mitchella repens</i>	Partridgeberry	*	47
<i>Osmorhiza claytoni</i>	Sweet cicely	*	37
<i>Polygonatum pubescens</i>	Hairy solomon's seal	*	36
<i>Viola pubescens</i>	Downy yellow violet	*	33

		ATAtOn	ATM
<i>Equisetum spp.</i>	Horsetails	71	*
<i>Ariseama atropurpurea</i>	Jack-in-the-pulpit	58	22
<i>Onoclea sensibilis</i>	Sensitive fern	56	*
<i>Parthenocissus quinq.</i>	Virginia creeper	56	*
<i>Impatiens capensis</i>	Jewelweed	48	*
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	42	*
<i>Laportea canadensis</i>	Wood nettle	34	*
<i>Sanicula spp.</i>	Snakeroot	34	*
<i>Rubus pubescens</i>	Dwarf raspberry	32	*
<i>Circaea spp.</i>	Enchanter's nightshades	28	*
<i>Oxalis montana</i>	Wood sorrel	25	*

<i>Aralia nudicaulis</i>	Wild sarsaparilla	54/<1	82/7
<i>Aster macrophyllus</i>	Large-leaved aster	56/1	74/11
<i>Pteridium aquilinum</i>	Bracken fern	19/<1	68/8
<i>Lycopodium obscurum</i>	Ground-pine	15	65
<i>Lonicera canadensis</i>	American fly honeysuckle	14	59
<i>Diervilla lonicera</i>	Bush honeysuckle	20/<1	57/5
<i>Actaea spp.</i>	Baneberries	20	50

		ACal	ATD
<i>Caulophyllum thalictroides</i>	Blue cohosh	86	40
<i>Impatiens capensis</i>	Jewelweed	57	*
<i>Solidago flexicaulis</i>	Zigzag goldenrod	51	17
<i>Rubus pubescens</i>	Dwarf raspberry	47	*

<i>Circaea</i> spp.	Enchanter's nightshades	45	10
<i>Osmunda claytoniana</i>	Interrupted fern	45	22
<i>Allium tricoccum</i>	Wild leek	43	*
<i>Sanguinaria canadensis</i>	Bloodroot	43	*
<i>Mitella diphylla</i>	Miterwort	37	10
<i>Onoclea sensibilis</i>	Sensitive fern	29	*
		ACal	AOCa
<i>Impatiens capensis</i>	Jewelweed	57	*
<i>Dryopteris phegopteris</i>	Long beech fern	55	16
<i>Rubus pubescens</i>	Dwarf raspberry	47	*
<i>Circaea</i> spp.	Enchanter's nightshades	45	16
<i>Osmunda claytoniana</i>	Interrupted fern	45	22
<i>Allium tricoccum</i>	Wild leek	43	19
<i>Acer spicatum</i>	Mountain maple	29	*
<i>Onoclea sensibilis</i>	Sensitive fern	29	*
<i>Aster macrophyllus</i>	Large-leaved aster	57/1	78/8
<i>Uvularia grandiflora</i>	Large-flowered bellwort	22	48
		AHI	AH
<i>Parthenocissus quinq.</i>	Virginia creeper	70	26
<i>Circaea</i> spp.	Enchanter's nightshades	64/2	15/<1
<i>Geranium maculatum</i>	Wild geranium	57/7	21/2
<i>Impatiens capensis</i>	Jewelweed	51	*
<i>Onoclea sensibilis</i>	Sensitive fern	45	*
<i>Sanicula</i> spp.	Snakeroot	43	16
<i>Fragaria</i> spp.	Strawberries	40	11
<i>Oxalis montana</i>	Wood sorrel	40	*
<i>Equisetum</i> spp.	Horsetails	38	*
<i>Adiantum pedatum</i>	Maidenhair fern	28	60
<i>Uvularia grandiflora</i>	Large-flowered bellwort	15	53
<i>Streptopus roseus</i>	Rosey twisted stalk	*	41
<i>Sambucus pubens</i>	Red-berried elder	*	35
<i>Dirca palustris</i>	Leatherwood	11	34
		ArAbVC	TMC
<i>Cornus canadensis</i>	Bunchberry	98/13	88/1
<i>Vaccinium</i> spp.	Blueberries	96/10	41/1
<i>Gaultheria procumbens</i>	Wintergreen	37/4	21/1
<i>Athyrium filix-femina</i>	Lady fern	15	47
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	18	42
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	*	32
<i>Trillium</i> spp.	Trilliums	11	27
<i>Actaea</i> spp.	Baneberries	14	26

Continued on next page.

<i>Dryopteris disjuncta</i>	Oak fern	*	26
<i>Dryopteris phegopteris</i>	Long beech fern	*	25
		TMC	ArAbCo
<i>Clintonia borealis</i>	Yellow beedlilly	77	23
<i>Lycopodium obscurum</i>	Ground-pine	66	*
<i>Coptis groenlandica</i>	Goldthread	58	13
<i>Lonicera canadensis</i>	American fly honeysuckle	56	24
<i>Mitchella repens</i>	Partridgeberry	46	*
<i>Streptopus roseus</i>	Rosey twisted stalk	44	*
<i>Lycopodium spp.</i>	Clubmosses	39	*
<i>Equisetum spp.</i>	Horsetails	31	58
<i>Fragaria spp.</i>	Strawberries	24	51
<i>Prunus virginiana</i>	Chokecherry	23	50
<i>Cornus stolonifera</i>	Red-osier dogwood	*	30
<i>Onoclea sensibilis</i>	Sensitive fern	15	30

		TMC	ATAtOn
<i>Cornus canadensis</i>	Bunchberry	88	24
<i>Clintonia borealis</i>	Yellow beedlilly	78	31
<i>Pteridium aquilinum</i>	Bracken fern	70/9	19/2
<i>Lycopodium obscurum</i>	Ground pine clubmoss	66	15
<i>Coptis groenlandica</i>	Goldthread	60	14
<i>Diervilla lonicera</i>	Bush honeysuckle	59	20
<i>Lonicera canadensis</i>	Fly honeysuckle	57	14
<i>Mitchella repens</i>	Partridgeberry	46	21
<i>Vaccinium spp.</i>	Blueberries	39	*
<i>Lycopodium spp.</i>	Clubmosses	38	*
<i>Equisetum spp.</i>	Horsetails	31	71
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	18	58
<i>Onoclea sensibilis</i>	Sensitive fern	16	56
<i>Parthenocissus quinq.</i>	Virginia creeper	*	56
<i>Impatiens capensis</i>	Touch-me-not	13	48
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	*	42
<i>Laportea canadensis</i>	Woodnettle	*	34
<i>Sanicula marilandica</i>	Black snakeroot	*	34
<i>Amphicarpa bracteata</i>	Hog peanut	*	29
<i>Circaea spp.</i>	Nightshade	*	28

		ArAbCo	ATAtOn
<i>Cornus canadensis</i>	Bunchberry	88	24
<i>Pteridium aquilinum</i>	Bracken fern	73	19
<i>Diervilla lonicera</i>	Bush honeysuckle	69	20
<i>Osmunda claytoniana</i>	Interrupted fern	57	27
<i>Amelanchier spp.</i>	Juneberry	43	15

<i>Vaccinium spp.</i>	Blueberries	38	*
<i>Apocynum andro.</i>	Spreading dogbane	31	*
<i>Cornus stolonifera</i>	Red-osier dogwood	30	*
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	*	58
<i>Parthenocissus quinq.</i>	Virginia creeper	*	56
<i>Impatiens capensis</i>	Jewelweed	21	48
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	10	42
<i>Laportea canadensis</i>	Wood nettle	*	34
<i>Sanicula spp.</i>	Snakeroot	13	34
<i>Dryopteris disjuncta</i>	Oak fern	14	33
<i>Streptopus roseus</i>	Rosey twisted stalk	*	33
<i>Amphicarpa bracteata</i>	Hog peanut	13	29
<i>Dryopteris phegopteris</i>	Long beech fern	10	29
<i>Circaea spp.</i>	Enchanter's nightshades	*	28
<i>Osmorhiza claytoni</i>	Sweet cicely	*	28
<i>Oxalis montana</i>	Wood sorrel	*	25

		ArAbCo	ACal
<i>Corylus spp.</i>	Hazelnut	93/16	61/4
<i>Cornus canadensis</i>	Bunchberry	88/11	16/<1
<i>Pteridium aquilinum</i>	Bracken fern	73	16
<i>Diervilla lonicera</i>	Bush honeysuckle	69	14
<i>Equisetum spp.</i>	Horsetails	58	20
<i>Fragaria spp.</i>	Strawberry	51	14
<i>Vaccinium spp.</i>	Blueberries	38	*
<i>Apocynum andro.</i>	Dogbane	31	*
<i>Cornus stolonifera</i>	Red osier dogwood	30	*
<i>Caulophyllum thalictroides</i>	Blue cohosh	*	86
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	*	78
<i>Actaea spp.</i>	Baneberry	13	73
<i>Dryopteris disjuncta</i>	Oak fern	14	73
<i>Osmorhiza claytoni</i>	Sweet Cicely	*	59
<i>Impatiens capensis</i>	Jewelweed	21	57
<i>Dryopteris phegopteris</i>	Long beech fern	10	55
<i>Solidago flexicaulis</i>	Zigzag goldenrod	10	51
<i>Circaea spp.</i>	Nightshade	*	45
<i>Dirca palustris</i>	Leatherwood	*	45
<i>Allium tricoccum</i>	Wild leek	*	43
<i>Sanguinaria canadensis</i>	Bloodroot	*	43
<i>Viola pubescens</i>	Downy yellow violet	*	43

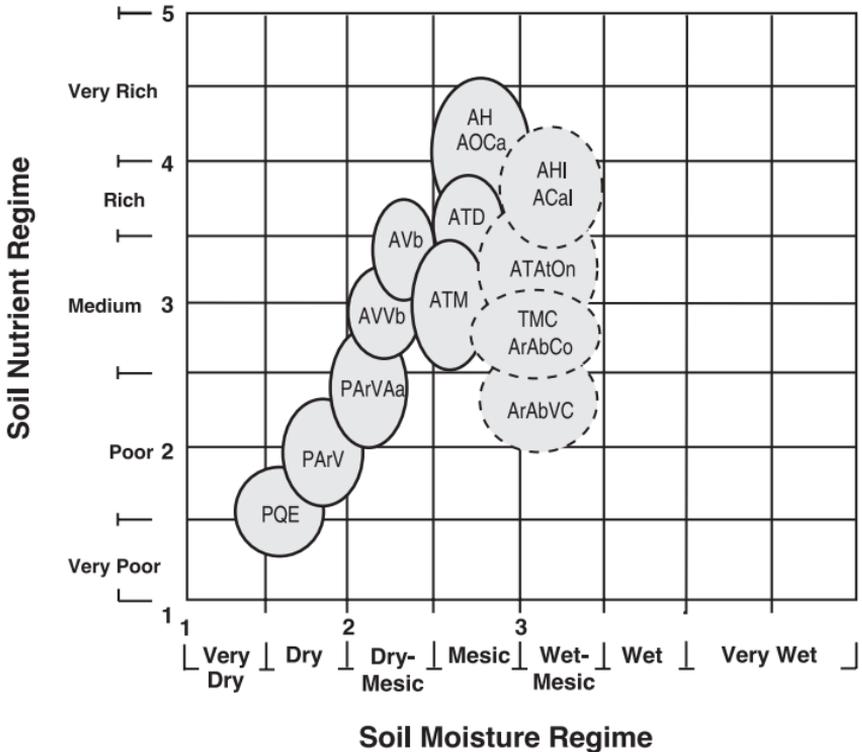
		ATAtOn	AHI
<i>Dryopteris disjuncta</i>	Oak fern	33	*

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<i>Streptopus roseus</i>	Rosey twisted stalk	33	*
<i>Rubus pubescens</i>	Dwarf raspberry	32	15
<i>Clintonia borealis</i>	Yellow beadlilly	31	*
<i>Dryopteris phegopteris</i>	Long beech fern	31	*
<i>Hepatica americana</i>	Round-lobed hepatica	29	*
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	42/<1	94/5
<i>Sanguinaria canadensis</i>	Bloodroot	14	87
<i>Solidago flexicaulis</i>	Zigzag goldenrod	19	62
<i>Geranium maculatum</i>	Wild geranium	14	57
<i>Viola pub./penn.</i>	Downy/smooth yellow violet	19	53
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica	16	51
<i>Smilacina racemosa</i>	False solomon's seal	*	47
<i>Actaea spp.</i>	Baneberries	20	45
<i>Caulophyllum thalictroides</i>	Blue cohosh	18	45
<i>Allium tricoccum</i>	Wild leek	*	43
<i>Adiantum pedatum</i>	Maidenhair fern	*	28
		ATAtOn	ACal
<i>Equisetum spp.</i>	Horsetails	71	20
<i>Onoclea sensibilis</i>	Sensitive fern	56	29
<i>Parthenocissus quinq.</i>	Virgina creeper	56	25
<i>Fragaria spp.</i>	Wild strawberry	34	14
<i>Amphicarpa bracteata</i>	Hog peanut	29	*
<i>Oxalis montana</i>	Wood sorrel	25	*
<i>Caulophyllum thalictroides</i>	Blue cohosh	18	86
<i>Actaea spp.</i>	Baneberry	20	73
<i>Lonicera canadensis</i>	Fly honeysuckle	14	63
<i>Solidago flexicaulis</i>	Zig-zag goldenrod	19	51
<i>Dirca palustris</i>	Leatherwood	*	45
<i>Polygonatum pubescens</i>	Solomon's seal	19	45
<i>Allium tricoccum</i>	Wild leek	*	43
<i>Sanguinaria canadensis</i>	Bloodroot	14	43
<i>Viola pub./penn.</i>	Downy/smooth yellow violet	19	43
<i>Sambucus pubens</i>	Red-berried elder	16	41
<i>Adiantum pedatum</i>	Maidenhair Fern	*	37
<i>Smilacina racemosa</i>	False Solomon's seal	*	35
		ACal	AHI
<i>Dryopteris disjuncta</i>	Oak fern	73	*
<i>Lonicera canadensis</i>	American fly honeysuckle	63	13
<i>Dryopteris phegopteris</i>	Long beech fern	55	*
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	51	21
<i>Rubus pubescens</i>	Dwarf raspberry	47	15
<i>Dirca palustris</i>	Leatherwood	45	11
<i>Polygonatum pubescens</i>	Hairy solomon's seal	45	13

<i>Clintonia borealis</i>	Yellow beadlilly	41	*
<i>Sambucus pubens</i>	Red-berried elder	41	*
<i>Hepatica americana</i>	Round-lobed hepatica	35	*
<i>Streptopus roseus</i>	Rosey twisted stalk	33	*
<i>Acer spicatum</i>	Mountain maple	29	*
<i>Lycopodium obscurum</i>	Ground-pine	29	*
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	25/<1	94/5
<i>Parthenocissus quinq.</i>	Virginia creeper	25/<1	70/4
<i>Thalictrum dioicum</i>	Early meadow rue	16	66
<i>Geranium maculatum</i>	Wild geranium	*	57
<i>Amphicarpa bracteata</i>	Hog peanut	*	53
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica	*	51
<i>Laportea canadensis</i>	Wood nettle	22	51
<i>Sanicula spp.</i>	Snakeroot	18	43
<i>Oxalis montana</i>	Wood sorrel	*	40

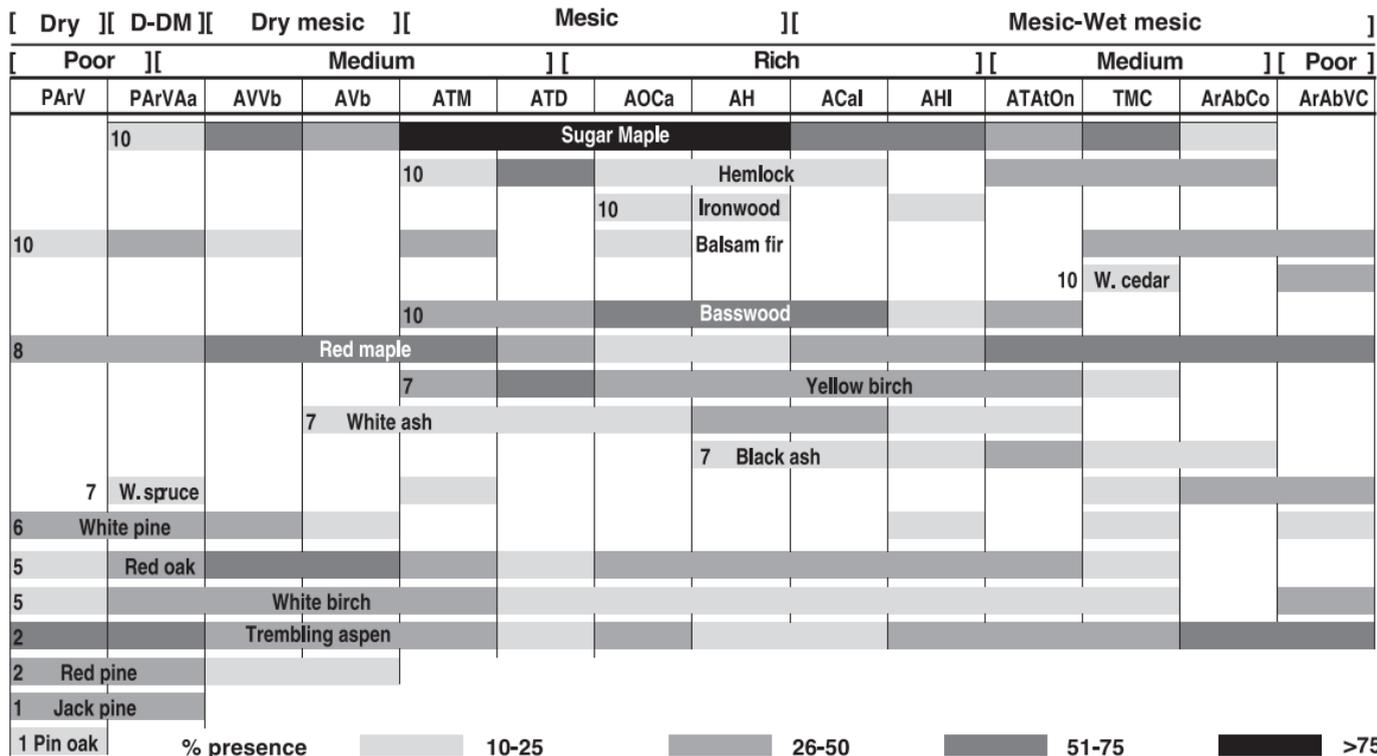
Relationship of Habitat Types to Soil Moisture and Nutrient Regimes in Region 3



Occurrence of Tree Species Across Habitat Types of Region 3

(Data from 1996 FIA)

Numbers in front of bars are relative shade tolerance values: 1, least tolerant; 10, most tolerant



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Occurrence of Tree Species on Habitat Types of Region 3

Numbers in parentheses are number of study plots. Size classes: SA - saplings, MT - medium trees (4-10" dbh), LT - large trees (>10" dbh).

Numbers are frequency of occurrence classes: 1, 10-25%; 2, 26-50%; 3, 51-75%; 4, 76-100%

Letters are abundance classes representing average stems per acre when present:

For saplings: A, <100; B, 100-200; C, 201-400; D, >400. For trees: A, <10; B, 10-20; C, 21-40; D, >40

	PQE	PArV (21)			PArVAa (49)			AVVb (43)			AVb (44)			ATM (139)			ATD (50)							
		SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT					
Jack Pine	Inadequate Data	1B	2D	2C		1D	1B																	
Red Pine		1A	2D	2B		1B	2D	2C		1A														
White Pine		2A	2C	2B		1A	1C	2B		2A	1B	1C	1A											
N. Pin Oak		1B		1B																				
N. Red Oak		2B	1C	1B		1A	1C	2B		1B	2C	3C		2A	2C	3B			1B					
White Oak												1A												
Bur Oak																								
Bigtooth Aspen		2C	1D	1D		1C	1D	1B		2C	1C	2B		2D	2C	2B		1C	1B					
Trembling Aspen		3D	3D	2A		3C	3D	2C		2D	2D	2B		2D	2C	1A			1B					
White Birch		2B	1C			2A	2C	2B		2A	3D	2B		2A	2C	1B			1C	1A				
Yellow Birch															1A	1B	2A		2A	1C	3B			
Red Maple		2C	2C			4B	3D	2B		3A	3C	2B		3B	3D	3B			1A	2C	2B			
Sugar Maple						1A	1D	1B		2B	3D	1A		2A	1C				4B	4D	4C			
Basswood											1A			1A		1B				1C	2C			
White Ash												1B	1C		1A	1C	1A				1A			
Green Ash																								
Black Ash															1A	1C								
American Elm															1A									
Bitternut Hickory																								
Black Cherry		2A				2A				1A				1A					2A	1B		1A	1C	1B
Ironwood (Hophornbeam)										2B				1A					2B					2B
Musclewood (Hornbeam)										1A				1B					1B					
E. Hemlock																				1B			1B	2B
Balsam Fir		1B				3C	2C			2C	1C			2B					2C	2C		1B		
White Spruce				1A		1A		1A												1A				
Black Spruce		1B				1A																		
N. White Cedar																								

continues
other side →

Occurrence of Tree Species on Habitat Types of Region 3 (continued)

	AOCa (113)			AH (68)			AHI (24)			ACal (42)			ATAtOn (58)			ArAbCo (34)			TMC (116)			ArAbVC (45)									
	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT							
Jack Pine																															
Red Pine																							1D	1C							
White Pine								1B	1B													1B	1B	1B							
N. Pin Oak																															
N. Red Oak						2B							1A	1A	1B	2A							1A								
White Oak																															
Bur Oak								1A		1A																					
Bigtooth Aspen																							1C	1B							
Trembling Aspen	2D	2D	2B		1C	1C	1A		2B	1D	2B		1A	1C		2C	2C	2B		2D	4D	2B	2D	2D	2B	3D	2D	3B			
White Birch			1A															1A					2A	1D	1B	2A	2D	1B			
Yellow Birch			1C	2A		1A	1C	2A		1B	1C			1A	1C	2A		2A	2C	2B			1A	1C	1A						
Red Maple	1A	1C	1B		1B	2C	1B		2A	2D	2B		2A	2D	2B		3B	4D	3B		3B	3D	3B	3B	3D	2B	3B	3D	1B		
Sugar Maple	4B	4D	4C		4B	4D	4C		3B	2D	3C		4B	4D	4C		2A	2C	2B		1B	1C			2B	2D	1B				
Basswood	1A	3C	3B		2A	2C	3C		2B	1D	1C		2B	2B	3B		2A	2B	2B												
White Ash	1A	1C	1B		1A	1C	2A		1C		1A		1B	1C	2B				1A												
Green Ash													1B	1B		2B	1D	1A													
Black Ash					1A	1B			2B	1B	1A		1B	2C	1B		2B	2D	2A		2B	1C			1B	1D					
American Elm	1B				2A	1B			3A	2B	1A		1A			2A	1B			1A											
Bitternut Hickory							1B																								
Black Cherry	2A	1B	1A						1A							1A					2A	1C			2A				2B		
Ironwood (Hophornbeam)	2B	1C			3A	1C			2B	1D			2A		2A																
Musclewood (Hornbeam)					1A				2B				1A			2B					2B										
E. Hemlock							1C								1B										1B	1D	2B				
Balsam Fir	1B	1C	1A										1B		1B						2B	2D			4C	2D	1B	3C	2D	1B	
White Spruce																									1C	1B	1A	1D	2A		
Black Spruce																															
N. White Cedar																															

Current Relative Importance of Common Forest Cover Types on Habitat Types of Region 3

*** - Dominant: >50%; ** - Common: 10-50%; * - Minor: <10% of all cover types observed on that habitat type.

Cover Type	PQE	PARV	PARVAa	AVVb	AVb	ATM	ATD	AOCa	AH	AHI	ACaI	ATAAtOn	ArAbCo	TMC	ArAbVC
Pin Oak - Red Oak	*	*													
Jack Pine - Oak*	**	*	*												
Jack Pine	***	**	*												
Red Pine	**	**	**	*	*										
White Pine - Red Pine	*	**	**	*	*										**
White Pine - Oak*	*	*	*	*	*										
Red Oak	*	*	*	**	**	*									
Aspen - Oak*	*	*	*	**	**	*									
Aspen - Pine*	*	**	**	*	*	*								*	**
Aspen	*	**	**	**	**	**	**	**	*	**	*	**	**	**	**
White Pine		**	**	*	*	*				*				*	*
White Pine - Red Maple		*	*	*	*									*	*
White Birch		*	*	*	*	*								*	*
Aspen - White Birch		*	**	**	*	*	*							**	**
Aspen - Red Maple		*	*	*	*	*						**	**	**	**
Red Maple		*	*	*	*	*						**	**	*	*
Red Oak - Red Maple		*	**	**	**	*						*			
Balsam Fir - White Spruce			*	*	*	*							*	**	**
Aspen - Balsam Fir			*	*	*	*						*	**	**	**
Balsam Fir - Red Maple			*	*	*	*						*	**	**	**
Sugar Maple - Red Maple				*	*	**	*	*	*	**	**	**	*	*	
Sugar Maple - Red Oak				*	*	*	*	*	*	*	*	*			
Sugar Maple				*	*	**	***	***	***	**	***	*			
Sugar Maple - Basswood						**	**	**	**	**	**	*			
Sugar Maple - Basswood - Ash - Yellow Birch*						*	*	**	**	*	**	*			
Sugar Maple - Hemlock - Yellow Birch - Red Maple						*	**	*	*	*	*	**		**	
Hemlock						*	*	*	*	*	*	*		*	

- Oak is predominantly red oak, but northern pin oak and white oak may be important components.
Pine is any mix of white, red, and jack pines.
Ash is predominantly white ash on mesic sites, and white, green, and black ashes on mesic to wet-mesic sites.

Occurrence of Understory Species Across the Habitat Types of Region 3

Numbers represent frequency of occurrence classes: • 10-25%; 1, 26-50%; 2, 51-75%; 3, 76-100%.
 Letters are coverage classes: A<1%; B 1-5%; C 6-15%; D>16%. Numbers of study plots in parentheses.

Scientific name	Common name	PQE (RB)	PARv (62)	PARVAa (114)	AVVb (48)	AVb (62)	ATM (230)	ATD (72)	AOCa (186)	AH (97)	AHI (47)	ACal (58)	ATAOn (85)	ArAbCo (83)	TMC (202)	ArAbVC (95)
Shrubs																
<i>Prunus pennsylvanica</i>	Pin cherry	2B	1B	*		*	*			*				*	*	*
<i>Comptonia peregrina</i>	Sweetfern	2C	2B	*	*	*										
<i>Vaccinium</i> spp.	Blueberries	3D	3C	3B	1B	1B										
<i>Amelanchier</i> spp.	Juneberry	3B	2B	2B	2B	2B	1B	*	*	*	1B	*	*	1A	1B	2B
<i>Diervilla lonicera</i>	Bush honeysuckle	1C	1B	1B	2B	2B	2B	*	1B	*	*	*	*	2B	2B	2C
<i>Corylus</i> spp.	Hazels	*	3C	3D	3D	3C	3C	1B	2C	1C	1C	2B	2C	3D	3C	3C
<i>Rubus</i> spp.	Blackberry/raspberry	*	3B	2C	2C	3C	1C	1B	2B	1C	2B	1B	2C	2D	1C	2C
<i>Prunus virginiana</i>	Chokecherry	*	*	*	1B	*	1B	1B	1B	*	1B	1B	1B	1B	*	1B
<i>Lonicera canadensis</i>	American fly honeysuckle			1B	1B	*	2B	1B	2B	*	*	2B	*	*	2B	1B
<i>Viburnum acerifolium</i>	Maple-leaved viburnum			*	3C	3C	*									
<i>Hamamelis virginiana</i>	Witch hazel					3C										
<i>Dirca palustris</i>	Leatherwood				1C	*	*	1B	2B	1B	*	1B				
<i>Cornus alternifolia</i>	Alternated-leaved dogwood			*	*	*	2B	1B	1B	1B	*	2A	1B	1B	1B	
<i>Ribes</i> spp.	Gooseberries			*	*	1A	1B	2B	3B	3B	3B	3B	2B	3B	1B	*
<i>Sambucus pubens</i>	Red-berried elder							1A	1B	1B		1B	*			
<i>Acer spicatum</i>	Mountain maple					*	*	*				1B	*	*	*	*
<i>Rubus pubescens</i>	Dwarf raspberry									*	1B	1C	1D	1C		*
<i>Rubus flagellaris</i>	Dewberry				*							1C			*	*
<i>Rubus hispidus</i>	Swamp dewberry				*							*		1D	*	
<i>Cornus stolonifera</i>	Red-osier dogwood													1C		
Ferns, Allies, Lichens, Mosses																
<i>Cladonia rangiferina</i>	Reindeer moss	1B														
<i>Pteridium aquilinum</i>	Bracken fern	3D	3D	3D	3C	3D	2C		1B	*	*	*	*	1C	2C	3D
<i>Lycopodium obscurum</i>	Ground-pine clubmoss		2B	2B	1B	1B	2B	2B	1B			1B	*		2B	2B
<i>Lycopodium</i> spp.	Clubmosses	*	*	*	*	*	*	1A				*			1B	2B
<i>Osmunda claytoniana</i>	Interrupted fern			*	*	*	1B	*	*	*	*	1B	1B	2B	1B	1B
<i>Athyrium filix-femina</i>	Lady fern			*	*	*	2B	3B	3C	2B	2C	3C	3C	2C	1B	*
<i>Dryopteris spinulosa</i>	Spinulose shield fern			*	*	*	2B	3C	2B	2B	2B	3B	2B	2C	2B	2B
<i>Dryopteris disjuncta</i>	Oak fern						1B	2B	1B	*		2B	1B	*	1B	
<i>Dryopteris phegopteris</i>	Long beech fern					*	1B	*				2B	1B	*	1B	
<i>Botrychium virginianum</i>	Rattlesnake fern							*	1B	1A		*	*			
<i>Adiantum pedatum</i>	Maidenhair fern						*	2B	2B	1B	1B					
<i>Onoclea sensibilis</i>	Sensitive fern								1B	1B	2B	1B	2B	1B	*	
<i>Equisetum</i> spp.	Horsetails									1B	*	2B	2B	1B		*
Forbs and Subshrubs																
<i>Melampyrum lineare</i>	Cow wheat	2B														
<i>Epigaea repens</i>	Trailing arbutus	3C	*													
<i>Gaultheria procumbens</i>	Wintergreen	3D	3C	2B	2B	1B									*	1B
<i>Apocynum androsaemifolium</i>	Spreading dogbane	1B	2A	1A	1B	1B	1B	*	1A	*				1B	*	*
<i>Trientalis borealis</i>	Starflower	2B	2B	3B	2B	2B	3B	3B	2B	*	1B	2B	2B	2B	3B	3B
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	2B	3C	3C	3B	2B	3B	3B	2B	1B	2B	2B	2B	3B	3B	3C
<i>Waldsteinia fragarioides</i>	Barren strawberry	*	3D	2D	1C	*								*	*	
<i>Fragaria</i> spp.	Strawberries	*	1B	1B	1A	*	*	*	*	1B	*	1B	2B	*	1B	
<i>Anemone quinquefolia</i>	Wood anemone	*	1B	1B	3B	2B	2B	1A	1A	1A	1B	1A	1A	1B	1B	1B
<i>Aster macrophyllus</i>	Large-leaved aster	*	2C	3D	3D	3D	2D	2B	3C	2C	2B	2B	2B	2C	3C	2D
<i>Polygala paucifolia</i>	Fringed polygala	*		1B	1B	1B	*								*	*
<i>Uvularia sessifolia</i>	Sessile-leaved bellwort		1B	1B	2B	1A	2B	2B	1B	1B	2B	2B	1B	1A	1B	*
<i>Aralia nudicaulis</i>	Wild sarsaparilla		1B	2B	2B	3B	3C	2B	3C	1B	1C	2B	2B	2C	3B	3C
<i>Mitchella repens</i>	Partridgeberry			1B	2B	1B	1B	*				*	*		1B	1B
<i>Clintonia borealis</i>	Yellow beadiilly			2B	1B	1A	2B	1B	1B	*		1B	1B	*	3B	3B
<i>Streptopus roseus</i>	Rosey twisted stalk			1B	2B	*	1B	2B	2B	1B		1B	1B		1B	1B
<i>Smilacina racemosa</i>	False solomon's seal		*	*	1B	2B	1B	1B	1B	1B	1B	1A			*	
<i>Galium triflorum</i>	Sweet-scented bedstraw		*	*	1B	*	2B	1A	2A	1A	2A	1A	1A	1B	1A	1B
<i>Polygonatum pubescens</i>	Hairy solomon's seal			*	1B	1B	1B	2B	1A	1B	*	1B	*		*	
<i>Viola pubescens/pennsylvanica</i>	Downy/smooth yellow violet				1B	*	1B	1B	2B	2B	2B	1B	*		*	
<i>Thalictrum dioicum</i>	Early meadow rue		*	1C	1B	*		*	2B	2B	*	1B	*	*		
<i>Desmodium glutinosum</i>	Pointed-leaved tick trefoil				1B											
<i>Geranium maculatum</i>	Wild geranium				*					*	2C		*			
<i>Sanicula</i> spp.	Snakeroots				*			*	*	1B	*	1B	*			

Continued on next page.

Region 4 - Habitat Type Distribution

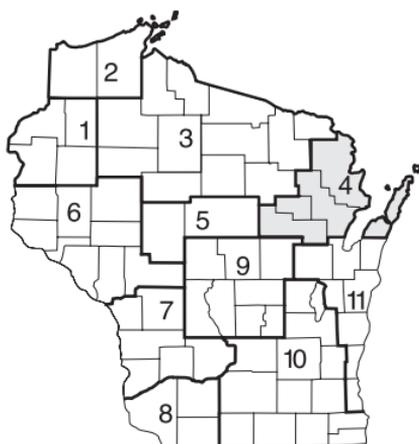
Habitat Type	Occurrence in the Region	Primary Landforms and Soils	Page No.
PARVAo	Common in Marinette County, and minor in other three counties.	Excessively drained outwash sands.	3-12
PARVAa-Vb	Common in Marinette County, and minor in Oconto County where it grades to PARVPo.	Sandy outwash soils, but also water worked sands on moraines and lake plains.	3-22
PARVPo	Of localized occurrence, primarily in eastcentral Shawano County and eastern Menominee County. In Oconto County, grades to PARVAa-Vb.	Sandy outwash soils, and water worked sands on moraines.	3-26
AVb	Common throughout much of the region. Most common in Oconto and least common in Shawano Counties.	Well drained sandy loams on rolling moraines.	3-42
TFAa	Mainly along the shoreline of the Door Peninsula.	Lacustrine or glacial lakebed deposits are most common.	3-34
ATFPo	Found throughout the Door Peninsula.	Undulating topography, thin calcareous till over dolomite bedrock.	3-46
ATFSt	Mainly along shorelines of the Door Peninsula.	Lacustrine or glacial lake deposits are most common.	3-54
AFAI	Found throughout the Door Peninsula.	Undulating topography, thin calcareous till over dolomite bedrock.	3-68
AFVb	Common in Menominee and Oconto Counties, and minor in Marinette and Shawano Counties.	Well drained sandy loams and loams on rolling moraines.	3-50
ATM	Scattered throughout the region. Most common in western and northern areas.	Occurs on most landforms and various soils, but most common on well drained sandy loams on moraines.	3-52
ATFD	Common in Menominee and Oconto Counties, and minor in Shawano and southern Marinette Counties.	Well drained sandy loams and loams on rolling moraines.	3-56
ATDH	Common in Menominee County, and minor in Shawano, Oconto, and Langlade Counties.	Well drained loamy till and loess.	3-62
AFAd	Scattered throughout the region. Most common in Menominee and Shawano Counties.	Well drained loamy till and loess.	3-66
AH	Common in Menominee and Shawano Counties, and scattered in Oconto and Marinette Counties.	Well drained loamy till and loess.	3-74
AHI	Uncommon, sparsely scattered throughout the region.	Somewhat poorly drained loamy till and loess.	3-78
ATAAtOn	Scattered throughout the region. Most common in southeastern Marinette and western Shawano Counties.	Somewhat poorly drained loamy till and loess.	3-84
TMC	Scattered throughout the region.	Somewhat poorly drained soils on most landforms. Most common on sandy loams on moraines.	3-90
ArAbVC	Scattered in Marinette County, and uncommon elsewhere.	Somewhat poorly drained sands. Occurs on most landforms, but most common on pitted outwash.	3-100

Region 4

Extent, topography, geology and soils

Region 4 encompasses Marinette, Oconto, Menominee, Shawano and Door Counties. The entire region was glaciated during the Wisconsin glacial period. The Region is characterized by a great variety of glacial and fluvio-glacial landforms, from till and lacustrine plains to end/recessional moraines and outwashes. In contrast with the other northern regions, glacial deposits of Region 4 are predominantly calcareous. Topography varies from flat lacustrine plains, rolling till plains to steeper recessional moraines and other ice-contact landforms. Of the six habitat type groups the dry mesic, mesic, and wet mesic to wet groups comprise almost 70 percent of the area. The other three groups are relatively equally represented.

Although Door Peninsula is included here it differs from the rest of Region 4 in both geology and climate. In many areas soils are developed in thin calcareous till over dolomite bedrock. Loams and silt loams prevail, but some extensive zones of sandy deposits occur near Lake Michigan shoreline in many locations.



Forest vegetation

This Region supports a great diversity of forest types. Nineteen relatively common tree species make up a wide range of upland forest types. In broadest terms we can group forest types into those of dry to dry-mesic, mesic, and wet-mesic habitat types. (wet, lowland sites have not been classified into habitat types).

The dry to dry-mesic habitat types are characterized by mixtures of pines, oaks, aspen, white birch, and red maple. The stands of the mesic sites typically are dominated by sugar maple and basswood, and sometimes by aspen. American beech, whose range is almost entirely confined to this Region, is often an important component. Important associates include

white ash, ironwood, red maple, yellow birch and hemlock. The wet-mesic habitat types are characterized by mixtures of red maple, balsam fir, white spruce, aspen, and white birch, although on richer sites ashes, basswood, beech, and sugar maple are well represented. On mesic and wet-mesic sites, hemlock, yellow birch, and to some extent

beech, were much better represented in the presettlement forests than they are today. At the time of settlement, the predominant upland forest types in the region were comprised of mesic hardwoods, hemlock and white pine. Currently, the predominant upland forest types are comprised of mesic hardwoods and aspen.

Region 4 Transitions to Adjoining Regions:

1. In extreme northwestern Marinette County, compare with Region 3. The following habitate types can occur: AVVb, ATD, AOCa, and ACal.
2. In southern Oconto County and extreme southeastern Shawano County, compare with Region 11. The following habitate types could occur: AFH, AFTD, AFAs-O, and AFAs.

Region 4 Key to Habitat Types

1 Soil somewhat poorly drained. Two or more present:

Cornus canadensis / bunchberry (c), *Rubus pubescens* / dwarf raspberry (c), *Coptis groenlandica* / goldthread, *Linnaea borealis* / twinflower, *Oxalis montana* / wood sorrel, *Equisetum spp.* / horsetails, *Onoclea sensibilis* / sensitive fern, *Impatiens capensis* / jewelweed, *Circaea spp.* / enchanter's nightshades (c)

go to Key C

1 Soil moderately well drained to excessively drained.

Species listed in 1 above rarely present

go to 2

2 Two or more present: *Dryopteris disjuncta* / oak fern, *Actaea spp.* / baneberries, *Arisaema atrorubens* / jack-in-the-pulpit, *Solidago flexicaulis* / zigzag goldenrod, *Sambucus pubens* / red elderberry, *Laportea canadensis* / wood nettle, *Hepatica acutiloba* / sharp-lobed hepatica, *Hydrophyllum virginianum* / virginia waterleaf, *Caulophyllum thalictroides* / blue cohosh, *Sanguinaria canadensis* / bloodroot.

Species listed in 2 below rarely present

go to Key B

2 Two or more present: *Quercus ellipsoidalis* / pin oak seedlings, *Vaccinium spp.* / blueberries, *Gaultheria procumbens* / wintergreen, *Lysimachia quadrifolia* / whoreled loosestrife, *Rosa spp.* / roses, *Comptonia peregrina* / sweetfern, *Desmodium glutinosum* / pointed-leaved tick trefoil, *Amphicarpa bracteata* / hog peanut, *Hamamelis virginiana* / witch hazel, *Viburnum acerifolium* / maple-leaved viburnum (c)

Species listed in 2 above rarely present

go to Key A

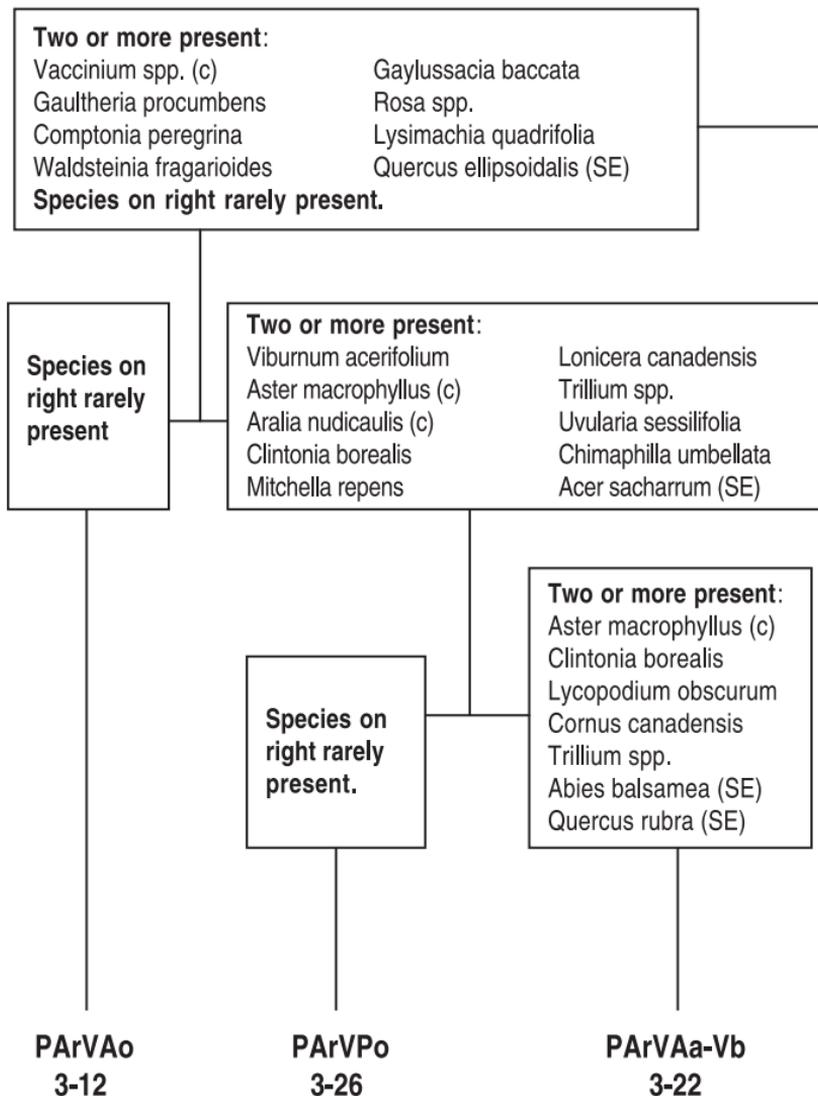
Terms used in keys:

common (c): >1% coverage

well represented (w): >5% coverage

better represented: more species are present (does not refer to coverage)

REGION 4 - Key A to Habitat Types (Scientific Names)



Two or more present:

Viburnum acerifolium (w)

Hamamelis virginiana

Amphicarpa bracteata

Desmodium glutinosum

Species on left rarely present.

Hepatica americana

Viola pubescens

Uvularia grandiflora

Osmorhiza claytoni

**Species on right
rarely present.**

Two or more present:

Dryopteris spinulosa (c)

Athyrium filix-femina (c)

Adiantum pedatum

Osmorhiza claytoni

Actaea spp.

Uvularia grandiflora

Aralia racemosa

Medeola virginiana

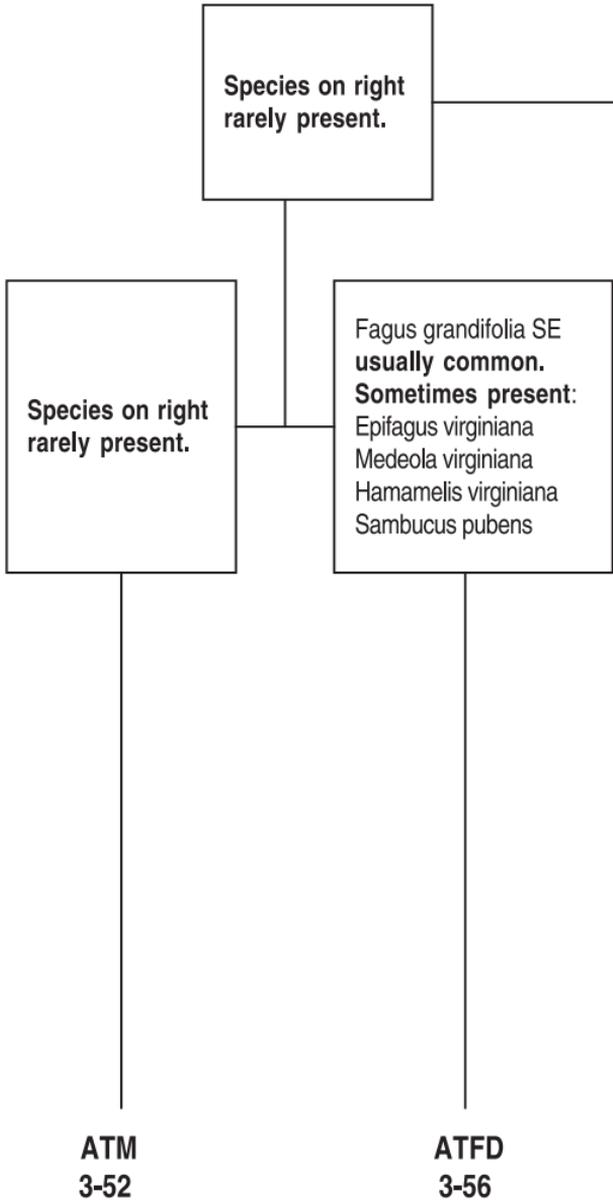
AVb

3-42

AFVb

3-50

REGION 4 - Key B to Habitat Types (Scientific Names)



Two or more present:
 Hydrophyllum virginianum Hepatica acutiloba
 Sanguinaria canadensis Laportea canadensis
 Caulophyllum thalictroides Dirca palustris

Two or more present:
 Trientalis borealis
 Clintonia borealis
 Hepatica americana
 Lycopodium spp.
 Dryopteris disjuncta
 Acer spicatum

**Species on left
 rarely present.**

Fagus grandifolia SE
 usually common.
**Sum of coverage of
 species on right <15%.**

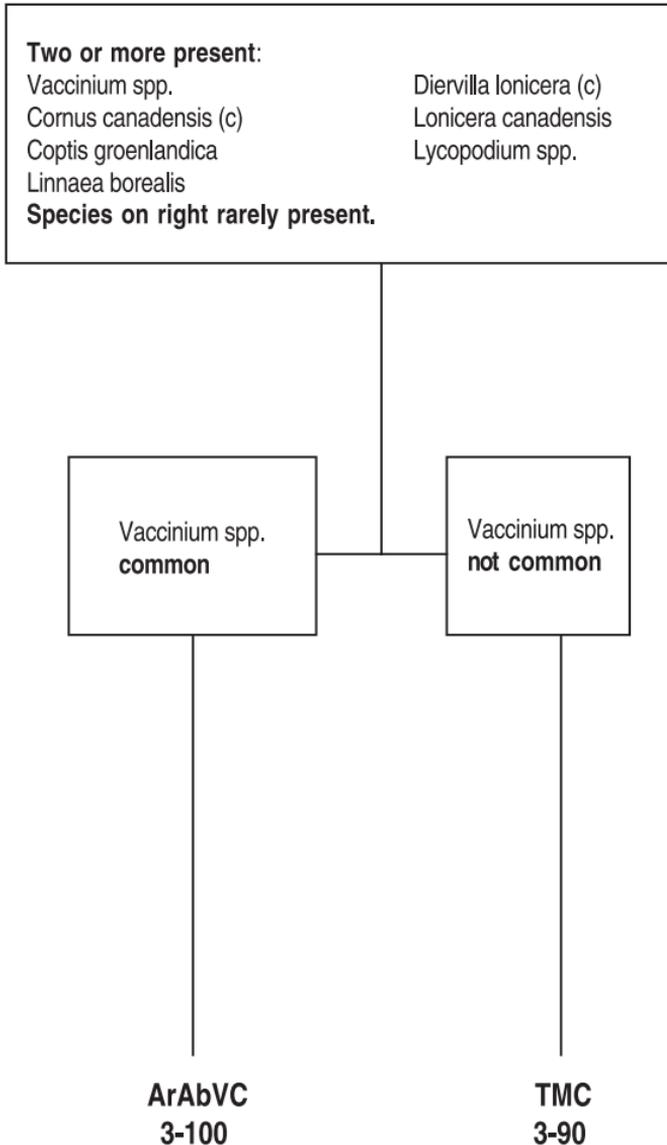
Fagus grandifolia SE **absent**
**Sum of coverage of
 species below >15%:**
 Hydrophyllum virginianum
 Laportea canadensis
 Osmorhiza claytoni
 Dryopteris spinulosa

ATDH
3-62

AFAd
3-66

AH
3-74

REGION 4 - Key C to Habitat Types (Scientific Names)



Two or more present:

Hydrophyllum virginianum
Sanguinaria canadensis
Laportea canadensis
Arisaema atrorubens
Osmorhiza claytoni

Species on left rarely present.

Sanicula spp.
Parthenocissus quinq.
Onoclea sensibilis
Circaea spp.
Impatiens capensis

**Species on right
rarely present.**

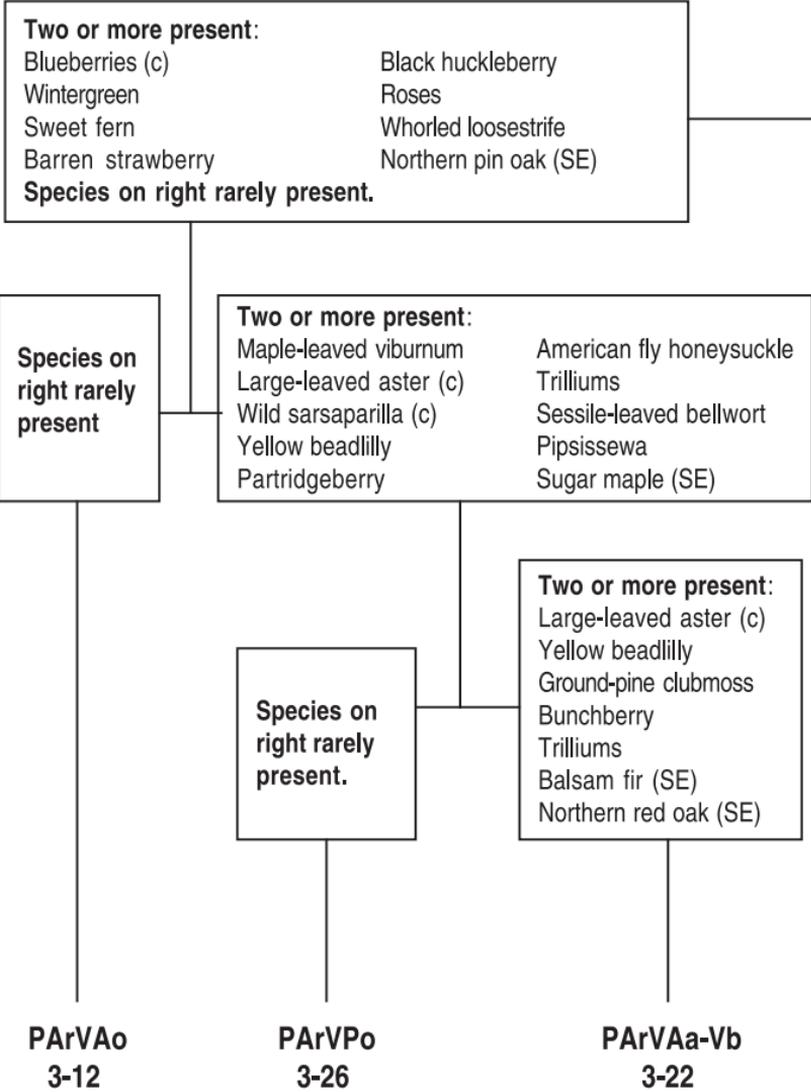
Two or more present:

Caulophyllum thalictroides Solidago flexicaulis
Sanguinaria canadensis Adiantum pedatum
Allium tricoccum Hepatica acutiloba

**ATAtOn
3-84**

**AHI
3-78**

REGION 4 - Key A to Habitat Types (Common Names)



Two or more present:

Maple-leaved viburnum (w)

Witch hazel

Hog peanut

Pointed-leaved tick trefoil

Species on left rarely present.

Round-lobed hepatica

Downy yellow violet

Large-flowered bellwort

Sweet cicely

**Species on right
rarely present.**

Two or more present:

Spinulose shield fern (c)

Lady fern (c)

Maidenhair fern

Sweet cicely

Baneberries

Large-flowered bellwort

Spikenard

Indian cucumber root

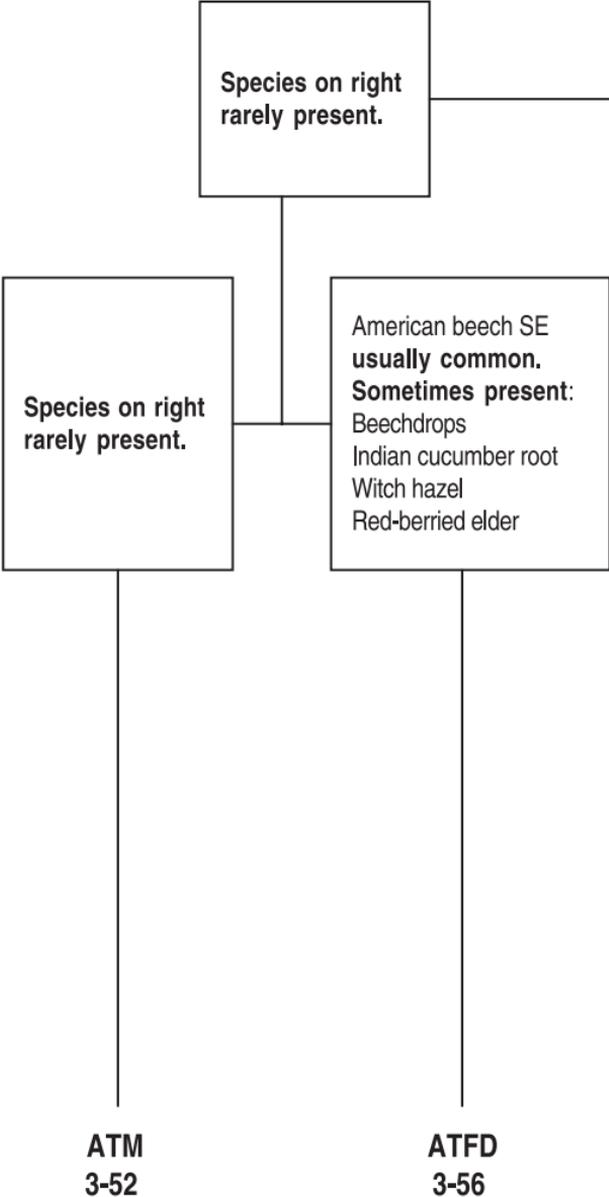
AVb

3-42

AFVb

3-50

REGION 4 - Key B to Habitat Types (Common Names)



Two or more present:
 Virginia waterleaf
 Bloodroot
 Blue cohosh

Sharp-lobed hepatica
 Wood nettle
 Leatherwood

Two or more present:
 Starflower
 Yellow beadiilly
 Round-lobed hepatica
 Clubmosses
 Oak fern
 Mountain maple

**Species on left
 rarely present.**

American beech SE
usually common.
**Sum of coverage of
 species on right <15%.**

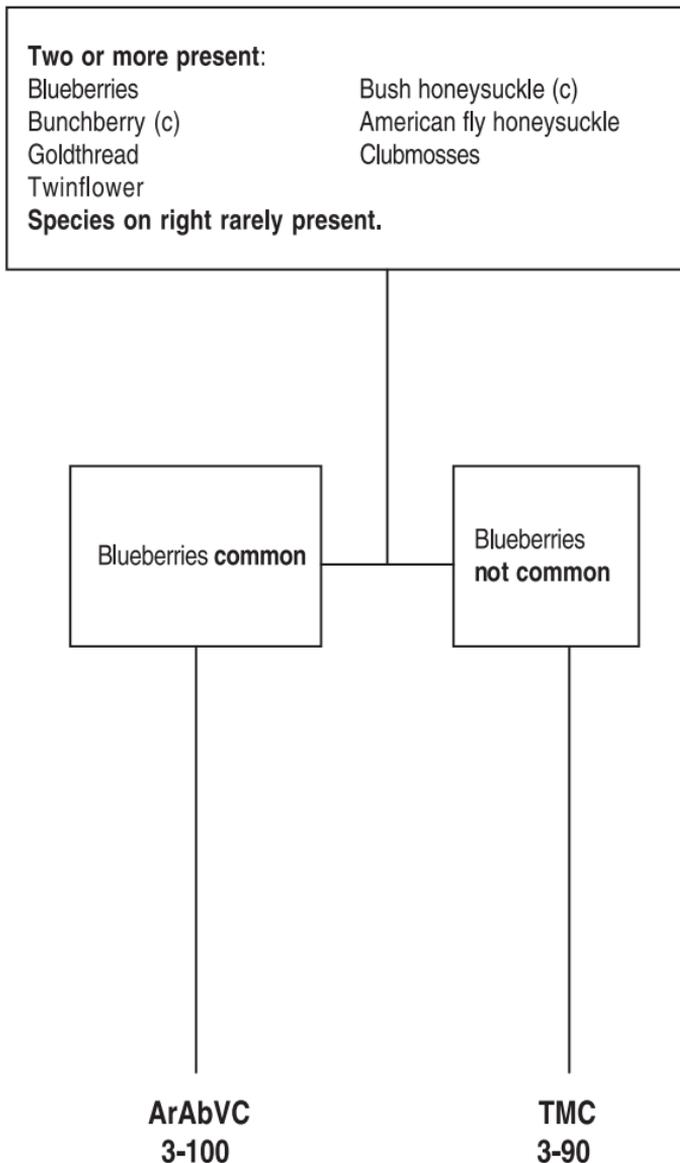
American beech SE **absent.**
**Sum of coverage of
 species below >15%:**
 Virginia waterleaf
 Wood nettle
 Sweet cicely
 Spinulose shield fern

ATDH
3-62

AFAd
3-66

AH
3-74

REGION 4 - Key C to Habitat Types (Common Names)



Two or more present:

Virginia waterleaf

Bloodroot

Wood nettle

Jack-in-the-pulpit

Sweet cicely

Species on left rarely present.

Snakeroots

Virginia creeper

Sensitive fern

Enchanter's nightshades

Jewelweed

**Species on right
rarely present.**

Two or more present:

Blue cohosh

Bloodroot

Wild leek

Zigzag goldenrod

Maidenhairfern

Sharp-lobed hepatica

**ATAtOn
3-84**

**AHI
3-78**

Comparison of Major Floristic Differences Between Various Habitat Types of Region 4

The following tables may be used to identify habitat types when identification through keys is inconclusive. The tables list only those species whose constancy percentages differ significantly between the types being compared. If the average coverage values also are significantly different, they are shown as a second value, separated from the constancy value by a back slash.

The species found in a stand should better match the list of species either above (h.t. in left column) or below (h.t. in right column) the horizontal line.

(Constancy / Average coverage; * = <10% constancy)

		PArVAo	PArVPo
<i>Comptonia peregrina</i>	Sweet fern	74	25
<i>Monarda fistulosa</i>	Wild bergamot	24	*
<i>Aralia nudicaulis</i>	Wild sarsaparilla	14/<1	50/>1
<i>Mitchella repens</i>	Partridgeberry	*	50
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	*	42
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	*	42
<i>Chimaphilla umbellata</i>	Pipsissewa	*	42

		PArVAo	PArVAa-Vb
<i>Rosa spp.</i>	Roses	32	*
<i>Helianthus spp.</i>	Sunflowers	28	*
<i>Monarda fistulosa</i>	Wild bergamot	24	*
<i>Aster macrophyllus</i>	Large-leaved aster	20	88
<i>Aralia nudicaulis</i>	Wild sarsaparilla	14/<1	71/2
<i>Polygala paucifolia</i>	Fringed polygala	20	61
<i>Lycopodium obscurum</i>	Ground-pine	22	59
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	*	54
<i>Clintonia borealis</i>	Yellow beadlilly	*	50
<i>Cornus canadensis</i>	Bunchberry	12	48
<i>Trillium spp.</i>	Trilliums	*	43
<i>Mitchella repens</i>	Partridgeberry	*	38
<i>Lonicera canadensis</i>	American fly honeysuckle	*	23
<i>Hamamelis virginiana</i>	Witch hazel	*	23

		PArVPo	PArVAa-Vb
<i>Lysimachia quadrifolia</i>	Whorled loosestrife	67	21
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	42	*

<i>Chimaphilla umbellata</i>	Pipsissewa	42	*
<i>Rosa spp.</i>	Roses	42	*
<i>Gaylussacia baccata</i>	Black huckleberry	42	*
<i>Rhus radicans</i>	Poison ivy	33	*
<i>Aster macrophyllus</i>	Large-leaved aster	17/<1	88/5
<i>Polygala paucifolia</i>	Fringed polygala	33	61
<i>Lycopodium obscurum</i>	Ground-pine	*	59
<i>Clintonia borealis</i>	Yellow beadlilly	17	50
<i>Cornus canadensis</i>	Bunchberry	*	48
<i>Trillium spp.</i>	Trilliums	17	43
<i>Galium triflorum</i>	Sweet-scented bedstraw	*	25

		PARVPo	AVb
<i>Lysimachia quadrifolia</i>	Whorled loosestrife	67	26
<i>Vaccinium spp.</i>	Blueberries	58	34
<i>Chimaphilla umbellata</i>	Pipsissewa	42	*
<i>Rosa spp.</i>	Roses	42	*
<i>Gaylussacia baccata</i>	Black huckleberry	42	*
<i>Waldsteinia fragarioides</i>	Barren strawberry	42	13

<i>Aster macrophyllus</i>	Large-leaved aster	17/<1	87/10
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	42/1	85/6
<i>Hamamelis virginiana</i>	Witch hazel	17	77
<i>Trillium spp.</i>	Trilliums	17	76
<i>Amphicarpa bracteata</i>	Hog peanut	*	61
<i>Lycopodium obscurum</i>	Ground-pine	*	42
<i>Hepatica americana</i>	Round-lobed hepatica	*	29

		PARVAa-Vb	AVb
<i>Gaultheria procumbens</i>	Wintergreen	80	31
<i>Vaccinium spp.</i>	Blueberries	75/6	34/2
<i>Cornus canadensis</i>	Bunchberry	48	18
<i>Comptonia peregrina</i>	Sweet fern	39	11
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	54/2	85/6
<i>Hamamelis virginiana</i>	Witch hazel	23/4	77/9
<i>Amphicarpa bracteata</i>	Hog peanut	11	61
<i>Polygonatum pubescens</i>	Hairy solomon's seal	16	34
<i>Hepatica americana</i>	Round-lobed hepatica	14	29
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	*	29
<i>Desmodium glutinosum</i>	Pointed-leaved tick trefoil	*	27
<i>Thalictrum dioicum</i>	Early meadow rue	*	26

Continued on next page.

		PArVAa-Vb	ATM
<i>Gaultheria procumbens</i>	Wintergreen	80	*
<i>Vaccinium spp.</i>	Blueberries	75	*
<i>Polygala paucifolia</i>	Fringed polygala	61	16
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	54	13
<i>Apocynum andro.</i>	Spreading dogbane	54	27
<i>Comptonia peregrina</i>	Sweet fern	39	*
<i>Dryopteris spinulosa</i>	Spinulose shield fern	16/<1	69/4
<i>Athyrium filix-femina</i>	Lady fern	*	60/4
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	*	56
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	*	52
<i>Actaea spp.</i>	Baneberries	*	50
<i>Ribes spp.</i>	Gooseberries	*	50
<i>Hepatica americana</i>	Round-lobed hepatica	14	40
<i>Osmorhiza claytoni</i>	Sweet cicely	*	37
<i>Viola pubescens</i>	Downy yellow violet	*	33

		AVb	AFVb
<i>Hamamelis virginiana</i>	Witch hazel	77/9	58/3
<i>Amelanchier spp.</i>	Juneberry	63	31
<i>Vaccinium spp.</i>	Blueberries	34	*
<i>Gaultheria procumbens</i>	Wintergreen	31	12
<i>Lysimachia quadrifolia</i>	Whorled loosestrife	26	*
<i>Uvularia grandiflora</i>	Large-flowered bellwort	10	62
<i>Dryopteris spinulosa</i>	Spinulose shield fern	23	54
<i>Athyrium filix-femina</i>	Lady fern	19	50
<i>Adiantum pedatum</i>	Maidenhair fern	*	50
<i>Medeola virginiana</i>	Indian cucumber root	*	46
<i>Dirca palustris</i>	Leatherwood	18	38
<i>Viola pubescens</i>	Downy yellow violet	11	35
<i>Osmorhiza claytoni</i>	Sweet cicely	*	35
<i>Aralia racemosa</i>	Spikenard	*	31
<i>Actaea spp.</i>	Baneberries	*	23

		AVb	ATM
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	85	13
<i>Hamamelis virginiana</i>	Witch hazel	77	*
<i>Amphicarpa bracteata</i>	Hog peanut	61	11
<i>Smilacina racemosa</i>	False solomon's seal	61	26
<i>Vaccinium spp.</i>	Blueberries	34	*
<i>Gaultheria procumbens</i>	Wintergreen	31	*
<i>Polygala paucifolia</i>	Fringed polygala	31	16
<i>Desmodium glutinosum</i>	Pointed-leaved tick trefoil	27	*
<i>Dryopteris spinulosa</i>	Spinulose shield fern	23/<1	69/4

<i>Clintonia borealis</i>	Yellow beadlilly	27	68
<i>Athyrium filix-femina</i>	Lady fern	19/1	60/4
<i>Lonicera canadensis</i>	American fly honeysuckle	16	59
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	19	52
<i>Actaea spp.</i>	Baneberries	*	50
<i>Streptopus roseus</i>	Rosey twisted stalk	18	49
<i>Osmorhiza claytoni</i>	Sweet cicely	*	37
<i>Dryopteris disjuncta</i>	Oak fern	*	26
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	*	22

		AFVb	ATM
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	85	13
<i>Amphicarpa bracteata</i>	Hog peanut	81	11
<i>Uvularia grandiflora</i>	Large-flowered bellwort	62	11
<i>Hamamelis virginiana</i>	Witch hazel	58	*
<i>Smilacina racemosa</i>	False solomon's seal	54	26
<i>Adiantum pedatum</i>	Maidenhair fern	50	*
<i>Medeola virginiana</i>	Indian cucumber root	46	*
<i>Desmodium glutinosum</i>	Pointed-leaved tick trefoil	38	*
<i>Aralia racemosa</i>	Spikenard	31	*
<i>Thalictrum dioicum</i>	Early meadow rue	31	12
<i>Aralia nudicaulis</i>	Wild sarsaparilla	69/3	82/7
<i>Corylus spp.</i>	Hazelnuts	81/2	80/10
<i>Diervilla lonicera</i>	Bush honeysuckle	42/<1	57/5
<i>Dryopteris disjuncta</i>	Oak fern	12	26
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	*	22

		AFVb	ATFD
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	85	13
<i>Amphicarpa bracteata</i>	Hog peanut	81	13
<i>Uvularia grandiflora</i>	Large-flowered bellwort	62	20
<i>Hamamelis virginiana</i>	Witch hazel	58	20
<i>Adiantum pedatum</i>	Maidenhair fern	50	27
<i>Desmodium glutinosum</i>	Pointed-leaved tick trefoil	38	*
<i>Dirca palustris</i>	Leatherwood	38	*
<i>Thalictrum dioicum</i>	Early meadow rue	31	13
<i>Polygala paucifolia</i>	Fringed polygala	31	*
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	*	60
<i>Sambucus pubens</i>	Red-berried elder	19	40
<i>Dryopteris disjuncta</i>	Oak fern	12	40
<i>Caulophyllum thalictroides</i>	Blue cohosh	*	27

Continued on next page.

		AFVb	AFAd
<i>Trientalis borealis</i>	Starflower	69	*
<i>Hamamelis virginiana</i>	Witch hazel	58	*
<i>Hepatica americana</i>	Round-lobed hepatica	50	*
<i>Medeola virginiana</i>	Indian cucumber root	46	*
<i>Clintonia borealis</i>	Yellow beadlilly	42	*
<i>Lycopodium obscurum</i>	Ground-pine	42	*
<i>Desmodium glutinosum</i>	Pointed-leaved tick trefoil	38	*
<i>Sanguinaria canadensis</i>	Bloodroot	*	75
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica	12	58
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	*	58
<i>Sambucus pubens</i>	Red-berried elder	19	50
<i>Laportea canadensis</i>	Wood nettle	*	50
<i>Circaea spp.</i>	Enchanter's nightshades	*	50
<i>Caulophyllum thalictroides</i>	Blue cohosh	*	42
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	*	42
<i>Phryma leptostachya</i>	Lopseed	*	33
<i>Allium tricoccum</i>	Wild leek	*	33

		ATM	ATFD
<i>Corylus spp.</i>	Hazelnuts	80/10	40/2
<i>Pteridium aquilinum</i>	Bracken fern	68/8	33/2
<i>Diervilla lonicera</i>	Bush honeysuckle	57	13
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	56	27
<i>Amelanchier spp.</i>	Juneberry	45	20
<i>Cornus canadensis</i>	Bunchberry	31	*
<i>Polygonatum pubescens</i>	Hairy solomon's seal	36	87
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	22	60
<i>Sambucus pubens</i>	Red-berried elder	*	40
<i>Aralia racemosa</i>	Spikenard	*	27
<i>Mitella diphylla</i>	Miterwort	12	27
<i>Adiantum pedatum</i>	Maidenhair fern	*	27
<i>Parthenocissus quinq.</i>	Virginia creeper	*	27
<i>Medeola virginiana</i>	Indian cucumber root	*	20
<i>Hamamelis virginiana</i>	Witch hazel	*	20

		ATM	ATDH
<i>Pteridium aquilinum</i>	Bracken fern	68	32
<i>Cornus canadensis</i>	Bunchberry	31	*
<i>Osmunda claytoniana</i>	Interrupted fern	27	*
<i>Osmorhiza claytoni</i>	Sweet cicely	37	73
<i>Uvularia grandiflora</i>	Large-flowered bellwort	11	73
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	*	64
<i>Sanguinaria canadensis</i>	Bloodroot	*	64

<i>Caulophyllum thalictroides</i>	Blue cohosh	18	59
<i>Mitella diphylla</i>	Miterwort	12	59
<i>Dirca palustris</i>	Leatherwood	25	55
<i>Adiantum pedatum</i>	Maidenhair fern	*	50
<i>Aralia racemosa</i>	Spikenard	*	41
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica	*	41
<i>Solidago flexicaulis</i>	Zigzag goldenrod	20	41
<i>Sambucus pubens</i>	Red-berried elder	*	36

		ATFD	ATDH
<i>Medeola virginiana</i>	Indian cucumber root	20	*
<i>Uvularia grandiflora</i>	Large-flowered bellwort	20	73
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	*	64
<i>Sanguinaria canadensis</i>	Bloodroot	*	64
<i>Caulophyllum thalictroides</i>	Blue cohosh	27	59
<i>Mitella diphylla</i>	Miterwort	27	59
<i>Dirca palustris</i>	Leatherwood	*	55
<i>Adiantum pedatum</i>	Maidenhair fern	27	50
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica	*	41
<i>Hepatica americana</i>	Round-lobed hepatica	13	41
<i>Solidago flexicaulis</i>	Zigzag goldenrod	*	41

		ATFD	AFAAd
<i>Trientalis borealis</i>	Starflower	73	*
<i>Streptopus roseus</i>	Rosey twisted stalk	67	*
<i>Mitchella repens</i>	Partridgeberry	53	*
<i>Lycopodium obscurum</i>	Ground-pine	47	*
<i>Lonicera canadensis</i>	American fly honeysuckle	40	17
<i>Clintonia borealis</i>	Yellow beadlilly	40	*
<i>Dryopteris disjuncta</i>	Oak fern	40	*
<i>Sanguinaria canadensis</i>	Bloodroot	*	75
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica	*	58
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	*	58
<i>Uvularia grandiflora</i>	Large-flowered bellwort	20	50
<i>Dirca palustris</i>	Leatherwood	*	50
<i>Amphicarpa bracteata</i>	Hog peanut	13	50
<i>Laportea canadensis</i>	Wood nettle	13	50
<i>Caulophyllum thalictroides</i>	Blue cohosh	27	42
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	13	42
<i>Botrychium virginianum</i>	Rattlesnake fern	*	42
<i>Phryma leptostachya</i>	Lopseed	*	33
<i>Allium tricoccum</i>	Wild leek	*	33

Continued on next page.

		ATDH	AFAAd
<i>Dryopteris spinulosa</i>	Spinulose shield fern	77/5	25/1
<i>Streptopus roseus</i>	Rosey twisted stalk	73	*
<i>Trientalis borealis</i>	Starflower	68	*
<i>Clintonia borealis</i>	Yellow beadlilly	59	*
<i>Lonicera canadensis</i>	American fly honeysuckle	59	17
<i>Hepatica americana</i>	Round-lobed hepatica	41	*
<i>Lycopodium obscurum</i>	Ground-pine	41	*
<i>Acer spicatum</i>	Mountain maple	27	*
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	14	42

		ATDH	AH
<i>Trientalis borealis</i>	Starflower	68	25
<i>Clintonia borealis</i>	Yellow beadlilly	59	15
<i>Lonicera canadensis</i>	American fly honeysuckle	59	19
<i>Hepatica americana</i>	Round-lobed hepatica	41	14
<i>Lycopodium obscurum</i>	Ground-pine	41	*
<i>Mitchella repens</i>	Partridgeberry	36	*
<i>Acer spicatum</i>	Mountain maple	27	*
<i>Thalictrum dioicum</i>	Early meadow rue	14	52
<i>Allium tricoccum</i>	Wild leek	*	47
<i>Laportea canadensis</i>	Wood nettle	14	43

		AFAAd	AH
<i>Circaea spp.</i>	Enchanter's nightshades	50	15
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	42	*
<i>Phryma leptostachya</i>	Lopseed	33	16
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	58/3	88/8
<i>Dryopteris spinulosa</i>	Spinulose shield fern	25/1	71/5
<i>Osmorhiza claytoni</i>	Sweet cicely	67/2	70/5
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	17	48
<i>Allium tricoccum</i>	Wild leek	33/<1	47/2
<i>Laportea canadensis</i>	Wood nettle	50/4	43/9

		ArAbVC	PARVPo
<i>Cornus canadensis</i>	Bunchberry	98	*
<i>Clintonia borealis</i>	Yellow beadlilly	76	17
<i>Lycopodium obscurum</i>	Ground-pine	75	22
<i>Aster macrophyllus</i>	Large-leaved aster	64/11	17/<1
<i>Coptis groenlandica</i>	Goldthread	64	*
<i>Lycopodium spp.</i>	Clubmosses	54	17
<i>Dryopteris spinulosa</i>	Spinulose shield fern	52	17
<i>Lonicera canadensis</i>	American fly honeysuckle	39	*

<i>Linnaea borealis</i>	Twinflower	34	*
<i>Rubus pubescens</i>	Dwarf raspberry	20	*
<i>Apocynum andro.</i>	Spreading dogbane	20	75
<i>Lysimachia quadrifolia</i>	Whorled loosestrife	*	67
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	18	42
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	*	42
<i>Chimaphilla umbellata</i>	Pipsissewa	*	42
<i>Rosa spp.</i>	Roses	*	42
<i>Gaylussacia baccata</i>	Black huckleberry	*	42

		ArAbVC	PArVAa-Vb
<i>Cornus canadensis</i>	Bunchberry	98/13	48/3
<i>Coptis groenlandica</i>	Goldthread	64	13
<i>Lycopodium spp.</i>	Clubmosses	54	23
<i>Dryopteris spinulosa</i>	Spinulose shield fern	52	16
<i>Linnaea borealis</i>	Twinflower	34	*
<i>Streptopus roseus</i>	Rosey twisted stalk	33	*
<i>Rubus pubescens</i>	Dwarf raspberry	20	*
<i>Gaultheria procumbens</i>	Wintergreen	37	80
<i>Polygala paucifolia</i>	Fringed polygala	18	61
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	*	54
<i>Apocynum andro.</i>	Spreading dogbane	20	54
<i>Trillium spp.</i>	Trilliums	11	43
<i>Comptonia peregrina</i>	Sweet fern	*	39
<i>Smilacina racemosa</i>	False solomon's seal	*	39

		TMC	ATM
<i>Cornus canadensis</i>	Bunchberry	88	31
<i>Coptis groenlandica</i>	Goldthread	60	*
<i>Vaccinium spp.</i>	Blueberries	39	*
<i>Rubus pubescens</i>	Dwarf raspberry	36	*
<i>Equisetum spp.</i>	Horsetails	31	*
<i>Trillium spp.</i>	Trilliums	28	64
<i>Osmorhiza claytoni</i>	Sweet cicely	11	37
<i>Polygonatum pubescens</i>	Hairy solomon's seal	17	36
<i>Dirca palustris</i>	Leatherwood	*	25

		TMC	ATFD
<i>Cornus canadensis</i>	Bunchberry	88	*
<i>Corylus cornuta</i>	Beaked hazelnut	84/8	40/2
<i>Pteridium aquilinum</i>	Bracken fern	70/9	33/2

Continued on next page.

<i>Coptis groenlandica</i>	Goldthread	60	*
<i>Diervilla lonicera</i>	Bush honeysuckle	59	13
<i>Vaccinium spp.</i>	Blueberries	39	*
<i>Rubus pubescens</i>	Dwarf raspberry	36	*
<i>Osmunda claytoniana</i>	Interrupted fern	33	13
<i>Equisetum spp.</i>	Horsetails	31	*
<i>Polygonatum pubescens</i>	Hairy solomon's seal	17	87
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	18	60
<i>Trillium spp.</i>	Trilliums	28	60
<i>Osmorhiza claytoni</i>	Sweet cicely	11	53
<i>Actaea spp.</i>	Baneberries	26	53
<i>Sambucus pubens</i>	Red-berried elder	*	40
<i>Smilacina racemosa</i>	False solomon's seal	10	40
<i>Viola pubescens</i>	Downy yellow violet	18	40

		ATAtOn	ATM
<i>Equisetum spp.</i>	Horsetails	71	*
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	58	22
<i>Onoclea sensibilis</i>	Sensitive fern	56	*
<i>Parthenocissus quinq.</i>	Virginia creeper	56	*
<i>Impatiens capensis</i>	Jewelweed	48	*
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	42	*
<i>Laportea canadensis</i>	Wood nettle	34	*
<i>Sanicula spp.</i>	Snakeroot	34	*
<i>Rubus pubescens</i>	Dwarf raspberry	32	*
<i>Circaea spp.</i>	Enchanter's nightshades	28	*
<i>Oxalis montana</i>	Wood sorrel	25	*
<i>Aralia nudicaulis</i>	Wild sarsaparilla	54/2	82/7
<i>Aster macrophyllus</i>	Large-leaved aster	56/4	74/11
<i>Pteridium aquilinum</i>	Bracken fern	19/2	68/8
<i>Lycopodium obscurum</i>	Ground-pine	15	65
<i>Lonicera canadensis</i>	American fly honeysuckle	14	59
<i>Diervilla lonicera</i>	Bush honeysuckle	20/<1	57/5
<i>Actaea spp.</i>	Baneberries	20	50
<i>Dirca palustris</i>	Leatherwood	*	25

		ATAtOn	ATFD
<i>Athyrium filix-femina</i>	Lady fern	78/6	40/2
<i>Equisetum spp.</i>	Horsetails	71	*
<i>Onoclea sensibilis</i>	Sensitive fern	56	*
<i>Parthenocissus quinq.</i>	Virginia creeper	56	27
<i>Impatiens capensis</i>	Jewelweed	48	*
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	42	*
<i>Laportea canadensis</i>	Wood nettle	34	13

<i>Sanicula</i> spp.	Snakeroot	34	*
<i>Rubus pubescens</i>	Dwarf raspberry	32	*
<i>Oxalis montana</i>	Wood sorrel	25	*
<i>Polygonatum pubescens</i>	Hairy solomon's seal	19	87
<i>Streptopus roseus</i>	Rosey twisted stalk	33	67
<i>Actaea</i> spp.	Baneberries	20	53
<i>Mitchella repens</i>	Partridgeberry	21	53
<i>Lycopodium obscurum</i>	Ground-pine	15	47
<i>Lonicera canadensis</i>	American fly honeysuckle	14	40
<i>Sambucus pubens</i>	Red-berried elder	16	40
<i>Smilacina racemosa</i>	False solomon's seal	*	40
<i>Viola pubescens</i>	Downy yellow violet	19	40

		ATAAtOn	AFAAd
<i>Equisetum</i> spp.	Horsetails	71	*
<i>Trientalis borealis</i>	Starflower	61	*
<i>Onoclea sensibilis</i>	Sensitive fern	56	*
<i>Impatiens capensis</i>	Jewelweed	48	*
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	39	17
<i>Dryopteris disjuncta</i>	Oak fern	33	*
<i>Rubus pubescens</i>	Dwarf raspberry	33	*
<i>Clintonia borealis</i>	Yellow beadlily	31	*
<i>Dryopteris phegopteris</i>	Long beech fern	29	*

<i>Sanguinaria canadensis</i>	Bloodroot	14	75
<i>Actaea</i> spp.	Baneberries	20	75
<i>Osmorhiza claytoni</i>	Sweet cicely	28	67
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica	16	58
<i>Uvularia grandiflora</i>	Large-flowered bellwort	*	50
<i>Smilacina racemosa</i>	False solomon's seal	*	50
<i>Adiantum pedatum</i>	Maidenhair fern	*	50
<i>Dirca palustris</i>	Leatherwood	*	50
<i>Sambucus pubens</i>	Red-berried elder	*	50
<i>Caulophyllum thalictroides</i>	Blue cohosh	18	42
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	*	42
<i>Botrychium virginianum</i>	Rattlesnake fern	14	42

		AHI	AFAAd
<i>Solidago flexicaulis</i>	Zigzag goldenrod	62	25
<i>Geranium maculatum</i>	Wild geranium	57	17
<i>Impatiens capensis</i>	Jewelweed	51	*
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	51	17
<i>Onoclea sensibilis</i>	Sensitive fern	45	*
<i>Trientalis borealis</i>	Starflower	43	*

Continued on next page.

<i>Oxalis montana</i>	Wood sorrel	40	*
<i>Equisetum spp.</i>	Horsetails	38	*
<i>Uvularia grandiflora</i>	Large-flowered bellwort	15	50
<i>Dirca palustris</i>	Leatherwood	11	50
<i>Sambucus pubens</i>	Red-berried elder	*	50
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	*	42
<i>Botrychium virginianum</i>	Rattlesnake fern	*	42
<i>Polygonatum pubescens</i>	Hairy solomon's seal	13	33
<i>Phryma leptostachya</i>	Lopseed	*	33

		AHI	ATDH
<i>Thalictrum dioicum</i>	Early meadow rue	66	14
<i>Geranium maculatum</i>	Wild geranium	57	*
<i>Impatiens capensis</i>	Jewelweed	51	*
<i>Laportea canadensis</i>	Wood nettle	51	14
<i>Onoclea sensibilis</i>	Sensitive fern	45	*
<i>Allium tricoccum</i>	Wild leek	43	*
<i>Sanicula spp.</i>	Snakeroot	43	*
<i>Oxalis montana</i>	Wood sorrel	40	*
<i>Equisetum spp.</i>	Horsetails	38	*
<i>Streptopus roseus</i>	Rosey twisted stalk	*	73
<i>Uvularia grandiflora</i>	Large-flowered bellwort	15	73
<i>Clintonia borealis</i>	Yellow beadlilly	*	59
<i>Lonicera canadensis</i>	American fly honeysuckle	13	59
<i>Mitella diphylla</i>	Miterwort	28	59
<i>Dirca palustris</i>	Leatherwood	11	55
<i>Aralia racemosa</i>	Spikenard	*	41
<i>Hepatica americana</i>	Round-lobed hepatica	*	41
<i>Lycopodium obscurum</i>	Ground-pine	*	41

		AHI	AH
<i>Parthenocissus quinq.</i>	Virginia creeper	70	26
<i>Circaea spp.</i>	Enchanter's nightshades	64/2	15/<1
<i>Geranium maculatum</i>	Wild geranium	57/7	21/2
<i>Impatiens capensis</i>	Jewelweed	51	*
<i>Onoclea sensibilis</i>	Sensitive fern	45	*
<i>Sanicula spp.</i>	Snakeroot	43	16
<i>Fragaria spp.</i>	Strawberries	49	11
<i>Oxalis montana</i>	Wood sorrel	40	*
<i>Equisetum spp.</i>	Horsetails	38	*
<i>Adiantum pedatum</i>	Maidenhair fern	28	60
<i>Uvularia grandiflora</i>	Large-flowered bellwort	15	53
<i>Streptopus roseus</i>	Rosey twisted stalk	*	41

<i>Sambucus pubens</i>	Red-berried elder	*	35
<i>Dirca palustris</i>	Leatherwood	11	34

		ArAbVC	TMC
<i>Cornus canadensis</i>	Bunchberry	98/13	88/5
<i>Vaccinium spp.</i>	Blueberries	99/10	39/1
<i>Gaultheria procumbens</i>	Wintergreen	37	20
<i>Athyrium filix-femina</i>	Lady fern	15	47
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	18	43
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	*	32
<i>Trillium spp.</i>	Trilliums	11	28
<i>Actaea spp.</i>	Baneberries	14	26
<i>Dryopteris disjuncta</i>	Oak fern	*	26
<i>Dryopteris phegopteris</i>	Long beech fern	*	26

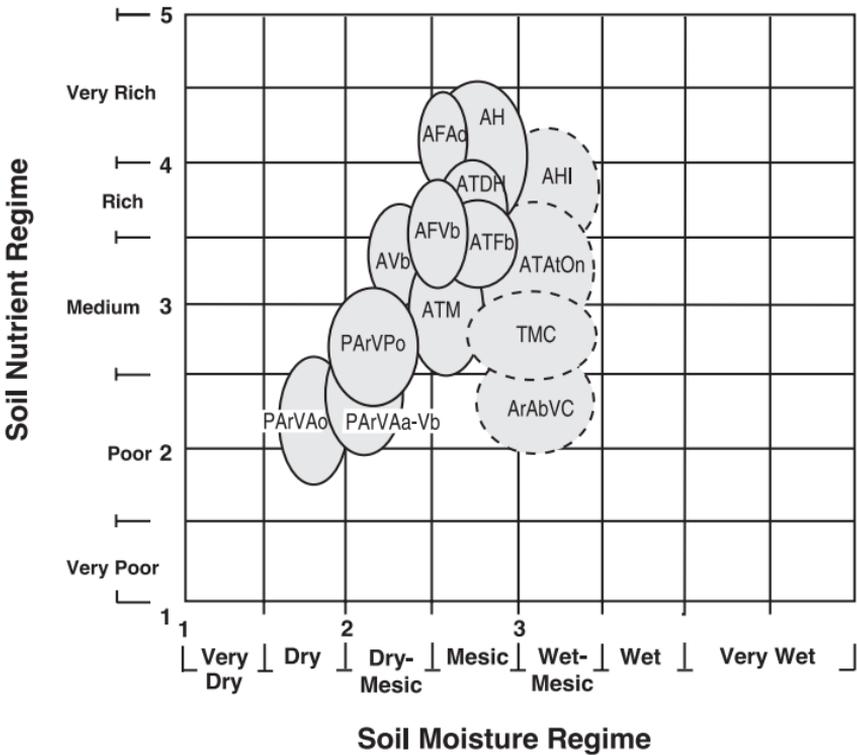
		TMC	ATAtOn
<i>Cornus canadensis</i>	Bunchberry	88	24
<i>Clintonia borealis</i>	Yellow beadlilly	78	31
<i>Pteridium aquilinum</i>	Bracken fern	70/9	19/2
<i>Lycopodium obscurum</i>	Ground-pine	66	15
<i>Coptis groenlandica</i>	Goldthread	60	14
<i>Diervilla lonicera</i>	Bush honeysuckle	59	20
<i>Lonicera canadensis</i>	American fly honeysuckle	57	14
<i>Amelanchier spp.</i>	Juneberry	46	15
<i>Mitchella repens</i>	Partridgeberry	46	21
<i>Vaccinium spp.</i>	Blueberries	39	*
<i>Lycopodium spp.</i>	Clubmosses	38	*
<i>Equisetum spp.</i>	Horsetails	31	71
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	18	58
<i>Onoclea sensibilis</i>	Sensitive fern	16	56
<i>Parthenocissus quinq.</i>	Virginia creeper	*	56
<i>Impatiens capensis</i>	Jewelweed	13	48
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	*	42
<i>Laportea canadensis</i>	Wood nettle	*	34
<i>Sanicula spp.</i>	Snakeroot	*	34

		ATAtOn	AHI
<i>Dryopteris disjuncta</i>	Oak fern	33	*
<i>Streptopus roseus</i>	Rosey twisted stalk	33	*
<i>Rubus pubescens</i>	Dwarf raspberry	32	15
<i>Clintonia borealis</i>	Yellow beadlilly	31	*
<i>Dryopteris phegopteris</i>	Long beech fern	31	*
<i>Hepatica americana</i>	Round-lobed hepatica	29	*

Continued on next page.

<i>Hydrophyllum virginianum</i>	Virginia waterleaf	42/2	94/5
<i>Sanguinaria canadensis</i>	Bloodroot	14	87
<i>Solidago flexicaulis</i>	Zigzag goldenrod	19	62
<i>Geranium maculatum</i>	Wild geranium	14	57
<i>Viola pub./penn.</i>	Downy/smooth yellow violet	19	53
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica	16	51
<i>Smilacina racemosa</i>	False solomon's seal	*	47
<i>Actaea spp.</i>	Baneberries	20	45
<i>Caulophyllum thalictroides</i>	Blue cohosh	18	45
<i>Allium tricoccum</i>	Wild leek	*	43
<i>Adiantum pedatum</i>	Maidenhair fern	*	28

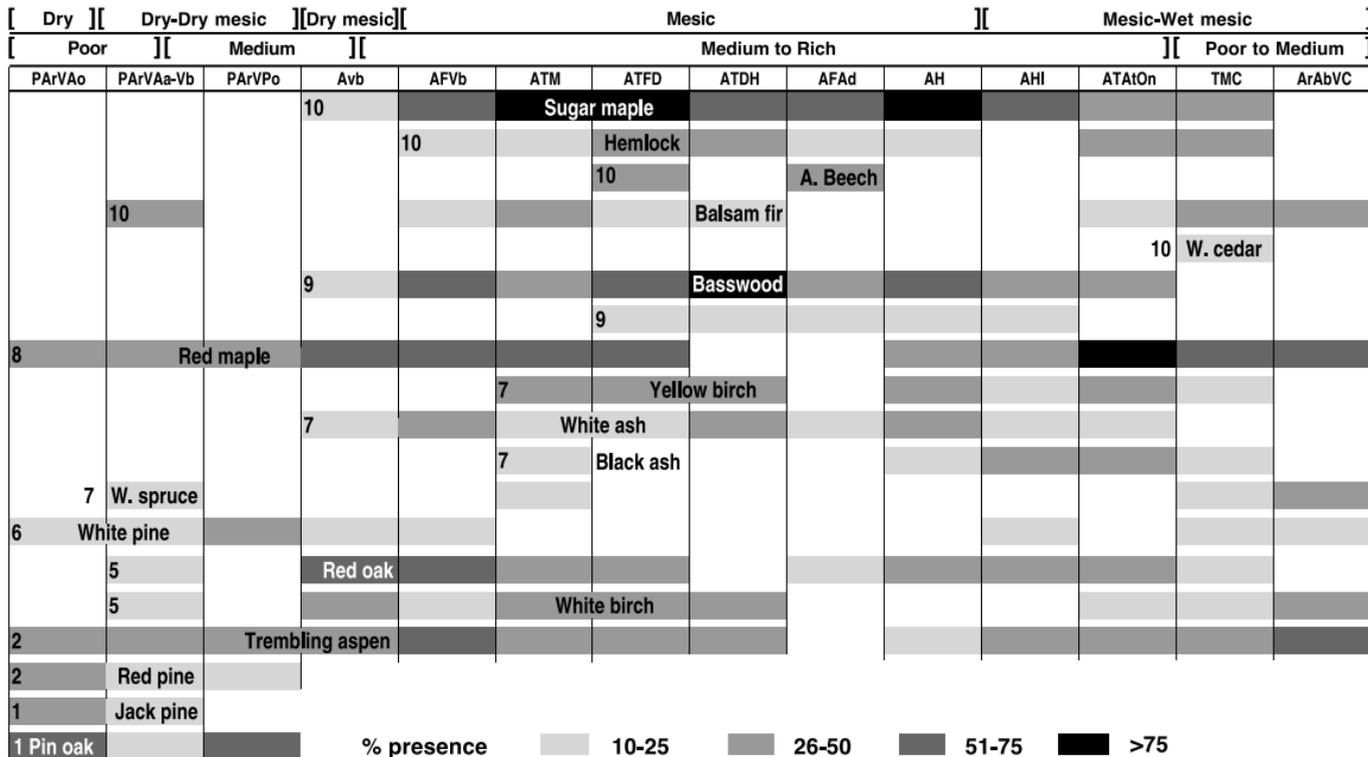
Relationship of Habitat Types to Soil Moisture and Nutrient Regimes in Region 4



Occurrence of Tree Species Across Habitat Types of Region 4

(Data from 1996 FIA)

Numbers in front of bars are relative shade tolerance values: 1, least tolerant; 10, most tolerant

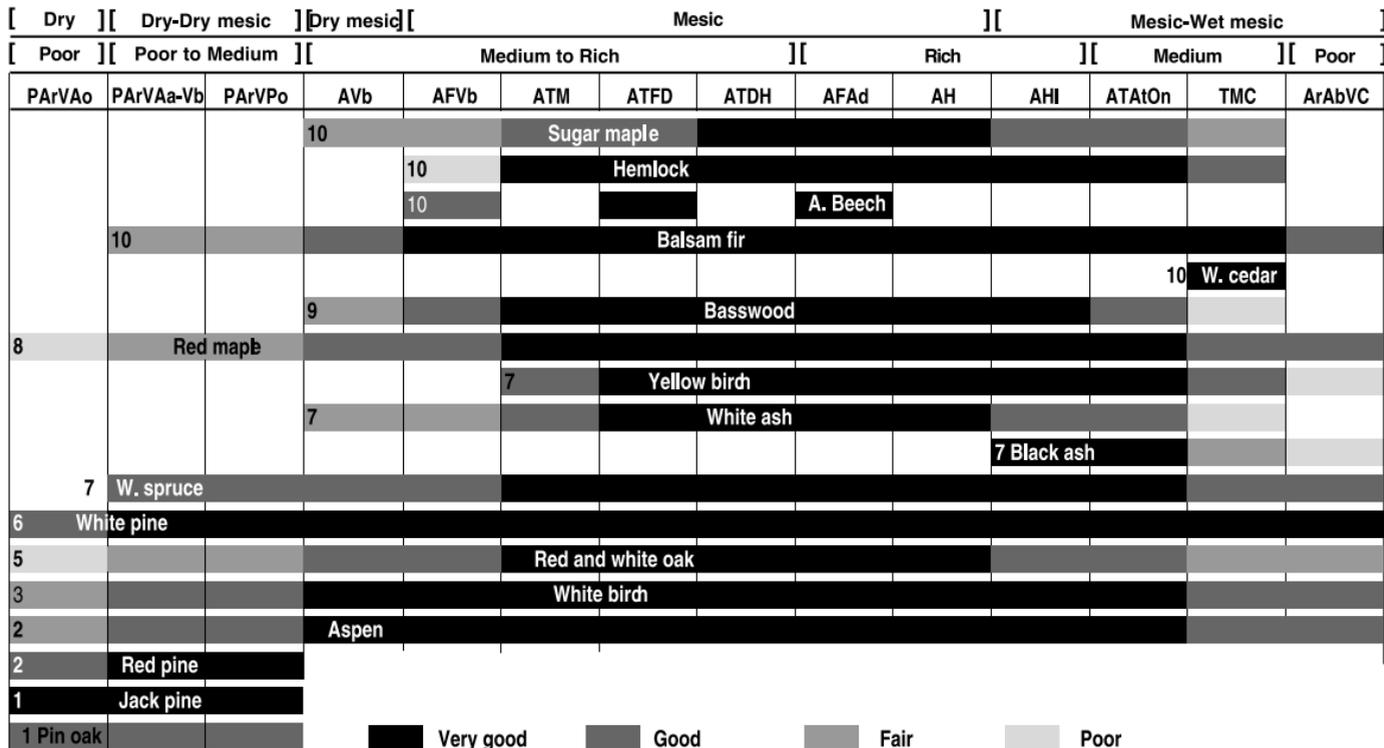


2-111

Relative Growth Potential for Major Tree Species Across Habitat Types of Region 4

(Only those habitat types where the species occurs naturally are considered)

Numbers in front of bars are relative shade tolerance values: 1, least tolerant; 10, most tolerant



2-112

Occurrence of Tree Species on Habitat Types of Region 4

Numbers in parentheses are number of study plots. Size classes: SA - saplings, MT - medium trees (4-10" dbh), LT - large trees (>10" dbh).

Numbers are frequency of occurrence classes: 1, 10-25%; 2, 26-50%; 3, 51-75%; 4, 76-100%

Letters are abundance classes representing average stems per acre when present:

For saplings: A, <100; B, 100-200; C, 201-400; D, >400. For trees: A, <10; B, 10-20; C, 21-40; D, >40

	PArVAo (22)			PArVPo (4)			PArVAa-Vb (27)			AVb (44)			AFVb (20)			ATM (139)			ATFD (10)					
	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT			
Jack Pine	1B	2B	1A	1A	1A																			
Red Pine	1C	2C	2B		1D	1A			1D															
White Pine	2A	1C	1A	3C	2D			1A 1B 1B	1B 1C 1A	1A	1B													
N. Pin Oak	2B	2D	3C	2A	3C	3C	1A 1D 1A																	
N. Red Oak	1B						2A 1B 1A			2A 2C 3B				1A 2C 3B	1A 1C 2B						2A			
White Oak				1A								1A			1A									
Bur Oak																								
Bigtooth Aspen	2C			2A 1C			3C 2C 1C			2D 2C 2B				1C 1B 2B	1C		1B				2C 2C			
Trembling Aspen	3D	2D	1A	1C 1B 2A			3C 2D 2B			2D 2C 1A				1D 1C 3B	2D 2D 2B							1D 2C		
White Birch	1A						1A 1D 1A			2A 2C 1B				2A 1C 1A	1A 2C 2A							2C 2B		
Yellow Birch															1A 1B 2A							2A 2C 2A		
Red Maple	2B	2B	1A	3C 2D 2A			4B 2D 2B			3B 3D 3B				2B 3C 3B	3B 3D 3B							2A 3C 2B		
Sugar Maple										2A 1C				4B 3D 3B	4B 4D 3C							4B 4C 3B		
Beech													1A									2C 2B 2C		
Basswood										1A	1B		1C 2C 3B	1A 2C 2B							2A 3C 3B			
White Ash										1B 1C			1A 2C 1B	1A 1C 1A							1A			
Green Ash																								
Black Ash															1A 1C									
American Elm															1A									
Bitternut Hickory													1A 1B											
Butternut														1A										
Black Cherry	2A			1A			2A			1A			1A		2A 1B									
Ironwood (Hophornbeam)										1A			3A		2B							1A 1D		
Musclewood (Hornbeam)										1B			1A		1B									
E. Hemlock														1A			1B				2A 1B 2B			
Balsam Fir							2B 2C 1A			2B			2B 1B		2C 2C							2A 1B		
White Spruce							1A 1C										1A							
N. White Cedar																								

continues
other side →

Occurrence of Tree Species on Habitat Types of Region 4 (continued)

	ATDH (11)			AFAd (8)			AH (68)			AHI (24)			ATAtOn (58)			TMC (116)			ArAbVC (45)				
	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT		
Jack Pine																							
Red Pine			1A																		1D	1C	
White Pine										1B	1B					1B					1B	1B	
N. Pin Oak																							
N. Red Oak						1C			2B			2A	1A	1B	2A			1A					
White Oak																							
Bur Oak										1A	1A												
Bigtooth Aspen	1B	1B																1B			1C	1B	
Trembling Aspen	2D	2D	2A				1C	1C	1A	2B	1D	2B	2C	2C	2B	2D	2D	2B			3D	2D	3B
White Birch	1A	1D	2A													2A	1D	1B			2A	2D	1B
Yellow Birch	1A	1B	2A				1A	1C	2A	1B	1C		2A	2C	2B	1A	1C	1A					
Red Maple							1B	2C	1B	2A	2D	2B	3B	4D	3/B	3B	3D	2B			3B	3D	1B
Sugar Maple	3B	3C	3B	4B	2D	3B	4B	4D	4C	3B	2D	3C	2A	2C	2B	2B	2D	1B					
Beech				3B	1D	2A																	
Basswood		2C	4B	1C	1C	2A	2A	2C	3C	2B	1D	1C	2A	2B	2B								
White Ash	2A	1C	2B	1C	1C	1A	1A	1C	2A	1C		1A			1A								
Green Ash													2B	1D	1A								
Black Ash							1A	1B		2B	1B	1A	2B	2D	2A	1B	1D						
American Elm	2A			2B	1B		2A	1B		3A	2B	1A	2A	1B									
Bitternut Hickory				1A	1B	2A			1B														
Butternut						1A																	
Black Cherry	2A	1B		1A						1A			1A			2A					2B		
Ironwood (Hophornbm.)	2A	1B		4A	1D		3A	1C		2B	1D		2A										
Musclewood (Hornbm.)							1A			2B			2B										
E. Hemlock	1A	1C	2B	1B		1C			1A				1A	2C	2B	1B	1D	2B					
Balsam Fir	3B	1D											2B	1C		4C	2D	1B			3C	2D	1B
White Spruce																1A	1C	1B			1A	1D	2A
N. White Cedar																1A	1D	1B					

Current Relative Importance of Common Forest Cover Types on Habitat Types of Region 4

*** - Dominant: >50%; ** - Common: 10-50%; * - Minor: <10% of all cover types observed on that habitat type.

Cover Type	PARVAo	PARVPo	PARVAa-Vb	AVb	AFVb	ATM	ATFD	ATDH	AFAd	AH	AHI	ATAtoN	TMC	ArAbVC
Jack Pine	*													
Jack Pine - Pin Oak	**	*												
Pin Oak	**	**	*											
Red Pine	**	**	**	*										
White Pine - Red Pine	*	*	*	*										**
White Pine - Red Maple	*	*	*	*									*	*
White Pine - Oak*	*	*	*	*	*									
Aspen - Oak*	**	*	*	**	*	*								
Aspen - Pine*	**	**	**	*	*	*							*	**
Aspen - Red Maple	*	*	**	*	*	*						**	**	**
Oak - Red Maple*	*	**	**	**	**	*						*		
Red Maple	*	*	*	*	*	*						**	*	*
White Pine	*	**	*	*	*	*	*				*		*	*
Aspen	*	**	**	**	**	**	*	*	*	*	**	**	**	**
Aspen - White Birch			*	*	*	*	*	*					**	**
White Birch			*	*		*							*	*
Aspen - Balsam Fir			*			*					*	**	**	**
Balsam Fir - Red Maple			*			*					*	**	**	**
Balsam Fir - White Spruce			*			*							**	**
Red Oak			*	**	**	*			*					
Basswood - Red Oak				*	*	*			*					
Sugar Maple - Red Oak				*	**	*	*	*	**	*	*	*		
Sugar Maple - Red Maple				*	**	**	*	*	*	*	**	**	*	
Sugar Maple				*	**	**	**	**	**	***	**	*		
Sugar Maple - Basswood					*	**	*	**	**	**	**	*		
Sugar Maple - Basswood - Ash - Yellow Birch*					*	*	*	**	*	**	*	*		
Sugar Maple - Hemlock - Yellow Birch - Red Maple					*	*	**	**		*	*	**	**	
Hemlock						*	*	*		*	*	*	*	
Sugar Maple - Beech - Hemlock - Yellow Birch					*		**		*					
Sugar Maple - Beech - Basswood - White Ash					*		**		**					
Sugar Maple - Beech - Red Oak					*		*		**					

Occurrence of Understory Species Across the Habitat Types of Region 4

Numbers represent frequency of occurrence classes: • 10-25%; 1, 26-50%; 2, 51-75%; 3, 76-100%.

Letters are coverage classes: A<1%; B 1-5%; C 6-15%; D>15%. Numbers of study plots in parentheses.

Scientific names	Common names	PARVAo (50)	PARVPo (12)	PARVAa-Vb (56)	AVb (62)	AFVb (26)	ATM (230)	ATFD (15)	ATDH (22)	AFAd (12)	AH (97)	AHI (47)	ATAtoN (85)	TMC (202)	ArAbVC (95)
Shrubs															
Rosa spp.	Roses	1B	1B												
Comptonia peregrina	Sweetfern	2B	*	1B	*										
Gaylussacia baccata	Huckleberry		1B												
Vaccinium spp.	Blueberries	3D	2C	2C	1B									1A	3D
Amelanchier spp.	Juneberry	2B	2B	3B	2B	1B	1B	*	1A		*	1B	*	1B	2B
Diervilla lonicera	Bush honeysuckle	1B	2B	3B	2B	1A	2B	*	1B		*	*	*	2B	2C
Corylus spp.	Hazels	2C	2B	3C	3C	3B	3C	1B	2C	1A	1C	1C	2C	3C	3C
Rubus spp.	Blackberry/raspberry	3C	3B	3C	3C	1C	1C	1B	2C	1B	1C	2B	2C	1C	2C
Rhus radicans	Poison ivy	*	1A		*								*		
Crataegus spp.	Hawthorns	*										1C			
Prunus virginiana	Chokecherry	*	1A	*	*		1B	*	1B		*	1B	1B	*	1B
Viburnum acerifolium	Maple-leaved viburnum	*	1B	2B	3C	3B	*	*	*	1B					
Hamamelis virginiana	Witch hazel		*	*	3C	2B		*	*						
Lonicera canadensis	American fly honeysuckle		*	*	*	1B	2B	1A	2B	*	*	*	*	2B	1B
Cornus alternifolia	Alternated-leaved dogwood				*	*	2B	*	1B		1B	*	1B	1B	
Ribes spp.	Gooseberries				*	1A	1B	3B	3B	2B	3B	3B	2B	1B	*
Dirca palustris	Leatherwood				*	1B	*		2B	2B	1B	*			
Sambucus pubens	Red-berried elder				*			1A	1B	1B	1B		*		
Acer spicatum	Mountain maple						*		1B				*	*	*
Rubus pubescens	Dwarf raspberry											*	1C	1C	*
Ferns, Allies, Lichens, Mosses															
Pteridium aquilinum	Bracken fern	3D	3C	3D	3D	2C	2C	1B	1C			*	*	2C	3D
Lycopodium obscurum	Ground-pine clubmoss	*		2B	1B	1B	2B	1B	1B				*	2B	2B
Lycopodium spp.	Clubmosses	*	*	*	*	*	*	1B	*					1B	2B
Osmunda claytoniana	Interrupted fern			*	*	1B	1B	*			*	*	1B	1B	1B
Athyrium filix-femina	Lady fern				*	1B	2B	1B	1B	1B	2B	2C	3C	1B	*
Dryopteris spinulosa	Spinulose shield fern		*	*	*	2B	2B	3B	3C	1B	2B	2B	2B	2B	2B
Dryopteris disjuncta	Oak fern				*	1B	1A	*			*		1B	1B	
Dryopteris phegopteris	Long beech fern				*	*	*						1B	1B	
Botrychium virginianum	Rattlesnake fern				*				*	1B	1A		*		
Adiantum pedatum	Maidenhair fern				1B			1B	2B	2B	2B	1B			
Onoclea sensibilis	Sensitive fern											1B	2B	*	
Equisetum spp.	Horsetails				*							1B	2B	1B	*
Forbs and Subshrubs															
Helianthus spp.	Sunflowers	1B													
Convolvulus spithameus	Hedge bindweed	1A		*											
Chimaphilla umbellata	Pipsissewa		1B												
Lysimachia quadrifolia	Whorled loosestrife	1B	2A	*	1B										
Gaultheria procumbens	Wintergreen	2B	1B	3B	1B	*							*	1B	
Waldsteinia fragarioides	Barren strawberry	1C	1A	*	*								*	*	
Fragaria spp.	Strawberries	2A		2B	*	*	*		*		*	1B	1B	*	1B
Apocynum androsaemifolium	Spreading dogbane	2A	2A	2B	1B	*	1B	*	1A	*	*			*	*
Smilacina racemosa	False solomon's seal	1A	*	1B	2B	2B	1B	1B	*	2A	1B	1B		*	
Trientalis borealis	Starflower	2A	2B	3B	2B	2B	3B	2B	2B		*	1B	2B	3B	3B
Maianthemum canadense	Wild lily-of-the-valley	3B	3B	3B	2B	2B	3B	2B	3C	1A	1B	2B	2B	3B	3C
Anemone quinquefolia	Wood anemone	1A	1A	1A	2B	1A	2B	2A	1A	*	1A	1A	1A	1B	1B
Aster macrophyllus	Large-leaved aster	*	*	3C	3D	2B	2D	1C	3D	1B	2C	2B	2B	3C	2D
Aralia nudicaulis	Wild sarsaparilla	*	1B	2B	3B	2B	3C	2B	2C		1B	1C	2B	3B	3C
Uvularia sessifolia	Sessile-leaved bellwort		1A		1A	1B	2B	1A	1B	*	1B	2B	1B	1B	*
Polygonatum pubescens	Hairy solomon's seal		*	*	1B	1B	1B	3B	1A	1B	1B	*	*	*	
Clintonia borealis	Yellow beadlily		*	1A	1A	1B	2B	1B	2B		*		1B	3B	3B
Smilax tamnoides	Bristly greenbrier				*	*							*		
Desmodium glutinosum	Pointed-leaved tick trefoil				1B	1B									
Amphicarpa bracteata	Hog peanut			*	2B	3C	*	*	1C	1B	1B	2B	1C		
Thalictrum dioicum	Early meadow rue		*		1B	1B	*	*	*	*	2B	2B	1B	*	
Geranium maculatum	Wild geranium				*		*		*	*	*	2C	*		
Mitchella repens	Partridgeberry		1B	1A	1B	1B	1B	2B	1A				*	1B	1B
Polygala paucifolia	Fringed polygala	*	1A	2B	1B	1B	*						*	*	*
Trillium spp.	Trilliums	*	*	1A	3B	3A	2B	2B	3B	2B	3B	3B	1A	1B	*
Prenanthes alba	White lettuce		*	*	1A	1A	*			*		1A	*		
Hepatica americana	Round-lobed hepatica			*	1B	1B	1B	*	1B		*		1A	1B	*
Streptopus roseus	Rosey twisted stalk				*	1B	1B	2A	2B			1B	1B	1B	1B

**Door Peninsula
Transitions to Adjoining Regions:**

1. For Kewaunee and Brown Counties also consult the Guide to Forest Communities and Habitat Types of Central and Southern Wisconsin (Kotar and Burger 1996).

REGION 4 - Key A to Habitat Types of Door Peninsula (Scientific Names)

Soils predominantly sands with water table within 5 feet.

Two or more present:

Lonicera canadensis

Prenanthes alba

Fragaria spp.

Mitchella repens

Polygala paucifolia

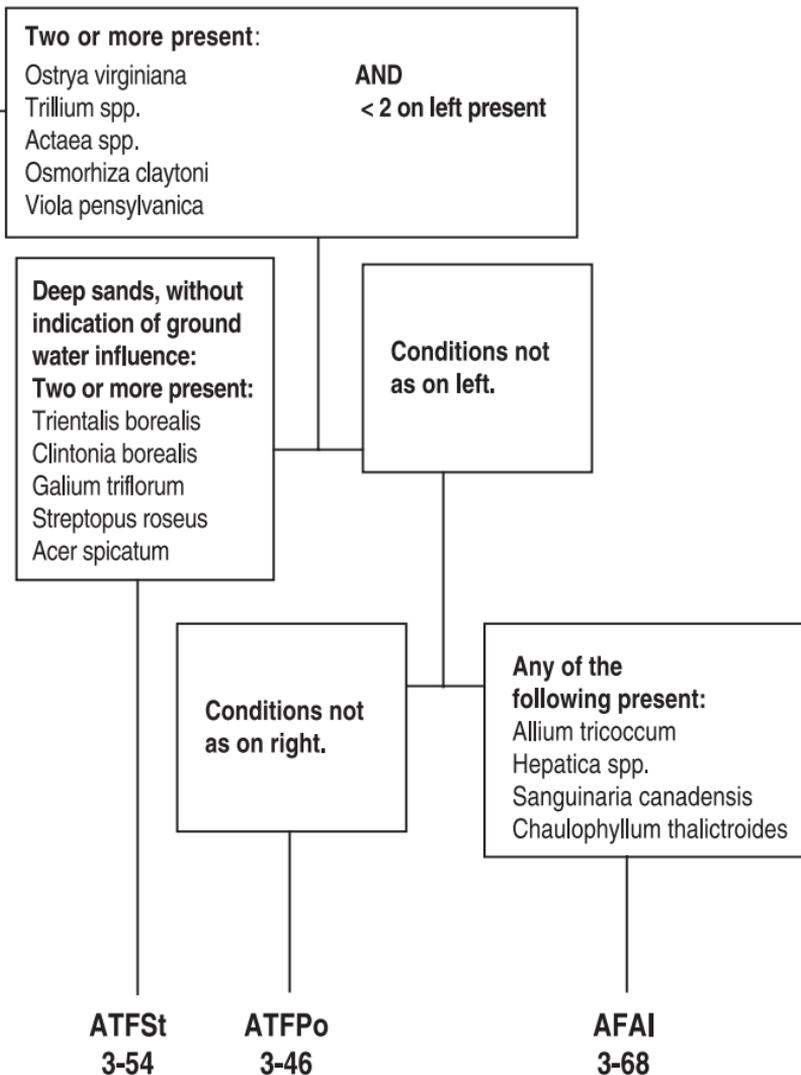
Lycopodium obscurum

Gaultheria procumbens

AND

< 2 on right present

TFAa
3-34



REGION 4 - Key A to Habitat Types of Door Peninsula (Common Names)

Soils predominantly sands with water table within 5 feet.
Two or more present:

Fly honeysuckle	Ground pine
White lettuce	Wintergreen
Wild strawberry	AND
Partridgeberry	< 2 on right present
Fringed polygala	

TFAa
3-34

Two or more present:
Ironwood
Trillium
Baneberry
Sweet cicely
Smooth yellow violet

AND
< 2 on left present

Deep sands, without indication of ground water influence:
Two or more present:
Starflower
Yellow beadlily
Sweet-scented bedstraw
Rosey twisted stalk
Mountain maple

Conditions not as on left.

Conditions not as on right.

Any of the following present:
Wild leek
Hepatica
Bloodroot
Blue cohosh

ATFSt
3-54

ATFPo
3-46

AFAI
3-68

Comparison of Major Floristic Differences Between Various Habitat Types of Door Peninsula

The following tables may be used to identify habitat types when identification through keys is inconclusive. The tables list only those species whose constancy percentages differ significantly between the types being compared. If the average coverage values also are significantly different, they are shown as a second value, separated from the constancy value by a back slash.

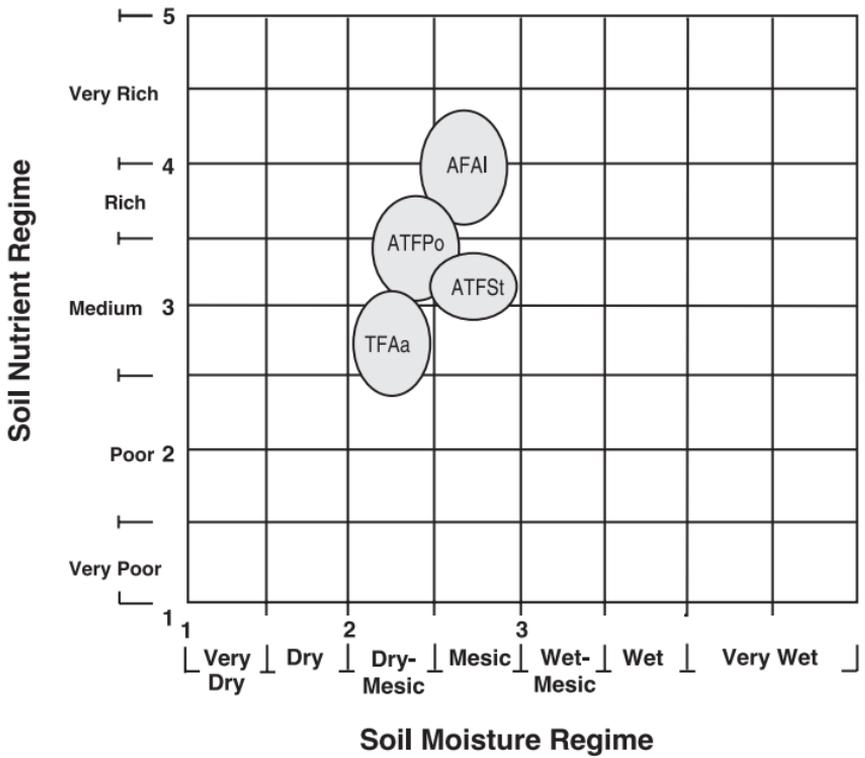
The species found in a stand should better match the list of species either above (h.t. in left column) or below (h.t. in right column) the horizontal line.
(Constancy / Average coverage; * = <10% constancy)

		TFAa	ATFSt
<i>Corylus cornuta</i>	Beaked hazelnut	100/13	62/1
<i>Acer rubrum</i>	Red maple	100	25
<i>Polygala paucifolia</i>	Fringed polygala	55	*
<i>Polygonatum pubescens</i>	Hairy solomon's seal	55	100
<i>Galium triflorum</i>	Sweet-scented bedstraw	55	100
<i>Osmorhiza claytoni</i>	Sweet cicely	33/1	87/5
<i>Actaea spp.</i>	Baneberries	22	87
<i>Streptopus roseus</i>	Rosey twisted stalk	*	75
<i>Dryopteris spinulosa</i>	Spinulose shield fern	22	75
<i>Ostrya virginiana</i>	Ironwood	22	75
<i>Ribes cynosbati</i>	Prickly gooseberry	11	75
<i>Trillium cernuum</i>	Nodding trillium	*	62
<i>Sambucus pubens</i>	Red-berried elder	*	50
<i>Acer spicatum</i>	Mountain maple	22/1	50/11
<i>Botrychium virginianum</i>	Rattlesnake fern	11	50

		ATFPo	AFAI
<i>Aralia nudicaulis</i>	Wild sarsaparilla	72/11	20/1
<i>Ribes cynosbati</i>	Prickly gooseberry	22	93
<i>Viola pensylvanica</i>	Smooth yellow violet	38	80
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica	16	66
<i>Sambucus pubens</i>	Red-berried elder	16	60
<i>Allium tricoccum</i>	Wild leek	*	60
<i>Caulophyllum thal.</i>	Blue cohosh	*	46
<i>Ranunculus abortivus</i>	Small-flowered crowfoot	11	46
<i>Sanguinaria canadensis</i>	Bloodroot	*	33

		ATFSt	ATFPo
<i>Galium triflorum</i>	Sweet-scented bedstraw	100	*
<i>Trientalis borealis</i>	Starflower	87	16
<i>Dryopteris spinulosa</i>	Spinulose shield fern	75	38
<i>Ribes cynosbati</i>	Prickly gooseberry	75	22
<i>Streptopus roseus</i>	Rosey twisted stalk	75	11
<i>Clintonia borealis</i>	Yellow beadlilly	75	5
<i>Corylus cornuta</i>	Beaked hazelnut	62	16
<i>Acer spicatum</i>	Mountain maple	50	*

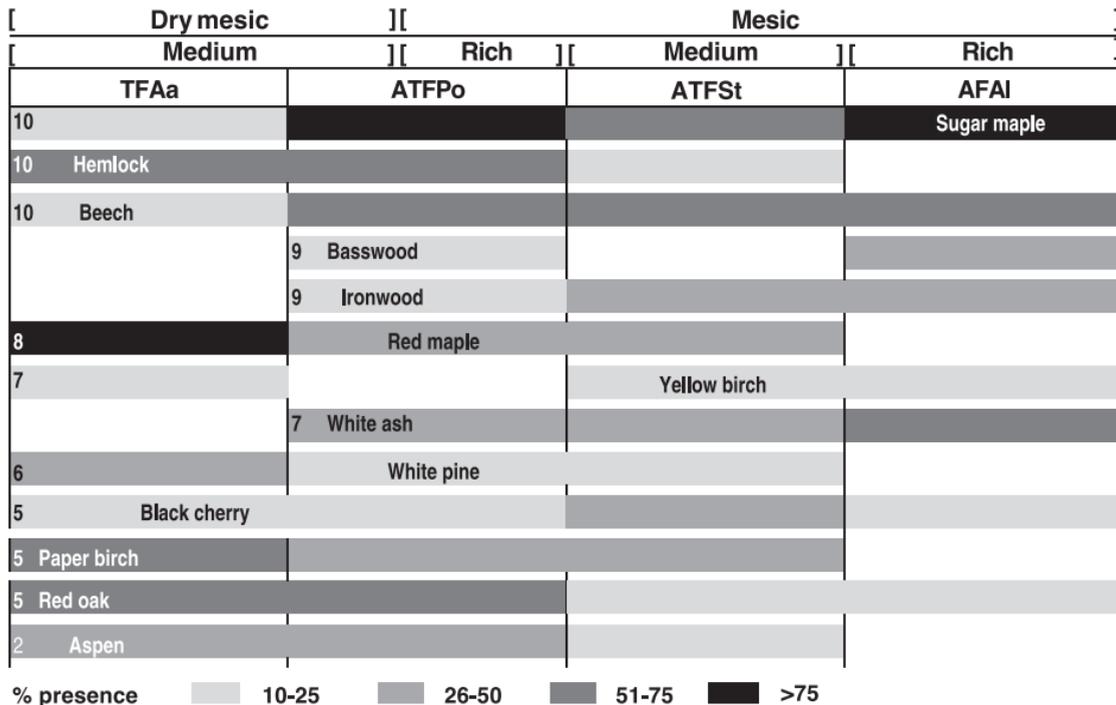
Relationship of Habitat Types to Soil Moisture and Nutrient Regimes in Door Peninsula



Occurrence of Tree Species Across Habitat Types of Door Peninsula

(Data from 1996 FIA)

Numbers in front of bars are relative shade tolerance values: 1, least tolerant; 10, most tolerant



Occurrence of Tree Species on Habitat Types of the Door Peninsula

Size classes: SE - seedlings; SA - saplings; MT - medium trees (4-10" DBH); LT - large trees (>10" DBH).

Numbers are percent of reference stands for a given habitat type: * <10%; 1, 10-25%; 2, 26-50%; 3, 51-75%; 4, 76-100%.

Letters are coverage classes: A <5%; B 5-15%; C 16-35%; D >35%.

2-127

	TFAa				ATFPo				ATFSt				AFAI			
	SE	SA	MT	LT	SE	SA	MT	LT	SE	SA	MT	LT	SE	SA	MT	LT
Balsam fir	1 A	1 B	1 A						2 A				*	1 A		
White spruce	1 A	1 A							1 A				*			
Trembling aspen	1 A	1 A	1 A													
Northern white cedar	1 A	1 A	1 B		*	1 A	1 C	1 C				1 B				
Bigtooth aspen	2 A	2 A	2 B	2 B	2 A	1 B	1 B	2 C	1 A		1 B	1 B				
Red pine		1 A				*	1 A	1 C								
Paper birch	1 A	2 A	3 C	1 B	*	1 B	2 C	2 B			2 B	2 D		*	*	
Northern red oak	3 A	3 B	2 C	3 C	1 A	2 A	2 B	3 C	2 A	1 A		1 D	*			1 C
White pine	2 A	1 A	2 B	2 B		*	*	1 C				1 B				*
White oak	1 A	1 A														
Black cherry	2 A	2 A	1 A		1 A		1 B		2 A	2 B	1 B	2 A	3 A	1 A	*	1 A
Elms		1 A					*		1 A		1 A		1 A	1 A	*	
White ash	2 A	2 A			3 A	2 A	2 B	2 B	2 A	2 B	1 B	2 B	3 A	3 A	1 A	3 B
Yellow birch			1 B				*	*	1 A		1 A			*	*	1 B
Bitternut hickory								*					*	1 A	*	
Red maple	2 A	4 C	4 D	3 C		1 B	2 B		1 A	2 B	1 B	2 C		*		
American hornbeam	1 A				*					1 A						
Ironwood	1 A	1 A			2 A	2 B	1 B		3 A	3 B	2 B		3 A	3 C	2 B	*
Basswood	1 A				1 A	*	1 B	1 B					3 A	3 A	2 B	2 B
Eastern hemlock		2 B	3 B	1 B	1 A	3 A	3 B	2 C	1 A	1 B	1 D	1 B	1 A	1 A	*	
American beech	2 A	3 B	1 B	1 A	2 A	3 A	2 B	1 C	4 A	3 C	3 C	2 C	3 A	3 C	2 C	3 C
Sugar maple		1 A	1 B		2 A	4 C	4 C	3 B	3 A	4 C	3 D	3 C	4 B	4 C	4 C	4 D

Occurrence of Understory Species Across the Habitat Types of Door Peninsula

Numbers represent frequency of occurrence classes: * 10-25%; 1, 26-50%; 2, 51-75%; 3, 76-100%.

Letters are coverage classes: A <5%; B 6-15%; C >15%. Number of study plots in parentheses.

Shrubs		TFAa (9)	ATFPo (17)	ATFSt (8)	AFAl(13)
Rubus spp	Blackberries/raspberries	2A			
Hamamelis virginiana	Witch hazel	1B	*		
Diervilla lonicera	Bush honeysuckle	2A	*		
Cornus alternifolia	Alternate-leaved dogwood	1A			*
Acer spicatum	Mountain maple	*		1B	
Lonicera canadensis	American fly honeysuckle	3A	1A	1A	*
Rubus spp.	Blackberries/raspberries	*		2A	1A
Prunus virginiana	Chokecherry	3A	1A	2A	3B
Amelanchier spp.	Juneberry	3A	1A	1A	1A
Corylus cornuta	Beaked hazelnut	3B	*	2A	*
Ribes cynosbati	Prickly gooseberry	*	*	2A	3A
Viburnum acerifolium	Maple-leaved viburnum	1B	1A	*	1A
Sambucus pubens	Red-berried elder		*	1A	2A
Ferns and Fern allies					
Pteridium aquilinum	Bracken fern	3B	1B	*	
Dryopteris spinulosa	Spinulose shield fern	*	1A	2A	1A
Botrychium virginianum	Rattlesnake fern	*	2A	1A	2A
Forbs and Subshrubs					
Antennaria neglecta	Field pussytoes	1A			
Cornus canadensis	Bunchberry	1A			
Gaultheria procumbens	Wintergreen	1A			
Medeola virginiana	Indian cucumber root	1A			
Polygala paucifolia	Fringed polygala	2A	*		
Clintonia borealis	Yellow beadlily	2A		2A	
Mitchella repens	Partridgeberry	2A		1A	
Phryma leptostachya	Lopseed	*		*	1A
Arisaema atrorubens	Jack-in-the-pulpit	*		*	1A
Galium triflorum	Sweet-scented bedstraw	2A		3A	*
Fragaria vesca	Wood strawberry	2A		*	*
Apocynum androsaemifolium	Spreading dogbane	1A	*	*	
Actaea spp.	Baneberries	*	3A	3A	3A
Smilacina racemosa	False solomon's seal	*	3A	*	3A
Osmorhiza claytoni	Sweet cicely	1A	2A	3B	3A
Solidago flexicaulis	Zigzag goldenrod	1A	*	1A	*
Polygonatum pubescens	Hairy solomon's seal	2A	3A	3A	3A
Prenanthes alba	White lettuce	2A	*	1A	*
Maianthemum canadense	Wild lily-of-the-valley	3A	3A	3A	2A
Trientalis borealis	Starflower	3A	*	3A	*
Grasses spp.	Grasses	3B	3A	3B	3A
Aster macrophyllus	Large-leaved aster	3B	2C	3B	2A
Aralia nudicaulis	Wild sarsaparilla	3C	2B	2C	*
Thalictrum dioicum	Early meadow rue			1A	
Caulophyllum thalictroides	Blue cohosh			1A	1A
Galium asprellum	Cleavers			*	1A
Streptopus roseus	Rosey twisted stalk		*	3A	
Trillium spp.	Trillium		1A	2A	3A
Viola pensylvanica	Smooth yellow violet		1A	*	3A
Anemone quinquefolia	Wood anemone		*	*	1A
Hepatica acutiloba	Sharp-lobed hepatica		*	*	2A
Ranunculus abortivus	Small-flowered crowfoot		*	*	1A
Uvularia grandiflora	Large-flowered bellwort		1A		2A
Allium tricoccum	Wild leek				2A
Sanguinaria canadensis	Bloodroot				1A

Region 5 - Habitat Type Distribution

Habitat Type	Occurrence in the Region	Primary Landforms and Soils	Page No.
PARVHa	Very common in southern and western Clark County. Uncommon elsewhere.	Somewhat excessively to moderately well drained sandy soils on erosional surfaces, stream terraces, and outwash. Also, shallow sandy loams over sandstone.	3-20
AVb-V	Scattered throughout Clark County. Uncommon elsewhere.	Well to moderately well drained sandy loams and loamy sands on erosional surfaces and moraines.	3-38
AVb	Scattered throughout Marathon County. Uncommon elsewhere.	Well drained sandy loams on rolling moraines and erosional surfaces.	3-42
ATM	Scattered throughout Marathon and NE Clark Counties. Towards central Clark County, the range limits of hemlock are exceeded, and oaks and elms become more common on similar site types.	Well to moderately well drained loams (sl, l, sil) on moraines and erosional surfaces.	3-52
AHVb	Scattered across the rolling bedrock-controlled ridges of Marathon County.	Well drained silt loams and loams on erosional surfaces and moraines.	3-64
AH	Common in Marathon and Clark (except SW) Counties	Well to moderately well drained silt loams and loams on moraines and erosional surfaces.	3-74
AHl	Common in Marathon and Clark (except SW) Counties.	Somewhat poorly drained silt loams and loams on moraines and erosional surfaces.	3-78
ATAtOn	Very common in Marathon County, and minor in NE Clark County. Towards central Clark County, the range limits of hemlock are exceeded, and oaks and elms become more common on similar site types.	Somewhat poorly drained loams and silt loams on bedrock-controlled erosional surfaces and moraines.	3-84
TMC	Scattered throughout Marathon County, and uncommon in NE Clark County. Towards central Clark County, the range limits of hemlock are exceeded, and oaks and elms become more common on similar site types.	Somewhat poorly drained sandy loams (occasionally loamy sands and loams) on most landforms.	3-90
PARVRh	Very common in southern and western Clark County. Uncommon elsewhere.	Somewhat poorly drained sandy soils on erosional surfaces, stream terraces, and outwash. Also, damp shallow sandy loams over sandstone.	3-102

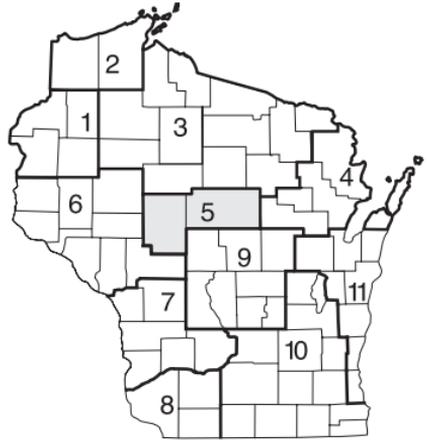
Region 5

Extent, topography, geology and soils

This region is comprised of only two counties, Marathon and Clark. It is the only northern region almost entirely outside the limits of the Wisconsin stage of glaciation. However, the region is blanketed by glacial deposits of older glaciation.

Most of Clark and a substantial portion of western and northern Marathon County are characterized by nearly level to rolling till plains. Soils are predominantly slowly permeable silt loams developed in wind blown silt, often more than 30 inches deep. A large portion of central Marathon county is characterized by well drained to somewhat poorly drained loams and silt loams over bedrock, residuum, till, and slopewash. The landscape is undulating to hilly, and characterized by its bedrock controlled rolling ridges.

In stark contrast to the rest of the Region, a portion of southern and southwestern Clark County is a sandstone plateau interlaced with stream terraces. It is characterized by well to poorly drained sandy and loamy soils over shaly sandstone. Topography is undulating to rolling with numerous rock outcrops. Another zone of sandy soils



(glacial outwash, floodplains, and terraces) occurs in central Marathon County, along the valleys of Wisconsin River and its major tributaries. In addition, the extreme eastern portion of Marathon County extends into an undulating to rolling zone of pitted outwash and end/recessional moraines of the Green Bay lobe of the Wisconsin glaciation. Well drained loamy and sandy soils are typical.

Due to the variety of landforms and soils found in the Region, most regional habitat type groups are common. The mesic to wet-mesic group is most extensive, but also common are mesic, dry-mesic, and dry. Forested lowlands also are common.

The maps of the Natural Divisions of Wisconsin (Hole and Germaine 1994) and Sections

and Subsections of Wisconsin (WI DNR 2001) provide good characterizations of the region.

Forest vegetation

This region represents the southern fringe of what, in the broadest sense, is referred to as the “northern mixed hardwood-conifer forest”. Hemlock, spruce and fir become less well represented toward the southern and especially western parts of the Region, and some of the typically southern species, such as white oak, bur oak, black oak, and bitternut hickory can often be found. The understory flora likewise shows an influx of southern species and a diminishing presence of the boreal species.

The Region supports a great diversity of forest types. Fifteen relatively common tree species make up a wide range of upland forest types. In broadest terms we can group forest types into those of dry to dry-mesic, mesic, and wet-mesic habitat types. (wet, lowland sites have not been classified into habitat types). The

dry to dry-mesic habitat types are characterized by mixtures of pines, oaks, aspen, white birch, and red maple. The stands of the mesic sites typically are dominated by sugar maple and basswood, and sometimes by aspen. Important associates include white ash, red oak, bitternut hickory, ironwood, red maple, yellow birch and hemlock. The wet-mesic habitat types are characterized by mixtures of red maple, white pine, oaks, aspen, and white birch, although on richer sites ashes, elms, basswood, and sugar maple are well represented. On mesic and wet-mesic sites, hemlock and yellow birch were much better represented in the presettlement forests than they are today. At the time of settlement, the predominant upland forest types in the region were comprised of mesic hardwoods, oaks, hemlock and white pine. Currently, the predominant upland forest types are comprised of mesic hardwoods, oaks, and aspen.

Region 5 Key to Habitat Types

1 Soil somewhat poorly drained. Two or more present:

Cornus canadensis / bunchberry (c), *Rubus pubescens* / dwarf raspberry (c), *Rubus hispidus* / swamp dewberry (c), *Coptis groenlandica* / goldthread, *Linnaea borealis* / twinflower, *Oxalis montana* / wood sorrel, *Equisetum spp.* / horsetails, *Onoclea sensibilis* / sensitive fern, *Osmunda cinnamomea* / cinnamon fern, *Symplocarpus foetidus* / skunk cabbage, *Impatiens capensis* / jewelweed, *Circaea spp.* / enchanter's nightshades (c)

go to Key B

**1 Soil moderately well drained to excessively drained.
Species listed in 1 above rarely present**

go to Key A

Terms used in keys:

common (c): >1% coverage

well represented (w): >5% coverage

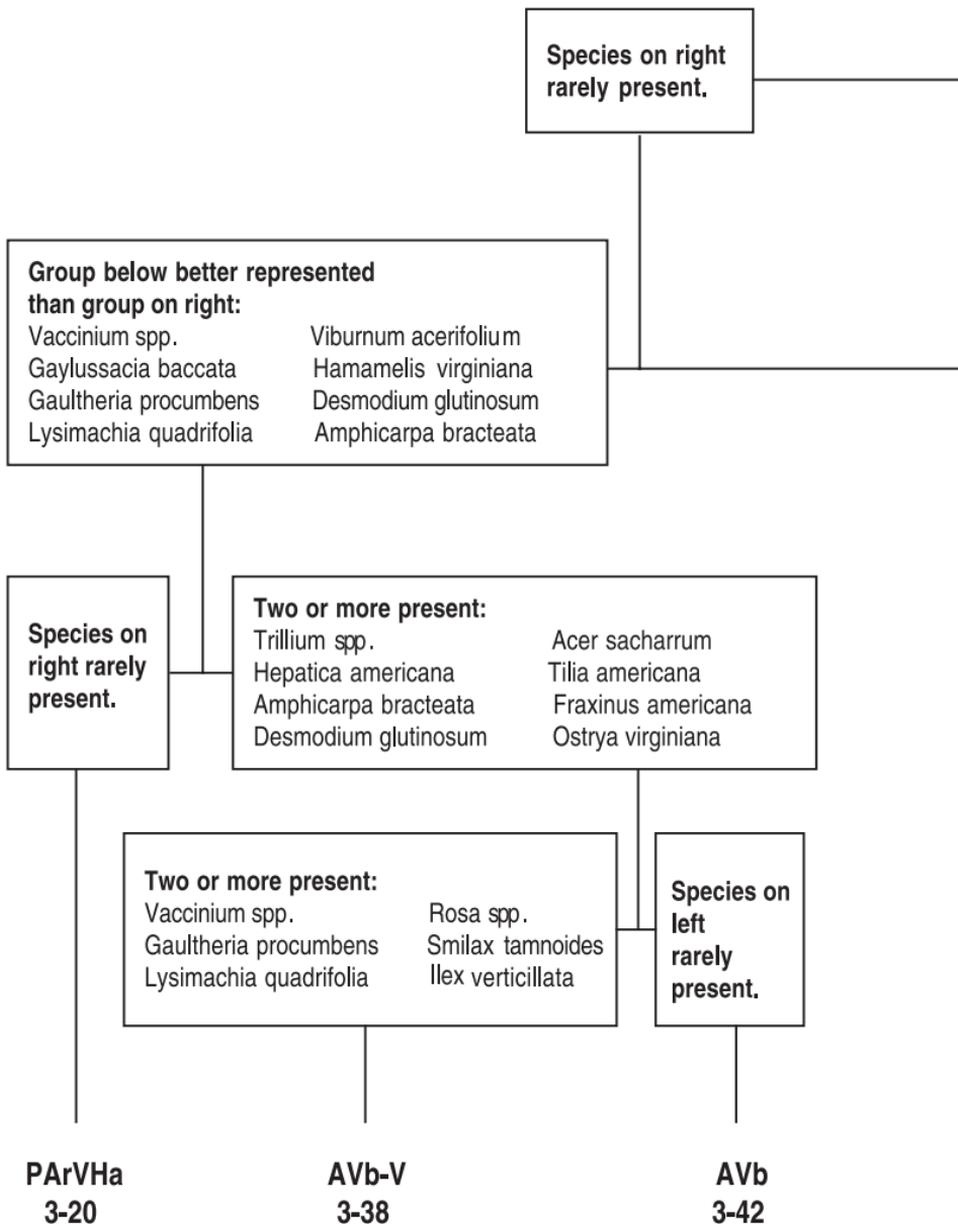
better represented: more species are present (does not refer to coverage)

Region 5

Transitions to Adjoining Regions:

1. In northern Marathon and Clark Counties, on the till plain, ArAbCo from Region 3 can occur.
2. If a site is drier and poorer than PARVHa, then the habitat type could correspond to PVGy from Region 6.

Region 5 - Key A to Habitat Types (Scientific Names)



Two or more present:

Caulophyllum thalictroides
Sanguinaria canadensis
Hydrophyllum virginianum
Hepatica acutiloba
Allium tricoccum

Laportea canadensis
Botrychium virginianum
Adiantum pedatum
Sambucus pubens

Group below better represented than group on left:

Dryopteris spinulosa (c)
Clintonia borealis (c)
Athyrium filix-femina (c)
Streptopus roseus
Arisaema atrorubens
Betula alleghaniensis
Actaea spp.
Tsuga canadensis

Two or more present:

Viburnum acerifolium
Hamamelis virginiana
Desmodium glutinosum

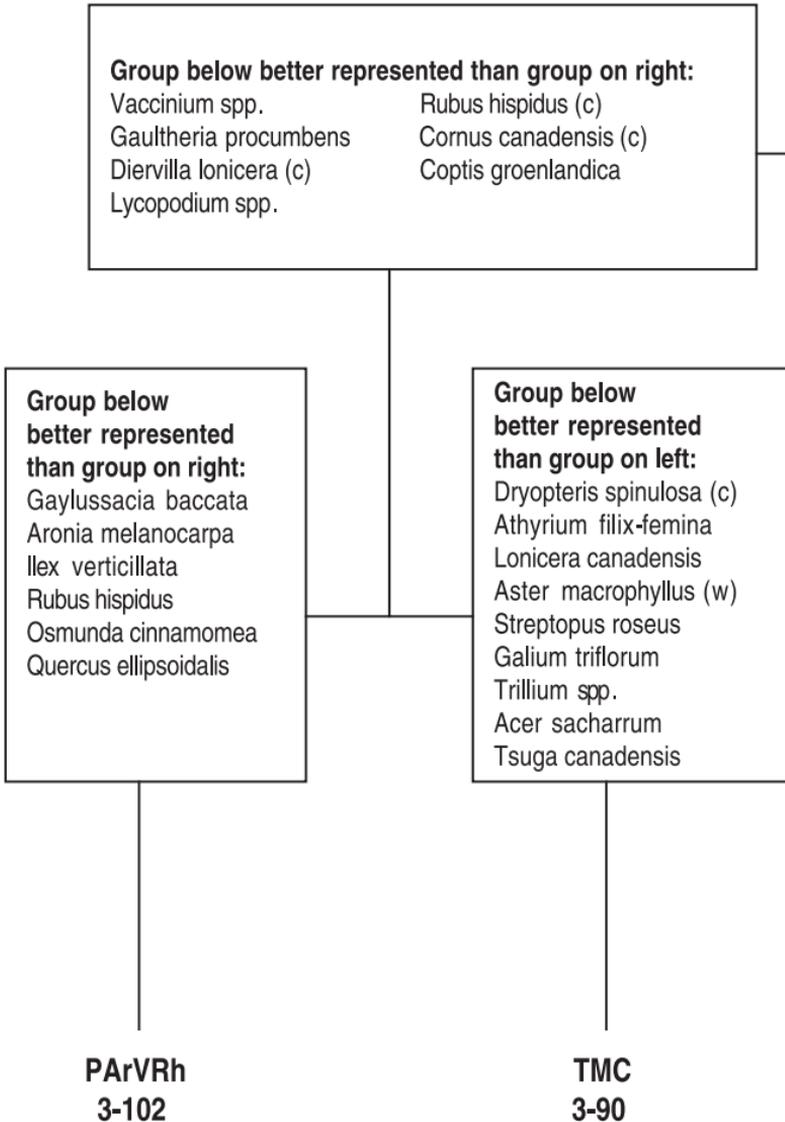
Species on left rarely present.

ATM
3-52

AHVb
3-64

AH
3-74

Region 5 - Key B to Habitat Types (Scientific Names)



Group below better represented than group on left:

Hydrophyllum virginianum
Caulophyllum thalictroides
Sanguinaria canadensis
Laportea canadensis
Arisaema atrorubens

Osmorhiza claytoni
Parthenocissus quinq.
Sanicula spp.
Circaea spp.
Impatiens capensis

**Species on right
rarely present.**

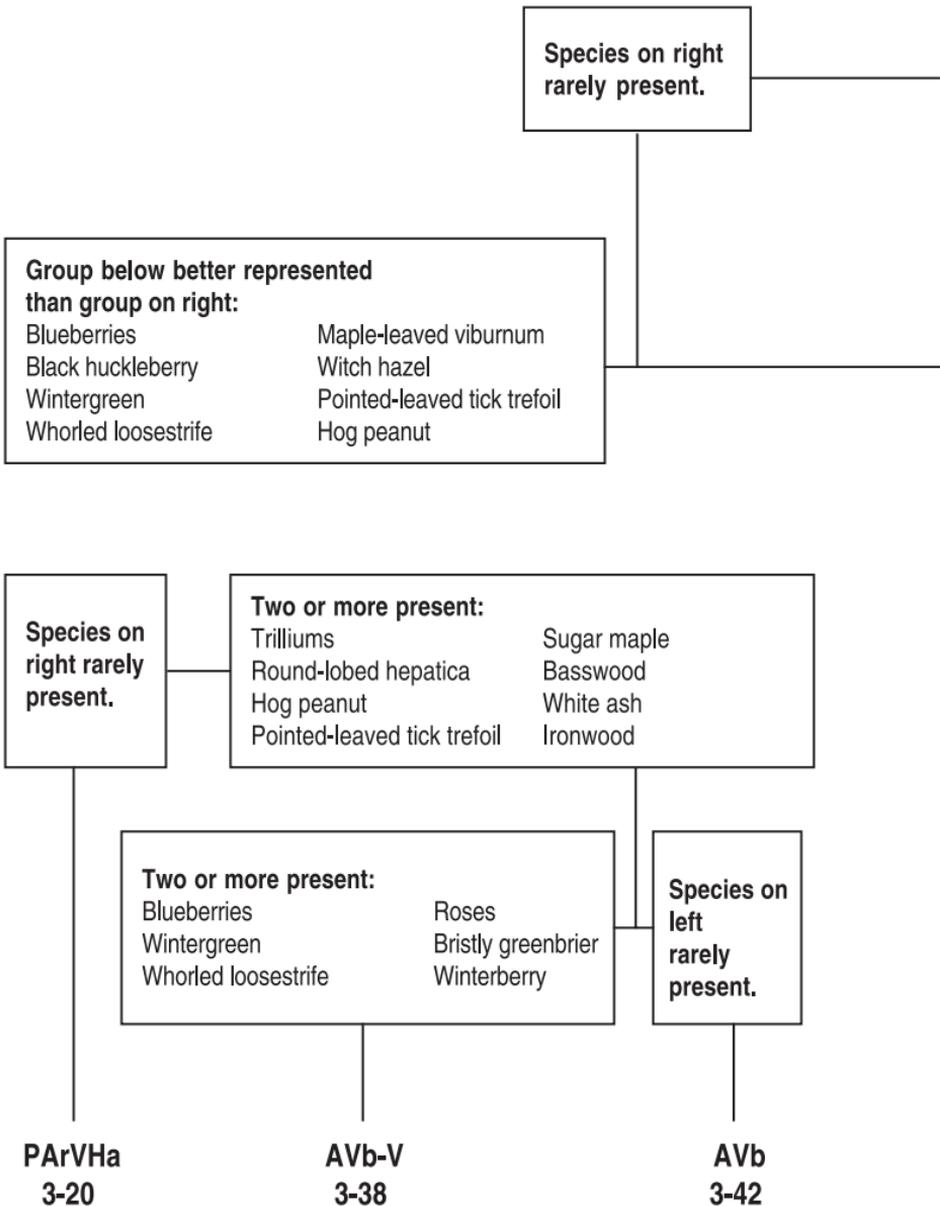
Two or more present:

Caulophyllum thalictroides
Sanguinaria canadensis
Allium tricoccum
Hepatica acutiloba
Solidago flexicaulis
Adiantum pedatum

**ATAtOn
3-84**

**AHI
3-78**

Region 5 - Key A to Habitat Types (Common Names)



Two or more present:

Blue cohosh

Bloodroot

Virginia waterleaf

Sharp-lobed hepatica

Wild leek

Wood nettle

Rattlesnake fern

Maidenhair fern

Red-berried elder

Group below better represented than group on left:

Spinulose shield fern (c)

Yellow beadlelily (c)

Lady fern (c)

Rosey twisted stalk

Jack-in-the-pulpit

Yellow birch

Baneberries

Eastern hemlock

Two or more present:

Maple-leaved viburnum

Witch hazel

Pointed-leaved tick trefoil

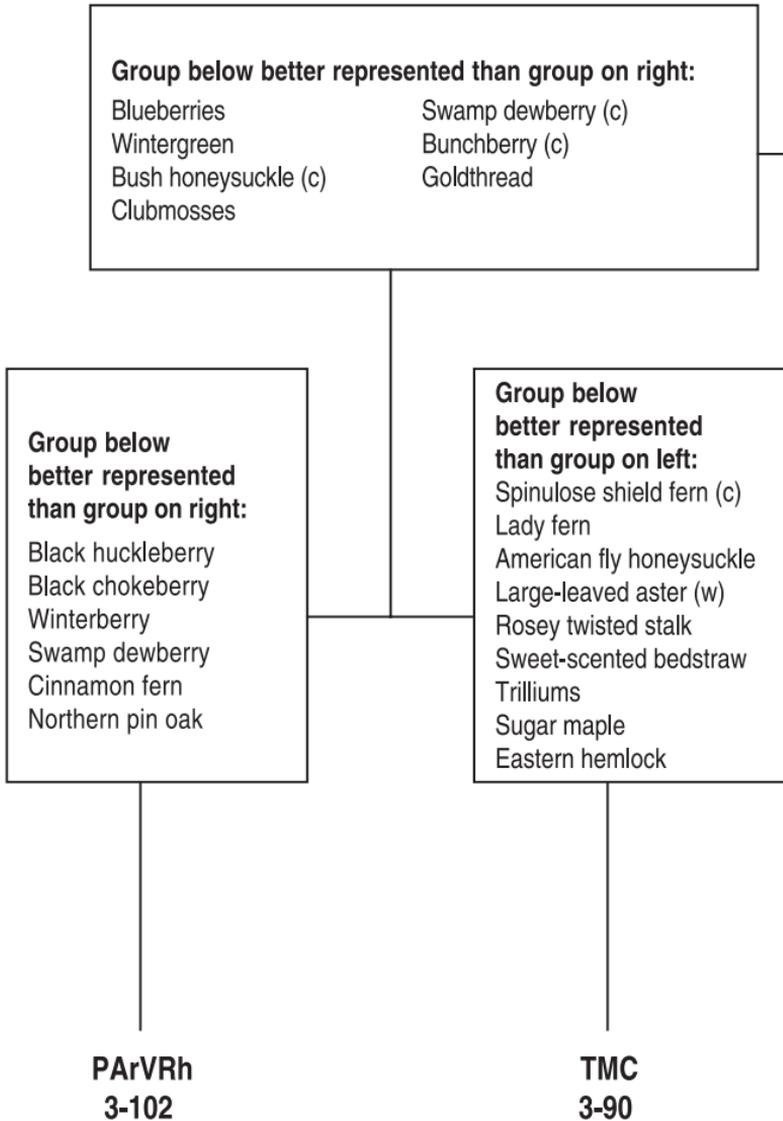
Species on left rarely present.

ATM
3-52

AHVb
3-64

AH
3-74

Region 5 - Key B to Habitat Types (Common Names)



Group below better represented than group on left:

Virginia waterleaf	Sweet cicely
Blue cohosh	Virginia creeper
Bloodroot	Snakeroots
Wood nettle	Enchanter's nightshades
Jack-in-the-pulpit	Jewelweed

**Species on right
rarely present.**

Two or more present:

Blue cohosh
Bloodroot
Wild leek
Sharp-lobed hepatica
Zigzag goldenrod
Maidenhair fern

**ATAAtOn
3-84**

**AHI
3-78**

Comparison of Major Floristic Differences Between Various Habitat Types of Region 5

The following tables may be used to identify habitat types when identification through keys is inconclusive. The tables list only those species whose constancy percentages differ significantly between the types being compared. If the average coverage values also are significantly different, they are shown as a second value, separated from the constancy value by a back slash.

The species found in a stand should better match the list of species either above (h.t. in left column) or below (h.t. in right column) the horizontal line.

(Constancy / Average coverage; * = <10% constancy)

		PARVHa	AVb-V
<i>Gaultheria proc.</i>	Wintergreen	82	20
<i>Gaylussacia baccata</i>	Black huckleberry	66	*
<i>Apocynum andro.</i>	Spreading dogbane	40	10
<i>Desmodium glut.</i>	Pointed-leaved tick trefoil	*	60
<i>Hepatica americana</i>	Round-lobed hepatica	*	60
<i>Prenanthes alba</i>	White lettuce	*	50
<i>Amphicarpa brac.</i>	Hog peanut	*	50
<i>Viola pubescens</i>	Downy yellow violet	*	50
<i>Cornus rac.</i>	Gray dogwood	*	40
<i>Trillium spp.</i>	Trilliums	*	40
<i>Lonicera canadensis</i>	American fly honeysuckle	*	30

		AVb-V	AVb
<i>Vaccinium spp.</i>	Blueberries	100	34
<i>Smilax tamnoides</i>	Bristly greenbrier	70	13
<i>Osmunda clay.</i>	Interrupted fern	70	21
<i>Lysimachia quad.</i>	Whorled loosestrife	60	26
<i>Rosa spp.</i>	Roses	50	*
<i>Cornus rac.</i>	Gray dogwood	40	*
<i>Ilex verticillata</i>	Winterberry	30	*
<i>Rubus hispidus</i>	Swamp dewberry	30	*
<i>Trillium spp.</i>	Trilliums	40	76
<i>Polygonatum pubescens</i>	Hairy solomon's seal	*	34
<i>Polygala paucifolia</i>	Fringed polygala	*	31
<i>Clintonia borealis</i>	Yellow beadlilly	*	27

		AVb	ATM
<i>Viburnum acer.</i>	Maple-leaved viburnum	85	13
<i>Hamamelis virg.</i>	Witch hazel	77	*
<i>Amphicarpa brac.</i>	Hog peanut	61	11
<i>Smilacina rac.</i>	False solomon's seal	61	26
<i>Vaccinium spp.</i>	Blueberries	34	*
<i>Gaultheria procum.</i>	Wintergreen	31	*
<i>Polygala paucifolia</i>	Fringed polygala	31	16
<i>Desmodium glut.</i>	Pointed-leaved tick trefoil	27	*
<i>Dryopteris spinulosa</i>	Spinulose shield fern	23/<1	69/4
<i>Clintonia borealis</i>	Yellow beadlily	27	68
<i>Athyrium filix-femina</i>	Lady fern	19/1	60/4
<i>Lonicera canadensis</i>	American fly honeysuckle	16	59
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	19	52
<i>Actaea spp.</i>	Baneberries	*	50
<i>Streptopus roseus</i>	Rosey twisted stalk	18	49
<i>Osmorhiza claytoni</i>	Sweet cicely	*	37
<i>Dryopteris disjuncta</i>	Oak fern	*	26
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	*	22

		ATM	AH
<i>Trientalis borealis</i>	Starflower	87	25
<i>Clintonia borealis</i>	Yellow beadlily	68	15
<i>Pteridium aquilinum</i>	Bracken fern	68	*
<i>Lycopodium obs.</i>	Ground-pine	65	*
<i>Lonicera canadensis</i>	American fly honeysuckle	59	19
<i>Diervilla lonicera</i>	Bush honeysuckle	57	11
<i>Mitchella repens</i>	Partridgeberry	47	*
<i>Amelanchier spp.</i>	Juneberry	45	12
<i>Hepatica americana</i>	Round-lobed hepatica	40	14
<i>Hydrophyllum virg.</i>	Virginia waterleaf	*	88
<i>Sanguinaria can.</i>	Bloodroot	*	82
<i>Caulophyllum thal.</i>	Blue cohosh	18	81
<i>Osmorhiza claytoni</i>	Sweet cicely	37/1	70/5
<i>Adiantum pedatum</i>	Maidenhair fern	*	60
<i>Uvularia grandiflora</i>	Large-flowered bellwort	11	53
<i>Thalictrum dioicum</i>	Early meadow rue	12	52
<i>Allium tricoccum</i>	Wild leek	*	47
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica	*	47
<i>Solidago flexicaulis</i>	Zigzag goldenrod	20	45
<i>Laportea canadensis</i>	Wood nettle	*	43

		AHVb	AH
<i>Viburnum acer.</i>	Maple-leaved viburnum	100	*
<i>Hamamelis virg.</i>	Witch hazel	100	*
<i>Carpinus caroliniana</i>	American hornbeam	88	25
<i>Amelanchier spp.</i>	Juneberry	55	12
<i>Desmodium glut.</i>	Pointed-leaved tick trefoil	55	*
<i>Hepatica americana</i>	Round-lobed hepatica	44	14
<i>Smilax herbacea</i>	Carrion flower	44	*
<i>Mitchella repens</i>	Partridgeberry	33	*
<i>Allium tricoccum</i>	Wild leek	*	47
<i>Laportea canadensis</i>	Wood nettle	11/1	43/9
<i>Streptopus roseus</i>	Rosey twisted stalk	11	41

		PARVRh	PARVHa
<i>Ilex verticillata</i>	Winterberry	93	40
<i>Rubus hispidus</i>	Swamp dewberry	87	41
<i>Osmunda cinn.</i>	Cinnamon fern	62	*
<i>Cornus canadensis</i>	Bunchberry	50	25
<i>Coptis groenlandica</i>	Goldthread	43	*
<i>Clintonia borealis</i>	Yellow beadlilly	37	*
<i>Dryopteris spinulosa</i>	Spinulose shield fern	25	*
<i>Symplocarpus foet.</i>	Skunk cabbage	25	*
<i>Lysimachia quad.</i>	Whorled loosestrife	18	69
<i>Viburnum acer.</i>	Maple-leaved viburnum	*	67
<i>Hamamelis virg.</i>	Witch hazel	*	51
<i>Diervilla lonicera</i>	Bush honeysuckle	*	51
<i>Smilax tamnoides</i>	Bristly greenbrier	14	35

		PARVRh	AVb-V
<i>Ilex verticillata</i>	Winterberry	93	30
<i>Rubus hispidus</i>	Swamp dewberry	87	30
<i>Gaylussacia baccata</i>	Black huckleberry	75	*
<i>Osmunda cinn.</i>	Cinnamon fern	62	*
<i>Gaultheria procum.</i>	Wintergreen	62	20
<i>Cornus canadensis</i>	Bunchberry	50	20
<i>Coptis groenlandica</i>	Goldthread	43	*
<i>Clintonia borealis</i>	Yellow beadlilly	37	*
<i>Aronia melan.</i>	Black chokeberry	31	10
<i>Symplocarpus foet.</i>	Skunk cabbage	25	*
<i>Aster macrophyllus</i>	Large-leaved aster	37/<1	100/5
<i>Hamamelis virg.</i>	Witch hazel	*	90
<i>Viburnum acer.</i>	Maple-leaved viburnum	*	90
<i>Smilax tamnoides</i>	Bristly greenbrier	14	70
<i>Lysimachia quad.</i>	Whorled loosestrife	18	60

<i>Diervilla lonicera</i>	Bush honeysuckle	*	60
<i>Hepatica americana</i>	Round-lobed hepatica	*	60
<i>Desmodium glut.</i>	Pointed-leaved tick trefoil	*	60
<i>Amphicarpa brac.</i>	Hog peanut	*	50
<i>Viola pubescens</i>	Downy yellow violet	*	50
<i>Trillium spp.</i>	Trilliums	*	40

		TMC	AVb
<i>Cornus canadensis</i>	Bunchberry	88	18
<i>Clintonia borealis</i>	Yellow beadlelily	78	27
<i>Dryopteris spinulosa</i>	Spinulose shield fern	72/3	23/<1
<i>Coptis groenlandica</i>	Goldthread	60	*
<i>Lonicera canadensis</i>	American fly honeysuckle	57	16
<i>Athyrium filix-femina</i>	Lady fern	47/5	19/1
<i>Streptopus roseus</i>	Rosey twisted stalk	45	18
<i>Rubus pubescens</i>	Dwarf raspberry	36	*
<i>Equisetum spp.</i>	Horsetails	31	*
<i>Viburnum acer.</i>	Maple-leaved viburnum	*	85
<i>Hamamelis virg.</i>	Witch hazel	*	77
<i>Trillium spp.</i>	Trilliums	28	76
<i>Amphicarpa brac.</i>	Hog peanut	*	61
<i>Smilacina rac.</i>	False solomon's seal	10	61
<i>Desmodium glut.</i>	Pointed-leaved tick trefoil	*	27

		TMC	ATM
<i>Cornus canadensis</i>	Bunchberry	88	31
<i>Coptis groenlandica</i>	Goldthread	60	*
<i>Vaccinium spp.</i>	Blueberries	39	*
<i>Rubus pubescens</i>	Dwarf raspberry	36	*
<i>Equisetum spp.</i>	Horsetails	31	*
<i>Trillium spp.</i>	Trilliums	28	64
<i>Osmorhiza claytoni</i>	Sweet cicely	11	37
<i>Polygonatum pub.</i>	Hairy solomon's seal	17	36
<i>Dirca palustris</i>	Leatherwood	*	25

		ATAAtOn	ATM
<i>Equisetum spp.</i>	Horsetails	71	*
<i>Ariseama atrorubens</i>	Jack-in-the-pulpit	58	22
<i>Onoclea sensibilis</i>	Sensitive fern	56	*
<i>Parthenocissus quinq.</i>	Virginia creeper	56	*
<i>Impatiens capensis</i>	Jewelweed	48	*
<i>Hydrophyllum virg.</i>	Virginia waterleaf	42	*
<i>Laportea canadensis</i>	Wood nettle	34	*

Continued on next page.

<i>Sanicula</i> spp.	Snakeroot	34	*
<i>Rubus pubescens</i>	Dwarf raspberry	32	*
<i>Circaea</i> spp.	Enchanter's nightshades	28	*
<i>Oxalis montana</i>	Wood sorrel	25	*
<i>Aralia nudicaulis</i>	Wild sarsaparilla	54/2	82/7
<i>Aster macrophyllum</i>	Large-leaved aster	56/4	74/11
<i>Pteridium aquilinum</i>	Bracken fern	19/2	68/8
<i>Lycopodium obs.</i>	Ground-pine	15	65
<i>Lonicera canadensis</i>	American fly honeysuckle	14	59
<i>Diervilla lonicera</i>	Bush honeysuckle	20/<1	57/5
<i>Actaea</i> spp.	Baneberries	20	50

		ATAtOn	AH
<i>Equisetum</i> Spp.	Horsetails	71	*
<i>Onoclea sensibilis</i>	Sensitive fern	56	*
<i>Impatiens capensis</i>	Jewelweed	48	*
<i>Sanicula</i> spp.	Snakeroot	34	16
<i>Dryopteris disjuncta</i>	Oak fern	33	15
<i>Rubus pubescens</i>	Dwarf raspberry	32	*
<i>Clintonia borealis</i>	Yellow beadlilly	31	15
<i>Hydrophyllum virg.</i>	Virginia waterleaf	42/2	88/8
<i>Sanguinaria can.</i>	Bloodroot	14	82
<i>Caulophyllum thal.</i>	Blue cohosh	18	81
<i>Viola pub./penn.</i>	Downy/smooth yellow violet	19	61
<i>Adiantum pedatum</i>	Maidenhair fern	*	60
<i>Actaea</i> spp.	Baneberries	20	53
<i>Uvularia grandiflora</i>	Large-flowered bellwort	*	53
<i>Allium tricoccum</i>	Wild leek	*	47
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica	16	47
<i>Solidago flexicaulis</i>	Zigzag goldenrod	19	45

		AHI	AH
<i>Parthenocissus quinq.</i>	Virginia creeper	70	26
<i>Circaea</i> spp.	Enchanter's nightshades	64/2	15/<1
<i>Geranium maculatum</i>	Wild geranium	57/7	21/2
<i>Impatiens capensis</i>	Jewelweed	51	*
<i>Onoclea sensibilis</i>	Sensitive fern	45	*
<i>Sanicula</i> spp.	Snakeroot	43	16
<i>Fragaria</i> spp.	Strawberries	49	11
<i>Oxalis montana</i>	Wood sorrel	40	*
<i>Equisetum</i> spp.	Horsetails	38	*
<i>Adiantum pedatum</i>	Maidenhair fern	28	60
<i>Uvularia grandiflora</i>	Large-flowered bellwort	15	53
<i>Streptopus roseus</i>	Rosey twisted stalk	*	41

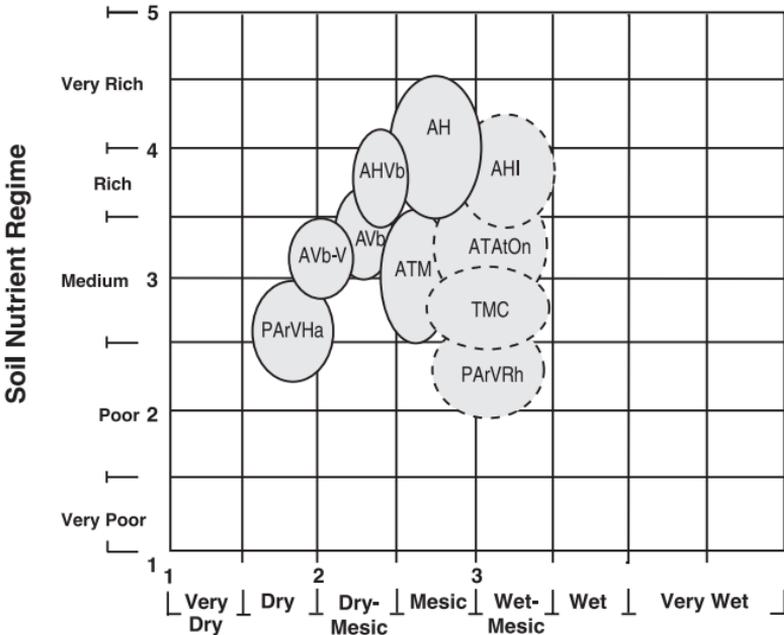
<i>Sambucus pubens</i>	Red-berried elder	*	35
<i>Dirca palustris</i>	Leatherwood	11	34
		PARVRh	TMC
<i>Ilex verticillata</i>	Winterberry	93	*
<i>Rubus hispidus</i>	Swamp dewberry	87	18
<i>Vaccinium spp.</i>	Blueberries	87	39
<i>Gaylussacia baccata</i>	Black huckleberry	75	*
<i>Gaultheria procum.</i>	Wintergreen	62	20
<i>Osmunda cinn.</i>	Cinnamon fern	62	12
<i>Aronia melan.</i>	Black chokeberry	31	*
<i>Corylus cornuta</i>	Beaked hazelnut	25/<1	84/8
<i>Clintonia borealis</i>	Yellow beadlilly	37/<1	78/3
<i>Aster macrophyllus</i>	Large-leaved aster	37/<1	77/9
<i>Dryopteris spinulosa</i>	Spinulose shield fern	25	72
<i>Diervilla lonicera</i>	Bush honeysuckle	*	59
<i>Lonicera canadensis</i>	American fly honeysuckle	*	57
<i>Athyrium filix-femina</i>	Lady fern	*	47
<i>Streptopus roseus</i>	Rosey twisted stalk	*	45
<i>Galium triflorum</i>	Sweet-scented bedstraw	*	41
<i>Rubus pubescens</i>	Dwarf raspberry	*	36
<i>Ribes spp.</i>	Gooseberries	*	32
<i>Equisetum spp.</i>	Horsetails	*	31
<i>Trillium spp.</i>	Trilliums	*	28
		TMC	ATAAtOn
<i>Cornus canadensis</i>	Bunchberry	88	24
<i>Clintonia borealis</i>	Yellow beadlilly	78	31
<i>Pteridium aquilinum</i>	Bracken fern	70/9	19/2
<i>Lycopodium obs.</i>	Ground-pine	66	15
<i>Coptis groenlandica</i>	Goldthread	60	14
<i>Diervilla lonicera</i>	Bush honeysuckle	59	20
<i>Lonicera canadensis</i>	American fly honeysuckle	57	14
<i>Mitchella repens</i>	Partridgeberry	46	21
<i>Vaccinium spp.</i>	Blueberries	39	*
<i>Lycopodium spp.</i>	Clubmosses	38	*
<i>Equisetum spp.</i>	Horsetails	31	71
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	18	58
<i>Onoclea sensibilis</i>	Sensitive fern	16	56
<i>Parthenocissus quinq.</i>	Virginia creeper	*	56
<i>Impatiens capensis</i>	Jewelweed	13	48
<i>Hydrophyllum virg.</i>	Virginia waterleaf	*	42
<i>Laportea canadensis</i>	Wood nettle	*	34
<i>Sanicula marilandica</i>	Black snakeroot	*	34

Continued on next page.

<i>Amphicarpa brac.</i>	Hog peanut	*	29
<i>Circaea spp.</i>	Enchanter's nightshades	*	28

		ATAtOn	AHI
<i>Dryopteris disjuncta</i>	Oak fern	33	*
<i>Streptopus roseus</i>	Rosey twisted stalk	33	*
<i>Rubus pubescens</i>	Dwarf raspberry	32	15
<i>Clintonia borealis</i>	Yellow beadlilly	31	*
<i>Dryopteris phegopteris</i>	Long beech fern	31	*
<i>Hepatica americana</i>	Round-lobed hepatica	29	*
<i>Hydrophyllum virg.</i>	Virginia waterleaf	42/2	94/5
<i>Sanguinaria can.</i>	Bloodroot	14	87
<i>Solidago flexicaulis</i>	Zigzag goldenrod	19	62
<i>Geranium maculatum</i>	Wild geranium	14	57
<i>Viola pub./penn.</i>	Downy/smooth yellow violet	19	53
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica	16	51
<i>Smilacina rac.</i>	False solomon's seal	*	47
<i>Actaea spp.</i>	Baneberries	20	45
<i>Caulophyllum thalict.</i>	Blue cohosh	18	45
<i>Allium tricoccum</i>	Wild leek	*	43
<i>Adiantum pedatum</i>	Maidenhair fern	*	28

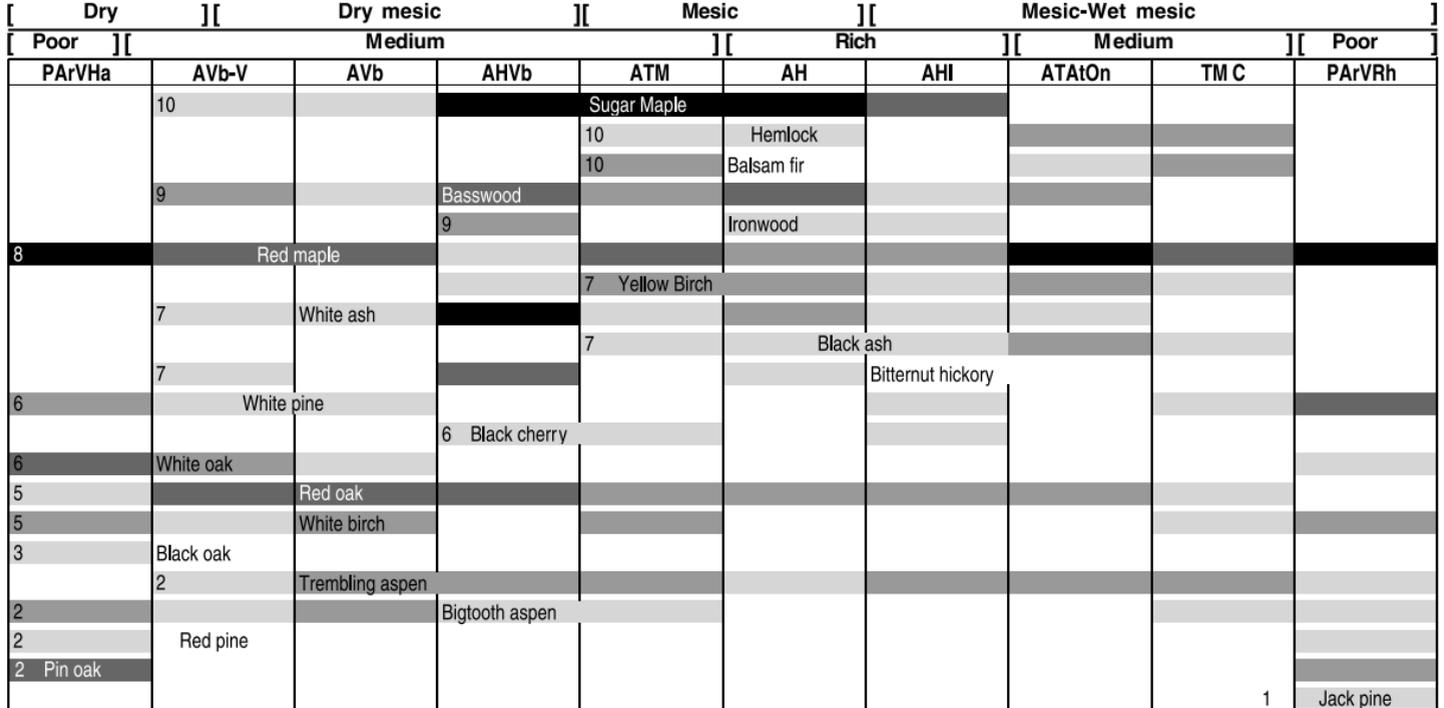
Relationship of Habitat Types to Soil Moisture and Nutrient Regimes in Region 5



Occurrence of Tree Species Across Habitat Types of Region 5

(Data from 1996 FIA)

Numbers in front of bars are relative shade tolerance values: 1, least tolerant; 10, most tolerant



2-147

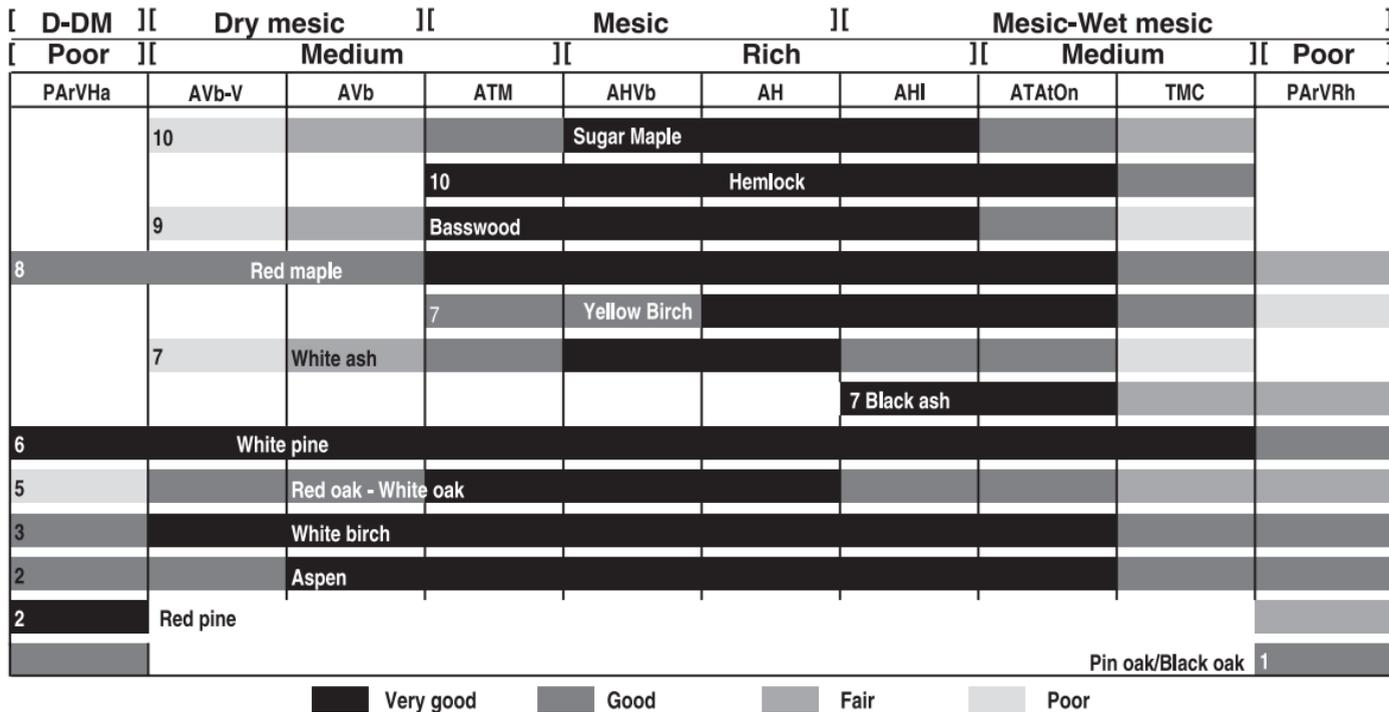
% presence 10-25 26-50 51-75 >75

Relative Growth Potential for Major Tree Species Across Habitat Types of Region 5

(Only those habitat types where the species occurs naturally are considered)

Numbers in front of bars are relative shade tolerance values: 1, least tolerant; 10, most tolerant

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Occurrence of Tree Species on Habitat Types of Region 5

Numbers in parentheses are number of study plots. Size classes: SA - saplings, MT - medium trees (4-10" dbh), LT - large trees (>10" dbh)

Numbers are frequency of occurrence classes: 1, 10-25%; 2, 26-50%; 3, 51-75%; 4, 76-100%

Letters are abundance classes representing average stems per acre when present: for saplings: A, <100; B, 100-200; C, 201-400; D, >400 for trees: A, <10; B, 10-20; C, 21-40; D, >40

	PARVHa (62)*			AVb-V (16)			AVb (44)			ATM (139)			AHVb (9)**			AH (68)			AHI (24)			ATAtOn (58)			TMC (116)			PARVRh (16)*											
	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT	SA	MT	LT									
Jack Pine																													1B	1B									
Red Pine			1B																										1A	1B									
White Pine	2A	2B	1C			1A		1B	1C	1A								1B	1B									1B	3B	3B	3D								
N. Pin Oak	1A	3B	3C																										1A	1B	2B								
Black Oak			1A																																				
N. Red Oak			1B			1C		1A	1D	3B		2A	2C	3B		1A	1C	2B			2B		3C					2B											
White Oak	2A	3B	2C			2A		2A	2C	2B				1A																									
Bur Oak										1A										1A			1A							2A	1A	1C							
Bigtooth Aspen	1B	2B	2C			1C		1C	1D	1C		2D	2C	2B		1C		1B											1B		1A								
Trembling Aspen						2B		2D	2C	1A		2D	2D	2B		1A	2B		1C	1C	1A		2B	1D	2B		2C	2C	2B		1A								
White Birch	1A	2A				2B		2A	2C	1B		1A	2C	2A															2A	2A	1A								
Yellow Birch												1A	1B	2A		1A			1A	1C	2A		1B	1C			2A	2C	2B		1A	1C	1A						
Red Maple	4C	4C	2B			3B		3B	3D	2A		3B	3D	3B		1A	1A	1A		1B	2C	1B		2A	2D	2B		3B	4D	3B		3B	3D	2B		4C	4C	2B	
Sugar Maple						2B		2A	1C	1B		2A	1C			4B	4D	3C		4C	4D	3B		4B	4D	4C		3B	2D	3C		2A	2C	2B		2B	2D	1B	
Basswood						1A		1A	2C	1C		1A		1B		1A	2C	2B		3A	3A	3A		2A	2C	3C		2B	1D	1C		2A	2B	2B					
White Ash								1A		1B	1C		1A	1C	1A		3A	4A	3B		1A	1C	2A		1C		1A												
Green Ash														1A	1C														2B	1D	1A								
Black Ash														1A	1C													2B	1B	1A		2B	2D	2A		1B	1D		
American Elm												1A																											
Bitternut Hickory										1A						1A	1A						2A	1B		3A	2B	1A		2A	1B								
Black Cherry	1A					1A		1A				2A	1B			2A	3A	2A					1B					1A											2A
Ironwood (Hophornbeam)						2B		1A				2B				3B	2B						3A	1C		2B	1D		2A										
Musclewood (Hornbeam)						2A		1B				1B				2A	1A						1A			2B			2B										
E. Hemlock														1B		1A							1A			1A				1A	2C	2B		1B	1D	2B			
Balsam Fir								2B				2C	2C																2B	1C					4C	2D	1B		
White Spruce													1A																						1A	1C	1B		
N. White Cedar																																			1A	1D	1B		

* Data from A Guide to Forest Communities and Habitat Types of Central and Southern Wisconsin (1996).

Letters are abundance classes representing average crown coverage when present: A, <5%; B, 5-15%; C, 16-35%; D, >35%.

** Data from Marathon County Addendum (unpublished). Letters represent crown coverage classes.

Current Relative Importance of Common Forest Cover Types on Habitat Types of Region 5

*** - Dominant: >50%; ** - Common: 10-50%; * - Minor: <10% of all cover types observed on that habitat type.

Cover Type	PArVHa	AVb-V	AVb	ATM	AHVb	AH	AHI	ATAiOn	TMC	PArVRh
Jack Pine - Oak*										*
Oak*	**	**								**
Red Pine	*	*	*							*
White Pine - Red Pine	*	*	*							*
White Pine - Oak*	*	*	*							*
White Pine - Red Maple	*	*	*						*	**
White Pine	*	*	*	*			*		*	**
Aspen - Pine*	**	*	*	*					*	**
Aspen - White Birch	*	*	*	*					**	*
Aspen - Red Maple	**	*	*	*				**	**	**
Oak - Red Maple*	**	**	**	*				*		**
Red Maple	*	*	*	*				**	*	*
Aspen - Oak*	**	**	**	*	*					**
Aspen	**	**	**	**	*	*	**	**	**	**
White Birch			*	*					*	
Balsam Fir - White Spruce				*					**	
Aspen - Balsam Fir				*				*	**	
Balsam Fir - Red Maple				*				*	**	
Red Oak		**	**	*	**					
Basswood - Red Oak (white oak)		*	*	*	**					
Sugar Maple - Red Oak (white oak)		*	*	*	**	*	*	*		
Sugar Maple - Red Maple		*	*	**	*	*	**	**	*	
Sugar Maple		*	*	**	**	***	**	*		
Sugar Maple - Basswood				**	**	**	**	*		
Sugar Maple - Basswood - Ash - Yellow Birch*				*	*	**	*	*		
Sugar Maple - Hemlock - Yellow Birch - Red Maple				*		*	*	**	**	
Hemlock				*		*	*	*	*	

Occurrence of Understory Species Across the Habitat Types of Region 5

Numbers represent frequency of occurrence classes: • 10-25%; 1, 26-50%; 2, 51-75%; 3, 76-100%.
 Letters are coverage classes: A<1%; B 1-5%; C 6-15%; D>15%. Numbers of study plots in parentheses.

Scientific name	Common name	PARVHa* (62)	AVb-V (10)	AVb (62)	ATM (230)	AHVb** (9)	AH (97)	AHI (47)	ATAtoN (85)	TMC (202)	PARVRh* (16)
Shrubs											
Rosa spp.	Roses	*	1A								
Gaylussacia baccata	Huckleberry	2B									2C
Vaccinium spp.	Blueberries	3A	3A	1B						1A	3A
Diervilla lonicera	Bush honeysuckle	2A	2A	2B	2B		*	*	*	2B	
Amelanchier spp.	Juneberry	3B	3B	2B	1B	2A	*	1B	*	1B	3A
Corylus spp.	Hazels	1B	3C	3C	3C	2B	1C	1C	2C	3C	1A
Rubus spp.	Blackberry/raspberry	2A	3C	3C	1C		1C	2B	2C	1C	1B
Viburnum acerifolium	Maple-leaved viburnum	2A	3B	3C	*	3A					
Hamamelis virginiana	Witch hazel	2B	3D	3C		3B					
Lonicera canadensis	American fly honeysuckle	1A	*		2B	2A	*	*	*	2B	
Prunus virginiana	Chokecherry	*	*		1B	3A	*	1B	1B	*	
Cornus alternifolia	Alternated-leaved dogwood	*	1A	*	2B	2A	1B	*	1B	1B	*
Ribes spp.	Gooseberries		*	*	1B	3A	3B	3B	2B	1B	
Dirca palustris	Leatherwood			*	*		1B	*			
Sambucus pubens	Red-berried elder					2A	1B		*		
Crataegus spp.	Hawthorns		1B					1C			
Cornus racemosa	Gray dogwood		1B					1B			
Aronia melanocarpa	Black chokeberry	*									1A
Ilex verticillata	Winterberry	1A	1B					*	*		3B
Rubus hispidus	Swamp dewberry	1A	1B							*	3B
Rubus pubescens	Dwarf raspberry							*	1C	1C	
Ferns, Allies, Lichens, Mosses											
Pteridium aquilinum	Bracken fern	3C	3C	3D	2C			*	*	2C	2C
Lycopodium obscurum	Ground-pine clubmoss	1A	1A	1B	2B				*	2B	2A
Lycopodium spp.	Clubmosses			*	*					1B	*
Osmunda claytoniana	Interrupted fern	1B	2B	*	1B		*	*	1B	1B	1B
Osmunda cinnamomea	Cinnamon fern									*	2D
Athyrium filix-femina	Lady fern			*	2B		2B	2C	3C	1B	
Dryopteris spinulosa	Spinulose shield fern		*	*	2B	3A	2B	2B	2B	2B	*
Dryopteris disjuncta	Oak fern				1B		*		1B	1B	
Dryopteris phegopteris	Long beech fern				*				1B	1B	
Botrychium virginianum	Rattlesnake fern					2A	1A		*		
Adiantum pedatum	Maidenhair fern					3B	2B	1B			
Onoclea sensibilis	Sensitive fern							1B	2B	*	
Equisetum spp.	Horsetails							1B	2B	1B	
Forbs and Subshrubs											
Lysimachia quadrifolia	Whorled loosestrife	2A	2B	1B							*
Gaultheria procumbens	Wintergreen	3A	*	1B						*	2A
Apocynum androsaemifolium	Spreading dogbane	1A		1B	1B		*			*	1A
Mitchella repens	Partridgeberry	1A	1A	1B	1B				*	1B	2A
Trientalis borealis	Starflower	2A	3A	2B	3B		*	1B	2B	3B	3A
Smilax tamnoides	Bristly greenbrier	1A	2A	*	*	2A		*	*		*
Maianthemum canadense	Wild lily-of-the-valley	2A	1A	2B	3B	2A	1B	2B	2B	3B	3B
Aster macrophyllus	Large-leaved aster	2A	3B	3D	2D		2C	2B	2B	3C	1A
Aralia nudicaulis	Wild sarsaparilla	3B	2B	3B	3C	3A	1B	1C	2B	3B	3A
Uvularia sessifolia	Sessile-leaved bellwort	3A	3A	1A	2B	2A	1B	2B	1B	1B	3A
Smilacina racemosa	False solomon's seal	*	1A	2B	1B	3A	1B	1B		*	*
Anemone quinquefolia	Wood anemone	*	1B	2B	2B	3A	1A	1A	1A	1B	1A
Fragaria spp.	Strawberries		1A	*	*		*	1B	1B	*	
Hepatica americana	Round-lobed hepatica		2A	1B	1B		*	*	1A	1B	
Prenanthes alba	White lettuce		1A	1A	*	2A		1A	*		*
Desmodium glutinosum	Pointed-leaved tick trefoil		2B	1B		2A					
Amphicarpa bracteata	Hog peanut		1B	2B	*	3A	1B	2B	1C		
Viola pubescens/pennsylvanica	Downy/smooth yellow violet		1A	*	1B		2B	2B	*	*	
Trillium spp.	Trilliums		1A	3B	2B	3A	3B	3B	1A	1B	
Polygala paucifolia	Fringed polygala			1B	*					*	
Clintonia borealis	Yellow beadlily		1A	2B			*		1B	3B	1A
Thalictrum dioicum	Early meadow rue			1B	*	2A	2B	2B	1B	*	
Polygonatum pubescens	Hairy solomon's seal			1B	1B	3A	1B	*	*	*	*
Streptopus roseus	Rosey twisted stalk	*		*	1B		1B		1B	1B	

Continued on next page.

Scientific name	Common name	PArVHa* (62)	AVb-V (10)	AVb (62)	ATM (230)	AHVb** (9)	AH (97)	AHI (47)	ATAIOn (85)	TMC (202)	PArVRh* (16)
<i>Galium triflorum</i>	Sweet-scented bedstraw			*	2B		1A	2B	1A	1A	
<i>Sanicula</i> spp.	Snakeroots			*			*	1B	1B		
<i>Geranium maculatum</i>	Wild geranium			*			*	2C	*		
<i>Parthenocissus quinquefolia</i>	Virginia creeper					2D	1B	2B	2B		
<i>Aralia racemosa</i>	Spikenard						1B				
<i>Uvularia grandiflora</i>	Large-flowered bellwort			*	*	1B	2B	*			
<i>Actaea</i> spp.	Baneberries				1B	3A	2B	1B	*	1A	
<i>Osmorhiza claytoni</i>	Sweet cicely				1B	3A	2B	1B	1B	*	
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit				*	2A	1B	1B	2B	*	
<i>Mitella diphylla</i>	Miterwort				*	2A	1B	1A	*		
<i>Solidago flexicaulis</i>	Zigzag goldenrod				*		1B	2B	*		
<i>Caulophyllum thalictroides</i>	Blue cohosh				*	2A	3B	1B	*		
<i>Hydrophyllum virginianum</i>	Virginia waterleaf					2A	3C	3B	1B		
<i>Sanguinaria canadensis</i>	Bloodroot					2A	3B	3B	*		
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica						2B	2B	*		
<i>Laportea canadensis</i>	Wood nettle						1C	2B	1B		
<i>Allium tricoccum</i>	Wild leek						1B	1B			
<i>Circaea</i> spp.	Enchanter's nightshades						*	1B	1B		
<i>Impatiens capensis</i>	Jewelweed							2B	1C	*	
<i>Oxalis montana</i>	Wood sorrel							1A	*	*	
<i>Coptis groenlandica</i>	Goldthread								*	2B	1B
<i>Cornus canadensis</i>	Bunchberry	*	*	*	1B				*	3C	1B

* Data from A Guide to Forest Communities and Habitat Types of Central and Southern Wisconsin (1996).

** Data from Marathon County Addendum (unpublished). Only species present with 44% or greater frequency are included.

Description of Habitat Types

(Habitat types are presented in five groups: very dry to dry; dry to dry-mesic; dry mesic; mesic; mesic to wet-mesic)

For each habitat type the following information is included:

Distribution. Brief description of the geographic distribution of each type. based on the 1996 Forest Inventory and Analysis (FIA) survey.

Landform and soils. Pre-dominant landforms and soil families associated with the described habitat type. This information is based on data from our study sites and on soil and Natural Division maps.

Major forest cover types. The information given in this section is based on data from the 1996 FIA.

Shrub and small tree layer. This section describes the best represented (not necessarily diagnostic) species in our reference stands. The label "small trees" is applied to species that do not reach normal tree size in Wisconsin, or on a given habitat type. It does **not** apply to saplings of typical tree species. Examples are choke cherry and American hornbeam (*Carpinus caroliniana*)

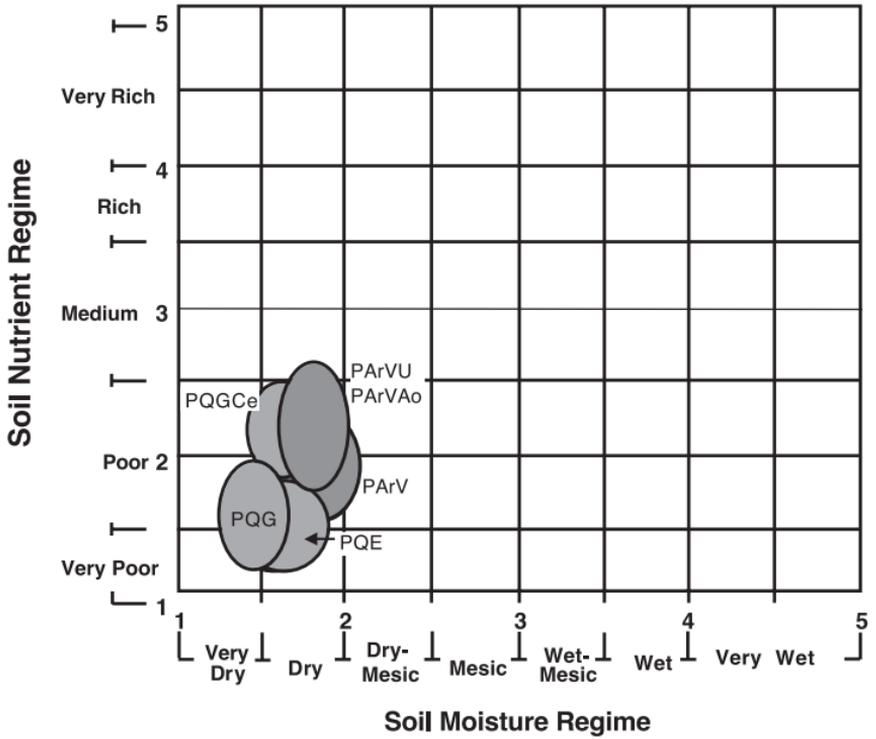
Ground flora characteristics. This section describes both the typical dominant species and some diagnostic species useful for distinguishing among similar habitat types.

Disturbance and succession. In this section we briefly discuss the historic and present disturbance regimes and ecological characteristics of tree species that play a role in forest dynamics.

Successional diagrams. These diagrams depict the common present cover types (currently prevalent stages are marked with thick borders) and most conspicuous directions of change in the absence of disturbance. Boxes in the lower portion of the diagram represent the early successional stages and the top box, the late successional stage. Solid arrows indicate the common and dotted arrows the less frequent successional pathways. Actual composition of any stage depends on the type and timing of disturbance and availability of seed sources. Species in parentheses are potential associates.

Management implications. This field guide is not intended as a manual for specific management practices. It is a tool to help assess the biological potential of a given site. The most obvious management options and limitations from the forestry, wildlife and recreation point of view are listed.

Habitat Type Group 1 (Very Dry to Dry, Poor)



PQE

Pinus -Quercus/Epigaea

(*Pinus strobus*-*Quercus rubra*/*Epigaea repens*)

White pine-Red oak/Trailing arbutus

Distribution: Uncommon, occurring only in a limited area within Region 3 (see Regional Description).

Landform and soils: Occurs on deep, excessively drained, outwash sands. The moisture regime is **very dry to dry**, and the nutrient regime is **very poor to poor**.

Vegetation:

Common forest cover types: Jack pine is the prevailing cover type. Mixtures of jack-, red- and, less frequently, white pine are also common. Red oak and red maple are often present, but typically only in small diameter classes. Scattered individuals of black spruce, white spruce and balsam fir sometimes occur.

Shrub and small tree layer: Tall shrub layer is usually absent. Particularly conspicuous is the absence or low presence of hazel. Blueberries and sweetfern are best represented shrubs. Other less well represented species are juneberry, pin cherry, and bush honeysuckle.

Ground flora characteristics: Bracken fern typically is the dominant herb. Grasses, sedges and wintergreen are also well represented. Other common, but less well represented species are trailing arbutus, cow wheat, wild lily of-the-valley and star-flower. In some stands reindeer lichens are well represented.

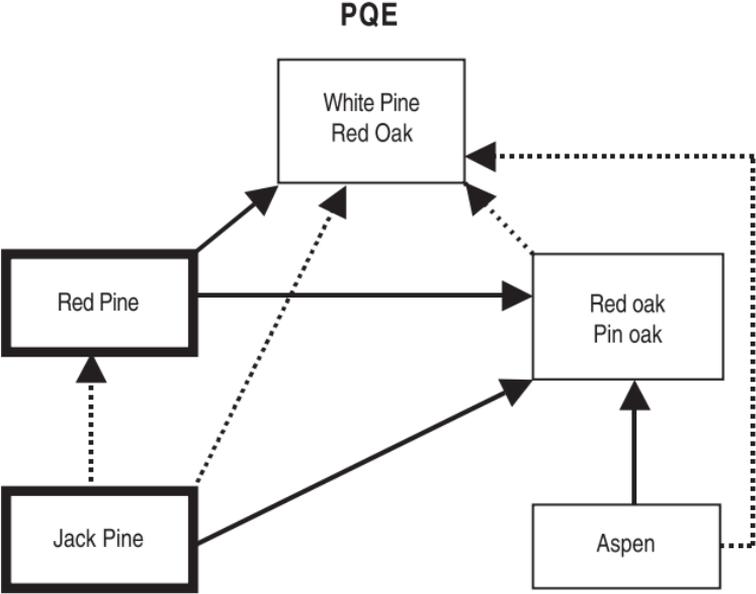
Management implications:

This type is most suitable for jack pine management. Red pine plantations are possible but productivity is only moderate and plantation survival in drier than normal years may be more of a problem than on other types. If red pine is established on this type, a shorter rotation should be considered with fiber rather than sawlog production as a management objective. Aspen and red oak are not recommended on this type except for wildlife consideration.

Vertical structure of stands on this type is poor with low potential for improvement.

Disturbance and succession: All tree species occurring on this habitat type are adapted to disturbance, particularly fire. Jack pine historically has been the most prevalent species. However, white pine, and less frequently red pine, readily invade jack pine stands. White pine

easily succeeds other species when seed source is available although it may suffer considerable mortality in years of extreme drought. Red oak and red maple saplings of sprout or seed origin are often present, but neither of these species grows well on this habitat type.



PQG
Pinus -Quercus/Gaultheria
(Pinus strobus-Quercus spp./Gaultheria procumbens)
White pine-Pin Oak/Wintergreen

Distribution: Common in Region 2 (see Regional Description).

Landform and soils: Occurs on deep, excessively drained, outwash sands on the Bayfield Sand Plains. The moisture regime is **very dry to dry**, and the nutrient regime is **very poor to poor**.

Vegetation:

Common forest cover types: Current communities are most often dominated by jack pine. Mixtures of pin, bur and red oak also occur. Some communities contain all of above species plus aspen or red pine.

Shrub and small tree layer: Tall shrub layer is not well developed on this type. Blueberries, sweet fern, juneberry and wild rose are most common and best represented shrubs. In some stands American hazel is well represented. Other, less common shrubs are blackberries, dewberries, and bush honeysuckle.

Ground flora characteristics: Except for bracken fern, the herb layer is poorly developed. Wintergreen, wild lily-of-the-valley and sometimes dogbane, are the only common species. Perhaps the most conspicuous characteristic of this habitat type is relatively low presence of big-leaf aster, typically one of the best represented herbs in northern forests..

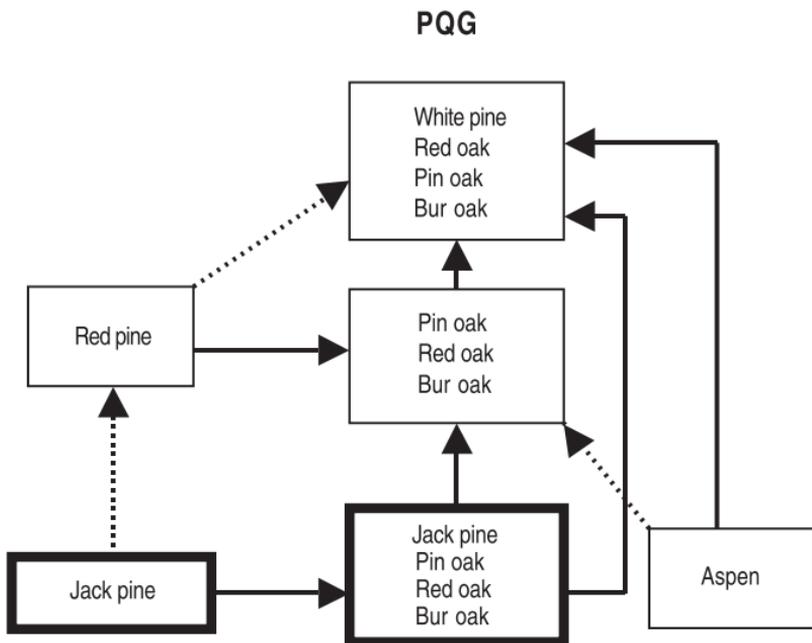
Management implications:

This type is most suitable for jack pine management. Red pine plantations are possible but productivity is only moderate and plantation survival in drier than normal years may be more of a problem than on other types. If red pine is established on this type, a shorter rotation should be considered with fiber rather than sawlog production as a management objective. Aspen and oak are not recommended on this type except for wildlife consideration.

Vertical structure of stands on this type is poor with very low potential for improvement.

Disturbance and succession: All tree species occurring on this habitat type are adapted to disturbance, particularly fire. Jack pine and northern pin oak historically have been the most prevalent species. White pine is not common in current stands because of a lack of seed sources. However, where seed source is

present white pine easily succeeds other species although its growth is suboptimal and considerable mortality can be expected in years of extreme drought. Pin oak is persistent on this type primarily due to its sprouting ability. Red maple is sometimes found, but it does not appear to develop beyond the sapling stage.



PQGCe
Pinus -Quercus/Gaultheria-Ceanothus
(Pinus strobus-Quercus spp./
Gaultheria procumbens-Ceanothus americanus)
White pine-Oak/Wintergreen-New Jersey Tea

Distribution: Common in Region 1 (see Regional Description).

Landform and soils: Occurs on deep, excessively drained outwash sands on the Bayfield Sand Plains. The moisture regime is **dry**, and the nutrient regime is **poor**.

Vegetation:

Common forest cover types: Pure or mixed stands of jack and red pine, with or without admixture of red or pin oak are common. Stands of various mixtures of pin, red, bur or white oak are also common. Aspen, especially bigtooth, is often present.

Shrub and small tree layer:

This layer is usually well developed and diverse, with dense clumps common. Occasionally, tall shrubs may be sparse, especially on severely disturbed sites, and under dense oak stands. Principal species are hazel, juneberry, blueberries and blackberries.

Ground flora characteristics:

Typically, the best represented species are bracken fern, grasses and sedges, wild

lily-of-the-valley and wintergreen. New Jersey tea, the name sake of this habitat type, is characteristic of the type, but its frequency of occurrence is relatively low.

Management implications:

From the forestry point of view this type has limited management potential. Jack pine and red pine appear to be the best choice. White pine is uncommon at present due to a lack of seed sources. Although its growth is less than optimal on this type, white pine is sufficiently shade tolerant to become established on any cover type when seed source is present.

Pure or mixed stands of jack pine and pin oak are the most common and can be perpetuated without difficulty for fiber and wildlife purposes. Red oak is also found on this type, but its growth rate and quality are poor.

The maintenance of forest openings would also be relatively easy on this type.

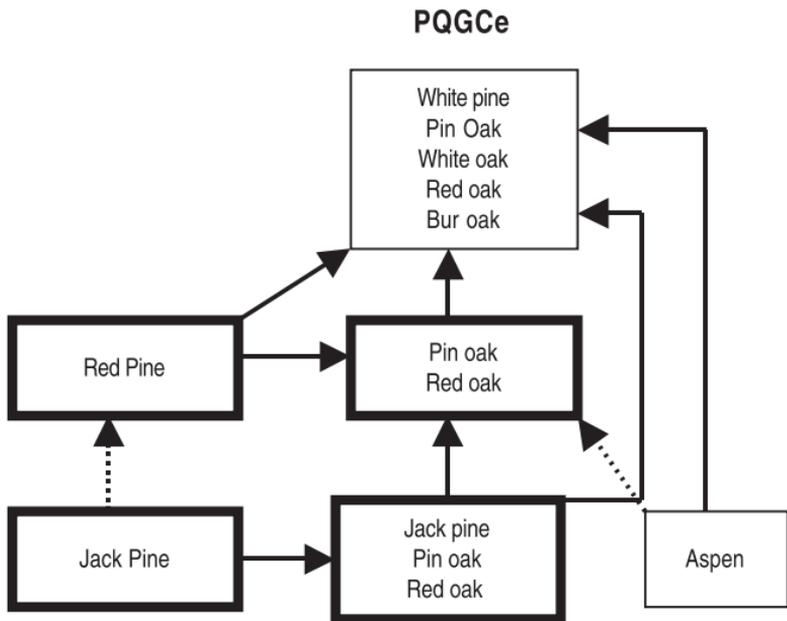
Although pin oak is generally considered a very shade intolerant species it is nevertheless the only species consistently reproducing in most stands on this

habitat type. In dense mature oak stands, no tree reproduction of any kind is found. It is assumed that any crown disturbance will again result in the reproduction of this species either through new seedlings or resprouting of grubs and stumps. Apparently, none of the more tolerant tree species of this region, with the exception of white pine, is capable of growing on these poor sites.

Disturbance and succession: All tree species occurring on this type are adapted to fire disturbance. In the absence of fire white pine appears to be

best suited for reproduction in the understory and could be expected to dominate undisturbed stands. It is not yet very abundant in present stands but where seed source is present it shows strong presence in the seedling and sapling layers.

Phase: PQGCe(Ap): The **Amorpha (Ap)** phase is identified by the presence of *Amorpha canescense*, leadplant, or *Campanula rotundifolia*, bluebell. It occurs in extreme western Burnett and NW Polk Counties. This phase appears to be associated with a historically distinct fire disturbance regime.



PArV and PArV-U
Pinus -Acer rubrum/Vaccinium
(Pinus strobus-Acer rubrum/Vaccinium angustifolium)
White pine-Red maple/Blueberries
and Uvularia sessilifolia (Sessile bellwort) variant

Distribution: **PArV** occurs in Region 3, and **PArV-U** occurs in Region 2 (see Regional Descriptions).

Landform and soils: These habitat types are associated predominantly with outwash, but occasionally occur on moraines where water worked sands have accumulated. They usually occur on excessively to somewhat excessively drained (can range to moderately well drained) sands and loamy sands. The moisture regime is **dry**, and the nutrient regime is **poor**.

Vegetation:

Common forest cover types: *Pine (jack, red, white)* and *aspen* dominated stands are most common. *Red oak* and *red maple* dominated stands are less frequent, but the two species are common associates. Mixtures of any of above species can be found. Pin oak and white birch are minor associates.

Shrub and small tree layer: The shrub layer is usually well developed with dense clumps common. Principal tall shrub species are *hazel* and *juneberry*. Other

well represented shrubs are *blueberries*, *blackberries*, *bush honeysuckle* and *sweet fern*.

Ground flora characteristics: *Bracken fern* typically is the dominant herb. On the **Uvularia** variant *big-leaf aster* often shares dominance. Other common species on both types are *wild lily-of-the valley*, *wintergreen* and *star flower*. *Barren strawberry* is well represented on the **PArV** type, especially in the northern parts of Region 3. *Wild sarsaparilla* and *sessile bellwort* are more common on the **Uvularia** variant.

Management implications:

These two habitat types are the most common type on sandy soils with moderate horizon development in northern Wisconsin. Considerable amount of management experience exists for this type.

The types have been managed most successfully for *jack pine*, *red pine*, and *aspen*. Unmanaged stands of *red oak* and *red maple* mixtures are also common. If these cover types are desirable for wildlife management or pulpwood production, they can easily be

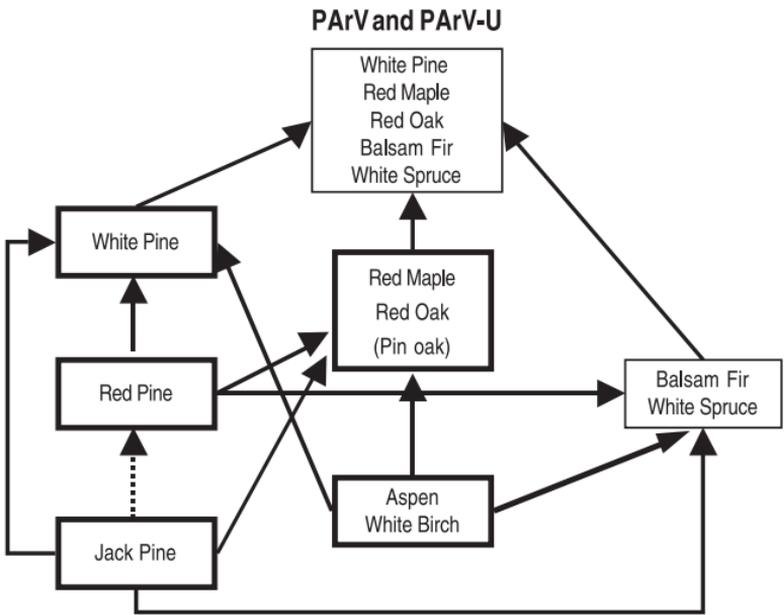
perpetuated because they are not threatened by the takeover by *sugar maple* and other tolerant hardwoods. However, saw-log quality *red oak* management is more effective on slightly more mesic and nutrient-richer habitat types.

White pine management is also possible, although these types represents the lower end of the range of habitat types suitable for this species.

Disturbance and succession: Most tree species commonly occurring on this habitat type, are adapted to fire disturbance. *Jack pine*, *red pine* and to a lesser degree *red oak* are dependent on fire for regeneration. Historically, pure and mixed stands of

pine (*jack*, *red* and *white*) were most prevalent. *Red oak* and *red maple* were common associates. *Aspen* stands were less common than they are today.

On this habitat type *white pine* is not dependent on fire for regeneration because it is sufficiently shade tolerant to regenerate in the understory of most communities that typically develop on this habitat type. Many current stands are dominated by *red oak* and *red maple* simply because *white pine* seed source has been eliminated through logging and fires in the past. *Red maple* and *red oak* do not compete with *white pine* in the main canopy layer, but rather constitute a second canopy layer.



PArVAo

Pinus -Acer rubrum/Vaccinium-Apocynum (Pinus strobus-Acer rubrum/Vaccinium angustifolium- Apocynum androsaemifolium) White pine-Red maple/Blueberries-Spreading dogbane

Distribution: Scattered throughout Region 4, but most common in the northern half (see Regional Descriptions).

Landform and soils: Associated predominantly with outwash, but occasionally occurs on moraines and lake plains where water worked sands have accumulated. Usually occurs on excessively to somewhat excessively drained sands and loamy sands. The moisture regime is **dry**, and the nutrient regime is **poor**.

Vegetation:

Common forest cover types: Most common type is pin oak, pure or with a mixture of pine (Jack, red, white) and fair quality aspen. Red maple saplings are often present.

Shrub and small tree layer:

This layer is generally sparse and under 3 feet tall. Best represented species are blueberries, raspberries, sweet fern, hazel and juneberry.

Ground flora characteristics:

Bracken fern typically is the dominant herb. Other well represented species are wild lily-of-the-valley and wintergreen. Common but less abundant are spreading dogbane, starflower, and wild strawberry.

Management implications:

The type has been managed most successfully for jack pine, red pine, and aspen. Unmanaged stands of red oak and red maple mixtures are also common. If these cover types are desirable for wildlife management or pulpwood production, they can easily be perpetuated because they are not threatened by the takeover by sugar maple and other tolerant hardwoods. However, sawlog quality red oak management is more effective on slightly more mesic and nutrient-richer habitat types.

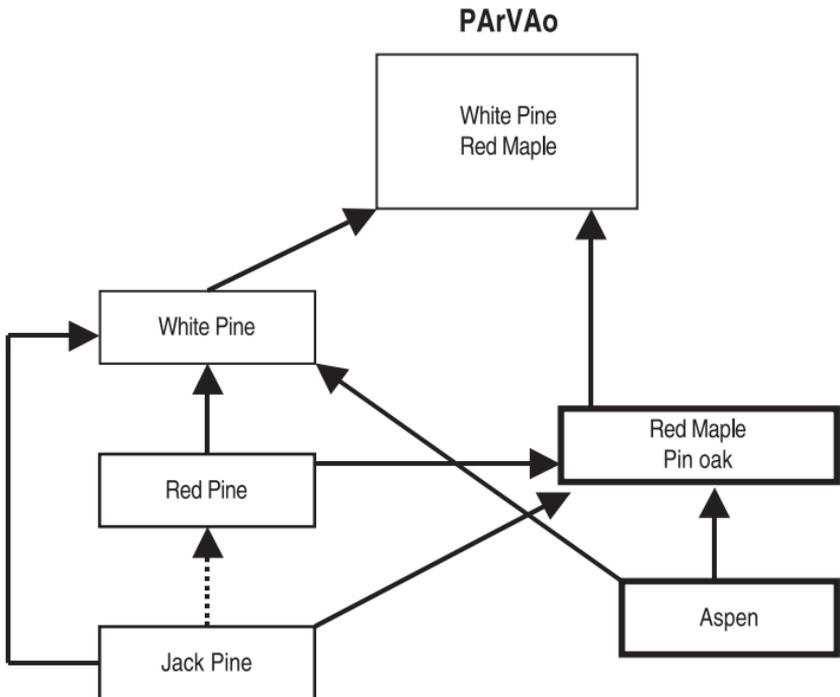
White pine management is also possible, although this type represents the lower end of the range of habitat types suitable for this species.

Disturbance and succession:

Most tree species commonly occurring on this habitat type, are adapted to fire disturbance. Jack pine, red pine and oak depend on fire for regeneration. Historically, pure and mixed stands of pine (jack, red and white) were most prevalent. Pin oak, red oak, aspen and red maple were common associates.

White pine is not dependent on fire for regeneration because it is sufficiently shade tolerant to

regenerate in the understory of most communities that typically develop on this habitat type. Many current stands are dominated by red oak, pin oak and red maple simply because white pine seed source has been eliminated through logging and fires in the past. Red maple and oak do not compete with white pine in the main canopy layer, but rather constitute a second canopy layer.



QAp
Quercus/Amorpha
(Quercus alba - Quercus spp./Amorpha canescens)
Oak/Leadplant

Distribution: Occurs only in extreme western Region 1 (see Regional Description).

Landform and soils: Occurs on deep, excessively drained outwash sands on the extreme southwestern end of the Bay-field Sand Plains. The moisture regime is **dry**, and the nutrient regime is **poor to medium**.

Vegetation:

Common forest cover types: Pure or mixed stands of jack pine and pin oak are most common. Also common are mixed oak (pin, red, bur, white) stands. Red pine and aspen stands are found less frequently.

Shrub and small tree layer: This layer is usually well developed and diverse, with dense clumps common. Occasionally, shrubs may be sparse, especially under dense oak stands. Most consistently present and best represented are hazel, chokecherry and juneberry. Poison ivy is often abundant. Blueberries are somewhat less common (70% constancy), but well represented when present. Other frequently occurring, but

less abundant species are black cherry, wild rose, and leadplant. Most common tree saplings are pin oak, bur oak and red maple.

Ground flora characteristics: Herb layer is poorly developed. Grasses and sedges typically represent most of the cover. Wild lily-of-the-valley and star-flowered Solomon's seal are often the only other common herbs. Other less frequent, but characteristic species are: columbine, hairy Solomon's seal, wild strawberry, Virginia creeper and dogbane.

Management implications: Management potential for this habitat type is not fully understood. Although it superficially resembles PQGce habitat type and it occurs on similar soils, QAp is decidedly more dry-mesic. This is evidenced by the common occurrence of white oak reproduction in many stands and occasional presence of white ash, hornbeam and elm reproduction.

Although jack pine is a common associate of pin oak dominated stands, jack pine natural regeneration efforts have largely

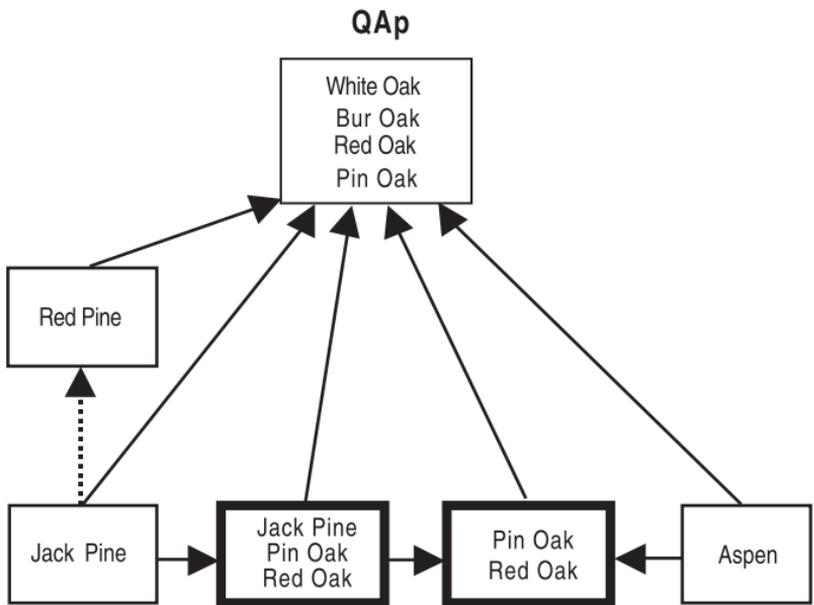
been unsuccessful on this type in Polk county (information from local foresters).

Aspen can be productive for wildlife. Red pine provides timber management alternative. Oaks are more productive on dry-mesic habitat types, but can be maintained for wildlife, firewood and pulp.

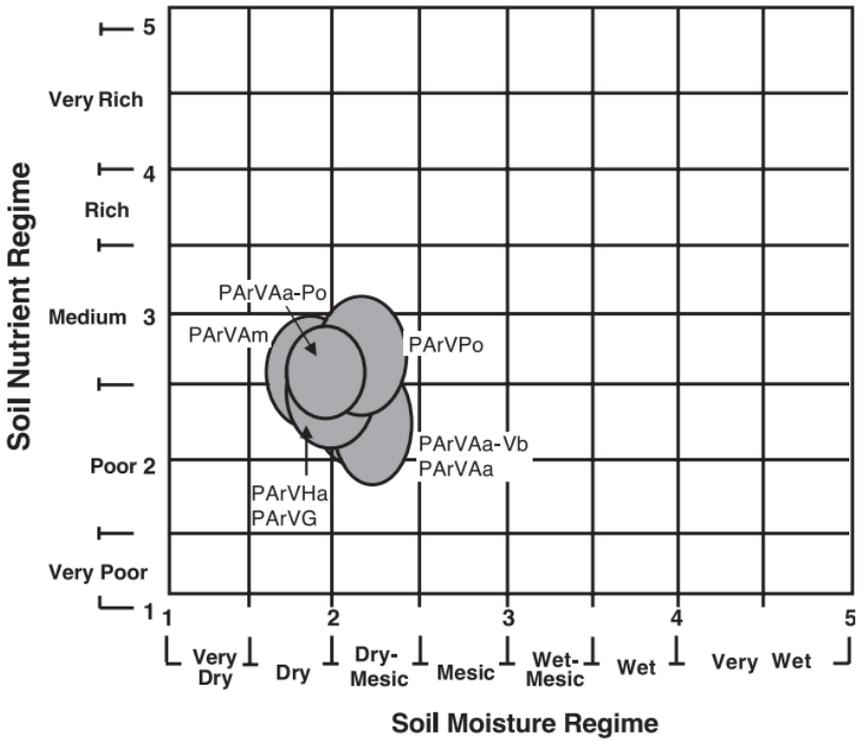
An important management consideration is a strong tendency on this type for the development of a dense and species-diverse shrub component.

Disturbance and succession: Historically, the landscape where QAp type occurs has

been strongly dominated by frequent fire disturbance. All current stands are dominated by shade intolerant and fire adapted species. In the original habitat type classification (Kotar et al. 1988) the type was named after pin oak because of this species' persistence on the landscape, largely due to its sprouting ability. However, there is no reason to believe that white pine could not become a permanent component of stands on this habitat type if seed source becomes available. The name Pinus-Quercus/Amorpha would perhaps be more appropriate.



Habitat Type Group 2 (Dry to Dry-Mesic, Poor to Medium)



PARVAm

Pinus-Acer rubrum/ Vaccinium -Amphicarpa (Pinus strobus-Acer rubrum/Vaccinium angustifolium. - Amphicarpa bracteata)

White pine-Red maple/Blueberries-Hog peanut

Distribution: Common in Region 1 (see Regional Description).

Landform and soils: Associated primarily with outwash, but also occurs on lake plains and moraines where water worked sands have accumulated. Occurs primarily on somewhat excessively to excessively drained (can range to moderately well drained) loamy sands and sands. The moisture regime is **dry to dry-mesic**. The nutrient regime is **poor to medium**.

Vegetation:

Common forest cover types: Aspen is the best represented cover type. Common associates in aspen stands are pine (jack, red, white), oak (red, pin, bur, or white) white birch and red maple. Stands composed of mixtures of any of the above species are also found.

Shrub and small tree layer: This layer typically is well developed. Hazel is usually the dominant shrub. Other well represented species include juneberry, bush honeysuckle, blueberries and blackberries.

Ground flora characteristics: Bracken fern and big leaf aster typically are the dominant herbs. Other common, but less abundant

species include hog peanut, wild lily of-the-valley, wild sarsaparilla, false Solomon's seal, northern bedstraw and small-flowered bellwort.

Management implications: This type is suitable for management of all early successional species occurring in this region. White pine is the most stable forest type and was the principal species of the old growth stands. The frequency of residual white pines, and natural white pine reproduction, is the highest on this habitat type in Region 1.

Mixtures of oaks also represent a high percentage of present stands on this habitat type. If oak management is desirable for either forestry or wildlife purposes, it is important to note that four species of oak commonly occur on this type (pin, bur and white oaks in addition to red oak). Because each of these species has different regeneration requirements, many strategies may be possible for maintaining an oak cover type. However, for optimal oak production, habitat types of group 3 (dry mesic) offer higher potentials.

This type is particularly suited for management of pines (jack, red, white), because growth potentials are high and competition pressure from shade tolerant hardwoods is relatively low.

Aspen and white birch are productive and can be considered for timber and wildlife benefits.

Management of mesic hardwoods is not recommended on this type, even though they sometimes occur here as invaders.

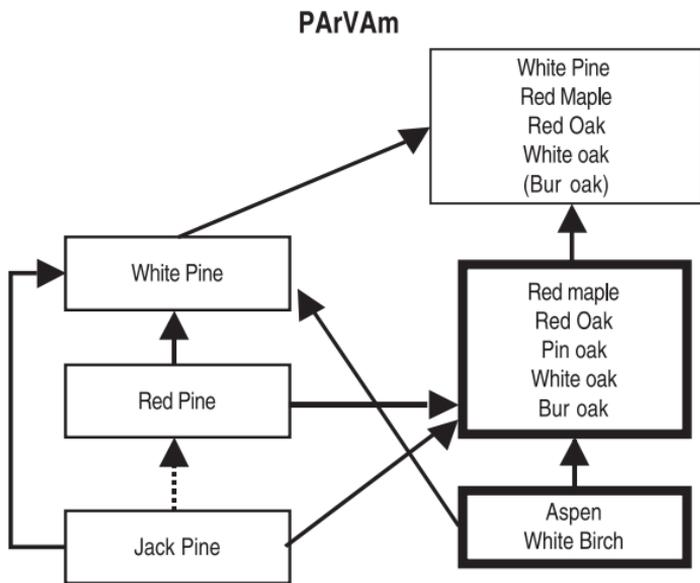
Disturbance and succession:

Most tree species commonly occurring on this habitat type, are adapted to fire disturbance. Jack pine, red pine, aspen, white birch and to a lesser degree red oak are dependent on fire for regeneration. Historically, pure and mixed stands of pine (jack, red and white) were most prevalent. White pine particularly was well represented. Red oak and red maple were common associates. Aspen stands were less common than they are today.

On this habitat type white pine is not dependent on fire for regen-

eration because it is sufficiently shade tolerant to regenerate in the understory of most communities that typically develop on this habitat type. Many current stands are dominated by red oak and red maple because white pine seed source has been eliminated through logging and fires in the past. Red maple and red oak do not compete with white pine in the main canopy layer, but rather constitute a second canopy layer.

Phase: PARVAm (Ap): The Amorphia (Ap) phase is identified by the presence of *Amorpha canescens*, leadplant, or *Campanula rotundifolia*, bluebell. It occurs in extreme western Burnett and NW Polk Counties. This phase appears to be associated with a historically distinct fire disturbance regime.



PARVHa

Pinus -Acer rubrum/Vaccinium-Hamamelis (Pinus strobus-Acer rubrum/Vaccinium angustifolium-Hamamelis virginiana)

White pine-Red maple/Blueberry-Witch hazel

Distribution: Common in south-western Region 5 (see Regional Description). Also occurs in Region 6.

Landform and soils: Associated predominantly with the rolling erosional surface of the Neilsville Sandstone Plateau. Also occurs on sandy stream terraces and outwash. Occurs primarily on somewhat excessively to moderately well drained loamy sands and sands. Also occurs on shallow sandy loams over sandstone. The moisture regime is **dry to dry-mesic**, the nutrient regime is **poor to medium**.

Vegetation:

Common forest cover types: Stands dominated by any of the following species are common: Pine (jack, red, white), oak (red, pin, black, white), red maple and aspen.

Shrub and small tree layer:

This layer is generally not dense. The following species are most common: Juneberry, Huckleberry, maple-leaf viburnum, black cherry, blackberries and raspberries, witch hazel and

beaked hazel. Although their constancies are only moderate Maple-leaf viburnum and especially witch hazel are strong indicators of this habitat type.

Ground flora characteristics:

With the exception of bracken fern and wild sarsaparilla herbs do not have high coverage. Other common species are: Blueberries, wintergreen, sessile bellwort, and big-leaf aster. There is a sporadic occurrence of some species that more strongly characterize wet-mesic types e.g.: starflower, swamp dewberry, partridgeberry, and winterberry.

Management implications:

White pine, red maple aspen and white birch clearly show better growth on this habitat type than they do on habitat types of group 1. If oak regeneration is desired control of red maple reproduction is often necessary.

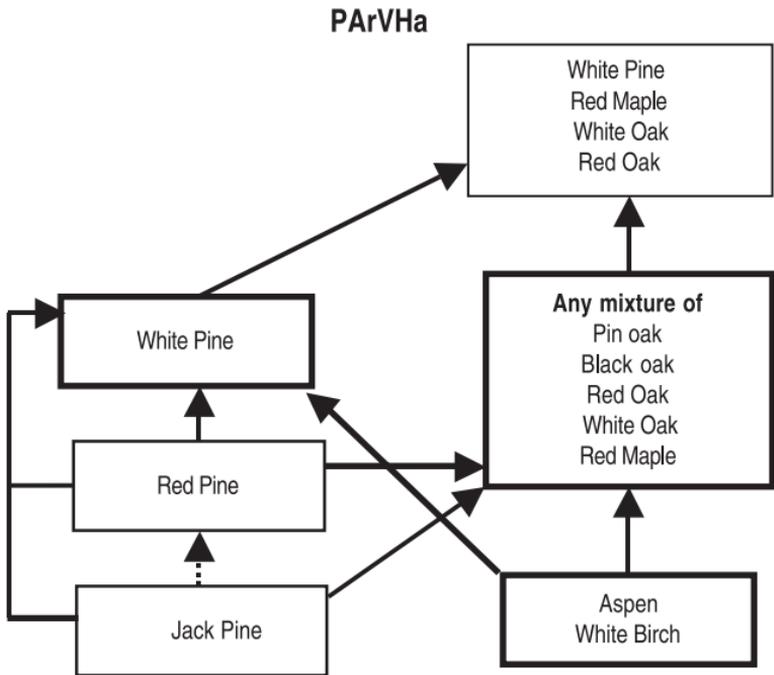
Disturbance and succession:

Many tree species commonly occurring on this habitat type, are adapted to fire disturbance. Jack pine, red pine, pin oak and to a lesser degree red oak are

dependent on fire for regeneration. Historically, pure and mixed stands of pine (jack, red and white) were most prevalent. White pine particularly was well represented. Red oak and red maple were common associates. Aspen stands have been much less common than they are today.

On this habitat type white pine is not dependent on fire for regeneration because it is sufficiently shade tolerant to

regenerate in the understory of most communities that typically develop on this habitat type. Many current stands are dominated by red oak and red maple simply because white pine seed source has been eliminated through logging and fires in the past. Red maple and oaks do not compete with white pine in the main canopy layer, but rather constitute a second canopy layer.



PARVAa, PARVAa-Po, PARVAa-Vb

**Pinus -Acer rubrum/Vaccinium-Aralia habitat type
(Pinus strobus-Acer rubrum/Vaccinium angustifolium-
Aralia nudicaulis)**

**White pine-Red maple/Blueberry-Wild sarsaparilla habitat type
and**

**Polygonatum pubescens (Hairy Solomon's seal) variant
Viburnum acerifolium (Mapleleaf viburnum) variant**

Distribution: **PARVAa** and its two geographic variants are a very common and widely distributed suite of habitat types. **PARVAa** occurs throughout Region 3, common in some areas and scattered in others. The **Po** variant is common in northeastern Region 2. The **Vb** variant is common in northern Region 4, but is supplanted by a similar habitat type (**PARVPO**) in the south (see Regional Descriptions).

Landform and soils: Associated primarily with outwash, but also occur on moraines and lake plains where water worked sands have accumulated. Occur primarily on somewhat excessively to excessively drained loamy sands, but drainage class may range from excessively drained to moderately well drained, and texture from sand to sandy loam. The moisture regime is **dry to dry-mesic**. The nutrient regime is **poor to medium**.

Vegetation:

Common forest cover types: Any mixture of white pine, red pine, aspen, red oak and red maple are the most prevalent cover types. White birch, balsam fir and white spruce are common associates. On the **Po** variant, sugar maple is sometimes present.

Shrub and small tree layer:

This layer is usually well developed. Dominant tall shrub typically is beaked hazel. Also well represented are blackberries, junberries and blueberries. Less well represented are bush honeysuckle and American fly-honeysuckle. Mapleleaf viburnum is frequent on the **Vb** and occasional on the **Po** variant.

Ground flora characteristics:

Bracken fern and large-leaved aster typically are the dominant herbs. Other well represented species include wintergreen, wild lily-of-the-valley and starflower. Less frequently present but distinguishing this habitat

type from dry and nutrient poor types are wild sarsaparilla and yellow beadlily. Rosey twisted stalk and barren strawberry are often present, especially on the **PARVAa**. Spreading dogbane and fringed polygala are more common on the **Vb** variant.

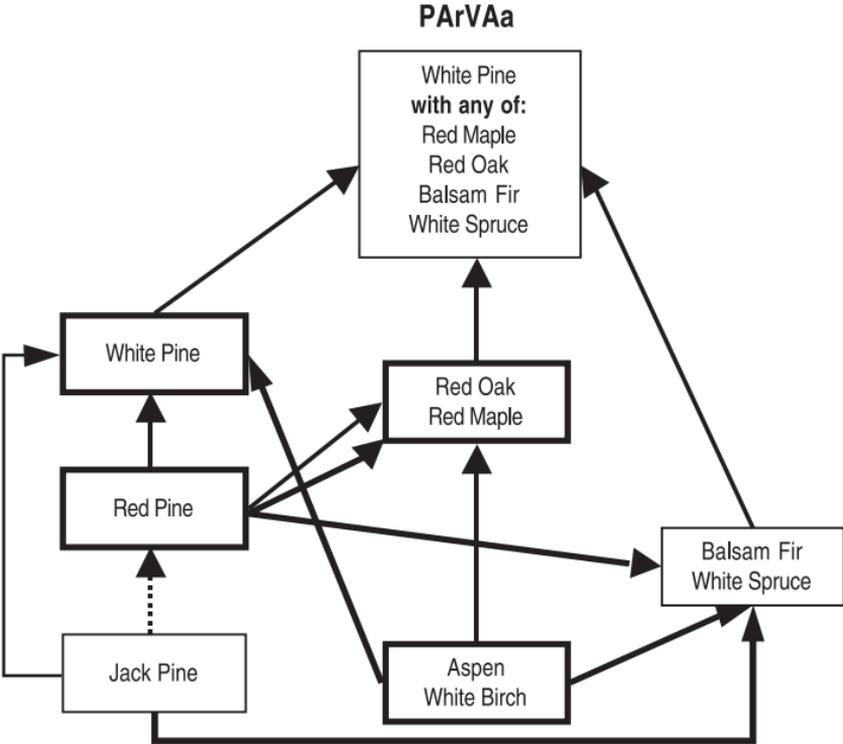
Management implications: This type is particularly suited for management of pines (jack, red, white), because growth potential for these species is high and competition pressure from understory vegetation and shade tolerant hardwoods is relatively low. This is especially true for red and jack pine whose growth

does not increase appreciably on more mesic habitat types while competition pressure on those types is significantly greater.

Aspen and white birch should also be considered as an alternative from both the forestry and wildlife point of view.

Red oak grows moderately well on this type and is a good choice for wildlife or fiber production management. However, for optimal oak production, habitat types of group 3 (dry mesic) offer higher potentials.

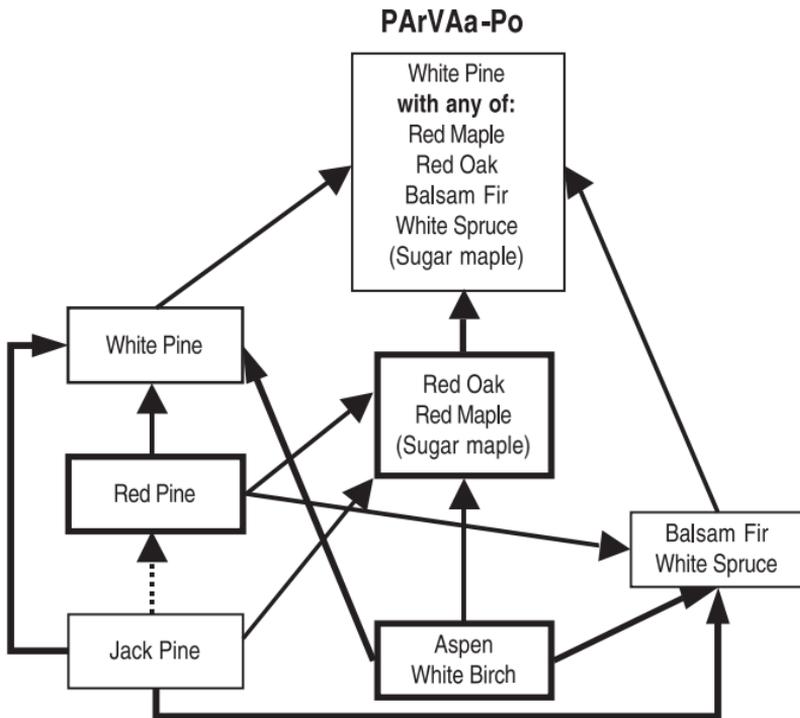
This type has a good potential for the maintenance of the shrub component if desirable for wildlife.



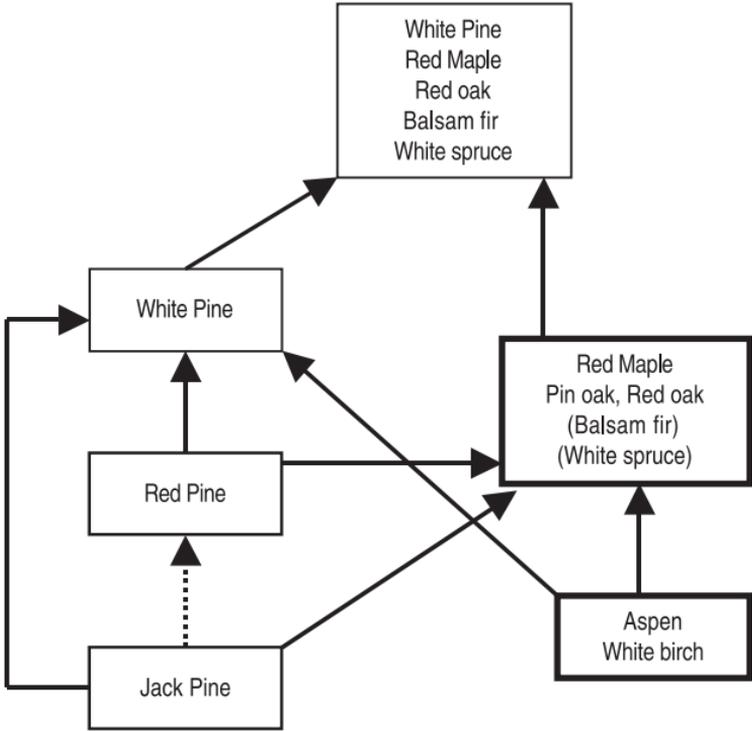
Potential for hardwood management (other than red oak and red maple) is very low.

Disturbance and succession: Most tree species commonly occurring on this habitat type, are adapted to fire disturbance. Jack pine, red pine, aspen, white birch and to a lesser degree red oak are dependent on fire for regeneration. Historically, pure and mixed stands of pine (jack, red and white) were most prevalent. White pine particularly was well represented. Red oak and red maple were common associates. Aspen stands were less common than they are today.

White pine is not dependent on fire for regeneration because it is sufficiently shade tolerant to regenerate in the understory of most communities that typically develop on this habitat type. Many current stands are dominated by red oak and red maple simply because white pine seed source has been eliminated through logging and fires in the past. Red maple and red oak do not compete with white pine in the main canopy layer, but rather constitute a second canopy layer.



PARVAa-Vb



PARVPo

Pinus -Acer rubrum/Vaccinium-Polygonatum (Pinus strobus-Acer rubrum/Vaccinium angustifolium- Polygonatum pubescens)

White pine-Red maple/Blueberry-Hairy Solomon's seal

Distribution: Generally, of localized occurrence in southcentral Region 4 (see Regional Descriptions).

Landform and soils: Associated predominantly with outwash, but also occurs on moraines where water worked sands have accumulated. Occurs primarily on somewhat excessively to excessively drained loamy sands, but drainage class may range from excessively drained to moderately well drained, and texture from sand to sandy loam. The moisture regime is **dry to dry-mesic**. The nutrient regime is **poor to medium**.

Vegetation:

Common forest cover types: Stands dominated by any mix of the following species are common: jack-, red-, white pine; red oak, pin oak, red maple and aspen.

Shrub and small tree layer:

This layer often is well developed. Typical dominant shrubs are hazel, blackberries, blueberries, chokecherry, juneberry and bush honeysuckle. Red maple is most common sapling.

Ground flora characteristics:

Bracken fern typically is the dominant herb. Other herb species tend to be poorly represented. Most frequently present are wild lily-of-the valley, whorled loosestrife, spreading dogbane and starflower. This habitat type's namesake, hairy solomon's seal (*Polygonatum pubescens*), occurred with high frequency on the Menominee Indian Reservation where the type was first described. Elsewhere in Region 4 Solomon's seal is less common.

Management implications:

This type is particularly suited for management of pines (jack, red or white), because growth potential for these species is high and competition pressure from understory vegetation and shade tolerant hardwoods is relatively low. This is especially true for red and jack pine whose growth does not increase appreciably on more mesic habitat types while competition pressure on those types is significantly greater.

Aspen should also be considered as an alternative from both the forestry and wildlife point of view.

Red oak grows moderately well on this type and is a good choice for wildlife or fiber production management. However, for optimal oak production, habitat types of the dry mesic group offer higher potentials.

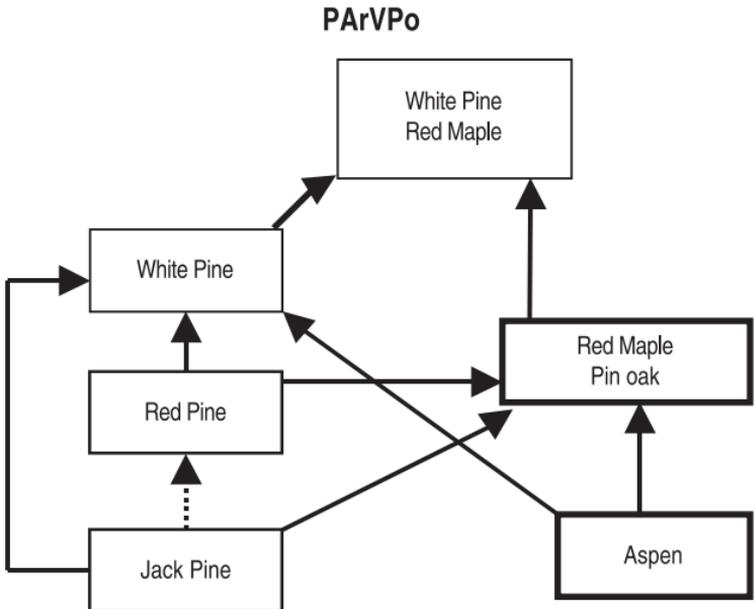
This type has a good potential for the maintenance of the shrub component if desirable for wildlife.

Potential for hardwood management (other than red oak and red maple) is very low.

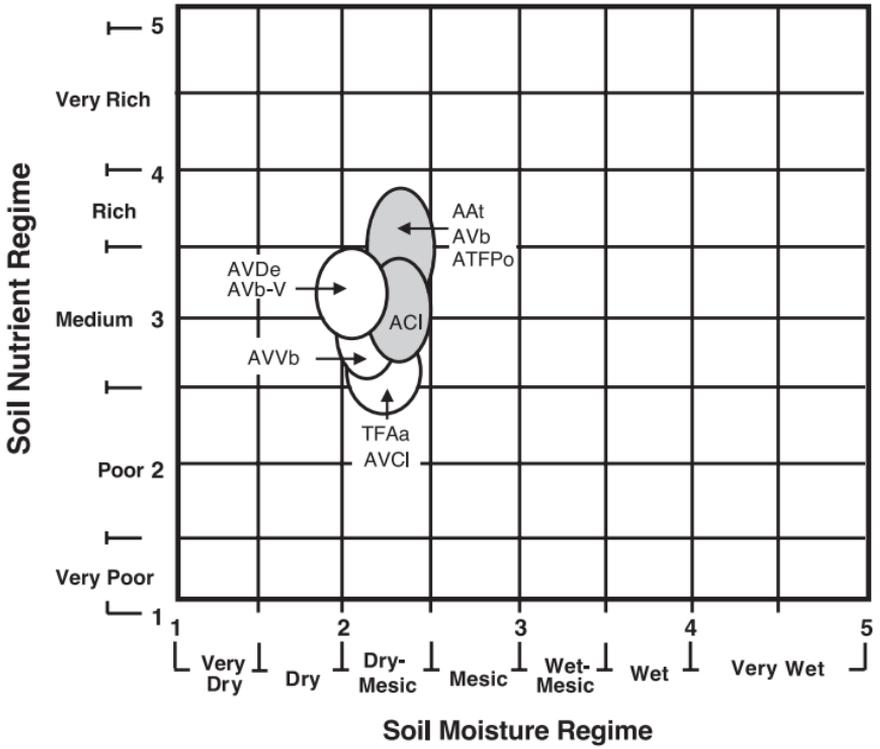
Disturbance and succession: Most tree species commonly occurring on this habitat type, are adapted to fire disturbance. Jack pine, red pine, pin oak and to a lesser degree red oak depend on fire for regeneration. Historically, pure and mixed stands of pine (jack, red and white) were

most prevalent. White pine particularly was well represented. Red oak and red maple were common associates. Although less common than today, aspen often became established following fires, but was soon succeeded by white pine.

White pine is not dependent on fire for regeneration because it is sufficiently shade tolerant to regenerate in the understory of most communities that typically develop on this habitat type. Many current stands are dominated by red oak and red maple simply because white pine seed source has been eliminated through logging and fires in the past. Red maple and red oak do not compete with white pine in the main canopy layer, but rather constitute a second canopy layer.



Habitat Type Group 3 (Dry Mesic, Poor to Rich)



AVVb
Acer/Vaccinium-Viburnum
(Acer saccharum/Vaccinium angustifolium-
Viburnum acerifolium)
Sugar maple/Blueberry-Maple-leaved viburnum

Distribution: Scattered throughout Region 3 (see Regional Description).

Landform and soils: Associated predominantly with end/recessional moraines and pitted outwash. Occurs primarily on well drained sandy loams, but also occurs on loamy sands. The moisture regime is **dry-mesic**. The nutrient regime is **medium**.

Vegetation:

Common forest cover types: Stands dominated by any of the following species are most common: Red oak, red maple, white birch and aspen. Frequent associates are white and red pine, balsam fir and white spruce. In some stands sugar maple is well represented. (Basswood and white ash are conspicuously under-represented on this habitat type).

Shrub and small tree layer: This layer typically is diverse and well developed. The best represented species typically are hazel and maple-leaved viburnum. Other common shrubs include juneberry, black-

berries and bush honeysuckle. Blueberries typically can be found, but are not well represented.

Ground flora characteristics: Bracken fern and large-leaved aster typically are the dominant herbs. Other frequently present species include wintergreen, starflower, wood anemone, wild sarsaparilla, sessile bellwort, partridgeberry, wild lily-of-the valley and rosey twisted stalk.

Management implications:

This type was dominated by white and red pine in the pre-logging era and large charred stumps are still common today. However, aspen, white birch, red oak and red maple also appear to be well suited for this type and many of the present stands contain a large component of these species. Red oak reproduction is usually present and it responds well to release. Many examples of a shelterwood cut demonstrate that oak can more than keep pace with sugar and red maple height growth. In the absence of disturbance, stands on this habitat type are gradually taken

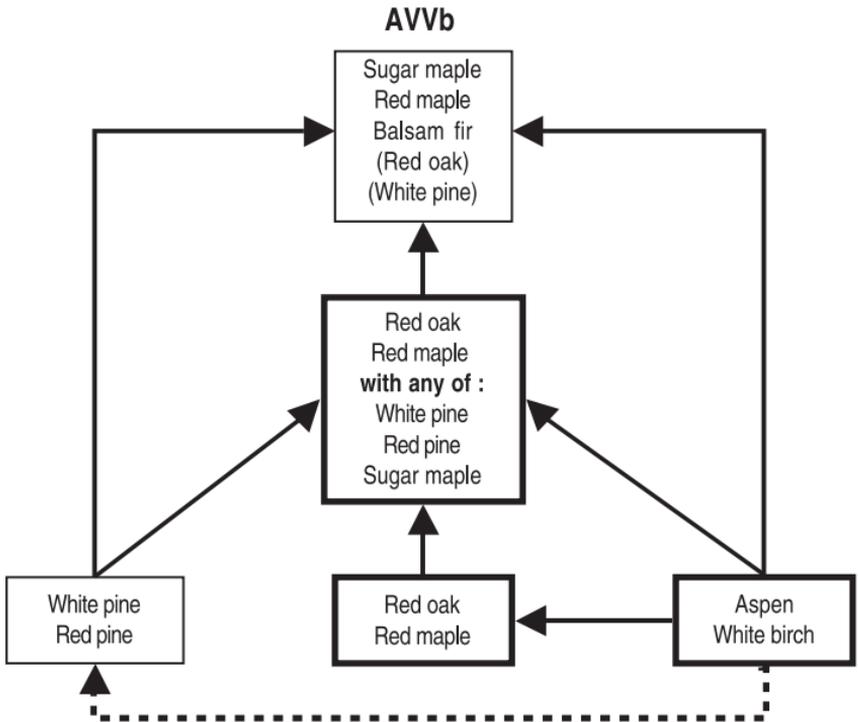
over by sugar maple. However growth and yield of sugar maple is suboptimal and this habitat type probably should not be considered a high priority for long rotation hardwood management under most conditions.

Some of the stands are developing a natural understory of white pine, providing another management option in the future.

An important characteristic of this type from the wildlife management point of view is its high potential for shrub layer development and low potential for ground vegetation.

Disturbance and succession:

This habitat type typically represents conditions where soils marginally support sugar maple, but where historically fire also played an important role. White pine was a prominent species in presettlement forests. Current stands typically are dominated by red oak and red maple, or aspen and white birch, but reinvasion of white pine is occurring where seed source is present. However, in the absence of disturbance or management, sugar maple and red maple will increasingly dominate future stands.



AVCI

Acer /Vaccinium-Clintonia

(Acer saccharum/Vaccinium angustifolium-Clintonia borealis)

Sugar maple/Blueberry-Yellow beadleily

Distribution: Occurs in Region 2 (see Regional Description).

Landform and soils: Associated predominantly with coarse, rolling moraines. Occurs primarily on moderately well drained sandy loams and loamy sands. The moisture regime is **dry-mesic**. The nutrient regime is **poor to medium**.

Vegetation:

Common forest cover types: Stands dominated by any of the following species are most common: aspen, white birch, red oak, red maple and sugar maple. Common associates are white pine, balsam fir and white spruce.

Shrub and small tree layer:

This layer is usually well developed. Dominant tall shrubs typically are beaked hazel, mountain maple, fly honeysuckle and juneberry. Other frequent species with typically lower coverage are blueberries, bush honeysuckle and alternate-leaved dogwood.

Ground flora characteristics:

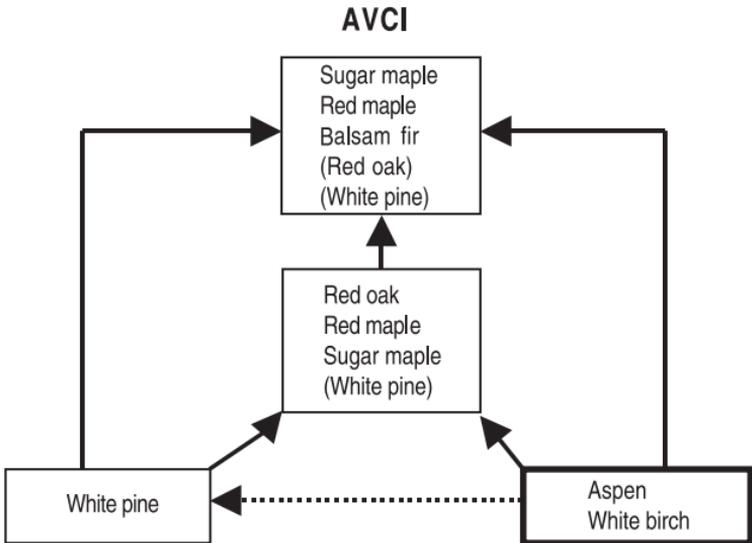
This layer typically is well developed and species diverse. Dominant herbs typically are bracken fern, large-leaved aster and wild sarsaparilla. Frequent, but with lower coverage are rosey twisted stalk, hairy solomon's seal, sessile bellwort, starflower, wild lily -of-the valley, yellow beadleily and ground pine.

Management implications:

Although sugar maple reproduction is often well represented this habitat type does not support quality sugar maple stands. Basswood exhibits better form than sugar maple, but is not well represented. White ash and yellow birch are found only rarely. From forestry perspective the most suitable species are aspen, red maple and all native conifers except hemlock.

Disturbance and succession: This habitat type typically represents conditions where soils marginally support sugar maple, but where historically fire also played an important role. White pine was a prominent species in many presettlement forests, but is poorly represented in current stands, apparently due to lim-

ited seed source. Many current stands are dominated by red oak, white birch or aspen, but in the absence of disturbance or management, sugar maple and red maple will increasingly dominate future stands. Presence of balsam fir and white spruce will also increase.



TFAa
Tsuga-Fagus/Aralia
(Tsuga canadensis-Fagus grandifolia/Aralia nudicaulis)
Eastern hemlock-American beech /Wild sarsaparilla

Distribution: Mainly along the shorelines of Door Peninsula.

Landform and soils: Lacustrine, or glacial lake bed deposits, are typical landforms. This type occurs in same areas as the **ATFSt** type, but has ground water influence within approximately five feet of the surface. In spite of this subsurface moisture vegetation reflects **dry mesic, low to medium** nutrient conditions, in great contrast to the **ATFSt** habitat type.

Vegetation:

Common forest cover types: Most common are stands dominated by aspen, red oak and red maple. Important associates are white pine, hemlock and beech.

Shrub and small tree layer: This layer typically is moderately

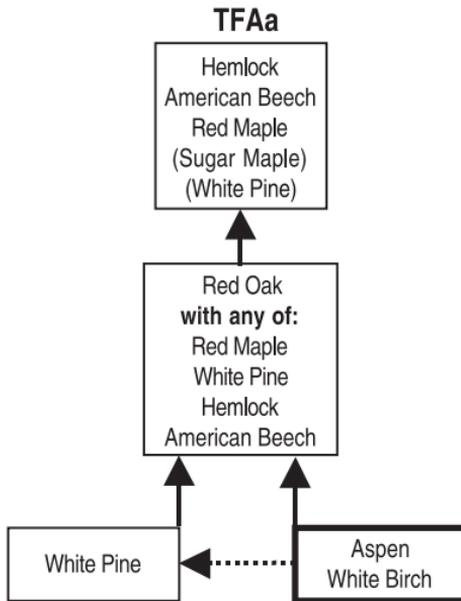
well developed. Most common species are beaked hazel, juneberry, chokecherry, fly honeysuckle, bush honeysuckle and blackberries. Blueberries are conspicuously rare for a sandy soil habitat type.

Ground flora characteristics: Herb layer typically is dominated by bracken fern, wild sarsaparilla, large-leaved aster and grasses and sedges. Other common species include fringed polygala, yellow beedlily, partridgeberry, starflower and wild lily-of-the-valley.

Management implications: This type is favorable for management of red oak and white pine, although red maple competition will probably have to be dealt with in many stands.

Disturbance and succession: All tree species listed above under common forest cover types are capable of colonizing this type after a disturbance. Succession toward more shade tolerant species is less evident here than on the closely

associated **ATFSt** type. Red maple, beech and to some extent hemlock, are the only species showing some evidence of succession. Sugar maple and basswood do not appear to be suited to this habitat type.



AVDe
Acer/Vaccinium-Desmodium
(Acer saccharum/Vaccinium angustifolium-
Desmodium glutinosum)
Sugar maple/Blueberry-Pointed-leaved tick trefoil

Distribution: Common in Region 1 (see Regional Description).

honeysuckle, blackberries and alternate-leaved dogwood.

Landform and soils: Associated primarily with end/recessional moraines, but also occurs on outwash and coarse, rolling ground moraines. Occurs primarily on well drained sandy loams and loamy sands. The moisture regime is **dry-mesic**. The nutrient regime is **medium**.

Ground flora characteristics: Bracken fern and large-leaved aster typically are the dominant herbs. Other well represented species include wild sarsaparilla, hog peanut, early meadowrue, interrupted fern, pointed-leaved tick trefoil, false Solomon's seal and sessile bellwort.

Vegetation:

Common forest cover types: Stands dominated by any of the following species are common: Aspen, oak (red, white) and red maple. Sugar maple is often present and its dominance will probably increase in the future. Additional associates include white pine, white birch and basswood.

Management implications:

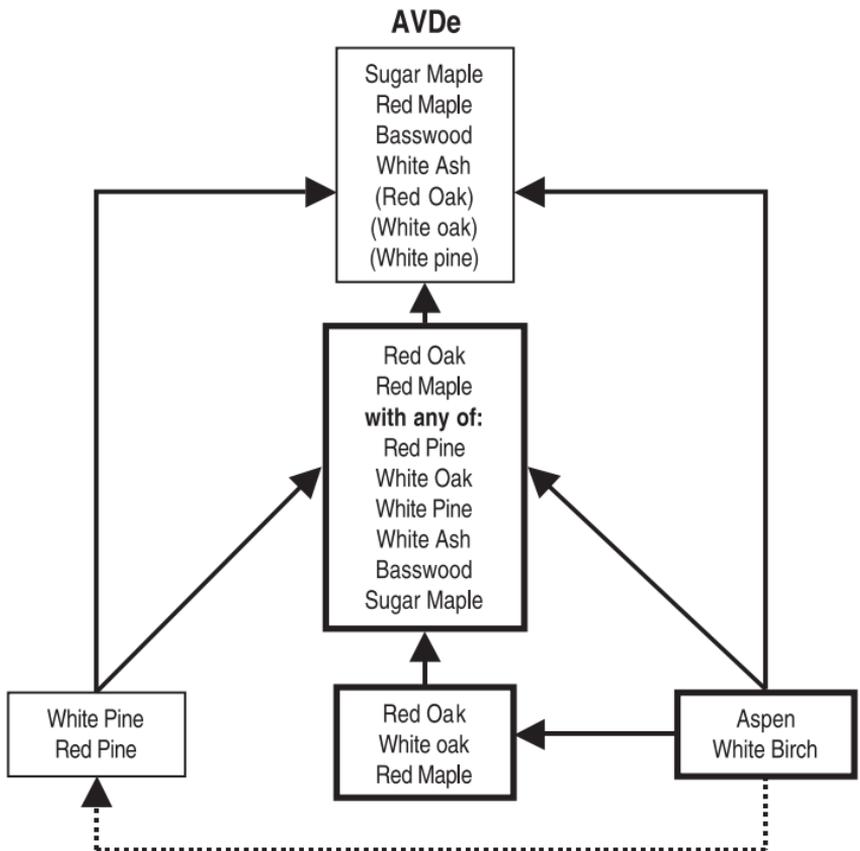
This type is suitable for management of most early successional species for either fiber, wildlife, or other purposes. Oak stands (red and white) are common and regeneration potential appears to be high. Although sugar maple, basswood and ironwood occur here, they do not grow well enough to out-compete the oaks. However, seedlings and saplings of these species, together with several shrub species, contribute to the vertical structure of the stands which is considered desirable for wildlife. This habitat type offers some of the best opportunities for enhancement of vegetation structure and diversity.

Shrub and small tree layer:

This layer typically is moderately well developed and diverse in species. Maple-leaved viburnum and hazel are usually best represented. Other common species with lower coverages are blueberries, bush

Disturbance and succession: This habitat type typically represents conditions where soils marginally support sugar maple, but where historically fire also played an important role. White pine was a prominent species in many presettlement forests. Current stands typically are

dominated by red oak, white oak, red maple, or aspen but reinvasion of white pine is occurring where seed source is present. However, in the absence of disturbance or management, shade tolerant mesic species will increasingly dominate future stands.



AVb-V

Acer/Viburnum (Vaccinium variant) **(Acer saccharum/Viburnum acerifolium)** **(Vaccinium angustifolium variant)**

Sugar maple/Maple-leaved viburnum (Blueberry variant)

Distribution: Scattered in western Region 5 (see Regional Description).

Landform and soils: Associated predominantly with erosional surfaces and moraines. Occurs primarily on well to moderately well drained sandy loams and loamy sands over till and sandstone. The moisture regime is **dry-mesic to dry**. The nutrient regime is **medium**.

Vegetation:

Common forest cover types: Stands dominated by oak (red, white), red maple and aspen are most common. Sugar maple is not well represented in current stands. Other, less common associates are white birch, white pine and basswood.

Shrub and small tree layer:

Tall shrub layer often characterizes this habitat type. Best represented species are witch hazel, beaked hazel and maple-leaved viburnum. Other common shrubs are juneberry, blackberries, blueberries and bush honeysuckle.

Ground flora characteristics:

Bracken fern and large-leaved aster typically are the dominant herbs. Other common species include wild sarsaparilla, pointed-leaf tick trefoil sessile bellwort, interrupted fern, round-lobed hepatica, false Solomon's seal, starflower, wood anemone and whorled loosestrife.

Management implications:

This habitat type is well suited for management of mid-tolerant species (red oak, white oak, white pine and white ash) because sugar maple is poorly represented in most current stands, and when present, it competes less aggressively than it does on the mesic habitat types. Aspen and white birch also grow exceptionally well on this type.

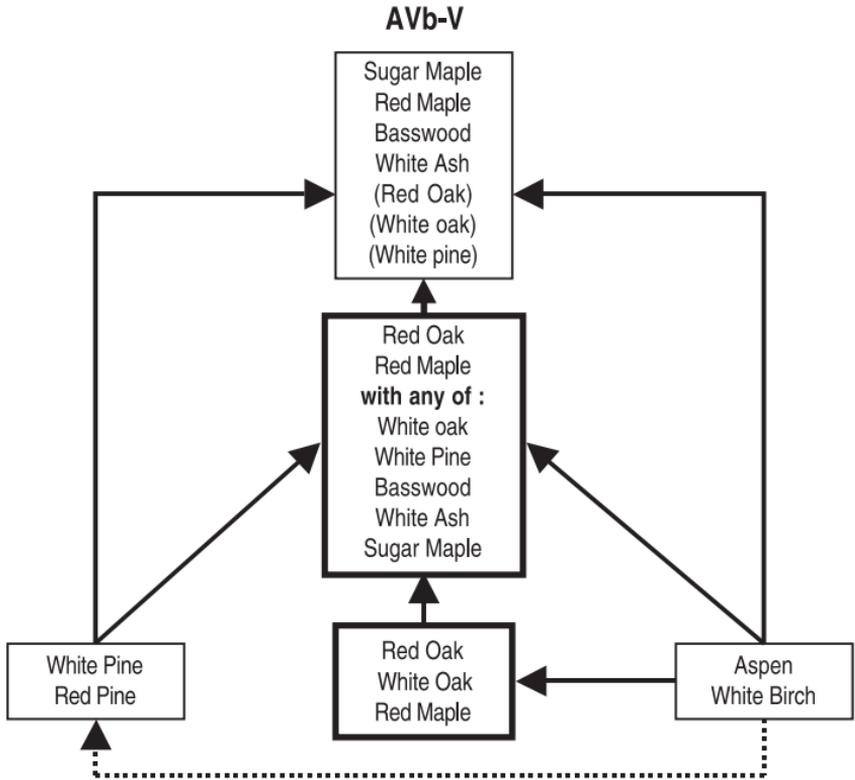
Important characteristics of this type for wildlife management are the high potential for development of shelter and forage (shrubs, oaks, aspen).

Disturbance and succession:

This habitat type typically represents conditions where soils support the mesic species (e.g.,

sugar maple, basswood, white ash), but where historically fire also played an important role. White pine was a prominent species in presettlement forests. Current stands typically are dominated by red oak, white oak and red maple, but reinvasion

of white pine is occurring where seed source is present. However, in the absence of disturbance or management, shade tolerant mesic species (sugar maple, red maple, basswood, white ash) will increasingly dominate future stands.



ACI
Acer/Clintonia
(Acer saccharum/Clintonia borealis)
Sugar maple/Yellow beadleily

Distribution: Occurs in Region 2 (see Regional Description).

Landform and soils: Associated predominantly with rolling moraines. Occurs primarily on well drained sandy loams. The moisture regime is **dry-mesic**. The nutrient regime is **medium**.

Vegetation:

Common forest cover types: Stands dominated by any of the following species are most common: Red oak, red maple, sugar maple, white birch and aspen. Common associates include: Basswood, white ash and yellow birch.

Shrub and small tree layer: This layer typically is only moderately well developed. Best represented species are hazel and fly honeysuckle. Other frequent species are juneberry and alternate-leaved dogwood.

Ground flora characteristics: Herb layer typically is well developed and species rich.

Best represented herbs are wild sarsaparilla and large-leaved aster. Other frequent and well represented species are: wild lily-of-the valley, starflower, sessile bellwort and yellow beadleily. Also common are: False Solomon's seal, hairy Solomon's seal, rosey twisted stalk, shield fern and ground pine.

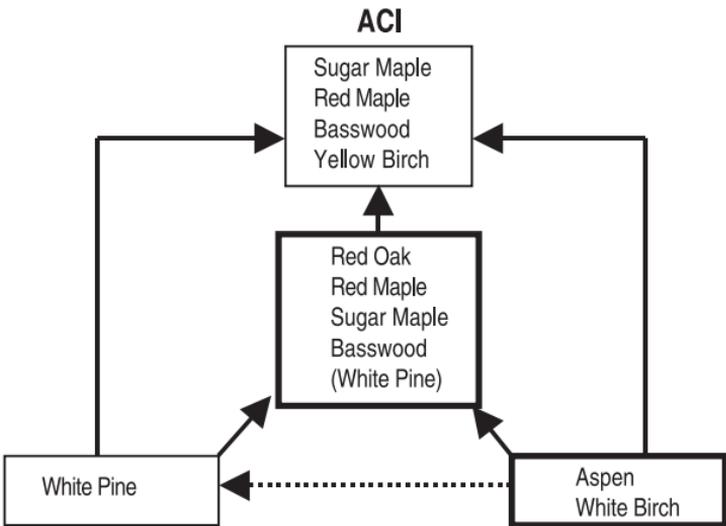
Management implications:

Sugar maple is well represented in many current stands and exhibits moderate growth and vigor, but competes less aggressively than it does on the more mesic habitat types. Of the typical associates of sugar maple in northern forests (e.g., basswood, white ash, yellow birch) only basswood sometimes occurs. From forestry perspective the most suitable species are aspen, red maple and all native conifers except hemlock. Encouraging conifer component can contribute to landscape diversity and wildlife habitat.

Disturbance and succession:

This habitat type represents conditions where soils support shade tolerant mesic hardwoods (e.g., sugar maple, red maple, basswood, white ash and yellow birch). Windthrow instead of fire historically was (and still is) the primary disturbance factor. There was considerable presence of white pine and red oak in presettlement forests. White

pine is typically absent today, while red oak dominated stands are relatively common, presumably due to selective logging pressure and red oak's ability to sprout. However, in the absence of disturbance or management, tolerant mesic hardwoods will increasingly dominate future stands. Presence of balsam fir and white spruce will also increase.



AVb
Acer/Viburnum
(Acer saccharum/Viburnum acerifolium)
Sugar maple/Maple-leaved viburnum

Distribution: Common throughout Region 4, and scattered across Region 5 and south-eastern Region 3 (see Regional Descriptions).

Landform and soils: Associated predominantly with end/recessional moraines (particularly those deposited by the Green Bay lobe), but also occurs on coarse, rolling ground moraines. Occurs primarily on well drained sandy loams, but also occurs on loamy sands and loams. The moisture regime is **dry-mesic**. The nutrient regime is **medium to rich**

Vegetation:

Common forest cover types: Stands dominated by red oak, red maple and aspen are most common. Primary associates are white birch and white pine. Sugar maple is not well represented in current stands. Other less common associates are basswood and white ash.

Shrub and small tree layer: A well developed tall shrub layer often characterizes this habitat

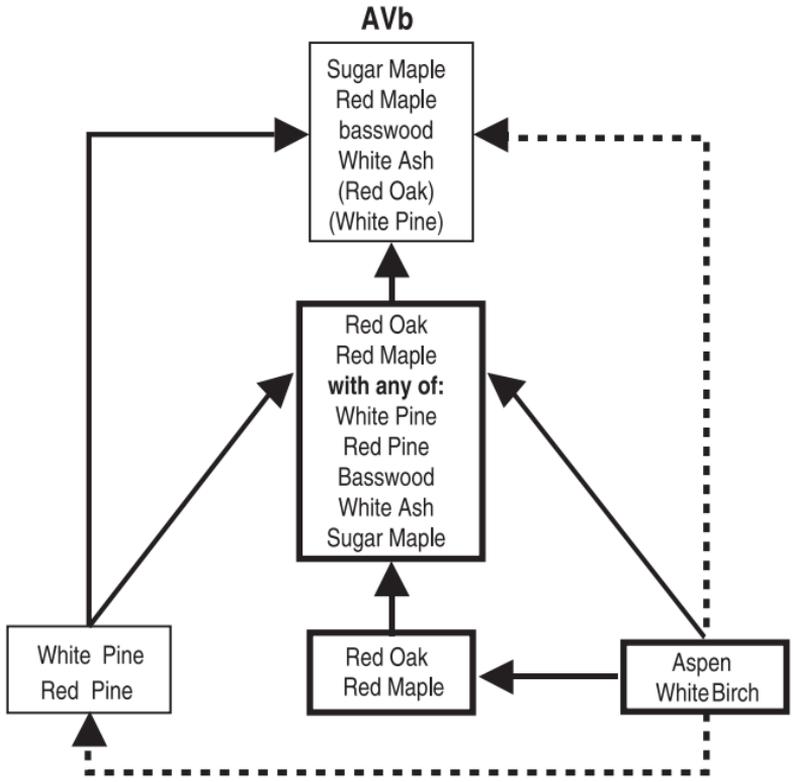
type. Best represented species are hazel, maple-leaved viburnum and witch hazel. Other common shrubs are juneberry, blackberries and bush honeysuckle. Red maple typically is the dominant sapling.

Ground flora characteristics: Bracken fern and large-leaved aster typically are the dominant herbs. Other common species include wild sarsaparilla, trillium, hog peanut, round-lobed hepatica, false Solomon's seal, starflower, wood anemone and wild lily-of-the-valley.

Management implications: On this habitat type, red oak, white pine, white birch and aspen demonstrate excellent growth and vigor. Performance of red maple, white ash and basswood is moderate. Sugar maple is poorly represented in most current stands, exhibits relatively poor growth and vigor, and competes less aggressively than it does on the more mesic habitat types.

Disturbance and succession: This habitat type typically represents conditions where soils support the mesic species (e.g., sugar maple, basswood, white ash), but where historically fire played an important role. White pine was a prominent species in presettlement forests. Current

stands typically are dominated by aspen, red oak and red maple, but reinvasion of white pine is occurring where seed source is present. However, in the absence of disturbance or management, shade tolerant mesic species will increasingly dominate future stands.



AAt
Acer/ Athyrium
(Acer saccharum/Athyrium filix-femina)
Sugar maple/Lady fern

Distribution: Common in Region 1 (see Regional Description).

Landform and soils: Associated predominantly with moraines and loess deposits. Occurs primarily on well to moderately well drained loams (sl, l, sil). The moisture regime is **dry-mesic**, the nutrient regime is **medium to rich**.

Vegetation:

Common forest cover types: Stands dominated by the following species are most common: red oak, white oak, red maple, sugar maple and aspen. White pine, basswood, white ash and white birch are common associates.

Shrub and small tree layer: This layer typically is moderately well developed. Best represented species are maple-leaved viburnum, hazel and alternate-leaved dogwood.

Ground flora characteristics: Large-leaved aster is the best represented herb. Bracken fern

can be locally abundant but it is considerably less important than it is on drier habitat types. Other common species are sweet cicely, trillium, early meadowrue, hog peanut, wild sarsaparilla, sessile bellwort, starflower, tick trefoil, wild geranium, interrupted fern, and lady fern.

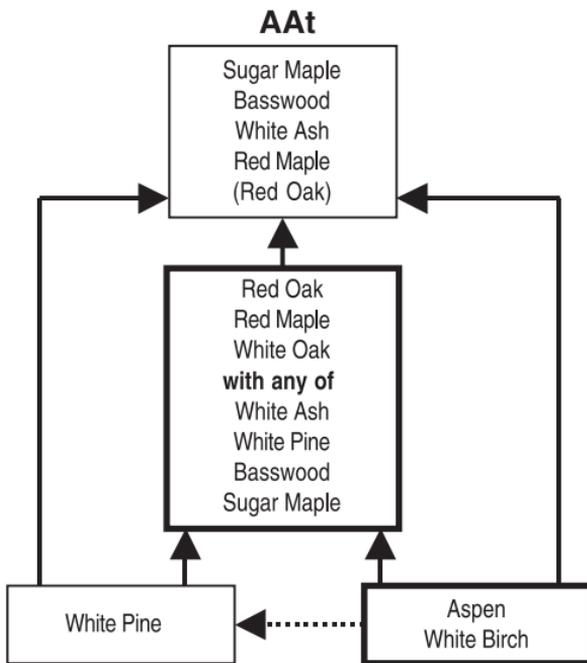
Management implications:

Together with ACaCi this is the principal habitat type in Region 1 for effective hardwood management. It differs considerably from the related types in other regions by complete absence of hemlock and yellow birch and by strong representation of red oak and red maple in early and mid-successional stands. Potential for oak management is high. Aspen and white birch also demonstrate excellent growth and vigor.

Mesic hardwoods (sugar maple, red maple, basswood, white ash) offer another alternative. Although this is not an optimal habitat type, potential growth and quality are good.

Disturbance and succession: This habitat type represents conditions where soils support shade tolerant mesic hardwoods (e.g., sugar maple, basswood, and yellow birch). Historically, there was sufficient windthrow and fire disturbance to maintain significant presence of white pine, oaks and other less shade

tolerant species. White pine is typically absent today, while oak dominated stands are relatively common, presumably due to oak's ability to sprout. However, in the absence of disturbance or management, tolerant mesic hardwoods will increasingly dominate future stands.



ATFPo
Acer-Tsuga-Fagus/Polygonatum
(Acer saccharum-Tsuga canadensis-
Fagus grandifolia/Polygonatum pubescens)
Sugar maple-Eastern hemlock-American beech /
Hairy Solomon's seal

Distribution: Throughout Door Peninsula.

Landform and soils: Undulating topography controlled by relatively level dolomite bedrock, covered by thin calcareous glacial till. Loamy soils with pronounced rocky surface are typical. Soil moisture regime is **dry mesic to mesic** and nutrient regime is **medium to rich**.

Vegetation:

Common forest cover types: Most common are stands dominated by sugar maple, beech, hemlock, red oak and aspen. Basswood and white ash are common associates.

Shrub and small tree layer:

This layer typically is moderately well developed. The following species can be found, typically

with low coverage: maple-leaved viburnum, juneberry, choke-cherry and fly honeysuckle.

Ground flora characteristics:

Herb layer typically is sparse. Best represented species are: large-leaved aster, wild sarsaparilla, wild lily of-the-valley, hairy Solomon's seal, false Solomon's seal and baneberry.

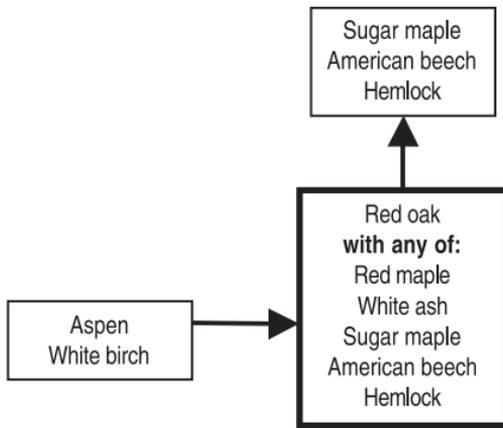
Management implications:

Many current stands on this habitat type do not have excessive advance reproduction of tolerant species and offer good opportunity for management of mid-tolerant species, particularly red oak and white ash. Where shade tolerant species dominate, even-aged silvicultural methods may be used to maintain mixed composition if desired.

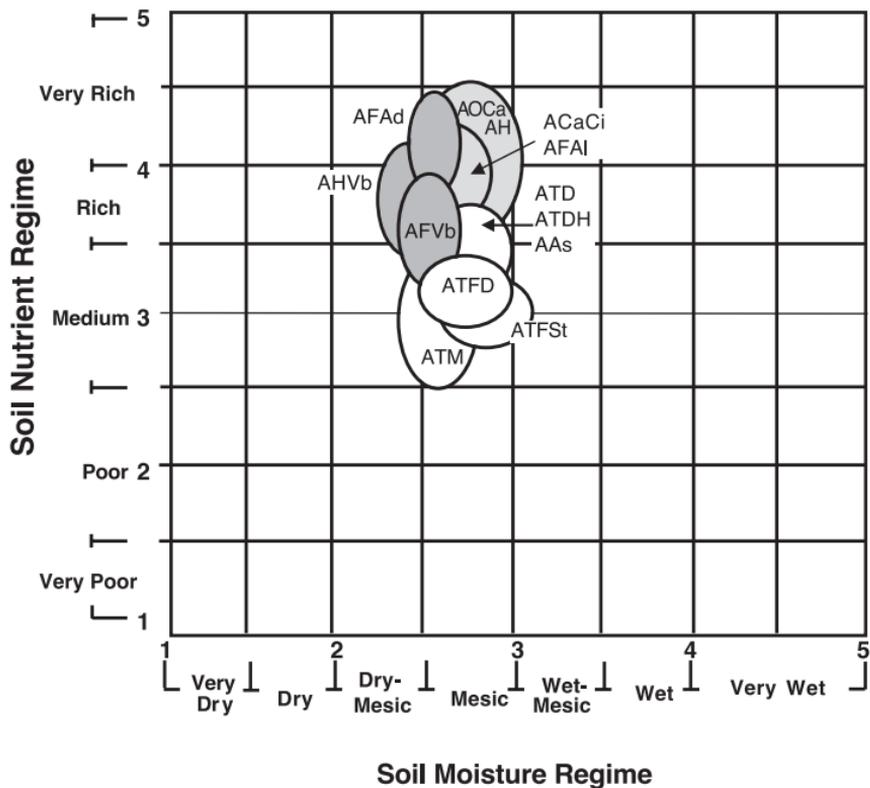
Disturbance and succession:
The common presence of aspen, paper birch, red oak and red maple suggests that forests on this habitat type were more severely disturbed in the past than were those on the closely associated, but more mesic

AFAI habitat type. Because of dry mesic conditions the succession to shade tolerant mesic species is somewhat slower than on the mesic types, but sugar maple, beech or hemlock reproduction is evident in most stands.

ATFPo



Habitat Type Group 4 (Mesic, Medium to Very Rich)



AFVb

Acer-Fagus/Viburnum

(*Acer saccharum*-*Fagus grandifolia*/*Viburnum acerifolium*
Sugar maple-American beech/Maple-leaved viburnum)

Distribution: Scattered throughout Region 4 (see Regional Descriptions).

Landform and soils: Associated predominantly with end/recessional moraines deposited by the Green Bay lobe, but also occurs on rolling ground moraines. Occurs primarily on well drained sandy loams and loams. The moisture regime is **dry-mesic to mesic**. The nutrient regime is **medium to rich**.

Vegetation:

Common forest cover types: Stands dominated by aspen, red oak, and sugar maple are most common. Primary associates are basswood, white ash and red maple. American beech has historically been an important component on this habitat type, but is currently well represented only on the Menominee Indian Reservation and parts of Nicolet National Forest.

Shrub and small tree layer:

This layer typically is well developed. Best represented shrubs are hazel, maple-leaf viburnum and witch hazel.

Ground flora characteristics:

Herb layer is only moderately well developed, but many species can be found. Among the most common are bracken fern, large-leaved aster, shield fern, hog peanut, wild sarsaparilla, trillium, large-flowered bellwort and false Solomon's seal.

Management implications:

This habitat type offers a wide range of management options. All major tree species, except hemlock and yellow birch, appear to be well suited to this type. Management decisions will most strongly be guided by the composition and condition of the present stand.

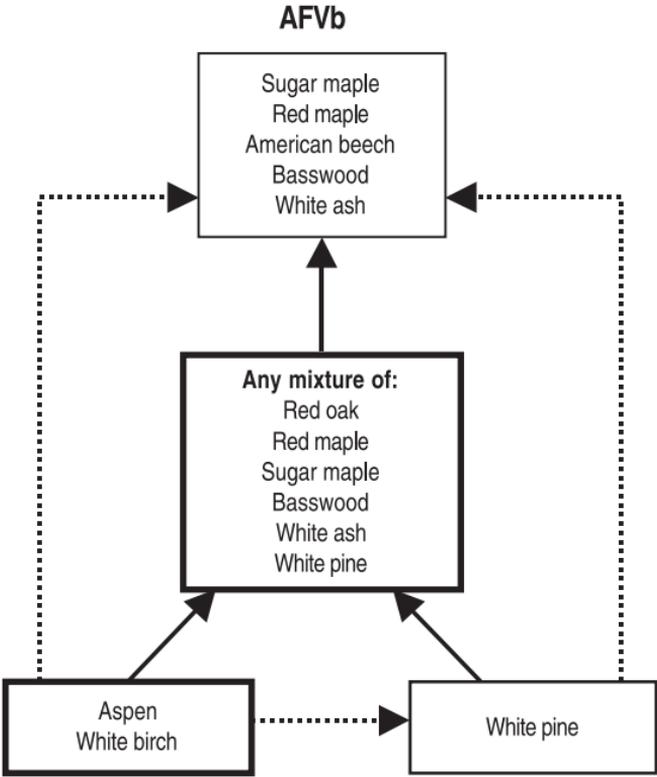
Disturbance and succession:

This habitat type represents conditions where soils support moderate to good growth, of several, shade tolerant mesic hardwoods (sugar maple, red maple, American beech, basswood). These species exert strong competition especially as stand development proceeds.

When conditions permit establishment, red oak, white

pine, white birch, and aspen can exhibit excellent growth and vigor. Although windthrow was probably the dominant disturbance factor historically, fire influence is also evident. Pre-settlement forests contained an appreciable component of white

pine and red oak. However, current stands dominated by intolerant and mid-tolerant species are mostly the result of fires associated with past logging. In the absence of disturbance these stands readily succeed to sugar maple, red maple and beech.



ATM

Acer-Tsuga/Maianthemum

(*Acer saccharum*-*Tsuga canadensis*/*Maianthemum canadense*)
Sugar maple-Eastern hemlock/Wild lily-of-the-valley

Distribution: The most common and widely distributed habitat type in northern Wisconsin. Common throughout most of Region 3, scattered throughout much of Region 4, and scattered in portions of Regions 5 and 2 (see Regional Descriptions).

Landform and soils: Occurs on most landforms within its range, but is most common on moraines. Occurs primarily on well to moderately well drained sandy loams, but also occurs on loams, silt loams, and loamy sands. The moisture regime is **mesic to dry-mesic**. The nutrient regime is **medium**.

Vegetation:

Common forest cover types: Most major northern Wisconsin tree species and cover types (except jack pine, scrub oak, beech) currently can be found on ATM habitat type. Most prevalent at this time are sugar maple and aspen dominated stands. Common associates are red oak, red maple, basswood, white ash, yellow birch and hemlock.

Shrub and small tree layer: This layer is moderately well developed only in younger and early

successional stands. In older and late successional stands shrubs are poorly represented. Most common species are hazel, alternate-leaved dogwood, fly honeysuckle and bush honeysuckle.

Ground flora characteristics:

The herb layer is dominated by species typical of dry mesic to mesic sites such as large-leaved aster, wild sarsaparilla, wild lily-of-the-valley and bracken fern. Other common species are: club mosses, shield fern, lady fern, starflower, yellow bearded iris and wood anemone. The species characteristic of the mesic, nutrient rich sites occur only sporadically on this habitat type.

Management implications: This is perhaps the most diverse type in terms of management options. The type represents what has long been known as the sugar maple-hemlock-yellow birch forest or simply hemlock-hardwood forest. **ATM** supports the highest number of tree species, and therefore, the most diverse mixtures of forest cover types on a landscape level. Growth rates are high for both hardwoods and conifers. Management decisions will be heavily influenced

by the composition and condition of present stands. Although sugar maple is the most tolerant species occurring on this type, it does not always dominate mid-successional stands as completely as it does on the mesic, nutrient rich habitat types. Because of this, the stability of mixed stands appears to be greater on this type.

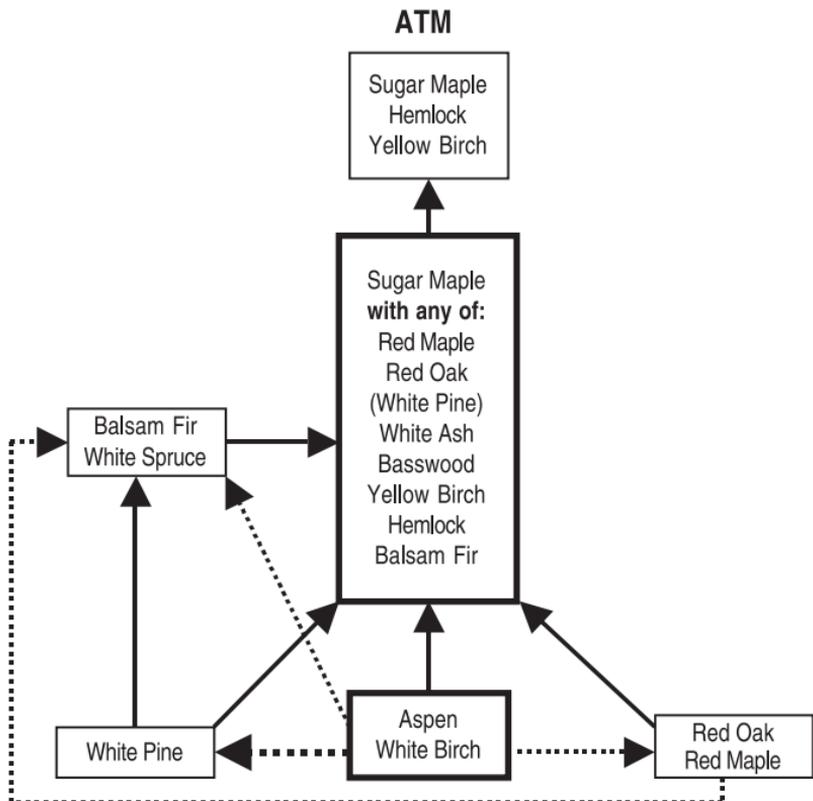
Early successional species such as red oak, white pine, white birch and aspen exhibit excellent growth and vigor, but require intense disturbance for regeneration to become established.

Disturbance and succession:

This habitat type represents conditions where soils support growth, and therefore significant competition, by all native shade tolerant mesic species (e.g., sugar maple, red maple, basswood, hemlock, yellow birch). Hemlock was much more prominent in presettlement forests than it is today. Its recovery from past logging is slow, due to limited seed source and apparently inadequate regeneration conditions.

Other less shade tolerant species such as white ash, white pine and red oak also grow

Continued on next page.



exceptionally well, but in the absence of major disturbance, their regeneration is limited to canopy gaps. Windthrow, with relatively long return interval has historically been the primary disturbance factor, but some instances fire was also important. *White pine* was prominent in some presettlement forests, presumably resulting from major

disturbances, but it is not clear whether it can maintain itself through gap regeneration on this habitat type. Current stands dominated by intolerant and mid-tolerant species are probably without exception the result of fires associated with past logging. The longer the period without major disturbance the stronger is the dominance of *sugar maple*.

ATFSt
Acer-Tsuga-Fagus/Streptopus
(Acer saccharum-Tsuga canadensis-
Fagus grandifolia/Streptopus roseus)
Sugar maple-Eastern hemlock-
American beech/Rosey twisted stalk

Distribution: Mainly along shorelines of Door Peninsula.

are red maple, hemlock, white ash and black cherry.

Landform and soils: Lacustrine or glacial lake bed deposits are typical landform. Due to the combination of cool Lake climate and calcareous soil parent material soil-forming processes are complex. Vegetation on sandy soils differs considerably from that on similar texture soils in other regions. Moisture regime is **mesic** and nutrient regime is **medium**.

Shrub and small tree layer: This layer typically is poorly developed. Most common species are beaked hazel, chokecherry, blackberries and gooseberries.

Ground flora characteristics: Herb layer typically is moderately well developed. Most frequently occurring species are: Sweet cicely, large-leaved aster, baneberry, sweet-scented bedstraw, hairy Solomon's seal, wild lily-of-the-valley, starflower and rosey twisted stalk.

Vegetation:
Common forest cover types: Most common are stands dominated by sugar maple and American beech. Important associates

Management implications: Management options on this type

are relatively limited. The type is heavily dominated by sugar maple, usually at all stages of succession. Aspen or aspen-birch stands are encountered on this type only where severe, repeated burns have occurred, and they usually succeed to sugar maple in one generation.

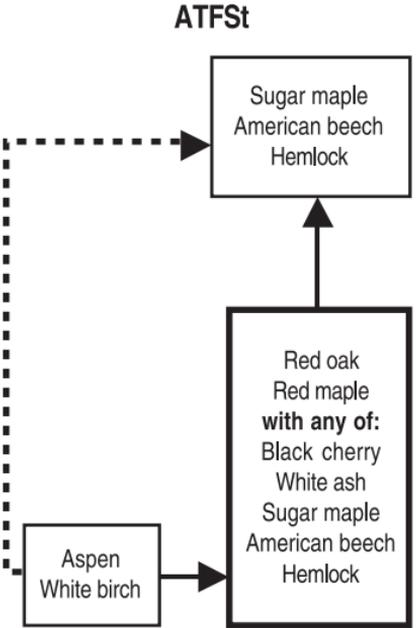
Many present stands on this type are in poor condition due to past cutting practices or are overstocked with small-diameter trees. Wildlife value of such stands is also low unless browse production is maintained by frequent thinnings. However hardwood productivity of properly managed stands on this type is high. If hemlock regeneration is a management objective, this type is well-suited for it.

Disturbance and succession:

This habitat type represents conditions where soils support all native shade tolerant mesic species (sugar maple, beech, basswood, hemlock, yellow birch). Hemlock and beech were much more prominent in presettlement forests than they are today. Their recovery from past logging is slow largely due to limited seed sources.

Other less shade tolerant species (e.g., white ash and red oak) also grow exceptionally well, but in the absence of major disturbance, their regeneration

is limited to canopy gaps. Wind-throw, with relatively long return interval (300+ years) rather than fire has historically been the primary disturbance factor. The longer the period without major disturbance the stronger is the dominance of sugar maple, hemlock and beech. Scattered White pines were common in some presettlement forests presumably resulting from major disturbances, but white pine cannot be considered a “gap species” on this habitat type. Current stands dominated by intolerant and mid-tolerant species are probably without exception the result of fires associated with past logging.



ATFD
Acer-Tsuga-Fagus/Dryopteris
(Acer saccharum-Tsuga canadensis-
Fagus grandifolia/Dryopteris spinulosa)
Sugar maple-Eastern hemlock-
American beech/Spinulose shield fern

Distribution: Scattered throughout Region 4 (see Regional Descriptions).

Landform and soils: Associated predominantly with rolling moraines. Occurs primarily on well to moderately well drained sandy loams and loams. The moisture regime is **mesic**. The nutrient regime is **medium to rich**.

Vegetation:

Common forest cover types: Most common are stands dominated by sugar maple with any of the following major associates: Hemlock, American beech, basswood, white ash, yellow birch, red oak, red maple, aspen and white birch.

Shrub and small tree layer: This layer typically is not well developed. Gooseberries tend to be the only common shrub.

Ground flora characteristics: Herb layer typically is only moderately well developed. Best represented species are shield fern, hairy Solomon's seal, wild sarsaparilla, sweet cicely, baneberry,

rosey twisted stalk and trillium. This habitat type generally lacks the species characteristic on nutrient rich sites.

Management implications: Management options on this type are similar to those described for the **ATD** habitat type, although the role of beech in stand dynamics is not well understood. Literature suggests that beech litter hinders germination of many species, including sugar maple, but is favorable to beech germination. Partial cuttings, which do not promote rapid decomposition of litter, would therefore appear to favor beech.

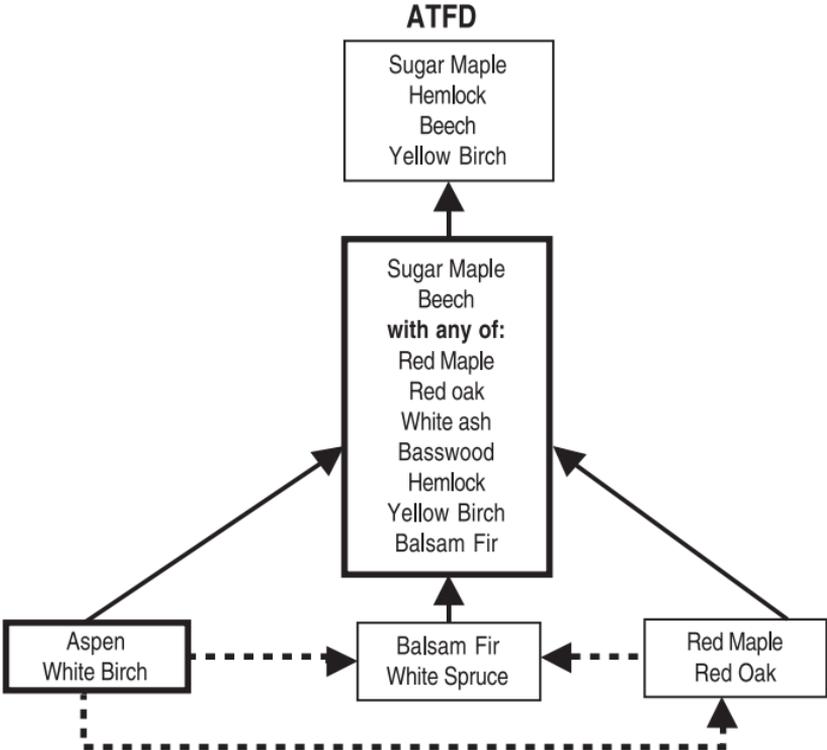
Wood value of beech has historically been low, but potential for high mast production makes this species desirable for wildlife management. Most other species also grow well on this type if germination and establishment conditions are present.

Disturbance and succession: This habitat type represents conditions where soils support growth, and therefore significant competition, by all native shade

tolerant mesic species (sugar maple, red maple, American beech, basswood, hemlock, yellow birch). Hemlock and beech were much more prominent in presettlement forests than they are today. Their recovery from past logging is slow largely due to limited seed sources and, in the case of hemlock, inadequate regeneration conditions.

Other less shade tolerant species (e.g., white ash and red oak) also grow exceptionally well but in the absence of major disturbance, their regeneration is limited to canopy gaps. Windthrow, with relatively long

return interval, rather than fire, has historically been the primary disturbance factor. The longer the period without major disturbance the stronger is the dominance of sugar maple, hemlock and beech. Scattered White pines were common in some presettlement forests, presumably resulting from major disturbances, but white pine probably cannot maintain itself through gap regeneration on this habitat type. Current stands dominated by intolerant and mid-tolerant species are probably without exception the result of fires associated with past logging.



AAs
Acer/Arisaema
(Acer saccharum/Arisaema atrorubens)
Sugar maple/Jack-in-the-pulpit

Distribution: Occurs in Region 2 (see Regional Description).

Landform and soils: Associated predominantly with rolling moraines. Till in this area is coarse, stony and characterized by poorly defined drainage patterns. Perched water table at various depths is common. Sandy loams, loams, and silt loams predominate. General moisture regime is **mesic**. The nutrient regime is **medium to rich**.

Vegetation:

Common forest cover types: Most common are *sugar maple* dominated stands. Common associates are *basswood*, *red maple*, *red oak*, *aspen*, *white birch* and *yellow birch*. An important characteristic of this habitat type is the absence of *hemlock*.

Shrub and small tree layer: This layer typically is not well developed. Best represented shrubs are *hazel*, *alternate-leaved dogwood*, *mountain maple*, *juneberry*, *fly honey-suckle* and *dwarf raspberry*.

Ground flora characteristics: Herb layer typically is well developed and species rich. *Large-leaved aster* and *wild sarsaparilla* typically are best represented herbs. Also common are *yellow beadleily*, *shield fern*, *lady fern*, *sessile-leaved bellwort*, *sweet cicely*, *downy yellow violet*, *star-flower*, *wild lily-of-the-valley* and *wood anemone*.

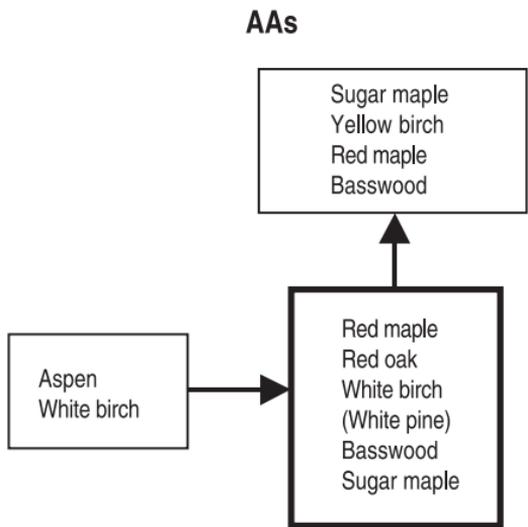
Management implications:

This is a suitable habitat type for the sugar maple dominated northern hardwoods. Many present stands are in poor condition due to past cutting practices, or are overstocked with small diameter trees. Evenaged management will encourage greater tree species diversity, while unevenaged management tends to maximize tree quality.

Red oak is found only in the largest diameter classes, suggesting origin in the post logging conditions. There is virtually no red oak regeneration in present stands. Growth potential for *aspen* and *red maple* is also high.

Disturbance and succession: This habitat type represents conditions where soils support shade tolerant and strongly competitive *sugar maple* and *red maple*. *Basswood* is a common associate, but *white ash* is rare. Windthrow, instead of fire, historically was (and still is) the primary dis-

turbance factor, accounting for considerable presence of *white pine* and *red oak* in presettlement forests. However, in the absence of disturbance sugar maple can be expected to dominate all stands, but presence of *balsam fir* and *white spruce* will also increase.



ATD

Acer-Tsuga/Dryopteris

(*Acer saccharum*-*Tsuga canadensis*/*Dryopteris spinulosa*)
Sugar maple-Eastern hemlock/Spinulose shield fern

Distribution: Scattered throughout the northern portion of Region 3 (see Regional Description).

Landform and soils: Associated predominantly with moraines (especially ground moraines) and loess deposits. Occurs on well to moderately well drained sandy loams, loams, and silt loams. The moisture regime is **mesic**. The nutrient regime is **medium to rich**.

Vegetation:

Common forest cover types: Most common are sugar maple and aspen dominated stands. Common associates are basswood, white ash, red maple, red oak, yellow birch and hemlock.

Shrub and small tree layer:

This layer typically is not well developed. Some common species with low frequency of occurrence are gooseberries, leatherwood, alternate-leaved dogwood, red-berried elder and fly honeysuckle.

Ground flora characteristics:

Except for shield fern and lady

fern, herb coverage typically is low. Other common species are wild lily-of-the-valley, starflower, large-leaved aster, wild sarsaparilla, rosey twisted stalk, and hairy Solomon's seal.

Management implications:

Management options on this type are relatively limited. The type is heavily dominated by sugar maple, usually at all stages of succession. Aspen or aspen-birch stands are encountered on this type only where severe, repeated burns have occurred, and they usually succeed to sugar maple in one generation.

This is an ideal habitat type for management of mesic hardwoods and hemlock. Many present stands on this type are in poor condition due to past cutting practices or are overstocked with small-diameter trees. Wildlife value of such stands is also low unless browse production is maintained by frequent thinning. However, hardwood productivity of properly managed stands on this type is very high. If hemlock regeneration is a management objective, this type

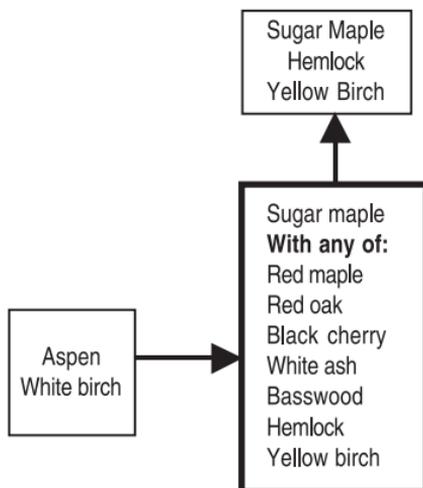
is well-suited for it. A shelterwood system (with about 70% crown closure) combined with light soil scarification has been used successfully.

Disturbance and succession: This habitat type represents conditions where soils support near optimal growth, and therefore most intense competition, by all native shade tolerant mesic species (e.g., sugar maple, basswood, hemlock, yellow birch). Hemlock was much more prominent in presettlement forests than it is today. Its recovery from past logging is slow due to limited seed source and inadequate regeneration conditions.

Other less shade tolerant species (e.g., white ash and red

oak) also grow exceptionally well but in the absence of major disturbance, their regeneration is limited to canopy gaps. Windthrow, with relatively long return interval, rather than fire has historically been the primary disturbance factor. The longer the period without major disturbance the stronger is the dominance of sugar maple. Scattered white pines were present in some presettlement forests presumably resulting from major disturbances, but white pine cannot be considered a “gap species” on this habitat type. Current stands dominated by intolerant and mid-tolerant species are probably without exception the result of fires associated with past logging.

ATD



ATDH

Acer-Tsuga/Dryopteris-Hydrophyllum

(*Acer saccharum*-*Tsuga canadensis*/*Dryopteris spinulosa*-*Hydrophyllum virginianum*)

Sugar maple-Hemlock /Spinulose shield fern-Virginia waterleaf

Distribution: Occurs in western Region 4 (see Regional Descriptions).

Landform and soils: Associated predominantly with moraines (especially ground moraines) and loess deposits. Occurs primarily on well to moderately well drained loams and silt loams. The moisture regime is **mesic**. The nutrient regime is **rich**.

Vegetation:

Common forest cover types: Most common are stands dominated by sugar maple with any of the following major associates: Hemlock, basswood, white ash, yellow birch and red maple. Aspen and white birch stands also occur.

Shrub and small tree layer:

This layer typically is not well developed. Gooseberries tend to be most frequently present. Other relatively common species are hazel, blackberries, fly honeysuckle and leatherwood.

Ground flora characteristics:

Herb layer typically is only moderately well developed. Best rep-

resented species are shield fern, large-leaf aster, wild lily-of-the-valley, trillium, wild sarsaparilla, sweet cicely, jack in-the-pulpit, large-flowered bellwort, Virginia waterleaf and blue cohosh.

Management implications:

Management options on this type are relatively limited. The type is heavily dominated by sugar maple, usually at all stages of succession. Aspen or aspen-birch stands are encountered on this type only where severe, repeated burns have occurred, and they usually succeed to sugar maple in one generation.

Many present stands on this type are in poor condition due to past cutting practices or are overstocked with small-diameter trees. Wildlife value of such stands is also low unless browse production is maintained by frequent thinnings. However, hardwood productivity of properly managed stands on this type is high. If hemlock regeneration is a management objective, this type is well-suited for it.

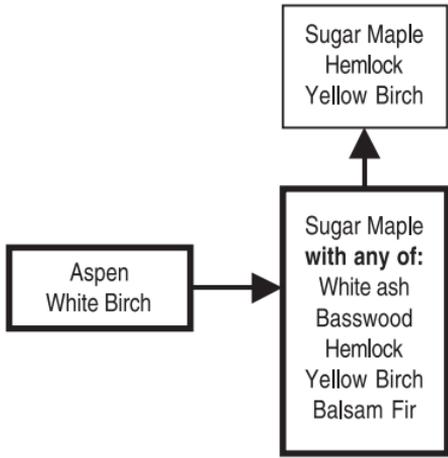
Disturbance and succession:

This habitat type represents conditions where soils support near optimal growth, and therefore intense competition, by all native shade tolerant mesic species (sugar maple, basswood, hemlock, yellow birch). Hemlock was much more prominent in presettlement forests than it is today. Its recovery from past logging is slow due to limited seed source and inadequate regeneration conditions.

Other less shade tolerant species (e.g., white ash and red oak) also grow exceptionally well but in the absence of major disturbance, their regeneration

is limited to canopy gaps. Wind-throw, with relatively long return interval rather than fire, has historically been the primary disturbance factor. The longer the period without major disturbance the stronger is the dominance of sugar maple. Scattered white pines were common in some presettlement forests, presumably resulting from major disturbances, but white pine cannot be considered a “gap species” on this habitat type. Current stands dominated by intolerant and mid-tolerant species are probably without exception the result of fires associated with past logging.

ATDH



AHVb
Acer/Hydrophyllum-Viburnum
(Acer saccharum/Hydrophyllum virginianum-
Viburnum acerifolium)
Sugar maple/Virginia waterleaf-Maple-leaved viburnum

Distribution: Scattered in eastern Region 5 (see Regional Description).

Landform and soils: Associated predominantly with rolling bedrock-controlled erosional surfaces in Marathon County. Occurs on well drained silt loams and loams over till, residuum, slopewash, and bedrock. The moisture regime is **mesic to dry-mesic**. The nutrient regime is **rich**.

Vegetation:

Common forest cover types: Most common are sugar maple dominated stands with basswood, red oak, white ash, or bitternut hickory as major associates. Red oak dominated stands are also common.

Shrub and small tree layer: This layer typically is well developed. Most common species are maple-leaf viburnum, witch hazel, chokecherry, juneberry and gooseberries.

Ground flora characteristics: Herb layer typically is not well developed but may contain many species. Most frequently

occurring are maidenhair fern, shield fern, sweet cicely, large-flowered bellwort, wild sarsaparilla, false Solomon's seal, hairy Solomon's seal, hog peanut, wood anemone, downy yellow violet and baneberry.

Management implications:

This is one of the habitat types most suited for management of mixed hardwoods. Often appreciable amounts of mid-tolerant species (red oak, white ash) are present. Red maple typically is not well represented. However, aggressive control of maple competition will be necessary to facilitate establishment of the mid tolerant species.

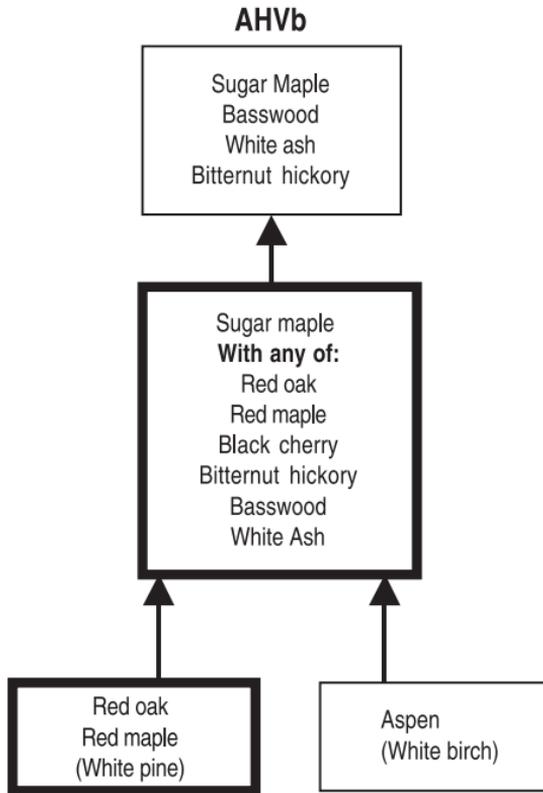
Disturbance and succession:

This habitat type represents conditions where soils support optimal growth of shade tolerant and strongly competitive sugar maple. Basswood and yellow birch are the only other common species in undisturbed stands. Hemlock was also a component in some presettlement forests, but it has not recovered from early logging.

Other less shade tolerant species (e.g., white ash and red

oak) also grow exceptionally well but in the absence of major disturbance, their regeneration is limited to canopy gaps. Windthrow, with relatively long return interval, rather than fire has historically been the primary disturbance factor. The longer the period without major disturbance the stronger is the dominance of sugar maple. Scattered white

pinus were present in some presettlement forests presumably resulting from major disturbances, but white pine cannot be considered a “gap species” on this habitat type. Current stands dominated by intolerant and mid-tolerant species are probably without exception the result of fires associated with past logging.



AFAAd
Acer-Fagus/Adiantum
(Acer saccharum-Fagus grandifolia/Adiantum pedatum)
Sugar maple-American beech /Maidenhair fern

Distribution: Scattered throughout Region 4 (see Regional Descriptions).

Landform and soils: Associated predominantly with moraines (especially ground moraines) and loess deposits. Occurs primarily on well drained loams and silt loams. The moisture regime is **mesic to dry-mesic**. The nutrient regime is **rich to very rich**.

Vegetation:

Common forest cover types: Most common are stands dominated by sugar maple with any of the following major associates: American beech, basswood, white ash, red oak and bitternut hickory.

Shrub and small tree layer:

This layer typically is not well developed. Gooseberries and leatherwood tend to be the only common shrub.

Ground flora characteristics:

Herb layer typically is only moderately well developed. Best represented species are sharp-lobed hepatica, maidenhair fern, virginia waterleaf, bloodroot, baneberry, large-flowered bellwort, trillium and false Solomon's seal.

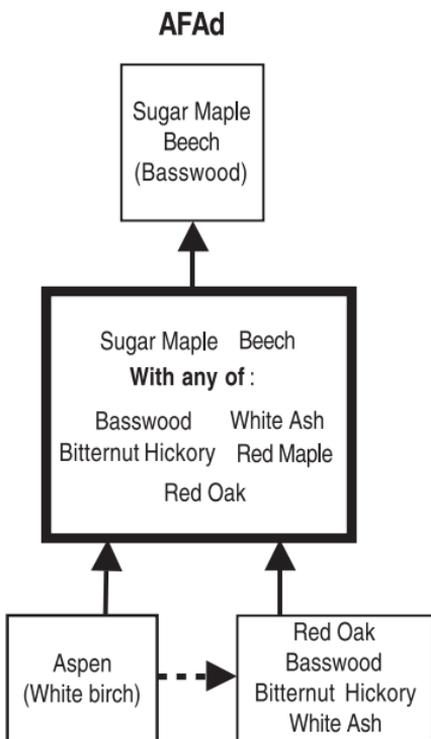
Management implications:

This is one of the habitat types best suited for management of mixed hardwoods. Apparently due to somewhat dry mesic conditions sugar maple regeneration does not dominate the understory as completely as it does on the mesic habitat types. Often an appreciable component of less tolerant species (red oak, white ash, white birch) is present. It is also significant that red maple typically is not well represented on this type.

Disturbance and succession: This habitat type represents conditions where soils support near optimal growth, and therefore strong competition, by several shade tolerant mesic hardwoods (sugar maple, red maple, American beech, basswood).

The less shade tolerant white ash and red oak also grow exceptionally well, but regenerate readily only in canopy gaps. Although windthrow was

probably the dominant disturbance factor historically, fire influence is also evident. Pre-settlement forests contained an appreciable component of white pine and red oak. However, current stands dominated by intolerant and mid-tolerant species are mostly the result of fires associated with past logging. In the absence of disturbance these stands readily succeed to sugar maple and beech.



AFAI
Acer- Fagus/Allium
(Acer saccharum-Fagus grandifolia/Allium tricoccum)
Sugar maple-American beech /Wild leek

Distribution: Throughout Door Peninsula.

seal, sweet cicely, smooth yellow violet and trillium.

Landform and soils: Undulating topography controlled but relatively level dolomite bedrock, covered by thin calcareous glacial till. Soils are deep loams, moderately deep silt loams or any soil texture on lower slope position. Moisture regime is **mesic** and nutrient regime is **rich to very rich**.

Management implications: Like other habitat types in the mesic, nutrient rich group, the **AFAI** type represents optimal habitat type for “northern hardwood” management. Both even and uneven aged methods of management are suitable depending on the condition of the original stands.

Vegetation:

Common forest cover types: Sugar maple and beech dominated stands are most common. Basswood and white ash are the only important associates.

Conversion of even the poorest quality of hardwood stands on this type to conifers is not recommended because of extreme difficulty of controlling competing vegetation.

Shrub and small tree layer: This layer typically is poorly developed. The following species can be found, typically with low coverage: Chokecherry, gooseberries, red-berried elder and blackberries.

Except in thinned stands, shrub development on this type is relatively low, but ground vegetation diversity is often high. Sustained browse production can be maintained only through frequent thinning.

Ground flora characteristics: Herb layer typically is poorly to moderately well developed. Most frequently occurring species are: baneberry, false Solomon’s seal, hairy Solomon’s

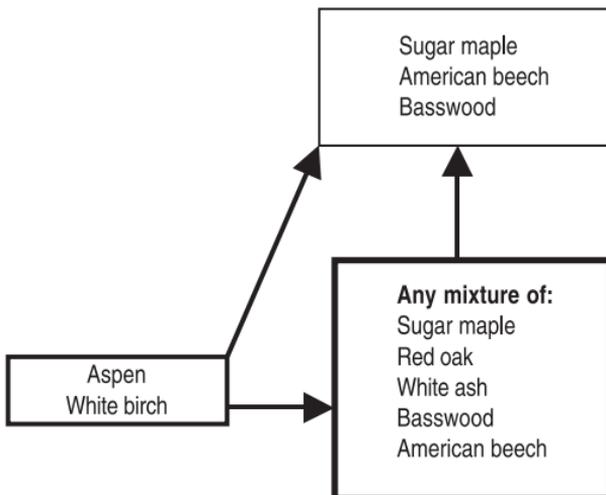
Older stands have considerable esthetic and recreational value with an opportunity for old-growth management.

Disturbance and succession:

This habitat type represents conditions where soils support optimal growth, and therefore most intense competition, by all native shade tolerant mesic hardwoods (e.g., sugar maple, beech, basswood, yellow birch). Other less shade tolerant species (e.g., white ash and red oak) also grow exceptionally well but in the absence of major disturbance, their regeneration is limited to canopy gaps. Windthrow, with relatively long return interval (300+ years) rather than

fire has historically been the primary disturbance factor. The longer the period without major disturbance the stronger is the dominance of sugar maple. Scattered white pines were present in some presettlement forests, presumably resulting from major disturbances, but white pine cannot be considered a “gap species” on this habitat type. Current stands dominated by intolerant and mid-tolerant species are probably without exception the result of fires associated with past logging.

AFAI



ACaCi
Acer/Caulophyllum-Circaea
(Acer saccharum/Caulophyllum thalictroides-
Circaea quadrisulcata)
Sugar maple/Blue cohosh-Enchanter's nightshade

Distribution: Common in Region 1 (see Regional Description).

Landform and soils: Associated predominantly with moraines and loess deposits. Usually occurs on well to moderately well drained silt loams, but occasionally occurs on loams and sandy loams. The moisture regime is **mesic to dry-mesic**. The nutrient regime is **rich to very rich**.

Vegetation:

Common forest cover types: Stands dominated by the following species are most common: Aspen, red oak, white oak and sugar maple. Common associates are red maple, white birch, black cherry, basswood and white ash. Less common associates are bitternut hickory and butternut.

Shrub and small tree layer: This layer is not well developed. Most frequently present are gooseberries and blackberries. Other species with low frequency of occurrence include hazel, maple-leaved viburnum and alternate-leaved dogwood.

Ground flora characteristics:

Herb layer is well developed and species rich. Best represented species include: Large-leaf aster, wild geranium, early meadow-rue, sweet cicely and downy/smooth yellow violet. Other common species include: Enchanter's nightshade, false Solomon's seal, zig-zag goldenrod, sessile bellwort, wood anemone, hog peanut, Virginia creeper, blue cohosh and bloodroot.

Management implications:

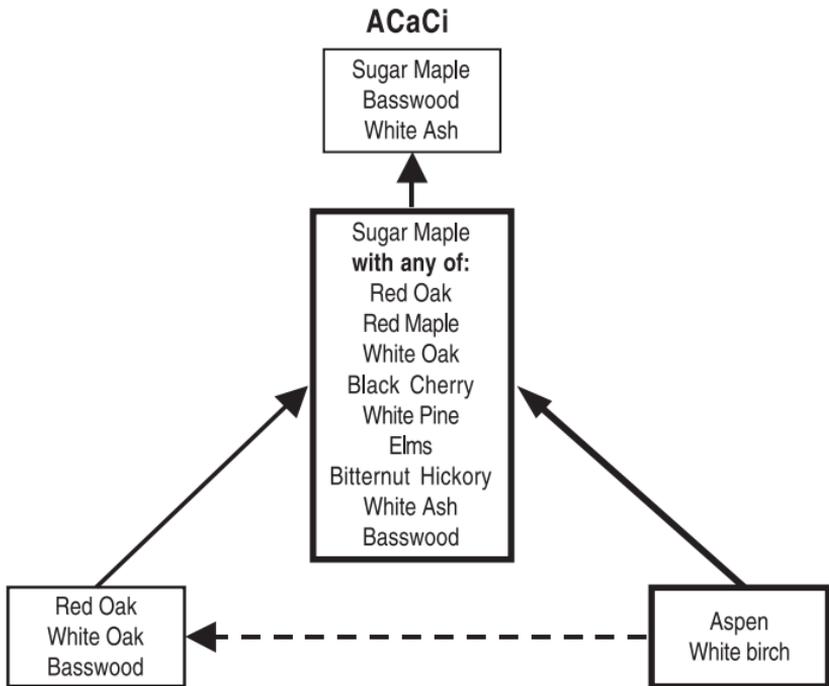
This habitat type is well suited for the management of northern hardwoods. However, it is important to note that while sugar maple is the most shade tolerant species occurring on this type, its competitive advantage does not appear to be sufficient to completely dominate mature stands as it does on the mesic habitat types in other regions. Many current stands are dominated by other hardwood species (e.g., red oak, white oak, basswood, red maple) with sugar maple representing only a small percentage of total composition. For this reason, ACaCi offers the best opportunity for

management of northern hardwoods where species other than sugar maple can be favored. However, aggressive practices will be necessary to control maple competition and facilitate the establishment of mid tolerant species.

Disturbance and succession:

This habitat type represents conditions where soils support near optimal growth, and therefore intense competition, by shade tolerant mesic hardwoods, primarily sugar maple, red maple and basswood. Other less shade tolerant species (e.g., white ash,

red oak and white oak) also grow exceptionally well but in the absence of major disturbance, their regeneration is limited to canopy gaps. Historically, fire was an important disturbance factor in this region, maintaining significant presence of oak and white pine. However, in the absence of disturbance stands dominated by intolerant and mid-tolerant species readily succeed to sugar maple, red maple and basswood wherever seed sources exist. The longer the period without major disturbance the stronger is the dominance of sugar maple.



AOCa
Acer/Osmorhiza-Caulophyllum
(Acer saccharum/Osmorhiza claytoni-
Caulophyllum thalictroides)
Sugar maple/Sweet cicely-Blue cohosh

Distribution: Very common, found throughout Region 3 (see Regional Description).

Landform and soils: Associated predominantly with moraines (especially ground moraines) and loess deposits. Usually occurs on well to moderately well drained silt loams and loams. The moisture regime is **mesic**. The nutrient regime is **rich to very rich**.

Vegetation:

Common forest cover types: Most common are sugar maple dominated stands. Common associates are basswood, white ash, red maple, red oak and yellow birch.

Shrub and small tree layer: This layer typically is not well developed. Most frequently occurring shrubs are hazel, leatherwood, gooseberries and blackberries.

Ground flora characteristics: Herb layer often is well developed and species rich. Best represented species typically are: Lady fern, wild sarsaparilla, large-leaved aster, trillium, hairy

Solomon's seal, false Solomon's seal, sweet cicely, downy yellow violet, blue cohosh, shield fern, baneberry and bloodroot.

Management implications:

AOCa type has long been viewed as the optimal habitat type for "northern hardwood" management in northern Wisconsin as well as Upper Michigan. Both even and uneven aged methods of management are suitable depending on the condition of the original stands. Even aged management encourages greater tree species diversity while uneven aged management tends to maximize tree quality.

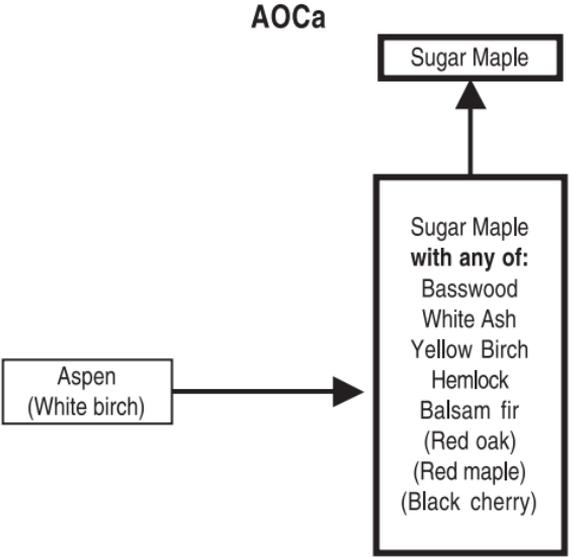
Conversion of even the poorest quality of hardwood stands on this type to conifers is not recommended because of extreme difficulty of controlling competing vegetation and because of excellent growth and quality of native hardwoods.

Except in thinned stands, shrub development on this type is relatively low, but ground vegetation diversity is often high. Sustained browse production can be maintained only through frequent thinning.

Disturbance and succession:

This habitat type represents conditions where soils support optimal growth, and therefore most intense competition, by all native shade tolerant mesic hardwoods (e.g., sugar maple, basswood, yellow birch). Other less shade tolerant species (e.g., white ash and red oak) also grow exceptionally well but in the absence of major disturbance, their regeneration is limited to canopy gaps. Windthrow, with relatively long return interval rather than fire, has historically been the primary

disturbance factor. The longer the period without major disturbance the stronger is the dominance of sugar maple. Scattered white pines were present in some presettlement forests, presumably resulting from major disturbances, but white pine cannot be considered a “gap species” on this habitat type. Current stands dominated by intolerant and mid-tolerant species are probably without exception the result of fires associated with past logging.



AH
Acer/Hydrophyllum
(Acer saccharum/Hydrophyllum virginianum)
Sugar maple/Virginia waterleaf

Distribution: Fairly common, and widely distributed. Occurs in Regions 5, 4, and 3. Common in the south (Region 5, southern portions of Regions 4 and 3), becomes less common (occasional) northward (northern Region 4, central Region 3), and absent from the northern reaches of Region 3 (see Regional Descriptions).

Landform and soils: Associated predominantly with moraines and loess deposits. Usually occurs on well to moderately well drained silt loams and loams. The moisture regime is **mesic**. The nutrient regime is **rich to very rich**.

Vegetation:

Common forest cover types: Most common are sugar maple dominated stands. Common associates are basswood, white ash, red maple, red oak and yellow birch. An important characteristic of this habitat type is an almost complete absence of hemlock.

Shrub and small tree layer: This layer typically is not well developed. Gooseberries,

leatherwood, red-berried elder and alternate-leaved dogwood are most characteristic.

Ground flora characteristics: Herb layer typically is well developed and species diverse. Virginia waterleaf, blue cohosh, bloodroot and maidenhair fern are most characteristic. Other common herbs include: Sweet cicely, lady fern, downy yellow violet, early meadowrue, large-flowered bellwort, trillium, big-leaf aster, shield fern, and sharp-lobbed hepatica.

Management implications: This type is in many ways similar to the **AOCa** habitat type. It represents the southern fringe of the northern mesic forest. Although sugar maple is still the dominant species in most stands, other hardwood species are much better represented than they are on the **AOCa**. The most conspicuous difference is the relatively common presence of bitternut hickory and low frequency of occurrence of yellow birch and hemlock.

This habitat type is optimal for northern hardwood management. Both even and uneven

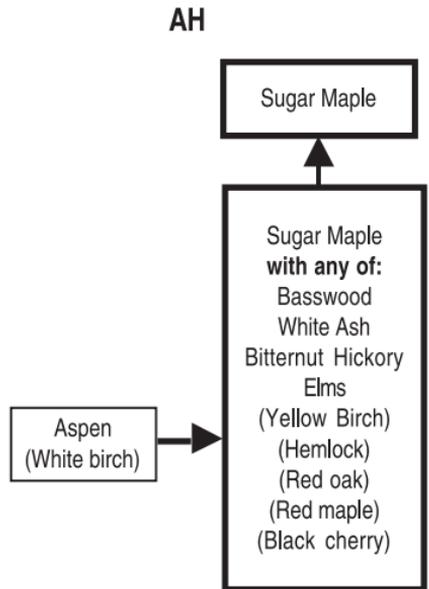
aged methods of management are suitable, depending on the condition of the original stands. Even aged management encourages greater tree species diversity, while uneven aged management tends to maximize tree quality.

Conversion of even the poorest quality of hardwood stands on this type to conifers is not recommended because of extreme difficulty of controlling competing vegetation and because of excellent growth and quality of native hardwoods.

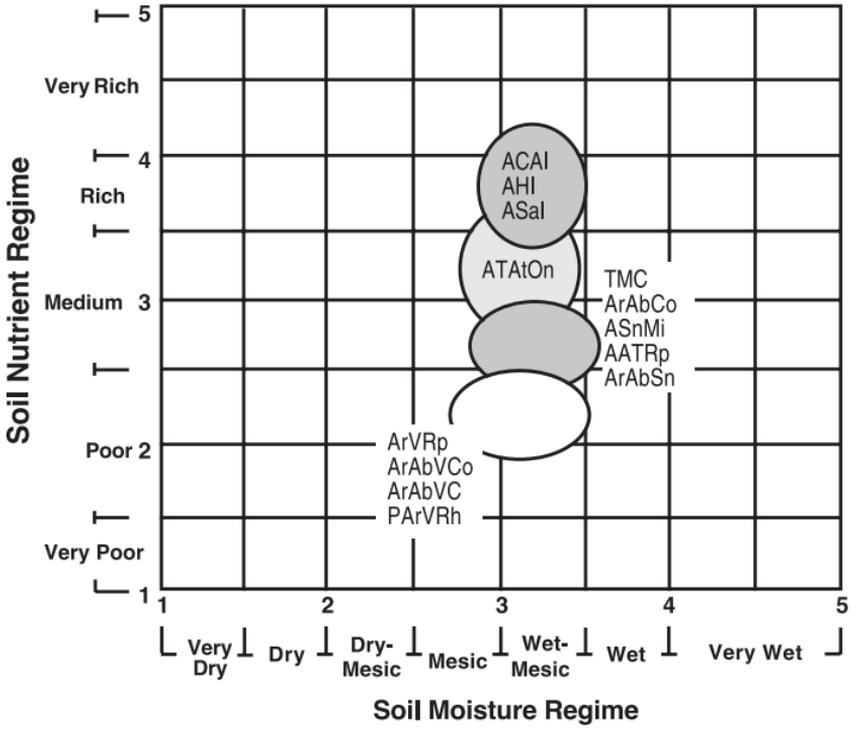
Except in thinned stands, shrub development on this type is relatively low, but ground vegetation diversity is often high. Sustained browse production can be maintained only through frequent thinning.

Disturbance and succession: This habitat type represents conditions where soils support optimal growth, and therefore most intense competition, by all native shade tolerant mesic hardwoods (i.e., sugar maple, red maple, basswood, yellow birch). Other less shade tolerant species (e.g., white ash and red oak) also grow exceptionally well but in the absence of major

disturbance, their regeneration is limited to canopy gaps. Windthrow, with relatively long return interval rather than fire, has historically been the primary disturbance factor. The longer the period without major disturbance the stronger is the dominance of sugar maple. Scattered white pines were present in some presettlement forests presumably resulting from major disturbances, but white pine cannot be considered a “gap species” on this habitat type. Current stands dominated by intolerant and mid-tolerant species are probably without exception the result of fires associated with past logging.



Habitat Type Group 5



AHI
Acer/Hydrophyllum-Impatiens
(Acer saccharum/Hydrophyllum virginianum-
Impatiens capensis)
Sugar maple/Virginia waterleaf-Jewelweed

Distribution: Common in Region 5, and scattered throughout the southern portions of Regions 4 and 3 (see Regional Descriptions).

Landform and soils: Associated predominantly with loess plains and moraines (especially ground moraines). Occurs on somewhat poorly drained silt loams and loams. The moisture regime is **mesic to wet-mesic**, the nutrient regime is **rich**.

Vegetation:

Common forest cover types: Sugar maple and aspen dominated stands are most common. Principal associates are red maple and basswood. Many other species occur as occasional associates, including black ash, elms, oaks, white ash and yellow birch.

Shrub and small tree layer: Shrub layer typically is not well developed. Only gooseberries and blackberries are common.

Ground flora characteristics: Herb layer typically is well

developed and species rich. Most frequently occurring and best represented species are: virginia waterleaf, trillium and bloodroot. Other relatively common species include: jewelweed, lady fern, shield fern, virginia creeper, early meadowrue, wild geranium, enchanter's nightshade, hog peanut, sharp-lobed hepatica and wood nettle.

Management implications:

This type is in many ways similar to the **AH** habitat type. It is strongly associated with silt loam soils, and often is subject to seasonal water table. These factors have strong influence on productivity and site operability.

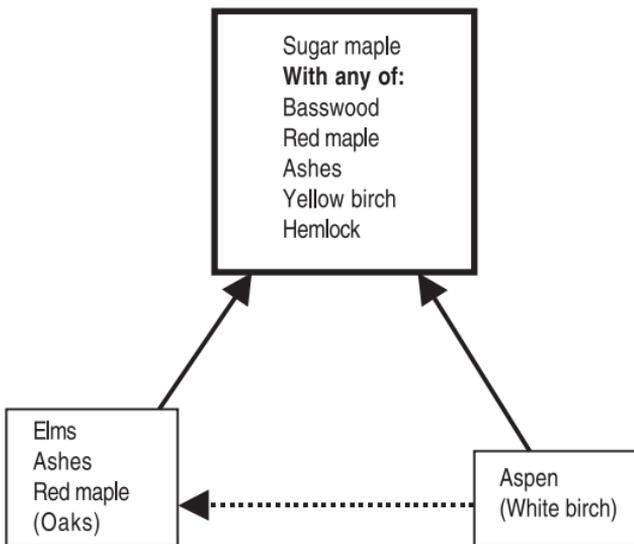
The soils are among the richest in soil nutrients, and yet they often support hardwood stands of only moderate yield and poor tree form. There is evidence that heavy cutting on such soils may cause a rise in water table due to decreased transpiration, leading to "swamping" of a site. At a minimum, some seasonal restrictions on logging may be necessary on such sites.

Disturbance and succession:

This habitat type represents conditions where soils support vigorous growth of all native mesic hardwoods (sugar maple, red maple, basswood, white ash, yellow birch) as well as black ash, hemlock and balsam fir. The somewhat poorly drained conditions are less than optimal for sugar maple but due to its strong shade tolerance, this species remains the primary

competitor. Forest dynamics on this habitat type are similar to those described for **AH**, but windthrow frequency may be higher here because of wetter soils. The longer the period without major disturbance the stronger is the dominance of sugar maple. Any stand dominated by intolerant and mid-tolerant species is probably without exception a result of fires associated with past logging.

AHI



ACal
Acer/Caulophyllum-Impatiens
(Acer saccharum/ Caulophyllum thalictroides-
Impatiens capensis)
Sugar maple/Blue cohosh-Jewelweed

Distribution: Scattered throughout Region 3 (see Regional Description).

Landform and soils: Associated predominantly with loess plains and moraines (especially ground moraines). Occurs on somewhat poorly drained silt loams and loams. The moisture regime is **mesic to wet-mesic**, the nutrient regime is **rich**.

Vegetation:

Common forest cover types: Sugar maple dominated stands are most common. Principal associates are red maple, basswood, white ash, black ash and yellow birch.

Shrub and small tree layer: Shrub layer typically is not well developed. Most common species are gooseberries, hazel, fly honeysuckle, and alternate-leaved dogwood.

Ground flora characteristics: Herb layer typically is well developed. Most frequently occurring

and best represented species are: Lady fern, shield fern, blue cohosh and jack-in-the-pulpit. Other relatively common species are: oak fern, long-beech fern, baneberry, sweet cicely, jewelweed, and zig-zag goldenrod.

Management implications:

This type is in many ways similar to the **AOCa** and **ATD** habitat types, but soils are somewhat poorly drained. Management implications are also similar although special care may be required with timing of logging operations and choice of equipment.

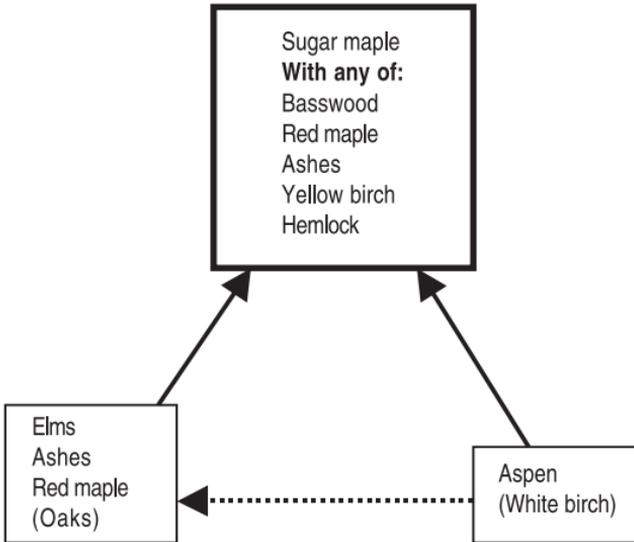
The soils are among the richest in soil nutrients, and yet they often support hardwood stands of only moderate yield and poor tree form. There is evidence that heavy cutting on such soils may cause a rise in water table due to decreased transpiration, leading to "swamping" of a site. At a minimum, some seasonal restrictions on logging may be necessary on such sites.

Disturbance and succession:

This habitat type represents conditions where soils support vigorous growth of all native mesic hardwoods (sugar maple, red maple, basswood, white ash, yellow birch) as well as black ash, hemlock and balsam fir. The somewhat poorly drained conditions are less than optimal for sugar maple but due to its strong shade tolerance, this species remains the primary competitor. Forest dynamics on this habitat type are similar to those described for **AOCa**, but

windthrow frequency may be higher here because of wetter soils. The longer the period without major disturbance the stronger is the dominance of sugar maple. Scattered white pines were present in some presettlement forests presumably resulting from major disturbances, but white pine cannot be considered a “gap species” on this habitat type. Any stand dominated by intolerant and mid-tolerant species is probably without exception a result of fires associated with past logging.

ACa1



ASal

Acer /Sanguinaria-Impatiens

(Acer saccharum/Sanguinaria canadensis-Impatiens capensis)
Sugar maple/Bloodroot-Jewelweed

Distribution: Scattered in Region 1 (see Regional Description).

Landform and soils: Associated predominantly with moraines and loess deposits. Occurs on somewhat poorly drained loams (sil, l, sl). The moisture regime is **mesic to wet-mesic**, the nutrient regime is **rich**.

Vegetation:

Common forest cover types: Stands dominated by aspen and red maple are most common. Principal associates are basswood, white birch and oak (red, white, bur). Sugar maple is not well represented in most stands but regeneration is often present.

Shrub and small tree layer:

This layer typically is poorly developed. Only gooseberries commonly occur.

Ground flora characteristics:

Herb layer is well developed and species diverse. Ferns typically are well represented. Best

represented species are jewelweed, early meadowrue, lady fern, interrupted fern, maidenhair fern, sensitive fern, large-leaved aster, hog peanut, wild geranium, virginia creeper and sweet cicely.

Management implications:

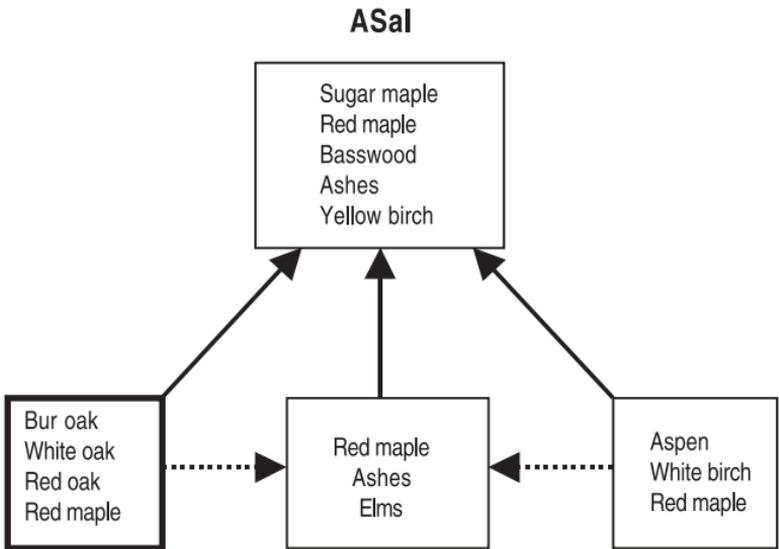
This type is in many ways similar to the **ACaCi** habitat type.

It is strongly associated with silt loam soils, and often is subject to seasonal perched water table. These factors have strong influence on productivity and site operability.

The soils are among the richest in soil nutrients, and yet they often support hardwood stands of only moderate yield and poor tree form. There is evidence that heavy cutting on such soils may cause a rise in water table due to decreased transpiration, leading to "swamping" of a site. At a minimum, some seasonal restrictions on logging may be necessary on such sites.

Disturbance and succession: This habitat type represents conditions where soils support growth of many native mesic hardwoods (sugar maple, red maple, basswood, white ash,). Red maple advance reproduction often is most abundant. Black ash and green ash are often present. The somewhat poorly drained conditions are less than optimal for sugar

maple, but due to its strong shade tolerance, it remains the primary competitor in late successional stands. Forest dynamics on this habitat type are similar to those described for **ACaCi**, but windthrow frequency may be higher here because of wetter soils. The longer the period without major disturbance the stronger is the dominance of sugar maple.



ATAtOn
Acer-Tsuga/Athyrium-Onoclea
**(Acer saccharum-Tsuga canadensis/
Athyrium filix-femina-Onoclea sensibilis)**
Sugar maple-Eastern hemlock/Lady fern-Sensitive fern

Distribution: Scattered irregularly across Regions 5, 4, and 3 (see Regional Descriptions). Locally common, especially in portions of Region 5.

Landform and soils: Associated predominantly with erosional surfaces and moraines (especially ground moraines). Occurs most commonly on somewhat poorly drained loams and silt loams overlying till, residuum, or bedrock (sometimes shallow). The moisture regime is **mesic to wet-mesic**. The nutrient regime is **medium**.

Vegetation:

Common forest cover types: Stands dominated by aspen, red maple, and sugar maple are most common. Principal associates are yellow birch, basswood, white ash, black ash and hemlock.

Shrub and small tree layer: Shrub layer typically is not well developed. Most common species are hazel, blackberries, gooseberries and dwarf raspberries.

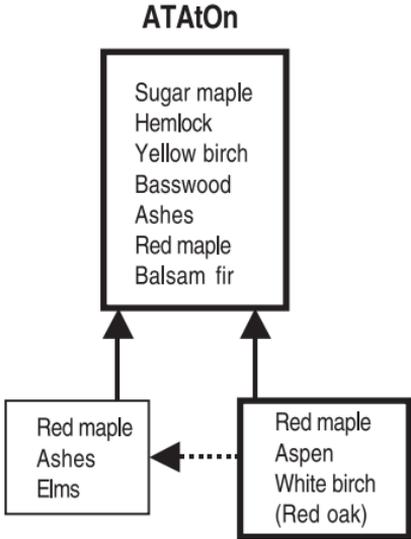
Ground flora characteristics: Lady fern and shield fern typically are best represented herbs. Less frequently present ferns include long beech fern, oak fern, sensitive fern and interrupted fern. Other relatively common species are: large-leaved aster, wild sarsaparilla, virginia creeper, wild lily-of-the-valley, horsetails and jack-in-the-pulpit.

Management implications: All species typically managed on mesic habitat types can also be managed on this type, although productivity is somewhat lower. However, red maple and black ash productivity is optimal on this type. Because of seasonal poor drainage or shallow soils there are harvesting and equipment limitations. There is evidence that heavy cutting on seasonally wet soils may cause a rise in water table due to decreased transpiration, leading to "swamping" of a site. At a minimum, some seasonal restrictions on logging may be necessary on such sites.

Disturbance and succession:

This habitat type represents conditions where soils support growth of all native mesic hardwoods (sugar maple, red maple, basswood, white ash, yellow birch) as well as black ash, hemlock and balsam fir. The somewhat poorly drained soils are less than optimal for sugar maple, but due to its great shade tolerance this species remains the primary competitor. Windthrow is the principal natural disturbance factor on this type. Because of less firm rooting, due to somewhat poorly drained soils, frequency of small-scale disturbance is higher than on the

better drained sites in the same area. Timing of disturbance, presence of advance regeneration, and seed source availability largely determine which species will benefit at any given time. For this reason, and because most species on this type are shade tolerant, the concept of relatively predictable “relay” succession (i.e., a less tolerant species is replaced by a more tolerant species) does not apply well to this habitat type. Aspen stands on this type do occur, but they invariably originated from fire disturbance associated with early logging rather than from windthrow.



ASnMi

Acer/Sanicula-Mitchella

(*Acer saccharum*/*Sanicula marilandica*-*Mitchella repens*)

Sugar maple/Black snakeroot-Partridgeberry

Distribution: Common on the Superior Clay Plain in Region 2 and extreme northwestern Region 3 (see Regional Descriptions).

Landform and soils: Associated predominantly with water worked till and lacustrine deposits. Typically the surface soil is sand, usually more than one foot thick, over-lying red clay. Occasionally occurs on coarse clayey soils, such as sandy clays and clay loams. Soils are somewhat poorly drained to moderately well drained. The moisture regime is **mesic to wet-mesic**. The nutrient regime is **medium**.

Vegetation:

Common forest cover types: Stands dominated by red maple, aspen and balsam fir are most common. White birch and white spruce are common associates. Sugar maple, black ash, red oak, white pine and red pine are present in some stands.

Shrub and small tree layer: Shrub layer typically is well

developed, and includes many species. Hazel, and fly honeysuckle are most often present. Other frequently occurring species include gooseberries, downy arrowwood, bush honeysuckle and dwarf raspberry.

Ground flora characteristics:

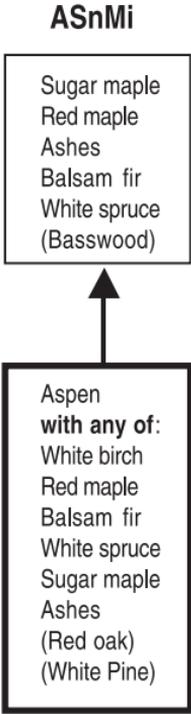
Herb layer is well developed and species rich. Bracken fern, lady fern, large-leaved aster and wild sarsaparilla typically are most abundant. Other common species include sessile-leaved bellwort, sweet-scented bedstraw, wild lily-of-the-valley, selfheal, sweet coltsfoot, bunchberry, horsetails and partridgeberry.

Management implications:

Although most current stands are understocked, many tree species show good growth potential. Aspen, white pine, red maple and white ash appear to be particularly suited to this type. Potential for mixed hardwood management is good, although sugar maple productivity and quality are below average.

Disturbance and succession: Historic composition and disturbance regime for this sand over clay habitat type is difficult to estimate because it co-occurs on the landscape with the predominant **ArAbSn** type which is entirely on clay. Both, wind and fire disturbance were important. It appears that **ASnMi** type sup-

ported a greater variety of species including sugar maple, red maple, red oak and white ash. In the absence of disturbance, both, red maple and sugar maple, in addition to balsam fir, are replacing stands of shade intolerant species mainly aspen, white birch and some red pine and red oak.



AAtRp

Acer/Athyrium-Rubus

(*Acer saccharum*/*Athyrium filix-femina* - *Rubus pubescens*)
Sugar maple/Lady fern-Dwarf raspberry

Distribution: Occurs in Region 2 (see Regional Description).

Landform and soils: Associated predominantly with rolling moraines. Typically occurs as scattered low-lying areas, along slope bottoms and drainage ways, and on lake and swamp borders. Occurs on somewhat poorly drained sandy loams, loams, and silt loams. The moisture regime is **mesic to wet-mesic**. The nutrient regime is **medium**.

Vegetation:

Common forest cover types: Stands dominated by aspen, red maple, and sugar maple are most common. Relatively common associates are white birch, red oak, black ash, basswood, yellow birch and balsam fir.

Shrub and small tree layer:

Shrub layer typically is only moderately well developed, but can include many species. Hazel, bush honeysuckle, gooseberry and dwarf raspberry are most often present.

Ground flora characteristics:

Herb layer is well developed and species rich. Bracken fern, lady fern, large-leaved aster and wild sarsaparilla typically are most abundant. Other common species include shield fern, interrupted fern, yellow beadlily, wild lily-of-the-valley, rosey twisted stalk, star flower, bunchberry horsetails and sessile bellwort.

Management implications:

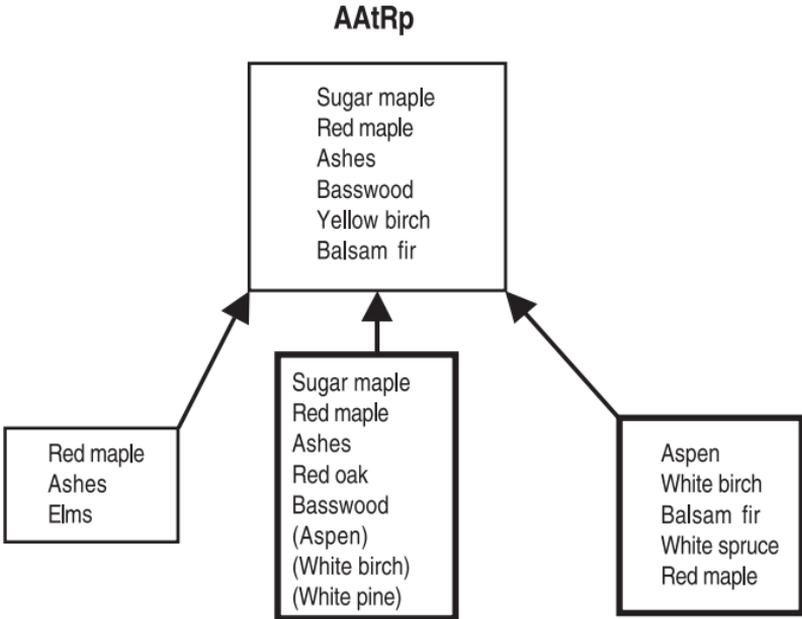
Aspen and white birch have high productivity on this type. Although both red maple and sugar maple compete well on this type, sugar maple quality appears to be below average while that of red maple is high. Management potentials probably are best for mixed hardwoods such as red maple, black ash, basswood and perhaps yellow birch, oaks and sugar maple. Encouraging conifer component can contribute to landscape diversity and wildlife habitat.

Because of seasonal poor drainage or shallow soils there are harvesting and equipment limitations. There is evidence that heavy cutting on seasonally wet soils may cause a rise

in water table due to decreased transpiration, leading to “swamping” of a site. At a minimum, some seasonal restrictions on logging may be necessary on such sites. Windthrow is always a potential hazard on this type.

Disturbance and succession: Windthrow is the principal natural disturbance factor on this type. Because of less firm rooting, due to somewhat poorly drained soils, frequency of small-scale disturbance also is higher than on other habitat types in the same area. Any of the tree species commonly occurring on this type respond to disturbances.

Timing of disturbance, presence of advance regeneration and seed source availability largely determine which species will benefit at any given time. For this reason, and because most species on this type are shade tolerant, the concept of relatively predictable “relay” succession (i.e., a less tolerant species is replaced by a more tolerant species) does not apply well to this habitat type. Aspen stands on this type do indeed succeed to balsam fir and white spruce, but these stands invariably originated from fire disturbance associated with early logging rather than from windthrow.



TMC
Tsuga/Maianthemum-Coptis
(Tsuga canadensis/Maianthemum canadense-
Coptis groenlandica)
Eastern hemlock/Wild lily-of-the valley-Goldthread

Distribution: Very common, and widely distributed. Common throughout most of Region 3, and scattered in Regions 4 and 5 (see Regional Descriptions).

Landform and soils: Occurs on most landforms within its range, but is most common on moraines. Typically occurs as scattered low-lying areas, along slope bottoms and drainage-ways, and on lake and swamp borders. Most commonly occurs on somewhat poorly drained, podzolized sandy loams, and occasionally on loamy sands and loams. The moisture regime is **mesic to wet-mesic**, the nutrient regime is **medium**.

Vegetation:

Common forest cover types: Stands dominated by aspen, red maple, balsam fir and sugar maple are most common. Principal associates are white birch, yellow birch, hemlock, and white spruce.

Shrub and small tree layer: Shrub layer typically is not well developed. Most common species are hazel, fly honeysuckle

and bush honeysuckle. Occasionally blackberries and dwarf raspberries are abundant.

Ground flora characteristics: Herb layer is composed primarily of species characteristic of northern (near-boreal) forests and raw humus substrate. Most common species include: wild lily of-the-valley, starflower, bunchberry, clubmosses, yellow bead-lily, large-leaf aster, wild sarsaparilla, bracken fern and shield fern.

Management implications: Because conifers (balsam fir, white cedar, hemlock and white spruce) are almost a constant component of stands on this type, it contributes greatly to local community diversity.

Of the hardwood species, aspen, white birch, red maple and yellow birch grow well on this type but sugar maple, basswood and white ash are not well represented and typically display relatively poor vigor and quality.

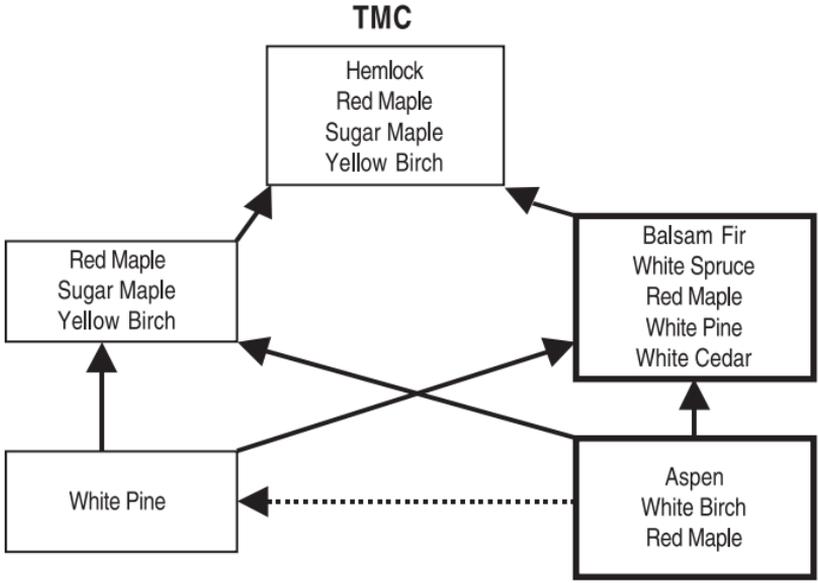
Young stands are capable of producing good mixtures of browse species (aspen, birch, balsam poplar red maple, sugar maple and yellow birch sprouts,

along with mountain maple and other shrubs).

Because of seasonal poor drainage or shallow soils there are harvesting and equipment limitations. There is evidence that heavy cutting on seasonally wet soils may cause a rise in water table due to decreased transpiration, leading to “swamping” of a site. At a minimum, some seasonal restrictions on logging may be necessary on such sites. Windthrow is always a potential hazard on this type.

Disturbance and succession: Windthrow is the principal natural disturbance factor on this type. Because of less firm rooting, due to somewhat poorly drained soils, frequency of small-scale disturbance also is higher

than on other habitat types in the same area. Any of the tree species commonly occurring on this type respond to disturbances. Timing of disturbance, presence of advance regeneration and seed source availability largely determine which species will benefit at any given time. For this reason, and because most species on this type are shade tolerant, the concept of relatively predictable “relay” succession (i.e., a less tolerant species is replaced by a more tolerant species) does not apply well to this habitat type. Aspen stands on this type do indeed succeed to balsam fir and white spruce, but these stands invariably originated from fire disturbance associated with early logging rather than from windthrow.



ArAbCo
Acer rubrum-Abies/Cornus
(Acer rubrum-Abies balsamea/Cornus canadensis)
Red maple-Balsam fir/Bunchberry

Distribution: Predominantly occurs in the westcentral portion of Region 3, where it is common (see Regional Description).

Landform and soils: Associated predominantly with loess plains, but occasionally occurs on till plains. Soils are somewhat poorly drained silt loams. The moisture regime is **wet-mesic**. The nutrient regime is **medium**.

Vegetation:

Common forest cover types: Stands dominated by aspen and red maple are most common. Balsam fir, is a common associate and white spruce, black ash, and sugar maple is a minor associate.

Shrub and small tree layer: Shrub layer typically is moderately well developed. Best represented species are hazel, gooseberries, blackberries, dwarf raspberry and bush honeysuckle. Occasionally abundant are red osier dogwood and blueberries.

Ground flora characteristics: Herb layer is moderately well developed and relatively species poor. Most common species are wild lily-of-the-valley, bunchberry, large-leaved aster, wild sarsaparilla, starflower, interrupted fern, shield fern, horse-tails and lady fern.

Management implications: This type is strongly associated with silt loams subject to high water table, seasonally approaching surface. Potential for "swamping" is high. There are limits for operability and seasonal restrictions may be necessary. This type is best suited for management of balsam fir, white spruce, aspen and red maple, primarily for pulpwood and wildlife habitat. Increasing conifer component in many stands is recommended to improve future management alternatives and habitat diversity.

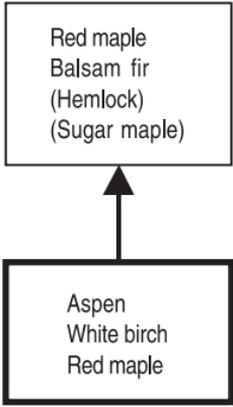
Disturbance and succession:

Windthrow is the principal disturbance factor on this type. Because of less firm rooting, due to somewhat poorly drained soils, frequency of small-scale wind disturbance is higher than on other habitat types in the same area. Any of the tree species commonly occurring on this type respond to disturbances. Timing of disturbance, advance regeneration and seed source availability largely determine which species will benefit at any given time. For this reason, and because most species on this type are shade tolerant, the concept of relatively predictable

“relay” succession (i.e., a less tolerant species is replaced by a more tolerant species) does not apply well to this habitat type.

Presettlement records show that hemlock was prominent on this habitat type, but this species is virtually absent in present stands. In spite of its former prominence, hemlock was not used in naming this habitat type because it is not clear whether it can reestablish itself under current conditions. Any disturbance of present stands favors aspen regeneration. In the absence of disturbance red maple, and to some extent balsam fir, readily succeed other species.

ArAbCo



ArAbSn
Acer rubrum-Abies/Sanicula
(Acer rubrum-Abies balsamea/Sanicula marilandica)
Red maple-Balsam fir/Black snakeroot

Distribution: The predominant type on the Superior Clay Plain in Region 2 and extreme north-western Region 3 (see Regional Descriptions).

Landform and soils: Associated predominantly with lacustrine deposits and water worked till. The surface soil is clay, occasionally overlain by a thin (< 6 inches) layer of sand. Although soils are somewhat poorly drained, a site can be very wet or very dry, depending on the season and on recent precipitation. The moisture regime is **mesic to wet-mesic**. The nutrient regime is **poor to medium**.

Vegetation:

Common forest cover types: Stands dominated by aspen and balsam fir are most common. Principal associates are red maple, white birch and white spruce..

Shrub and small tree layer: Shrub layer typically is well developed and species diverse.

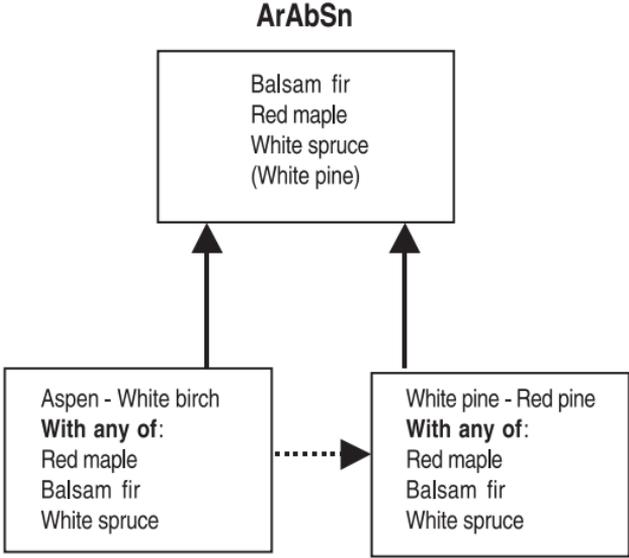
Best represented species are hazel, speckled alder, red-osier dogwood and wild rose. Other common species are dewberries, dwarf raspberry, bush honeysuckle and downy arrowwood.

Ground flora characteristics: Herb layer is well developed and species rich. Bracken fern and large-leaved aster typically are most abundant. Other common species include: Wild strawberry, wild sarsaparilla, bunchberry, snakeroot, selfheal, horsetails and sweet coltsfoot.

Management implications: Aspen productivity is high, but succession to balsam fir or red maple is advanced in many stands. Conifers provide landscape diversity and wildlife habitat. White pine, white spruce and balsam fir can be productive for wildlife and fiber. Aspen and white birch can be considered for wildlife and timber. Red maple has good growth potential and is a viable management alternative.

Disturbance and succession: Clayey soils are subject to great fluctuation in soil moisture regime, not only year to year, but also in response to seasonal precipitation patterns. For this reason suitable regeneration conditions for different tree species also fluctuate widely. Historically, balsam fir and white spruce were best represented on this habitat type, but scattered white and red pines were

also common. Following early logging, aspen became the dominant forest type, but succession to balsam fir, and to a lesser degree, white spruce and red maple, is evident everywhere where seed sources are present. While there is no good record of the degree of red maple representation in presettlement forests, the species is well represented today.



ArVRp

Acer rubrum/Vaccinium-Rubus

(Acer rubrum/Vaccinium angustifolium-Rubus pubescens)

Red maple/Blueberry-Dwarf raspberry

Distribution: Scattered in Region 1 (see Regional Description).

Landform and soils: Associated primarily with outwash, but also occurs on lake plains and moraines where water worked sands have accumulated. Typically occurs as scattered low-lying areas, along slope bottoms and drainageways, and on lake and swamp borders. Most commonly occurs on somewhat poorly drained loamy sands and sands, and occasionally sandy loams. The moisture regime is **mesic to wet-mesic**, the nutrient regime is **poor to medium**.

Vegetation:

Common forest cover types:

Stands dominated by aspen and red maple are most common. Associates include white birch, pine (jack, red, white) and oak (red, pin, white, bur).

Shrub and small tree layer:

Tall shrubs are not abundant. Best represented are dwarf raspberry, bush honeysuckle, blueberries and juneberry.

Ground flora characteristics:

Herb layer is not well developed. Best represented are bracken fern, large-leaf aster, wild lily-of-the-valley, wild sarsaparilla, bunchberry, starflower and sessile-leaved bellwort.

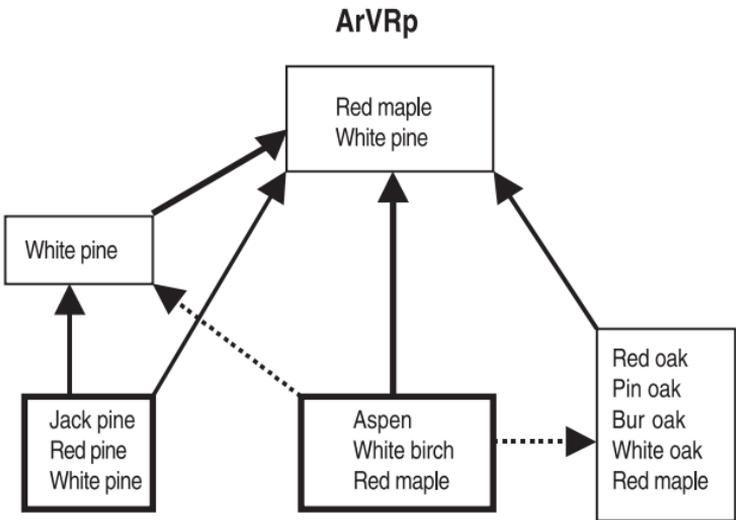
Management implications:

Aspen, red maple and white pine are best suited for management on this habitat type. Maintaining oaks as associates provides forage for wildlife, but timber growth and quality are only fair.

Because of seasonal poor drainage or shallow soils there are harvesting and equipment limitations. There is evidence that heavy cutting on seasonally wet soils may cause a rise in water table due to decreased transpiration, leading to "swamping" of a site. At a minimum, some seasonal restrictions on logging may be necessary on such sites. Windthrow is always a potential hazard on this type.

Disturbance and succession: Historically, fire was an important disturbance factor throughout Region 1. All species occurring on this habitat type, except red maple, are intolerant of shade and benefit from fire disturbance. Timing of disturbance, advance regeneration and seed source availability largely control the composition of a new stand.

There is considerable year to year variation in soil moisture regime which differentially affects regeneration success of tree species. In the absence of disturbance red maple typically dominates advance regeneration, however, white pine may also become an important component in the future.



ArAbVCo

Acer rubrum-Abies/Vaccinium-Cornus

(Acer rubrum-Abies balsamea/Vaccinium-Cornus canadensis)

Red maple-Balsam fir/Blueberry-Bunchberry

Distribution: Occurs in Region 2 (see Regional Description).

Landform and soils: Associated predominantly with coarse, rolling moraines, but also occurs on outwash. Typically occurs as scattered low-lying areas, along slope bottoms and drainage ways, and on lakes and swamp borders. Most commonly occurs on somewhat poorly drained loamy sands and sands. The moisture regime is **mesic to wet-mesic**. The nutrient regime is **poor**.

Vegetation:

Common forest cover types: Stands dominated by aspen, white birch, red maple and balsam fir are most common. Principal associates are white spruce and white pine.

Shrub and small tree layer:

Shrub layer typically is well developed. Best represented species are hazel, mountain maple, juneberry, bush honeysuckle, fly honeysuckle and blueberries.

Ground flora characteristics:

Herb layer is well developed and species rich. The following species typically dominate: bracken fern, large-leaved aster, ground pine clubmoss and wild sarsaparilla. Other common species include bunchberry, rosey twisted stalk, sweet-scented bedstraw and yellow beadlily.

Management implications:

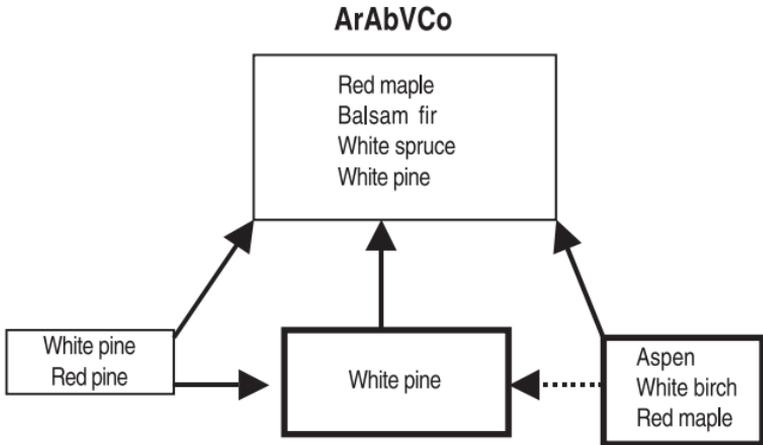
Aspen, red maple, white birch, balsam fir and white spruce are best suited for management on this habitat type. White pine is another alternative. This habitat type offers good potential for management of conifers for wild-life benefits and for enhancing landscape biodiversity. Where drier hummocks are present red pine also grows exceptionally well.

Because of seasonal poor drainage or shallow soils there are harvesting and equipment limitations. There is evidence that heavy cutting on seasonally wet soils may cause a rise in water table due to decreased transpiration, leading to "swamping" of a site. At a minimum, some seasonal restrictions on

logging may be necessary on such sites. Windthrow is always a potential hazard on this type.

Disturbance and succession: Because of poorly drained sandy soils historic fire disturbance has likely been less frequent than on the better drained sites. This is evident by the presence (historic and current) of shade tolerant

and fire sensitive species such as red maple, balsam fir and white spruce. Aspen stands are common today, but they are largely a result of fires associated with past logging. Red maple and balsam fir are the most obvious succeeding species, but white spruce and white pine may also become more important in the future.



ArAbVC

Acer rubrum-Abies/Vaccinium-Coptis

(Acer rubrum-Abies balsamea/Vaccinium angustifolium-Coptis groenlandica)

Red maple-Balsam fir/Blueberry-Goldthread

Distribution: Fairly common, and widely distributed. Scattered throughout most of Regions 3 and 4 (see Regional Descriptions).

Landform and soils: Occurs on most landforms within its range. Most common on pitted outwash, but also occurs on moraines and lake plains where water worked sands have accumulated. Typically occurs as scattered low-lying areas, along slope bottoms and drainageways, and on lake and swamp borders. Most commonly occurs on somewhat poorly drained, podzolized loamy sands and sands. The moisture regime is **mesic to wet-mesic**. The nutrient regime is **poor**.

Vegetation:

Common forest cover types: Stands dominated by aspen, pine (white, red), red maple and balsam fir are most common. White birch and white spruce are common associates.

Shrub and small tree layer:

Shrub layer typically is only moderately well developed. Best represented species are

blueberries, hazel, blackberries, junberry and bush honeysuckle.

Ground flora characteristics:

Herb layer typically is well developed but relatively low in species diversity. Bracken fern, large-leaved aster and wild sarsaparilla typically dominate. Other common species include: wild lily-of-the-valley, starflower, yellow beadlily, shield fern, club mosses, bunchberry and goldthread.

Management implications:

Aspen, red maple, white birch, balsam fir and white spruce are best suited for management on this habitat type. White pine is another alternative. This habitat type offers good potential for management of conifers for wildlife benefits and for enhancing landscape biodiversity. Where drier hummocks are present red pine also grows exceptionally well.

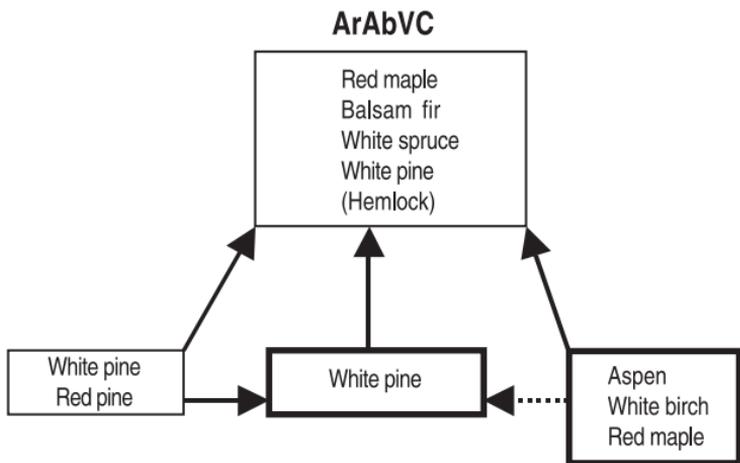
Because of seasonal poor drainage or shallow soils there are harvesting and equipment limitations. There is evidence that heavy cutting on season-

ally wet soils may cause a rise in water table due to decreased transpiration, leading to “swamping” of a site. At a minimum, some seasonal restrictions on logging may be necessary on such sites. Windthrow is always a potential hazard on this type.

Disturbance and succession: Windthrow apparently is the principal disturbance factor on this type, but fire historically also played a role. This is evidenced by considerable presence of white and red pine as well as white birch and aspen.

In the absence of disturbance, red maple and balsam fir are most frequently replacing pine and aspen stands. However, white pine is probably capable of maintaining itself in small numbers through regeneration in gaps.

Presettlement records suggest that hemlock was present on this habitat type, but it is virtually absent in present stands. Hemlock was not used in naming this habitat type because it is not clear whether it can reestablish itself under current conditions.



PARVRh
Pinus-Acer rubrum/Vaccinium-Rubus
(Pinus strobus-Acer rubrum/Vaccinium angustifolium-
Rubus hispidus)
White pine-Red maple/Blueberry-Swamp dewberry

Distribution: Common in south-western Region 5 (see Regional Description). Also occurs in Regions 6, 7, and 9

Landform and soils: In Region 5, associated predominantly with the rolling erosional surface of the Neilsville Sandstone plateau. Also occurs on sandy stream terraces and outwash. Occurs primarily on somewhat poorly drained loamy sands and sands. Also occurs on damp, shallow sandy loams over sandstone. The moisture regime is **mesic to wet-mesic**. The nutrient regime is **poor**.

Vegetation:

Common forest cover types: Stands dominated by oak (red, pin, black, white), pine (jack, red, white), red maple, aspen and white birch are most common.

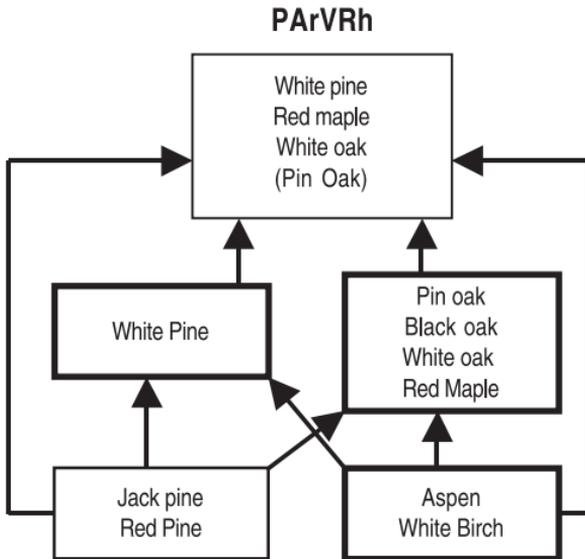
Shrub and small tree layer: Tall shrubs are not abundant. Most frequently present are swamp dewberry, winterberry, blueberry, huckleberry and juneberry.

Ground flora characteristics: Herb layer is not well developed nor species rich. Most often present species are bracken fern, cinnamon fern, wild sarsaparilla, starflower, wild lily-of-the-valley, sessile-leaved bellwort, partridgeberry, wintergreen, and clubmosses.

Management implications: Aspen, white pine and red maple are best suited for management on this habitat type. Because of seasonal poor drainage or shallow soils there are harvesting and equipment limitations. There is evidence that heavy cutting on seasonally wet soils may cause a rise in water table due to decreased transpiration, leading to "swamping" of a site. At a minimum, some seasonal restrictions on logging may be necessary on such sites. Windthrow is always a potential hazard on this type.

Disturbance and succession: Windthrow is the current principal natural disturbance factor on this type, although historically fire was also important. Because of less firm rooting, due to poorly drained soils, frequency of small-scale disturbance is higher than on other habitat types in the same area. White pine appears to be well adapted

to this habitat type and was the dominant species in presettlement forests. Red maple and oaks were always present, but assumed dominance only after white pine was logged off. Since then white pine seed source has steadily increased and white pine regeneration is now common in many stands.



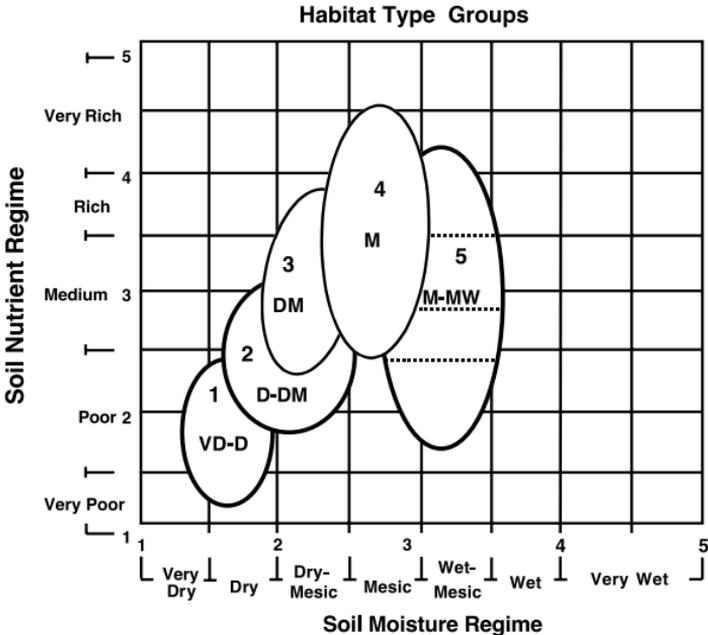
Management Implications

This guide is not intended as a manual for specific management prescriptions, because these depend on management objectives and a host of internal and external factors. However, it is a tool to help assess the biological potential of a given site and to identify ecological and silvicultural alternatives for a given stand or forest community.

Habitat type groups: In order to obtain additional information about characteristics of forest habitat types, the 1996 FIA (Forest Inventory and Analysis) survey included identification of measurement plots by habitat type. Considerable amount of useful information was derived

from this survey. To simplify the analysis and discussion of the inventory data, the similar habitat types (those representing similar position on the moisture-nutrient gradient) from the five habitat type regions were combined into five groups: Very dry to dry (**VD-D**), Dry to dry mesic (**D-DM**), Dry mesic (**DM**), Mesic (**M**) and Mesic to wet mesic (**M-WM**). This section summarizes some characteristics of the five habitat type groups.

For additional information refer to the North Central Research Station, General Technical Report NC-207: Analysis of the 1996 Wisconsin Forest Statistics by Habitat Type, by Kotar, Kovach and Brand.



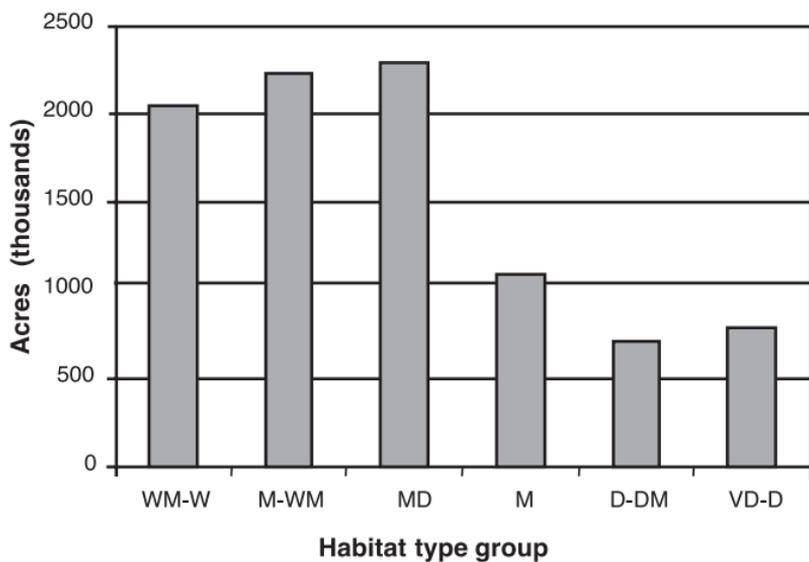
Habitat Types by Group and Region

Within habitat type groups habitat types are arranged top to bottom, from poorer to richer.

Types in different regions, but located on the same line are most similar in terms of management implications.

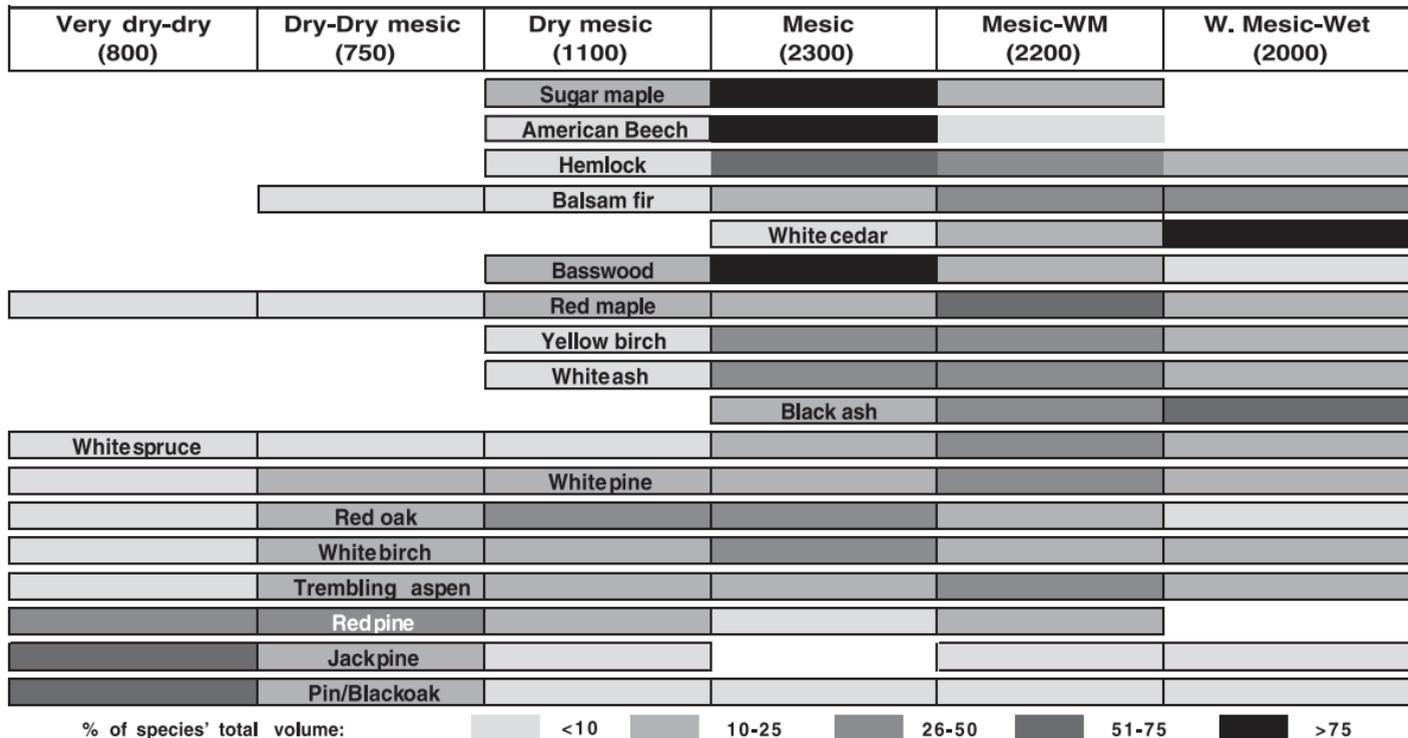
Habitat Type Group		Region 1	Region 2	Region 3	Region 4	Door Co.	Region 5	
Very Dry to Dry	a	PQG	PQG	PQE	PARVAo			
	b							PQGCe
	c	PARV-U	PARV					
	d	QAp						
Dry to Dry-mesic		PARVAm	PARVAa-Po	PARVAa	PARVAa-Vb, PARVPo		PARVHa	
Dry-mesic	a	AVDe	AVCI	AVVb	AVb	TFAa	AVb-V AVb	
	b		ACI					
	c		AAt	AVb		ATFPo		
Mesic	a	ACaCi	ATM	ATM	ATM	ATFSt	ATM	
	b				AFVb			
	c				ATFD			
	d			AAs	ATD	ATDH		
	e				AOCa, AH	AFAAd	AFAI	AHVb
	f					AH		AH
Mesic to Wet-mesic	a	ArVRp	ArAbVCo	ArAbVC	ArAbVC		PARVRh	
	b		ArAbSn					
	c		AAtRp	TMC, ArAbCo	TMC		TMC	
	d		ASnMi					
	e		ATAtOn	ATAtOn	ATAtOn			
	f	ASal	ACal, AHI	AHI	AHI			

Extent of Habitat Type Groups in Northern Wisconsin



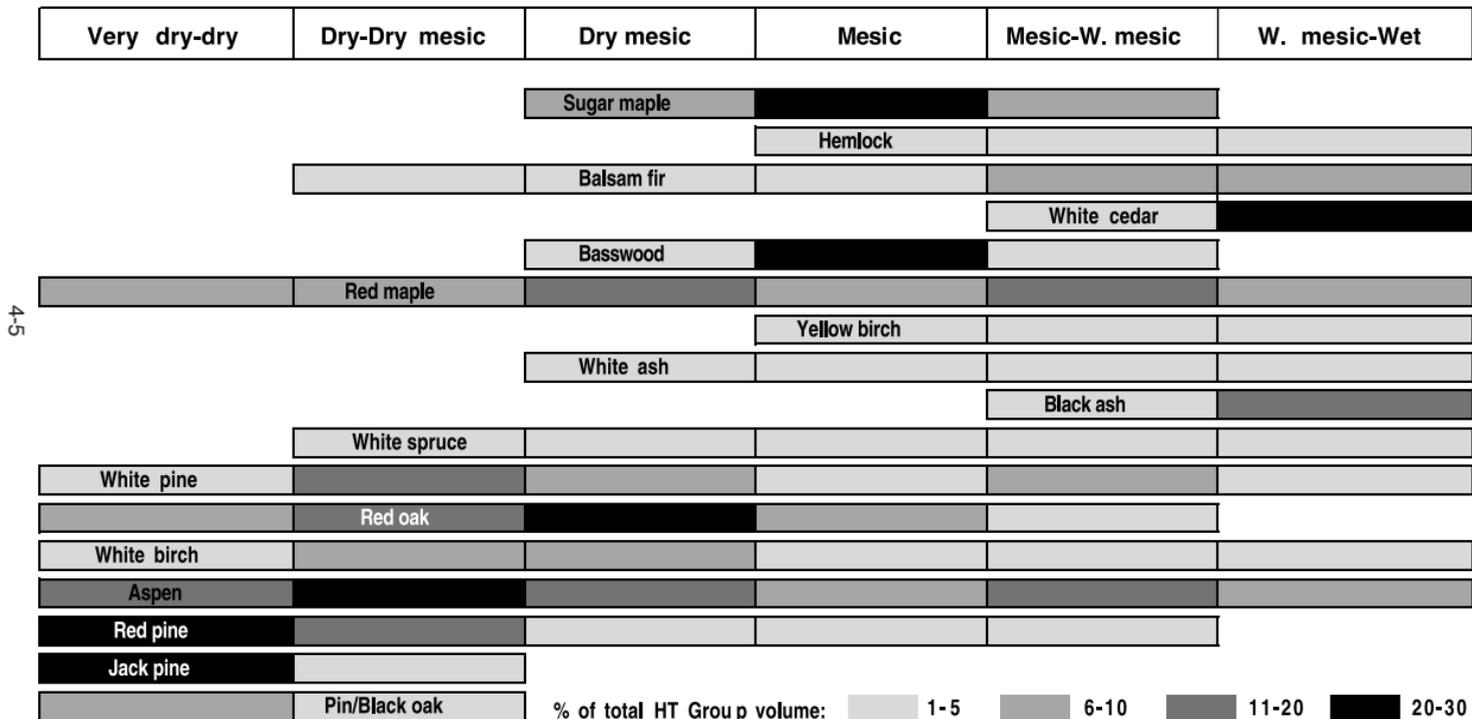
Representation of Major Tree Species Across Habitat Type Groups as a Percentage of Species' Total Growing Stock Volume.

(From 1995 FIA.) (Numbers in parentheses are acres in thousands.)



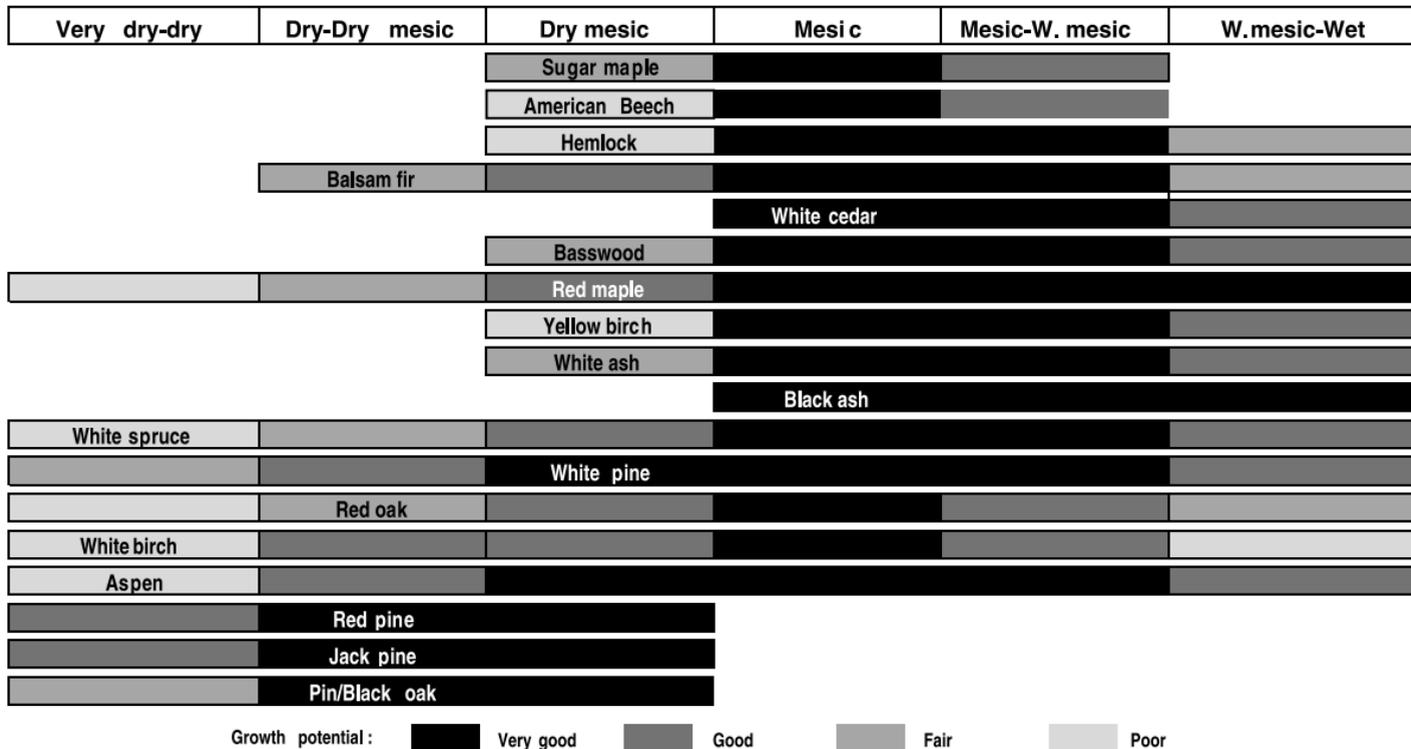
**Representation of Major Tree Species Within Habitat Type Groups (read in columns)
as a Percentage of Species' Total Growing Stock Volume.**

(From 1995 FIA.)

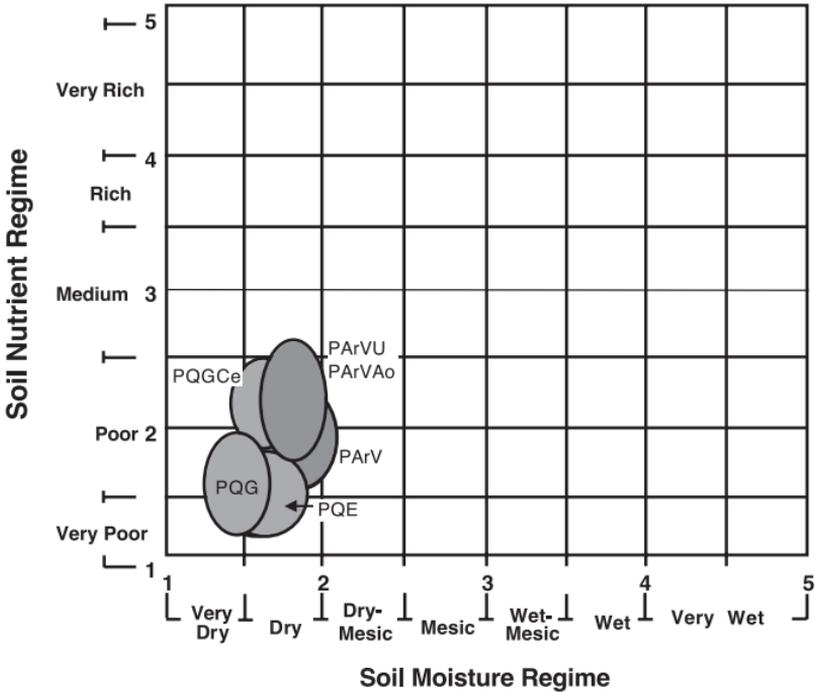


Relative Growth Potential for Major Tree Species Across Habitat Type Groups

Only those habitat types where the species occurs naturally are considered.



Habitat Type Group 1
(Very dry to dry, nutrient poor sites:
White pine habitat type series):
PQGCe, QAp, PQG, PARV-U, PQE, PARV, PARVAo



Site characteristics: These types represent the driest and nutrient poor ecosystems in their respective regions. They are most often associated with glacial outwash deposits.

Principal cover types: Relatively pure or mixed stands of pines (jack, red, white) and oaks (red, pin, occasionally bur) are most common. Aspen/white birch stands also occur although they are significantly less com-

mon on the poorest types of this group.

Regeneration: Red maple typically is best represented in advance regeneration, especially on the "better" habitat types of this group. If seed source is present white pine seedling and saplings also can be well represented. Aspen, jack pine, red pine and, to some extent oaks, are more dependent on fire or logging for regeneration.



Growth potential: All three native pines are well suited for these types, although red pine and especially white pine has considerably higher yield potential on habitat types of groups 2 and 3. Red oak, red maple, aspen and white birch potential is poor. Other native hardwoods do not occur on these sites.

Other management considerations: From an ecological point of view there are many reasons for maintaining the presence of less productive deciduous species on these habitat types. Soils on these types are generally

very low in nutrients and organic matter. Coniferous foliage is not a good source of mineral nutrients and in addition it promotes loss of soil nutrients through leaching. The foliage of the less productive deciduous species is richer in nutrients than is conifer foliage and thus contributes greatly to nutrient build up through litter fall.

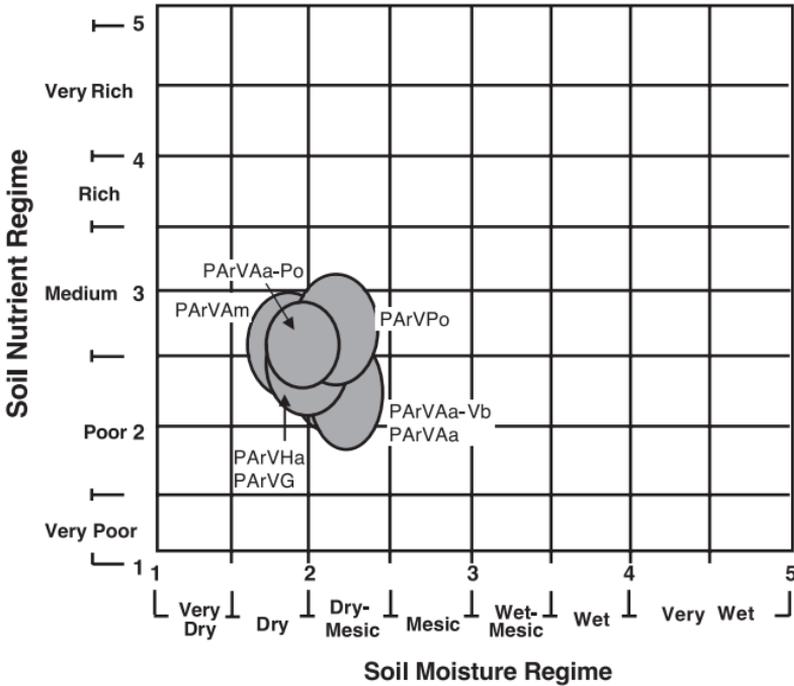
Mixed coniferous-deciduous forests also provide habitat for a greater variety of wildlife and are less susceptible to catastrophic destruction by insects, disease or severe climatic conditions.

Habitat Type Group 2

(Dry to dry mesic, nutrient poor to medium sites:

White pine - Red maple habitat type series):

PArVAm, PArVAa, PArVAa-Po, PArVAa-Vb, PArVPo, PArVHa

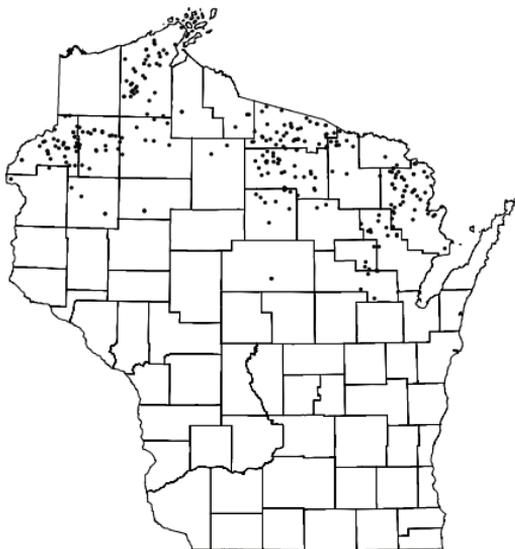


Site characteristics: These habitat types occur on landscapes with somewhat more favorable moisture and nutrient conditions than those of group 1. Most common landform is pitted outwash, but these types also occur on moraines and lake plains where water worked sands have accumulated.

Principal cover types: Based on data from 1996 FIA (growing stock volumes) best represented

species are aspen, red oak, red pine, and white pine. Red maple is ubiquitous but it generally represents younger age classes.

Regeneration: Red maple typically is the best represented species in advance regeneration, but white pine is also well represented where seed source is present. Occasionally sugar maple or basswood reproduction is found, but these species do not grow well on these sites.

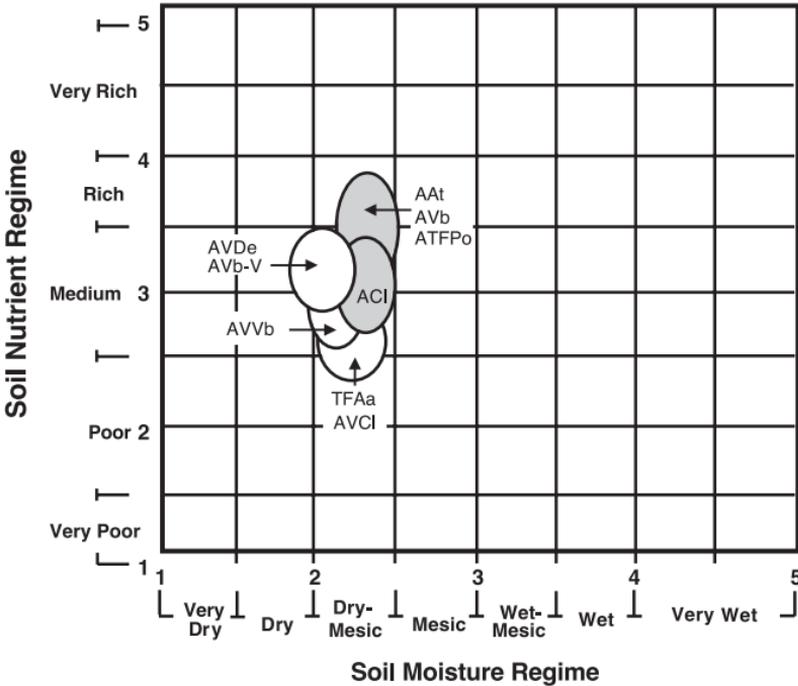


Growth potential: Red and white pines have best growth potential. Bigtooth aspen growth is substantially better on these types than that of quaking aspen. Red oak and red maple potential for sawtimber is only modest.

Other management considerations: Although pines are best suited for wood production on these types, retention of deciduous species is desirable from wildlife habitat perspective and maintenance of soil nutrient regime.

Habitat Type Group 3

(Dry mesic, nutrient medium sites: Sugar maple, Sugar maple - Eastern hemlock and Sugar maple - Beech habitat type series):
 AVDe, AAt, AVCI, ACI, AVVb, AVb, AVb-V, TFAa, ATFPo

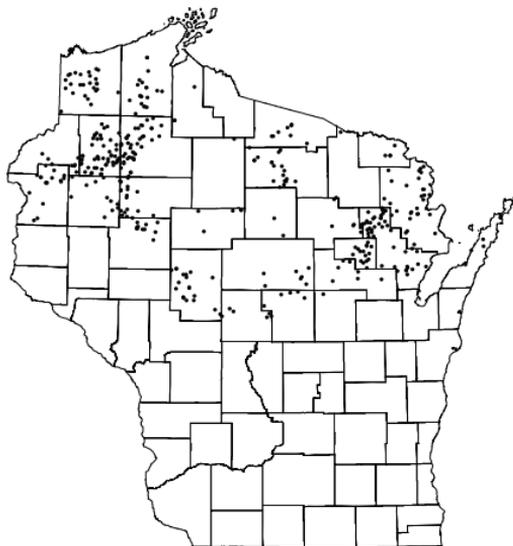


Site characteristics: These habitat types are associated primarily with end/recessional moraines, but they also occur on rolling ground moraines with coarser soil texture.

Principal cover types: Based on 1996 FIA data (growing stock volumes) red oak, red maple and aspen were best represented. White pine is a common associate in some stands. Sugar maple, when present, typically

represents the younger age classes.

Regeneration: Although red maple typically is the best represented advance reproduction, sugar maple is also frequently present and plays a strong role in community dynamics. Red oak is often present but typically in low numbers. Where seed source is present white pine regeneration can also be found.



Growth potential: With the exception of hemlock and yellow birch, all native upland tree species achieve good growth on these types. Only on mesic (and in some cases wet mesic) types is their growth potential higher. Never the less, competition pressure from mesic hardwoods, particularly sugar maple (and beech on some types), is considerably less than on mesic habitat types.

Other management considerations: Although sugar maple has the potential of becoming the dominant species in late successional stands red maple tends to be more successful in dominating mid-successional stands. These types frequently offer good opportunities for management of red oak and/or white pine.

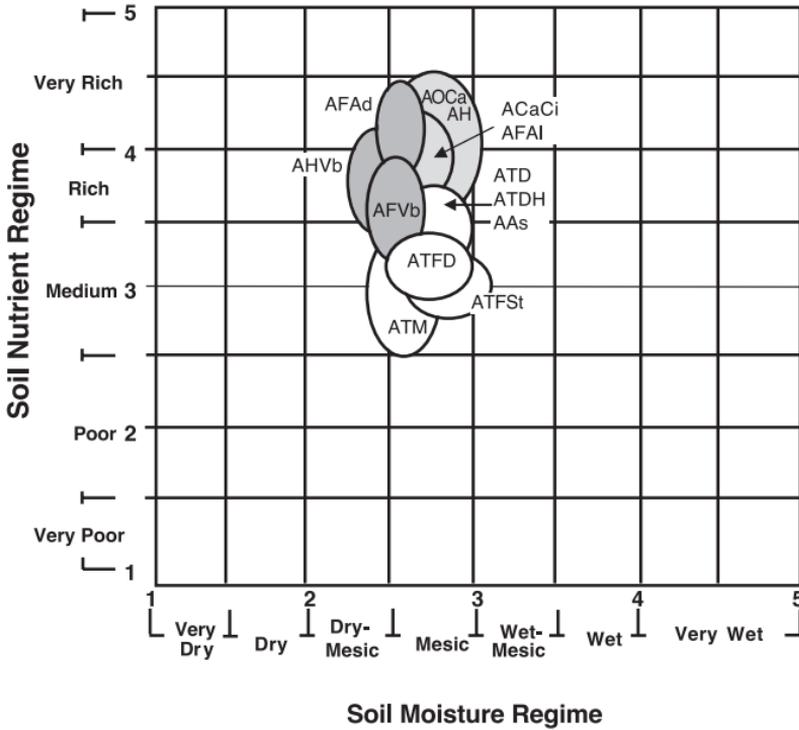
Habitat Type Group 4

(Mesic, medium to rich nutrient sites:

Sugar maple, Sugar maple - Eastern hemlock and

Sugar maple - Eastern hemlock - Beech habitat type series):

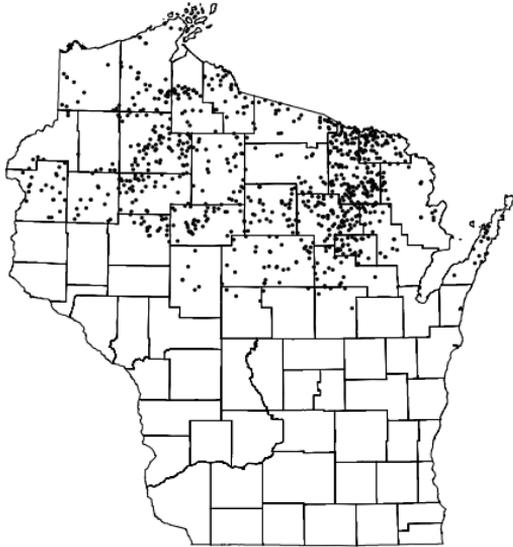
ACaCi, ATM, AAs, ATD, AOCa, AH, AFVb, ATFD, ATDH, AFAd, ATFS, AFAI, AHVb



Site characteristics: These types are associated primarily with ground moraines or other landforms covered by wind-blown (loess) deposits. Soils typically are well to moderately well drained.

Principal cover types: Sugar maple is most often the principal component of stands on

all habitat types of this group. Major associates differ somewhat among the five regions and along the range of the moisture and nutrient gradient encompassed by this habitat type group. Basswood is most often the primary associate, particularly on the richest habitat types. On habitat types toward



the lower range of nutrients, red maple, yellow birch and, potentially, hemlock are the most important associates. In regions one and two, white ash is less well represented than it is in other regions. On habitat types approaching the dry mesic conditions (AFVb, AHVb, AFAd) red oak is often well represented.

Regeneration: Sugar maple most often dominates advance reproduction. Depending on the habitat type and stand history, basswood, white ash, red maple, yellow birch, beech, ironwood and hemlock may be well represented.

Growth potential: Under favorable conditions, in respect to competition, any of the native species may reach optimal growth on these habitat types.

Other management considerations: Both even and uneven age methods of management are suitable, depending on the condition of the original stands. Even age management encourages greater tree species diversity while uneven age management tends to maximize tree quality.

Conversion of even the poorest quality stands to conifers is not recommended because of extreme difficulty of controlling competing vegetation and because of excellent growth of native hardwoods.

Except in thinned stands, shrub development is relatively low, but ground vegetation diversity is often high. Sustained browse production can be maintained only through frequent thinning.

Habitat Type Group 5

(Mesic to wet mesic, nutrient poor to rich sites:

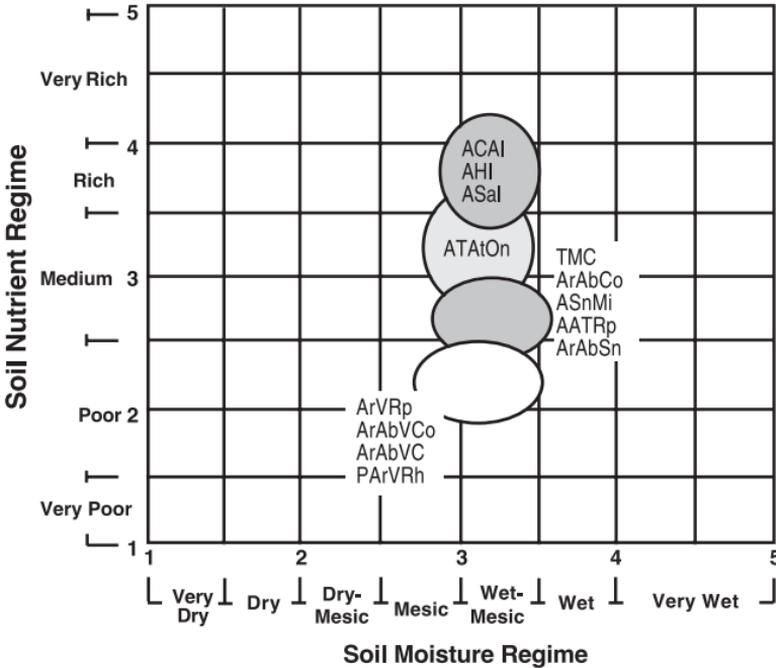
Red maple, Red maple - White pine, Red maple -

Balsam fir, Eastern hemlock, Sugar maple - Eastern hemlock,

Sugar maple, habitat type series):

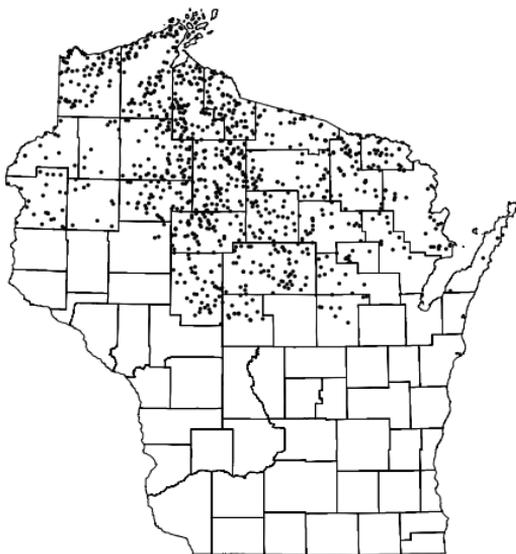
PAVRh, ArVRp, ArAbVC, ArAbVCo, ArAbSn, TMC, ATAtOn,

AAtRp, ASnMi, ASal, ACal, AHI



Site characteristics: All habitat types in this group represent somewhat poorly drained sites. These include sandy soils with high or perched water table as well as loams and silt loams with relatively poor internal drainage. Nutrient regime ranges from poor to rich.

Principal cover types: Because of the wide range of nutrient conditions many species and cover types are found. Aspen, white birch and red maple occur on all habitat types of this group, but are best represented toward the lower range of nutrient conditions. White pine, balsam fir and hemlock are also best represented in this lower nutrient



range. Sugar maple, basswood and ash (white, green, black), on the other hand, are confined to the medium to rich segment of the nutrient gradient.

Regeneration: Red maple and balsam fir are the most common advance regeneration species on the lower end of the nutrient range. On the richer habitat types sugar maple and basswood tend to predominate, but red maple is often well represented.

Growth potential: Based on FIA data we can conclude that growth potential for most species is somewhat below that on the mesic types, but still in the fair to good range.

Other management considerations: Although sugar maple competes well on the richer types of this group, wood quality is often not as good as on the mesic types. Because of relatively poor drainage, windthrow is more frequent on these types than on other types in the same area. Timing and frequency of disturbance, together with seed source availability, largely control the composition and structure of stands. Management activities are frequently dictated by disturbance events. Potential for “swamping” the site is high in many cases.

Habitat Types by Group and Region

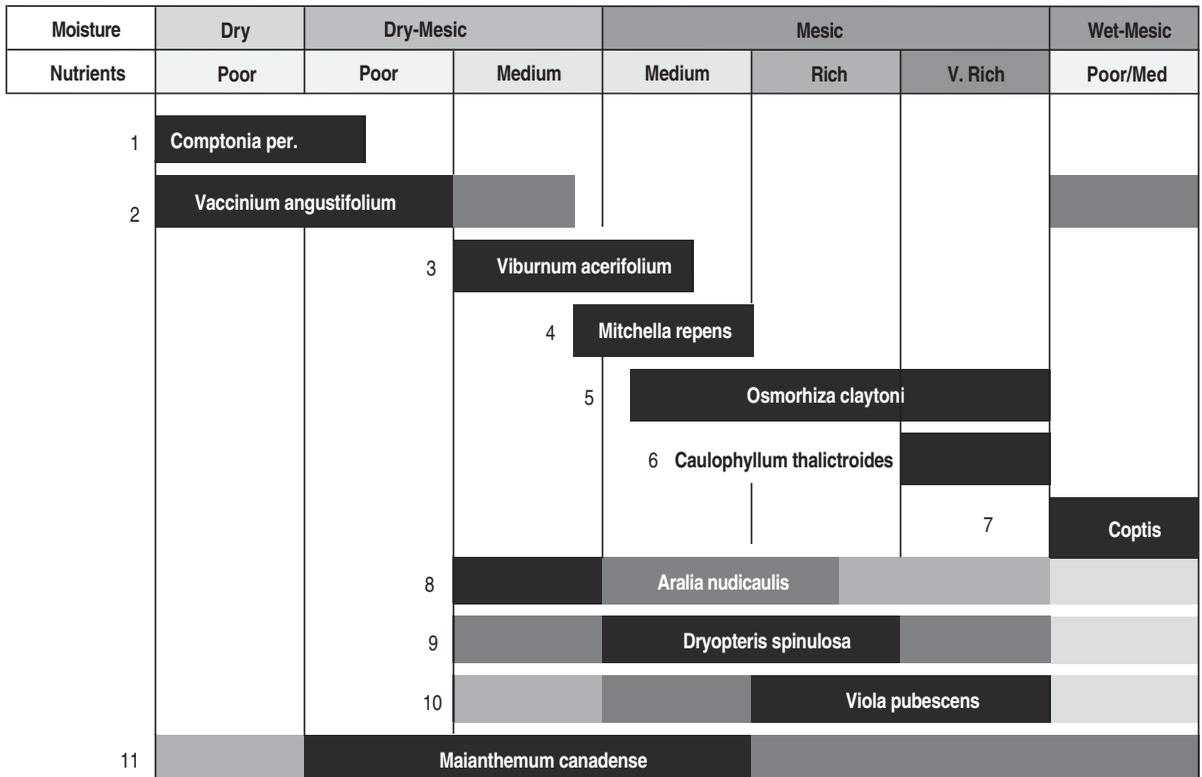
Within habitat type groups habitat types are arranged top to bottom, from poorer to richer.

Types in different regions, but located on the same line are most similar in terms of management implications.

Habitat Type Group		Region 1	Region 2	Region 3	Region 4	Door Co.	Region 5	
Very Dry to Dry	a	PQGCe	PQG	PQE	PArVAo			
	b		PARV-U	PARV				
	c	QAp						
	d							
Dry to Dry-mesic		PARVAm	PARVAa-Po	PARVAa	PARVAa-Vb, PARVPo		PARVHa	
Dry-mesic	a	AVDe AAAt	AVCI	AVVb	AVb	TFAa	AVb-V AVb	
	b		ACI			ATFPo		
	c							
Mesic	a	ACaCi	ATM	ATM	ATM	ATFSt	ATM	
	b					AFVb		
	c					ATFD		
	d		AAs	AAs	ATD	ATDH	AFAI	AHVb AH
	e							
	f				AOCa, AH	AH		
Mesic to Wet-mesic	a	ArVRp	ArAbVCo	ArAbVC	ArAbVC		PARVRh	
	b		ArAbSn					
	c		AAAtRp	TMC, ArAbCo	TMC		TMC	
	d	ASnMi						
	e	ASal		ATAtOn	ATAtOn		ATAtOn	
	f			ACal, AHI	AHI		AHI	

Ecological Species Groups of Northern Wisconsin's Upland Forests

Shading density indicates relative frequency of occurrence



1. *Comptonia peregrina* group

Comptonia peregrina
Amorpha canescens
Ceanothus americanus
Convolvulus spithameus
Eqigaea repens
Melampyrum lineare
Rosa sp.

2. *Vaccinium angustifolium* group

Vaccinium angustifolium
Apocynum androsaemifolium
Chimaphila umbellata
Cornus racemosa
Galium boreale
Gaultheria procumbens
Lysimachia quadrifolia
Pedicularis canadensis
Smilacina stellata
Waldsteinia fragarioides

3. *Viburnum acerifolium* group

Viburnum acerifolium
Desmodium glutinosum
Hamamelis virginiana
Osmunda claytoniana
Polygala paucifolia
Prenanthes alba

4. *Mitchella repens* group

Mitchella repens
Clintonia borealis

Lycopodium clavatum
Lycopodium lucidulum
Lycopodium obscurum
Medeola virginiana

5. *Osmorhiza claytoni* group

Osmorhiza claytoni
Actaea rubra
Arisaema atrorubens
Botrychium virginianum
Dryopteris disjuncta
Sambucus pubens
Solidago flexicaulis

6. *Caulophyllum thalictroides* group

Caulophyllum thalictroides
Adiantum pedatum
Allium tricoccum
Boehmeria cylindrica
Hepatica acutiloba
Hydrophyllum virginianum
Laportea canadensis
Mitella diphylla
Sanguinaria canadensis

7. *Coptis groenlandica* group

Coptis groenlandica
Cornus canadensis
Linnaea borealis
Oxalis montana

8. *Aralia nudicaulis* group

Aralia nudicaulis

Amphicarpa bracteata
Lonicera canadensis

9. *Dryopteris spinulosa* group

Dryopteris spinulosa
Aralia racemosa
Galium triflorum
Hepatica americana
Trillium sp.

10. *Viola pubescens* group

Viola pubescens
Athyrium filix-femina
Cornus alternifolia
Dirca palustris
Polygonatum pubescens
Ribes sp.
Streptopus roseus
Uvularia grandiflora
Viola pensylvanica

11. *Maianthemum canadense* group

Maianthemum canadense
Amelanchier sp.
Anemone quinquefolia
Aster macrophyllum
Corylus cornuta
Prunus virginiana
Rubus sp.
Smilacina racemosa
Trientalis borealis
Uvularia sessilifolia

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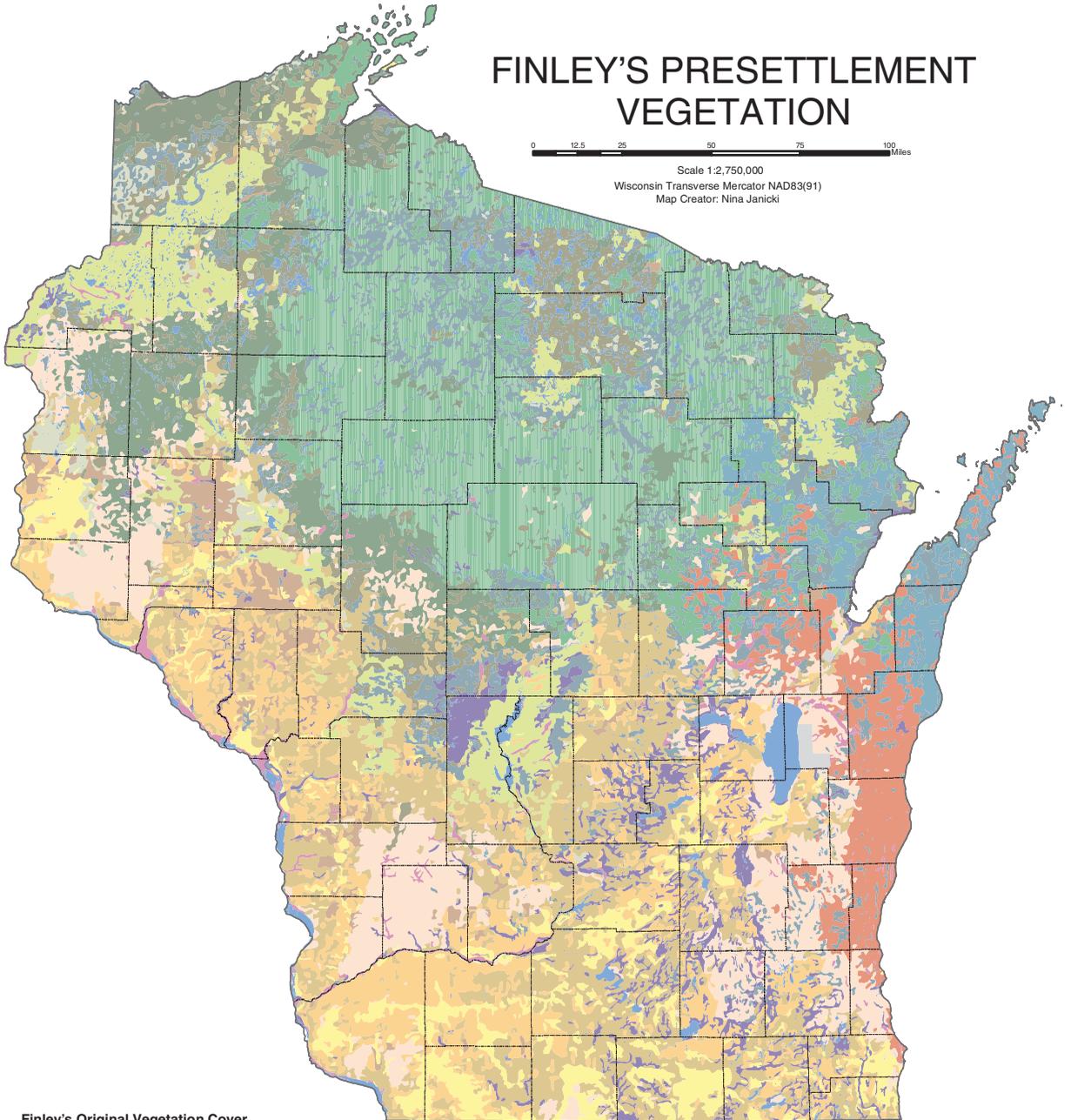
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FINLEY'S PRESETTLEMENT VEGETATION

0 12.5 25 50 75 100 Miles

Scale 1:2,750,000
Wisconsin Transverse Mercator NAD83(91)
Map Creator: Nina Janicki



Finley's Original Vegetation Cover

BOREAL FOREST

White Spruce, balsam fir, tamarack, white cedar, white birch, aspen

MIXED CONIFER - DECIDUOUS FOREST

Beech, hemlock, sugar maple, yellow birch, white pine, red pine
Hemlock, sugar maple, yellow birch, white pine, red pine
Sugar maple, yellow birch, white pine, red pine
White pine red pine
Jack pine, scrub (hill's), oak forest and barrens
Aspen, white birch, pine

DECIDUOUS FOREST

Beech, sugar maple, basswood, red oak, white oak, black oak
Sugar maple, basswood, red oak, white oak, black oak
Oak - white oak, black oak, bur oak
Oak openings - bur oak, white oak, black oak

GRASSLAND AND BRUSH

Prairie
Brush

WETLAND AND VEGETATION

Swamp conifers - white cedar, black spruce, tamarack, hemlock
Lowland hardwoods - willow, soft maple, box elder, ash, elm
Marsh and sedge meadow, wet prairie, lowland shrubs

OTHER

Area with vegetation cover type not interpreted on the source map
Hydrographic area from 1:250000-scale land use and land cover layer

Data created by Robert W. Finley - 1976 Professor of Geography Emeritus, University of Wisconsin Center System. Digital Data prepared by Maribeth Milner and Steve Ventura, University of Wisconsin - Madison. This data layer is included in DVGISlib, a part of the DNRView extension to ArcView. DNRView makes it easier to use and share DNR geographic data. Trained ArcView users can obtain DNRView from the appropriate regional contact listed in the "GIS" Datasharing" section. The data on this map are available on a cost of resources basis from WDNR, GIS Services Section. Visit <http://www.dnr.state.wi.us/org/at/et/geo>.

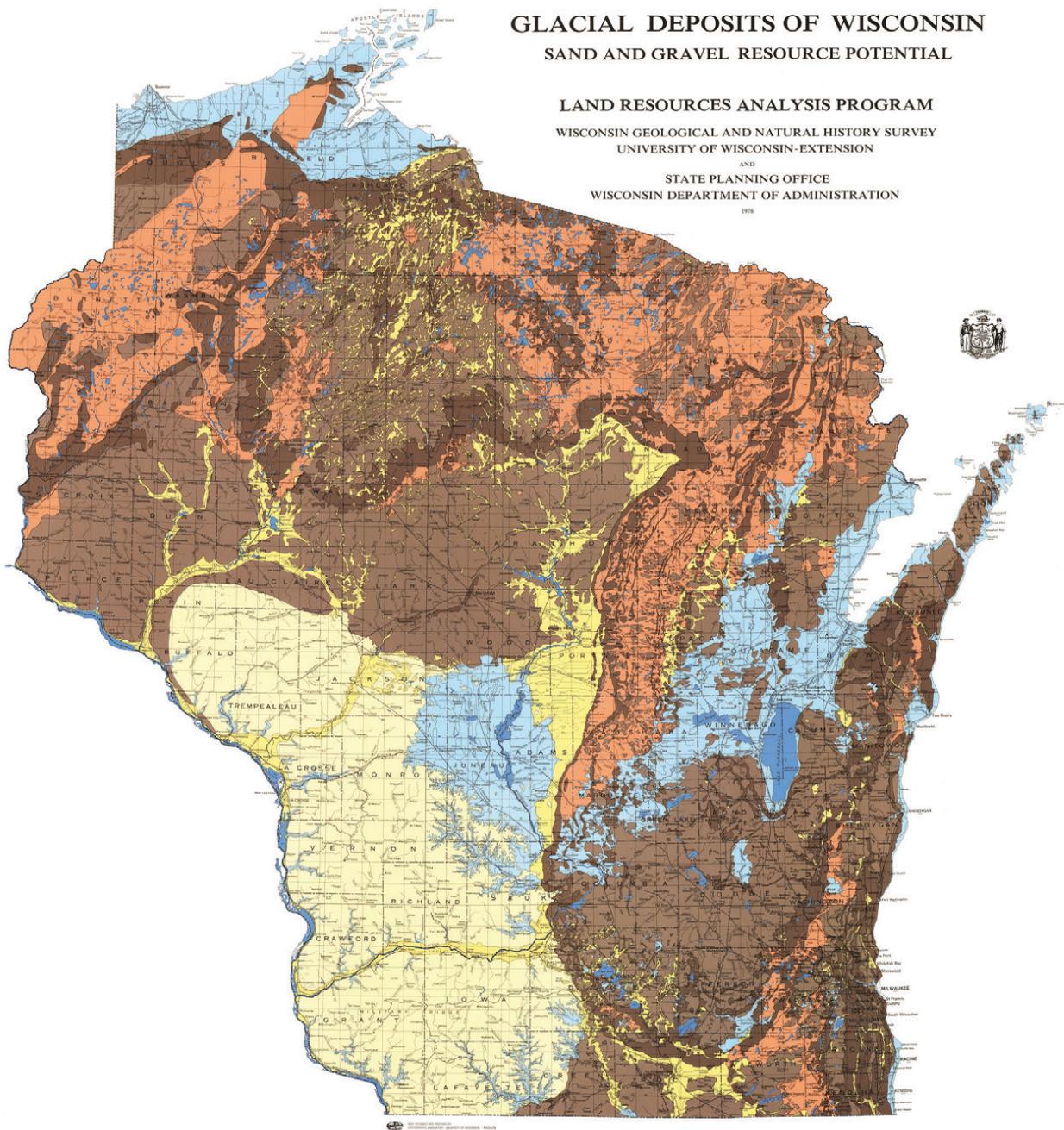
This map depicts the distribution of the major forest types, as reconstructed from the records of land surveys, conducted prior to or at the time of major settlement.

It must not be construed that these forest types represent climax forests. They simply show the dominant species components of forests that existed at that time. The species composition was undoubtedly far more complex than is shown here. The primary value of the map is that it helps us infer the major soil-climatic zones from the distribution ranges of major tree species. Of particular interest are the distributions of hemlock, yellow birch, beech, and oaks.

GLACIAL DEPOSITS OF WISCONSIN

SAND AND GRAVEL RESOURCE POTENTIAL

LAND RESOURCES ANALYSIS PROGRAM
 WISCONSIN GEOLOGICAL AND NATURAL HISTORY SURVEY
 UNIVERSITY OF WISCONSIN-EXTENSION
 AND
 STATE PLANNING OFFICE
 WISCONSIN DEPARTMENT OF ADMINISTRATION
 1976



Outwash

Outwash plains, terraces, fans, and valley trains. Mainly well-sorted and stratified sand and/or sand and gravel.

Ground Moraine

Till plains, thin drift, mostly till of relatively uniform thickness but discontinuous in some areas of older drift. Includes drumlins.

Glaciolacustrine Deposits

Lake sediments, including associated deltas, sand dunes, and organic deposits. Mainly sand, silt and clay.

Water

Pitted Outwash and Other Ice Contact Deposits

Pitted outwash plains, kames, eskers, crevasse fillings, and related features. Mainly sand and gravel with sorting and stratification locally poor.

End Moraines

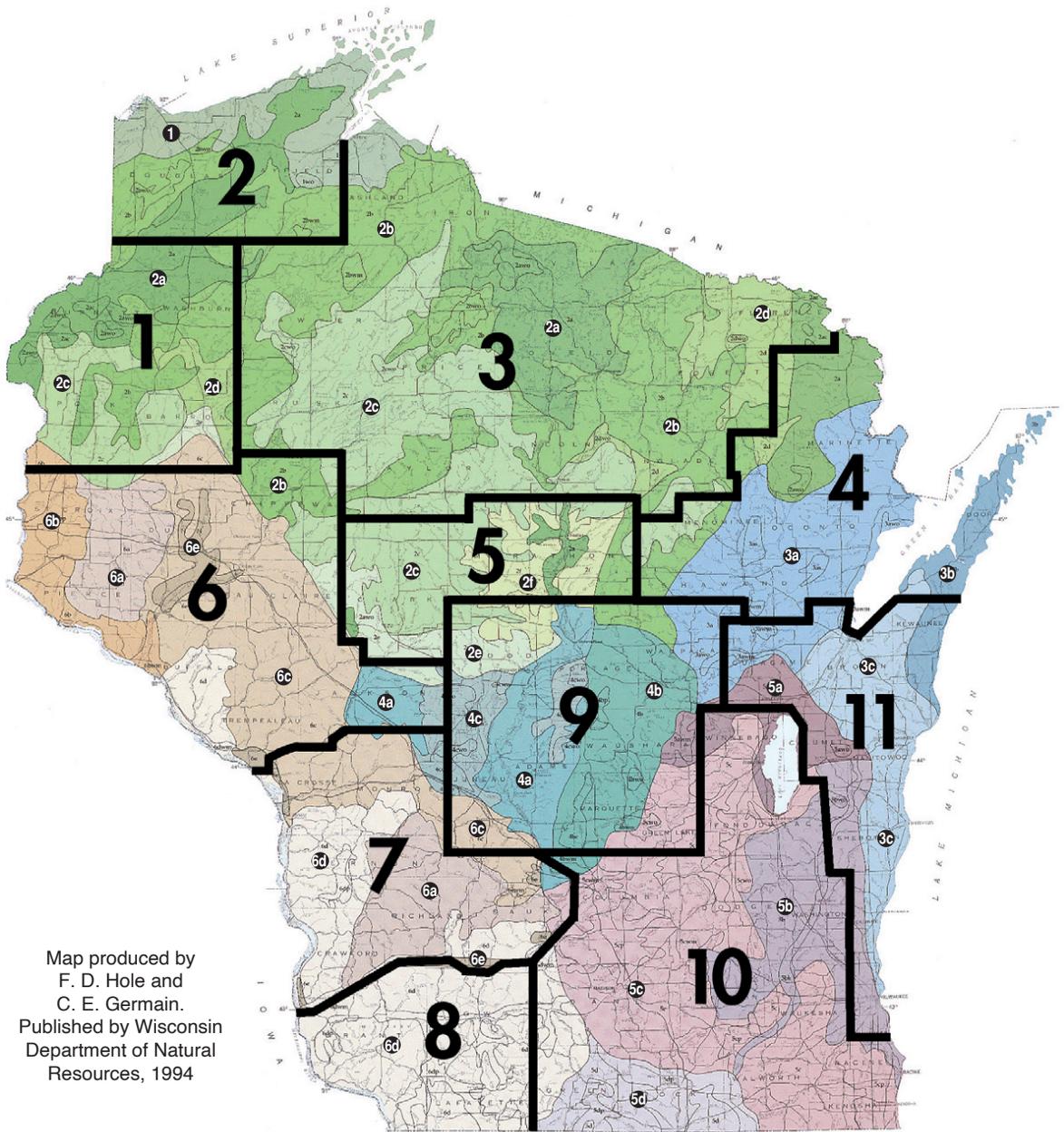
Terminal, recessional and inter-lobate moraines, mostly till and associated local ice contact deposits.

No Glacial Deposits

Glacial Deposits of Wisconsin

This map shows the distribution of the basic types of glacial and fluvio-glacial (water-transported) deposits, or landforms, which are strongly related to major soil categories. Because considerable variation in soil texture, depth, and other characteristics exists within each of the deposit types depicted, the map should not be viewed as a substitute for a soil map. However, on a local level, various habitat types often correlate strongly with the distribution of these deposits.

(Map by D.W. Hadley and J.H. Pelham and published by the Wisconsin Geological and Natural History Survey. LANDRAP Map 10-DI)

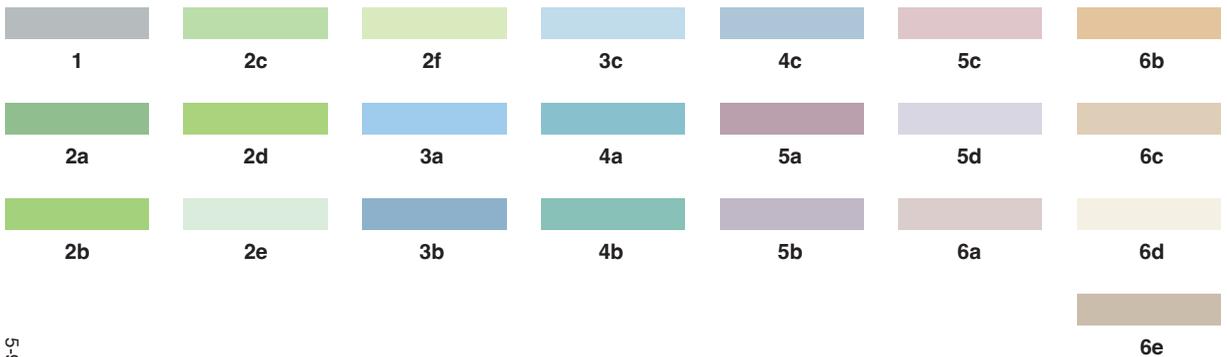


Map produced by
 F. D. Hole and
 C. E. Germain.
 Published by Wisconsin
 Department of Natural
 Resources, 1994

Natural Divisions of Wisconsin

The map is based on published state maps of bedrock geology, glacial deposits, landforms, aeolian silt and sand deposits, vegetation and soils. The titles of the six primary divisions reflect the bases used in delineation; presettlement vegetation, landform and soil. Because of the small scale of the map reproduced here, only first order subdivisions are shown. The accompanying legend was modified and abbreviated accordingly. The original map, at a scale of

1:1 million, includes some second order subdivisions, and a much more comprehensive legend. We found considerable correspondence between natural subdivisions and distribution of specific habitat types. The relationships are noted in habitat type descriptions. The user must keep in mind, however, that the Natural Divisions map describes only presettlement vegetation, while habitat types also include current conditions.



Key to Natural Divisions of Wisconsin Map

Division 1. Lake Superior

Lowland: Boreal Forest

Soils formed from till and lacustrine deposits, calcareous red clays, pink sands, peats, and mucks. Undulating and rolling plains with balsam fir, white spruce, white pine, white cedar, aspen, and paper birch; some sugar maple, yellow birch, and hemlock; black spruce-tamarack in organic soil wetlands.

Division 2. Northern Highland:

Deciduous and Coniferous Forest

2a Pine-oak forests and barrens; podzolized outwash sands; nearly level to rolling landscape with lakes and bogs; small inclusions of clayey soils in Burnett and Florence Counties. White and red pine forests developed in absence of fire. Black spruce and tamarack on wet organic soil.

2b Sugar maple-hemlock-yellow birch-white pine forest; podzolized stony loams over acid outwash and till; undulating to rolling landscape. Moraines, drumlins, ice-contact features, and outwash plains with lakes and bogs. Mostly northern mesic forest, some spruce-fir on wet mineral soils and spruce-tamarack bogs on wet organic soils.

2c Sugar maple-basswood-yellow birch-hemlock forest, podzolized, slowly permeable silt loams; nearly level to undulating landscape. Wind-blown silt cover, up to 30 inches thick. Organic soil wetland; vegetation similar to that of wetlands in 2b.

2d Sugar maple-basswood-yellow birch forest, with hemlock and white pine; podzolized silt loams over outwash sands; undulating topography.

Soils more droughty than in 2c; strongly podzolized. Black spruce and tamarack bogs on wet organic soils.

2e Maple-oak-white pine forests; well to poorly drained podzolized loamy sands over acid, infertile shaly sandstone; undulating to rolling terrain with extensive wetlands. Pre-settlement forest; red and white oak, maples, and white pine on uplands and lowland deciduous, including red maple and American elm, in wetlands.

2f Sugar maple-hemlock-yellow birch forest; podzolized silt loams and loams over decomposed igneous and metamorphic rocks; undulating to rolling topography with many long slopes. Spruce-fir, tamarack, and black ash on large organic soil wetland.

Division 3. Lake Michigan

Shoreland: Northern

Deciduous (with American beech) and Coniferous Forest

3a Beech-sugar maple-hemlock forest; podzolized loams over pink, calcareous till; undulating to rolling topography.

3b Beech-sugar maple-hemlock forest; podzolized silt loams on thin, pink calcareous till over dolomite bedrock; undulating to rolling landscape. White cedar and spruce-fir forest on thin neutral or alkaline soils on outer Door Peninsula.

3c Beech-sugar maple forest; red clay on calcareous till; level to rolling topography. Yellow birch and elms with some hemlock and white pine along the Lake Michigan shore.

**Division 4. Central Plains:
Oak-Pine Barrens, Oak Forest,
Oak Savanna, and Wetlands**

4a Pine and oak barrens; nearly level sand plains with sandstone buttes. Droughty infertile sands in the west part and more fertile outwash and dune sands in the central part; fire-maintained jack pine, Hill's oak and black oak.

4b Oak savanna, oak forest, and prairie; sandy loams on nearly level outwash plains and rolling till surfaces with kettle lakes. Black oak and Hill's oak with associated prairie vegetation. Includes many wetland types.

**Division 5. Southeastern Ridges
and Lowlands: Deciduous Forest,
Savanna, and Prairie**

5a Sugar maple-basswood-elm forest; clay soils formed in red calcareous till; undulating land surface. Mineral soil wetlands and organic soil wetlands are included.

5b Mixed sugar maple-basswood-red oak-white oak forest; silt loams and loams over brown calcareous loam till; undulating to rolling topography. In locations protected from fire, leeward of rivers and lakes, sugar maple and basswood dominate. Oak-hickory and maple-basswood forest on undulating to steep Kettle Moraine and adjoining hilly, stony lands.

5c Oak savanna and prairie; silt loams over calcareous till and stratified calcareous outwash; undulating to rolling topography. Oak savanna and oak forest of white, bur, black and red oak.

5d Sugar maple-basswood-red oak-white oak forest, oak savanna and prairie; silt loams over pre-Wisconsin leached till on uplands and over Wisconsin calcareous outwash on plains; undulating to rolling surface.

Mesic forest, bur, and white oak savanna with prairie on uplands, prairie on outwash plains.

**Division 6. Southwestern
Upland: Deciduous Forest,
Oak Savanna, and Prairie**

6a Sugar maple-basswood-oak forest; silt loams over acid till (north) and over cherty red clay, dolomite, and sandstone (south); undulating to hilly landscape. Mesic forests in both north and south parts with natural fire barriers, e.g., Kickapoo River. Some white pine in northern part.

6b Bur, white and Hill's oak forest, oak savanna, and prairie; silt loams and sandy loams over acid to calcareous till; dolomite and sandstone; rolling to hilly topography. Floodplain forest; silver maple, swamp white oak, and willows along major rivers.

6c Oak savanna; silt loams and sandy loams over sandstone; rolling to hilly. Bur, white, and Hill's oak savanna with oak forest in absence of fire; some white and red pine on favorable exposures. Prairie and sedge meadow on wet mineral soils.

6d Oak savanna and prairie; silt loams over cherty, clay residuum on dolomite ridges; silt loams over sandstone on some valley walls; rolling to hilly land surface. Occurs in four major areas, with bur, white and black oak, and interspersed prairie. Extensive prairie on ridge tops and outwash terraces; floodplain forests on wet mineral soils.

6e Terrace prairie; sandy and loams soils over outwash sand; nearly level topography. Occurs in seven areas in the Wisconsin, Mississippi, and Chippewa River valleys; prairie grasses and forbs. Prairie on wet mineral soils.



National Hierarchical Framework of Ecological Units (NHFEU)
Sections and Subsections of Wisconsin
 (See Introduction section for explanation)

212I – Lake Superior Section

Subsections:
 212Ic – Apostle Islands

212J – Southern Superior Uplands Section

Subsections:
 212Jb – Penokee-Gogebic Iron Range
 212Jc – Winegar Moraines

212K – Western Superior Uplands Section

Subsections:
 212Ka – Bayfield Sand Plains
 212Kb – Mille Lacs Uplands

212O – Lake Michigan Section

Subsections:
 212Ob – Green Bay

212Q – North Central Wisconsin Uplands Section

Subsections:
 212Qa – St. Croix Subsection
 212Qb – Lincoln Formation Till Plain, Mixed Hardwoods

212Qc – Lincoln Formation Till Plain, Hemlock-Hardwoods
 212Qd – Rib Mountain Rolling Ridges

212T – Northern Great Lakes Section

Subsections:
 212Ta – Green Bay Lobe Stagnation Moraine
 212Tb – West Green Bay Till Plain
 212Tc – Athelstane Sandy Outwash and Moraines
 212Te – Green Bay Sandy Lake Plain
 212Tf – Door Peninsula

212X – Northern Highland Section

Subsections:
 212Xa – Glidden Loamy Drift Plain
 212Xb – Northern Highlands Pitted Outwash
 212Xc – Brule and Paint Rivers Drumlinized Ground Moraine
 212Xd – Central/Northwest Wisconsin Loess Plains
 212Xe – Perkinstown End Moraine
 212Xf – Hayward Stagnation Moraines
 212Xg – Crystal Falls Plains and Hill

212Y – Southwest Lake Superior Clay Plain Section

Subsections:
 212Ya – Superior/Ashland Clay Plain Subsection

212Z – Green Bay-Manitowoc Upland Section

Subsections:
 212Za – Outagamie Loamy Till and Silty Lake Plain
 212Zb – Green Bay Clayey and Silty Lake Plain
 212Zc – Manitowoc Till Plain

200 – Humid Temperate Domain

220 – Hot Continental Division

222 – Eastern Broadleaf Forest (Continental) Province

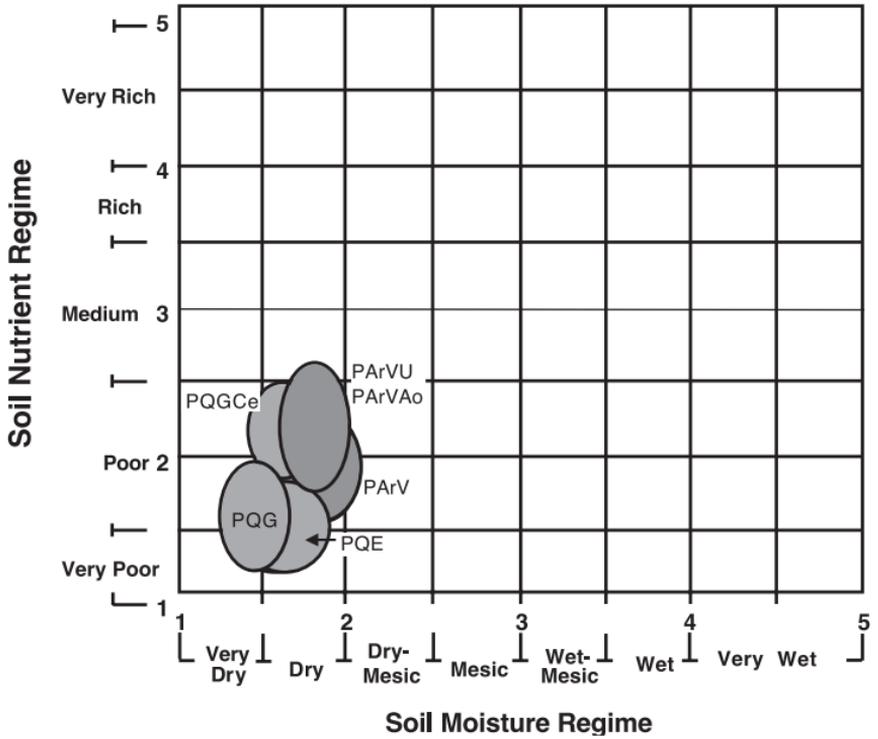
222K – Southwestern Great Lakes Morainal Section
 222Kb – Central Wisconsin Moraines and Outwash Subsection

222Kc – Lake Winnebago Clay Plain Subsection	222L – North Central U.S. Driftless and Escarpment Section	222M – Minnesota and Northeast Iowa Morainal Section
222Kd – South Central Wisconsin Prairie and Savannah Subsection	222La – Menominee Eroded Pre-Wisconsin Till Subsection	222Md – Rosemont Baldwin Plains and Moraines Subsection
222Ke – Southern Green Bay Lobe Subsection	222Lb – Melrose Oak Forest and Savannah Subsection	222R – Wisconsin Central Sands Section
222Kf – Geneva/Darien Moraines and Till Plains Subsection	222Lc – Mississippi/Wisconsin River Ravines Subsection	222Ra – Central Wisconsin Sand Plain Subsection
222Kg – Kenosha/Lake Michigan Plain and Moraines Subsection	222Ld – Kickapoo/ Wisconsin River Ravines Subsection	222Rb – Neilsville Sandstone Plateau Subsection
222Kh – Rock River Old Drift Country Subsection	222Le – Mineral Point Prairie/Savannah Subsection	

Constancy Tables

Habitat Types of Group 1

(Very Dry to Dry, Poor)



PQE

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=62)	Coverage %
<i>Pteridium aquilinum</i>	Bracken fern	100	60.7
<i>Gaultheria procumbens</i>	Wintergreen	96	14.9
<i>Vaccinium</i> spp.	Blueberries	96	17.5
<i>Epigaea repens</i>	Trailing arbutus	95	5.7
<i>Amelanchier</i> spp.	Juneberry	88	1.8
<i>Melampyrum lineare</i>	Cow wheat	74	2.9
<i>Comptonia peregrina</i>	Sweet fern	66	7.4
<i>Trientalis borealis</i>	Starflower	54	1.5
<i>Prunus pensylvanica</i>	Pin cherry	54	3.1
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	51	2.8
<i>Diervilla lonicera</i>	Bush honeysuckle	50	7.5
<i>Cladina rangiferina</i>	Reindeer moss	40	1.8
<i>Apocynum androsaemifolium</i>	Spreading dogbane	37	1.3
<i>Antennaria neglecta</i>	Field pussytoes	33	0.8
<i>Hieracium</i> spp.	Hawkweed	32	4.9
<i>Convolvulus spithameus</i>	Hedge bindweed	25	3.3
<i>Fragaria</i> spp.	Wild Strawberry	25	1.5
<i>Cladonia mitis</i>	Blue cladonia	25	1.2
<i>Aster macrophyllus</i>	Large-leaved aster	24	3.9
<i>Cornus canadensis</i>	Bunchberry	22	4.8
<i>Lycopodium clavatum</i>	Common club-moss	22	3.6

PQG

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=49)	Coverage %
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	94	4.3
<i>Gaultheria procumbens</i>	Wintergreen	90	3.9
<i>Comptonia peregrina</i>	Sweet fern	88	4.8
<i>Amelanchier</i> spp.	Juneberry	84	2.8
<i>Pteridium aquilinum</i>	Bracken fern	76	20.0
<i>Vaccinium</i> spp.	Blueberries	93	18.0
<i>Apocynum androsaemifolium</i>	Spreading dogbane	59	0.5
<i>Rosa</i> spp.	Wild rose	61	1.0
<i>Corylus americana</i>	American hazelnut	53	12.0
<i>Anemone quinquefolia</i>	Wood anemone	49	1.2
<i>Arctostaphylos uva-ursi</i>	Bearberry	47	1.5
<i>Diervilla lonicera</i>	Bush honeysuckle	47	1.7
<i>Corylus cornuta</i>	Beaked hazelnut	43	4.5
<i>Salix</i> spp.	Willow	41	2.0
<i>Lithospermum canescens</i>	Hoary puccoon	39	0.6
<i>Rubus</i> spp.	Blackberries/raspberries	39	2.1
<i>Trientalis borealis</i>	Starflower	39	1.2
<i>Aster macrophyllus</i>	Large-leaved aster	37	4.5
<i>Fragaria</i> spp.	Wild Strawberry	37	0.9
<i>Lonicera</i> spp.	Honeysuckle	24	1.1
<i>Rubus hispidus/flagellaris</i>	Dewberries	47	3.0
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	24	1.1
<i>Cladina rangiferina</i>	Reindeer moss	22	2.0
<i>Epigaea repens</i>	Trailing arbutus	22	1.4
<i>Melampyrum lineare</i>	Cow wheat	22	2.3
<i>Prunus pumila</i>	Sand cherry	20	0.5
<i>Hieracium</i> spp.	Hawkweed	18	0.8
<i>Convolvulus</i> spp.	Bindweed	16	1.0
<i>Aralia nudicaulis</i>	Wild sarsaparilla	16	0.5
<i>Campanula rotundifolia</i>	Bluebell	16	0.5
<i>Cypripedium acaule</i>	Pink lady's slipper	16	0.5
<i>Galium boreale</i>	Northern bedstraw	14	0.9
<i>Pedicularis canadensis</i>	Wood betony	14	0.5
<i>Antennaria neglecta</i>	Field pussytoes	12	0.5
<i>Lonicera canadensis</i>	American fly honeysuckle	12	0.9
<i>Prunus virginiana</i>	Choke cherry	12	0.9
<i>Prunus pensylvanica</i>	Pin cherry	10	0.5

PQGc

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=61)	Coverage %
<i>Corylus</i> spp.	Hazelnut	100	16.0
<i>Vaccinium</i> spp.	Blueberries	97	9.3
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	87	1.3
<i>Amelanchier</i> spp.	Juneberry	82	1.7
<i>Galium boreale</i>	Northern bedstraw	82	1.1
<i>Rosa</i> spp.	Wild rose	80	1.0
<i>Pteridium aquilinum</i>	Bracken fern	75	12.2
<i>Gaultheria procumbens</i>	Wintergreen	67	2.2
<i>Fragaria</i> spp.	Wild Strawberry	66	0.6
<i>Rubus</i> spp.	Blackberries/raspberries	61	6.7
<i>Apocynum androsaemifolium</i>	Spreading dogbane	61	0.6
<i>Anemone quinquefolia</i>	Wood anemone	57	0.6
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	54	0.7
<i>Lysimachia quadrifolia</i>	Whorled loosestrife	52	0.8
<i>Diervilla lonicera</i>	Bush honeysuckle	46	4.8
<i>Smilacina stellata</i>	Starflowered Solomon's seal	43	0.7
<i>Prunus virginiana</i>	Choke cherry	43	1.4
<i>Achillea millefolium</i>	Yarrow	38	0.5
<i>Smilacina racemosa</i>	False Solomon's seal	31	0.5
<i>Aquilegia canadensis</i>	Wild columbine	30	0.5
<i>Ceanothus americana</i>	New Jersey tea	30	2.3
<i>Cladina rangiferina</i>	Reindeer moss	28	0.7
<i>Lathyrus</i> spp.	Wild Peas	28	0.7
<i>Trientalis borealis</i>	Starflower	28	0.5
<i>Convolvulus spithameus</i>	Hedge bindweed	26	0.5
<i>Vicia</i> spp.	Violets	26	0.5
<i>Cornus racemosa</i>	Gray dogwood	26	7.0
<i>Salix</i> spp.	Willow	25	5.9
<i>Melampyrum lineare</i>	Cow wheat	25	1.0
<i>Rhus radicans</i>	Poison Ivy	25	3.3
<i>Lycopodium complanatum</i>	Trailing Christmas-green	25	2.0
<i>Aralia nudicaulis</i>	Wild sarsaparilla	23	1.2
<i>Aster macrophyllus</i>	Large-leaved aster	23	1.4
<i>Arctostaphylos uva-ursi</i>	Bearberry	23	1.0
<i>Pedicularis canadensis</i>	Wood betony	21	1.1
<i>Chimaphila umbellata</i>	Pipsissewa	21	0.5

PARV

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=62)	Coverage %
<i>Pteridium aquilinum</i>	Bracken fern	100	15.4
<i>Vaccinium</i> spp.	Blueberries	95	7.4
<i>Corylus</i> spp.	Hazelnut	90	9.8
<i>Gaultheria procumbens</i>	Wintergreen	81	8.7
<i>Rubus</i> spp.	Blackberries/raspberries	77	3.6
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	76	5.2
<i>Waldsteinia fragarioides</i>	Barren strawberry	76	12.2
<i>Amelanchier</i> spp.	Juneberry	69	4.3
<i>Aster macrophyllus</i>	Large-leaved aster	68	7.0
<i>Trientalis borealis</i>	Starflower	66	2.5
<i>Comptonia peregrina</i>	Sweet fern	63	3.9
<i>Apocynum androsaemifolium</i>	Spreading dogbane	53	1.0
<i>Lycopodium obscurum</i>	Ground-pine	52	1.1
<i>Diervilla lonicera</i>	Bush honeysuckle	50	3.2
<i>Prunus pensylvanica</i>	Pin cherry	50	2.0
<i>Fragaria</i> spp.	Wild Strawberry	48	2.6
<i>Anemone quinquefolia</i>	Wood anemone	45	1.5
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	37	3.0
<i>Aralia nudicaulis</i>	Wild sarsaparilla	32	1.1
<i>Epigaea repens</i>	Trailing arbutus	20	1.1
<i>Prunus virginiana</i>	Choke cherry	19	1.8
<i>Smilacina racemosa</i>	False Solomon's seal	19	0.7
<i>Chimaphila umbellata</i>	Pipsissewa	18	1.0
<i>Cornus canadensis</i>	Bunchberry	18	1.6

PARV-U

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=40)	Coverage %
<i>Pteridium aquilinum</i>	Bracken fern	100	25.7
<i>Aster macrophyllus</i>	Large-leaved aster	93	9.9
<i>Corylus cornuta</i>	Beaked hazelnut	93	16.9
<i>Gaultheria procumbens</i>	Wintergreen	90	9.7
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	90	1.5
<i>Vaccinium</i> spp.	Blueberries	88	7.4
<i>Amelanchier</i> spp.	Juneberry	88	5.6
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	78	2.7
<i>Trientalis borealis</i>	Starflower	75	2.5
<i>Aralia nudicaulis</i>	Wild sarsaparilla	73	3.3
<i>Comptonia peregrina</i>	Sweet fern	50	3.2
<i>Apocynum androsaemifolium</i>	Spreading dogbane	50	0.5
<i>Diervilla lonicera</i>	Bush honeysuckle	48	1.8
<i>Smilacina racemosa</i>	False Solomon's seal	45	1.5
<i>Rubus flagellaris</i>	Swamp dewberry	45	3.3
<i>Anemone quinquefolia</i>	Wood anemone	43	2.7
<i>Fragaria</i> spp.	Wild Strawberry	40	1.0
<i>Rubus</i> spp.	Blackberries/raspberries	33	4.4
<i>Melampyrum lineare</i>	Cow wheat	25	0.8
<i>Clintonia borealis</i>	Yellow beadlily	25	1.3
<i>Lysimachia quadrifolia</i>	Whorled loosestrife	25	0.8
<i>Chimaphila umbellata</i>	Pipsissewa	23	0.8
<i>Epigaea repens</i>	Trailing arbutus	23	0.8
<i>Salix</i> spp.	Willow	20	3.3
<i>Cornus canadensis</i>	Bunchberry	20	1.4
<i>Corylus americana</i>	American hazelnut	20	4.4
<i>Pedicularis canadensis</i>	Wood betony	18	0.9
<i>Streptopus roseus</i>	Rosey twisted stalk	18	0.5

PARVAo

Understory species in order of decreasing constancy, with average coverage.

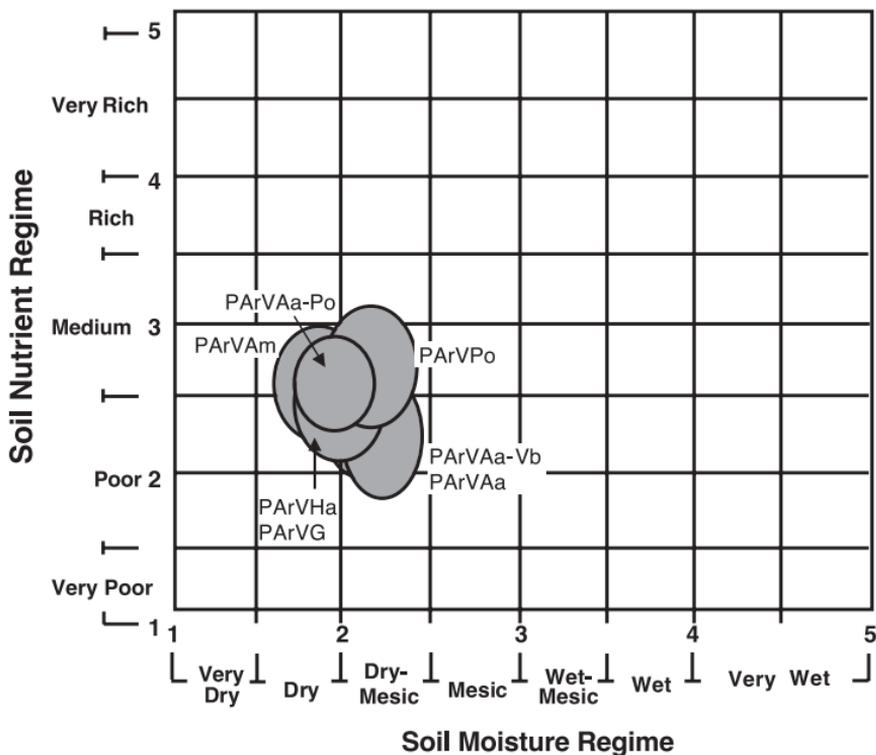
Scientific name	Common name	Constancy % (N=50)	Coverage %
<i>Vaccinium</i> spp.	Blueberries	96	12.1
<i>Pteridium aquilinum</i>	Bracken fern	92	14.1
<i>Rubus</i> spp.	Blackberries/raspberries	90	5.5
<i>Corylus</i> spp.	Hazelnut	86	9.6
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	76	1.2
<i>Comptonia peregrina</i>	Sweet fern	74	3.5
<i>Amelanchier</i> spp.	Juneberry	68	3.3
<i>Apocynum androsaemifolium</i>	Spreading dogbane	68	0.9
<i>Trientalis borealis</i>	Starflower	64	1.0
<i>Gaultheria procumbens</i>	Wintergreen	64	3.3
<i>Fragaria</i> spp.	Wild Strawberry	56	0.8
<i>Diervilla lonicera</i>	Bush honeysuckle	50	2.1
<i>Smilacina racemosa</i>	False Solomon's seal	38	0.6
<i>Anemone quinquefolia</i>	Wood anemone	38	0.5
<i>Rosa</i> spp.	Wild rose	32	1.1
<i>Lysimachia quadrifolia</i>	Whorled loosestrife	32	3.1
<i>Helianthus</i> spp.	Sunflowers	30	4.5
<i>Convolvulus spithameus</i>	Hedge bindweed	28	0.5
<i>Waldsteinia fragarioides</i>	Barren strawberry	26	8.7
<i>Monarda fistulosa</i>	Wild bergamot	24	3.8
<i>Lycopodium obscurum</i>	Ground-pine	22	0.5
<i>Aster macrophyllus</i>	Large-leaved aster	20	1.5
<i>Lonicera</i> spp.	Honeysuckle	20	0.8
<i>Pedicularis canadensis</i>	Wood betony	20	1.3
<i>Polygala paucifolia</i>	Fringed polygala	20	1.0
<i>Prunus virginiana</i>	Choke cherry	16	3.6
<i>Galium triflorum</i>	Sweet-scented bedstraw	16	0.5
<i>Lycopodium</i> spp.	Club-moss	16	0.8
<i>Prunus pensylvanica</i>	Pin cherry	16	0.5
<i>Aralia nudicaulis</i>	Wild sarsaparilla	14	0.9
<i>Melampyrum lineare</i>	Cow wheat	14	1.2

QAp

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=10)	Coverage %
Grasses & Sedges	Grasses & Sedges	100	37.6
<i>Corylus cornuta</i>	Beaked hazelnut	100	15.5
<i>Prunus virginiana</i>	Choke cherry	100	4.8
<i>Amelanchier</i> spp.	Juneberry	100	3.9
<i>Rhus radicans</i>	Poison Ivy	90	6.4
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	80	5.0
<i>Aquilegia canadensis</i>	Wild columbine	80	1.7
<i>Vaccinium angustifolium</i>	Low sweet blueberry	70	13.0
<i>Rosa</i> spp.	Wild rose	70	2.3
<i>Smilacina stellata</i>	Starflowered Solomon's seal	70	2.2
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	70	2.0
<i>Amorpha canescens</i>	Leadplant	70	1.9
<i>Fragaria vesca</i>	Wood strawberry	70	1.3
<i>Rubus</i> spp.	Blackberries/raspberries	60	2.5
<i>Cornus</i> spp.	Dogwood	50	1.8
<i>Pyrola</i> spp.	Pyrolas	40	2.3
<i>Campanula rotundifolia</i>	Bluebell	40	1.6
<i>Smilax herbacea</i>	Carrion Flower	40	1.4
<i>Asclepias</i> spp.	Milkweeds	40	1.4
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	40	1.2
<i>Apocynum medium</i>	Dogbane	40	1.2
<i>Pteridium aquilinum</i>	Bracken fern	30	23.1
<i>Amphicarpa bracteata</i>	Hog peanut	30	3.3
<i>Smilacina racemosa</i>	False Solomon's seal	30	2.2
<i>Lithospermum arvense</i>	Corn gromwell	30	1.9
<i>Vitis riparia</i>	Riverbank grape	30	1.4
<i>Trientalis borealis</i>	Starflower	30	1.3
<i>Ribes</i> spp.	Gooseberry	30	1.1
<i>Galium boreale</i>	Northern bedstraw	20	2.5
<i>Tradescantia virginiana</i>	Spiderwort	20	1.6
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	20	1.5
<i>Aralia nudicaulis</i>	Wild sarsaparilla	20	1.4
<i>Lathyrus</i> spp.	Wild Peas	20	1.2
<i>Viola</i> spp.	Violets	20	1.0
<i>Galium</i> spp.	Bedstraws	20	1.0

Habitat Types of Group 2 (Dry to DryMesic, Poor to Medium)



PARVAm

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=59)	Coverage %
<i>Aster macrophyllus</i>	Large-leaved aster	92	14.5
<i>Vaccinium</i> spp.	Blueberries	92	3.6
<i>Pteridium aquilinum</i>	Bracken fern	88	9.3
<i>Amelanchier</i> spp.	Juneberry	81	1.8
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	78	0.8
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	75	0.6
<i>Diervilla lonicera</i>	Bush honeysuckle	71	1.1
<i>Corylus cornuta</i>	Beaked hazelnut	69	8.1
<i>Galium boreale</i>	Northern bedstraw	69	1.0
<i>Amphicarpa bracteata</i>	Hog peanut	68	7.3
<i>Anemone quinquefolia</i>	Wood anemone	68	0.6
<i>Rubus</i> spp.	Blackberries/raspberries	66	4.9
<i>Fragaria</i> spp.	Wild strawberry	58	0.8
<i>Aralia nudicaulis</i>	Wild sarsaparilla	56	4.8
<i>Smilacina racemosa</i>	False Solomon's seal	53	0.5
<i>Apocynum androsaemifolium</i>	Spreading dogbane	47	0.9
<i>Cornus racemosa</i>	Gray dogwood	47	2.1
<i>Geranium maculatum</i>	Wild geranium	47	1.0
<i>Lysimachia quadrifolia</i>	Whorled loosetrife	46	0.7
<i>Viburnum rafinesquianum</i>	Downy arrowwood	46	1.1
<i>Desmodium glutinosum</i>	Pointed-leaved tick trefoil	44	2.3
<i>Gaultheria procumbens</i>	Wintergreen	44	0.6
<i>Ribes</i> spp.	Gooseberry	44	0.6
<i>Trientalis borealis</i>	Star flower	41	0.6
<i>Lathyrus</i> spp.	Wild peas	37	1.2
<i>Prunus virginiana</i>	Choke cherry	37	1.0
<i>Rhus radicans</i>	Poison ivy	36	1.6
<i>Corylus americana</i>	American hazelnut	32	13.2
<i>Aquilegia canadensis</i>	Wild columbine	29	1.9
<i>Thalictrum dioicum</i>	Early meadow rue	24	2.1
<i>Parthenocissus quinquefolia</i>	Virginia creeper	20	1.9
<i>Hepatica americana</i>	Round-lobed hepatica	17	0.5
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	15	0.5
<i>Helianthus</i> spp.	Sunflowers	14	0.5
<i>Prenanthes alba</i>	White lettuce	14	0.5
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	14	0.5
<i>Lycopodium</i> spp.	Club-moss	12	0.5
<i>Achillea millefolium</i>	Yarrow	10	0.5
<i>Lycopodium obscurum</i>	Ground-pine	10	0.5
<i>Streptopus roseus</i>	Rosey twisted stalk	10	0.5
<i>Zanthoxylum americanum</i>	Prickly ash	10	9.8

PARVHa

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=62)	Coverage %
<i>Vaccinium angustifolium</i>	Low sweet blueberry	98	0.9
<i>Amelanchier</i> spp.	Juneberry	98	1.9
<i>Pteridium aquilinum</i>	Bracken fern	95	9.0
<i>Gaultheria procumbens</i>	Wintergreen	82	0.6
Sedges spp.	Sedges	82	1.0
<i>Aralia nudicaulis</i>	Wild sarsaparilla	82	1.8
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	79	0.7
<i>Aster macrophyllus</i>	Large-leaved aster	72	0.6
<i>Lysimachia quadrifolia</i>	Whorled loosertrife	69	0.5
<i>Trientalis borealis</i>	Star flower	67	0.5
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	67	0.9
<i>Gaylussacia baccata</i>	Black huckleberry	66	3.4
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	64	0.7
Grasses spp.	Grasses	64	0.6
<i>Rubus</i> spp.	Blackberries/raspberries	59	0.8
<i>Diervilla lonicera</i>	Bush honeysuckle	51	0.6
<i>Hamamelis virginiana</i>	Witch hazel	51	4.8
<i>Osmunda claytoniana</i>	Interrupted fern	46	1.4
<i>Rubus hispidus</i>	Swamp dewberry	41	0.6
<i>Corylus cornuta</i>	Beaked hazelnut	41	1.4
<i>Ilex verticillata</i>	Winterberry	40	0.6
<i>Mitchella repens</i>	Partridgeberry	40	0.6
<i>Apocynum androsaemifolium</i>	Spreading dogbane	40	0.5
<i>Smilax tamnoides</i>	Bristly greenbrier	35	0.5
<i>Lycopodium obscurum</i>	Ground-pine	29	0.5
<i>Smilacina racemosa</i>	False Solomon's seal	25	0.5
<i>Cornus canadensis</i>	Bunchberry	25	0.8
<i>Corylus americana</i>	American hazelnut	24	0.8
<i>Rosa</i> spp.	Roses	20	0.5

PARVAa

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=114)	Coverage %
<i>Pteridium aquilinum</i>	Bracken fern	93	13.9
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	89	5.7
<i>Corylus</i> spp.	hazelnut	87	16.1
<i>Vaccinium</i> spp.	Blueberries	85	4.6
<i>Aster macrophyllus</i>	Large-leaved aster	82	13.0
<i>Trientalis borealis</i>	Star flower	81	3.9
<i>Amelanchier</i> spp.	Juneberry	72	1.9
<i>Aralia nudicaulis</i>	Wild sarsaparilla	72	4.3
<i>Lycopodium obscurum</i>	Ground-pine	72	2.8
<i>Gaultheria procumbens</i>	Wintergreen	64	4.9
<i>Rubus</i> spp.	Blackberries/raspberries	62	5.6
<i>Clintonia borealis</i>	Yellow beadlilly	59	2.3
<i>Waldsteinia fragarioides</i>	Barren strawberry	54	10.1
<i>Cornus canadensis</i>	Bunchberry	52	3.8
<i>Diervilla lonicera</i>	Bush honeysuckle	50	4.1
<i>Fragaria</i> spp.	Wild strawberry	50	3.6
<i>Anemone quinquefolia</i>	Wood anemone	45	2.6
<i>Lonicera canadensis</i>	American fly honeysuckle	45	1.9
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	42	1.6
<i>Streptopus roseus</i>	Rosey twisted stalk	41	1.3
<i>Apocynum androsaemifolium</i>	Spreading dogbane	36	0.9
<i>Polygala paucifolia</i>	Fringed polygala	32	1.5
<i>Mitchella repens</i>	Partridgeberry	26	2.2
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	25	0.8
<i>Dryopteris spinulosa</i>	Spinulose shield fern	25	0.7
<i>Galium triflorum</i>	Sweet-scented bedstraw	24	0.9
<i>Lycopodium</i> spp.	Club-moss	22	3.4
<i>Smilacina racemosa</i>	False Solomon's seal	22	1.7
<i>Prunus virginiana</i>	Choke cherry	20	1.8

PARVAa-Po

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=13)	Coverage %
<i>Pteridium aquilinum</i>	Bracken fern	100	18.9
<i>Corylus cornuta</i>	Beaked hazelnut	100	11.9
<i>Vaccinium</i> spp.	Blueberries	100	3.0
<i>Aster macrophyllus</i>	Large-leaved aster	100	21.1
<i>Gaultheria procumbens</i>	Wintergreen	100	3.9
<i>Trientalis borealis</i>	Star flower	92	1.8
<i>Amelanchier</i> spp.	Juneberry	92	2.6
<i>Aralia nudicaulis</i>	Wild sarsaparilla	92	4.0
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	85	0.5
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	85	3.0
<i>Smilacina racemosa</i>	False Solomon's seal	85	1.9
<i>Diervilla lonicera</i>	Bush honeysuckle	77	1.5
<i>Rubus hispidus</i> /flag.	Dewberry	69	3.0
<i>Anemone quinquefolia</i>	Wood anemone	62	0.5
<i>Lycopodium obscurum</i>	Ground-pine	54	0.9
<i>Clintonia borealis</i>	Yellow beadlily	54	1.9
<i>Lonicera canadensis</i>	American fly honeysuckle	54	1.6
<i>Streptopus roseus</i>	Rosey twisted stalk	38	0.5
<i>Fragaria</i> spp.	Wild strawberry	38	0.5
<i>Apocynum androsaemifolium</i>	Spreading dogbane	31	0.5
<i>Mitchella repens</i>	Partridgeberry	31	0.5
<i>Epiagea repens</i>	Trailing arbutus	31	1.0
<i>Lathyrus</i> spp.	Wild peas	31	2.0
<i>Monotropa uniflora</i>	Indian pipe	31	1.0
<i>Polygala paucifolia</i>	Fringed polygala	23	0.5
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	23	1.3
<i>Prunus virginiana</i>	Choke cherry	23	1.3
<i>Viola pubescens</i>	Downy yellow violet	23	1.0
<i>Cornus canadensis</i>	Bunchberry	15	1.8
<i>Galium triflorum</i>	Sweet-scented bedstraw	15	0.5
<i>Chimaphila umbellata</i>	Pipsissewa	15	0.5

PARVAa-Vb

Understory species in order of decreasing constancy, with average coverage.

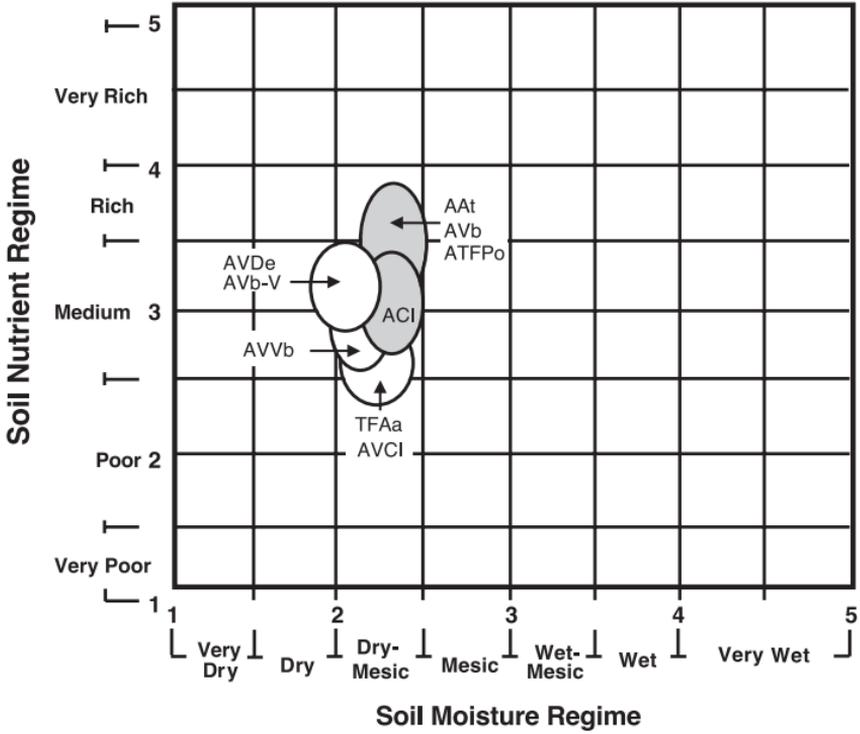
Scientific name	Common name	Constancy % (N=56)	Coverage %
<i>Pteridium aquilinum</i>	Bracken fern	100	17.3
<i>Rubus</i> spp.	Blackberries/raspberries	89	7.2
<i>Aster macrophyllus</i>	Large-leaved aster	88	5.1
<i>Amelanchier</i> spp.	Juneberry	84	2.0
<i>Corylus</i> spp.	hazelnut	84	8.6
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	82	2.1
<i>Gaultheria procumbens</i>	Wintergreen	80	4.3
<i>Diervilla lonicera</i>	Bush honeysuckle	77	2.2
<i>Trientalis borealis</i>	Star flower	77	1.5
<i>Vaccinium</i> spp.	Blueberries	75	5.8
<i>Aralia nudicaulis</i>	Wild sarsaparilla	71	2.1
<i>Polygala paucifolia</i>	Fringed polygala	61	1.6
<i>Fragaria</i> spp.	Wild strawberry	60	1.7
<i>Lycopodium obscurum</i>	Ground-pine	59	1.8
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	54	2.3
<i>Apocynum androsaemifolium</i>	Spreading dogbane	54	1.7
<i>Clintonia borealis</i>	Yellow beadlily	50	1.0
<i>Anemone quinquefolia</i>	Wood anemone	48	0.8
<i>Cornus canadensis</i>	Bunchberry	48	3.0
<i>Trillium</i> spp.	Trilliums	43	0.8
<i>Comptonia peregrina</i>	Sweetfern	39	3.1
<i>Smilacina racemosa</i>	False Solomon's seal	39	1.1
<i>Mitchella repens</i>	Partridgeberry	38	0.6
<i>Galium triflorum</i>	Sweet-scented bedstraw	25	0.7
<i>Lycopodium</i> spp.	Club-moss	23	1.3
<i>Pedicularis canadensis</i>	Wood betony	23	0.7
<i>Waldsteinia fragarioides</i>	Barren strawberry	23	14.1
<i>Lonicera canadensis</i>	American fly honeysuckle	23	0.7
<i>Hamamelis virginiana</i>	Witch hazel	23	4.3
<i>Convolvulus spithameus</i>	Upright bindweed	21	0.5
<i>Lysimachia quadrifolia</i>	Whorled loosetrife	21	5.2
<i>Corylus americana</i>	American hazelnut	21	7.0
<i>Prenanthes alba</i>	White lettuce	20	0.5
<i>Dryopteris spinulosa</i>	Spinulose shield fern	16	0.8
<i>Aquilegia canadensis</i>	Wild columbine	16	0.8
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	16	0.5
<i>Osmunda claytoniana</i>	Interrupted fern	16	3.7

PARVPO

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=12)	Coverage %
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	100	4.2
<i>Pteridium aquilinum</i>	Bracken fern	100	5.2
<i>Rubus</i> spp.	Blackberries/raspberries	83	2.5
<i>Amelanchier</i> spp.	Juneberry	75	1.3
<i>Apocynum androsaemifolium</i>	Spreading dogbane	75	0.5
<i>Corylus</i> spp.	hazelnut	84	5.0
<i>Diervilla lonicera</i>	Bush honeysuckle	67	3.3
<i>Lysimachia quadrifolia</i>	Whorled loosetrife	67	1.4
<i>Vaccinium</i> spp.	Blueberries	83	7.0
<i>Trientalis borealis</i>	Star flower	58	1.6
<i>Anemone quinquefolia</i>	Wood anemone	50	0.9
<i>Aralia nudicalis</i>	Wild sarsaparilla	50	1.3
<i>Mitchella repens</i>	Partridgeberry	50	1.3
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	42	0.5
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	42	1.5
<i>Chimaphila umbellata</i>	Pipsissewa	42	2.0
<i>Rosa</i> spp.	Roses	42	1.0
<i>Gaultheria procumbens</i>	Wintergreen	42	2.0
<i>Gaylussacia baccata</i>	Black huckleberry	42	1.0
<i>Waldsteinia fragarioides</i>	Barren strawberry	42	0.5
<i>Prunus virginiana</i>	Choke cherry	33	0.5
<i>Polygala paucifolia</i>	Fringed polygala	33	0.5
<i>Rhus radicans</i>	Poison ivy	33	0.5
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	25	1.3
<i>Smilacina racemosa</i>	False Solomon's seal	25	0.5
<i>Arctostaphylos uva-ursi</i>	Bearberry	25	0.5
<i>Comptonia peregrina</i>	Sweetfern	25	1.3
<i>Thalictrum dioicum</i>	Early meadow rue	17	1.8
<i>Dryopteris spinulosa</i>	Spinulose shield fern	17	0.5
<i>Aster macrophyllus</i>	Large-leaved aster	17	0.5
<i>Clintonia borealis</i>	Yellow beadlilly	17	0.5
<i>Hamamelis virginiana</i>	Witch hazel	17	15.0
<i>Lonicera canadensis</i>	American fly honeysuckle	17	0.5
<i>Lycopodium complanatum</i>	Trailing Christmas-green	17	0.5
<i>Prenanthes alba</i>	White lettuce	17	0.5
<i>Prunus pennsylvanica</i>	Pin cherry	17	3.0
<i>Trillium</i> spp.	Trilliums	17	0.5

Habitat Types of Group 3 (Dry mesic, Poor to Rich)



AVVb

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=48)	Coverage %
<i>Pteridium aquilinum</i>	Bracken fern	92	7.4
<i>Aster macrophyllus</i>	Large-leaved aster	83	12.1
<i>Corylus</i> spp.	Hazelnuts	83	13.3
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	81	2.5
<i>Anemone quinquefolia</i>	Wood anemone	77	1.2
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	77	6.3
<i>Trientalis borealis</i>	Starflower	75	4.0
<i>Aralia nudicaulis</i>	Wild sarsaparilla	71	4.5
<i>Amelanchier</i> spp.	Juneberry	67	1.4
<i>Gaultheria procumbens</i>	Wintergreen	60	3.0
<i>Diervilla lonicera</i>	Bush honeysuckle	58	2.6
<i>Rubus</i> spp.	Blackberries/raspberries	56	9.8
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	56	2.2
<i>Mitchella repens</i>	Partridgeberry	54	3.3
<i>Streptopus roseus</i>	Rosey twisted stalk	52	1.2
<i>Lycopodium obscurum</i>	Ground-pine	50	1.9
<i>Clintonia borealis</i>	Yellow beadiilly	48	1.9
<i>Waldsteinia fragarioides</i>	Barren strawberry	48	9.0
<i>Vaccinium</i> spp.	Blueberry	48	1.3
<i>Fragaria</i> spp.	Wild strawberry	48	1.0
<i>Lonicera canadensis</i>	American fly honeysuckle	46	2.5
<i>Apocynum androsaemifolium</i>	Spreading dogbane	44	1.0
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	42	1.1
<i>Dirca palustris</i>	Leatherwood	40	6.8
<i>Smilacina racemosa</i>	False Solomon's seal	38	1.5
<i>Viola pubescens</i>	Downy yellow violet	35	1.1
<i>Polygala paucifolia</i>	Fringed polygala	33	1.0
<i>Prunus virginiana</i>	Choke cherry	31	2.3
<i>Galium triflorum</i>	Sweet-scented bedstraw	29	1.2
<i>Pyrola</i> spp.	Shinleafs	27	0.5
<i>Thalictrum dioicum</i>	Early meadow rue	27	5.9
<i>Amphicarpa bracteata</i>	Hog peanut	25	6.6
<i>Hepatica americana</i>	Round-lobed hepatica	25	2.1
<i>Athyrium filix-femina</i>	Lady fern	23	1.6
<i>Dryopteris spinulosa</i>	Spinulose shield fern	23	1.6
<i>Lycopodium</i> spp.	Club-moss	23	1.4
<i>Actaea</i> spp.	Baneberries	21	0.5
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	21	1.3
<i>Cornus canadensis</i>	Bunchberry	21	0.8
<i>Osmunda claytoniana</i>	Interrupted fern	21	1.5
<i>Trillium</i> spp.	Trilliums	21	4.4

AVCI

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=24)	Coverage %
<i>Corylus cornuta</i>	Beaked hazelnut	100	9.0
<i>Aralia nudicaulis</i>	Wild sarsaparilla	100	8.0
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	100	5.0
<i>Trientalis borealis</i>	Starflower	100	1.0
<i>Aster macrophyllus</i>	Large-leaved aster	95	9.0
<i>Clintonia borealis</i>	Yellow beadlily	95	2.4
<i>Lonicera canadensis</i>	American fly honeysuckle	95	1.2
<i>Streptopus roseus</i>	Rosey twisted stalk	95	1.1
<i>Pteridium aquilinum</i>	Bracken fern	91	6.0
<i>Amelanchier</i> spp.	Juneberry	91	1.0
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	91	1.0
<i>Acer spicatum</i>	Mountain maple	87	2.9
<i>Lycopodium obscurum</i>	Ground-pine	87	2.4
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	79	1.0
<i>Diervilla lonicera</i>	Bush honeysuckle	75	1.0
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	75	1.6
<i>Dryopteris spinulosa</i>	Spinulose shield fern	70	1.3
<i>Pyrola</i> spp.	Shinleaves	70	1.2
<i>Galium triflorum</i>	Sweet-scented bedstraw	66	1.6
<i>Anemone quinquefolia</i>	Wood anemone	66	1.5
<i>Vaccinium angustifolium</i>	Low-sweet blueberry	50	1.0
<i>Cornus canadensis</i>	Bunchberry	45	1.2
<i>Rubus pubescens</i>	Dwarf raspberry	41	1.5
<i>Actaea</i> spp.	Baneberries	41	1.4
<i>Smilacina racemosa</i>	False Solomon's seal	41	1.4
<i>Vaccinium myrtilloides</i>	Canada blueberry	41	1.2
<i>Apocynum androsaemifolium</i>	Spreading dogbane	37	1.0
<i>Fragaria</i> spp.	Wild strawberry	37	1.0
<i>Lycopodium lucidulum</i>	Shining club-moss	33	1.0
<i>Viola pubescens</i>	Downy yellow violet	33	1.0
<i>Prunus virginiana</i>	Choke cherry	33	1.2
<i>Gaultheria procumbens</i>	Wintergreen	33	1.2
<i>Prenanthes alba</i>	White lettuce	29	1.0
<i>Mitchella repens</i>	Partridgeberry	29	1.0
<i>Lonicera</i> spp.	Honeysuckles	29	1.0
<i>Lycopodium</i> spp.	Club-moss	25	1.4
<i>Osmorhiza claytoni</i>	Sweet cicely	25	1.2

TFAa

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=9)	Coverage %
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	100	1.9
<i>Trientalis borealis</i>	Starflower	100	1.9
<i>Amelanchier</i> spp.	Juneberry	100	2.1
<i>Corylus</i> spp.	Hazelnuts	100	13.8
<i>Prunus virginiana</i>	Choke cherry	88	2.4
<i>Aster macrophyllus</i>	Large-leaved aster	88	12.5
<i>Pteridium aquilinum</i>	Bracken fern	88	5.1
<i>Aralia nudicaulis</i>	Wild sarsaparilla	77	22.0
<i>Lonicera canadensis</i>	American fly honeysuckle	77	1.2
<i>Clintonia borealis</i>	Yellow beadlily	66	1.4
<i>Prenanthes alba</i>	White lettuce	66	1.3
<i>Mitchella repens</i>	Partridgeberry	55	1.4
<i>Fragaria</i> spp.	Wild strawberry	55	1.2
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	55	1.3
<i>Polygala paucifolia</i>	Fringed polygala	55	1.5
<i>Diervilla lonicera</i>	Bush honeysuckle	55	1.1
<i>Galium triflorum</i>	Sweet-scented bedstraw	55	1.9
<i>Rubus</i> spp.	Blackberries/raspberries	55	3.8
<i>Antennaria</i> spp.	Pussytoes	44	4.0
<i>Gaultheria procumbens</i>	Wintergreen	44	1.5
<i>Apocynum androsaemifolium</i>	Spreading dogbane	33	1.3
<i>Cornus canadensis</i>	Bunchberry	33	1.4
<i>Osmorhiza claytoni</i>	Sweet cicely	33	1.1
<i>Solidago flexicaulis</i>	Zigzag goldenrod	33	1.1
<i>Medeola virginiana</i>	Indian cucumber root	33	1.1
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	33	12.7
<i>Lonicera</i> spp.	Honeysuckles	33	1.4
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	33	1.3
<i>Hamamelis virginiana</i>	Witch hazel	33	11.1
<i>Dryopteris spinulosa</i>	Spinulose shield fern	22	1.1
<i>Actaea</i> spp.	Baneberries	22	1.1
<i>Vaccinium</i> spp.	Blueberry	22	1.4
<i>Parthenocissus quinquefolia</i>	Virginia creeper	22	1.1
<i>Lycopodium lucidulum</i>	Shining club-moss	22	1.4
<i>Lycopodium obscurum</i>	Ground-pine	22	1.1
<i>Smilacina racemosa</i>	False Solomon's seal	22	1.1
<i>Rhus radicans</i>	Poison ivy	22	1.6
<i>Amphicarpa bracteata</i>	Hog peanut	22	1.1
<i>Vitis riparia</i>	Riverbank grape	22	1.1
<i>Acer spicatum</i>	Mountain maple	22	1.1

AVDe

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=51)	Coverage %
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	90	9.4
<i>Aster macrophyllus</i>	Large-leaved aster	88	9.3
<i>Pteridium aquilinum</i>	Bracken fern	88	5.8
<i>Vaccinium</i> spp.	Blueberry	80	0.8
<i>Aralia nudicaulis</i>	Wild sarsaparilla	80	2.8
<i>Amphicarpa bracteata</i>	Hog peanut	80	4.6
<i>Desmodium glutinosum</i>	Pointed-leaved tick trefoil	73	4.5
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	73	1.0
<i>Thalictrum dioicum</i>	Early meadow rue	67	1.7
<i>Smilacina racemosa</i>	False Solomon's seal	65	1.0
<i>Corylus cornuta</i>	Beaked hazelnut	65	8.7
<i>Rubus</i> spp.	Blackberries/raspberries	61	7.4
<i>Diervilla lonicera</i>	Bush honeysuckle	59	1.1
<i>Trientalis borealis</i>	Starflower	57	0.9
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	53	0.8
<i>Osmunda claytoniana</i>	Interrupted fern	53	3.2
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	51	1.1
<i>Hepatica americana</i>	Round-lobed hepatica	49	0.7
<i>Trillium</i> spp.	Trilliums	47	0.9
<i>Gaultheria procumbens</i>	Wintergreen	47	2.3
<i>Amelanchier</i> spp.	Juneberry	47	0.9
<i>Anemone quinquefolia</i>	Wood anemone	43	0.6
<i>Apocynum androsaemifolium</i>	Spreading dogbane	43	0.7
<i>Viola pubescens</i>	Downy yellow violet	39	0.8
<i>Smilax tamnoides</i>	Bristly greenbrier	37	0.8
<i>Geranium maculatum</i>	Wild geranium	37	1.2
<i>Mitchella repens</i>	Partridgeberry	35	0.8
<i>Lonicera canadense</i>	American fly honeysuckle	33	1.9
<i>Fragaria</i> spp.	Wild strawberry	31	0.5
<i>Viburnum rafinesquianum</i>	Downy arrowwood	31	0.7
<i>Athyrium filix-femina</i>	Lady fern	29	1.7
<i>Cliantonia borealis</i>	Yellow beadlily	27	1.0
<i>Streptopus roseus</i>	Rosey twisted stalk	27	0.5
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	27	0.7
<i>Lycopodium obscurum</i>	Ground-pine	22	0.5
<i>Galium boreale</i>	Northern bedstraw	20	0.8
<i>Rhus radicans</i>	Poison ivy	20	2.0
<i>Prunus virginiana</i>	Choke cherry	20	0.5

AVb-V

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=10)	Coverage %
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	93	7.3
<i>Corylus</i> spp.	Hazelnuts	87	5.5
<i>Aster macrophyllus</i>	Large-leaved aster	75	2.5
<i>Osmunda claytoniana</i>	Interrupted fern	68	2.7
<i>Mitchella repens</i>	Partridgeberry	62	1.3
<i>Hamamelis virginiana</i>	Witch hazel	56	4.6
<i>Pteridium aquilinum</i>	Bracken fern	56	1.9
<i>Vaccinium angustifolium</i>	Low-sweet blueberry	50	1.5
<i>Hepatica americana</i>	Round-lobed hepatica	50	1.5
<i>Trillium</i> spp.	Trilliums	43	1.5
<i>Aralia nudicaulis</i>	Wild sarsaparilla	43	3.3
<i>Amphicarpa bracteata</i>	Hog peanut	43	1.9
<i>Trientalis borealis</i>	Starflower	43	1.5
<i>Desmodium glutinosum</i>	Pointed-leaved tick trefoil	37	1.5
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	37	1.9
<i>Ribes</i> spp.	Gooseberry	37	1.5
<i>Viola pubescens</i>	Downy yellow violet	31	1.5
<i>Smilacina racemosa</i>	False Solomon's seal	31	1.5
<i>Cornus</i> spp.	Dogwoods	31	1.5
<i>Aster</i> spp.	Asters	31	1.5
<i>Streptopus roseus</i>	Rosey twisted stalk	31	1.5
<i>Pyrola</i> spp.	Shinleaves	25	1.5
<i>Rubus Allegheniensis</i>	Common blackberry	18	6.2
<i>Geranium maculatum</i>	Wild geranium	18	1.5
<i>Monotropa uniflora</i>	Indian pipe	18	1.5
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	18	1.5
<i>Gaultheria procumbens</i>	Wintergreen	18	1.5
<i>Lycopodium</i> spp.	Club-moss	18	1.5

ACI

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=27)	Coverage %
<i>Aster macrophyllus</i>	Large-leaved aster	96	6.0
<i>Trientalis borealis</i>	Starflower	96	1.2
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	92	1.4
<i>Streptopus roseus</i>	Rosey twisted stalk	92	1.6
<i>Aralia nudicaulis</i>	Wild sarsaparilla	92	5.1
<i>Clintonia borealis</i>	Yellow beadlily	89	1.2
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	89	3.0
Grasses spp.	Grasses	89	1.5
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	89	1.9
<i>Lonicera canadensis</i>	American fly honeysuckle	89	1.5
<i>Corylus cornuta</i>	Beaked hazelnut	85	3.1
<i>Smilacina racemosa</i>	False Solomon's seal	78	1.4
<i>Amelanchier</i> spp.	Juneberry	71	1.4
<i>Lycopodium obscurum</i>	Ground-pine	67	1.9
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	64	1.2
<i>Mitchella repens</i>	Partridgeberry	60	1.9
<i>Viola</i> spp.	Violets	57	1.4
<i>Dryopteris spinulosa</i>	Spinulose shield fern	57	1.6
<i>Pteridium aquilinum</i>	Bracken fern	46	1.7
<i>Actaea</i> spp.	Baneberries	46	1.1
<i>Pyrola</i> spp.	Shinleaves	46	1.2
<i>Galium triflorum</i>	Sweet-scented bedstraw	46	1.2
<i>Acer spicatum</i>	Mountain maple	46	1.6
<i>Osmorhiza claytoni</i>	Sweet cicely	32	1.2
<i>Prenanthes alba</i>	White lettuce	32	1.1
<i>Lycopodium lucidulum</i>	Shining club-moss	28	1.5
<i>Anemone quinquefolia</i>	Wood anemone	28	1.2
<i>Dirca palustris</i>	Leatherwood	28	2.8
<i>Prunus virginiana</i>	Choke cherry	28	1.2
<i>Viola pubescens</i>	Downy yellow violet	25	1.3
<i>Gaultheria procumbens</i>	Wintergreen	25	1.1
<i>Vaccinium angustifolium</i>	Low-sweet blueberry	25	1.1
<i>Apocynum androsaemifolium</i>	Spreading dogbane	21	1.1
<i>Trillium</i> spp.	Trilliums	21	1.2
<i>Diervilla lonicera</i>	Bush honeysuckle	21	1.2
<i>Rubus parviflorus</i>	Thimbleberry	21	1.8

AVb

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=62)	Coverage %
<i>Pteridium aquilinum</i>	Bracken fern	97	10.8
<i>Aster macrophyllus</i>	Large-leaved aster	87	10.1
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	85	6.2
<i>Corylus</i> spp.	Hazelnuts	81	5.3
<i>Hamamelis virginiana</i>	Witch hazel	77	9.3
<i>Rubus</i> spp.	Blackberries/raspberries	77	6.9
<i>Aralia nudicaulis</i>	Wild sarsaparilla	76	3.3
<i>Trillium</i> spp.	Trilliums	76	1.6
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	74	1.8
<i>Amelanchier</i> spp.	Juneberry	63	2.0
<i>Trientalis borealis</i>	Starflower	63	2.8
<i>Amphicarpa bracteata</i>	Hog peanut	61	5.0
<i>Anemone quinquefolia</i>	Wood anemone	61	1.5
<i>Smilacina racemosa</i>	False Solomon's seal	61	1.6
<i>Diervilla lonicera</i>	Bush honeysuckle	52	1.9
<i>Mitchella repens</i>	Partridgeberry	47	1.4
<i>Apocynum androsaemifolium</i>	Spreading dogbane	44	1.8
<i>Lycopodium obscurum</i>	Ground-pine	42	2.5
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	34	1.2
<i>Vaccinium</i> spp.	Blueberry	34	1.8
<i>Gaultheria procumbens</i>	Wintergreen	31	2.8
<i>Polygala paucifolia</i>	Fringed polygala	31	1.4
<i>Hepatica americana</i>	Round-lobed hepatica	29	1.3
<i>Prenanthes alba</i>	White lettuce	29	0.6
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	29	0.9
<i>Clintonia borealis</i>	Yellow beadlily	27	0.9
<i>Desmodium glutinosum</i>	Pointed-leaved tick trefoil	27	2.9
<i>Lysimachia quadrifolia</i>	Whorled loosestrife	26	3.4
<i>Thalictrum dioicum</i>	Early meadow rue	26	2.2
<i>Prunus virginiana</i>	Choke cherry	24	0.8
<i>Dryopteris spinulosa</i>	Spinulose shield fern	23	0.7
<i>Galium triflorum</i>	Sweet-scented bedstraw	23	0.7
<i>Osmunda claytoniana</i>	Interrupted fern	21	1.1
<i>Rhus radicans</i>	Poison ivy	21	1.3
<i>Athyrium filix-femina</i>	Lady fern	19	1.3
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	19	0.9
<i>Fragaria</i> spp.	Wild strawberry	19	0.7
<i>Cornus canadensis</i>	Bunchberry	18	1.2
<i>Dirca palustris</i>	Leatherwood	18	1.6
<i>Ribes</i> spp.	Gooseberry	18	0.7
<i>Streptopus roseus</i>	Rosey twisted stalk	18	1.9

AAt

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=62)	Coverage %
<i>Aster macrophyllus</i>	Large-leaved aster	92	7.9
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	89	1.7
<i>Amphicarpa bracteata</i>	Hog peanut	87	4.2
<i>Thalictrum dioicum</i>	Early meadow rue	81	2.2
<i>Trillium</i> spp.	Trilliums	79	1.4
<i>Aralia nudicaulis</i>	Wild sarsaparilla	76	2.0
<i>Osmorhiza claytoni</i>	Sweet cicely	76	2.3
<i>Desmodium glutinosum</i>	Pointed-leaved tick trefoil	68	4.4
<i>Geranium maculatum</i>	Wild geranium	68	2.0
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	68	3.9
<i>Athyrium filix-femina</i>	Lady fern	66	4.4
<i>Corylus cornuta</i>	Beaked hazelnut	65	4.6
<i>Osmunda claytoniana</i>	Interrupted fern	63	4.0
<i>Pteridium aquilinum</i>	Bracken fern	61	3.9
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	60	0.9
<i>Trientalis borealis</i>	Starflower	58	0.9
<i>Smilax tamnoides</i>	Bristly greenbrier	56	1.3
<i>Hepatica americana</i>	Round-lobed hepatica	56	1.1
<i>Viola pubescens</i>	Downy yellow violet	56	0.7
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	55	0.7
<i>Streptopus roseus</i>	Rosey twisted stalk	50	0.8
<i>Ribes</i> spp.	Gooseberry	50	0.9
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	48	1.2
<i>Smilacina racemosa</i>	False Solomon's seal	48	1.2
<i>Anemone quinquefolia</i>	Wood anemone	47	1.0
<i>Sanicula marilandica</i>	Black snakeroot	47	2.5
<i>Solidago flexicaulis</i>	Zigzag goldenrod	45	1.9
<i>Diervilla lonicera</i>	Bush honeysuckle	44	3.4
<i>Viburnum rafinesquianum</i>	Downy arrowwood	40	1.9
<i>Rubus</i> spp.	Blackberries/raspberries	40	6.0
<i>Actaea rubra</i>	Red baneberry	37	0.6
<i>Adiantum pedatum</i>	Maidenhair fern	37	1.3
<i>Botrychium virginianum</i>	Rattlesnake fern	29	0.9
<i>Amelanchier</i> spp.	Juneberry	29	0.6
<i>Lonicera canadensis</i>	American fly honeysuckle	29	1.1
<i>Mitchella repens</i>	Partridgeberry	27	0.8
<i>Fragaria</i> spp.	Wild strawberry	27	0.5
<i>Aralia racemosa</i>	Spikenard	26	1.0
<i>Uvularia grandiflora</i>	Large-flowered bellwort	24	1.5
<i>Parthenocissus quinquefolia</i>	Virginia creeper	23	2.1
<i>Lathyrus</i> spp.	Wild peas	23	0.5
<i>Clintonia borealis</i>	Yellow beadlily	21	3.0

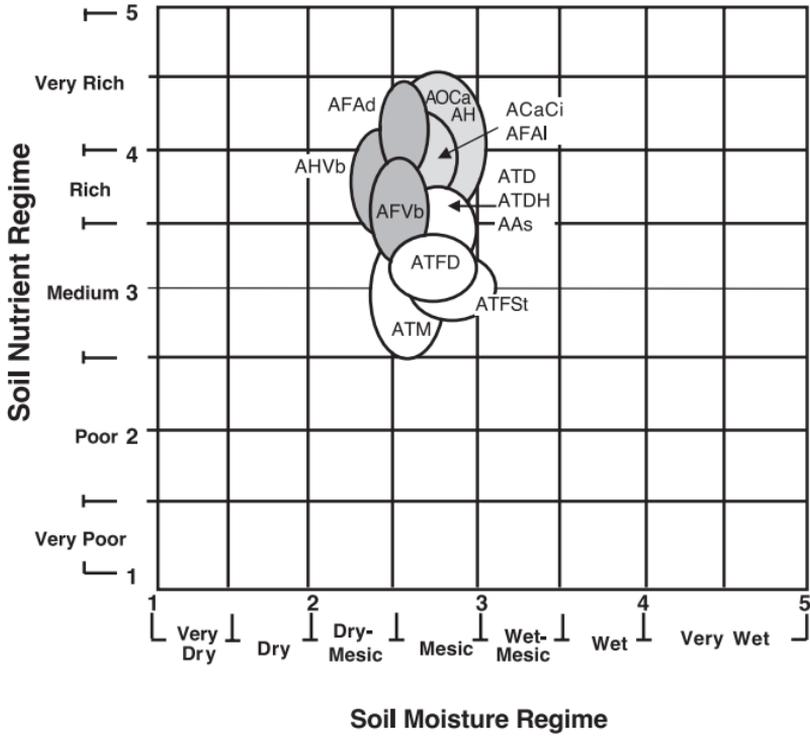
ATFPo

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=17)	Coverage %
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	88	1.7
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	83	1.7
<i>Smilacina racemosa</i>	False Solomon's seal	77	1.5
<i>Actaea</i> spp.	Baneberries	77	1.7
<i>Aster macrophyllus</i>	Large-leaved aster	72	27.1
<i>Aralia nudicaulis</i>	Wild sarsaparilla	72	11.5
<i>Osmorhiza claytoni</i>	Sweet cicely	66	1.4
<i>Botrychium virginianum</i>	Rattlesnake fern	61	1.3
<i>Pteridium aquilinum</i>	Bracken fern	50	8.2
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	44	1.1
<i>Prunus virginiana</i>	Choke cherry	44	1.5
<i>Uvularia grandiflora</i>	Large-flowered bellwort	44	2.2
<i>Trillium</i> spp.	Trilliums	44	1.3
<i>Viola pen./pub.</i>	Yellow/Downy yellow violet	38	1.3
<i>Amelanchier</i> spp.	Juneberry	38	2.4
<i>Dryopteris spinulosa</i>	Spinulose shield fern	38	1.3
<i>Lonicera</i> spp.	Honeysuckles	27	1.4
<i>Cornus rugosa</i>	Round-leaved dogwood	27	4.8
<i>Amphicarpa bracteata</i>	Hog peanut	22	10.2
<i>Ribes</i> spp.	Gooseberry	22	1.2
<i>Solidago flexicaulis</i>	Zigzag goldenrod	22	1.2
<i>Diervilla lonicera</i>	Bush honeysuckle	16	1.1
<i>Corylus</i> spp.	Hazelnuts	16	1.1
<i>Rhus radicans</i>	Poison ivy	16	5.2
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica	16	1.3
<i>Trientalis borealis</i>	Starflower	16	1.1
<i>Apocynum androsaemifolium</i>	Spreading dogbane	16	1.1
<i>Sambucus pubens</i>	Red-berried elder	16	5.2

Habitat Types of Group 4

(Mesic, Medium to Very Rich)



AFVb

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=26)	Coverage %
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	85	3.2
<i>Amphicarpa bracteata</i>	Hog peanut	81	8.7
<i>Corylus</i> spp.	Hazelnuts	81	1.9
<i>Trillium</i> spp.	Trilliums	81	1.0
<i>Aralia nudicaulis</i>	Wild sarsaparilla	69	2.6
<i>Trientalis borealis</i>	Starflower	69	1.5
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	65	1.7
<i>Pteridium aquilinum</i>	Bracken fern	62	5.8
<i>Uvularia grandiflora</i>	Large-flowered bellwort	62	2.9
<i>Aster macrophyllus</i>	Large-leaved aster	58	4.9
<i>Hamamelis virginiana</i>	Witch hazel	58	3.1
<i>Dryopteris spinulosa</i>	Spinulose shield fern	54	1.4
<i>Smilacina racemosa</i>	False Solomon's seal	54	1.2
<i>Adiantum pedatum</i>	Maidenhair fern	50	2.2
<i>Athyrium filix -femina</i>	Lady fern	50	1.1
<i>Hepatica americana</i>	Round-lobed hepatica	50	2.8
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	50	1.1
<i>Medeola virginiana</i>	Indian cucumber root	46	1.3
<i>Ribes</i> spp.	Gooseberry	46	0.9
<i>Clintonia borealis</i>	Yellow beadlilly	42	1.2
<i>Diervilla lonicera</i>	Bush honeysuckle	42	0.5
<i>Lycopodium obscurum</i>	Ground-pine	42	1.9
<i>Anemone quinquefolia</i>	Wood anemone	38	0.8
<i>Desmodium glutinosum</i>	Pointed-leaved tick trefoil	38	2.5
<i>Dirca palustris</i>	Leatherwood	38	1.5
<i>Mitchella repens</i>	Partridgeberry	38	1.0
<i>Prenanthes alba</i>	White lettuce	38	0.5
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	38	1.0
<i>Galium triflorum</i>	Sweet-scented bedstraw	35	1.1
<i>Lonicera canadensis</i>	American fly honeysuckle	35	1.3
<i>Osmorhiza claytoni</i>	Sweet cicely	35	1.1
<i>Viola pubescens</i>	Downy yellow violet	35	0.8
<i>Amelanchier</i> spp.	Juneberry	31	2.1
<i>Aralia racemosa</i>	Spikenard	31	1.1
<i>Polygala paucifolia</i>	Fringed polygala	31	2.1
<i>Rubus</i> spp.	Blackberries/raspberries	31	6.3
<i>Thalictrum dioicum</i>	Early meadow rue	31	2.1
<i>Osmunda claytoniana</i>	Interrupted fern	27	2.6
<i>Streptopus roseus</i>	Rosey twisted stalk	27	1.2
<i>Actaea rubra</i>	Baneberries	23	0.5
<i>Apocynum androsaemifolium</i>	Spreading dogbane	23	1.3
<i>Cornus canadensis</i>	Bunch berry	23	0.9
<i>Mitella diphylla</i>	Miterwort	23	0.9
<i>Botrychium virginianum</i>	Rattlesnake fern	19	0.5

ATM

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=230)	Coverage %
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	89	3.6
<i>Trientalis borealis</i>	Starflower	87	2.4
<i>Aralia nudicaulis</i>	Wild sarsaparilla	82	6.9
<i>Corylus</i> spp.	Hazelnuts	80	9.6
<i>Aster macrophyllus</i>	Large-leaved aster	74	11.1
<i>Dryopteris spinulosa</i>	Spinulose shield fern	69	3.5
<i>Clintonia borealis</i>	Yellow beadlily	68	4.1
<i>Pteridium aquilinum</i>	Bracken fern	68	8.4
<i>Lycopodium obscurum</i>	Ground-pine	65	2.8
<i>Trillium</i> spp.	Trilliums	64	2.0
<i>Athyrium filix -femina</i>	Lady fern	60	3.6
<i>Lonicera canadensis</i>	American fly honeysuckle	59	2.2
<i>Diervilla lonicera</i>	Bush honeysuckle	57	4.8
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	56	2.5
<i>Anemone quinquefolia</i>	Wood anemone	53	1.4
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	52	3.2
<i>Galium triflorum</i>	Sweet-scented bedstraw	51	1.4
<i>Actaea rubra</i>	Baneberries	50	1.2
<i>Ribes</i> spp.	Gooseberry	50	1.3
<i>Rubus</i> spp.	Blackberries/raspberries	50	6.4
<i>Streptopus roseus</i>	Rosey twisted stalk	49	2.0
<i>Mitchella repens</i>	Partridgeberry	47	2.4
<i>Amelanchier</i> spp.	Juneberry	45	1.9
<i>Hepatica americana</i>	Round-lobed hepatica	40	2.3
<i>Osmorhiza claytoni</i>	Sweet cicely	37	1.2
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	36	1.6
<i>Prunus virginiana</i>	Chokecherry	35	2.6
<i>Viola pubescens</i>	Downy yellow violet	33	1.7
<i>Cornus canadensis</i>	Bunch berry	31	2.1
<i>Apocynum androsaemifolium</i>	Spreading dogbane	27	1.9
<i>Osmunda claytoniana</i>	Interrupted fern	27	1.6
<i>Dryopteris disjuncta</i>	Oak fern	26	1.5
<i>Smilacina racemosa</i>	False Solomon's seal	26	1.6
<i>Dirca palustris</i>	Leatherwood	25	2.8
<i>Lycopodium</i> spp.	Clubmosses	24	1.6
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	22	1.7
<i>Fragaria</i> spp.	Wild strawberries	21	0.9
<i>Solidago flexicaulis</i>	Zigzag goldenrod	20	1.4

ATFSt

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=8)	Coverage %
<i>Aster macrophyllus</i>	Large-leaved aster	100	6.9
<i>Galium triflorum</i>	Sweet-scented bedstraw	100	1.2
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	100	1.8
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	100	1.5
<i>Actaea</i> spp.	Baneberries	87	1.2
<i>Osmorhiza claytoni</i>	Sweet cicely	87	5.3
<i>Trientalis borealis</i>	Starflower	87	1.6
<i>Aralia nudicaulis</i>	Wild sarsaparilla	75	16.1
<i>Clintonia borealis</i>	Yellow beadlily	75	2.7
<i>Dryopteris spinulosa</i>	Spinulose shield fern	75	1.4
<i>Prunus virginiana</i>	Chokecherry	75	2.1
<i>Ribes</i> spp.	Gooseberry	75	1.1
<i>Streptopus roseus</i>	Rosey twisted stalk	75	1.9
<i>Corylus</i> spp.	Hazelnuts	62	1.8
<i>Rubus</i> spp.	Blackberries/raspberries	62	1.5
<i>Trillium</i> spp.	Trilliums	62	1.1
<i>Acer spicatum</i>	Mountain maple	50	11.3
<i>Botrychium virginianum</i>	Rattlesnake fern	50	1.2
<i>Lonicera canadensis</i>	American fly honeysuckle	50	1.2
<i>Sambucus pubens</i>	Red-berried elder	50	1.2
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	50	2.0
<i>Amelanchier</i> spp.	Juneberry	37	1.3
<i>Caulophyllum thalictroides</i>	Blue cohosh	37	1.3
<i>Mitchella repens</i>	Partridgeberry	37	1.3
<i>Prenanthes alba</i>	White lettuce	37	1.3
<i>Solidago flexicaulis</i>	Zigzag goldenrod	37	1.3
<i>Thalictrum dioicum</i>	Early meadow rue	37	1.2
<i>Anemone quinquefolia</i>	Wood anemone	25	1.1
<i>Apocynum androsaemifolium</i>	Spreading dogbane	25	1.6
<i>Aquilegia canadensis</i>	Wild columbine	25	1.1
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	25	1.1
<i>Geum canadense</i>	White avens	25	1.4
<i>Lactuca</i> spp.	Wild lettuce	25	1.1
<i>Lonicera</i> spp.	Honeysuckle	25	1.1
<i>Pteridium aquilinum</i>	Bracken fern	25	1.8
<i>Solanum dulcamara</i>	Bittersweet nightshade	25	1.1
<i>Viburnum lentago</i>	Nannyberry	25	1.1
<i>Viola pen./pub.</i>	Downy/smooth yellow violet	25	1.1

ATFD

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=15)	Coverage %
<i>Dryopteris spinulosa</i>	Spinulose shield fern	87	1.5
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	87	1.3
<i>Ribes</i> spp.	Gooseberry	87	1.2
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	73	1.9
<i>Trientalis borealis</i>	Starflower	73	1.2
<i>Aralia nudicalis</i>	Wild sarsaparilla	67	3.5
<i>Streptopus roseus</i>	Rosey twisted stalk	67	1.5
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	60	1.6
<i>Trillium</i> spp.	Trilliums	60	1.2
<i>Actaea</i> spp.	Baneberries	53	1.5
<i>Anemone quinquefolia</i>	Wood anemone	53	1.5
<i>Mitchella repens</i>	Partridgeberry	53	1.1
<i>Osmorhiza claytoni</i>	Sweet cicely	53	2.9
<i>Aster Macrophyllus</i>	Large-leaved aster	47	5.7
<i>Lycopodium obscurum</i>	Ground-pine	47	3.6
<i>Athyrium felix -femina</i>	Lady fern	40	1.8
<i>Clintonia borealis</i>	Yellow beadlilly	40	1.8
<i>Corylus</i> spp.	Hazelnuts	40	1.8
<i>Dryopteris disjuncta</i>	Oak fern	40	1.9
<i>Lonicera canadensis</i>	American fly honeysuckle	40	1.5
<i>Sambucus pubens</i>	Red-berried elder	40	1.9
<i>Smilacina racemosa</i>	False Solomon's seal	40	1.3
<i>Viola pubescens</i>	Downy yellow violet	40	1.9
<i>Galium triflorum</i>	Sweet-scented bedstraw	33	1.5
<i>Pteridium aquilinum</i>	Bracken fern	33	2.0
<i>Adiantum pedatum</i>	Maidenhair fern	27	1.1
<i>Aralia racemosa</i>	Spikenard	27	1.1
<i>Caulophyllum thalictroides</i>	Blue cohosh	27	1.1
<i>Circaea</i> spp.	Enchanter's nightshades	27	1.5
<i>Lycopodium lucidulum</i>	Shining club-moss	27	1.1
<i>Mitella diphylla</i>	Miterwort	27	1.8
<i>Parthenocissus quinquefolia</i>	Virginia creeper	27	1.8
<i>Rubus</i> spp.	Blackberries/raspberries	27	1.8
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	27	1.5
<i>Amelanchier</i> spp.	Juneberry	20	1.5
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	20	1.3
<i>Hamamelis virginiana</i>	Witch hazel	20	2.2
<i>Lycopodium</i> spp.	Clubmosses	20	1.2
<i>Medeola virginiana</i>	Indian cucumber root	20	1.3
<i>Uvularia grandiflora</i>	Large-flowered bellwort	20	1.3
<i>Amphicarpa bracteata</i>	Hog peanut	13	1.5
<i>Apocynum androsaemifolium</i>	Spreading dogbane	13	1.8
<i>Circaea quadrisculata</i>	Enchanter's nightshade	13	1.8
<i>Diervilla lonicera</i>	Bush honeysuckle	13	7.8
<i>Dryopteris phegopteris</i>	Long beech fern	13	1.5
<i>Geranium maculatum</i>	Wild geranium	13	1.8
Grasses spp.	Grasses	13	3.0
<i>Hepatica americana</i>	Round-lobed hepatica	13	1.5
<i>Laportea canadensis</i>	Wood nettle	13	1.8
<i>Osmunda claytoniana</i>	Interrupted fern	13	1.5
<i>Prunus virginiana</i>	Chokecherry	13	1.5
<i>Thalictrum dioicum</i>	Early meadow rue	13	1.5
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	13	1.5
<i>Viola canadensis</i>	Canada white violet	13	1.8

AAs

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=22)	Coverage %
<i>Aster macrophyllus</i>	Large-leaved aster	100	5.8
<i>Clintonia borealis</i>	Yellow beadlilly	100	4.4
<i>Streptopus roseus</i>	Rosey twisted stalk	100	2.0
<i>Aralia nudicaulis</i>	Wild sarsaparilla	95	6.8
Grasses spp.	Grasses	91	1.7
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	91	1.8
<i>Anemone quinquefolia</i>	Wood anemone	87	1.2
<i>Dryopteris spinulosa</i>	Spinulose shield fern	87	1.0
<i>Trientalis borealis</i>	Starflower	87	1.7
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	87	2.3
<i>Viola pubescens</i>	Downy yellow violet	87	1.5
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	83	1.4
<i>Corylus cornuta</i>	Beaked hazelnut	83	3.8
<i>Osmorhiza claytoni</i>	Sweet cicely	83	2.0
<i>Viola</i> spp.	Violets	83	1.4
<i>Lonicera canadensis</i>	American fly honeysuckle	79	1.7
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	79	1.3
<i>Acer spicatum</i>	Mountain maple	75	1.5
<i>Amelanchier</i> spp.	Juneberry	75	1.2
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	75	1.5
<i>Lycopodium obscurum</i>	Ground-pine	75	1.9
<i>Athyrium filix -femina</i>	Lady fern	70	2.9
<i>Galium triflorum</i>	Sweet-scented bedstraw	70	1.4
<i>Trillium</i> spp.	Trilliums	66	1.3
<i>Actaea</i> spp.	Baneberries	62	1.2
<i>Rubus pubescens</i>	Dwarf raspberry	62	1.3
<i>Prunus virginiana</i>	Choke cherry	54	1.3
<i>Pyrola</i> spp.	Shinleaf	54	1.3
<i>Mitchella repens</i>	Partridgeberry	50	1.3
<i>Aralia racemosa</i>	Spikenard	45	1.2
<i>Diervilla lonicera</i>	Bush honeysuckle	45	1.2
<i>Osmunda claytoniana</i>	Interrupted fern	41	1.2
<i>Solidago</i> spp.	Goldenrods	41	1.2
<i>Fragaria virginiana</i>	Wild strawberry	37	1.3
<i>Hepatica americana</i>	Round-lobed hepatica	37	1.5
<i>Lycopodium lucidulum</i>	Shining club-moss	37	1.3
<i>Ribes</i> spp.	Gooseberry	33	1.2
<i>Dryopteris disjuncta</i>	Oak fern	29	1.6
<i>Pteridium aquilinum</i>	Bracken fern	29	1.3
<i>Ribes lacustre</i>	Swamp black currant	29	1.2
<i>Allium tricoccum</i>	Wild leek	25	1.2
<i>Prenanthes alba</i>	White lettuce	25	1.2
<i>Prunella vulgaris</i>	Selfheal	25	1.3
<i>Rubus</i> spp.	Blackberries/raspberries	25	1.2
<i>Sambucus pubens</i>	Red-berried elder	20	1.1

ATD

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=72)	Coverage %
<i>Dryopteris spinulosa</i>	Spinulose shield fern	94	5.9
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	92	2.0
<i>Trientalis borealis</i>	Starflower	86	1.6
<i>Athyrium filix -femina</i>	Lady fern	83	4.0
<i>Aralia nudicaulis</i>	Wild sarsaparilla	69	1.7
<i>Streptopus roseus</i>	Rosey twisted stalk	69	1.5
<i>Trillium</i> spp.	Trilliums	68	0.9
<i>Lonicera canadensis</i>	American fly honeysuckle	67	1.3
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	67	1.2
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	67	1.2
<i>Actaea rubra</i>	Baneberries	63	0.7
<i>Dryopteris disjuncta</i>	Oak fern	61	2.2
<i>Lycopodium obscurum</i>	Ground-pine	61	3.8
<i>Osmorhiza claytoni</i>	Sweet cicely	56	1.2
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	56	1.0
<i>Aster macrophyllus</i>	Large-leaved aster	54	3.6
<i>Galium triflorum</i>	Sweet-scented bedstraw	47	0.6
<i>Ribes</i> spp.	Gooseberry	46	1.4
<i>Clintonia borealis</i>	Yellow beadlily	44	2.3
<i>Dryopteris phegopteris</i>	Long beech fern	43	2.8
<i>Anemone quinquefolia</i>	Wood anemone	42	0.6
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	42	2.1
<i>Caulophyllum thalictroides</i>	Blue cohosh	40	0.8
<i>Corylus</i> spp.	Hazelnuts	39	1.7
<i>Viola pubescens</i>	Downy yellow violet	36	1.5
<i>Dirca palustris</i>	Leatherwood	35	1.9
<i>Sambucus pubens</i>	Red-berried elder	35	0.8
<i>Rubus</i> spp.	Blackberries/raspberries	33	5.0
<i>Prunus virginiana</i>	Chokecherry	29	1.5
<i>Smilacina racemosa</i>	False Solomon's seal	29	1.0
<i>Hepatica americana</i>	Round-lobed hepatica	28	1.5
<i>Lycopodium lucidulum</i>	Shining club-moss	28	0.8
<i>Osmunda claytoniana</i>	Interrupted fern	22	2.0
<i>Adiantum pedatum</i>	Maidenhair fern	21	1.5
<i>Mitchella repens</i>	Partridgeberry	21	1.0
<i>Uvularia grandiflora</i>	Large-flowered bellwort	19	3.5
<i>Viola</i> spp.	Violets	19	1.0
<i>Solidago flexicaulis</i>	Zigzag goldenrod	17	3.1
<i>Acer spicatum</i>	Mountain maple	15	2.0
<i>Amelanchier</i> spp.	Juneberry	15	3.1
<i>Viola canadensis</i>	Canada white violet	15	0.5

ATDH

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=22)	Coverage %
<i>Ribes</i> spp.	Gooseberry	95	2.2
<i>Aster macrophyllus</i>	Large-leaved aster	86	11.4
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	86	5.2
<i>Viola</i> pen./pub.	Downy/smooth yellow violet	86	1.8
<i>Trillium</i> spp.	Trilliums	82	3.4
<i>Dryopteris spinulosa</i>	Spinulose shield fern	77	5.0
<i>Aralia nudicaulis</i>	Wild sarsaparilla	73	7.9
<i>Osmorhiza claytoni</i>	Sweet cicely	73	2.5
<i>Streptopus roseus</i>	Rosey twisted stalk	73	1.4
<i>Uvularia grandiflora</i>	Large-flowered bellwort	73	3.9
<i>Rubus</i> spp.	Blackberries/raspberries	68	6.3
<i>Trientalis borealis</i>	Starflower	68	2.1
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	64	7.6
<i>Sanguinaria canadensis</i>	Bloodroot	64	3.5
<i>Actaea rubra</i>	Baneberries	59	1.3
<i>Caulophyllum thalictroides</i>	Blue cohosh	59	2.6
<i>Clintonia borealis</i>	Yellow beadlily	59	1.3
<i>Galium triflorum</i>	Sweet-scented bedstraw	59	1.3
<i>Lonicera canadensis</i>	American fly honeysuckle	59	2.1
<i>Mitella diphylla</i>	Miterwort	59	1.2
<i>Dirca palustris</i>	Leatherwood	55	3.0
<i>Adiantum pedatum</i>	Maidenhair fern	50	3.2
<i>Corylus</i> spp.	Hazelnuts	50	6.5
<i>Anemone quinquefolia</i>	Wood anemone	45	1.8
<i>Aralia racemosa</i>	Spikenard	41	1.6
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	41	1.2
<i>Diervilla lonicera</i>	Bush honeysuckle	41	3.2
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica	41	1.9
<i>Hepatica americana</i>	Round-lobed hepatica	41	1.6
<i>Lycopodium obscurum</i>	Ground-pine	41	1.2
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	41	1.8
<i>Prunus virginiana</i>	Chokecherry	41	2.4
<i>Solidago flexicaulis</i>	Zigzag goldenrod	41	1.3
<i>Athyrium filix -femina</i>	Lady fern	36	2.4
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	36	1.8
<i>Mitchella repens</i>	Partridgeberry	36	1.8
<i>Sambucus pubens</i>	Red-berried elder	36	1.8
<i>Apocynum androsaemifolium</i>	Spreading dogbane	32	1.2
<i>Pteridium aquilinum</i>	Bracken fern	32	9.2
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	32	1.6
<i>Acer spicatum</i>	Mountain maple	27	2.2
<i>Amelanchier</i> spp.	Juneberry	27	1.9
<i>Amphicarpa bracteata</i>	Hog peanut	27	8.2
<i>Parthenocissus quinquefolia</i>	Virginia creeper	27	1.9
<i>Botrychium virginianum</i>	Rattlesnake fern	23	1.5
<i>Hamamelis virginiana</i>	Witch hazel	23	1.5
<i>Lycopodium</i> spp.	Clubmosses	23	4.4
<i>Smilacina racemosa</i>	False Solomon's seal	23	1.0
<i>Lycopodium lucidulum</i>	Shining club-moss	18	2.4

AHVb

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=9)	Coverage %
<i>Anemone quinquefolia</i>	Wood anemone	100	0.5
<i>Dryopteris spinulosa</i>	Spinulose shield fern	100	0.6
Grasses spp.	Grasses	100	0.5
<i>Hamamelis virginiana</i>	Witch hazel	100	1.1
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	100	0.5
<i>Prunus virginiana</i>	Chokecherry	100	0.8
<i>Ribes</i> spp.	Gooseberry	100	0.8
Sedges spp.	Sedges	100	0.5
<i>Trillium</i> spp.	Trilliums	100	0.8
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	100	0.8
<i>Actaea</i> spp.	Baneberries	88	0.5
<i>Amphicarpa bracteata</i>	Hog peanut	88	0.5
<i>Viola</i> spp.	Violets	88	0.5
<i>Adiantum pedatum</i>	Maidenhair fern	77	1.2
<i>Aralia nudicaulis</i>	Wild sarsaparilla	77	0.5
<i>Osmorhiza claytoni</i>	Sweet cicely	77	0.9
<i>Smilacina racemosa</i>	False Solomon's seal	77	0.5
<i>Botrychium virginianum</i>	Rattlesnake fern	66	0.5
<i>Caullophyllum thalictroides</i>	Blue cohosh	66	0.5
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	66	0.5
<i>Lonicera canadensis</i>	American fly honeysuckle	66	0.5
<i>Sanguinaria canadensis</i>	Bloodroot	66	0.5
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	66	0.6
<i>Amelanchier</i> spp.	Juneberry	55	0.5
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	55	0.5
<i>Aster</i> spp.	Asters	55	1.0
<i>Corylus cornuta</i>	Beaked hazelnut	55	1.0
<i>Desmodium glutinosum</i>	Pointed-leaved tick trefoil	55	0.5
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	55	0.5
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	55	0.5
<i>Mitella diphylla</i>	Miterwort	55	0.5
<i>Parthenocissus quinquefolia</i>	Virginia creeper	55	15.8
<i>Prenanthes alba</i>	White lettuce	55	0.5
<i>Sambucus pubens</i>	Red-berried elder	55	0.5
<i>Smilax tamnoides</i>	Bristly greenbrier	55	0.5
<i>Thalictrum dioicum</i>	Early meadow rue	55	1.0
<i>Aralia racemosa</i>	Spikenard	44	1.8

<i>Circaea quadrisculata</i>	Enchanter's nightshade	44	0.5
<i>Dirca palustris</i>	Leatherwood	44	1.1
<i>Hepatica americana</i>	Round-lobed hepatica	44	0.5
<i>Pyrola</i> spp.	Shinleaf	44	0.5
<i>Smilax herbacia</i>	Carrion flower	44	0.5
<i>Solidago flexicaulis</i>	Zigzag goldenrod	44	0.5
<i>Uvularia grandiflora</i>	Large-flowered bellwort	44	1.8
<i>Aster macrophyllus</i>	Large-leaved aster	33	0.5
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica	33	1.3
<i>Mitchella repens</i>	Partridgeberry	33	0.5
<i>Osmunda claytoniana</i>	Interrupted fern	33	0.5
<i>Apocynum androsaemifolium</i>	Spreading dogbane	22	0.5
<i>Diervilla lonicera</i>	Bush honeysuckle	22	0.5
<i>Galium triflorum</i>	Sweet-scented bedstraw	22	0.5
<i>Panax quinquefolius</i>	Ginseng	22	0.5
<i>Phryma leptostachya</i>	Lopseed	22	0.5
<i>Pteridium aquilinum</i>	Bracken fern	22	7.8
<i>Sanicula marilandica</i>	Black snakeroot	22	0.5
<i>Solidago</i> spp.	Goldenrods	22	0.5

AFAd

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=12)	Coverage %
<i>Actaea rubra</i>	Baneberries	75	2.9
<i>Ribes</i> spp.	Gooseberry	75	1.1
<i>Sanguinaria canadensis</i>	Bloodroot	75	2.4
<i>Galium triflorum</i>	Sweet-scented bedstraw	67	0.8
<i>Osmorhiza claytoni</i>	Sweet cicely	67	2.4
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica	58	9.9
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	58	2.6
<i>Viola pen./pub.</i>	Downy/smooth yellow violet	58	1.1
<i>Adiantum pedatum</i>	Maidenhair fern	50	2.6
<i>Amphicarpa bracteata</i>	Hog peanut	50	4.2
<i>Athyrium felix -femina</i>	Lady fern	50	2.2
<i>Circaea quadrisculata</i>	Enchanter's nightshade	50	1.8
<i>Dirca palustris</i>	Leatherwood	50	3.8
<i>Laportea canadensis</i>	Wood nettle	50	3.8
<i>Rubus</i> spp.	Blackberries/raspberries	50	3.3
<i>Sambucus pubens</i>	Red-berried elder	50	1.3
<i>Smilacina racemosa</i>	False Solomon's seal	50	0.9

<i>Trillium</i> spp.	Trilliums	50	1.3
<i>Uvularia grandiflora</i>	Large-flowered bellwort	50	2.6
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	42	0.5
<i>Botrychium virginianum</i>	Rattlesnake fern	42	1.5
<i>Caullophyllum thalictroides</i>	Blue cohosh	42	1.5
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	42	0.5
<i>Parthenocissus quinquefolia</i>	Virginia creeper	42	1.0
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	42	2.5
<i>Allium tricoccum</i>	Wild leek	33	0.5
<i>Aster macrophyllus</i>	Large-leaved aster	33	1.8
<i>Corylus</i> spp.	Hazelnuts	33	0.5
<i>Phryma leptostachya</i>	Lopseed	33	2.4
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	33	1.8
<i>Apocynum androsaemifolium</i>	Spreading dogbane	25	0.5
<i>Dryopteris spinulosa</i>	Spinulose shield fern	25	1.3
<i>Mitella diphylla</i>	Miterwort	25	0.5
<i>Prenanthes alba</i>	White lettuce	25	2.2
<i>Sanicula marilandica</i>	Black snakeroot	25	1.3
<i>Smilax herbacea</i>	Carrion flower	25	0.5
<i>Solidago flexicaulis</i>	Zigzag goldenrod	25	0.5
<i>Viola pubescens</i>	Downy yellow violet	25	1.3
<i>Anemone quinquefolia</i>	Wood anemone	17	0.5
<i>Aralia racemosa</i>	Spikenard	17	0.5
<i>Geranium maculatum</i>	Wild geranium	17	0.5
<i>Lonicera canadensis</i>	American fly honeysuckle	17	0.5
<i>Thalictrum dioicum</i>	Early meadow rue	17	0.5
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	17	0.5

AFAI

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=13)	Coverage %
<i>Actaea</i> spp.	Baneberries	93	1.5
<i>Ribes</i> spp.	Gooseberry	93	1.7
<i>Osmorhiza claytoni</i>	Sweet cicely	86	1.9
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	86	1.8
<i>Trillium</i> spp.	Trilliums	86	1.6
<i>Prunus virginiana</i>	Chokecherry	80	5.2
<i>Smilacina racemosa</i>	False Solomon's seal	80	1.2
<i>Viola pen./pub.</i>	Downy/smooth yellow violet	80	1.4
<i>Aster macrophyllus</i>	Large-leaved aster	66	3.5
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica	66	2.0
<i>Allium tricoccum</i>	Wild leek	60	1.4
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	60	1.4
<i>Sambucus pubens</i>	Red-berried elder	60	1.5
<i>Uvularia grandiflora</i>	Large-flowered bellwort	60	2.3
<i>Galium</i> spp.	Bedstraws	59	1.2
<i>Botrychium virginianum</i>	Rattlesnake fern	53	1.2
<i>Caulophyllum thalictroides</i>	Blue cohosh	46	1.4
<i>Ranunculus</i> spp.	Buttercups	46	1.2
<i>Anemone quinquefolia</i>	Wood anemone	40	2.7
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	40	1.6
<i>Rubus</i> spp.	Blackberries/raspberries	33	1.2
<i>Sanguinaria canadensis</i>	Bloodroot	33	2.0
<i>Amelanchier</i> spp.	Juneberry	26	1.1
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	26	1.1
<i>Dryopteris spinulosa</i>	Spinulose shield fern	26	1.2
<i>Phryma leptostachya</i>	Lopseed	26	1.4
<i>Aralia nudicaulis</i>	Wild sarsaparilla	20	1.3
<i>Circaea quadrisulcata</i>	Enchanter's nightshade	20	1.4
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	20	1.1
<i>Geranium maculatum</i>	Wild geranium	20	1.1
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	20	1.4
<i>Lactuca</i> spp.	Wild lettuce	20	1.1
<i>Ranunculus</i> spp.	Buttercups	20	1.1
<i>Sanicula marilandica</i>	Black snakeroot	20	1.1
<i>Vitis riparia</i>	Riverbank grape	20	1.1

ACaCi

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=28)	Coverage %
<i>Osmorhiza claytoni</i>	Sweet cicely	86	4.3
<i>Aster macrophyllus</i>	Large-leaved aster	75	6.2
<i>Geranium maculatum</i>	Wild geranium	75	5.5
<i>Thalictrum dioicum</i>	Early meadow rue	75	2.2
<i>Trillium</i> spp.	Trilliums	75	2.4
<i>Viola pubescens</i>	Downy yellow violet	75	1.7
<i>Athyrium filix -femina</i>	Lady fern	71	5.6
<i>Circaea</i> spp.	Enchanter's nightshades	71	2.8
<i>Ribes</i> spp.	Gooseberry	68	1.5
<i>Solidago flexicaulis</i>	Zigzag goldenrod	68	1.4
<i>Parthenocissus quinquefolia</i>	Virginia creeper	64	1.7
<i>Amphicarpa bracteata</i>	Hog peanut	61	5.9
<i>Caulophyllum thalictroides</i>	Blue cohosh	61	0.9
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	61	1.1
<i>Adiantum pedatum</i>	Maidenhair fern	57	4.5
<i>Sanicula marilandica</i>	Black snakeroot	57	4.6
<i>Actaea</i> spp.	Baneberries	54	1.0
<i>Anemone quinquefolia</i>	Wood anemone	50	1.5
<i>Dryopteris spinulosa</i>	Spinulose shield fern	50	2.3
<i>Hepatica americana</i>	Round-lobed hepatica	50	1.2
<i>Sanguinaria canadensis</i>	Bloodroot	50	1.4
<i>Smilacina racemosa</i>	False Solomon's seal	50	1.2
<i>Aralia nudicalis</i>	Wild sarsaparilla	46	3.7
<i>Mitella diphylla</i>	Miterwort	46	0.9
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	46	0.7
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	43	1.9
<i>Osmunda claytoniana</i>	Interrupted fern	43	5.2
<i>Viburnum acerifolium</i>	Maple-leaved viburnum	43	3.0
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	39	1.6
<i>Desmodium glutinosum</i>	Pointed-leaved tick trefoil	39	4.3
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	39	0.7
<i>Botrychium virginianum</i>	Rattlesnake fern	36	1.3
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	36	0.8
<i>Rubus</i> spp.	Blackberries/raspberries	36	5.6
<i>Corylus cornuta</i>	Beaked hazelnut	32	3.8
<i>Sambucus pubens</i>	Red-berried elder	32	4.3
<i>Streptopus roseus</i>	Rosey twisted stalk	32	0.8

<i>Uvularia grandiflora</i>	Large-flowered bellwort	32	1.1
<i>Prenanthes alba</i>	White lettuce	29	0.5
<i>Smilax tamnoides</i>	Bristly greenbrier	29	1.1
<i>Trientalis borealis</i>	Starflower	29	0.8
<i>Galium</i> spp.	Bedstraws	25	3.3
<i>Laportea canadensis</i>	Wood nettle	25	8.5
<i>Prunus virginiana</i>	Choke cherry	25	0.5
<i>Galium triflorum</i>	Sweet-scented bedstraw	21	0.9
<i>Impatiens capensis</i>	Jewelweed	21	0.5
<i>Smilax herbacia</i>	Carrion flower	21	0.5
<i>Zanthoxylum americanum</i>	Prickly ash	21	14.3
<i>Lonicera canadensis</i>	American fly honeysuckle	18	1.0
<i>Viburnum rafinesquianum</i>	Downy arrowwood	18	1.5

AOCa

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=186)	Coverage %
<i>Ribes</i> spp.	Gooseberry	94	1.4
<i>Caulophyllum thalictroides</i>	Blue cohosh	91	1.6
<i>Athyrium filix-femina</i>	Lady fern	82	5.9
<i>Trillium</i> spp.	Trilliums	80	1.4
<i>Viola pubescens</i> 1	Downy/smooth yellow violet	80	2.7
<i>Aralia nudicaulis</i>	Wild sarsaparilla	78	6.5
<i>Aster macrophyllus</i>	Large-leaved aster	78	7.7
<i>Osmorhiza claytoni</i>	Sweet cicely	76	4.7
<i>Dryopteris spinulosa</i>	Spinulose shield fern	75	2.6
<i>Actaea rubra</i>	Baneberries	74	1.3
<i>Sanguinaria canadensis</i>	Bloodroot	69	2.3
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	68	1.5
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	67	1.4
<i>Corylus</i> spp.	Hazelnuts	67	5.8
<i>Trientalis borealis</i>	Starflower	62	1.4
<i>Galium triflorum</i>	Sweet-scented bedstraw	56	0.8
<i>Streptopus roseus</i>	Rosey twisted stalk	54	1.4
<i>Adiantum pedatum</i>	Maidenhair fern	53	2.1
<i>Rubus</i> spp.	Blackberries/raspberries	53	4.7
<i>Dirca palustris</i>	Leatherwood	51	1.7
<i>Lonicera canadensis</i>	American fly honeysuckle	51	1.5
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	50	1.0
<i>Uvularia grandiflora</i>	Large-flowered bellwort	48	2.2
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	48	1.8

<i>Cornus alternifolia</i>	Alternate-leaved dogwood	47	1.4
<i>Solidago flexicaulis</i>	Zigzag goldenrod	45	1.7
<i>Sambucus pubens</i>	Red-berried elder	44	2.4
<i>Clintonia borealis</i>	Yellow beadlily	42	1.6
<i>Hepatica americana</i>	Round-lobed hepatica	42	1.7
<i>Dryopteris disjuncta</i>	Oak fern	40	2.2
<i>Anemone quinquefolia</i>	Wood anemone	39	0.9
<i>Prunus virginiana</i>	Chokecherry	34	1.9
<i>Botrychium virginianum</i>	Rattlesnake fern	33	1.2
<i>Lycopodium obscurum</i>	Ground-pine	33	1.3
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	32	2.9
<i>Mitella diphylla</i>	Miterwort	30	1.3
<i>Diervilla lonicera</i>	Bush honeysuckle	28	3.9
<i>Pteridium aquilinum</i>	Bracken fern	27	4.3
<i>Smilacina racemosa</i>	False Solomon's seal	27	1.0
<i>Apocynum androsaemifolium</i>	Spreading dogbane	26	0.7
<i>Asarum canadense</i>	Large-leaved aster	24	1.4
<i>Aralia racemosa</i>	Spikenard	23	0.9
<i>Osmunda claytoniana</i>	Interrupted fern	22	1.4
<i>Allium tricoccum</i>	Wild leek	19	2.2
<i>Fragaria</i> spp.	Wild strawberries	19	2.5

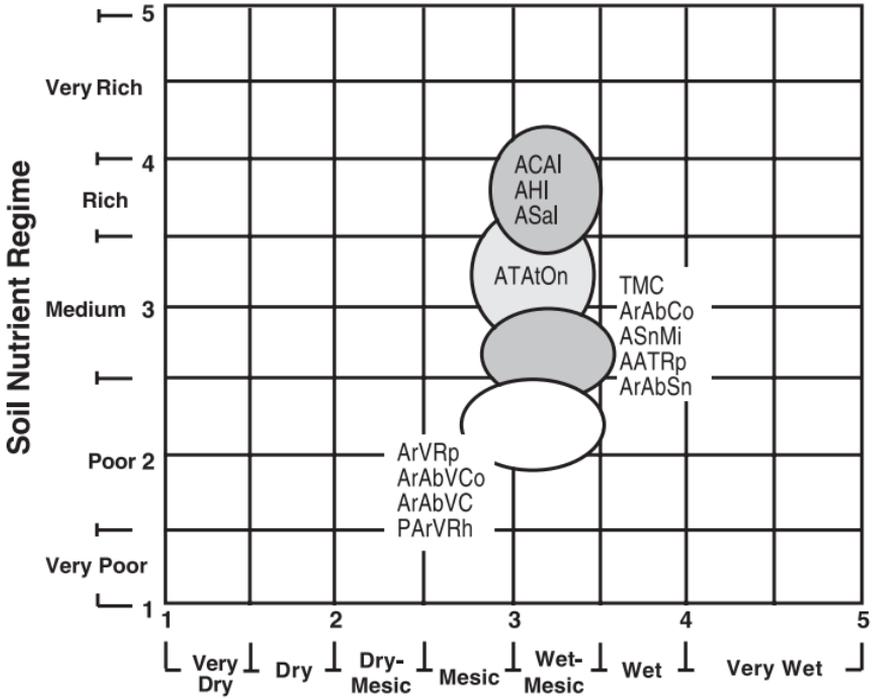
AH

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=97)	Coverage %
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	88	7.6
<i>Ribes</i> spp.	Gooseberry	85	2.3
<i>Sanguinaria canadensis</i>	Bloodroot	82	4.1
<i>Caulophyllum thalictroides</i>	Blue cohosh	81	3.2
<i>Trillium</i> spp.	Trilliums	80	2.9
<i>Dryopteris spinulosa</i>	Spinulose shield fern	71	4.7
<i>Osmorhiza claytoni</i>	Sweet cicely	70	5.0
<i>Viola pubescens</i> 1	Downy/smooth yellow violet	61	4.1
<i>Adiantum pedatum</i>	Maidenhair fern	60	3.7
<i>Athyrium filix-femina</i>	Lady fern	56	4.2
<i>Actaea rubra</i>	Baneberries	53	1.5
<i>Aster macrophyllus</i>	Large-leaved aster	53	5.9
<i>Uvularia grandiflora</i>	Large-flowered bellwort	53	4.6
<i>Thalictrum dioicum</i>	Early meadow rue	52	2.5
<i>Aralia nudicaulis</i>	Wild sarsaparilla	49	4.5
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	48	1.6
<i>Allium tricoccum</i>	Wild leek	47	2.4
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica	47	2.2
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	47	2.5
<i>Solidago flexicaulis</i>	Zigzag goldenrod	45	2.3
<i>Laportea canadensis</i>	Wood nettle	43	9.3
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	42	1.7
<i>Streptopus roseus</i>	Rosey twisted stalk	41	2.1
<i>Galium triflorum</i>	Sweet-scented bedstraw	39	1.0
<i>Amphicarpa bracteata</i>	Hog peanut	38	3.3
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	38	1.8
<i>Corylus cornuta</i>	Beaked hazelnut	38	5.8
<i>Mitella diphylla</i>	Miterwort	36	1.1
<i>Sambucus pubens</i>	Red-berried elder	35	4.3
<i>Anemone quinquefolia</i>	Wood anemone	34	0.9
<i>Dirca palustris</i>	Leatherwood	34	2.2
<i>Viola pennsylvanica</i>	Smooth yellow violet	33	3.7
<i>Smilacina racemosa</i>	False Solomon's seal	32	1.1
<i>Botrychium virginianum</i>	Rattlesnake fern	29	1.0
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	29	1.1
<i>Aralia racemosa</i>	Spikenard	27	3.0
<i>Rubus</i> spp.	Blackberries/raspberries	27	5.7
<i>Parthenocissus quinquefolia</i>	Virginia creeper	26	1.7
<i>Prunus virginiana</i>	Chokecherry	25	3.2
<i>Trientalis borealis</i>	Starflower	25	1.3
<i>Asarum canadense</i>	Large-leaved aster	23	2.2
<i>Geranium maculatum</i>	Wild geranium	21	2.5
<i>Lonicera canadensis</i>	American fly honeysuckle	19	2.0
<i>Viola canadensis</i>	Canada white violet	19	3.1

Habitat Types of Group 5

(Mesic to Wet-mesic, Poor to Rich)



AHI

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=47)	Coverage %
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	94	4.6
<i>Sanguinaria canadensis</i>	Bloodroot	87	2.5
<i>Trillium</i> spp.	Trilliums	81	3.4
<i>Parthenocissus quinquefolia</i>	Virginia creeper	70	4.3
<i>Dryopteris spinulosa</i>	Spinulose shield fern	68	3.8
<i>Athyrium filix-femina</i>	Lady fern	66	5.4
<i>Thalictrum dioicum</i>	Early meadow rue	66	2.3
<i>Circaea</i> spp.	Enchanter's nightshades	64	2.1
<i>Rubus</i> spp.	Blackberries/raspberries	64	4.4
<i>Ribes</i> spp.	Gooseberry	62	2.9
<i>Solidago flexicaulis</i>	Zigzag goldenrod	62	1.7
<i>Aster macrophyllus</i>	Large-leaved aster	57	2.2
<i>Geranium maculatum</i>	Wild geranium	57	6.6
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	57	1.3
<i>Amphicarpa bracteata</i>	Hog peanut	53	2.3
<i>Viola pubescens</i>	Downy yellow violet	53	2.9
<i>Galium triflorum</i>	Sweet-scented bedstraw	51	1.0
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica	51	1.8
<i>Impatiens capensis</i>	Jewelweed	51	1.0
<i>Laportea canadensis</i>	Wood nettle	51	3.9
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	51	1.2
<i>Fragaria</i> spp.	Strawberries	49	1.1
<i>Anemone quinquefolia</i>	Wood anemone	47	1.0
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	47	1.1
<i>Smilacina racemosa</i>	False Solomon's seal	47	2.3
<i>Actaea rubra</i>	Red baneberry	45	1.8
<i>Caulophyllum thalictroides</i>	Blue cohosh	45	3.1
<i>Corylus cornuta</i>	Beaked hazelnut	45	6.9
<i>Onoclea sensibilis</i>	Sensitive fern	45	1.1
<i>Allium tricoccum</i>	Wild leek	43	4.3
<i>Osmorhiza claytoni</i>	Sweet cicely	43	1.9
<i>Ribes cynosbati</i>	Prickly gooseberry	43	3.6
<i>Sanicula marilandica</i>	Black snakeroot	43	1.1
<i>Trientalis borealis</i>	Starflower	43	1.6
<i>Aralia nudicaulis</i>	Wild sarsaparilla	40	6.1
<i>Oxalis montana</i>	Wood sorrel	40	0.5
<i>Equisetum</i> spp.	Horsetails	38	1.9
<i>Amelanchier</i> spp.	Juneberry	34	1.1
<i>Viola</i> spp.	Violets	34	2.8
<i>Adiantum pedatum</i>	Maidenhair fern	28	4.6
<i>Cornus racemosa</i>	Gray dogwood	28	1.6
<i>Mitella diphylla</i>	Miterwort	28	0.9
<i>Crataegus</i> spp.	Hawthorns	26	6.2
<i>Prenanthes alba</i>	White lettuce	26	0.5
<i>Prunus virginiana</i>	Choke cherry	26	1.8
<i>Ilex verticillata</i>	Winterberry	23	0.5
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	21	2.2
<i>Osmunda claytoniana</i>	Interrupted fern	21	4.7
<i>Viburnum rafinesquianum</i>	Downy arrowwood	21	1.0

ACal

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=58)	Coverage %
<i>Dryopteris spinulosa</i>	Spinulose shield fern	92	4.4
<i>Athyrium filix-femina</i>	Lady fern	90	8.4
<i>Caulophyllum thalictroides</i>	Blue cohosh	86	4.1
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	78	1.8
<i>Actaea rubra</i>	Red baneberry	73	1.8
<i>Dryopteris disjuncta</i>	Oak fern	73	2.4
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	73	1.3
<i>Trientalis borealis</i>	Starflower	69	1.0
<i>Trillium</i> spp.	Trilliums	69	1.7
<i>Aralia nudicaulis</i>	Wild sarsaparilla	67	4.3
<i>Lonicera canadensis</i>	American fly honeysuckle	63	1.4
<i>Corylus cornuta</i>	Beaked hazelnut	61	3.6
<i>Osmorhiza claytoni</i>	Sweet cicely	59	2.2
<i>Aster macrophyllus</i>	Large-leaved aster	57	3.2
<i>Impatiens capensis</i>	Jewelweed	57	1.4
<i>Ribes</i> spp.	Gooseberry	57	1.9
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	57	1.9
<i>Dryopteris phegopteris</i>	Long beech fern	55	2.5
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	51	1.0
<i>Solidago flexicaulis</i>	Zigzag goldenrod	51	1.7
<i>Galium triflorum</i>	Sweet-scented bedstraw	47	0.7
<i>Rubus pubescens</i>	Dwarf raspberry	47	3.5
<i>Anemone quinquefolia</i>	Wood anemone	45	0.8
<i>Circaea alpina</i>	Dwarf enchanter's nightshade	45	1.8
<i>Dirca palustris</i>	Leatherwood	45	1.9
<i>Osmunda claytoniana</i>	Interrupted fern	45	3.7
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	45	1.2
<i>Allium tricoccum</i>	Wild leek	43	1.4
<i>Ribes cynosbati</i>	Prickly gooseberry	43	2.4
<i>Sanguinaria canadensis</i>	Bloodroot	43	2.4
<i>Viola pubescens</i>	Downy yellow violet	43	1.5
<i>Clintonia borealis</i>	Yellow Beadlilly	41	1.1
<i>Sambucus pubens</i>	Red-berried elder	41	2.4
<i>Adiantum pedatum</i>	Maidenhair fern	37	2.3
<i>Mitella diphylla</i>	Miterwort	37	3.3
<i>Hepatica americana</i>	Round-lobed hepatica	35	1.1
<i>Smilacina racemosa</i>	False Solomon's seal	35	0.8
<i>Rubus</i> spp.	Blackberries/raspberries	33	4.7
<i>Streptopus roseus</i>	Rosey twisted stalk	33	1.1
<i>Rubus flagellaris</i>	Dewberry	31	6.2
<i>Acer spicatum</i>	Mountajn Maple	29	2.0
<i>Lycopodium obscurum</i>	Ground-pine	29	2.1
<i>Onoclea sensibilis</i>	Sensitive fern	29	2.0
<i>Prunus virginiana</i>	Choke cherry	27	1.2

<i>Botrychium virginianum</i>	Rattlesnake fern	25	0.5
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	25	2.0
<i>Parthenocissus quinquefolia</i>	Virginia creeper	25	2.6
<i>Laportea canadensis</i>	Wood nettle	22	4.3
Grasses spp.	Grasses	22	0.7
<i>Rubus hispidus</i>	Swamp dewberry	22	2.5
<i>Uvularia grandiflora</i>	Large-flowered bellwort	22	1.2
<i>Circaea quadrisulcata</i>	Enchanter's nightshade	20	1.0
<i>Equisetum</i> spp.	Horsetails	20	0.5
<i>Mitchella repens</i>	Partridgeberry	20	0.8

ASal

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=17)	Coverage %
<i>Onoclea sensibilis</i>	Sensitive fern	88	1.2
<i>Sanguinaria canadensis</i>	Bloodroot	88	3.6
<i>Thalictrum dioicum</i>	Early meadow rue	88	2.3
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	75	7.5
<i>Impatiens capensis</i>	Jewelweed	75	5.8
<i>Trillium</i> spp.	Trilliums	75	4.2
<i>Actaea rubra</i>	Red baneberry	63	3.4
<i>Anemone quinquefolia</i>	Wood anemone	63	2.0
<i>Athyrium filix-femina</i>	Lady fern	63	12.6
<i>Corylus cornuta</i>	Beaked hazelnut	63	12.3
<i>Dryopteris spinulosa</i>	Spinulose shield fern	63	9.7
<i>Hepatica acutiloba</i>	Sharp-lobed hepatica	63	2.5
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	63	2.0
<i>Ribes</i> spp.	Gooseberry	63	4.4
<i>Sanicula marilandica</i>	Black snakeroot	63	4.4
<i>Adiantum pedatum</i>	Maidenhair fern	50	2.4
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	50	2.4
<i>Osmorhiza claytoni</i>	Sweet cicely	50	14.0
<i>Osmunda claytoniana</i>	Interrupted fern	50	6.0
<i>Parthenocissus quinquefolia</i>	Virginia creeper	50	8.4
<i>Prenanthes alba</i>	White lettuce	50	1.1
<i>Smilacina racemosa</i>	False Solomon's seal	50	1.1
<i>Trientalis borealis</i>	Starflower	50	2.4
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	50	1.1
<i>Amphicarpa bracteata</i>	Hog peanut	38	7.0
<i>Aster macrophyllus</i>	Large-leaved aster	38	11.0
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	38	1.3
<i>Cornus racemosa</i>	Gray dogwood	38	5.3
<i>Geranium maculatum</i>	Wild geranium	38	6.2
<i>Hepatica americana</i>	Round-lobed hepatica	38	5.3
<i>Mitella diphylla</i>	Miterwort	38	6.2
<i>Rubus pubescens</i>	Dwarf raspberry	38	2.2
<i>Smilax herbacea</i>	Carrion flower	38	0.5

<i>Smilax tamnoides</i>	Bristly greenbrier	38	1.3
<i>Streptopus roseus</i>	Rosey twisted stalk	38	1.3
<i>Viburnum lentago</i>	Nannyberry	38	1.3
<i>Viola pubescens</i>	Downy yellow violet	38	0.5
<i>Viola</i> spp.	Violets	38	6.2
<i>Agrimonia gryposepala</i>	Agrimony	25	3.0
<i>Allium tricoccum</i>	Wild leek	25	1.8
<i>Aralia nudicaulis</i>	Wild sarsaparilla	25	0.5
<i>Cicuta maculata</i>	Water-hemlock	25	1.8
<i>Circaea alpina</i>	Dwarf enchanter's nightshade	25	1.8
<i>Circaea quadrisulcata</i>	Enchanter's nightshade	25	3.0
<i>Cornus canadensis</i>	Bunchberry	25	1.8
<i>Desmodium glutinosum</i>	Pointed-leaved tick trefoil	25	15.0
<i>Dryopteris disjuncta</i>	Oak fern	25	1.8
<i>Dryopteris phegopteris</i>	Long beech fern	25	1.8
<i>Dryopteris</i> spp.	Shield ferns	25	15.0
<i>Galium asprellum</i>	Rough bedstraw	25	0.5
<i>Galium triflorum</i>	Sweet-scented bedstraw	25	0.5
<i>Geum</i> spp.	Avens	25	7.8
<i>Ilex verticillata</i>	Winterberry	25	1.8
<i>Laportea canadensis</i>	Wood nettle	25	20.3
<i>Lonicera canadensis</i>	American fly honeysuckle	25	0.5
<i>Pteridium aquilinum</i>	Bracken fern	25	9.0
<i>Ranunculus abortivus</i>	Small-flowered crowfoot	25	0.5
<i>Rhus radicans</i>	Poison ivy	25	1.8
<i>Rubus</i> spp.	Blackberries/raspberries	25	3.0
<i>Solidago flexicaulis</i>	Zigzag goldenrod	25	1.8
<i>Solidago</i> spp.	Goldenrods	25	7.8
<i>Viburnum rafinesquianum</i>	Downy arrowwood	25	0.5
<i>Zanthoxylum americanum</i>	Prickly ash	25	1.8

ATAtOn

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=85)	Coverage %
<i>Athyrium filix-femina</i>	Lady fern	78	6.3
<i>Equisetum</i> spp.	Horsetails	71	3.4
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	68	1.4
<i>Dryopteris spinulosa</i>	Spinulose shield fern	61	4.8
<i>Trientalis borealis</i>	Starflower	61	1.5
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	58	1.4
<i>Aster macrophyllus</i>	Large-leaved aster	56	4.4
<i>Oncoclea sensibilis</i>	Sensitive fern	56	3.0
<i>Parthenocissus quinquefolia</i>	Virginia creeper	56	2.1
<i>Aralia nudicaulis</i>	Wild sarsaparilla	54	2.1
<i>Rubus</i> spp.	Blackberries/raspberries	54	6.0
<i>Corylus cornuta</i>	Beaked hazelnut	51	7.1
<i>Impatiens capensis</i>	Jewelweed	48	7.9
<i>Ribes</i> spp.	Gooseberry	48	1.9
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	42	2.2
<i>Galium triflorum</i>	Sweet-scented bedstraw	41	0.9
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	39	1.5
<i>Trillium</i> spp.	Trilliums	38	0.8
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	36	1.1
<i>Anemone quinquefolia</i>	Wood anemone	34	0.8
<i>Fragaria virginiana</i>	Wild strawberry	34	1.2
<i>Laportea canadensis</i>	Wood nettle	34	3.6
<i>Sanicula marilandica</i>	Black snakeroot	34	2.7
<i>Dryopteris disjuncta</i>	Oak fern	33	1.5
<i>Streptopus roseus</i>	Rosey twisted stalk	33	1.7
<i>Rubus pubescens</i>	Dwarf raspberry	32	5.9
<i>Clintonia borealis</i>	Yellow Beadlily	31	1.6
<i>Amphicarpa bracteata</i>	Hog peanut	29	5.0
<i>Dryopteris phegopteris</i>	Long beech fern	29	2.8
<i>Hepatica americana</i>	Round-lobed hepatica	29	0.9
<i>Circaea quadrisulcata</i>	Enchanter's nightshade	28	2.1
<i>Osmorhiza claytoni</i>	Sweet cicely	28	1.8
<i>Osmunda claytoniana</i>	Interrupted fern	27	2.0
<i>Prunus virginiana</i>	Choke cherry	27	1.0
<i>Thalictrum dioicum</i>	Early meadow rue	27	3.1
<i>Oxalis montana</i>	Wood sorrel	25	0.7
<i>Prenanthes alba</i>	White lettuce	25	0.9
<i>Asarum canadense</i>	Wild ginger	24	1.6
<i>Cornus canadensis</i>	Bunchberry	24	1.3
<i>Mitchella repens</i>	Partridgeberry	21	0.8
<i>Acer spicatum</i>	Mountajn Maple	20	2.6
<i>Actaea rubra</i>	Red baneberry	20	0.6
<i>Diervilla lonicera</i>	Bush honeysuckle	20	0.6

ASnMi

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=29)	Coverage %
Aster macrophyllus	Large-leaved aster	93	24.1
Corylus cornuta	Beaked hazelnut	93	12.7
Uvularia sessilifolia	Sessile-leaved bellwort	90	1.4
Maianthemum canadense	Wild lily-of-the-valley	83	0.6
Pteridium aquilinum	Bracken fern	83	13.3
Aralia nudicaulis	Wild sarsaparilla	79	2.4
Galium triflorum	Sweet-scented bedstraw	76	0.8
Lonicera canadensis	American fly honeysuckle	76	2.2
Pyrola spp.	Shinleaf	76	1.3
Fragaria spp.	Strawberries	73	1.2
Athyrium filix-femina	Lady fern	72	5.0
Petasites palmatus	Sweet coltsfoot	72	1.0
Amelanchier spp.	Juneberry	69	1.9
Equisetum spp.	Horsetails	69	2.2
Ribes spp.	Gooseberry	69	0.8
Cornus canadensis	Bunchberry	66	1.7
Mitchella repens	Partridgeberry	66	1.3
Trientalis borealis	Starflower	66	0.8
Diervilla lonicera	Bush honeysuckle	62	6.1
Clintonia borealis	Yellow Beadlilly	59	1.9
Rubus pubescens	Dwarf raspberry	59	7.5
Viola spp.	Violets	59	0.7
Anemone quinquefolia	Wood anemone	52	0.5
Streptopus roseus	Rosey twisted stalk	52	0.6
Viburnum rafinesquianum.	Downy arrowwood	52	6.1
Actaea spp.	Baneberries	48	1.1
Sanicula marilandica	Black snakeroot	48	1.5
Dryopteris spinulosa	Spinulose shield fern	45	0.8
Osmunda claytoniana	Interrupted fern	45	2.7
Rubus flagellaris	Dewberry	45	1.6
Hepatica americana	Round-lobed hepatica	41	0.8
Lathyrus spp.	Wild peas	41	1.0
Viola pubescens	Downy yellow violet	41	0.8
Cornus alternifolia	Alternate-leaved dogwood	38	0.9
Cornus stolonifera	Red-osier dogwood	38	3.9
Apocynum androsaemifolium	Spreading dogbane	34	0.9
Osmorhiza claytoni	Sweet cicely	34	0.7
Prenanthes alba	White lettuce	34	0.5
Smilacina racemosa	False Solomon's seal	34	0.7
Rosa spp.	Wild rose	34	4.9
Agrimonia gryposepala	Agrimony	31	0.7
Arisaema atrorubens	Jack-in-the-pulpit	31	0.7
Rubus parviflorus	Thimble-berry	31	6.2
Rubus spp.	Blackberries/raspberries	31	9.2
Alnus rugosa	Speckled alder	28	6.3
Mitella nuda	Naked miterwort	28	2.3
Thalictrum dioicum	Early meadow rue	28	0.8
Waldsteinia fragarioides	Barren strawberry	28	15.6
Acer spicatum	Mountajn Maple	24	8.4
Hieracium spp.	Hawkweeds	24	0.5
Trillium spp.	Trilliums	24	0.5
Gaultheria procumbens	Wintergreen	21	1.2
Ilex verticillata	Winterberry	21	3.6
Polygala paucifolia	Fringed polygala	21	1.5

AAtrP

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=14)	Coverage %
<i>Aralia nudicaulis</i>	Wild sarsaparilla	100	2.9
<i>Diervilla lonicera</i>	Bush honeysuckle	100	1.3
<i>Corylus cornuta</i>	Beaked hazelnut	93	3.0
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	93	1.2
<i>Osmunda claytoniana</i>	Interrupted fern	93	1.7
<i>Pteridium aquilinum</i>	Bracken fern	93	1.2
<i>Aster macrophyllus</i>	Large-leaved aster	86	3.0
<i>Rubus pubescens</i>	Dwarf raspberry	86	1.9
<i>Athyrium filix-femina</i>	Lady fern	79	1.5
<i>Clintonia borealis</i>	Yellow Beadlily	79	1.5
<i>Ribes</i> spp.	Gooseberry	79	1.1
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	79	1.2
<i>Anemone quinquefolia</i>	Wood anemone	71	1.1
<i>Dryopteris spinulosa</i>	Spinulose shield fern	71	1.9
<i>Equisetum</i> spp.	Horsetails	71	1.2
<i>Fragaria virginiana</i>	Wild strawberry	71	1.2
<i>Galium triflorum</i>	Sweet-scented bedstraw	71	1.1
<i>Rubus</i> spp.	Blackberries/raspberries	71	1.7
<i>Trientalis borealis</i>	Starflower	64	1.1
<i>Amelanchier</i> spp.	Juneberry	57	2.5
<i>Cornus canadensis</i>	Bunchberry	57	1.7
<i>Streptopus roseus</i>	Rosey twisted stalk	57	1.2
<i>Lonicera canadensis</i>	American fly honeysuckle	50	1.7
<i>Alnus rugosa</i>	Speckled alder	43	3.7
<i>Osmorhiza claytoni</i>	Sweet cicely	43	1.1
<i>Petasites palmatus</i>	Sweet coltsfoot	43	1.1
<i>Prenanthes alba</i>	White lettuce	43	1.1
<i>Vaccinium</i> spp.	Blueberries	43	1.4
<i>Acer spicatum</i>	Mountajn Maple	36	1.3
<i>Actaea</i> spp.	Baneberries	36	1.2
<i>Cornus racemosa</i>	Gray dogwood	36	1.3
<i>Corylus americana</i>	American hazelnut	36	1.8
<i>Galium</i> spp.	Bedstraws	36	1.1
<i>Impatiens capensis</i>	Jewelweed	36	1.2
<i>Apocynum androsaemifolium</i>	Spreading dogbane	29	1.2
<i>Coptis groenlandica</i>	Goldthread	29	1.1
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	29	1.2
<i>Hepatica americana</i>	Round-lobed hepatica	29	1.1
<i>Lycopodium obscurum</i>	Ground-pine	29	1.1
<i>Onoclea sensibilis</i>	Sensitive fern	29	1.4
<i>Prunus virginiana</i>	Choke cherry	29	1.2
<i>Sanicula marilandica</i>	Black snakeroot	29	1.2
<i>Scutellaria lateriflora</i>	Mad-dog skullcap	29	1.1
<i>Trillium</i> spp.	Trilliums	29	1.1
<i>Aquilegia canadensis</i>	Wild columbine	21	1.3
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	21	1.1
<i>Convolvulus arvensis</i>	Field bindweed	21	1.1
<i>Dryopteris phegopteris</i>	Long beech fern	21	1.1
<i>Lycopodium lucidulum</i>	Shining club-moss	21	1.1
<i>Osmunda cinnamomea</i>	Cinnamon fern	21	1.2
<i>Thalictrum polygamum</i>	Tall meadowrue	21	1.1

TMC

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=202)	Coverage %
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	92	3.6
<i>Cornus canadensis</i>	Bunchberry	88	5.1
<i>Trientalis borealis</i>	Starflower	87	2.6
<i>Corylus cornuta</i>	Beaked hazelnut	84	7.8
<i>Aralia nudicaulis</i>	Wild sarsaparilla	84	4.2
<i>Cliintonia borealis</i>	Yellow Beadlilly	78	3.3
<i>Aster macrophyllus</i>	Large-leaved aster	77	9.1
<i>Dryopteris spinulosa</i>	Spinulose shield fern	72	2.9
<i>Pteridium aquilinum</i>	Bracken fern	70	8.6
<i>Lycopodium obscurum</i>	Ground-pine	66	3.1
<i>Coptis groenlandica</i>	Goldthread	60	2.0
<i>Diervilla lonicera</i>	Bush honeysuckle	59	4.2
<i>Lonicera canadensis</i>	American fly honeysuckle	57	2.4
<i>Anemone quinquefolia</i>	Wood anemone	50	1.4
<i>Rubus</i> spp.	Blackberries/raspberries	48	5.7
<i>Athyrium filix-femina</i>	Lady fern	47	4.8
<i>Ribes</i> spp.	Gooseberry	47	1.4
<i>Amelanchier</i> spp.	Juneberry	46	1.4
<i>Mitchella repens</i>	Partridgeberry	46	1.6
<i>Streptopus roseus</i>	Rosey twisted stalk	45	1.1
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	43	1.9
<i>Galium triflorum</i>	Sweet-scented bedstraw	41	0.9
<i>Vaccinium</i> spp.	Blueberries	39	0.9
<i>Lycopodium</i> spp.	Club-moss	38	2.9
<i>Rubus pubescens</i>	Dwarf raspberry	36	5.7
<i>Rubus hisp./flag.</i>	Swamp dewberry/ Dewberry	35	7.1
<i>Osmunda claytoniana</i>	Interrupted fern	33	3.2
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	32	3.7
<i>Equisetum</i> spp.	Horsetails	31	1.8
<i>Trillium</i> spp.	Trilliums	28	1.3
<i>Actaea</i> spp.	Baneberries	26	0.9
<i>Dryopteris disjuncta</i>	Oak fern	26	1.5
<i>Dryopteris phegopteris</i>	Long beech fern	26	1.9
<i>Hepatica americana</i>	Round-lobed hepatica	26	1.3
<i>Fragaria</i> spp.	Strawberries	23	1.9
<i>Apocynum androsaemifolium</i>	Spreading dogbane	23	1.6
<i>Prunus virginiana</i>	Choke cherry	22	1.7
<i>Acer spicatum</i>	Mountajn Maple	22	3.6
<i>Linnaea borealis</i>	Twinflower	22	1.2
<i>Polygala paucifolia</i>	Fringed polygala	21	1.7
<i>Gaultheria procumbens</i>	Wintergreen	20	3.4
<i>Oxalis montana</i>	Wood sorrel	19	2.3
<i>Arisaema atrorubens</i>	Jack-in-the-pulpit	18	0.7
<i>Viola pubescens</i>	Downy yellow violet	18	1.2
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	17	0.5

ArAbCo

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=83)	Coverage %
<i>Corylus cornuta</i>	Beaked hazelnut	93	16.6
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	89	3.5
<i>Cornus canadensis</i>	Bunchberry	88	11.0
<i>Ribes</i> spp.	Gooseberry	78	3.0
<i>Trientalis borealis</i>	Starflower	75	1.7
<i>Pteridium aquilinum</i>	Bracken fern	73	5.9
<i>Aralia nudicaulis</i>	Wild sarsaparilla	71	5.7
<i>Diervilla lonicera</i>	Bush honeysuckle	69	4.3
<i>Rubus</i> spp.	Blackberries/raspberries	69	12.0
<i>Dryopteris spinulosa</i>	Spinulose shield fern	68	5.0
<i>Equisetum</i> spp.	Horsetails	58	4.5
<i>Osmunda claytoniana</i>	Interrupted fern	57	3.0
<i>Aster macrophyllus</i>	Large-leaved aster	52	6.5
<i>Athyrium filix-femina</i>	Lady fern	52	5.8
<i>Fragaria</i> spp.	Strawberries	51	3.5
<i>Prunus virginiana</i>	Choke cherry	50	1.8
<i>Anemone quinquefolia</i>	Wood anemone	48	2.2
<i>Rubus hisp./flag.</i>	Swamp dewberry/ Dewberry	48	14.1
<i>Rubus pubescens</i>	Dwarf raspberry	46	14.8
<i>Amelanchier</i> spp.	Juneberry	43	1.0
<i>Vaccinium</i> spp.	Blueberries	38	6.7
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	37	1.7
<i>Apocynum androsaemifolium</i>	Spreading dogbane	31	2.1
<i>Galium triflorum</i>	Sweet-scented bedstraw	31	1.3
<i>Sphagnum</i> spp.	Sphagnum moss	31	3.1
<i>Cornus stolonifera</i>	Red-osier dogwood	30	6.6
<i>Onoclea sensibilis</i>	Sensitive fern	30	3.3
<i>Trillium</i> spp.	Trilliums	29	1.2
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	26	0.7
<i>Galium</i> spp.	Bedstraws	25	3.4
<i>Thalictrum dioicum</i>	Early meadow rue	25	1.5
<i>Lonicera canadensis</i>	American fly honeysuckle	24	1.4
<i>Alnus rugosa</i>	Speckled alder	23	5.5
<i>Clintonia borealis</i>	Yellow Beadlilly	23	3.4
<i>Hepatica americana</i>	Round-lobed hepatica	23	1.6
<i>Impatiens capensis</i>	Jewelweed	21	4.8

ArAbSn

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=69)	Coverage %
<i>Aster macrophyllus</i>	Large-leaved aster	93	23.0
<i>Corylus cornuta</i>	Beaked hazelnut	86	11.8
<i>Fragaria</i> spp.	Strawberries	81	3.2
<i>Pteridium aquilinum</i>	Bracken fern	80	11.4
<i>Cornus stolonifera</i>	Red-osier dogwood	77	9.0
<i>Amelanchier</i> spp.	Juneberry	74	5.2
<i>Equisetum</i> spp.	Horsetails	72	1.0
<i>Aralia nudicaulis</i>	Wild sarsaparilla	70	4.7
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	70	0.7
<i>Petasites palmatus</i>	Sweet coltsfoot	70	1.7
<i>Rubus pubescens</i>	Dwarf raspberry	68	9.6
<i>Rosa</i> spp.	Wild rose	82	4.9
<i>Sanicula marilandica</i>	Black snakeroot	68	1.3
<i>Alnus rugosa</i>	Speckled alder	65	11.0
<i>Diervilla lonicera</i>	Bush honeysuckle	65	5.5
<i>Viburnum rafinesquianum</i>	Downy arrowwood	65	6.3
<i>Galium triflorum</i>	Sweet-scented bedstraw	61	0.7
<i>Apocynum androsaemifolium</i>	Spreading dogbane	54	1.4
<i>Cornus canadensis</i>	Bunchberry	52	1.7
<i>Agrimonia gryposepala</i>	Agrimony	46	1.5
<i>Athyrium filix-femina</i>	Lady fern	46	4.6
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	45	1.0
<i>Ribes</i> spp.	Gooseberry	45	1.6
<i>Rubus flagellaris</i>	Dewberry	41	5.6
<i>Pyrola</i> spp.	Shinleaf	39	1.9
<i>Clintonia borealis</i>	Yellow Beadlily	38	1.2
<i>Mitella nuda</i>	Naked miterwort	38	0.6
<i>Trientalis borealis</i>	Starflower	38	0.8
<i>Lathyrus</i> spp.	Wild peas	36	0.7
<i>Lonicera canadensis</i>	American fly honeysuckle	36	1.1
<i>Actaea</i> spp.	Baneberries	35	0.9
<i>Prunus virginiana</i>	Choke cherry	35	3.1
<i>Ilex verticillata</i>	Winterberry	33	4.2
<i>Salix</i> spp.	Willow	33	7.4
<i>Streptopus roseus</i>	Rosey twisted stalk	33	0.7
<i>Vaccinium</i> spp.	Blueberries	33	2.0
<i>Anemone quinquefolia</i>	Wood anemone	32	0.5
<i>Waldsteinia fragarioides</i>	Barren strawberry	32	11.2
<i>Hieracium</i> spp.	Hawkweeds	29	4.4
<i>Rubus hispidus</i>	Swamp dewberry	29	7.7
<i>Fragaria</i> spp.	Strawberries	26	7.1
<i>Prenanthes alba</i>	White lettuce	26	0.5
<i>Cornus rugosa</i>	Round-leaved dogwood	25	5.5
<i>Dryopteris spinulosa</i>	Spinulose shield fern	23	0.5
<i>Gaultheria procumbens</i>	Wintergreen	22	1.0
<i>Mitchella repens</i>	Partridgeberry	22	0.7
<i>Rubus parviflorus</i>	Thimble-berry	22	15.7
<i>Rubus</i> spp.	Blackberries/raspberries	22	7.8
<i>Viola pubescens</i>	Downy yellow violet	20	0.5

ArVRp

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=10)	Coverage %
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	90	2.1
<i>Rubus pubescens</i>	Dwarf raspberry	90	1.6
<i>Amelanchier</i> spp.	Juneberry	70	1.2
<i>Aster macrophyllus</i>	Large-leaved aster	70	8.9
<i>Cornus canadensis</i>	Bunchberry	70	3.6
<i>Pteridium aquilinum</i>	Bracken fern	70	7.8
<i>Trientalis borealis</i>	Starflower	70	0.9
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	70	2.9
<i>Aralia nudicaulis</i>	Wild sarsaparilla	60	2.2
<i>Diervilla lonicera</i>	Bush honeysuckle	60	3.3
<i>Vaccinium</i> spp.	Blueberries	60	0.5
<i>Anemone quinquefolia</i>	Wood anemone	50	0.5
<i>Athyrium filix-femina</i>	Lady fern	50	3.9
<i>Corylus cornuta</i>	Beaked hazelnut	50	4.9
<i>Fragaria</i> spp.	Strawberries	50	1.5
<i>Osmunda claytoniana</i>	Interrupted fern	50	21.1
<i>Rubus hispida</i>	Swamp dewberry	50	3.9
<i>Apocynum androsaemifolium</i>	Spreading dogbane	40	0.5
<i>Lysimachia quadrifolia</i>	Whorled loosestrife	40	0.5
<i>Onoclea sensibilis</i>	Sensitive fern	40	1.8
<i>Amphicarpa bracteata</i>	Hog peanut	30	0.5
<i>Cornus racemosa</i>	Gray dogwood	30	10.2
<i>Gaultheria procumbens</i>	Wintergreen	30	0.5
<i>Geranium maculatum</i>	Wild geranium	30	0.5
<i>Lycopodium obscurum</i>	Ground-pine	30	0.5
<i>Lycopodium</i> spp.	Club-moss	30	0.5
<i>Parthenocissus quinquefolia</i>	Virginia creeper	30	0.5
<i>Rubus</i> spp.	Blackberries/raspberries	30	13.7
<i>Smilax tamnoides</i>	Bristly greenbrier	30	0.5
<i>Vicia</i> spp.	Vetches	30	0.5
<i>Alnus rugosa</i>	Speckled alder	20	0.5
<i>Clintonia borealis</i>	Yellow Beadlilly	20	0.5
<i>Dryopteris spinulosa</i>	Spinulose shield fern	20	0.5
<i>Galium boreale</i>	Northern bedstraw	20	0.5
<i>Galium triflorum</i>	Sweet-scented bedstraw	20	0.5
<i>Lycopodium complanatum</i>	Trailing Christmas-green	20	9.0
<i>Mentha</i> spp.	Mints	20	1.8
<i>Osmorhiza claytoni</i>	Sweet cicely	20	0.5
<i>Polygonatum pubescens</i>	Hairy Solomon's seal	20	0.5
<i>Potentilla</i> spp.	Cinquefoils	20	0.5
<i>Prenanthes alba</i>	White lettuce	20	0.5
<i>Rosa</i> spp.	Wild rose	20	0.5
<i>Trillium</i> spp.	Trilliums	20	0.5

ArAbVCo

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=17)	Coverage %
<i>Aster macrophyllus</i>	Large-leaved aster	100	12.8
<i>Cornus canadensis</i>	Bunchberry	100	2.2
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	100	4.7
<i>Trientalis borealis</i>	Starflower	100	1.6
<i>Corylus cornuta</i>	Beaked hazelnut	100	6.1
<i>Amelanchier</i> spp.	Juneberry	94	1.3
<i>Aralia nudicaulis</i>	Wild sarsaparilla	94	6.6
<i>Clintonia borealis</i>	Yellow Beadlilly	94	9.7
<i>Lonicera canadensis</i>	American fly honeysuckle	94	1.8
<i>Viola</i> spp.	Violets	88	2.0
<i>Pteridium aquilinum</i>	Bracken fern	88	7.9
<i>Lycopodium obscurum</i>	Ground-pine	88	8.4
<i>Streptopus roseus</i>	Rosey twisted stalk	88	1.4
Grasses spp.	Grasses	83	1.6
<i>Galium triflorum</i>	Sweet-scented bedstraw	83	1.6
<i>Diervilla lonicera</i>	Bush honeysuckle	83	1.8
<i>Anemone quinquefolia</i>	Wood anemone	72	1.5
<i>Lycopodium clavatum</i>	Common club-coss	72	3.4
<i>Pyrola</i> spp.	Shinleaf	72	1.2
<i>Dryopteris spinulosa</i>	Spinulose shield fern	72	1.0
<i>Vaccinium angustifolium</i>	Low sweet blueberry	72	1.6
<i>Coptis groenlandica</i>	Goldthread	61	1.8
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	55	1.7
<i>Acer spicatum</i>	Mountajn Maple	55	3.3
<i>Vaccinium myrtilloides</i>	Canada blueberry	55	1.6
<i>Solidago</i> spp.	Goldenrods	50	1.2
<i>Rubus pubescens</i>	Dwarf raspberry	50	1.3
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	50	1.5
<i>Fragaria virginiana</i>	Wild strawberry	44	1.4
<i>Osmunda claytoniana</i>	Interrupted fern	38	3.2
<i>Linnaea borealis</i>	Twinflower	38	5.9
<i>Apocynum androsaemifolium</i>	Spreading dogbane	33	1.3
<i>Mitchella repens</i>	Partridgeberry	33	2.6
<i>Prenanthes alba</i>	White lettuce	33	1.1
<i>Gaultheria procumbens</i>	Wintergreen	33	1.3
<i>Prunella vulgaris</i>	Selfheal	27	1.2
<i>Actaea</i> spp.	Baneberries	27	1.1
<i>Ribes lacustre</i>	Swamp black currant	27	1.4
<i>Prunus virginiana</i>	Choke cherry	27	1.3
<i>Lycopodium annotinum</i>	Stiff club-moss	22	1.2
<i>Dryopteris disjuncta</i>	Oak fern	22	1.2
<i>Lycopodium lucidulum</i>	Shining club-moss	22	1.1
<i>Rubus</i> spp.	Blackberries/raspberries	22	1.2
<i>Lonicera dioica</i>	Smooth-leaved honeysuckle	22	1.1

ArAbVC

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=95)	Coverage %
<i>Vaccinium</i> spp.	Blueberries	99	10.1
<i>Cornus canadensis</i>	Bunchberry	98	12.6
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	87	6.8
<i>Pteridium aquilinum</i>	Bracken fern	87	13.3
<i>Trientalis borealis</i>	Starflower	84	3.3
<i>Aralia nudicaulis</i>	Wild sarsaparilla	79	5.9
<i>Corylus</i> spp.	Hazelnuts	78	9.9
<i>Clintonia borealis</i>	Yellow Beadlily	76	4.1
<i>Lycopodium obscurum</i>	Ground-pine	75	4.2
<i>Diervilla lonicera</i>	Bush honeysuckle	66	5.6
<i>Aster macrophyllus</i>	Large-leaved aster	64	11.0
<i>Coptis groenlandica</i>	Goldthread	64	5.3
<i>Rubus</i> spp.	Blackberries/raspberries	56	8.4
<i>Amelanchier</i> spp.	Juneberry	55	1.6
<i>Lycopodium</i> spp.	Club-moss	54	2.9
<i>Dryopteris spinulosa</i>	Spinulose shield fern	52	2.3
<i>Fragaria</i> spp.	Strawberries	43	1.9
<i>Lonicera canadensis</i>	American fly honeysuckle	39	2.0
<i>Anemone quinquefolia</i>	Wood anemone	38	2.0
<i>Gaultheria procumbens</i>	Wintergreen	37	4.3
<i>Prunus virginiana</i>	Choke cherry	36	1.9
<i>Linnaea borealis</i>	Twinflower	34	3.9
<i>Mitchella repens</i>	Partridgeberry	33	2.0
<i>Streptopus roseus</i>	Rosey twisted stalk	33	1.1
<i>Galium triflorum</i>	Sweet-scented bedstraw	29	1.1
<i>Osmunda claytoniana</i>	Interrupted fern	26	2.4
<i>Waldsteinia fragarioides</i>	Barren strawberry	24	8.3
<i>Ribes</i> spp.	Gooseberry	21	1.8
<i>Rubus pubescens</i>	Dwarf raspberry	20	4.6
<i>Apocynum androsaemifolium</i>	Spreading dogbane	20	0.9
<i>Polygala paucifolia</i>	Fringed polygala	18	3.1
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	18	1.7
<i>Equisetum</i> spp.	Horsetails	18	2.1
<i>Alnus rugosa</i>	Speckled alder	18	2.2
<i>Prunus pennsylvanica</i>	Pin cherry	18	2.1
<i>Hepatica americana</i>	Round-lobed hepatica	17	1.9
<i>Athyrium filix-femina</i>	Lady fern	15	3.1

PARVRh

Understory species in order of decreasing constancy, with average coverage.

Scientific name	Common name	Constancy % (N=16)	Coverage %
<i>Trientalis borealis</i>	Star flower	100	0.5
<i>Ilex verticillata</i>	Winterberry	93	1.5
<i>Aralia nudicaulis</i>	Wild sarsaparilla	87	0.9
<i>Rubus hispidus</i>	Swamp dewberry	87	1.7
<i>Vaccinium</i> spp.	Blueberries	87	0.9
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	81	2.6
<i>Uvularia sessilifolia</i>	Sessile-leaved bellwort	81	0.7
<i>Amelanchier</i> spp.	Juneberry	81	0.7
<i>Mitchella repens</i>	Partridgeberry	75	0.5
<i>Pteridium aquilinum</i>	Bracken fern	75	9.1
<i>Gaylussacia baccata</i>	Black huckleberry	75	6.6
<i>Gaultheria procumbens</i>	Wintergreen	62	0.5
<i>Osmunda cinnamomea</i>	Cinnamon fern	62	20.0
<i>Lycopodium obscurum</i>	Ground-pine	56	0.5
<i>Cornus canadensis</i>	Bunchberry	50	1.4
<i>Corylus</i> spp.	Hazelnuts	50	0.5
<i>Coptis groenlandica</i>	Goldthread	43	3.3
<i>Rubus</i> spp.	Blackberries/raspberries	43	2.6
<i>Clintonia borealis</i>	Yellow Beadlilly	37	0.5
<i>Aster macrophyllus</i>	Large-leaved aster	37	0.5
<i>Apocynum androsaemifolium</i>	Spreading dogbane	31	0.5
<i>Anemone quinquefolia</i>	Wood anemone	31	0.5
<i>Osmunda claytoniana</i>	Interrupted fern	31	1.5
<i>Aronia melanocarpa</i>	Black chokeberry	31	0.6
<i>Cypripedium acaule</i>	Pink lady's slipper	25	1.1
<i>Symplocarpus foetidus</i>	Skunk cabbage	25	4.8
<i>Dryopteris spinulosa</i>	Spinulose shield fern	25	1.8
<i>Lysimachia quadrifolia</i>	Whorled loosestrife	18	0.5
<i>Prenanthes alba</i>	White lettuce	18	0.5

Plant Identification

This section will assist you with identification of the species used in the habitat type keys and some additional common forest plants. However, it is not intended as a complete guide to flora. Consult other references when needed. Species are arranged alphabetically, by scientific name.

Graphs of each species' representation on a moisture-nutrient grid are included. Shading represents frequency of occurrence classes for reference stands (10-25; 26-50; 51-75; >75 %). Distribution of species on habitat types of Region 3 is shown.

Field identification. When faced with an unknown plant, first examine it carefully and note features such as size of the whole plant, color of flower or foliage, hairiness (pubescence), flower and fruit characteristics, shape, arrangement and attachment of leaves. Remember that within any species, some of these features will vary depending on the season, microhabitat, or historic influences (e.g. defoliation, grazing, frost, etc.).

Examine the color plates and line drawings in this section,

and when you find one that best matches your specimen, carefully read the description. If no match is found you may have to consult other sources. Perhaps the easiest to use is **Newcomb's Wildflower Guide** (referenced below), but note that it does not include ferns. Additional references are listed below.

Useful References for Plant Identification

Billington, Cecil. 1952. *Ferns of Michigan*. Cranbrook Institute of Science; Bloomfield Hills, Mich. 240 pp.

Fasset, Norman C. 1976. *Spring Flora of Wisconsin*. 3rd edition with revisions by Margaret S. Bergseng. University of Wisconsin Press. 189 pp.

Newcomb, Lawrence. 1977. *Newcomb's Wildflower Guide*. Little, Brown and Co. Boston, Mass. 490 pp.

Smith, Helen V. 1966. *Michigan Wildflowers*. Cranbrook Institute of Science; Bloomfield, Mich. 468 pp.

Tryon, R. 1980. *Ferns of Minnesota*. University of Minnesota Press, Minneapolis, Minnesota.

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Scientific name	Common name	
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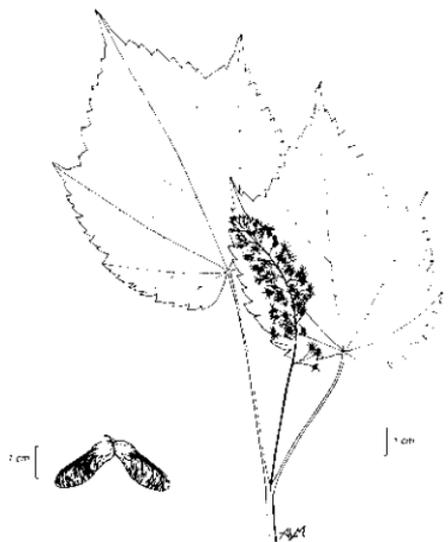
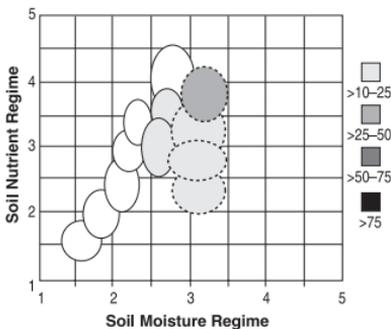
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Ash, Green	<i>Fraxinus pennsylvanic</i>
Ash, White	<i>Fraxinus americana</i>
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Aspen, Trembling	<i>Populus tremuloides</i>
Basswood	<i>Tilia americana</i>
Beech, American	<i>Fagus grandifolia</i>
Birch, White (Paper)	<i>Betula papyrifera</i>
Birch, Yellow	<i>Betula alleghaniensis</i>
Cedar, Northern White	<i>Thuja occidentalis</i>
Cherry, Black	<i>Prunus serotina</i>
Elm, American	<i>Ulmus americana</i>
Fir, Balsam	<i>Abies balsamea</i>
Hemlock, Eastern	<i>Tsuga canadensis</i>
Hickory, Bitternut	<i>Carya cordiformis</i>
Hornbeam, American (Musclewood)	<i>Carpinus caroliniana</i>
Ironwood (Eastern Hophornbeam)	<i>Ostrya virginiana</i>
Maple, Red	<i>Acer rubrum</i>
Maple, Sugar	<i>Acer saccharum</i>
Oak, Bur	<i>Quercus macrocarpa</i>
Oak, Northern Pin	<i>Quercus ellipsoidalis</i>
Oak, Northern Red	<i>Quercus rubra</i>
Oak, White	<i>Quercus alba</i>
Pine, Eastern White	<i>Pinus strobus</i>
Pine, Jack	<i>Pinus banksiana</i>
Pine, Red	<i>Pinus resinosa</i>
Poplar, Balsam	<i>Populus balsamifera</i>
Spruce, Black	<i>Picea mariana</i>
Spruce, White	<i>Picea glauca</i>



***Acer spicatum* Lam.**
Mountain Maple

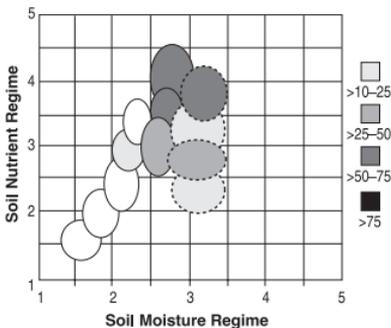
- Medium to large shrub, or rarely a small tree.
- Do not confuse with red maple saplings and seedlings. Mountain maple leaves have more pronounced venation and slightly hairy twigs and buds.

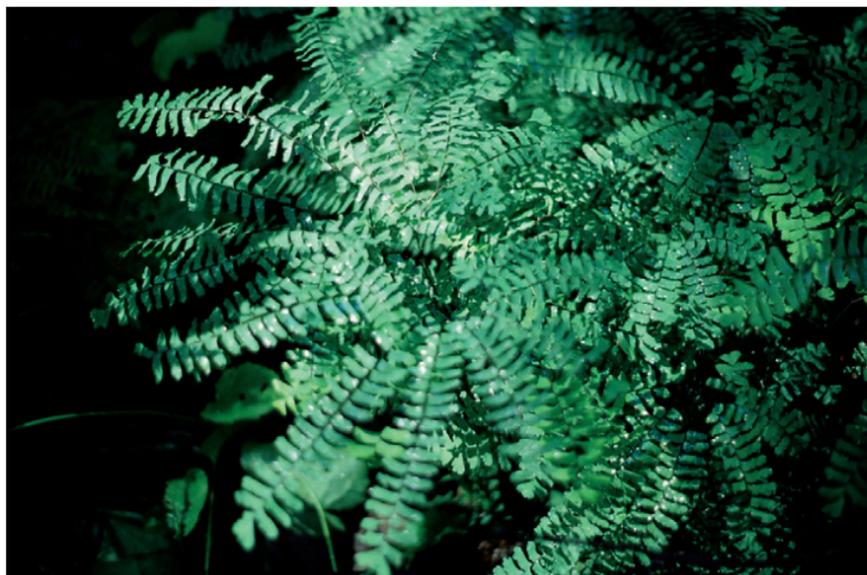




***Actaea rubra* (Ait.) Willd.**
Red Baneberry

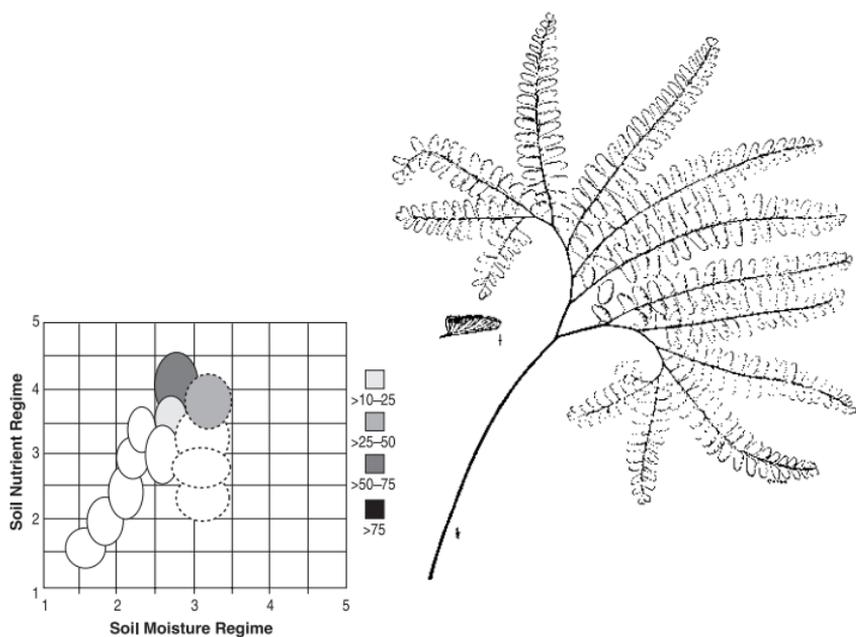
- Bright red berries in terminal clusters.
- A similar species, *A. pachypoda* (Doll's eyes) has very similar foliage but has white berries. The two occur in similar environments so distinction for habitat type classification is not necessary.
- Do not confuse with Sweet cicely, which has somewhat pubescent foliage and distinctly different flower and fruit.





***Adiantum pedatum* L.**
Maidenhair Fern

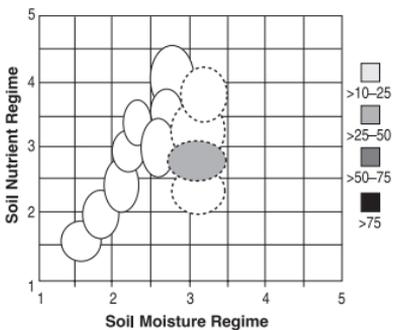
- Most common on mesic and nutrient-rich habitat types.





Agrimonia gryposepala Wallr.
Agrimony

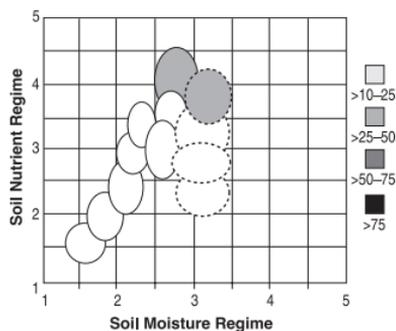
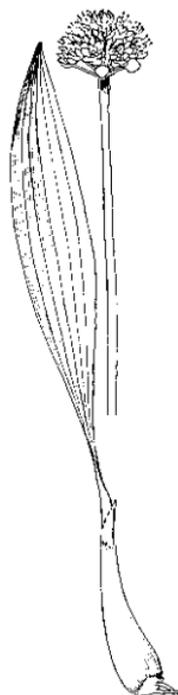
- A medium size herb with distinct divided leaves.
- Bristly fruits cling to clothing.





Allium tricoccum Ait.
Wild leek

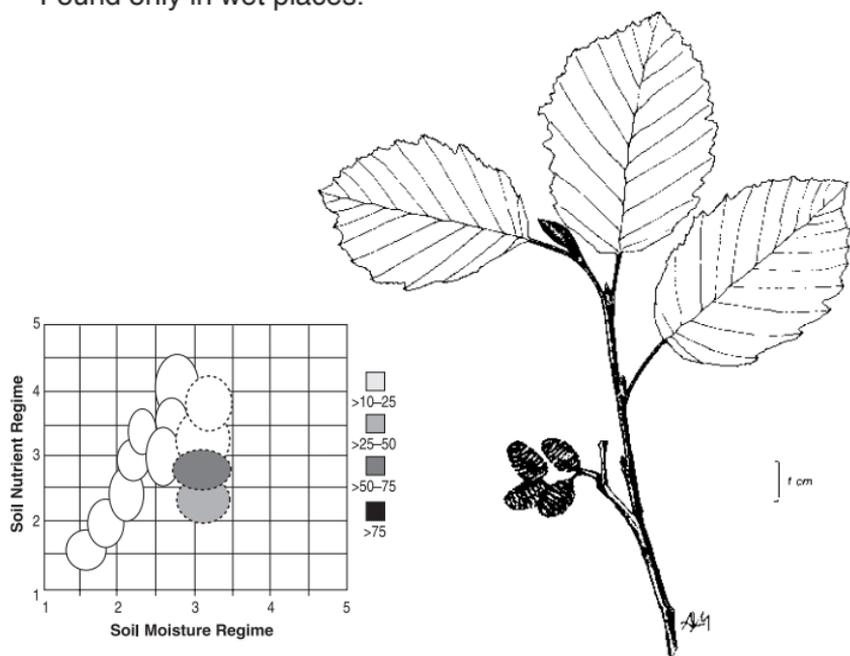
- Leaves only present in spring but seed stalk remains visible all summer.
- A strong onion odor is emitted when any part of this plant is crushed.
- Occurs only on the richest habitat types.





***Alnus rugosa* (DuRoi) Spreng.**
Speckled Alder

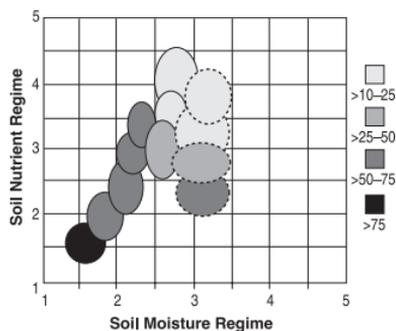
- A tall shrub with coarsely-toothed, somewhat shiny leaves.
- Found only in wet places.





Amelanchier spp.
Juneberry

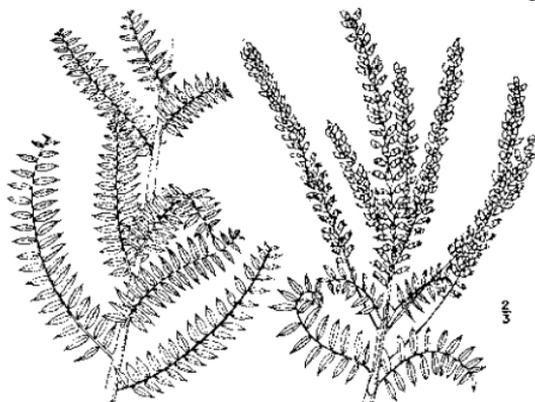
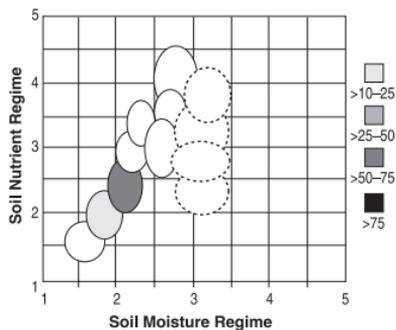
- Medium to large shrub or small tree.
- Leaf margins finely serrated from tip downward becoming smooth near the base.
- Many species of Juneberries exist but are difficult to distinguish so they are treated collectively.





***Amorpha canescens* Pursh.**
Lead Plant

- An erect shrub up to 3' tall, but often mistaken for an herb.
- Stem and leaves are downy-pubescent.
- This is typically a prairie plant, but it is also found in some forests in the prairie-forest transition zones.

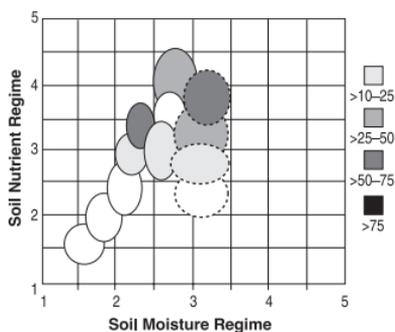


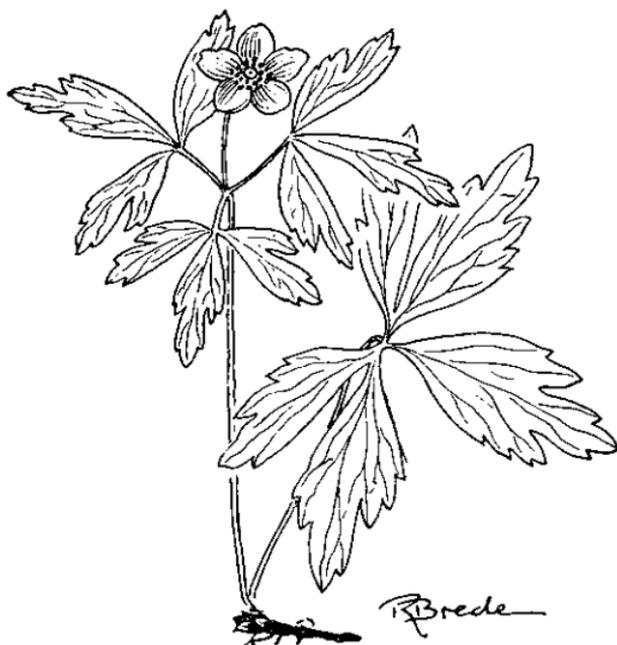


***Amphicarpa bracteata* (L.) Fern.**
Hog Peanut



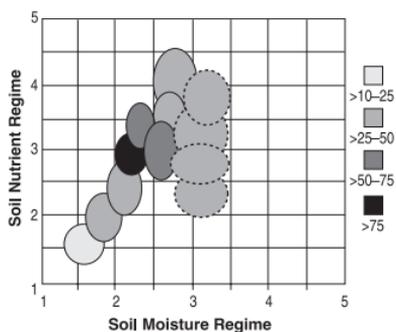
- Low twining or trailing perennial.
- Occurs on many habitat types, but is especially common in region 1.





Anemone quinquefolia L.
Wood Anemone

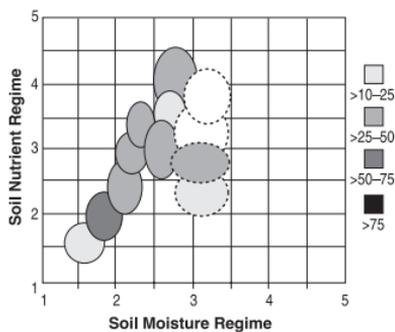
- Small herb (1-3" tall) usually growing in colonies.
- Flowering stems typically have three deeply cleft leaves growing from a whorl.





Apocynum androsaemifolium L.
Spreading Dogbane

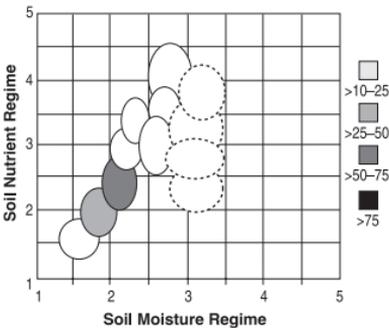
- A perennial, up to 4' tall with reddish stem and milky sap.





***Aquilegia canadensis* L.**
Wild Columbine

- Sometimes confused with *Thalictrum dioicum* (early meadow rue) if flowers are not present, but *Thalictrum* is found on dry-mesic to mesic sites while *Aquilegia* occurs on much drier habitat types.



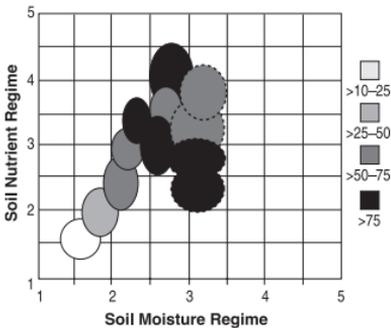
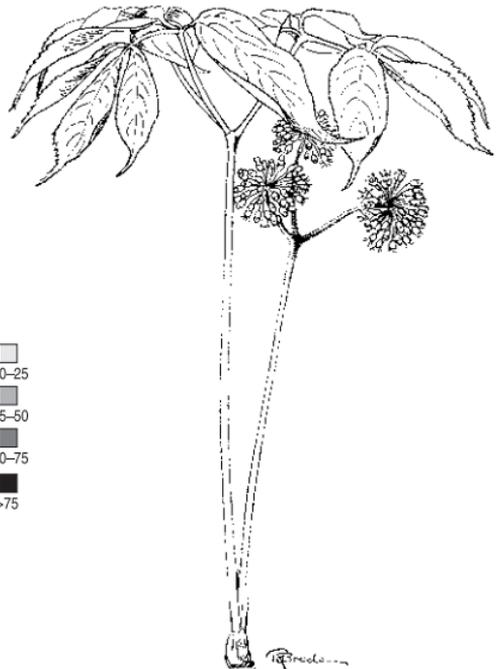
Leaves are dull green with white tint.

- Leaves are dull green with white tint.



***Aralia nudicaulis* L.**
Wild Sarsaparilla

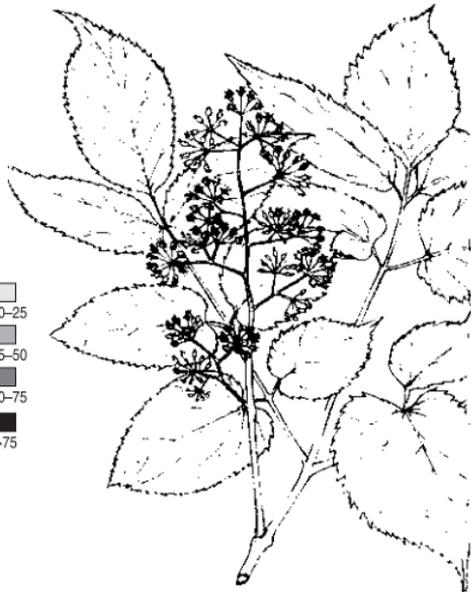
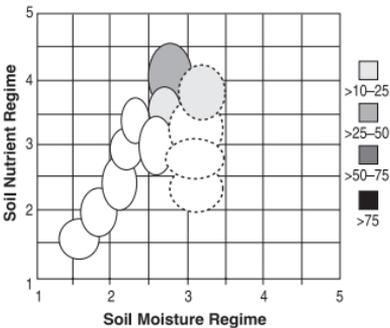
- Medium-tall herb up to 2.5'.
- Fruit borne on single leafless stem from base of plant.





***Aralia racemosa* L.**
Spikenard

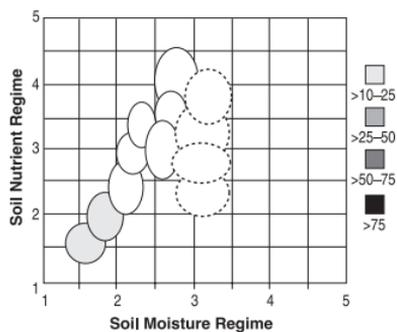
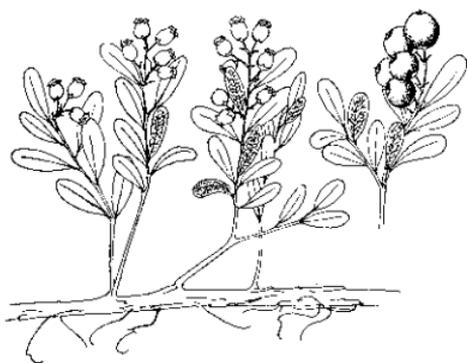
- Large herb, up to 5' tall, stem widely branched, leaflets large and heart shaped.





***Arctostaphylos uva-ursi* (L.) Spreng.**
 Bearberry

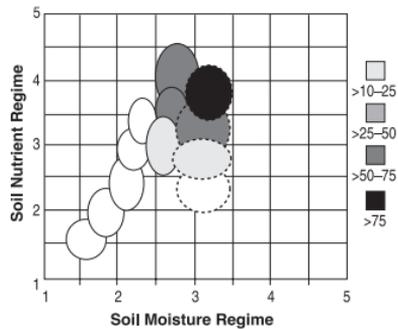
- Found on very dry habitat types.





***Arisaema atrorubens* (Ait.) Blume**
Jack-in-the-pulpit

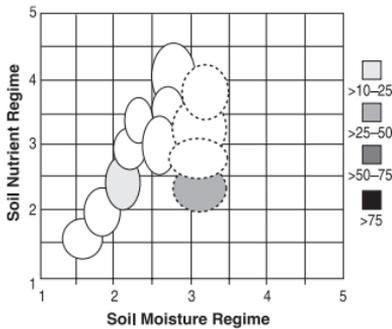
- Flower forms a “pulpit and canopy” appearance.
- Venation is pinnate and joined at leaf margin as distinguished from *Trillium* which has parallel venation and is not joined at the margin.

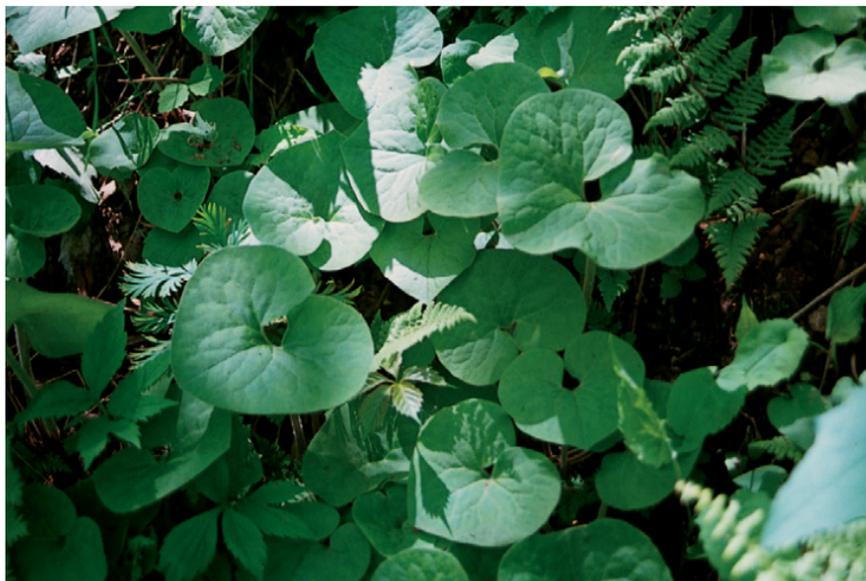




***Aronia melanocarpa* (Michx.) Eil.**
Black Chokeberry

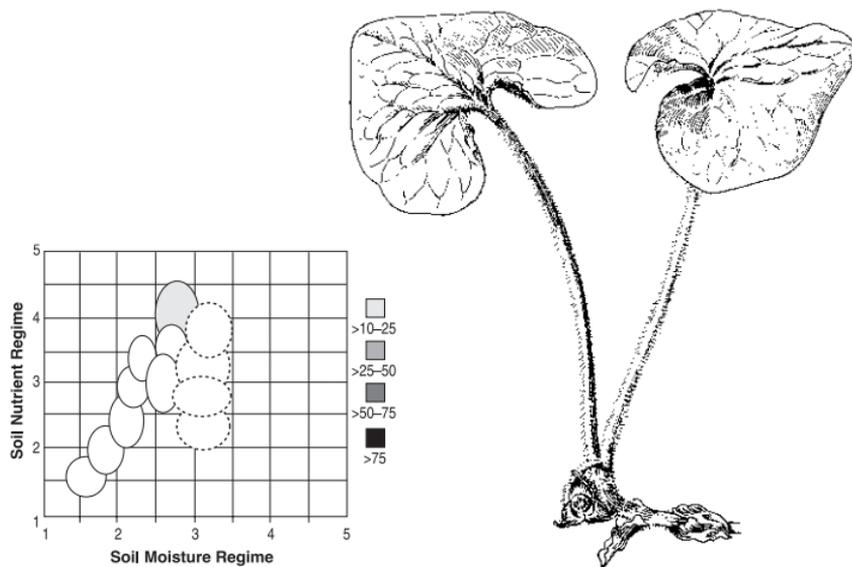
- Medium shrub up to 6' tall with finely serrated leaves.
- Leaves are commonly drawn to a point at the end and taper toward the base.

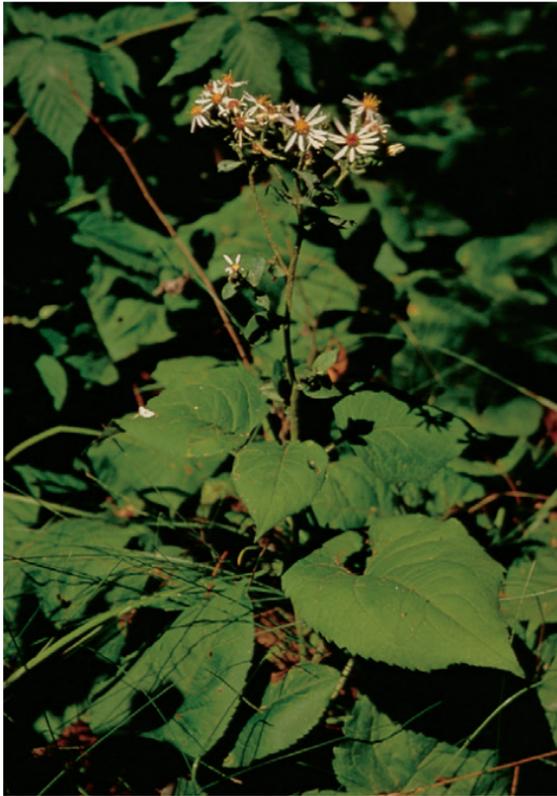




***Asarum canadense* L.**
Wild Ginger

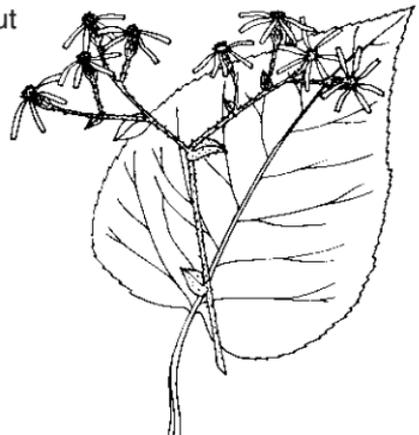
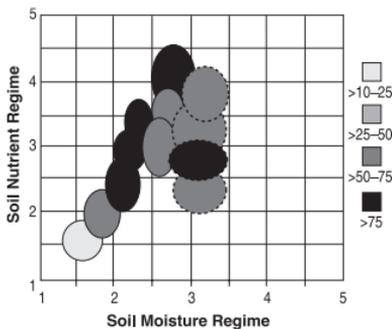
- Low, creeping, hairy perennial.
- Spicy and aromatic roots and rhizomes.





Aster macrophyllus L.
Large-leaved Aster

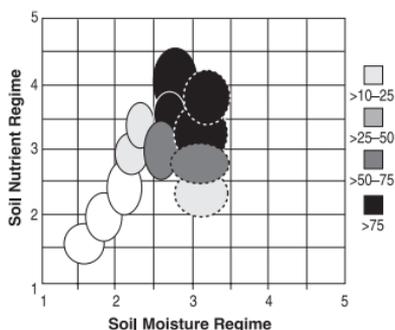
- Only large (thick and rough) basal leaves usually present.
- Often forms large dense patches.
- Flowering stems up to 3' tall but most often not present.





***Athyrium filix-femina* (L.) Roth**
Lady Fern

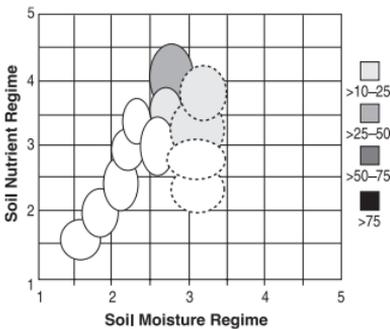
- Has the appearance of spinulose shield fern.
- Base of fronds (leaves) with dark brown or reddish-brown scales as distinguished from shield fern, which has light brown and coarser scales.





Botrychium virginianum (L.) SW.
Rattlesnake Fern

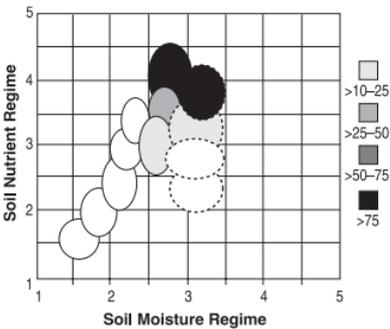
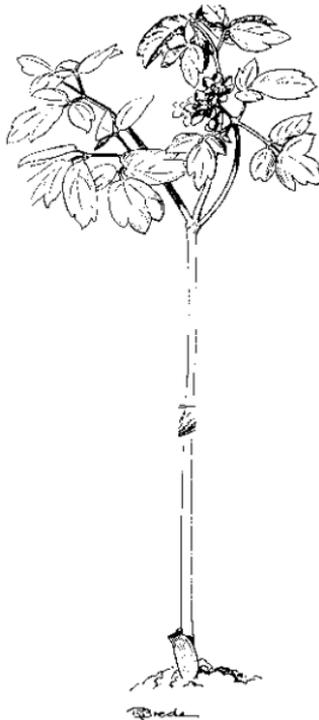
- A rather “fleshy” herb.
- The normally conspicuous spore bearing stalk not always present.
- Do not confuse with *Pteridium aquilinum* (bracken fern) which is much coarser.





Caulophyllum thalictroides (L.) Michx.
Blue Cohosh

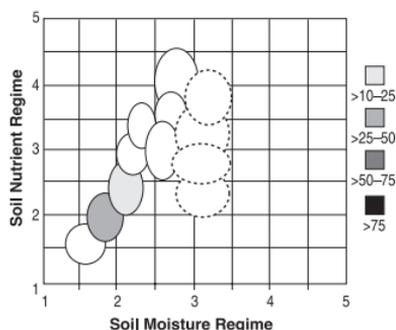
- Tall herb, up to 3' tall.
- Begins to turn yellow in August, often hard to find in September. Look for clusters of dark blue “berries” on dry stems.





Ceanothus americanus L.
New Jersey Tea

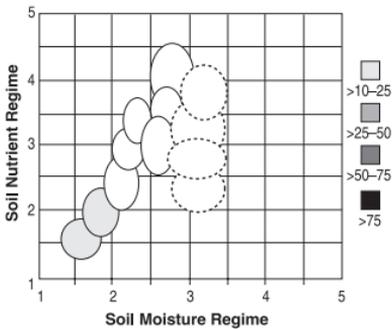
- Branching shrub under 4' tall with several stems from a reddish root stem.
- Finely toothed leaved with three main veins.





Chimaphila umbellata (L.) Bart
Pipsissewa

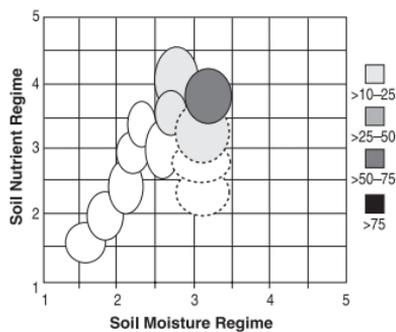
- Elongated, leathery, sharply toothed leaves with shiny upper surface.





***Circaea alpina* L.**
Dwarf Enchanter's Nightshade

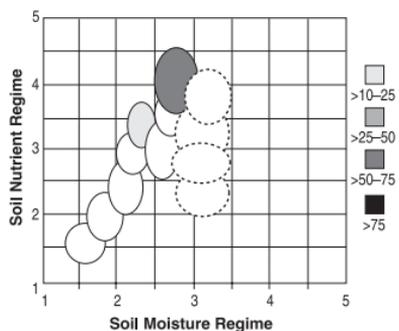
- Small herb, 3-6" high.
- Leaves 1-2" long coarsely toothed.





***Circaea quadrisulcata* (Maxim.) Franch. & Sav.**
 Enchanter's Nightshade

- Similar in appearance to *C. alpina* but taller (1-2').
- Leaves shallowly toothed with distinct marginal vein.





Cladina rangiferina
Reindeer Moss

- Found on dry habitat types
- This is a grayish lichen often found with the greenish colored *Cladina mitis* (Blue Cladonia).

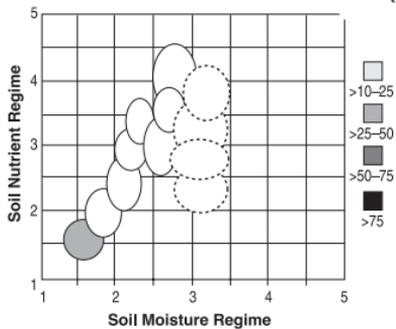


C. mitis



C. stellaris

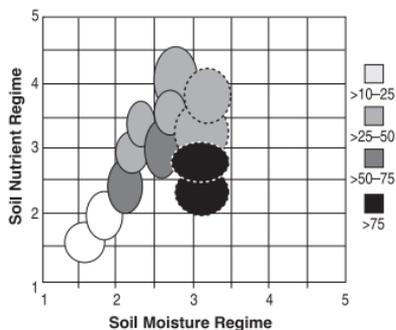
C. rangiferina





Clintonia borealis (A.T.) Raf.
Yellow Beadlily

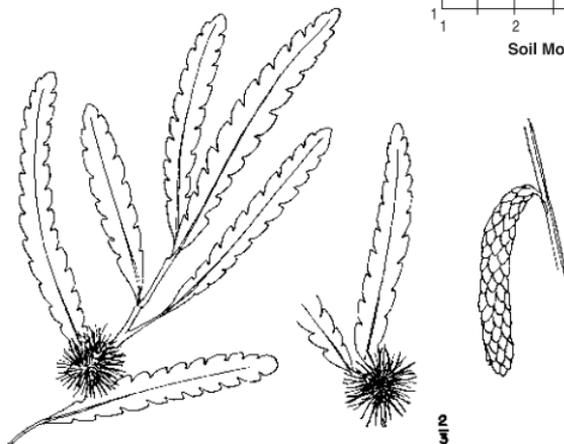
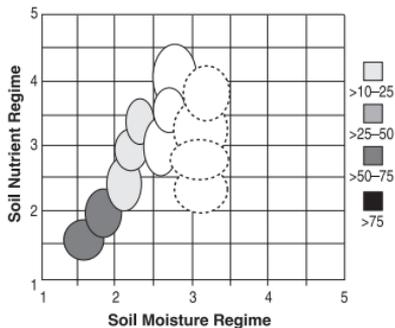
- Fleshy leaves with parallel veins.
- Yellow flowers appear in spring.
- Fruit is smooth and dark blue.





***Comptonia peregrina* (L.) Coult.**
Sweetfern

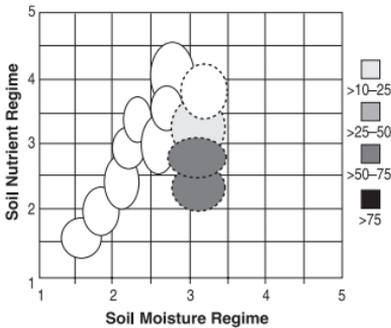
- Low, aromatic shrub found almost entirely on the driest, most nutrient-poor habitat types.
- Often abundant after fire.





Coptis groenlandica (Oeder) Fern.
Goldthread

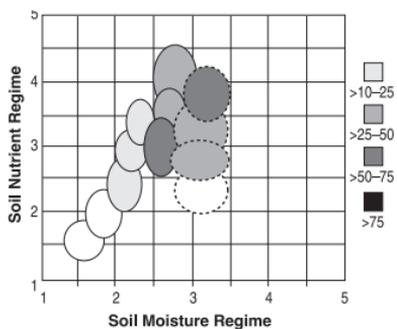
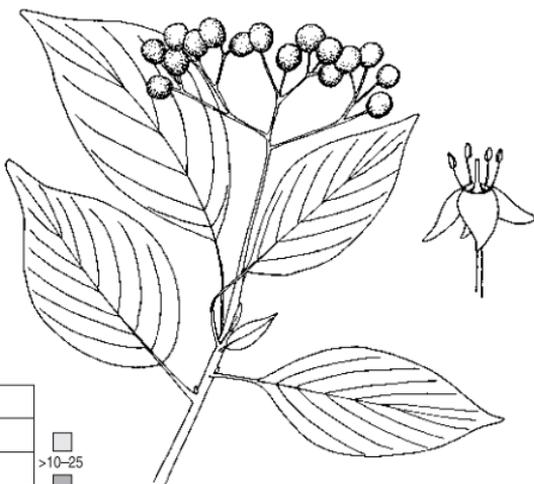
- Small herb with small, coarse, shiny, dark green leaves.
- Rootstalks are golden yellow and threadlike.





Cornus alternifolia L.F.
 Alternate-leaved Dogwood

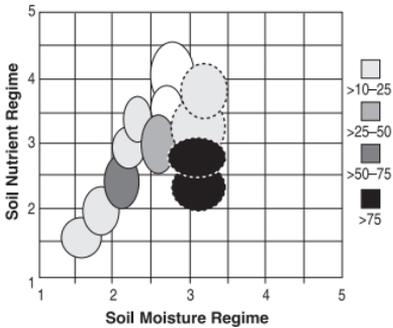
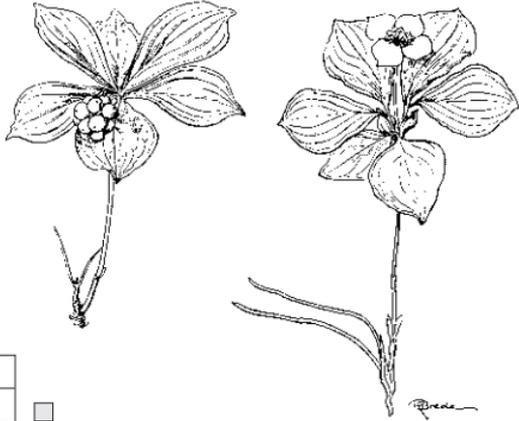
- Medium to large shrub, up to 10' tall.
- The only dogwood species with alternate leaves.





Cornus canadensis L.
Bunchberry

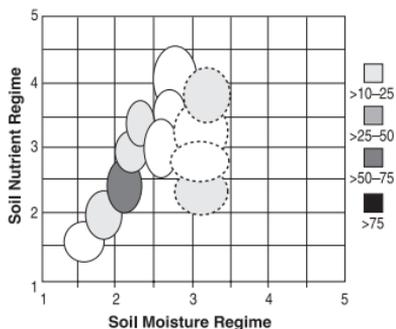
- Small herb, usually occurring in patches.
- Flowers appear white, fruit in clusters of red berries.

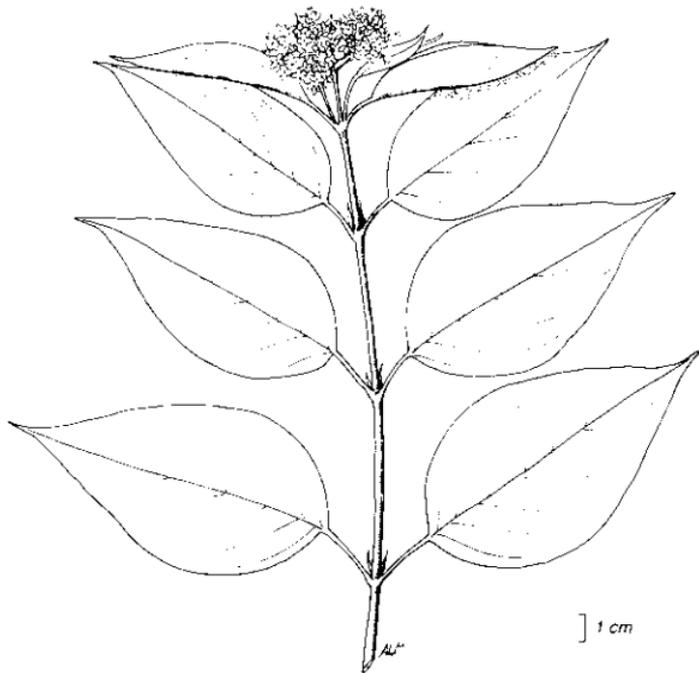




***Cornus racemosa* Lam.**
Gray Dogwood

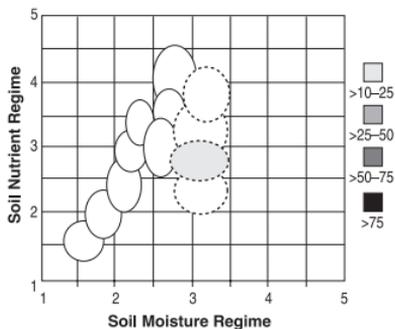
- A large shrub up to 7' tall.
- Stems and branches smooth and gray; only flower and fruit stems are bright red
- Do not confuse with *C. stolonifera* (red-osier dogwood), which has red stems and twigs.





***Cornus stolonifera* Michx.**
Red-osier Dogwood

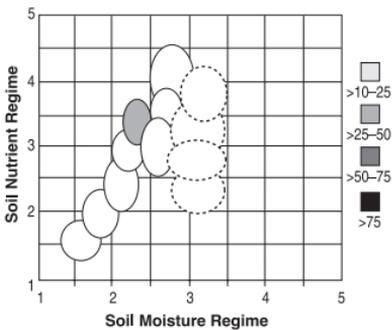
- Medium size shrub. Young branches usually bright red.
- Leaves with 5-7 veins, pale beneath.
- Most often occurs on wetter sites.

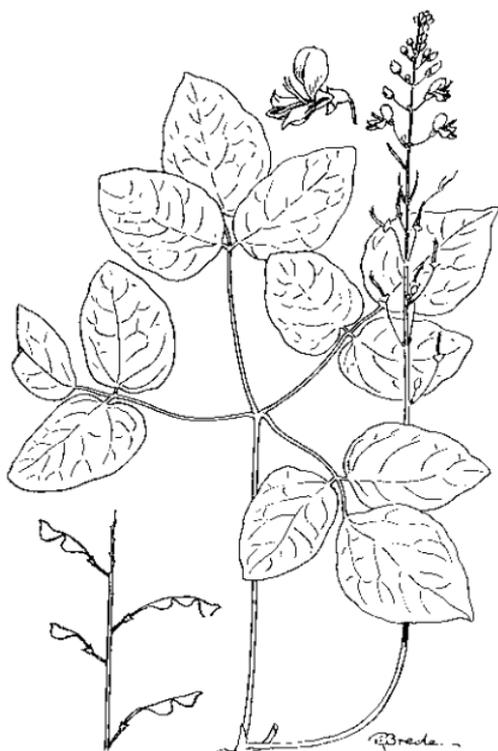




Desmodium glutinosum (Muhl) Wood
Pointed-leaved Tick Trefoil

- Tall herb, up to 3'. Leaves are divided with sharply pointed leaflets.
- Fruit is a sticky green pod that clings to clothing.





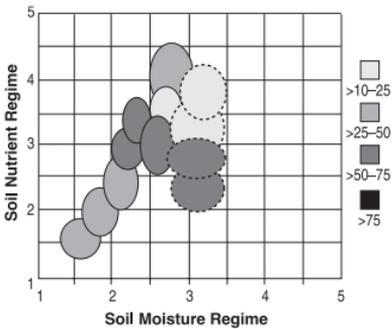
Desmodium nudiflorum L. DC.
Naked-flowered Tick Trefoil

- Similar to *D. glutinosum* but has a separate, leafless flowering stem and leaflets have blunt tips.



Diervilla lonicera Mill.
Bush Honeysuckle

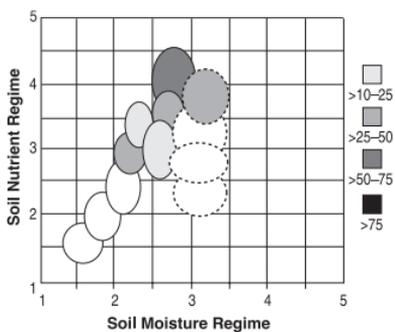
- Small shrub, usually under 3' tall.
- Occurs as single weak stems or in dense bushes.





***Dirca palustris* L.**
Leatherwood

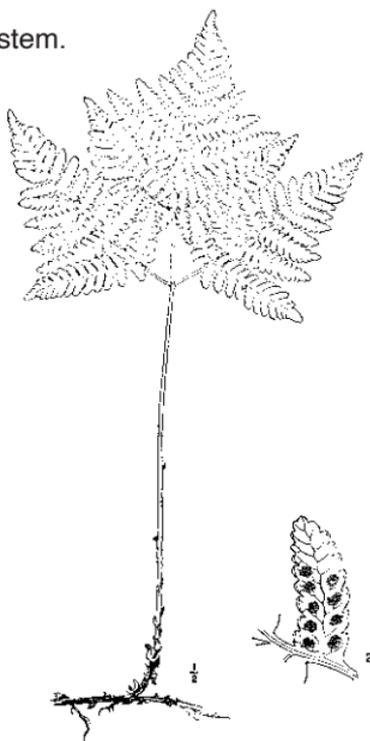
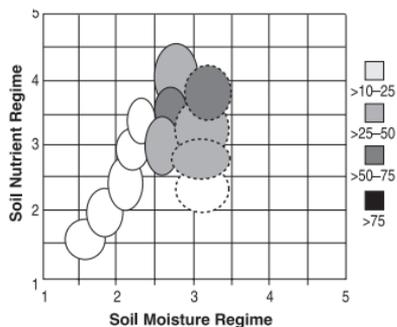
- Medium size shrub, up to 5' tall, with dull green leaves.
- The bark peels easily, but is very difficult to tear by pulling.





***Dryopteris disjuncta* (Ledeb.) C.V. Morton**
Oak Fern

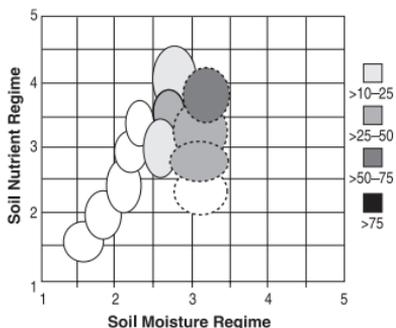
- A delicate looking fern with a dark stem.
- Slightly scaly near the base only.





***Dryopteris phegopteris* (L.) Christens.**
Long Beech Fern

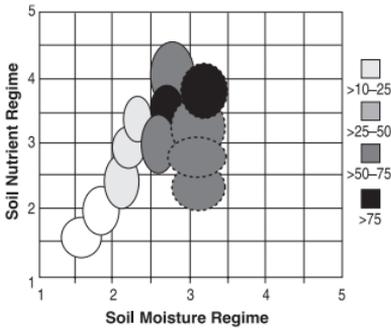
- Scaly stem and coarser in appearance than oak fern.
- The lowest pair of “leaves” point away from the tip of the plant.





Dryopteris spinulosa (O.F. Müll.) Watt.
Spinulose Shield Fern

- Scales on base of fronds are light brown as distinguished from lady fern which has dark brown or reddish-brown scales.
- Some fronds remain alive during the winter—they do not for lady fern.





Epifagus virginiana (L.) Bart.
Beechdrops

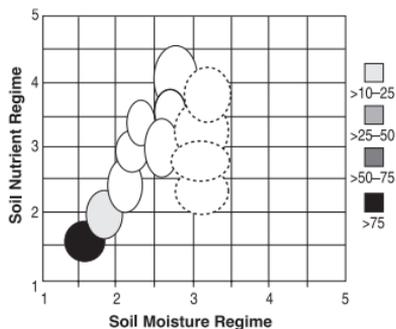
- Slender, purplish to yellow-brown branched herb
- Saprophytic or parasitic on roots of American Beech (*Fagus grandifolia*) and therefore only found within that tree's geographic range.





***Epigaea repens* L.**
Trailing Arbutus

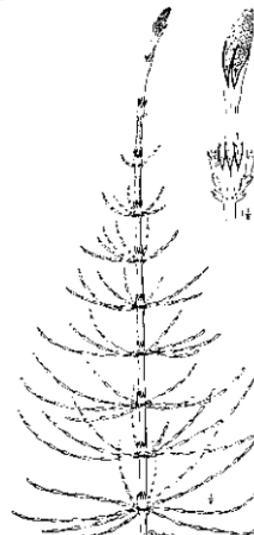
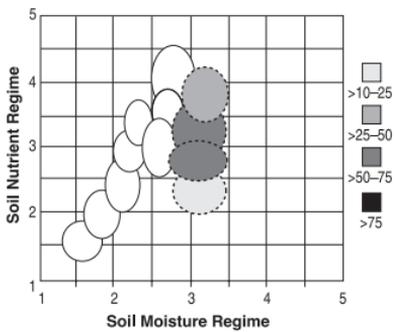
- Prostrate plant with coarse, hairy stems and leaves.
- Found mostly on dry, nutrient-poor habitat types, but also in some wet coniferous forests.





Equisetum spp.
Horsetails

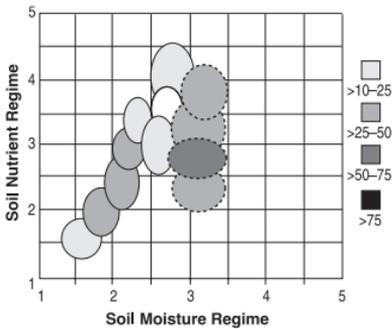
- Includes several species. All have jointed stems.





Fragaria virginiana Duchesne
Wild Strawberry

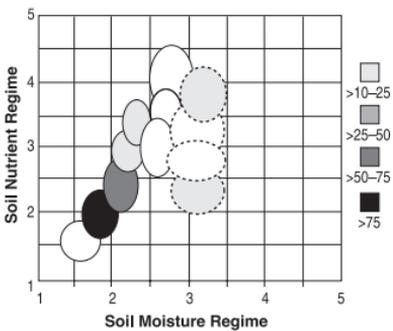
- A low growing plant with three oval, coarsely toothed leaves.

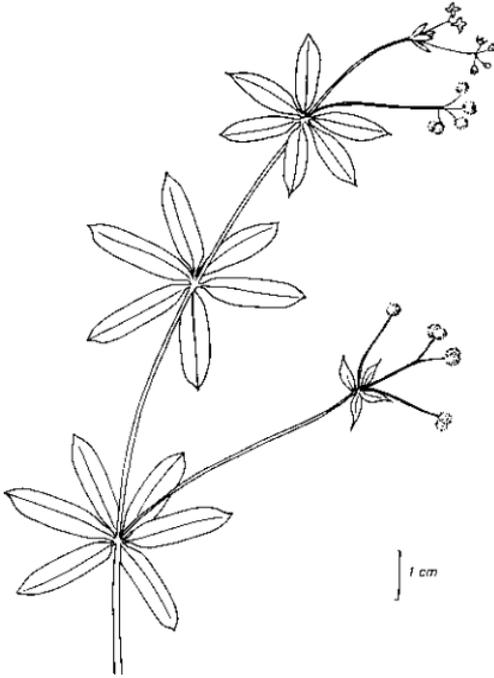




Galium boreale L.
Northern Bedstraw

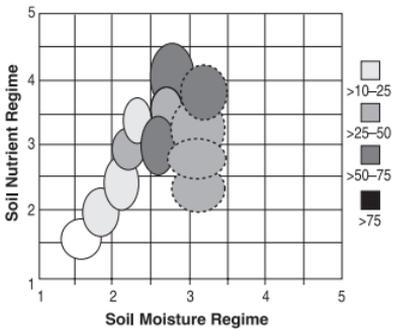
- Erect, square-stemmed herb with narrow leaves in whorls of four.





Galium triflorum Michx.
Sweet-scented Bedstraw

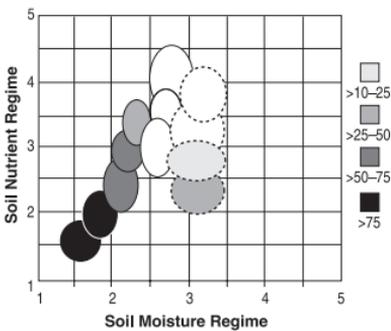
- Small, weak stemmed herb. Stem square and smooth.





Gaultheria procumbens L.
Wintergreen

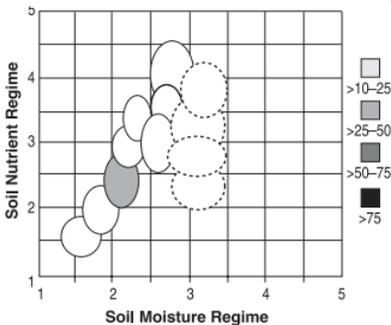
- Low-growing evergreen shrub with wintergreen odor and taste when crushed.
- Mature leaves dark green above and rather stiff.





***Gaylussacia baccata* (Wang.) K.Koch**
Black Huckleberry

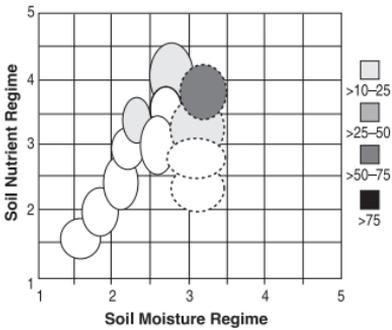
- Small shrub 1-3' tall.
- Fruit is similar to blueberry, but appear in clusters and vary in color from blue to black.
- Undersides of leaves covered with shiny resinous dots.





Geranium maculatum L.
Wild Geranium

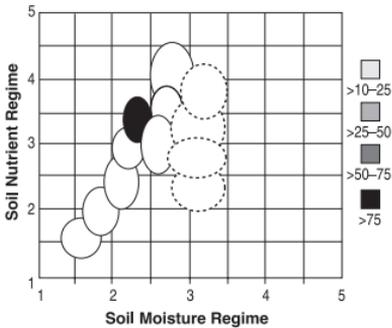
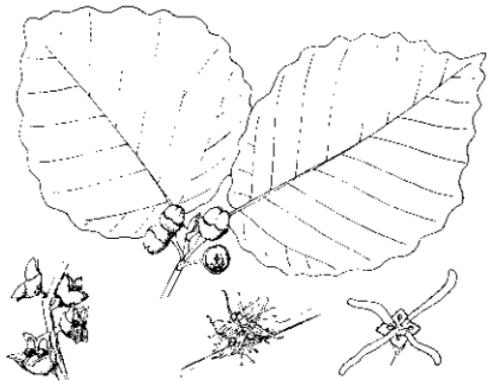
- Deeply cleft leaves with three to five lobes.





Hamamelis virginiana L.
Witch Hazel

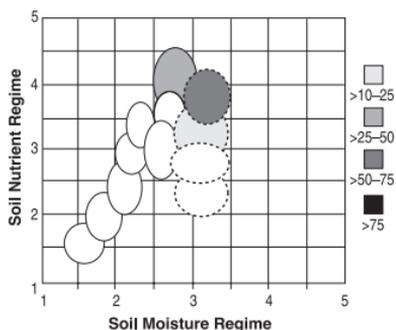
- Tall shrub, up to 15'.
- Leaves are 2-5" long, dull green with wavy margin.
- Flowers in the fall or early winter.





Hepatica acutiloba D.C.
Sharp-lobed Hepatica

- Similar to *H. americana* (round-lobed hepatica), but the leaves are usually longer than broad and the three lobes are more sharply pointed.
- The two species seldom grow together, *H. Acutiloba* occurs on the richest habitat type while *H. americana* has a wider distribution on poor to medium sites.

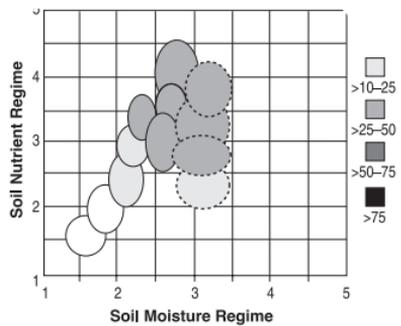




Hepatica americana (D.C.) Ker.
 Round-lobed Hepatica



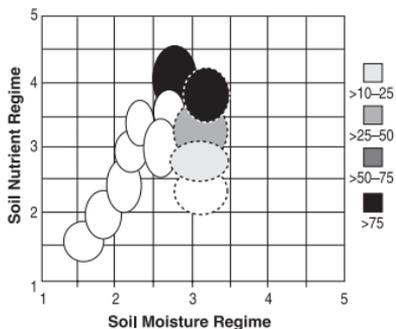
- Leaves usually broader than long with three, blunt to rounded lobes.
- Do not confuse with *H. Acutiloba*, compare descriptions.





Hydrophyllum virginianum L.
Virginia Waterleaf

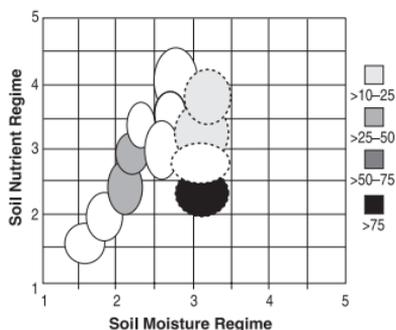
- 1 to 2' tall herb with rather weak, reclining stems.
- Leaves mostly basal, 5-7 lobed, often mottled as though water stained.
- Found primarily on mesic, nutrient-rich habitat types.





***Ilex verticillata* (L.) Gray**
Winterberry

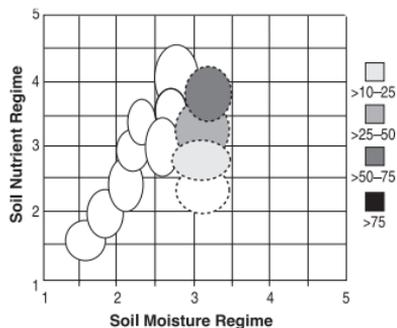
- A large shrub 3-12' tall with finely toothed leaves.
- Bright red berries found at base of leaves appear in October and persist into winter.





***Impatiens capensis* Meerb.**
Jewelweed

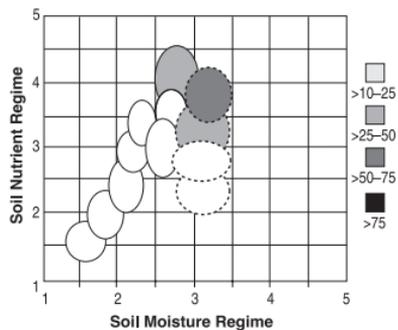
- Succulent, quickly wilting herb.
Translucent stems.





Laportea canadensis (L.) Wedd.
Wood Nettle

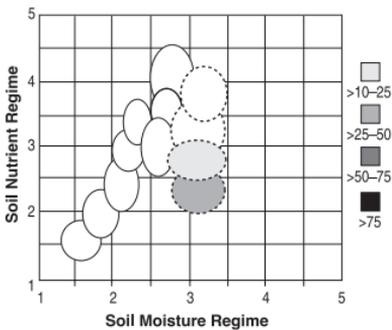
- The only nettle species with alternate leaves.
- Has stinging hairs.





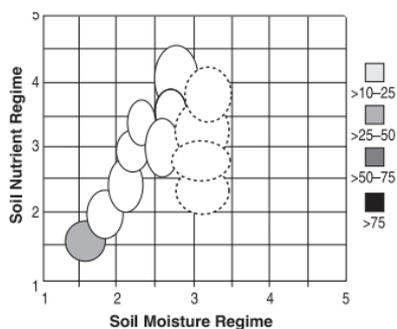
Linnaea borealis L.
Twinflower

- Small trailing plant. Leaves opposite.
- Do not confuse with *Mitchella repens* (partridgeberry) which has whitish veins.

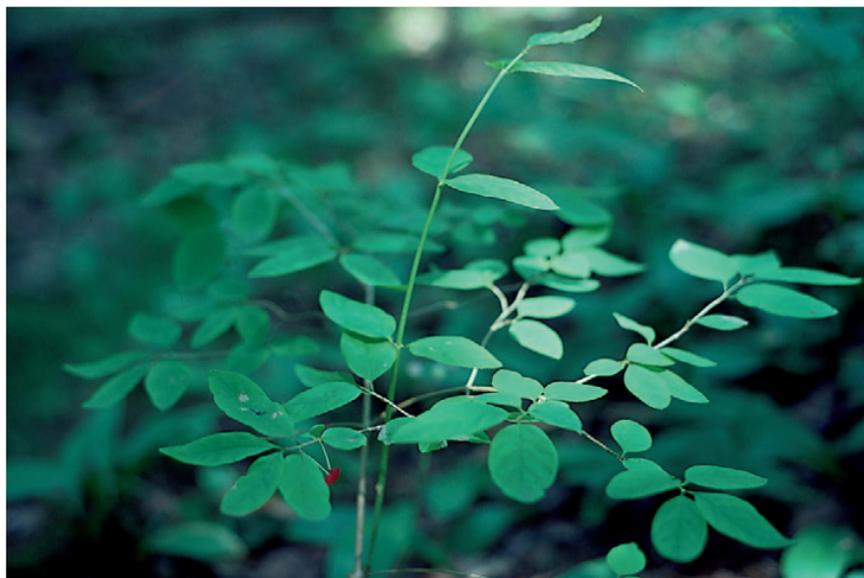




Lithospermum canescens (Michx.) Lehm.
Hoary Puccoon

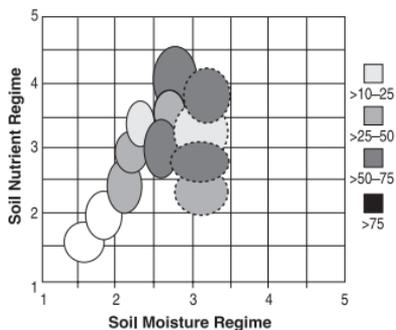
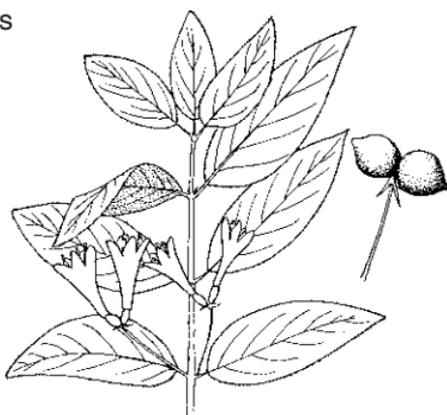


- Erect plant with a fine-hairy stem and leaves that appears grayish.
- Orange-yellow tubular flowers at top of stem.



***Lonicera canadensis* Marsh.**
American Fly Honeysuckle

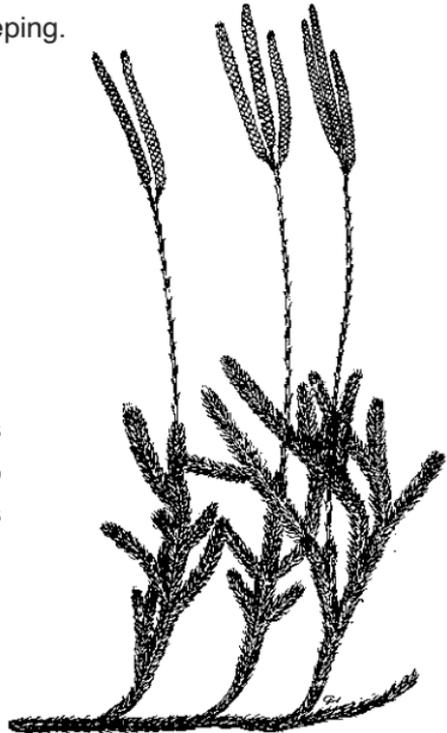
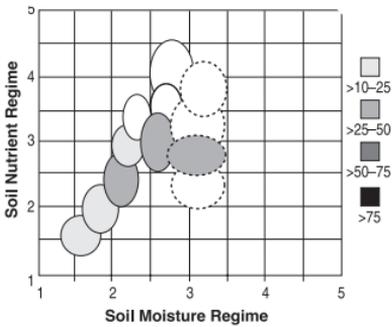
- Small shrub (2-4' tall). Leaves opposite, egg-shaped with smooth margins.





Lycopodium clavatum L.
Common Club-moss

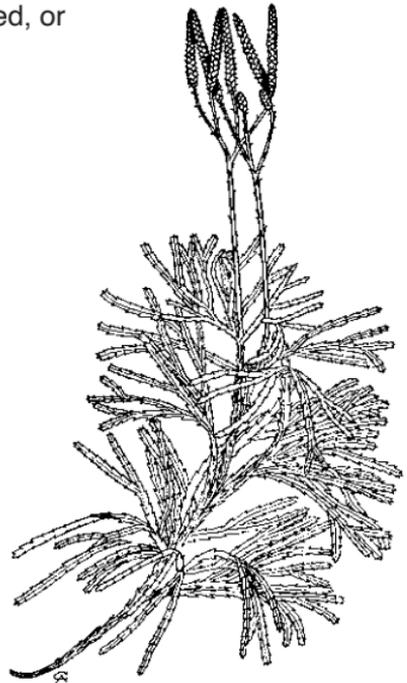
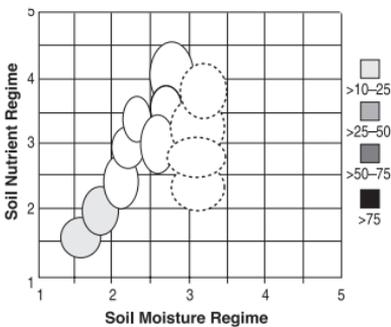
- Main stem prostrate and creeping.
Fruiting cones long-stalked.





***Lycopodium complanatum* L.**
Trailing Christmas-green

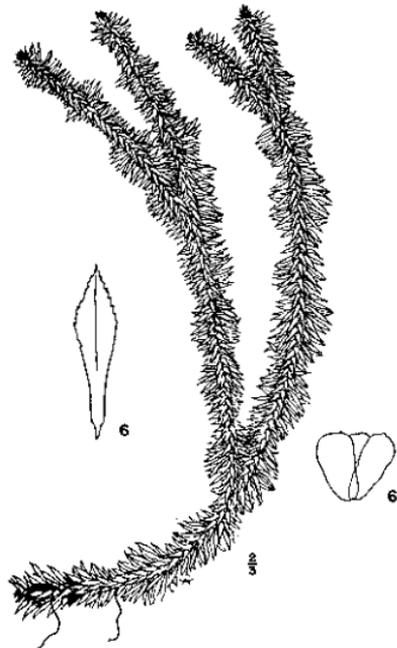
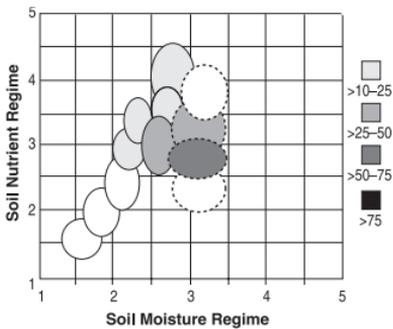
- Aerial stems irregularly branched, or forked to become fan-like.
- Branches flattened.





***Lycopodium lucidulum* Michx.**
Shining Club-moss

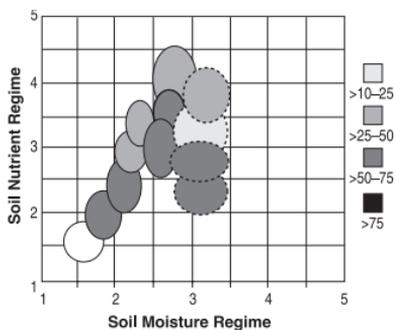
- Vertical stems ascending from a very leafy, long prostrate stem.
- Leaves zoned in groups of longer and shorter ones; dark-green, shining.





Lycopodium obscurum L.
Ground-pine

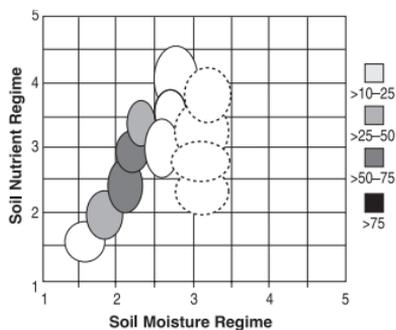
- Main stem creeping horizontally, deep in the soil.
- Vertical stems scattered, erect, tree-like form.





***Lysimachia quadrifolia* L.**
Whorled Loosestrife

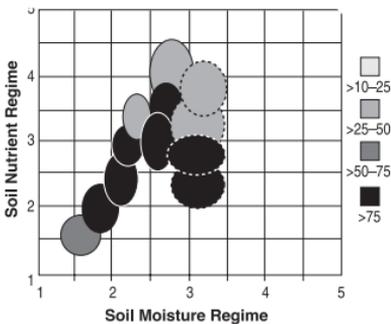
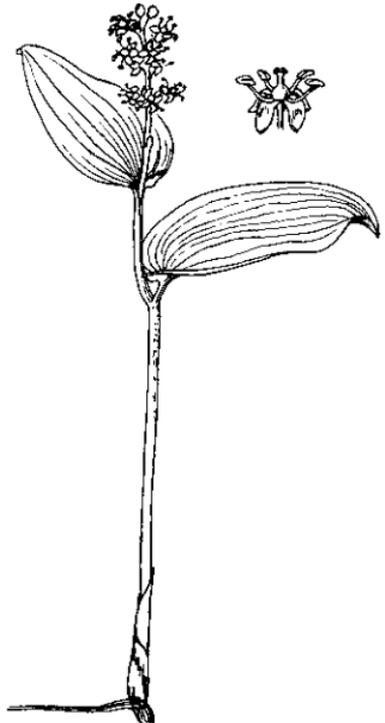
- Leaves in whorls of four with flower in the axils.
- Found most often on drier habitat types.





Maianthemum canadense Desf.
Wild lily-of-the-valley

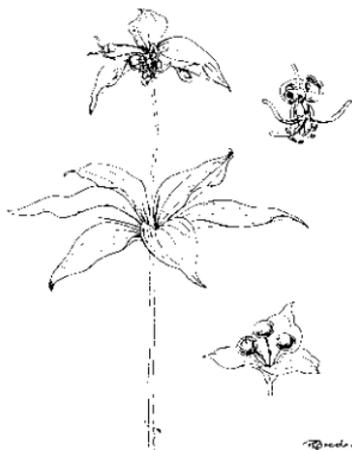
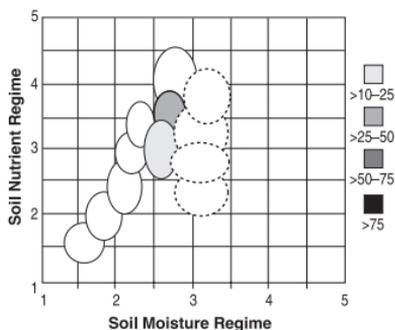
- Single leaf when not fruiting, two leaves when fruiting.
- Found on many habitat types in Northern Wisconsin.





Medeola virginiana L.
Indian Cucumber Root

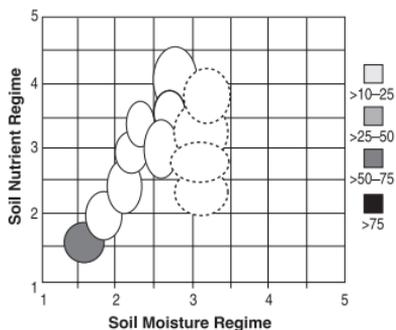
- Erect herb with leaves in two whorls, one of 5-9 leaves in the middle of the stem and the other of 3-5 at the top.
- Occasionally only the lower leaves are present. Do not confuse with *Trientalis borealis* (starflower).





Melampyrum lineare Desr.
Cow Wheat

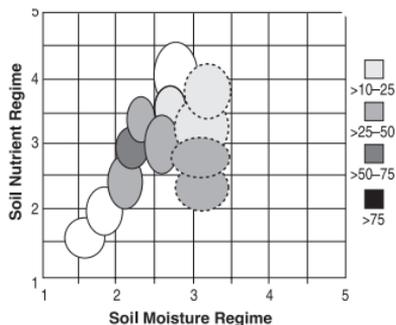
- The uppermost leaves commonly have a pair of sharp lobes at the base.
- Present on the driest of sites.





Mitchella repens L.
Partridgeberry

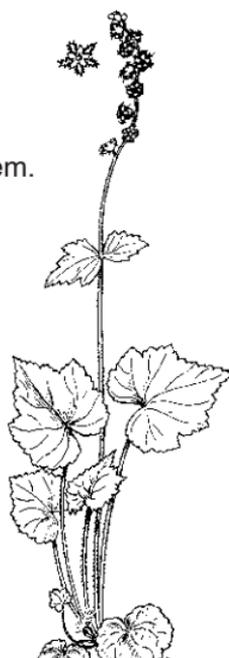
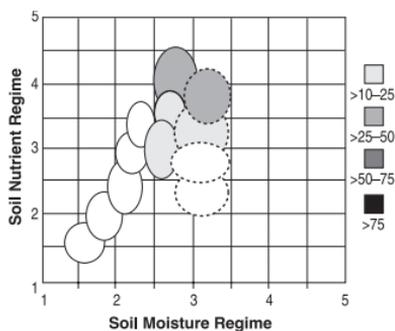
- Small creeping plant with paired, dark green leaves.
- Leaves have a whitish main vein.
- Do not confuse with *Linnaea borealis* (twin-flower).





Mitella diphylla L.
Miterwort

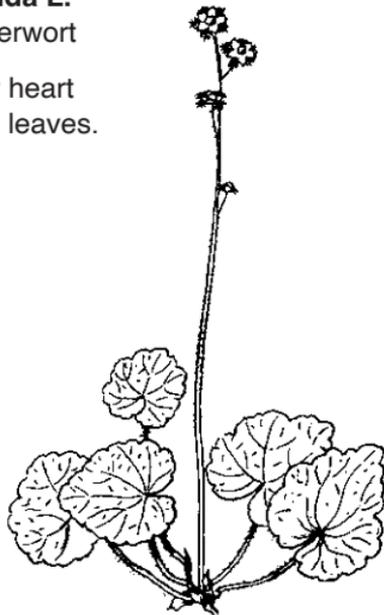
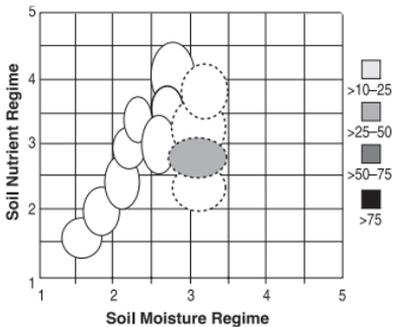
- A slender, erect plant (up to 1.5' tall) with a single pair of leaves near the middle of the stem.
- Long-stemmed basal leaves with heart shaped base.





Mitella nuda L.
Naked Miterwort

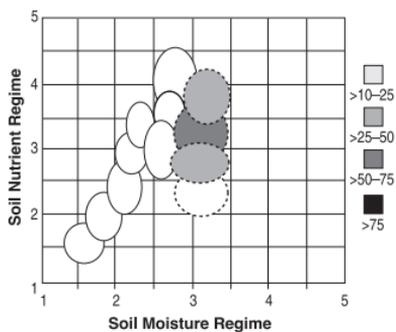
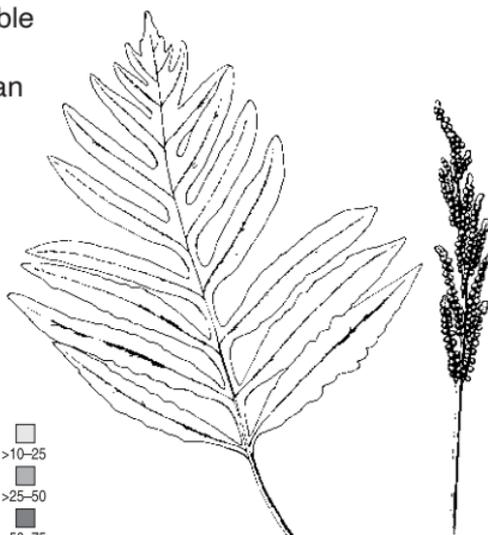
- Small herb (3-8" tall) with roundly heart shaped and bluntly toothed basal leaves.
- Leafless flowering stem (naked).





***Onoclea sensibilis* L.**
Sensitive Fern

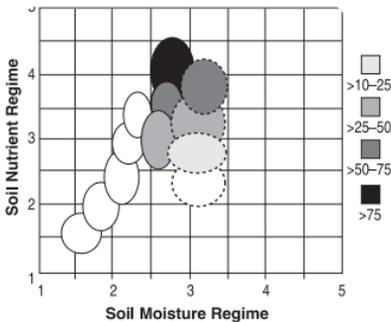
- A fern easily distinguishable from all other ferns by its broadly lobbed, rather than finely divided frond (leaf).





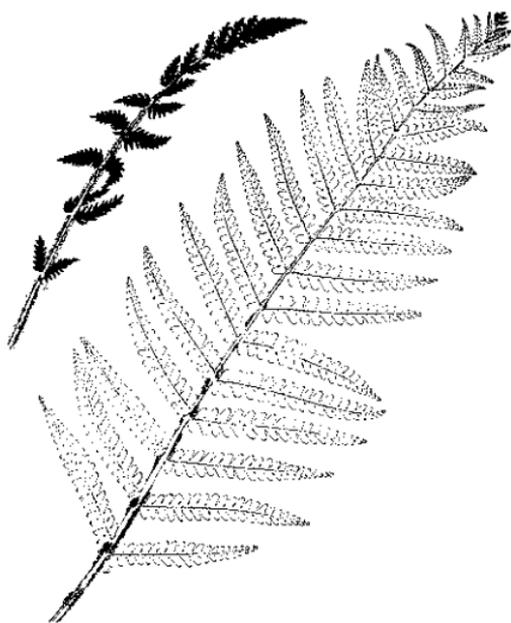
Osmorhiza claytoni (Michx.) C.B. Clark
Sweet cicely

- Herb, 1-3' tall. With hairy, fern-like leaves.
- Fruit narrow, blackish, clinging to clothes when ripe.
- Dry fruiting stems remain erect in fall after leaves have disappeared.

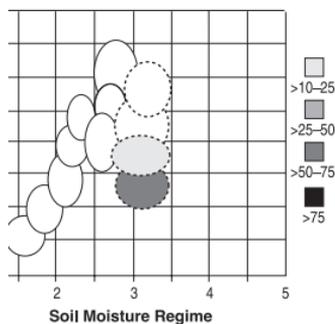




***Osmunda cinnamomea* L.**
Cinnamon Fern



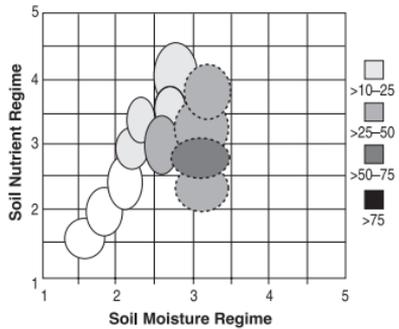
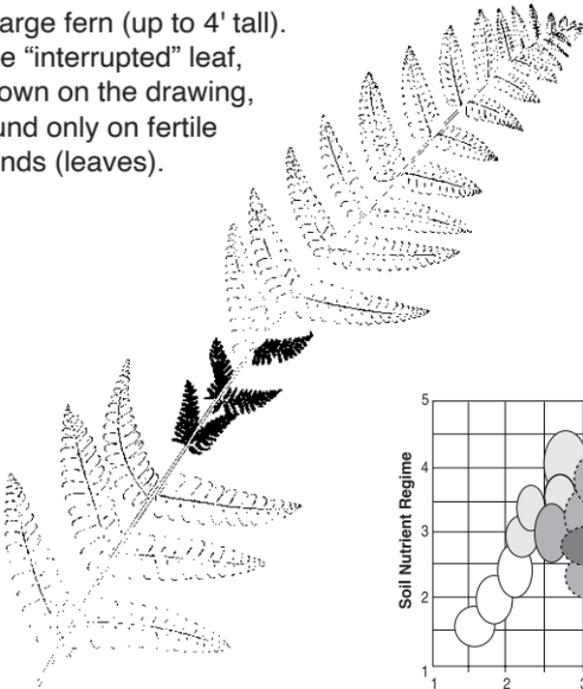
- A large fern (up to 4' tall).
- Similar to interrupted fern but fertile fronds (leaves) occur in the center of the clump.
- Wet-mesic to wet sites.





***Osmunda claytoniana* L.**
Interrupted fern

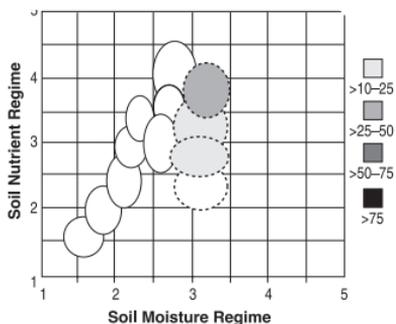
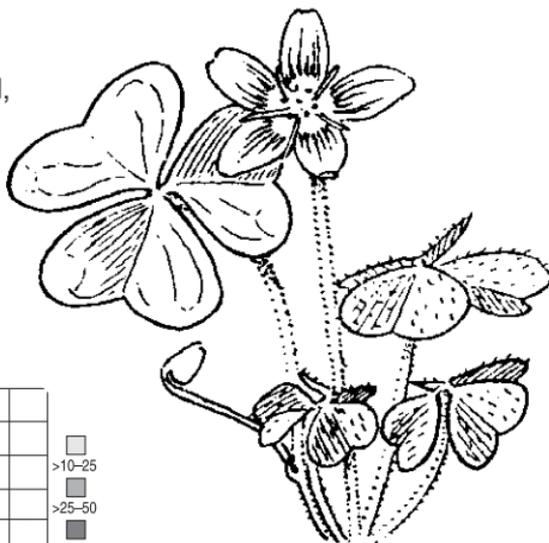
- A large fern (up to 4' tall).
- The “interrupted” leaf, shown on the drawing, found only on fertile fronds (leaves).





Oxalis montana Raf.
Wood Sorrel

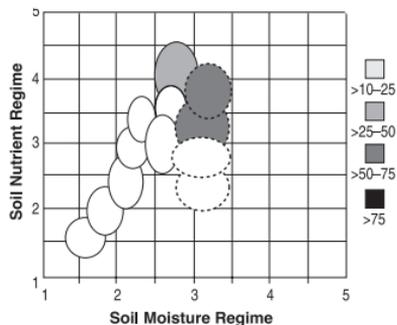
- White flowers with pink veins.
- Leaves heart-shaped, notched at tip.
- Found on somewhat poorly to poorly drained soils.





***Parthenocissus quinquefolia* (L.) Planch.**
Virginia Creeper

- Trailing vine. Stems often covered by forest litter and appear to represent single plants.

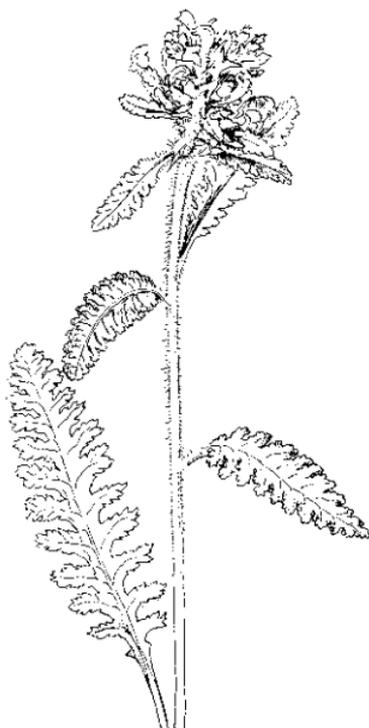
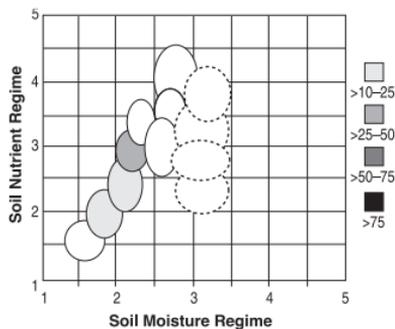




***Pedicularis canadensis* L.**

Wood Betony

- Basal leaves are somewhat hairy, deeply lobed and fern-like.
- Flowering stem, if present, has yellow or reddish flowers in dense cluster.

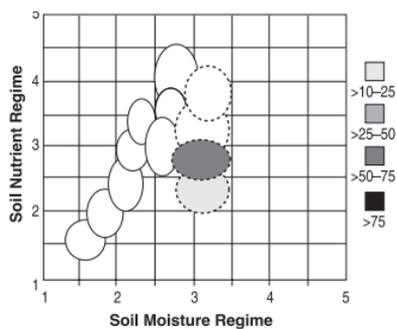




Petasites palmatus (Ait.)

Sweet Coltsfoot

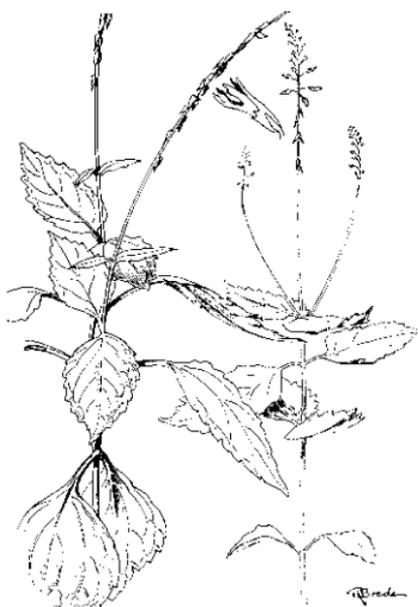
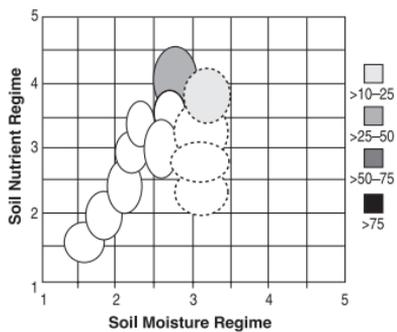
- Leaves long-stalked and deeply cleft.
- Blooms in spring before leaves appear.
- Found on mesic to wet-mesic sites





Phryma leptostachya L.
Lopseed

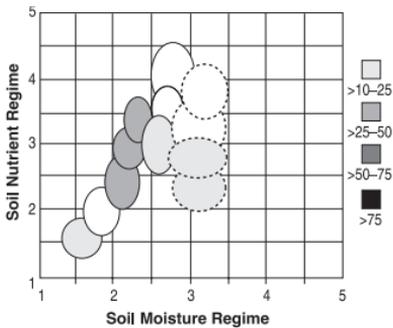
- Slender perennial up to 3' tall.
- Flowers arranged in pairs on leafless spike.

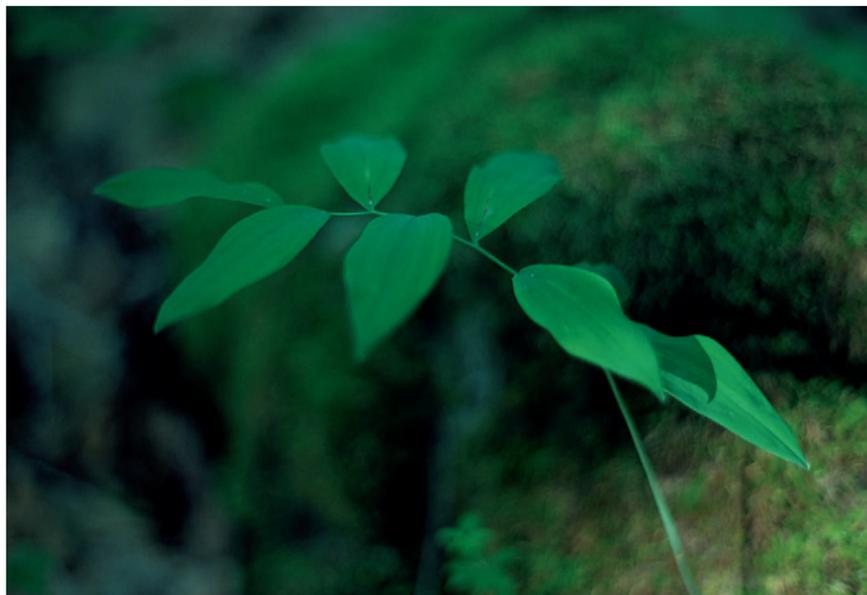




Polygala paucifolia Willd.
Fringed Polygala

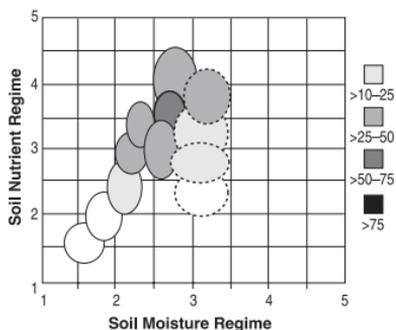
- Small plant (3-4" tall) with delicate purple flower.
- Do not confuse with *Gaultheria procumbens* (wintergreen), which has coarse shiny leaves and smells of wintergreen.





Polygonatum pubescens (Willd.) Pursh
Hairy Solomon's Seal

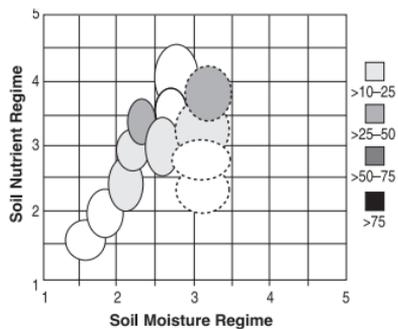
- Fragile, dull leaf with fine stiff hairs on the underside along the veins as distinguished from *Streptopus roseus* (rosey twisted stalk) which is finely hairy (whisker like) along leaf margin.
- Flowers hang down from leaf axils as distinguished from false Solomon's seal which flowers in a terminal cluster.





Prenanthes alba L.
White lettuce

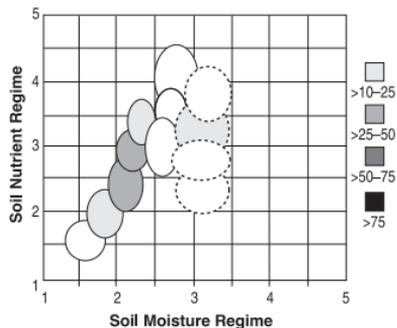
- Tall perennial (up to 4') with milky sap
- Basal leaves triangular shaped





Rhus radicans L.
Poison Ivy

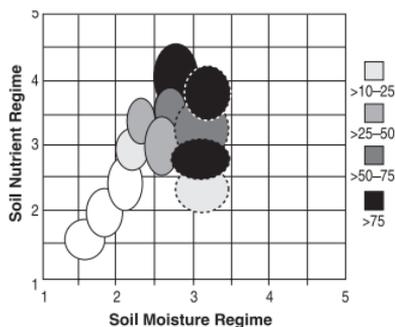
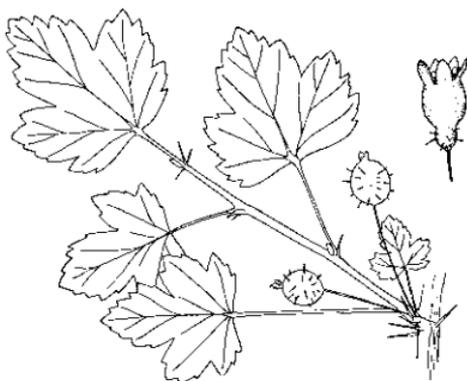
- Low shrub or climbing vine.
- Leaves shiny, divided into three segments.





Ribes spp.
Gooseberries

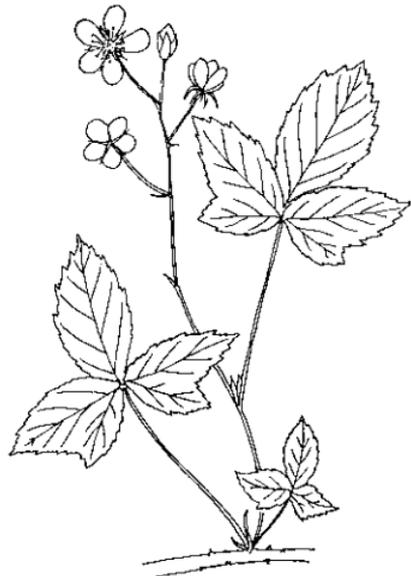
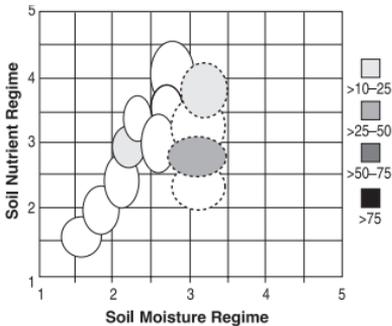
- Small shrubs (1-4' tall)
- A number of species are present in the area but they are often difficult to distinguish. They are treated collectively here.

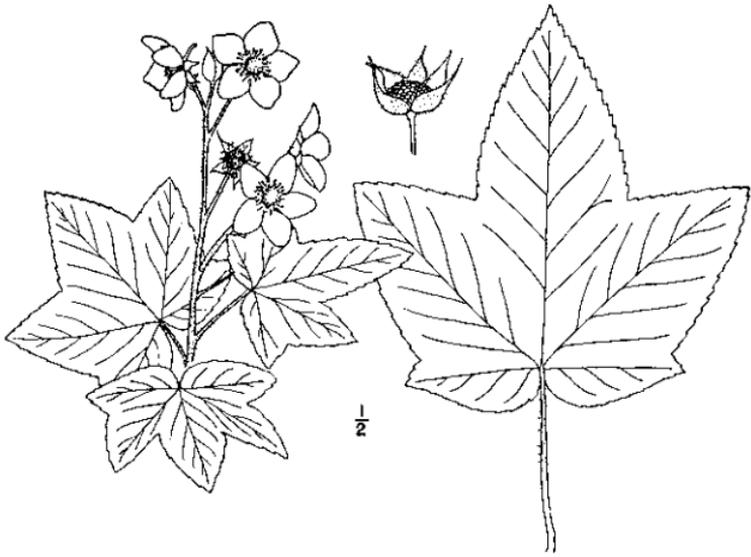




Rubus hispidus L.
Swamp Dewberry

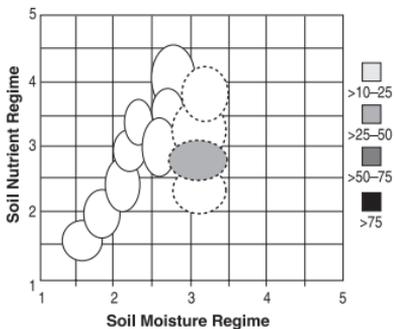
- Small trailing plant with spines along the runner.
- Leaves dark green, shiny with prominent veins.
- Site with poor drainage.





***Rubus parviflorus* Nutt.**
Thimbleberry

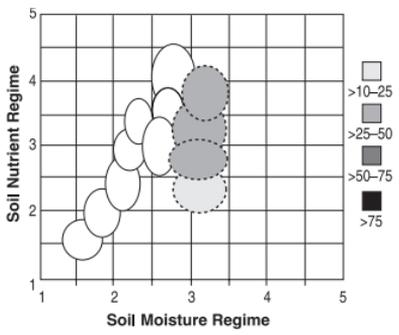
- Erect, branched shrub with large lobed leaves as long as broad.
- White flowers 1" in diameter, fruit is a round red berry (raspberry-like).





Rubus pubescens Raf.
Dwarf Raspberry

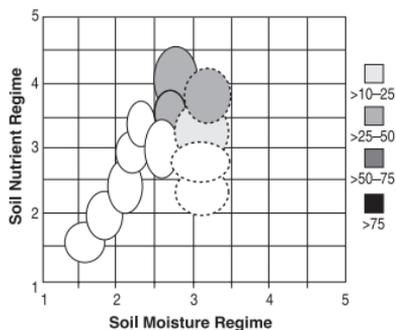
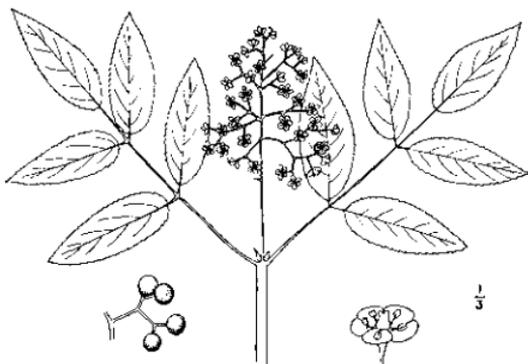
- Small trailing shrub with erect leafy branches and smooth runners.
- Leaves are more angular than those of *Rubus hispidus* (swamp dewberry).





***Sambucus pubens* Michx.**
Red-berried Elder

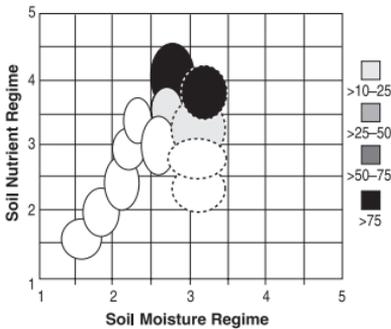
- Tall shrub (up to 12').
- Flowers are white while ripe fruits are red.





***Sanguinaria canadensis* L.**
Bloodroot

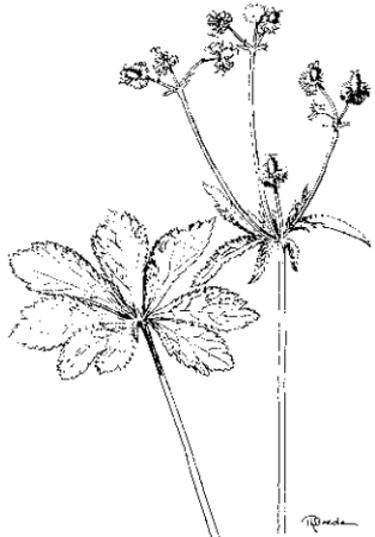
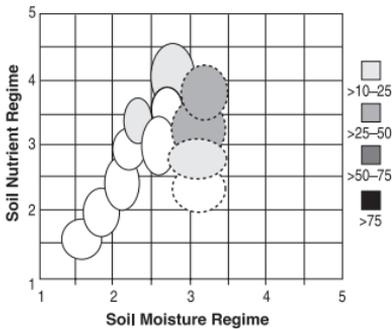
- Flowers in spring before leaves unfurl.
- Stem juice red to reddish-orange.





***Sanicula marilandica* L.**
Black Snakeroot

- Fruiting plant commonly up to 4' tall while non-fruiting plant will consist of a solitary palmate leaf.
- Fruit is a small bristly bur that adheres to clothing.

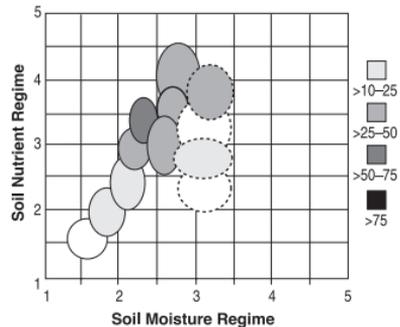
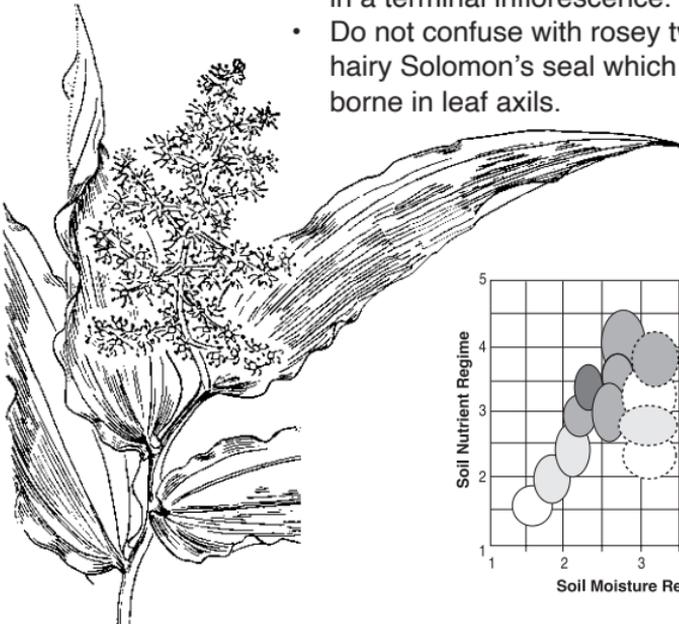




***Smilacina racemosa* (L.) Desf.**

False Solomon's Seal

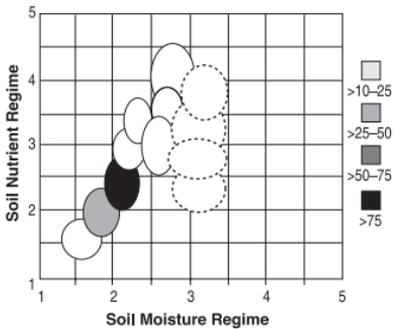
- Leaves are rather coarse, shiny, have three prominent veins and a wavy margin.
- Flowers (white) and fruits (red) clustered in a terminal inflorescence.
- Do not confuse with rosey twisted-stalk or hairy Solomon's seal which have flowers borne in leaf axils.





***Smilacina stellata* (L.) Desf.**
Star-flowered Solomon's Seal

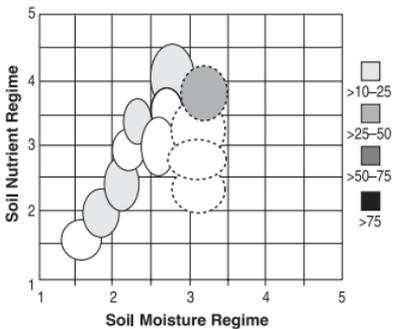
- Erect, with sessile leaves nearly clasping the stem.
- Most often found on dry habitat types.

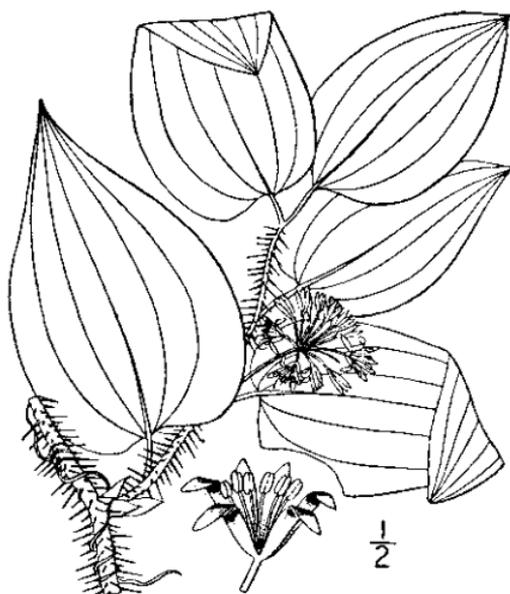




Smilax herbacea L.
Carrion Flower

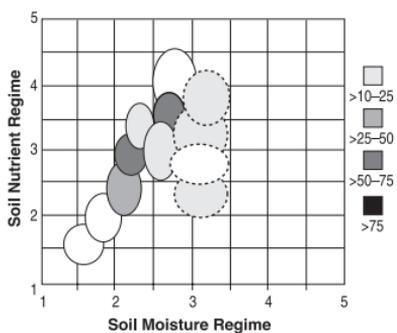
- Arching or climbing plant with smooth stems and ill-smelling flowers.
- Similar in appearance to *Smilax tamnoides* (Bristly greenbrier) which has numerous black bristles along the lower stem.





***Smilax tamnoides* L.**
 Bristly Greenbrier

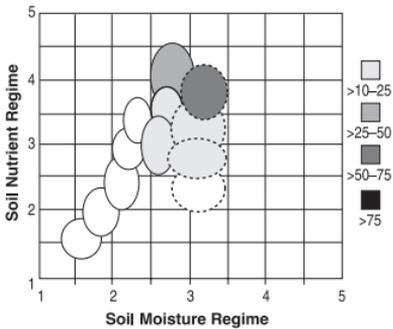
- Numerous black bristles along lower stem.





Solidago flexicaulis L.
Zigzag Goldenrod

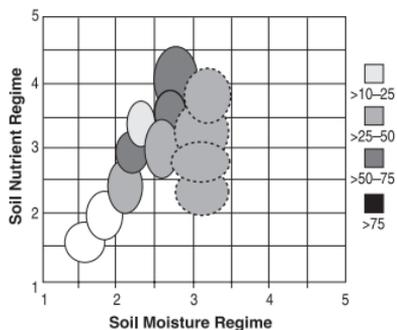
- Stem is somewhat angled (zigzags) between leaves.
- Leaves are sharply toothed.





***Streptopus roseus* Michx.**
Rosey TwistedStalk

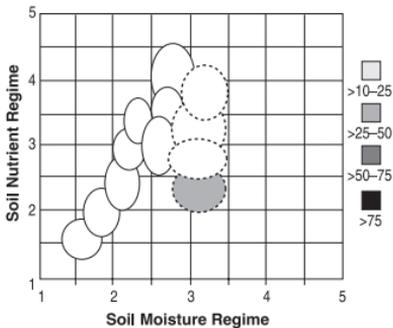
- A reclining herb 1-2' tall, often branched.
- Leaves stalkless with small, whisker-like hairs spaced along leaf margin.

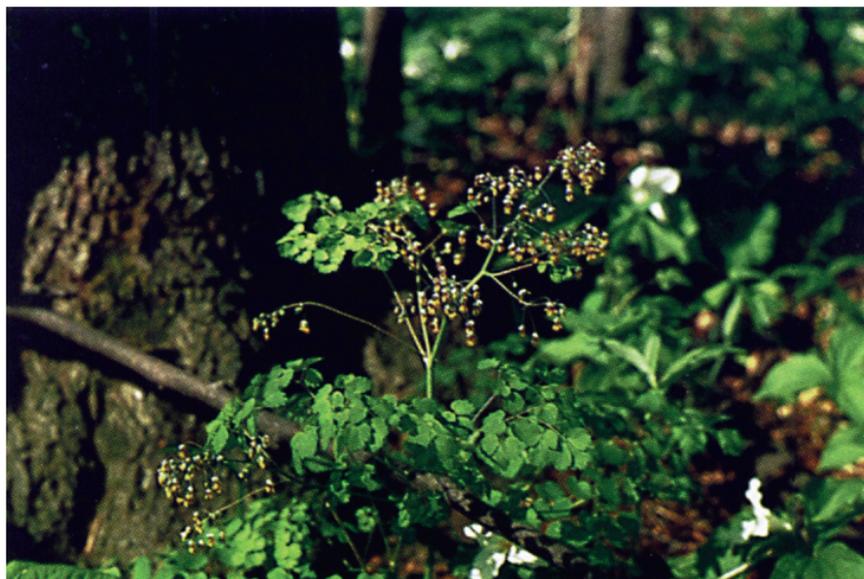




***Symplocarpus foetidus* (L.) Nutt.**
Skunk Cabbage

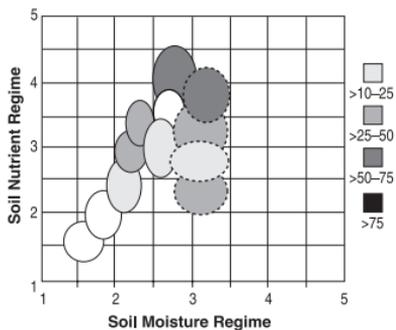
- Large-leaved, stemless plant that emits a skunk-like odor.
- Found only on some wet sites.





Thalictum dioicum L.
Early Meadow Rue

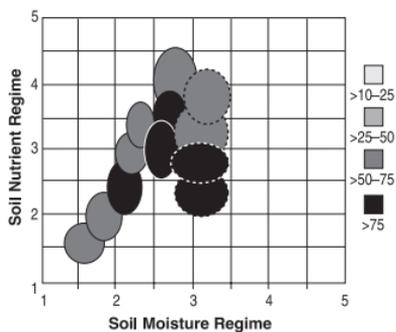
- Medium size herb (1-3' tall).
- Often confused with *Aquilegia canadensis* (Columbine) when flowers are absent. *Thalictum* leaflets are smaller, have wavy margins and are not as deeply lobed as columbine.

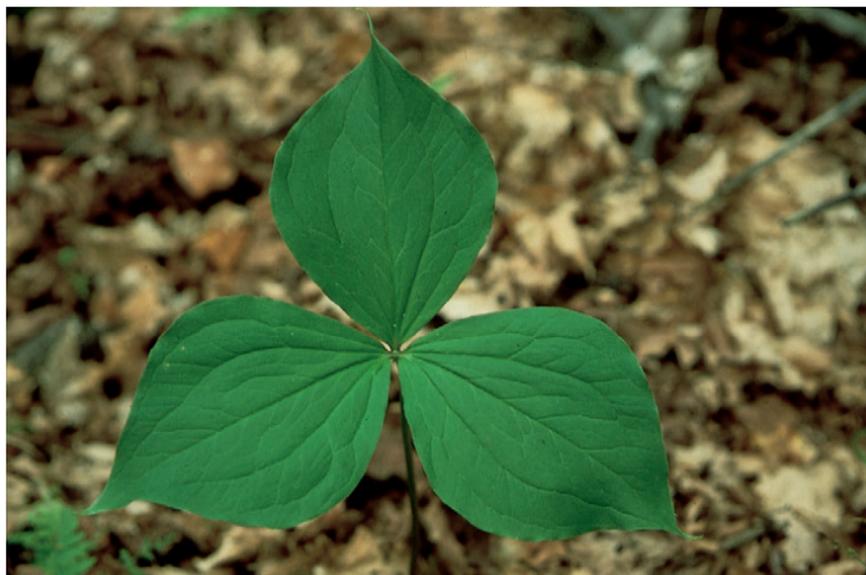




Trientalis borealis Raf.
Starflower

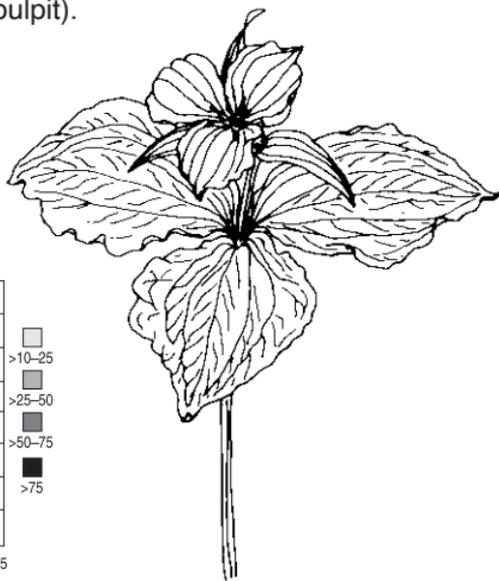
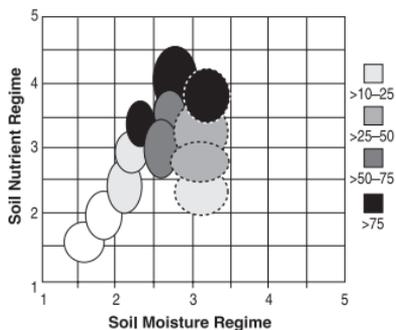
- Elongated, narrow leaves of variable length clustered at the top of a slender stem.
- Commonly found in Northern Wisconsin.





Trillium grandiflorum (Michx.) Salisb.
Large-flowered Trillium

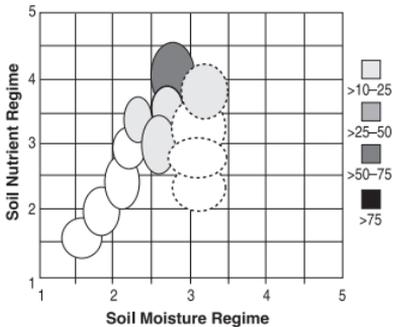
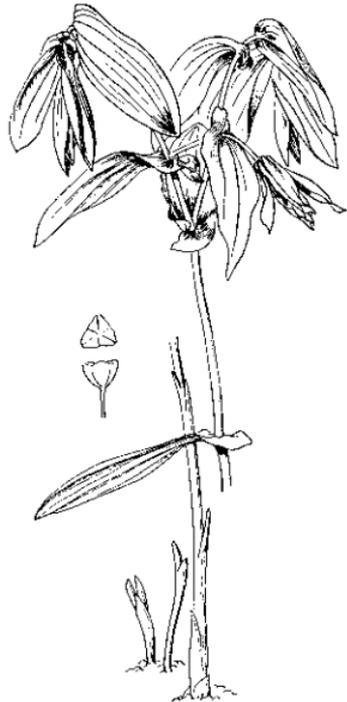
- Flowers are large, white, turning pink later in season.
- Often only leaves are present.
- Venation pattern distinguishes this species from *Arisaema atrorubens* (Jack-in-the-pulpit).





***Uvularia grandiflora* Sm.**
Large-flowered Bellwort

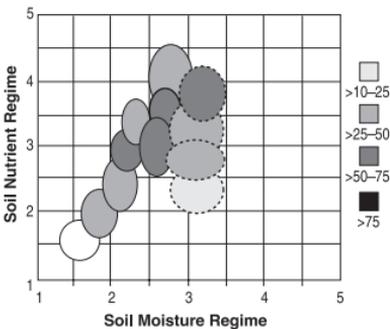
- Stems branched and pass through the base of the leaves.
- Fruit is an angular pod that rises above the leaf from axil.





Uvularia sessilifolia L.
Sessile-leaved Bellwort

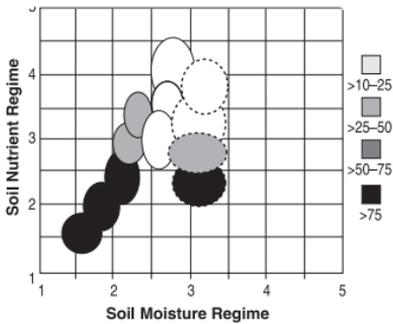
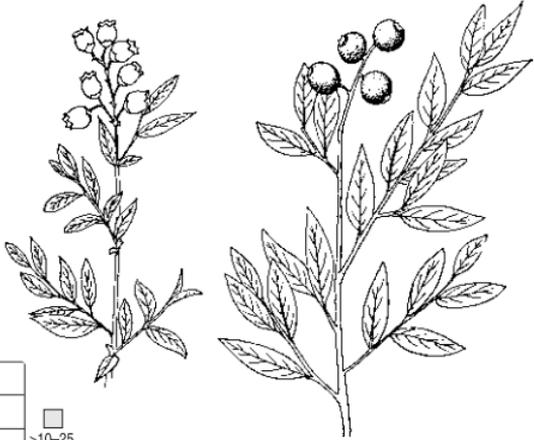
- Similar to *U. grandiflora* but leaves not pierced by stem.
- Often confused with *Polygonatum pubescens* (Hairy Solomon's Seal) but lacks fine hairs on the underside of leaves. Fruits and flowers are also completely different.





***Vaccinium angustifolium* (Ait.) Gray**
 Low Sweet Blueberry

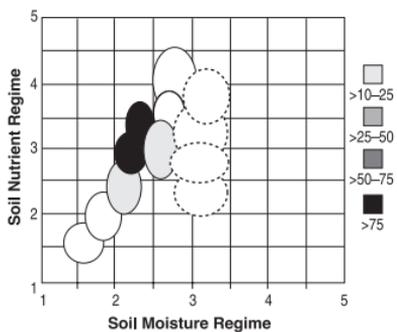
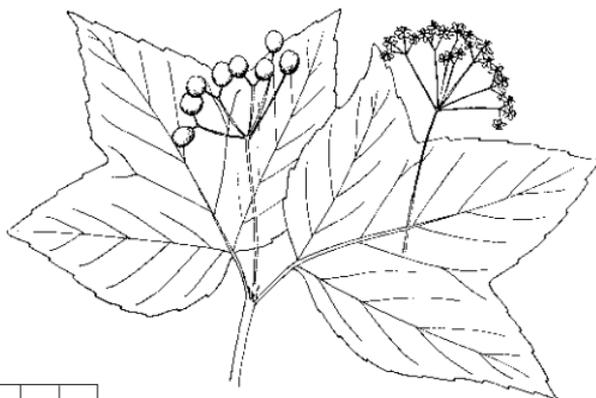
- Low shrub (1-2' tall).
 Hairless green stems.
 Leaves are finely serrated.





Viburnum acerifolium L.
Maple-leaved Viburnum

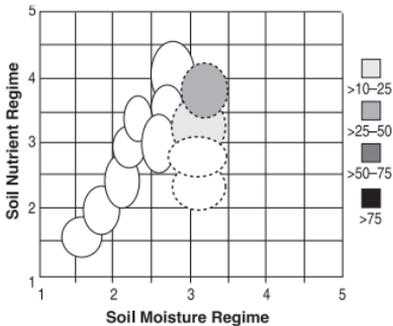
- Medium shrub (3-6' tall).
- Most common on dry-mesic habitat types.





Viburnum lentago L.
Nannyberry

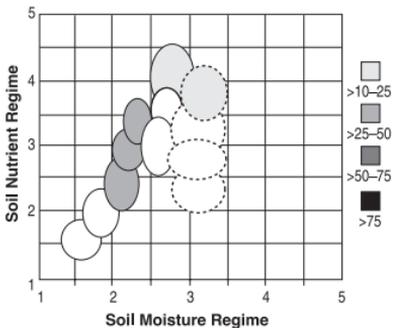
- Large shrub or small tree with finely toothed leaves.
- Terminal buds are light brown, long, thin and pointed.





***Viburnum rafinesquianum* Schult.**
Downy Arrowwood

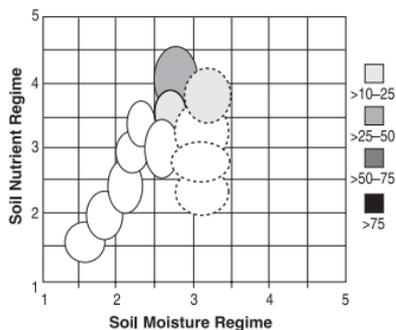
- Medium shrub (up to 6' tall) with egg-shaped, sharply toothed leaves.
- Petioles very short with soft down when young.





Viola canadensis L.
Canadian White Violet

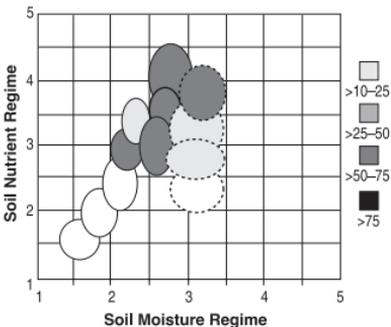
- Branched from the stem as with *Viola pubescens* (downy yellow violet), but with a white flower and more “delicate” in appearance.
- Leaves are more pointed than *V. pubescens*.





Viola pubescens Ait.
Downy Yellow Violet

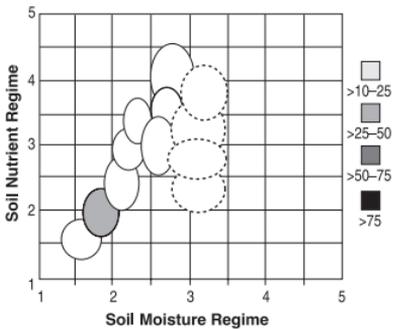
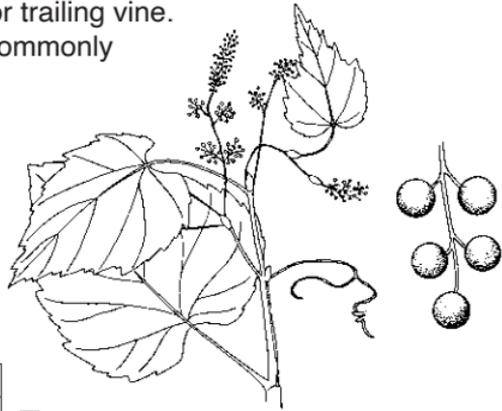
- Downy stem, leaves and seed capsule.
- Has no basal leaves. Stem leaves as broad as long.
- *Viola pensylvanica* (smooth yellow violet) is similar but is not pubescent and has basal leaves.





***Vitis riparia* Michx.**
Riverbank Grape

- A large-leaved climbing or trailing vine.
- In spite of its name it is commonly found in forests

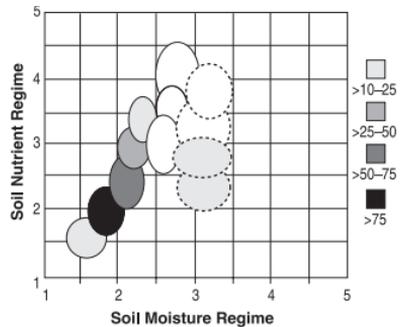




Waldsteinia fragarioides (Michx.) Tratt.
Barren Strawberry

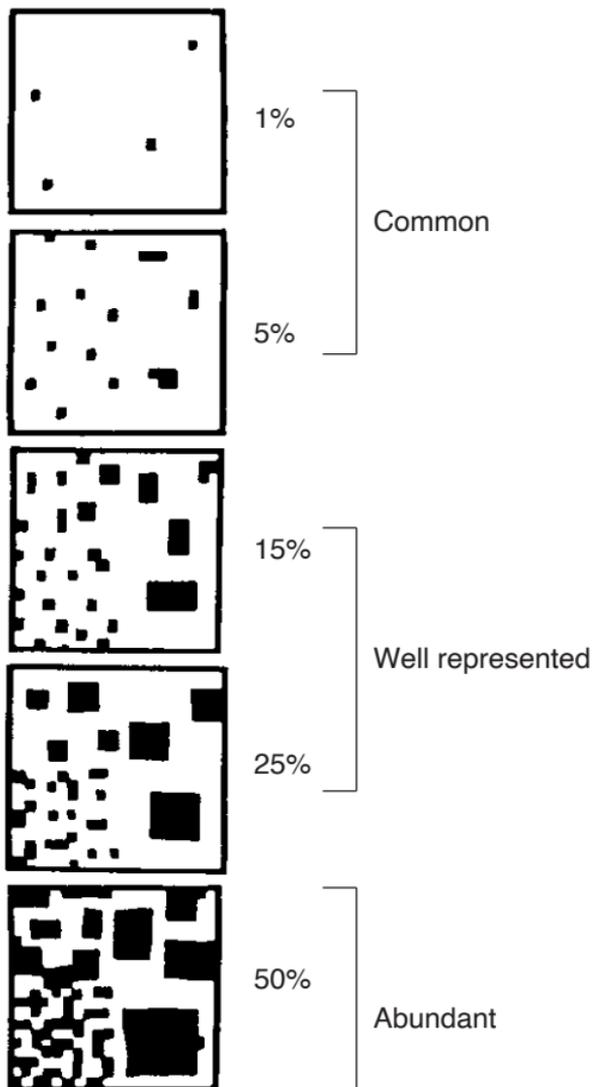


- Flowers yellow, leaves coarser than strawberry or wood anemone.
- Usually found on sandy or clayey soils following disturbance.



Guide for estimating plant coverage

Each quarter of any one square has the same amount of black.



Species Checklist for Field Use

Stand id #: _____	Cover type: _____	Habitat Type: _____
Date: ___/___/___	Collected by: _____	Location: _____

Herbs and Dwarf Shrubs

- 369 Agrimony
- 106 Anemone, Wood
- 144 Arbutus, Trailing
- 115 Aster, Large-leaved
- 102 Baneberry, Red
- 130 Beadlilly, Yellow
- 114 Bearberry
- 360 Bedstraw
- 533 Bedstraw, Northern
- 152 Bedstraw, Sweet-scented
- 336 Beechdrops
- 240 Bellwort, Large-flowered
- 241 Bellwort, Sessile-leaved
- 361 Bergamont, Wild
- 208 Betony, Wood
- 220 Bloodroot
- 133 Bunchberry
- 386 Cabbage, Skunk
- 337 Carrion flower
- 192 Christmas green, Trailing
- 186 Club-moss, Common
- 187 Club-moss, Shining
- 121 Cohosh, Blue
- 216 Coltsfoot, Sweet
- 111 Columbine, Wild
- 73 Cow wheat
- 70 Cucumber root, Indian
- 461 Dewberry, Swamp
- 531 Dogbane, Spreading
- 332 Fern, Bracken
- 322 Fern, Cinnamon
- 321 Fern, Interrupted
- 300 Fern, Lady
- 308 Fern, Long beech
- 301 Fern, Maidenhair
- 310 Fern, Oak
- 302 Fern, Rattlesnake
- 320 Fern, Sensitive
- 309 Fern, Spinulose shield
- 117 Geranium, Wild
- 100 Ginger, Wild
- 199 Goldenrod, Zigzag
- 132 Goldthread
- 435 Gooseberries
- 259 Grape, Riverbank
- 86 Greenbrier, Bristly
- 188 Ground-pine
- 94 Harebell
- 164 Hepatica, Round-lobed
- 161 Hepatica, Sharp-lobed

- 139 Hog peanut
- 355 Horsetails
- 84 Ivy, Poison
- 108 Jack-in-the-pulpit
- 167 Jewelweed
- 544 Lead plant
- 253 Leek, Wild
- 191 Lettuce, White
- 194 Lily-of the-valley, Wild
- 305 Loosestrife, Whorled
- 270 Lopseed
- 282 Meadow rue, Early
- 90 Miterwort
- 200 Miterwort, Naked
- 688 Moss, Reindeer
- 176 Nettle, Wood
- 279 Nightshade, Dwarf enchanter's
- 82 Nightshade, Enchanter's
- 196 Partridgeberry
- 92 Pipsissewa
- 239 Polygala, Fringed
- 371 Puccoon, Hoary
- 432 Raspberry, Dwarf
- 107 Sarsaparilla, Wild
- 286 Snakeroot, Black
- 222 Solomon's seal, False
- 212 Solomon's seal, Hairy
- 63 Solomon's seal, Star-flowered
- 204 Sorrel, Wood
- 113 Spikenard
- 539 Starflower
- 255 Strawberry, Barren
- 150 Strawberry, Wild
- 203 Sweet cicely
- 81 Tick trefoil, Naked-flowered
- 80 Tick trefoil, Pointed-leaved
- 235 Trillium, Large flowered
- 183 Twinflower
- 226 Twisted stalk, Rosey
- 244 Violet, Canadian white
- 251 Violet, Downy yellow
- 83 Virginia creeper
- 85 Waterleaf, Virginia
- 153 Wintergreen
- 101 Yarrow

Shrubs

- 404 Alder, Speckled
- 477 Arrowwod, Downy
- 429 Blackberry/ Raspberry
- 452 Blueberry, Low sweet
- 427 Cherry, Pin

- 423 Choke cherry
- 446 Chokeberry, Black
- 417 Dogwood, Alternate-leaved
- 402 Dogwood, Gray
- 521 Dogwood, Red-osier
- 440 Elder, Red-berried
- 426 Gooseberries
- 408 Hazelnut, Beaked
- 421 Honeysuckle
- 420 Honeysuckle, American-fly
- 411 Honeysuckle, Bush
- 515 Huckleberry, Black
- 403 Juneberry
- 143 Leatherwood
- 462 Maple, Mountain
- 516 Nannyberry
- 414 New Jersey tea
- 428 Roses
- 276 Sweetfern
- 430 Thimbleberry
- 457 Viburnum, Maple-leaved
- 442 Winterberry
- 436 Witch hazel

Trees

- 18 Ash, Black
- 19 Ash, White
- 17 Basswood
- 25 Beech, American
- 13 Birch, Paper
- 16 Birch, Yellow
- 22 Cherry, Black
- 3 Fir, Balsam
- 51 Green ash
- 6 Hemlock, Eastern
- 42 Hickory, Bitternut
- 27 Hornbeam, American
- 26 Ironwood
- 15 Maple, Red
- 14 Maple, Sugar
- 53 Oak, Northern pin
- 23 Oak, Northern red
- 8 Pine, Eastern white
- 7 Pine, Jack

Coverage Classes:

1	Present-trace	<1%
2	Common	1-5%
3	Well represented	5-25%
4	Abundant	>25%

Species Checklist for Field Use

Stand id #: _____ Cover type: _____ Habitat Type: _____
 Date: ___/___/___ Collected by: _____ Location: _____

Herbs and Dwarf Shrubs

- 101 Achillea millefolium
 102 Actaea rubra
 301 Adiantum pedatum
 369 Agrimonia gryposepala
 253 Allium tricoccum
 544 Amorpha canescens
 139 Amphicarpa bracteata
 106 Anemone quinquefolia
 531 Apocynum androsaemifolium
 111 Aquilegia canadensis
 107 Aralia nudicaulis
 113 Aralia racemosa
 114 Arctostaphylos uva-ursi
 108 Arisaema atrorubens
 100 Asarum canadense
 115 Aster macrophyllum
 300 Athyrium filix-femina
 302 Botrychium virginianum
 94 Campanula rotundifolia
 121 Caulophyllum thalictroides
 92 Chimaphila umbellata
 279 Circaea alpina
 82 Circaea quadrisulcata
 688 Cladina rangiferina/ mitis
 130 Clintonia borealis
 132 Coptis groenlandica
 133 Cornus canadensis
 80 Desmodium glutinosum
 81 Desmodium nudiflorum
 310 Dryopteris disjuncta
 308 Dryopteris phegopteris
 309 Dryopteris spinulosa
 336 Epifagus virginiana
 144 Epigaea repens
 355 Equisetum spp.
 150 Fragaria virginiana
 533 Galium boreale
 360 Galium spp.
 152 Galium triflorum
 153 Gaultheria procumbens
 117 Geranium maculatum
 161 Hepatica acutiloba
 164 Hepatica americana
 85 Hydrophyllum virginianum
 167 Impatiens capensis
 176 Laportea canadensis
 183 Linnaea borealis
 371 Lithospermum canescens
 186 Lycopodium clavatum
 192 Lycopodium complanatum

- 187 Lycopodium lucidulum
 188 Lycopodium obscurum
 305 Lysimachia quadrifolia
 194 Maianthemum canadense
 70 Medeola virginiana
 73 Melampyrum lineare
 196 Mitchella repens
 90 Mitella diphylla
 200 Mitella nuda
 361 Monarda fistulosa
 320 Onoclea sensibilis
 203 Osmorhiza claytoni
 322 Osmunda cinnamomea
 321 Osmunda claytoniana
 204 Oxalis montana
 83 Parthenocissus quinquefolia
 208 Pedicularis canadensis
 216 Petasites palmatus
 270 Phryma leptostachya
 239 Polygala paucifolia
 212 Polygonatum pubescens
 191 Prenanthes alba
 332 Pteridium aquilinum
 84 Rhus radicans
 435 Rubus flagellaris
 461 Rubus hispidus
 432 Rubus pubescens
 220 Sanguinaria canadensis
 286 Sanicula marilandica
 222 Smilacina racemosa
 63 Smilacina stellata
 337 Smilax herbacea
 86 Smilax tamnoides
 199 Solidago flexicaulis
 226 Streptopus roseus
 386 Symplocarpus foetidus
 282 Thalictrum dioicum
 539 Trientalis borealis
 235 Trillium grandiflorum
 240 Uvularia grandiflora
 241 Uvularia sessilifolia
 244 Viola canadensis
 251 Viola pubescens
 259 Vitis riparia
 255 Waldsteinia fragarioides

Shrubs

- 462 Acer spicatum
 404 Alnus rugosa
 403 Amelanchier spp.
 446 Aronia melanocarpa
 414 Ceanothus americanus

- 276 Comptonia peregrina
 417 Cornus alternifolia
 402 Cornus racemosa
 521 Cornus stolonifera
 408 Corylus cornuta
 411 Diervilla lonicera
 143 Dirca palustris
 515 Gaylussacia baccata
 436 Hamamelis virginiana
 442 Ilex verticillata
 420 Lonicera canadensis
 421 Lonicera spp.
 427 Prunus pensylvanica
 423 Prunus virginiana
 426 Ribes spp.
 428 Rosa spp.
 430 Rubus parviflorus
 429 Rubus spp.
 440 Sambucus pubens
 452 Vaccinium angustifolium
 457 Viburnum acerifolium
 516 Viburnum lentago
 477 Viburnum rafinesquianum

Trees

- 3 Abies balsamea
 15 Acer rubrum
 14 Acer saccharum
 16 Betula alleghaniensis
 13 Betula papyrifera
 27 Carpinus caroliniana
 42 Carya cordiformis
 25 Fagus grandifolia
 19 Fraxinus americana
 18 Fraxinus nigra
 51 Fraxinus pennsylvanic
 26 Ostrya virginiana
 7 Pinus banksiana
 8 Pinus strobus
 22 Prunus serotina
 53 Quercus ellipsoidalis
 23 Quercus rubra
 17 Tilia americana
 6 Tsuga canadensis

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