*A Guide to*

# Forest Communities and Habitat Types

*of*

# Central and Southern Wisconsin


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# A Guide to Forest Communities and Habitat Types of Central and Southern Wisconsin

*by*

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*and*

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# Authors and Acknowledgements

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J. Kotar
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# Foreword

Forest habitat type classification, a system based on the study of floristic composition of vegetation, groups communities and their environments into categories useful for management interpretation. The system has been in use in Michigan and Wisconsin for over 15 years. In 1980, a field guide for Upper Peninsula of Michigan and northeastern Wisconsin (Coffman et al.) was published, followed by a Field Guide for Northern Wisconsin (Kotar et al. 1988).

Since 1988, more than 1000 copies of the Northern Wisconsin field guide have been purchased by individuals, public agencies and forest industries, and over 600 individuals have attended training workshops on the use of the system. Never intended as a rigid guide, or a conclusive treatment of ecological site relationships, the field guide has proven useful to resource managers and researchers to deal with the wide array of forest communities that always reflect natural disturbance and management history, as well as inherent site capabilities.

For example, the habitat type system provides the National Resource Conservation Service (NRCS) a means for interpreting soil surveys in terms of implications for forest resource management. Using GIS computer technology they are producing habitat type distribution maps on various scales. Another example is the habitat type classification of permanent forest inventory plots by the USFS Forest Inventory and Analysis Program. The results will provide additional ecological information as well as improved interpretation of growth data, currently organized only by cover types.

Since 1989 over 1,100 stands were sampled in the southern two thirds of the state (48 counties) providing the basis for the present guide. There has been continuous evolution in scope and methods of presentation of information in the three publications. While, the Michigan field guide had strong emphasis on traditional forest management, the Northern Wisconsin field guide presented a broader interpretation. Although, still structured for use in field application, the current publication includes more comprehensive treatment of composition of present communities, regional differences, and history of vegetation development than do the preceding volumes. It is therefore intended not only as a "field guide" but rather as a more general reference to forest communities and site types of southern Wisconsin. It provides an



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ecological framework for the development of interpretations and prescriptions for all management objectives that involve manipulation of vegetation.

Although habitat type classification field guides are intended primarily for professional users, they are also being purchased by the general public. In an effort not to discourage wider use, we made a few compromises in the present guide. Common names of plants have been included in most tables and are used exclusively in narrative parts. We have also added a short summary of principal ecological characteristics of selected tree species. However, we have not attempted to reduce the use of other technical terms. We still encourage serious users to attend training workshops.

## Reminders and Cautionary Notes

The nature of forest vegetation of southern Wisconsin differs considerably from that in the north. In many areas, forests have been under continuous disturbance since, and often prior to, the Euro-American settlement. Disturbance included fires, grazing and other uses, in addition to logging. For these reasons the application of the classification to specific sites will often be difficult, particularly the use of the identification keys. However, we have included as much floristic and descriptive information as possible to enable a user to interpret major management implications of most communities and sites.

Not every community and site type is included in this classification. The habitat types described for each region are based on stands or woodlots that had acceptable conditions for sampling. For example, recently grazed or otherwise disturbed, or low density stands were not sampled. In some areas the most productive soils are entirely in agriculture and no forest was available for sampling. Particularly lacking in our samples of some regions were communities on the poorest sites, such as steep slopes and ridges with shallow soils, because these tended to be the most disturbed. Likewise, small inclusions of rock outcrops or sands, on otherwise loamy landscapes were not sampled. Also excluded are most wet and swampy sites.



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# Introduction

In order to effectively manage forest resources, classification systems are needed. Traditionally, resource classifications have been developed only for specific uses. Forest cover types, for example, traditionally a standard unit for forest management, have serious limitations as ecological basis for developing management prescriptions. They 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 allows resource managers to develop long-term management objectives and specific prescriptions for manipulating vegetation, based on knowledge of ecological potential of the land.



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## 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 (Pfister and Arno 1989).

**A "habitat type" includes all sites, or areas, capable of producing similar climax plant communities.**

Because it is the long-term result of plant succession and community development, the climax 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 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



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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.

**Presence of mature or "climax communities" is not necessary for recognizing habitat types.**

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, 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 comparison with 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 misidentifica-



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tion 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" (Archaumbalt et al. 1989; Host and Pregitzer 1991). Presence of any member of the group can be used to draw conclusions regarding the relative status of a particular environmental 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-Dumbois and Egller 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, correspondence of a community in question with the appropriate abstract plant associations should be determined by carefully following the diagnostic procedure outlined in the opening chapters of section 3.

## 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 Wisconsin 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



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units delineated in soil surveys (conducted by Natural Resource Conservation Service, NRCS, formerly SCS), usually do not coincide exactly with a given habitat type, although strong relationships often exist (Kotar 1986). The reasons for the lack of direct correlation's 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 different soil map units often have the same net effect on vegetation and therefore numerous map units represent the same habitat type. This is why 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.

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



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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).

In parts of SW Wisconsin, topography is sufficiently rugged to affect the expression of uniform soil properties. For example, a deep silt loam on level terrain would normally represent mesic site conditions. However, the same soil on a steep south-facing slope would likely result in dry-mesic conditions. In addition, the temperature differences would add to the contrast. In such situations habitat types cannot be directly related to soil mapping units, because slope aspect is not a criterion in soil map unit delineation. A new approach of landscape map unit delineation is needed to correct this problem.

## Relationship of the Habitat Type System to Other Site Classifications in the Lake States

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, depending on the availability of geological and soil surveys, all National Forests follow the same basic concepts. The system, known as **"The Ecological Classificaation System" (ECS),** is based on the nesting of smaller, more homogeneous land units within progressively larger, less homogeneous units (Cleland et al. 1993). 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.), specific soil, and presumably same kind of poten-



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tial vegetation. If ELTs or ELTPs are homogeneous enough to support only one potential climax 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 ECS, to the ELT level, currently exists only on the 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 ECS provides spatial information, identifies physical limitations of a site, and aids in ecological interpretation of landscape patterns.

A map of the higher orders of the ECS (also known as the Hierarchy of Ecological Units) for the Lake States is included in section 4.

**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 communities 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 more closely approximate composition of actul 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 con-



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ditions than do the trees. For further discussion of this topic see Kotar et al. 1988.

## 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 six 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 descriptions of individual regions in section 3).

## 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 lily or yellow beadlily, 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.

Thus, to avoid confusion, 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 long as the name can be understood. Our experience also shows that individuals without any formal training in botany quickly learn to at least recognize scientific names



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in print and can make good use of the field guide. In our *Field Guide to Forest Habitat Types of Northern Wisconsin* we used scientific names exclusively.

Nevertheless, we have found that the northern *Field Guide* is being used by nonprofessionals more widely than we had expected. Because we want to encourage wider use, we chose to use both scientific and common names, as much as possible, throughout this guide. However, for simplicity, we only use common names in the text portions of the guide. **When a question of accuracy arises while using common names, always consult the index to scientific names.**

## 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 regions. 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 a way that sample plots which share most species in common are grouped together. A computer program TWINSPAN (Hill, 1979) was used to produce the first approximation. The grouping of plots by this program does not necessarily represent ecological groupings or associations. Inter-



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pretation of these computer-generated groups and final delineation of associations involves comparisons with data bases 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). 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 give site is obtained by calculating a mean index from the individual indices of all species present on that site. Although this system was intended primarily for use in Minnesota, data from several Wisconsin studies were also included in its development and we found that, with caution, it can also be used in Wisconsin.

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 rectangles in the graphs presented in section 3 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 distur-



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bance. 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 Wisconsin, 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 potential dominance is assumed by other, less shade tolerant species such as white pine or red maple. Throughout Wisconsin sugar maple (Acer saccharum) is the potential dominant climax species on all mesic and some dry mesic site types. In some regions, basswood (Tilia americana) is a common associate of sugar maple, thus the mesic and dry mesic habitat types contain both names e.g. **Acer-Tilia/** Desmodium. For convenience the name is abbreviated **ATiDe**. The second part of the name, in this case **De** for **Desmodium glutinosum** (pointed-leaf tick trefoil), is one of the characteristic understory species of a dry-mesic sugar maple association. It is used to distinguish this association (or habitat type) from other mesic sugar maple-basswood types e.g. ATi**Sa** (Acer-Tilia/**Sanguinaria**) and ATi**Ca** (Acer-Tilia/ **Caulophyllum**).

Two other naming concepts must be explained: a habitat type **variant** and a habitat type **phase.** A variant is designated when similar, but not identical associations are delineated in two or more geographic regions. For example, ArCi-**Ph** (Acer rubrum/Circaea - **Phryma** variant) in region 7 is in most respects similar to a type **ArCi,** previously delineated in region 6. Never the less the region 7 type contains a number of species of typically southern centers of distribution. This implies some climatic difference between the two regions. In order to facilitate future research, the region 7 type was not lumped together with previously delineated ArCi type, but was given a label of geographic variant **ArCi-Ph**.

A habitat type **phase** relates to historic differences in disturbance regimes between two presumably identical site types. For example, plotting the locations of the reference stands of the **ATiDe** type on the map of presettlement vegetation showed that these areas were dominated by sugar maple-basswood forests. Almost all of these reference stands still have strong presence of maple and basswood today. However, the plotting of reference stands for the **ATiDe(Pr)** type in the same way showed that they represent areas formerly occupied by oak savanna or oak openings. There are no apparent differences in soil between these types and although sugar maple and basswood are rare today, wherever they do occur they grow well and are reproducing. Thus, the type was designated as **Acer-Tilia**



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**(ATi)** even though today's stands are dominated mostly by oaks and hickory. It is clear that communities on the **ATiDe(Pr)** habitat type represent a vegetation phase with significantly different historic development, and different management implications, than do the stands of the **ATiDe** type .



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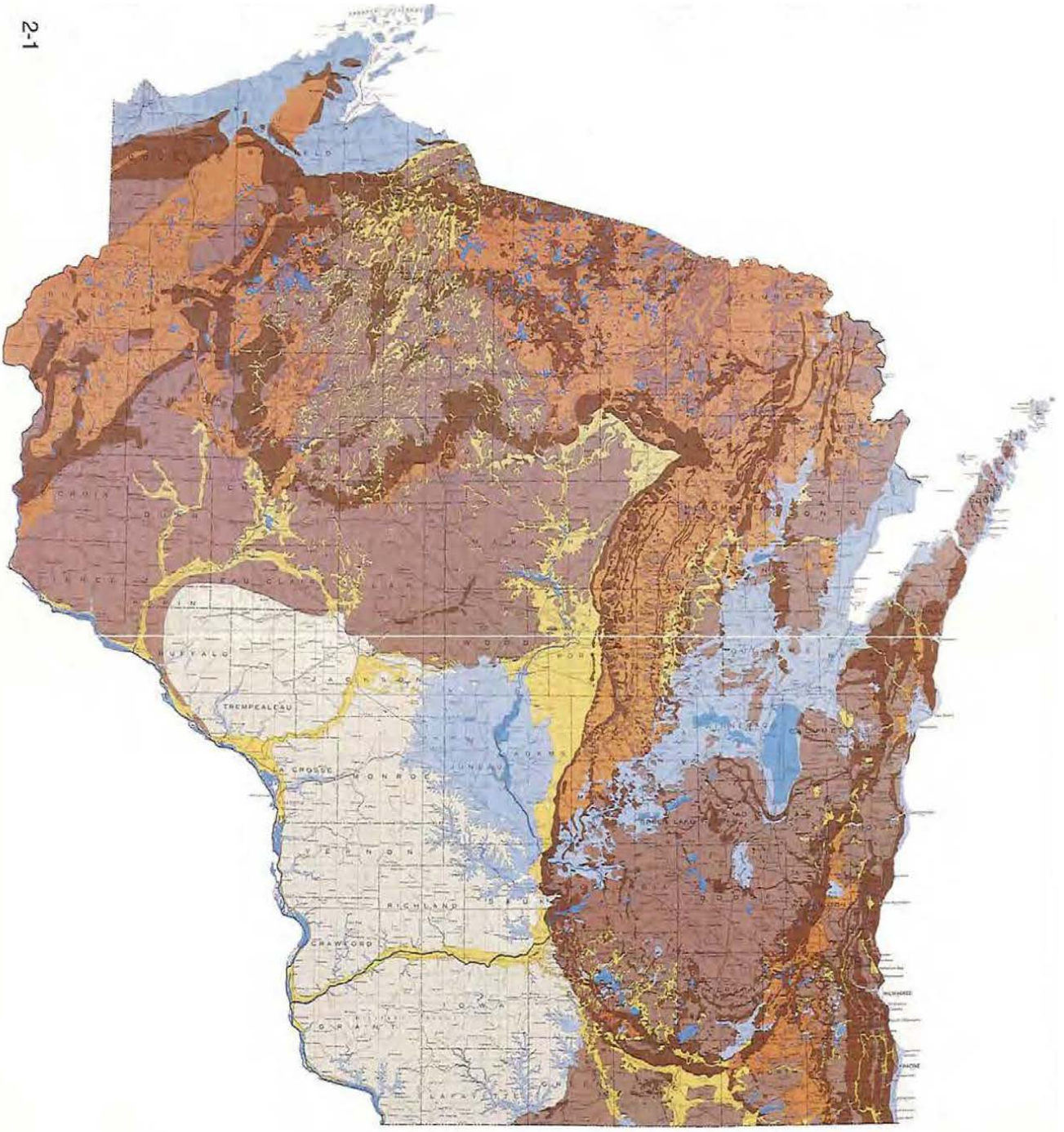



**Outwash**
Outwash plains, terraces, fans, and valley trains. Mainly well-sorted and stratified sand and/or sand and gravel.

**Ground Moraine**
Till plains, thing 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.

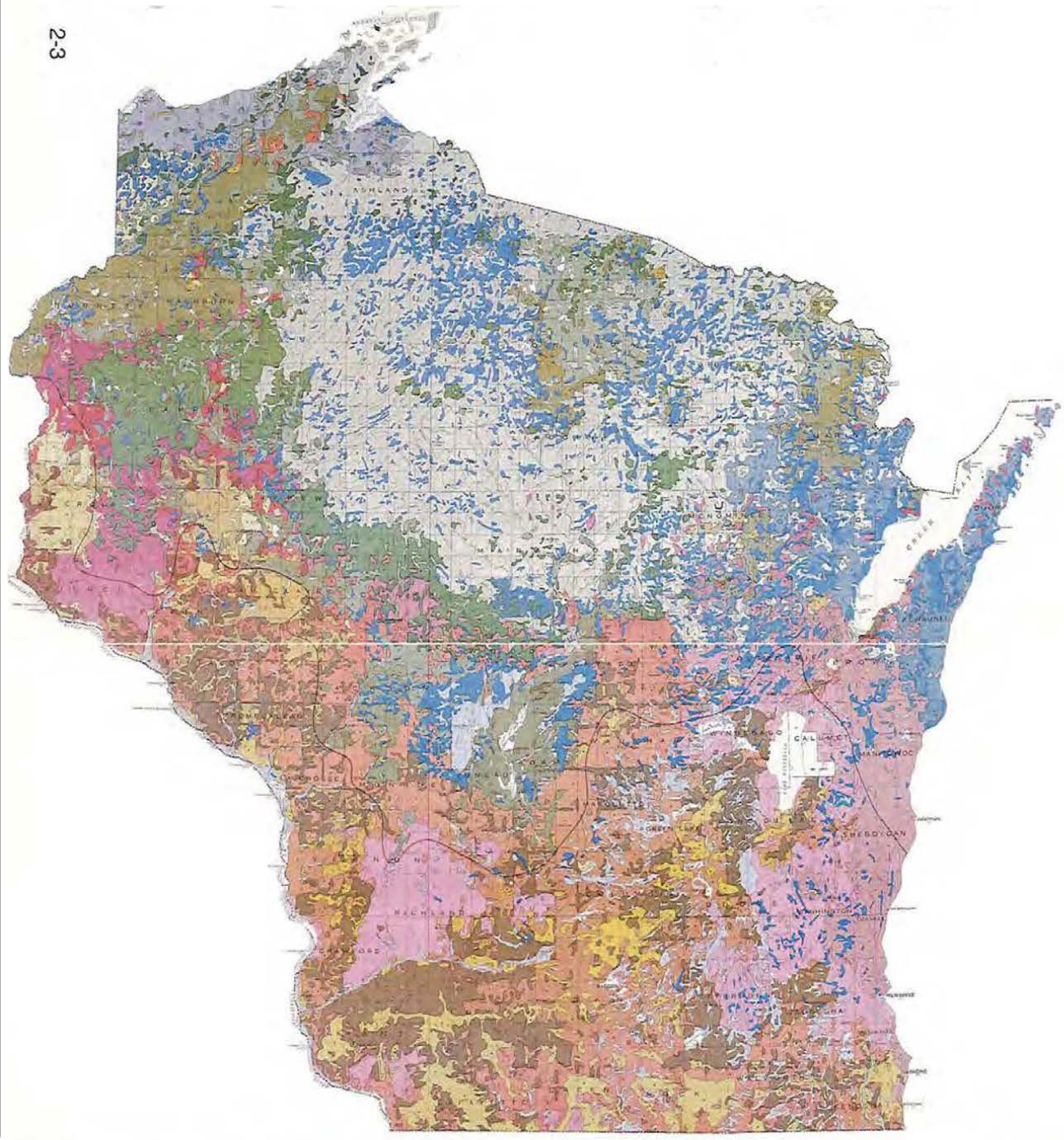
**End Moraines**
Terminal, recessional and interlobate morains, mostly till and associated local ice contact deposits.

**No Glacial Deposits**

## Map 2.1 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 published by the Wisconsin Geological and Natural History Survey.)



**Boreal forest**

White spruce, Balsam fir, Tamarack, White cedar, White birch, Aspen

**Mixed coniferous-deciduous forest**

Beech, Hemlock, Sugar maple, Yellow birch, White pine, Red pine

White pine, Red pine

Hemlock, Sugar maple, Yellow Birch, White pine, Red pine

Jack pine, Scrub (Hill's) Oak forest and barrens

Sugar maple, Yellow birch, White pine, Red pine

Aspen, White birch, Pine

Southern limit of pine as a common ingredient of the forest

**Deciduous forest**
(Often intermingles with White Pine and Red Pine above the southern pine limit

Beech, Sugar maple, Basswood, Red oak, White oak, Black oak

Oak, White oak, Black oak, Bur oak

Sugar maple, Basswood, Red oak, White oak, Black oak

Oak openings — Bur oak, White oak, Black oak

**Grassland and Brush**

Prairie

Brush

**Wetland vegetaion**

Swamp conifers—White cedar, Black spruce, Tamarack, Hemlock

Lowland hardwoods—Willo, Soft maple, Box elder, Ash, Elm, Cotton-wood, River birch

Marsh and sedge meadow, Wet prairie, Lowland shrubs

Map compiled by Robert W. Finley and published by the North Central Forest Experiment Station; U.S. Forest Service

## Map 2..2 Original Vegetation Cover of Wisconsin.

This map depicts the distribution of the major forest types, as reconstructed from the records of land surveys, conducted prior 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 cmoplex 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.

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# Key to Map 2.3. Natural Divisions of Wisconsin

### 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: Dedicuous 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 n orthern 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. Windblown 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. Presettlement 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.



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### 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 til 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 oiak savanna with oak forest in absense 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.



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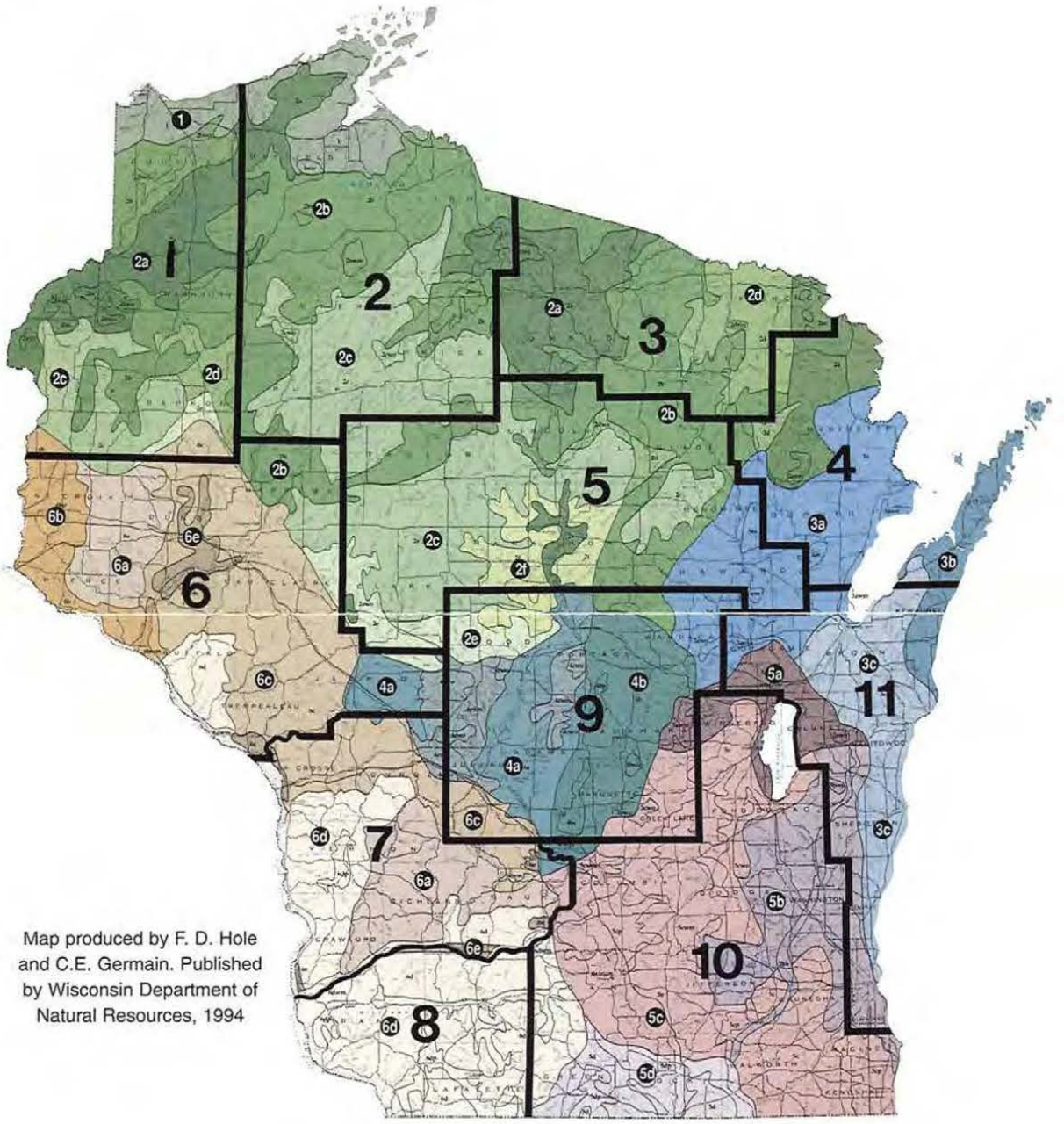


Map produced by F. D. Hole and C.E. Germain. Published by Wisconsin Department of Natural Resources, 1994

## Map 2.3 Natural Divisions of Wisconsin.

This 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.

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 2c | 2f | 3c | 4c | 5c | 6b |
| 2a | 2d | 3a | 4a | 5a | 5d | 6c |
| 2b | 2e | 3b | 4b | 5b | 6a | 6d |
| | | | | | | 6e |

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## Map 2.4 Wisconsin portion of the Ecological Units of the Eastern United States. USDA Forest Service, 1995.

See pages 1-8 and 1-9 for explanation.

**212H Northern Great Lakes Section**
Subsections:
212Ha Gwinn-Deerton outwash and sand ridges
212Hb Northern Lake Michigan Till Plain
212Hc Green Bay clayey and silty lake plain
212Hd Green Bay till plain
212He Door-Escanaba Peninsulas and Lake Plain
212Hh Seney sand lake plain
212Hj St. Ignace lake plain
212Hk Rudyard clay lake plain
212Hl Cheyboygan lake plain
212Hm Harrisville moraines
212Hn Stutsmanville sand ridges
212Ho Travers City drumlin fields
212Hp Vanderbilt moraines
212Hq Mio Outwash and Lake Ridges
212Hr Tawas lake plain
212Hs Cadillac end moraines
212Ht Big Rapids loamy moraines
212Hu Newaygo outwash and ice contact
212Hv Wellston outwash and ice contact
212Hw Manistee outwash and lake sands
212Hx Hart outwash and lake sands
212Hy Kalkaska Moraines

**212J Southern Superior Uplands Section**
Subsections:
212Ja Lake Superior Clay plaing
212Jb Gogebi-Penokee Iron range
212Jc Winegar moraines
212Jd St. Croix Moraine
212Je Central NW Wisconsin loess plain
212Jf Perkinstown end moraine
212Jg Lincoln formation till plain, mixed hardwoods
212Jh Neillsville snadstone plateau
212Ji Rib Mountain rolling ridges
212Jj Green Bay Lobe stagnation moraine
212Jk Spread Eagle-Dunbar barrens
212Jl Brule and Paint Rivers drumlinized ground moraine
212Jm Northern Highlands pitted outwash
212Jn Baraga coarse rocky till
212Jo Ewen Dissected Lake plaing
212Jp Keweenaw Peninsula
212Jq Isle Royale
212Jr Michigamme haghland
212Js Lincoln formation till plain, Hemlock-hardwoods

**212K Western Superior Section**
Subsections:
212Ka Bayfield sand plains
212Kb Mille Lacs uplands

**212L Northern Superior Uplands Section**
Subsections:
212La Border Lakes
212Lb North Shore highlands
212Lc Laurentian Highlands
212Ld Toimi Uplands

**212M Northern Minnesota and Ontario Section**
Subsections:
212Ma Littlefork-Vermillion Uplands

continued on back...

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212Mb Agassiz Lowlands

**212N Northern Minnesota Drift and Lake Plains Section**

Subsections:

212Na Chippewa Plains
212Nb St. Louis Moraines
212Nc Pine Moraines and outwash plains
212Nd Tamarack Lowlands

**220 Hot Continental Division**

**222 Eastern Broadleaf Forest (Continental) Province**

**222I Erie and Ontaior Lake Plain Section**

Subsections:

222Ia Maumee lake plain

**222J Southern Great Lakes Section**

Subsections:

222Ja Allegan Lake Plain and Moraines
222Jb Lansing till plain
222Jc Lansing medium-textured ground moraine
222Jd Huron-Saginaw lake plain
222Je Jackson Interlobate moriane
222Jf Washtenaw moraines

**222K Southwestern Great Lakes Morainal Section**

Subsections:

222Ka Western Central Wisconsin Sand Plain
222Kb Central Wisconsin Sand lake plain
222Kc Central Wisconsin moraines and outwash
222Kd Lake Winnebado Clay plain
222Ke SE Wisconsin rolling till plain and Kettle Moraine
222Kf South Central Wisconsin prairie-savannah
222Kg Kidder-McHenry drumlin
222Kh Johnstown moraines and plains
222Ki SW Lake Michigan Lake Border Moraines and plains
222Kj Darien Moraines and till plains
222Kk Rock River old drift country

**222L North Central US Driftless and Escarpment Section**

Subsections:

222La Reeve-Baldwin-Dallas eroded Pre-Wisconsin till
222Lb Sandstone bedrock Oak forest and savannah
222Lc Steeply dissected limestone, dolomite, sandstone
222Ld Kickapoo, steeply dissected sandstone
222Le Limestone-Dolomite prairie-savannah
222Lf Western Palezoic plateau

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## Explanation of Elements Included in this Section

### Floristic Identification Keys

We must emphasize that the key is not the classification, but only a tool to aid in habitat type identification. It is intended as a starting point for a user who is not yet familiar with characteristics of habitat types in a given region. Almost a decade of experience with the use of this system in northern Wisconsin shows that serious users soon become familiar with the characteristics of habitat types in their regions and do not require the use of keys on continuous basis.

The 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.

Follow the instructions below:

1. Locate yourself on the map and select the key for the appropriate region. **Note:** Because habitat type region boundaries were for convenience set to follow county lines, they should not be treated as absolute, or natural. Therefore, if you are located near any of these boundaries also consult keys of the adjacent region.

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 300 $m^2$ (56 ft x 56 ft) and look for species listed in the top two boxes in the key, joined by a horizontal line. Compare the statements in the two boxes, make your choice, and proceed down the flow chart to the next pair of boxes.

   In this process exclude extreme micro sites such as rotten logs, stumps, small wet areas and rock outcrops. In some instances the coverage estimate is added to the species presence. Coverage is the area covered by the gross outline (vertical projections) of an individual plant's foliage, or collectively covered by all individuals of a species within a designated reference area. It is expressed as a percentage of total reference area or as a coverage class. Two coverage classes are most often used in the key: 1%, designated in the key by (c) for common, and >5% (w) for well represented. It is important to remember that if the designated coverage value is not met, the species is considered as rare or poorly represented in the interpretation of the key.

4. For estimating coverage it is helpful to outline somewhere within the area being examined, the 1% and 5% reference areas. For a 300 $m^2$ observation plot the respective



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dimensions are 3m² (1.7 m x 1.7 m) or 31 ft² (5.6 ft x 5.6 ft); and 15 m² (3.9 m x 3.9 m) or 157 ft² (12.5 ft x 12.5 ft).

5. The statement in the key "at least 2 present" does not imply that a large number of species listed in the box should be expected. This is particularly true in the upper levels of the chart where species lists must include representative species of several different habitat types.

   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 explained below and other descriptions found in this section.

7. 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.

8. 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.

9. **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 an intermediate positions. In such cases, depending on management objectives, a stand can be assigned to the habitat type it resembles most closely (considering all information provided in this field guide), or it can be labeled as an intermediate, e.g., PVRh/PVHa.

## Tables of Comparison of Major Floristic Differences Between Closely Related Habitat Types

Sometimes an insufficient number of diagnostic species are present for the identification keys to work properly, or there is uncertainty about the outcome of the keying out process. In such cases one can examine the species that are present on the site and compare their expected frequencies of occurrence (constancy) between the keyed out type and other similar types.

Each regional section includes several tables of paired comparisons.



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The tables list those species whose constancy percentages differ significantly between the types being compared. If the average coverage values are also significantly different, they are shown as a second value, separated from the constancy value by a comma.

The species encountered should show the predominance of the higher constancy values on one of the two types being compared. The horizontal dividing line in the table separates the characteristic species groups of the two types.

Using this approach, together with other habitat type characteristics described in this field guide, it should be possible to allocate a site to the appropriate habitat type.

## Relationship of Habitat Types to Soil Moisture Nutrient Regimes

Habitat types of each region are shown on the moisture-nutrient synecocological coordinates grid. For explanation see **Relationship of Floristic Associations to Environment** in the introduction section.

## Description of Habitat Types

For each habitat type the following information is included:

**Distribution**. Brief description of our present knowledge of the geographic distribution of each type. Based on the distribution of our study sites, soil maps and, in some cases, maps of presettlement vegetation. Special reference is made to the map of Natural Divisions of Wisconsin, by Hole and Germain 1994. (See map section).

**Similar types.** Types in the same region, and sometimes adjacent regions, that are most easily confused with described type. The use of floristic comparison tables is advised.

**Landform and soils**. Predominant 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.** Because of a wide range of disturbance regimes many species combinations can be found on all habitat types. A listing or ranking of the abundance of specific cover types is not possible based on our data, because our sample stands were not randomly or systematically allocated within regions. Such information will become available once the habitat type classification of all continuous forest inventory (CFI) plots, used in the USFS Forest Inventory and Analysis Program, is completed. The project is currently in progress. The information given in this section is based on the analysis of reference stands representing each habitat type. This number ranged from 12 to 65 stands.

**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, American hornbeam *(Carpinus)* and black cherry on the droughty sites.



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**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 attempt to explain the origins of current forest mixtures and apparent successional trends in the absence of disturbance.

**Constancy tables.** Each habitat type description is accompanied by a constancy table. Constancy, or frequency of occurrence, is the percentage of reference stands (out of a total number of reference stands sampled for a given habitat type) in which a species occurred. It is therefore an indication of expected occurrence of a species in a particular stand on a given habitat type. Tables include all species with constancy grater than 20 percent. They are helpful for characterizing habitat types, but can also be useful to resource managers who are interested in identifying habitat types with preferential occurrence of particular species.

## Tables of the Occurrence of Tree Species on Various Habitat Types

These tables provide a quick overview of tree species across the environmental gradient represented by all habitat types within a region. The important feature here is a separate listing of four size classes (seedlings, saplings, medium and large-diameter trees). These tables can be used in conjunction with successional diagrams (section 4) to help assess the dynamics of forest cover types on various habitat types. They are particularly useful for identifying those habitat types where natural regeneration of a given species can be expected.

## Tables of Understory Species with Potential Diagnostic Value for Distinguishing Habitat Types of a Region

As explained in the introduction, no species have been found that occur exclusively on a single habitat type. However, if habitat types of a given region (instead of a whole state) are compared, we find that a few species do occur on only one, or perhaps two habitat types. More importantly, a fair number of species show discontinuities in presence, or display gradients in constancy, if habitat types are arranged along a moisture-nutrient gradient. A table shown such a listing is included in each region.

This table can be used to further verify habitat type identifications. In addition, this table is useful for identifying habitat types where species of particular interest is likely to be found. Also useful for this purpose is the alphabetized listing of species for all habitat types found in table 6.3 in the appendix.



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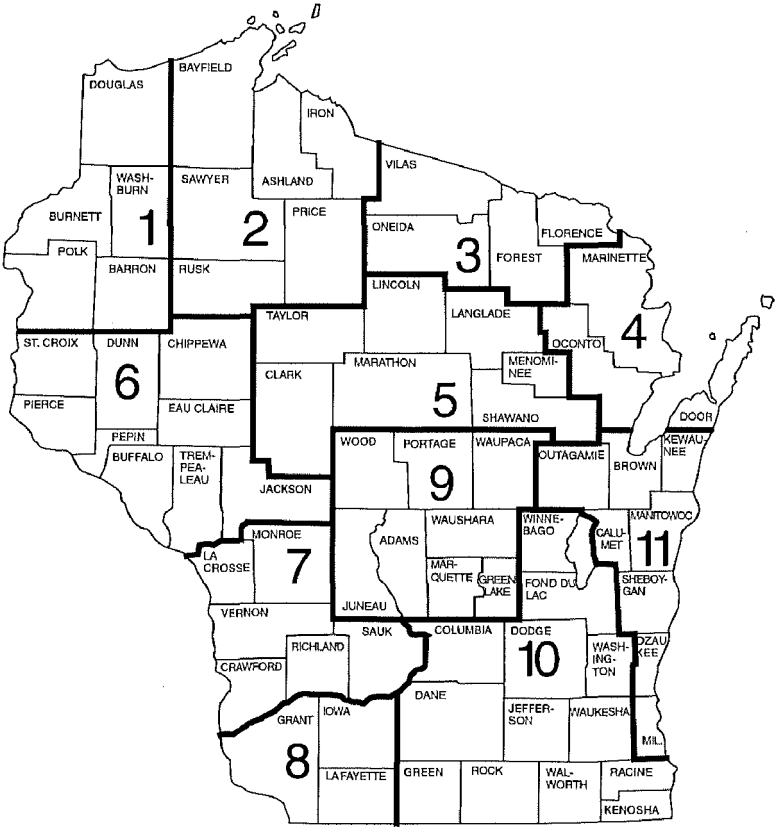


**Figure 3.1. Division of the state into 11 regions for purposes of habitat type classification. Regions 6 through 11 are included in this guide.**



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# Region 6

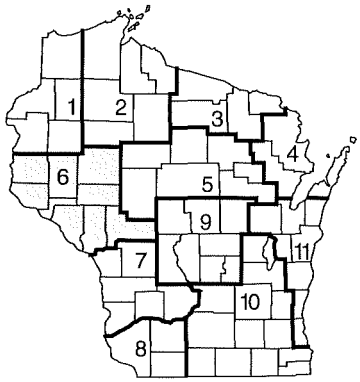
## Extent, topography, geology and soils

This region represents the northern part of the Natural Division 6 and includes the following counties: St. Croix, Pierce, Dunn, Chippewa, Eau Claire, Pepin, Buffalo Trempealeau and Jackson. The region has hilly topography resulting from stream dissection of sandstone bedrock. Much of it lies within the Driftless Area, but a thin layer of pre-Wisconsin glacial till covers some of the northern and northeastern portions. In many areas loess deposits provide a silt loam surface layer. Sandstone outcrops are common, as are low cliffs along stream courses. Natural subdivision 6c, characterized by weakly cemented sandstone, with a covering of a mixture of loess and sandstone residuum, represents more than half of the region's area. Dominant soils are Gale silt loam, formed in about two feet of loess over sandstone, and Norden loam, formed in loess mixed with greensand material. Hixton loam occurs where greenstone is absent. The infertile Boone sand, formed over nearly pure quartz, is also common.

The northern glaciated portion is characterized by two to three feet of loess over till that is either calcareous or leached. The till itself lies over dolomite bedrock. Santiago and Renova silt loam are the most common soils.

## Forest vegetation

Presettlement vegetation included oak savanna, oak openings, southern mesic forest, river bottom forest and pure stands of prairie. Pine and oak barrens were also present on the driest sites. As elsewhere in southern Wisconsin, fire regime largely controlled the distribution of vegetation types. Natural subdivisions in this region are based primarily on presettlement vegetation.




Natural Subdivision 6c, formerly occupied by oak savanna, oak opening or oak forest, represents the largest portion of this region. Current stands are composed of same species as described for presettlement communities, but individual stands vary greatly as a result of differences in disturbance and seed source availability. White oak, white pine and red maple are reproducing most successfully on dry and dry-mesic sites. Northern pin oak also shows strong ability to persist, but jack pine and red pine show little natural generation.

Subdivision 6a was delineated on the basis of occurrence of presettlement sugar maple-basswood forest. Another large unit of Subdivision 6a, also based on distribution of presettlement maple-basswood forest, was delineated in region 7, but floristic composition of these two blocks of mesic forest differ in some respects. Red and white oak were described as important components of presettlement sugar maple-basswood forests, but these species are not regenerating naturally under current conditions. Bitternut hickory and American elm are the only common species, besides sugar maple and basswood, that are successfully regenerating in mesic stands.



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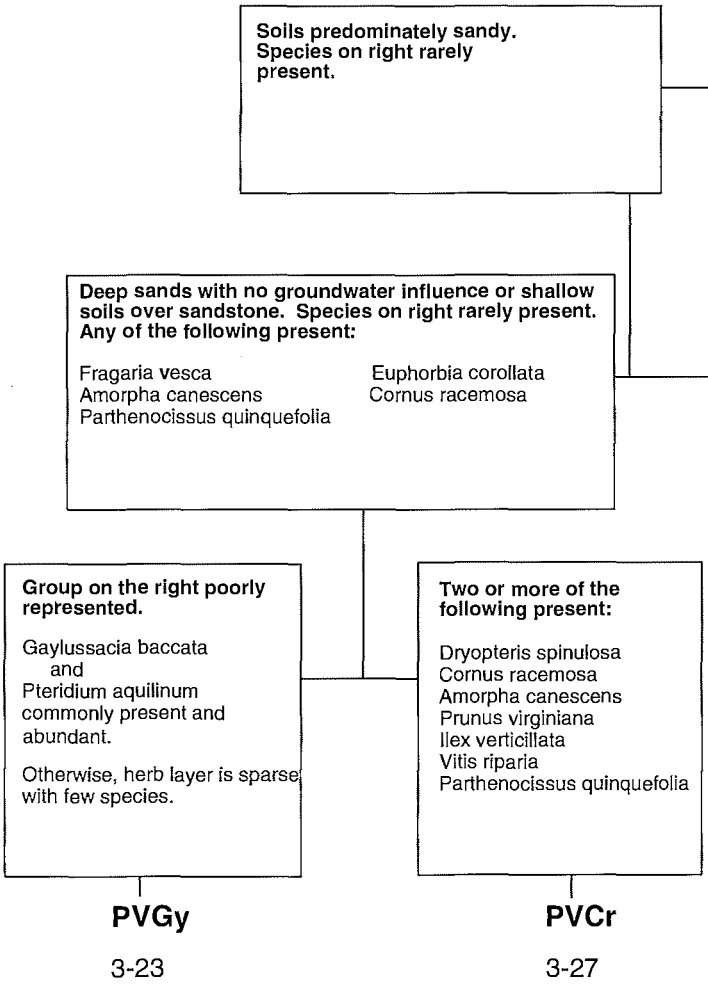
## Key to Habitat Types of Region 6 - Scientific Names (Key A)




**Group below well represented:** Several species are found rather than any one being common.

**Poorly represented:** Usually no more than one species from the group present. Abundance may be low or high.

* - This species carries the most weight

(C) - Common: >1% coverage



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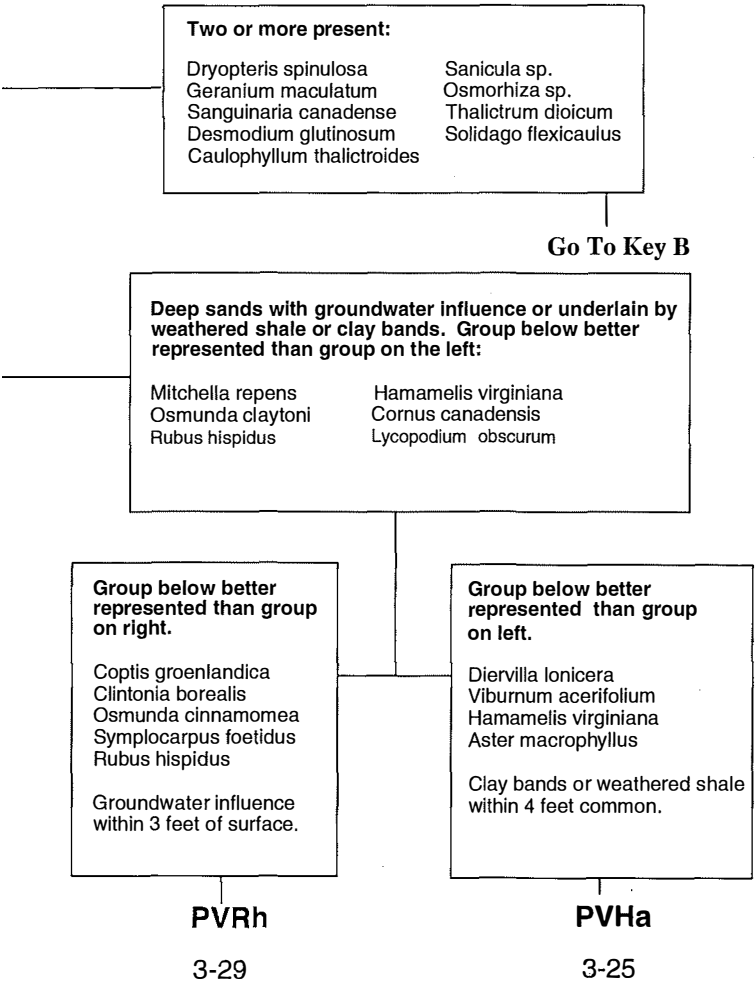




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# Key to Habitat Types of Region 6 - Scientific Names (Key B)

**Soils predominately sandy.**
**Species on right rarely present.**

**Go To Key A**

**Species on right seldom present.**
**Any of the following often common:**

Acer rubrum
Pteridium aquilinum
Maianthemum canadense
Vaccinium angustifolium

**Any of the following present:**

Vaccinium angustifolium
Lysimachia quadrifolia
Hepatica americana

**Species on the left seldom present.**

Circaea quadrisulcata often present.

**<2 on right present. Any of the following present:**

Parthenocissus quinq.
Desmodium nud.
Amelanchier sp.
Rubus sp. (C)

Quercus alba >
Quercus rubra

**Two or more present:**

Trillum sp.
Viburnum acer.
Thalictrum dioicum
Polygonatum pub.
Acer saccharum
Tilia americana
Ostrya virginiana

Quercus rubra >
Quercus alba

**<2 species on right present.**

**ArDe-V**
3-31

**AArVb**
3-38

**ArCi**
3-34

**Group below well represented:** Several species are found rather than any one being common.
**Poorly represented:** Usually no more than one species from the group present. Abundance may be low or high.
* - This species carries the most weight. **(C)** - Common: >1% coverage.



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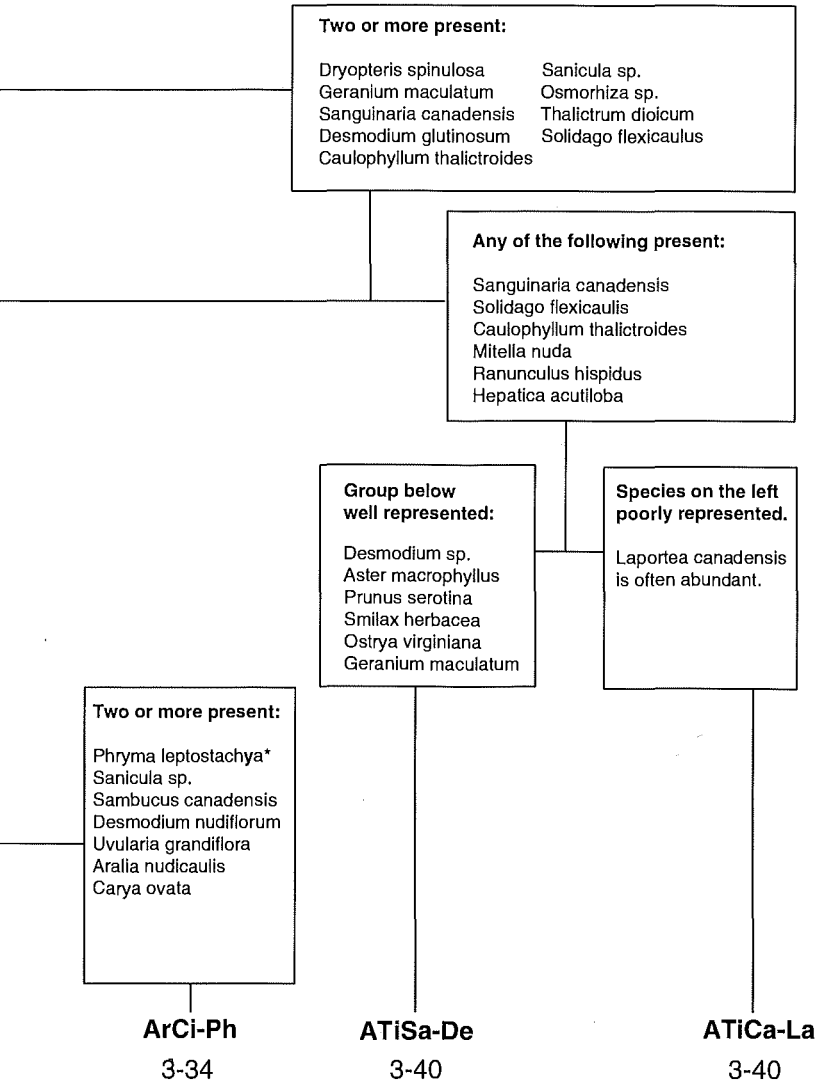




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# Key to Habitat Types of Region 6 - Common Names (Key A)

**Soils predominately sandy.**
**Species on right rarely present.**

**Deep sands with no groundwater influence or shallow soils over sandstone. Species on right rarely present. Any of the following present:**

Wood Strawberry
Lead Plant
Virginia Creeper
Flowering Spurge
Gray Dogwood

**Group on the right poorly represented.**

Black Huckleberry
and
Braken Fern
commonly present and abundant. Otherwise, herb layer is sparse with few species.

**PVGv**
3-23

**Two or more of the following present:**

Spinulose Shield Fern
Gray Dogwood
Lead Plant
Chokecherry
Winterberry
Riverbank Grape
Virginia Creeper

**PVCr**
3-27

**Group below well represented:** Several species are found rather than any one being common.
**Poorly represented:** Usually no more than one species from the group present. Abundance may be low or high.
***** - This species carries the most weight. **(C)** - Common: >1% coverage



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**Two or more present:**

Spinulose Shield Fern
Wild Geranium
Bloodroot
Blue Cohosh
Pointed-leaved Tick Trefoil
Snakeroots
Sweet Cicely/Aniseroot
Early Meadow Rue
Zig-zag Goldenrod

**Go To Key B**

**Deep sands with groundwater influence or underlain by weathered shale or clay bands. Group below better represented than group on the left:**

Partridgeberry
Interrupted Fern
Swamp Dewberry
Witch Hazel
Bunchberry
Ground Pine

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

Goldthread
Yellow Beadlilly
Cinnamon Fern
Skunk Cabbage
Swamp Dewberry

Groundwater influence within 3 feet of surface.

**PVRh**
3-29

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

Bush Honeysuckle
Maple-leaved Viburnum
Witch Hazel
Large-leaved Aster

Clay bands or weathered shale within 4 feet common.

**PVHa**
3-25



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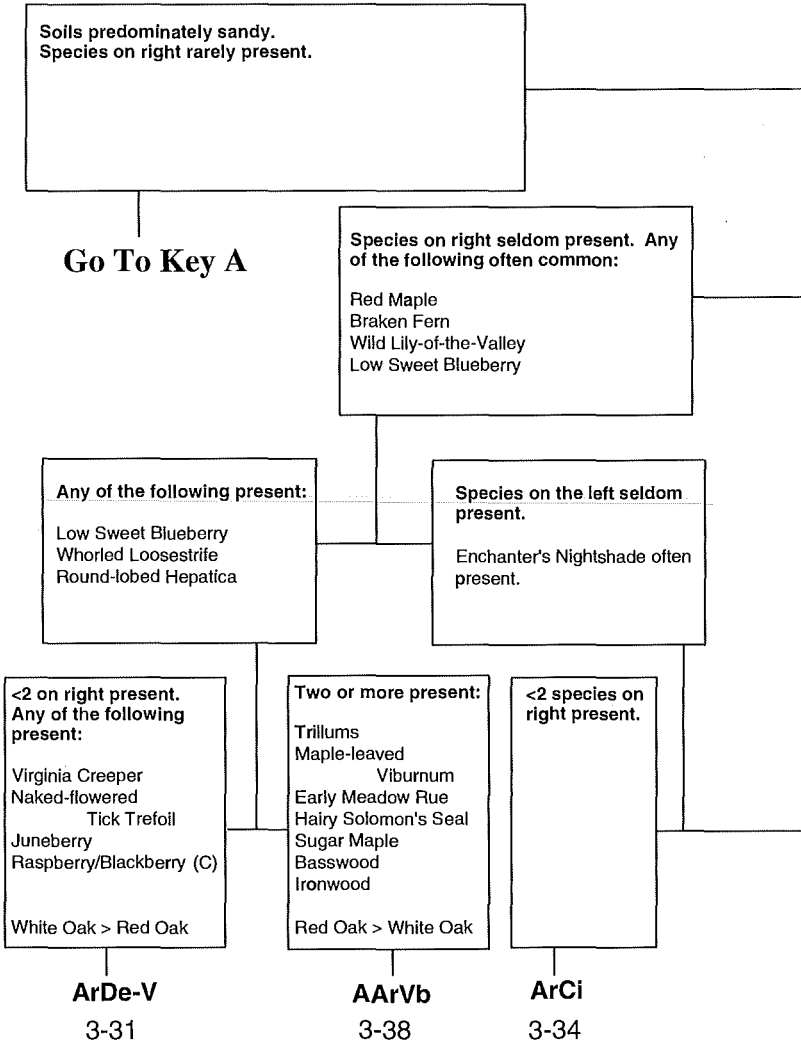
# Key to Habitat Types of Region 6 - Common Names (Key B)




**Group below well represented:** Several species are found rather than any one being common.
**Poorly represented:** Usually no more than one species from the group present. Abundance may be low or high.
* - This species carries the most weight. **(C)** - Common: >1% coverage.



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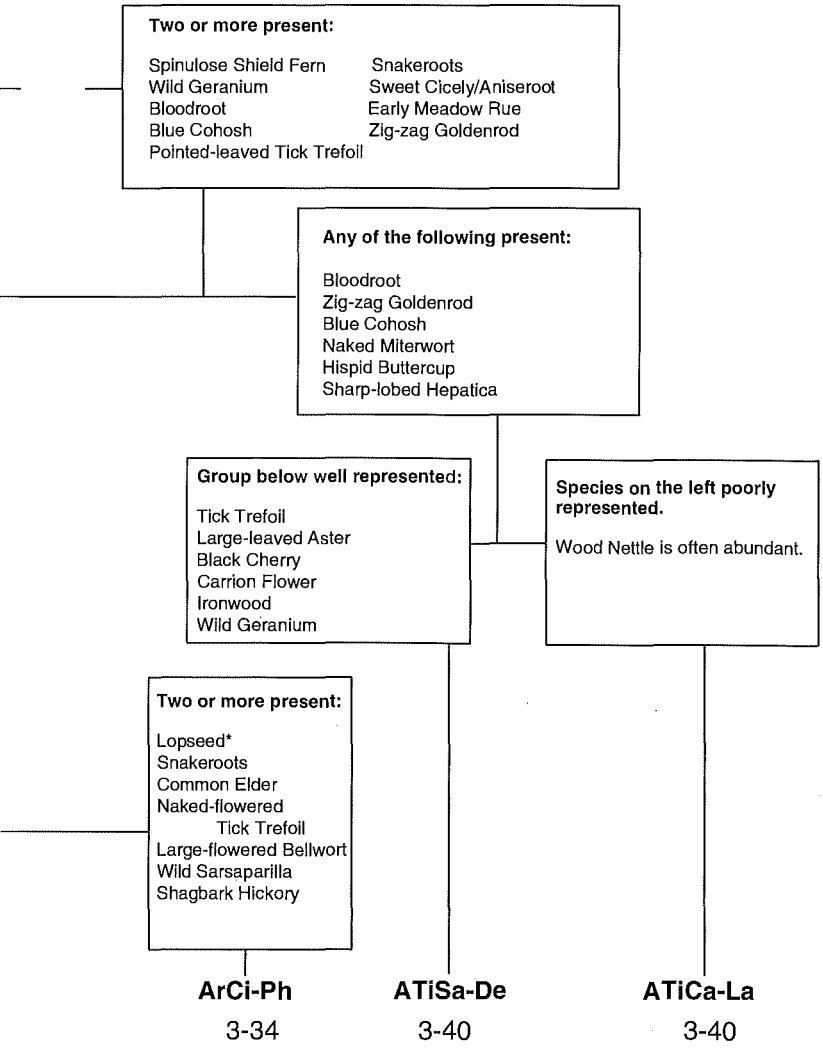





Previous View

# Comparison of Major Floristic Differences Between Closely Related Habitat Types - Region 6

| | | PVGy | PVCr |
|---|---|---|---|
| Gaylussacia baccata | Black huckleberry | 84,7 | 47,1 |
| Lysimachia quadrifolia | Whorled loosestrife | 69 | 35 |
| Gaultheria procumbens | Wintergreen | 55 | 17 |
| Epigaea repens | Trailing arbutus | 23 | . |
| Smilacina racemosa | False solomon's seal | 42 | 88 |
| Aralia nudicaulis | Wild sarsaparilla | 48 | 76 |
| Cornus racemosa | Gray dogwood | 7 | 76 |
| Prunus virginiana | Chokecherry | 12 | 76 |
| Ilex verticillata | Winterberry | 21 | 52 |
| Parthenocissus quinq. | Virginia creeper | 5 | 52 |
| Amorpha canescens | Lead plant | 10 | 35 |
| Smilax tamnoides | Bristly greenbrier | 5 | 35 |

| | | PVGy | PVHa |
|---|---|---|---|
| Aralia nudicaulis | Wild sarsaparilla | 48 | 82 |
| Aster macrophyllus | Large-leaved aster | 28 | 72 |
| Viburnum acerifolium | Maple-leaved viburnum | 12 | 67 |
| Hamamelis virginiana | Witch hazel | 3,1 | 51,5 |
| Osmunda claytoniana | Interrupted fern | 1 | 46 |
| Rubus hispidus | Swamp dewberry | 3 | 41 |
| Mitchella repens | Partridgeberry | 7 | 40 |
| Smilax tamnoides | Bristly greenbrier | 5 | 35 |
| Cornus canadensis | Bunchberry | . | 25 |

| | | PVCr | PVRh |
|---|---|---|---|
| Smilacina racemosa | False solomon's seal | 88 | 12 |
| Cornus racemosa | Gray dogwood | 76 | . |
| Prunus virginiana | Chokecherry | 76 | 6 |
| Corylus americana | Hazel-nut | 64 | 25 |
| Rosa spp. | Roses | 58 | . |
| Parthenocissus quinq. | Virginia creeper | 52 | 12 |
| Diervilla lonicera | Bush honeysuckle | 47 | . |
| Trientalis borealis | Starflower | 47 | 100 |
| Rubus hispidus | Swamp dewberry | 5 | 87 |
| Gaylussacia baccata | Black huckleberry | 47,1 | 75,7 |
| Mitchella repens | Partridgeberry | 17 | 75 |
| Gaultheria procumbens | Wintergreen | 17 | 62 |
| Osmunda cinnamomea | Cinnamon fern | | 62 |
| Lycopodium obscurum | Ground-pine | . | 56 |
| Cornus canadensis | Bunchberry | . | 50 |
| Coptis groenlandica | Goldthread | . | 43 |
| Clintonia borealis | Yellow beadlilly | . | 37 |
| Osmunda claytoniana | Interrupted fern | . | 31 |
| Aronia melanocarpa | Black chokeberry | 5 | 31 |

| | | PVGy | PVRh |
|---|---|---|---|
| Apocynum andro. | Spreading dogbane | 75 | 31 |
| Rosa spp. | Roses | 71 | . |
| Lysimachia quadrifolia | Whorled loosestrife | 69 | 18 |
| Diervilla lonicera | Bush honeysuckle | 44 | . |
| Euphorbia corollata | Flowering spurge | 35 | . |
| Trientalis borealis | Starflower | 41 | 100 |
| Ilex verticillata | Winterberry | 21 | 93 |
| Rubus hispidus | Swamp dewberry | 3 | 87 |



Previous View

*continued...*

| | | PVGy | PVRh |
|---|---|---|---|
| Mitchella repens | Partridgeberry | 7 | 75 |
| Osmunda cinnamomea | Cinnamon fern | . | 62 |
| Lycopodium obscurum | Ground-pine | 7 | 56 |
| Cornus canadensis | Bunchberry | . | 50 |
| Coptis groenlandica | Goldthread | . | 43 |
| Clintonia borealis | Yellow beadlilly | 1 | 37 |
| Osmunda claytoniana | Interrupted fern | 1 | 31 |

| | | PVCr | PVHa |
|---|---|---|---|
| Cornus racemosa | Gray dogwood | 76 | 3 |
| Prunus virginiana | Chokecherry | 76 | 6 |
| Parthenocissus quinq. | Virginia creeper | 52 | . |
| Amorpha canescens | Lead plant | 35 | . |
| Gaultheria procumbens | Wintergreen | 17 | 82 |
| Viburnum acerifolium | Maple-leaved viburnum | 11 | 67 |
| Hamamelis virginiana | Witch hazel | . | 51 |
| Osmunda claytoniana | Interrupted fern | . | 46 |
| Rubus hispidus | Swamp dewberry | 5 | 41 |
| Mitchella repens | Partridgeberry | 17 | 40 |
| Cornus canadensis | Bunchberry | . | 25 |

| | | PVRh | PVHa |
|---|---|---|---|
| Ilex verticillata | Winterberry | 93 | 40 |
| Rubus hispidus | Swamp dewberry | 87 | 41 |
| Osmunda cinnamomea | Cinnamon fern | 62,20 | 4,6 |
| Coptis groenlandica | Goldthread | 43 | 3 |
| Clintonia borealis | Yellow beadlilly | 37 | 1 |
| Symplocarpus foetidus | Skunk cabbage | 25 | . |
| Dryopteris spinulosa | Spinulose shield fern | 25 | 6 |
| Aster macrophyllus | Large-leaved aster | 37 | 72 |
| Lysimachia quadrifolia | Whorled loosestrife | 18 | 69 |
| Viburnum acerifolium | Maple-leaved viburnum | . | 67 |
| Diervilla lonicera | Bush honeysuckle | . | 51 |
| Hamamelis virginiana | Witch hazel | 6,1 | 51,5 |

| | | PVRh | ArDe-V |
|---|---|---|---|
| Trientalis borealis | Star flower | 100 | 14 |
| Ilex verticillata | Winterberry | 93 | 23 |
| Rubus hispidus | Swamp dewberry | 87 | . |
| Maianthemum canadense | Wild lily-of-the-valley | 81 | 38 |
| Mitchella repens | Partridgeberry | 75 | 9 |
| Gaylussacia baccata | Black huckleberry | 75.7 | 47,1 |
| Gaultheria procumbens | Wintergreen | 62 | . |
| Osmunda cinnamomea | Cinnamon fern | 62 | . |
| Lycopodium obscurum | Ground-pine | 56 | . |
| Cornus canadensis | Bunchberry | 50 | . |
| Coptis groenlandica | Goldthread | 43 | . |
| Desmodium glutinosum | Pointed-leaved tick trefoil | . | 90 |
| Diervilla lonicera | Bush honeysuckle | . | 71 |
| Geranium maculatum | Wild geranium | . | 71 |
| Smilacina racemosa | False solomon's seal | 12 | 71 |
| Cornus racemosa | Gray dogwood | . | 66 |
| Parthenocissus quinq. | Virginia creeper | 12 | 66 |
| Amphicarpa bracteata | Hog peanut | . | 61 |
| Osmorhiza claytoni | Sweet cicely | . | 57 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | . | 52 |
| Viburnum acerifolium | Maple-leaved viburnum | . | 38 |

*continued...*



Previous View

*continued...*

| | | PVHa | ArDe-V |
|---|---|---|---|
| Gaultheria procumbens | Wintergreen | 82 | . |
| Trientalis borealis | Star flower | 67 | 14 |
| Hamamelis virginiana | Witch hazel | 51 | 4 |
| Rubus hispidus | Swamp dewberry | 41 | . |
| Mitchella repens | Partridgeberry | 40 | 9 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 4 | 90 |
| Prunus virginiana | Chokecherry | 6 | 80 |
| Corylus americana | Hazel-nut | 24 | 80 |
| Smilacina racemosa | False solomon's seal | 25 | 71 |
| Geranium maculatum | Wild geranium | 1 | 71 |
| Cornus racemosa | Gray dogwood | 3 | 66 |
| Parthenocissus quinq. | Virginia creeper | . | 66 |
| Amphicarpa bracteata | Hog peanut | 9 | 61 |
| Lathyrus ochroleucus | Pale vetchling | 3 | 61 |
| Osmorhiza claytoni | Sweet cicely | . | 57 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 1 | 52 |
| Dryopteris spinulosa | Spinulose shield fern | 6 | 42 |

| | | ArDe-V | ArCi |
|---|---|---|---|
| Vaccinium angust. | Low sweet blueberry | 85 | 30 |
| Pteridium aquilinum | Braken fern | 86 | 61 |
| Aralia nudicaulis | Wild sarsaparilla | 76 | 23 |
| Cornus racemosa | Gray dogwood | 66 | 26 |
| Lathyrus ochroleucus | Pale vetchling | 61 | . |
| Lysimachia quadrifolia | Whorled loosestrife | 57 | 7 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 52 | . |
| Gaylussacia baccata | Black huckleberry | 47 | 3 |
| Phryma leptostachya | Lopseed | 33 | 3 |
| Circaea quadrisulcata | Enchanter's nightshade | 23 | 76 |
| Maianthemum canadense | Wild lily-of-the-valley | 38 | 69 |
| Viburnum lentago | Nannyberry | 19 | 34 |

| | | AArVb | ArCi |
|---|---|---|---|
| Viburnum acerifolium | Maple-leaved viburnum | 100 | 11 |
| Polygonatum pubescens | Hairy solomon's seal | 85 | 19 |
| Aralia nudicaulis | Wild sarsaparilla | 85 | 23 |
| Corylus cornuta | Beaked hazelnut | 71 | 19 |
| Osmunda claytoniana | Interrupted fern | 71 | . |
| Trillium spp. | Trilliums | 71 | 3 |
| Vaccinium angust. | Low sweet blueberry | 71 | 30 |
| Thalictrum dioicum | Early meadow rue | 57 | 19 |
| Lonicera canadensis | American fly honeysuckle | 57 | 3 |
| Hepatica americana | Round-lobed hepatica | 57 | 3 |
| Cornus alternifolia | Alternate-leaved dogwood | 42,5 | 19,1 |
| Hepatica acutiloba | Sharp-lobed hepatica | 42 | . |
| Rubus spp. | Blackberries/raspberries | 28 | 96 |
| Parthenocissus quinq. | Virginia creeper | 14 | 88 |
| Circaea quadrisulcata | Enchanter's nightshade | 28 | 76 |
| Osmorhiza claytoni | Sweet cicely | 28 | 73 |

| | | AArVb | ATiCa-La |
|---|---|---|---|
| Aster macrophyllus | Large-leaved aster | 100 | 10 |
| Viburnum acerifolium | Maple-leaved viburnum | 100 | . |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 85 | 13 |
| Prunus serotina | Black cherry | 85 | 3 |
| Polygonatum pubescens | Hairy solomon's seal | 85 | 27 |

*continued...*



Previous View

*continued...*

| | | AArVb | ATiCa-La |
|---|---|---|---|
| Aralia nudicaulis | Wild sarsaparilla | 85 | 10 |
| Osmunda claytoniana | Interrupted fern | 71 | 3 |
| Vaccinium angust. | Low sweet blueberry | 71 | 3 |
| Lonicera canadensis | American fly honeysuckle | 57 | 3 |
| Hepatica americana | Round-lobed hepatica | 57 | . |
| Osmorhiza claytoni | Sweet cicely | 28 | 79 |
| Sanguinaria canadensis | Bloodroot | . | 79 |
| Caulophyllum thal. | Blue cohosh | 14 | 72 |
| Asarum canadense | Wild ginger | . | 55 |
| Laportea canadensis | Wood nettle | . | 55,20 |
| Solidago flexicaulis | Zigzag goldenrod | 14 | 55 |
| Arisaema atrorubens | Jack-in-the-pulpit | . | 48 |
| Actaea spp. | Baneberries | . | 48 |
| Adiantum pedatum | Maidenhair fern | . | 44 |
| Mitella diphylla | Miterwort | . | 41 |
| Allium tricoccum | Wild leek | . | 34 |

| | | ArCi | ATiSa-De |
|---|---|---|---|
| Maianthemum canadense | Wild lily-of-the-valley | 69 | 7 |
| Corylus americana | Hazel-nut | 69 | 28 |
| Uvularia sessilifolia | Sessile-leaved bellwort | 65 | 21 |
| Pteridium aquilinum | Braken fern | 61 | 10 |
| Ilex verticillata | Winterberry | 38 | . |
| Vaccinium angust. | Low sweet blueberry | 30 | . |
| Solidago flexicaulis | Zigzag goldenrod | 7 | 92 |
| Sanguinaria canadensis | Bloodroot | 3 | 92 |
| Sanicula marilandica | Black snakeroot | 19 | 92 |
| Thalictrum dioicum | Early meadow rue | 19 | 85 |
| Uvularia grandiflora | Large-flowered bellwort | 19 | 82 |
| Cornus alternifolia | Alternate-leaved dogwood | 19 | 78 |
| Adiantum pedatum | Maidenhair fern | 7 | 75 |
| Mitella diphylla | Miterwort | . | 75 |
| Asarum canadense | Wild ginger | . | 75 |
| Hepatica acutiloba | Sharp-lobed hepatica | . | 64 |
| Caulophyllum thal. | Blue cohosh | 7 | 57 |

| | | ArCi-Ph | ATiSa-De |
|---|---|---|---|
| Phryma leptostachya | Lopseed | 82 | 35 |
| Galium triflorum | Sweet-scented bedstraw | 76 | 7 |
| Corylus americana | Hazel-nut | 73 | 28 |
| Cornus racemosa | Gray dogwood | 69 | 7 |
| Sambucus canadensis | Common elder | 54 | . |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 45 | 3 |
| Pyrola spp. | Pyrolas | 41 | . |
| Maianthemum canadense | Wild lily-of-the-valley | 34 | 7 |
| Geum lacinatum | Rough avens | 32 | . |
| Apocynum andro. | Spreading dogbane | 32 | 3 |
| Sanguinaria canadensis | Bloodroot | 8 | 92 |
| Solidago flexicaulis | Zigzag goldenrod | 6 | 92 |
| Thalictrum dioicum | Early meadow rue | 30 | 85 |
| Cornus alternifolia | Alternate-leaved dogwood | 15 | 78 |
| Mitella diphylla | Miterwort | . | 75 |
| Adiantum pedatum | Maidenhair fern | 30 | 75 |
| Asarum canadense | Wild ginger | 2 | 75 |
| Trillium spp. | Trilliums | 6 | 71 |
| Hepatica acutiloba | Sharp-lobed hepatica | . | 64 |
| Caulophyllum thal. | Blue cohosh | 6 | 57 |
| Ranunculus hispidus | Hispid buttercup | . | 53 |

*continued...*



Previous View

*continued...*

| | | ArDe-V | AArVb |
|---|---|---|---|
| Rubus spp. | Blackberries/raspberries | 100 | 28 |
| Amelanchier spp. | Juneberry | 85 | 14 |
| Smilacina racemosa | False solomon's seal | 71 | 28 |
| Cornus racemosa | Gray dogwood | 66 | . |
| Parthenocissus quinq. | Virginia creeper | 66 | 14 |
| Lathyrus ochroleucus | Pale vetchling | 61 | . |
| Osmorhiza claytoni | Sweet cicely | 57 | 28 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 52 | . |
| Gaylussacia baccata | Black huckleberry | 47 | . |
| Smilax herbacea | Carrion flower | 38 | . |
| Apocynum andro. | Spreading dogbane | 38 | . |
| Phryma leptostachya | Lopseed | 33 | . |
| Viburnum acerifolium | Maple-leaved viburnum | 38 | 100 |
| Polygonatum pubescens | Hairy solomon's seal | 28 | 85 |
| Ribes spp. | Gooseberries | 23 | 71 |
| Osmunda claytoniana | Interrupted fern | 28 | 71 |
| Corylus cornuta | Beaked hazelnut | 19 | 71 |
| Trillium spp. | Trilliums | 4 | 71 |

| | | ArDe-V | ArCi-Ph |
|---|---|---|---|
| Vaccinium angust. | Low sweet blueberry | 85 | 13 |
| Diervilla lonicera | Bush honeysuckle | 71 | 36 |
| Aster macrophyllus | Large-leaved aster | 57,4 | 28,1 |
| Gaylussacia baccata | Black huckleberry | 47 | . |
| Phryma leptostachya | Lopseed | 33 | 82 |
| Circaea quadrisulcata | Enchanter's nightshade | 23 | 93 |
| Sambucus canadensis | Common elder | 9 | 54 |
| Botrychium virginianum | Rattlesnake fern | 4 | 41 |
| Actaea spp. | Baneberries | 9 | 32 |
| Arisaema atrorubens | Jack-in-the-pulpit | 4 | 32 |
| Geum lacinatum | Rough avens | 4 | 32 |
| Aralia racemosa | Spikenard | 4 | 30 |
| Agrimonia gryposepala | Agrimony | . | 30 |

| | | AArVb | ArCi-Ph |
|---|---|---|---|
| Circaea quadrisulcata | Enchanter's nightshade | 28 | 93 |
| Osmorhiza claytoni | Sweet cicely | 28 | 93 |
| Geranium maculatum | Wild geranium | 42 | 91 |
| Phryma leptostachya | Lopseed | . | 82 |
| Parthenocissus quinq. | Virginia creeper | 14 | 76 |
| Cornus racemosa | Gray dogwood | . | 69 |
| Sanicula marilandica | Black snakeroot | 28 | 63 |
| Vitis riparia | Riverbank grape | . | 58 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | . | 45 |
| Botrychium virginianum | Rattlesnake fern | . | 41 |
| Aster macrophyllus | Large-leaved aster | 100 | 28 |
| Viburnum acerifolium | Maple-leaved viburnum | 100 | 19 |
| Polygonatum pubescens | Hairy solomon's seal | 85 | 17 |
| Corylus cornuta | Beaked hazelnut | 71 | 23 |
| Osmunda claytoniana | Interrupted fern | 71 | 30 |
| Vaccinium angust. | Low sweet blueberry | 71 | 13 |
| Trillium spp. | Trilliums | 71 | 6 |
| Hepatica americana | Round-lobed hepatica | 57 | 4 |
| Lonicera canadensis | American fly honeysuckle | 57 | 2 |
| Hepatica acutiloba | Sharp-lobed hepatica | 42 | . |

*continued...*



Previous View

*continued...*

| | | ArCi | ArCi-Ph |
|---|---|---|---|
| Phryma leptostachya | Lopseed | 3 | 82 |
| Aralia nudicaulis | Wild sarsaparilla | 23 | 69 |
| Cornus racemosa | Gray dogwood | 26 | 69 |
| Sanicula marilandica | Black snakeroot | 19 | 63 |
| Uvularia grandiflora | Large-flowered bellwort | 19 | 56 |
| Sambucus canadensis | Common elder | 3 | 54 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | . | 45 |
| Botrychium virginianum | Rattlesnake fern | 3 | 41 |
| Carya ovata | Shagbark hickory | . | 41 |
| Arisaema atrorubens | Jack-in-the-pulpit | 7 | 32 |

| | | ArCi | ATiCa-La |
|---|---|---|---|
| Rubus spp. | Blackberries/raspberries | 96 | 6 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 69 | 13 |
| Maianthemum canadense | Wild lily-of-the-valley | 69 | 6 |
| Corylus americana | Hazel-nut | 69 | . |
| Uvularia sessilifolia | Sessile-leaved bellwort | 65 | 27 |
| Pteridium aquilinum | Braken fern | 61 | . |
| Trillium spp. | Trilliums | 3 | 79 |
| Sanguinaria canadensis | Bloodroot | 3 | 79 |
| Caulophyllum thal. | Blue cohosh | 7 | 72 |
| Hepatica acutiloba | Sharp-lobed hepatica | . | 58 |
| Asarum canadense | Wild ginger | . | 55 |
| Mitella diphylla | Miterwort | . | 41 |
| Allium tricoccum | Wild leek | . | 34 |

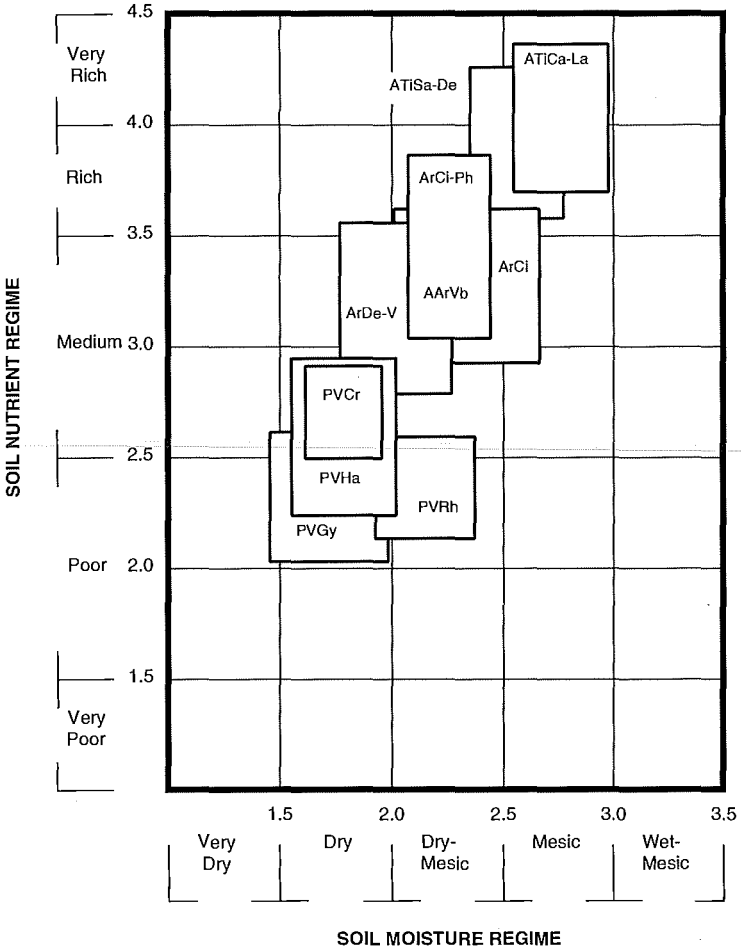
| | | ArCi-Ph | ATiCa-La |
|---|---|---|---|
| Geranium maculatum | Wild geranium | 91 | 24 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 91 | 13 |
| Rubus spp. | Blackberries/raspberries | 84,5 | 6,1 |
| Phryma leptostachya | Lopseed | 82 | 13 |
| Sedges spp. | Sedges | 78 | . |
| Corylus americana | Hazel-nut | 73 | . |
| Cornus racemosa | Gray dogwood | 69 | 3 |
| Aralia nudicaulis | Wild sarsaparilla | 69 | 10 |
| Sambucus canadensis | Common elder | 54 | . |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 45 | . |
| Sanguinaria canadensis | Bloodroot | 8 | 79 |
| Trillium spp. | Trilliums | 6 | 79 |
| Caulophyllum thal. | Blue cohosh | 6 | 72 |
| Hepatica acutiloba | Sharp-lobed hepatica | . | 58 |
| Solidago flexicaulis | Zigzag goldenrod | 6 | 55 |
| Asarum canadense | Wild ginger | 2 | 55 |
| Cornus alternifolia | Alternate-leaved dogwood | 15 | 51 |
| Mitella diphylla | Miterwort | . | 41 |

| | | ATiSa-De | ATiCa-La |
|---|---|---|---|
| Laportea canadensis | Wood nettle | 7,2 | 55,20 |
| Arisaema atrorubens | Jack-in-the-pulpit | 25 | 48 |
| Solidago flexicaulis | Zigzag goldenrod | 92 | 55 |
| Sanicula marilandica | Black snakeroot | 92 | 48 |
| Uvularia grandiflora | Large-flowered bellwort | 82 | 48 |
| Smilax herbacea | Carrion flower | 78 | 37 |
| Geranium maculatum | Wild geranium | 78 | 24 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 78 | 13 |
| Ostrya virginiana | Ironwood | 67 | 10 |
| Aster macrophyllus | Large-leaved aster | 67 | 10 |
| Prunus serotina | Black cherry | 53 | 3 |
| Aralia nudicaulis | Wild sarsaparilla | 42 | 10 |
| Osmunda claytoniana | Interrupted fern | 32 | 3 |



Previous View

# Relationship of Habitat Types to Soil Moisture and Nutrient Regimes in Region 6






Previous View

# PVGy
## *Pinus strobus/Vaccinium-Gaylussacia*
## (White pine/Blueberry-Huckleberry)

**Distribution:**
Most prevalent in Region 6, but also in northern parts of Region 7.
Natural subdivision 4a.

**Similar Types:** PVCr, PVHa

**Landform And Soils:**
Nearly level sand plains with sandstone buttes. Soil is sand or loamy sand, usually more than 3-4 feet deep. Well to excessively well drained. Representative soils are Tarr and Boone sand and loamy sand. The type is classified as **very dry to dry/poor nutrient**. Typical **PVGy** is found on flats and lower slopes. On steep upper slopes, S-SW aspects and narrow ridges a **xeric sub-type** of **PVGy** should be recognized. No plants consistently reflect these xeric conditions, but tree growth is strongly limited.

**Vegetation:**
**Common Forest Cover Types**: Various mixtures of *pines* (*jack, red, white), pin oak, black oak and white oak* occur. Pines exhibit normal growth, but oaks only attain small stature and poor form. *Red maple* is present mostly as saplings. In the literature these communities are usually referred to as pine and oak barrens.

**Shrub And Small Tree Layer**: This layer is absent or poorly developed except for *huckleberry.* The following species are often present, but with low coverages: *serviceberry, black cherry, blackberries* and *raspberries*. *Red maple* and *black cherry* are often dominant.

**Ground Flora Characteristics**: Except for *bracken fern*, herbs are largely absent or sparsely distributed. Most commonly found are: *common milkweed, whorled loosestrife* and *wild lily-of-the-valley.* Others, with even lower constancy are *wild sarsaparilla*, f*alse solomon's seal*, and *starflower.* Because only the most drought and low-nutrient tolerant species occur on the extreme end of this gradient plants cannot be used to further distinguish between "normal" and even more xeric sites. Therefore, when vegetation keys out to **PVGy** on steep upper slopes, S-SW aspects or narrow ridges, the site must be considered as a **xeric sub-type** of **PVGy** type.

**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 vigorous development in the seedling and sapling layers. *White oak* also appears to regenerate well enough to remain as a permanent associate. *Red pine, jack pine,* and *black oak* would become less common. *Red maple* and *black cherry* are often well represented in the sapling layer but attain only small tree size on this type and can be expected to persist as understory associates.



Previous View

# PVGy

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Pteridium aquilinum | Braken fern | 91 | 15.71 |
| Sedges spp. | Sedges | 85 | 3.26 |
| Apocynum andro. | Spreading dogbane | 75 | 0.51 |
| Lysimachia quadrifolia | Whorled loosestrife | 69 | 0.56 |
| Maianthemum canadense | Wild lily-of-the-valley | 64 | 0.85 |
| Uvularia sessilifolia | Sessile-leaved bellwort | 64 | 0.50 |
| Gaultheria procumbens | Wintergreen | 55 | 0.58 |
| Aralia nudicaulis | Wild sarsaparilla | 48 | 1.24 |
| Grasses spp. | Grasses | 44 | 1.58 |
| Smilacina racemosa | False solomon's seal | 42 | 0.50 |
| Trientalis borealis | Starflower | 41 | 0.63 |
| Euphorbia corollata | Flowering spurge | 35 | 0.50 |
| Aster macrophyllus | Large-leaved aster | 28 | 0.66 |
| Anemone quinquefolia | Wood anemone | 23 | 0.50 |
| Epigaea repens | Trailing arbutus | 23 | 0.50 |
| Potentilla simplex | Common cinquefoil | 21 | 0.50 |
| Goodyera pubescens | Downy rattlesnake plantain | 19 | 0.50 |
| Aster sagittifolius | Arrow-leaved aster | 19 | 0.50 |
| **Shrubs** | | | |
| Vaccinium angust. | Low sweet blueberry | 98 | 2.87 |
| Amelanchier spp. | Juneberry | 87 | 0.96 |
| Gaylussacia baccata | Black huckleberry | 83 | 7.38 |
| Rosa spp. | Roses | 71 | 0.56 |
| Rubus spp. | Blackberries/raspberries | 66 | 2.09 |
| Diervilla lonicera | Bush honeysuckle | 44 | 0.50 |
| Corylus americana | Hazel-nut | 41 | 1.37 |
| Corylus cornuta | Beaked hazelnut | 21 | 2.75 |
| Ilex verticillata | Winterberry | 21 | 0.50 |
| **Tree Seedlings** | | | |
| Acer rubrum | Red maple | 78 | 1.25 |
| Prunus serotina | Black cherry | 67 | 0.76 |
| Pinus strobus | White pine | 67 | 1.41 |
| Quercus ellipsoidalis | Northern pin oak | 66 | 0.84 |
| Quercus alba | White oak | 55 | 1.69 |
| Populus grandidentata | Bigtooth aspen | 30 | 0.65 |



Previous View

# PVHa
## *Pinus/Vaccinium-Hamamelis*
## (White pine/Blueberry-Witch hazel)

**Distribution:**
Primarily in eastern part of Eau Claire and NE Jackson counties and extending into SW Clark county. Corresponding closely to Natural Subdivision 2e.

**Similar types:** PVRh and PVGy

**Landform and soils:**
This habitat type is represented by two different types of substrate. **a)** Sandy to clayey loams over shaly sandstone. Bedrock is usually within 3 or 4 feet from surface. Moist or mottled layer is often present in lower C horizon. **b)** Loamy sand (sometimes with shaly-clay) usually over 4 feet deep with pronounced increase in moisture in the lower strata. Both conditions are classified as **dry/poor** to **medium nutrient**.

**Vegetation:**
**Common forest cover types**: Composition is similar to that of PVRh. *White pine, red maple* and *pin oak* are most common, but *white oak, red oak* and *aspen* also occur. Quality of stands varies greatly reflecting differences in past use, but all of above species show good growth in some stands.

**Shrub and small tree layer**: This layer is generally not dense. In terms of constancy values the following species are most common: *Serviceberry, 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 PVHa.

**Caution**: some stands on ridges, shallow soils or other extreme xeric sites may key out to PVHa by virtue of presence of *maple-leaf viburnum* (but not *witch hazel*). Such sites most likely represent a xeric sub-type of PVGy. (See description of PVGy).

**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 the PVRh type *e.g.*: *starflower, swamp dewberry, partridgeberry*, and *winterberry*.

**Disturbance and succession**: *White pine* is regenerating in all cover types if seed source is present. It is therefore considered as potential permanent and dominant component of any forest type. *Red maple* is probably the strongest potential associate, but only in the secondary canopy layer. White and especially *red oak* will likely decrease in importance without large scale disturbance.



Previous View

# PVHa

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Pteridium aquilinum | Braken fern | 95 | 9.01 |
| Gaultheria procumbens | Wintergreen | 82 | 0.60 |
| Sedges spp. | Sedges | 82 | 0.99 |
| Aralia nudicaulis | Wild sarsaparilla | 82 | 1.84 |
| Uvularia sessilifolia | Sessile-leaved bellwort | 79 | 0.71 |
| Aster macrophyllus | Large-leaved aster | 72 | 0.62 |
| Lysimachia quadrifolia | Whorled loosetrife | 69 | 0.50 |
| Trientalis borealis | Star flower | 67 | 0.50 |
| Maianthemum canadense | Wild lily-of-the-valley | 64 | 0.69 |
| Grasses spp. | Grasses | 64 | 0.57 |
| Osmunda claytoniana | Interrupted fern | 46 | 1.43 |
| Rubus hispidus | Swamp dewberry | 41 | 0.60 |
| Mitchella repens | Partridgeberry | 40 | 0.60 |
| Apocynum andro. | Spreading dogbane | 40 | 0.50 |
| Smilax tamnoides | Bristly greenbrier | 35 | 0.50 |
| Lycopodium obscurum | Ground-pine | 29 | 0.50 |
| Smilacina racemosa | False solomon's seal | 25 | 0.50 |
| Cornus canadensis | Bunchberry | 25 | 0.81 |
| **Shrubs** | | | |
| Amelanchier spp. | Juneberry | 98 | 1.87 |
| Vaccinium angust. | Low sweet blueberry | 98 | 0.87 |
| Viburnum acerifolium | Maple-leaved viburnum | 67 | 0.86 |
| Gaylussacia baccata | Black huckleberry | 66 | 3.43 |
| Rubus spp. | Blackberries/raspberries | 59 | 0.77 |
| Diervilla lonicera | Bush honeysuckle | 51 | 0.58 |
| Hamamelis virginiana | Witch hazel | 51 | 4.81 |
| Corylus cornuta | Beaked hazelnut | 41 | 1.44 |
| Ilex verticillata | Winterberry | 40 | 0.60 |
| Corylus americana | Hazel-nut | 24 | 0.83 |
| Rosa spp. | Roses | 20 | 0.50 |
| **Tree Seedlings** | | | |
| Acer rubrum | Red maple | 91 | 1.08 |
| Quercus alba | White oak | 79 | 1.01 |
| Prunus serotina | Black cherry | 61 | 0.71 |
| Pinus strobus | White pine | 59 | 1.23 |
| Quercus ellipsoidalis | Northern pin oak | 54 | 0.57 |
| Populus grandidentata | Bigtooth aspen | 45 | 0.59 |
| Crataegus spp. | Hawthorns | 27 | 0.53 |



Previous View

# PVCr

## *Pinus strobus/Vaccinium-Cornus racemosa*
## (White pine/Blueberry-Gray dogwood)

**Distribution:**
Primarily in northern parts of Region 7 and throughout Region 6. Closely associated with Natural Subdivisions 4a and 6c.

**Similar types:** PVGy, PVHa

**Landform and soils:**
Rolling to hilly topography with sandstone outcrops. Soils are either thin loam or silt loam over deep sand, or over bedrock. Soil example is Eleva sandy loam. This type is classified as **dry/ medium nutrient**.

**Vegetation:**
**Common forest cover types**: Mixtures of *white oak, black oak, pin oak* and *white pine* are most common. *Jack pine* is frequently present. *Red oak* is generally absent. *Red maple* is common and grows better than it does on **PVGy**, but less well than on **ArDe-V**. *Black cherry* is almost always present as saplings, but does not develop well into larger size class.

**Shrub and small tree layer**: This layer is much better represented on this type than it is on **PVGy**. Most diagnostic in this respect are *gray dogwood* and *choke cherry. Black cherry* is also better represented on **PVCr**. Other important species are *blackberries* and *raspberries, hazel* and *Serviceberry.*

**Ground flora characteristics**: Herbaceous layer is poorly developed on this type. A few species are better represented on this type than they are on the **PGy** and are useful for identification. These are *wild sarsaparilla, true solomon's seal* and *Virginia creeper.*

**Disturbance and succession:**
All tree species occurring on this type are adapted to fire disturbance. The relative frequency and intensity of fire probably controlled community composition in presettlement time. There is no evidence to suggest that in the absence of fire the same species, with the exception of *jack pine,* could not maintain themselves on this type. *White pine,* because of its much larger stature and longer life span than other species, is presumed to be a potential dominant.



Previous View

# PVCr

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Sedges spp. | Sedges | 100 | 2.24 |
| Smilacina racemosa | False solomon's seal | 88 | 0.50 |
| Pteridium aquilinum | Braken fern | 88 | 10.63 |
| Maianthemum canadense | Wild lily-of-the-valley | 76 | 0.69 |
| Aralia nudicaulis | Wild sarsaparilla | 76 | 3.69 |
| Uvularia sessilifolia | Sessile-leaved bellwort | 58 | 1.00 |
| Apocynum andro. | Spreading dogbane | 58 | 0.50 |
| Parthenocissus quinq. | Virginia creeper | 52 | 0.78 |
| Aster macrophyllus | Large-leaved aster | 47 | 0.81 |
| Trientalis borealis | Starflower | 47 | 0.50 |
| Lysimachia quadrifolia | Whorled loosestrife | 35 | 0.50 |
| Smilax tamnoides | Bristly greenbrier | 35 | 0.50 |
| Lathyrus ochroleucus | Pale vetchling | 29 | 0.50 |
| Pyrola spp. | Pyrolas | 29 | 0.50 |
| Vitis riparia | Riverbank grape | 29 | 0.50 |
| Dryopteris spinulosa | Spinulose shield fern | 29 | 0.50 |
| Euphorbia corollata | Flowering spurge | 29 | 0.50 |
| Grasses spp. | Grasses | 29 | 0.50 |
| Goodyera pubescens | Downy rattlesnake plantain | 23 | 0.50 |
| Galium triflorum | Sweet-scented bedstraw | 23 | 0.50 |
| Galium boreale | Northern bedstraw | 23 | 0.50 |
| Geranium maculatum | Wild geranium | 23 | 0.50 |
| Smilax herbacea | Carrion flower | 23 | 0.50 |
| Fragaria vesca | Wood strawberry | 23 | 0.50 |
| **Shrubs** | | | |
| Rubus spp. | Blackberries/raspberries | 88 | 2.63 |
| Amelanchier spp. | Juneberry | 88 | 1.33 |
| Vaccinium angust. | Low sweet blueberry | 82 | 1.21 |
| Cornus racemosa | Gray dogwood | 76 | 1.81 |
| Prunus virginiana | Chokecherry | 76 | 0.88 |
| Corylus americana | Hazel-nut | 64 | 2.27 |
| Rosa spp. | Roses | 58 | 0.75 |
| Ilex verticillata | Winterberry | 52 | 0.50 |
| Gaylussacia baccata | Black huckleberry | 47 | 1.13 |
| Diervilla lonicera | Bush honeysuckle | 47 | 1.44 |
| Amorpha canescens | Lead plant | 35 | 0.50 |
| Corylus cornuta | Beaked hazelnut | 29 | 1.00 |
| Crataegus spp. | Hawthorns | 23 | 0.50 |
| **Tree Seedlings** | | | |
| Quercus alba | White oak | 100 | 1.94 |
| Prunus serotina | Black cherry | 100 | 2.94 |
| Acer rubrum | Red maple | 70 | 0.71 |
| Pinus strobus | White pine | 52 | 0.78 |
| Quercus ellipsoidalis | Northern pin oak | 47 | 0.81 |
| Quercus velutina | Black oak | 23 | 1.13 |



Previous View

# PVRh

## *Pinus strobus/Vaccinium-Rubus hispidus*

## (White pine/Blueberry-Dewberry)

**Distribution:**
Mostly in Jackson county (E of Black River). Natural Subdivision 4a.

**Similar types:** PVGy, PVHa

**Landform and soils:**
Nearly level sand plains with sandstone buttes. Similar topography and surface soil as described for **PVGy.** However, on **PVRh** sites ground water influence is near the surface - usually within 3 feet. Soil examples are Fairchild, Iron run and Merrillan. In spite of ground water influence vegetation on these sandy soils is decidedly xerophytic. The type is classified as **dry-mesic/poor nutrient.**

**Vegetation:**
**Common forest cover types**: *White pine, red maple* and *pin oak,* in various mixtures, are most common dominants in current stands. *White oak* and *jack pine* are common associates, *red oak* is usually absent.

**Shrub and small tree layer**: This layer is generally absent of poorly developed. *Huckleberry* is often conspicuous but other species have low coverage. Those with high constancy are *black cherry, serviceberry* and *winterberry (Ilex).* Winterberry is best represented on this type. Conspicuously rare are *gray dogwood, chokecherry* and *hazel.* All of these are usually well represented on dry and dry-mesic sites.

**Ground flora characteristics**: The following group of species with moderate individual constancy values readily distinguish this type from other types in this region: *Partridgeberry, swamp dewberry, starflower, ground pine (Lycopodium obscurum), goldthread, bunchberry* and *yellow beadlily.* These species are characteristic members of northern forests and are rarely found in southern habitat types. *Cinnamon fern* sometimes dominates herb layer, especially where ground water is near the surface.

**Disturbance and succession**: Records of presettlement conditions show *white pine* as the dominant species on this habitat type. *Red maple* and *pin oak* were probably always present, but assumed dominance after *white pine* was logged off. Since then *white pine* seed source has slowly increased and *white pine* regeneration is now common in many stands.



Previous View

# PVRh

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Trientalis borealis | Starflower | 100 | 0.50 |
| Aralia nudicaulis | Wild sarsaparilla | 87 | 0.86 |
| Rubus hispidus | Swamp dewberry | 87 | 1.71 |
| Maianthemum canadense | Wild lily-of-the-valley | 81 | 2.58 |
| Uvularia sessilifolia | Sessile-leaved bellwort | 81 | 0.69 |
| Mitchella repens | Partridgeberry | 75 | 0.50 |
| Pteridium aquilinum | Braken fern | 75 | 9.13 |
| Gaultheria procumbens | Wintergreen | 62 | 0.50 |
| Osmunda cinnamomea | Cinnamon fern | 62 | 20.00 |
| Lycopodium obscurum | Ground-pine | 56 | 0.50 |
| Sedges spp. | Sedges | 56 | 0.50 |
| Cornus canadensis | Bunchberry | 50 | 1.44 |
| Coptis groenlandica | Goldthread | 43 | 3.29 |
| Grasses spp. | Grasses | 37 | 0.50 |
| Clintonia borealis | Yellow beadlilly | 37 | 0.50 |
| Aster macrophyllus | Large-leaved aster | 37 | 0.50 |
| Apocynum andro. | Spreading dogbane | 31 | 0.50 |
| Anemone quinquefolia | Wood anemone | 31 | 0.50 |
| Osmunda claytoniana | Interrupted fern | 31 | 1.50 |
| Cypripedium acaule | Pink lady's slipper | 25 | 1.13 |
| Viola spp. | Violets | 25 | 0.50 |
| Symplocarpus foetidus | Skunk cabbage | 25 | 4.75 |
| Dryopteris spinulosa | Spinulose shield fern | 25 | 1.75 |
| Pyrola spp. | Pyrolas | 18 | 0.50 |
| Lysimachia quadrifolia | Whorled loosestrife | 18 | 0.50 |
| Prenanthes alba | White lettuce | 18 | 0.50 |
| **Shrubs** | | | |
| Ilex verticillata | Winterberry | 93 | 1.50 |
| Vaccinium angust. | Low sweet blueberry | 87 | 0.86 |
| Amelanchier spp. | Juneberry | 81 | 0.69 |
| Gaylussacia baccata | Black huckleberry | 75 | 6.63 |
| Rubus spp. | Blackberries/raspberries | 43 | 2.57 |
| Aronia melanocarpa | Black chokeberry | 31 | 0.60 |
| Corylus americana | Hazel-nut | 25 | 0.50 |
| Corylus cornuta | Beaked hazelnut | 25 | 0.50 |
| **Tree Seedlings** | | | |
| Acer rubrum | Red maple | 93 | 0.83 |
| Pinus strobus | White pine | 81 | 2.38 |
| Quercus ellipsoidalis | Northern pin oak | 75 | 0.50 |
| Prunus serotina | Black cherry | 75 | 0.50 |
| Quercus alba | White oak | 68 | 0.95 |
| Populus grandidentata | Bigtooth aspen | 37 | 0.50 |



Previous View

# ArDe-V

## *Acer rubrum/Desmodium* habitat type, *Vaccinium* variant (Red maple/Pointed-leaf tick trefoil, Blueberry variant)

### Distribution:

Mainly in W Jackson, Trempealeau and Eau Claire counties, but also scattered in other counties of Natural Subdivision 6c. Also in northern and western parts of Habitat type Region 7.

**Similar types:** PVCr

### Landform and soils:

Rolling to hilly topography with sandstone and sometimes dolomitic bedrock. Soils are sandy loam to loam (typical example: Hixton loam). This type represents a distinct **transition between dry** and **dry-mesic sites.**

### Vegetation:

**Major forest cover types**: *White oak* and *red maple* are the most common dominants in stands that were sampled, but *red oak* is sometimes present. *Pin oak* or *black oak* are much less common than they or on **PVCr** type. *White pine* is often present.

**Shrub and small tree layer**: This layer is usually well represented. Major species in decreasing order of average coverage are: *Hazel, blackberries* and *raspberries, serviceberry, black cherry, gray dogwood* and *bush honeysuckle*. *Red maple* saplings often dominate this layer.

**Ground flora characteristics**: Number of species and total herb coverage is higher than on other dry types of this region. *Blueberry* occurs here with small coverage and helps to distinguish **ArDe-V** from **ArCi** and other dry-mesic and mesic types. The species that best distinguishes this type from drier types is *pointed-leaf tick trefoil*. Other diagnostic species with lower constancies are *sweet cicely, wild geranium* and *hog peanut*. Best represented species are *bracken fern, big-leaf aster, tick trefoil, wild sarsaparilla* and *Virginia creeper*.

**Disturbance and succession**: Presettlement fire regime favored development of oak communities. *Red oak* is not reproducing adequately in current stands even when *red oak* is dominant in the overstory. *White oak,* however, shows some ability to persist. The most successfully reproducing species is *red maple*. Based on understory composition and soil characteristics we conclude that *sugar maple* is not a potential climax dominant on this type. *Red maple* is the most shade tolerant species that is well adapted to these sites and is presumed to be climax. It is also possible that *white pine* can again become a permanent member of communities on this type once it can be established as a seed source. Competitive relationship between *white pine* and *red maple* on this type has not been established, however, it appears that under a disturbance regime of moderate fire frequency the two species would co-exist.



Previous View

# ArDe-V

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Sedges spp. | Sedges | 95 | 0.63 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 90 | 2.18 |
| Pteridium aquilinum | Braken fern | 85 | 6.31 |
| Aralia nudicaulis | Wild sarsaparilla | 76 | 1.13 |
| Smilacina racemosa | False solomon's seal | 71 | 0.67 |
| Geranium maculatum | Wild geranium | 71 | 0.67 |
| Parthenocissus quinquefolia | Virginia creeper | 66 | 1.89 |
| Amphicarpa bracteata | Hog peanut | 61 | 0.50 |
| Lathyrus ochroleucus | Pale vetchling | 61 | 0.50 |
| Osmorhiza claytoni | Sweet cicely | 57 | 0.50 |
| Aster macrophyllus | Large-leaved aster | 57 | 4.25 |
| Uvularia sessilifolia | Sessile-leaved bellwort | 57 | 1.92 |
| Lysimachia quadrifolia | Whorled loosestrife | 57 | 0.50 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 52 | 2.27 |
| Goodyera pubescens | Downy rattlesnake plantain | 47 | 0.50 |
| Grasses spp. | Grasses | 47 | 0.50 |
| Pyrola spp. | Pyrolas | 47 | 0.50 |
| Galium triflorum | Sweet-scented bedstraw | 42 | 0.50 |
| Dryopteris spinulosa | Spinulose shield fern | 42 | 0.50 |
| Smilax herbacea | Carrion flower | 38 | 0.50 |
| Apocynum androsaemifolium | Spreading dogbane | 38 | 0.81 |
| Maianthemum canadense | Wild lily-of-the-valley | 38 | 0.50 |
| Anemone quinquefolia | Wood anemone | 38 | 0.50 |
| Potentilla simplex | Common cinquefoil | 33 | 0.50 |
| Fragaria vesca | Wood strawberry | 33 | 0.50 |
| Asclepias spp. | Milkweeds | 33 | 0.50 |
| Solidago spp. | Goldenrods | 33 | 0.50 |
| Phryma leptostachya | Lopseed | 33 | 0.50 |
| Osmunda claytoniana | Interrupted fern | 28 | 1.33 |
| Hepatica americana | Round-lobed hepatica | 28 | 0.50 |
| Polygonatum pubescens | Hairy solomon's seal | 28 | 0.50 |
| Vitis riparia | Riverbank grape | 28 | 0.50 |
| Viola spp. | Violets | 23 | 0.50 |
| Circaea quadrisulcata | Enchanter's nightshade | 23 | 0.50 |
| Rhus radicans | Poison ivy | 23 | 0.50 |
| Uvularia grandiflora | Large-flowered bellwort | 23 | 0.50 |
| Smilax tamnoides | Bristly greenbrier | 23 | 0.50 |
| Sanicula marilandica | Black snakeroot | 23 | 0.50 |
| **Shrubs** | | | |
| Rubus spp. | Blackberries/raspberries | 100 | 3.79 |
| Vaccinium angustifolium | Low sweet blueberry | 85 | 0.50 |
| Amelanchier spp. | Juneberry | 85 | 4.44 |
| Corylus americana | Hazel-nut | 80 | 7.50 |
| Prunus virginiana | Chokecherry | 80 | 0.65 |
| Diervilla lonicera | Bush honeysuckle | 71 | 0.83 |
| Cornus racemosa | Gray dogwood | 66 | 1.89 |



Previous View

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| Rosa spp. | Roses | 66 | 0.50 |
| Gaylussacia baccata | Black huckleberry | 47 | 0.75 |
| Viburnum acerifolium | Maple-leaved viburnum | 38 | 0.81 |
| Viburnum rafinesquianum | Downy arrowwood | 28 | 0.92 |
| Ilex verticillata | Winterberry | 23 | 1.00 |
| Ribes spp. | Gooseberries | 23 | 0.50 |
| **Tree Seedlings** | | | |
| Prunus serotina | Black cherry | 95 | 1.38 |
| Acer rubrum | Red maple | 95 | 1.13 |
| Quercus alba | White oak | 80 | 0.94 |
| Quercus velutina | Black oak | 38 | 0.50 |
| Quercus rubra | Northern red oak | 38 | 0.50 |
| Carya ovata | Shagbark hickory | 33 | 0.86 |
| Populus grandidentata | Bigtooth aspen | 33 | 0.50 |
| Carya cordiformis | Bitternut hickory | 23 | 0.50 |
| Ulmus spp | Elms | 23 | 0.50 |
| Crataegus spp. | Hawthorns | 28 | 0.50 |



Previous View

# ArCi and ArCi-Ph
## *Acer rubrum/Circaea* community type (Red maple/Enchanters nightshade) and *Phryma* (Lopseed) variant

**Distribution:**
**ArCi** type occurs primarily in the NW parts of region 6 (Chippewa, Dunn, Eau Claire, Pepin counties), while **ArCi-Ph** is common in Jackson (west of Black River) and Trempealeau counties and in region 7. Natural Subdivision 6c.

**Similar types:** ATiDe, ATiDe(Pr)

**Landform and soils:**
Both types occur on rolling to hilly sandstone terrain. **ArCi** is commonly found on loamy soils and **ArCi-Ph** where thin silt loam cap is present. Both types are classified as **dry-mesic, medium to rich.**

**Vegetation:**
**Major forest cover types**: *Red oak, white oak* and *red maple*, in relatively pure stands or in mixtures, are most common. Mesic hardwoods (*sugar maple, basswood, white ash*) or *shagbark hickory* sporadically occur in some stands on the **ArCi-Ph** type.

**Shrub and small tree layer**: This layer is usually well developed. Principal species in descending order of average coverage are: *blackberry/raspberry, hazel, gooseberry, gray dogwood, serviceberry,* and *choke cherry*. However, *red maple* and *black cherry* saplings often dominate this layer.

**Ground flora characteristics**: Both types are distinguished from drier types of this region by generally lacking *blueberry* and *huckleberry*. Similarly, they are distinguished from the mesic types by general lack of the *blue cohosh* ecological species group (see **ATiCa** type). Most characteristic species are *nightshade, Virginia creeper, sweet cicely, wild geranium,* and *gooseberries*. **ArCi-Ph** is usually distinguishable from **ArCi** by presence of *lopseed* (*Phryma*). Other floristic differences between the two variants are subtle. **ArCi** contains several species of predominantly northern distribution while **ArCi-Ph** contains many of predominantly southern distribution (See constancy table).

**Disturbance and succession**: As is the case with several other plant association described in this field guide the climax nature of these two community types has not been adequately studied. The soils do not appear different from those that support tolerant mesic species in other parts of the region. However, these species are generally not found in this community type and *red maple* is presently the most common species capable of reproducing in present oak stands. For these reasons the type is referred to as "community type" rather than habitat type and *red maple* can perhaps be viewed as a "pseudo-climax" until *sugar maple* seed source once again becomes common on sites where fire once controlled community dynamics.



Previous View

# ArCi

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Circaea quadrisulcata | Enchanter's nightshade | 76 | 1.10 |
| Osmorhiza claytoni | Sweet cicely | 73 | 0.67 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 69 | 1.79 |
| Maianthemum canadense | Wild lily-of-the-valley | 69 | 0.43 |
| Uvularia sessilifolia | Sessile-leaved bellwort | 65 | 3.42 |
| Amphicarpa bracteata | Hog peanut | 65 | 3.47 |
| Grasses spp. | Grasses | 61 | 1.74 |
| Geranium maculatum | Wild geranium | 61 | 1.29 |
| Pteridium aquilinum | Braken fern | 61 | 1.71 |
| Aster macrophyllus | Large-leaved aster | 50 | 3.11 |
| Parthenocissus quinquefolia | Virginia creeper | 88 | 2.73 |
| Smilacina racemosa | False solomon's seal | 46 | 0.47 |
| Anemone quinquefolia | Wood anemone | 42 | 0.42 |
| Galium boreale | Northern bedstraw | 38 | 0.25 |
| Vitis riparia | Riverbank grape | 38 | 0.54 |
| Rhus radicans | Poison ivy | 38 | 1.94 |
| Smilax herbacea | Carrion flower | 38 | 0.15 |
| Fragaria vesca | Wood strawberry | 38 | 0.54 |
| Viola spp. | Violets | 34 | 0.27 |
| Prenanthes alba | White lettuce | 30 | 0.10 |
| Galium triflorum | Sweet-scented bedstraw | 30 | 0.35 |
| Dryopteris spinulosa | Spinulose shield fern | 30 | 3.54 |
| Trientalis borealis | Starflower | 26 | 0.17 |
| Actaea spp. | Baneberries | 26 | 0.10 |
| Solidago spp. | Goldenrods | 23 | 0.18 |
| Aralia nudicaulis | Wild sarsaparilla | 23 | 1.32 |
| Smilax tamnoides | Bristly greenbrier | 23 | 0.35 |
| Pyrola spp. | Pyrolas | 23 | 0.18 |
| **Shrubs** | | | |
| Rubus spp. | Blackberries/raspberries | 96 | 2.52 |
| Prunus virginiana | Chokecherry | 84 | 1.86 |
| Corylus americana | Hazel-nut | 69 | 4.92 |
| Ribes spp. | Gooseberries | 61 | 1.61 |
| Amelanchier spp. | Juneberry | 53 | 2.69 |
| Ilex verticillata | Winterberry | 38 | 0.49 |
| Viburnum lentago | Nannyberry | 34 | 2.62 |
| Vaccinium angustifolium | Low sweet blueberry | 30 | 0.77 |
| Cornus racemosa | Gray dogwood | 26 | 2.59 |
| Xanthoxylum americanum | Prickly ash | 26 | 3.20 |
| Diervilla lonicera | Bush honeysuckle | 23 | 2.67 |
| **Tree Seedlings** | | | |
| Prunus serotina | Black cherry | 92 | 2.42 |
| Acer rubrum | Red maple | 84 | 1.05 |
| Quercus alba | White oak | 50 | 1.04 |
| Quercus rubra | Northern red oak | 38 | 0.49 |
| Ulmus americana | American elm | 26 | 1.49 |



Previous View

# ArCi-Ph

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Circaea quadrisulcata | Enchanter's nightshade | 93 | 1.88 |
| Osmorhiza claytoni | Sweet cicely | 93 | 1.26 |
| Geranium maculatum | Wild geranium | 91 | 2.15 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 91 | 1.98 |
| Amphicarpa bracteata | Hog peanut | 84 | 1.77 |
| Phryma leptostachya | Lopseed | 82 | 1.21 |
| Sedges spp. | Sedges | 78 | 0.50 |
| Parthenocissus quinquefolia | Virginia creeper | 76 | 2.73 |
| Galium triflorum | Sweet-scented bedstraw | 76 | 0.57 |
| Viola spp. | Violets | 71 | 0.50 |
| Aralia nudicaulis | Wild sarsaparilla | 69 | 1.44 |
| Dryopteris spinulosa | Spinulose shield fern | 65 | 1.65 |
| Sanicula marilandica | Black snakeroot | 63 | 0.59 |
| Vitis riparia | Riverbank grape | 58 | 0.59 |
| Smilax herbacea | Carrion flower | 56 | 0.50 |
| Uvularia grandiflora | Large-flowered bellwort | 56 | 0.69 |
| Uvularia sessilifolia | Sessile-leaved bellwort | 52 | 0.60 |
| Grasses spp. | Grasses | 47 | 0.61 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 45 | 0.62 |
| Smilacina racemosa | False solomon's seal | 43 | 0.63 |
| Pyrola spp. | Pyrolas | 41 | 0.63 |
| Botrychium virginianum | Rattlesnake fern | 41 | 0.50 |
| Pteridium aquilinum | Braken fern | 36 | 1.09 |
| Athyrium filix-femina | Lady fern | 34 | 1.72 |
| Maianthemum canadense | Wild lily-of-the-valley | 34 | 0.81 |
| Urtica procera | Tall nettle | 32 | 0.50 |
| Geum lacinatum | Rough avens | 32 | 0.50 |
| Actaea spp. | Baneberries | 32 | 0.67 |
| Arisaema atrorubens | Jack-in-the-pulpit | 32 | 0.50 |
| Apocynum androsaemifolium | Spreading dogbane | 32 | 0.50 |
| Osmunda claytoniana | Interrupted fern | 30 | 1.89 |
| Thalictrum dioicum | Early meadow rue | 30 | 0.50 |
| Potentilla simplex | Common cinquefoil | 30 | 0.50 |
| Adiantum pedatum | Maidenhair fern | 30 | 0.50 |
| Aralia racemosa | Spikenard | 30 | 2.93 |
| Agrimonia gryposepala | Agrimony | 30 | 0.50 |
| Rhus radicans | Poison ivy | 28 | 4.65 |
| Aster macrophyllus | Large-leaved aster | 28 | 0.69 |
| Solidago spp. | Goldenrods | 28 | 0.54 |
| Galium boreale | Northern bedstraw | 26 | 0.50 |
| Lysimachia quadrifolia | Whorled loosestrife | 23 | 0.50 |
| Lathyrus ochroleucus | Pale vetchling | 23 | 0.50 |
| Anemone quinquefolia | Wood anemone | 23 | 0.50 |
| Fragaria vesca | Wood strawberry | 21 | 0.50 |
| Smilax tamnoides | Bristly greenbrier | 21 | 0.50 |



Previous View

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Shrubs** | | | |
| Rubus spp. | Blackberries/raspberries | 84 | 4.94 |
| Corylus americana | Hazel-nut | 73 | 2.10 |
| Prunus virginiana | Chokecherry | 71 | 0.95 |
| Cornus racemosa | Gray dogwood | 69 | 1.27 |
| Ribes spp. | Gooseberries | 60 | 2.25 |
| Sambucus canadensis | Common elder | 54 | 0.60 |
| Amelanchier spp. | Juneberry | 54 | 1.18 |
| Rosa spp. | Roses | 45 | 0.86 |
| Diervilla lonicera | Bush honeysuckle | 36 | 0.94 |
| Viburnum lentago | Nannyberry | 34 | 0.50 |
| Salix humilis | Prairie willow | 26 | 0.50 |
| Corylus cornuta | Beaked hazelnut | 23 | 2.95 |
| **Tree Seedlings** | | | |
| Prunus serotina | Black cherry | 91 | 0.74 |
| Acer rubrum | Red maple | 76 | 0.94 |
| Ulmus spp | Elms | 60 | 0.68 |
| Carya ovata | Shagbark hickory | 41 | 0.76 |
| Quercus alba | White oak | 36 | 0.68 |
| Populus grandidentata | Bigtooth aspen | 34 | 0.50 |
| Acer negundo | Box elder | 32 | 0.50 |
| Tilia americana | Basswood | 30 | 0.50 |
| Quercus rubra | Northern red oak | 23 | 0.50 |
| Carya cordiformis | Bitternut hickory | 21 | 0.75 |



Previous View

# AArVb

## *Acer saccharum-Acer rubrum/Viburnum acerifolium*
## (Sugar maple-red maple/maple-leaf viburnum)

**Distribution:**
Dunn, Chippewa, Eau Claire Counties, especially Natural Subdivision 6e. Most of the type currently in agriculture.

**Similar types:** ArDe-V

**Landform and soils:**
This type occurs within the outwash terraces (valley trains) of major rivers in this region (Chippewa, Red, Eau Claire and probably Black river) where a layer of loam or silt loam covers sand and gravel. It may also occur on moraines with similar texture. The type is classified as **dry-mesic/ medium nutrient**.

**Vegetation:**
**Common forest cover types**: Stands that were sampled (only 7) are dominated by *red* and *white oak*, but *red maple* and *sugar maple* are usually present.

**Shrub and small tree layer**: Most characteristic is *maple-leaf viburnum*. Others, in order of decreasing average coverage are *hazel, black cherry, choke cherry, fly honeysuckle* and *bush honeysuckle*. However, *ironwood* and *red maple* often dominate this layer.

**Ground flora characteristics**: Species of dry-mesic habitats prevail, e.g. *maple-leaf viburnum, hazel, bigleaf aster, wild sarsaparilla, pointed-leaf tick trefoil* and *bracken fern*. Presence of *blueberry* (constancy 72%) is also noteworthy because it underscores the trend toward a drier site type.

**Disturbance and succession**: Maps of presettlement vegetation show a complex pattern in the area where this type was identified. Oak, pine, prairie as well as maple-basswood communities were found. Clearly fire regime played a major role. In the absence of fire oak stands readily succeed to either red or sugar maple. It appears that *sugar maple* is not outcompeting red maple on this type, therefore both species are included in the habitat type name.



Previous View

# AArVb

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Grasses spp. | Grasses | 100 | 2.93 |
| Aster macrophyllus | Large-leaved aster | 100 | 1.63 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 85 | 0.43 |
| Polygonatum pubescens | Hairy solomon's seal | 85 | 0.18 |
| Aralia nudicaulis | Wild sarsaparilla | 85 | 2.60 |
| Osmunda claytoniana | Interrupted fern | 71 | 1.26 |
| Amphicarpa bracteata | Hog peanut | 71 | 1.56 |
| Uvularia sessilifolia | Sessile-leaved bellwort | 71 | 0.60 |
| Trillium spp. | Trilliums | 71 | 0.60 |
| Pteridium aquilinum | Braken fern | 71 | 0.40 |
| Anemone quinquefolia | Wood anemone | 57 | 0.35 |
| Dryopteris spinulosa | Spinulose shield fern | 57 | 1.55 |
| Thalictrum dioicum | Early meadow rue | 57 | 0.10 |
| Hepatica americana | Round-lobed hepatica | 57 | 0.47 |
| Hepatica acutiloba | Sharp-lobed hepatica | 42 | 0.43 |
| Maianthemum canadense | Wild lily-of-the-valley | 42 | 0.10 |
| Helianthus spp. | Sunflowers | 42 | 0.27 |
| Viola pensylvanica | Smooth yellow violet | 42 | 0.27 |
| Galium boreale | Northern bedstraw | 42 | 0.60 |
| Geranium maculatum | Wild geranium | 42 | 1.40 |
| Sanicula marilandica | Black snakeroot | 28 | 0.35 |
| Lysimachia quadrifolia | Whorled loosestrife | 28 | 0.10 |
| Solidago spp. | Goldenrods | 28 | 0.35 |
| Smilax tamnoides | Bristly greenbrier | 28 | 0.35 |
| Fragaria vesca | Wood strawberry | 28 | 0.60 |
| Osmorhiza claytoni | Sweet cicely | 28 | 0.35 |
| Circaea quadrisulcata | Enchanter's nightshade | 28 | 0.35 |
| Smilacina racemosa | False solomon's seal | 28 | 0.35 |
| Streptopus roseus | Rosey twisted stalk | 28 | 0.35 |
| Galium triflorum | Sweet-scented bedstraw | 28 | 0.10 |
| Trientalis borealis | Starflower | 28 | 0.35 |
| **Shrubs** | | | |
| Viburnum acerifolium | Maple-leaved viburnum | 100 | 3.27 |
| Ribes spp. | Gooseberries | 71 | 0.30 |
| Corylus cornuta | Beaked hazelnut | 71 | 3.76 |
| Prunus virginiana | Chokecherry | 71 | 0.40 |
| Vaccinium angust. | Low sweet blueberry | 71 | 0.30 |
| Diervilla lonicera | Bush honeysuckle | 57 | 0.35 |
| Corylus americana | Hazel-nut | 57 | 1.67 |
| Lonicera canadensis | American fly honeysuckle | 57 | 0.95 |
| Cornus alternifolia | Alternate-leaved dogwood | 42 | 5.23 |
| Rubus spp. | Blackberries/raspberries | 28 | 1.80 |
| Viburnum rafinesquianum | Downy arrowwood | 28 | 1.55 |
| Hamamelis virginiana | Witch hazel | 28 | 0.10 |
| **Tree Seedlings** | | | |
| Quercus rubra | Northern red oak | 100 | 0.31 |
| Prunus serotina | Black cherry | 85 | 0.83 |
| Acer rubrum | Red maple | 85 | 1.32 |
| Acer saccharum | Sugar maple | 57 | 2.42 |
| Tilia americana | Basswood | 57 | 0.82 |
| Ostrya virginiana | Ironwood | 57 | 2.28 |
| Fraxinus nigra | Black ash | 42 | 0.43 |
| Populus grandidentata | Bigtooth aspen | 42 | 0.43 |
| Quercus alba | White oak | 42 | 0.10 |



Previous View

# ATiCa-La and ATiSa-De

## *Acer-Tilia/Caulophyllum* habitat type, *Laportea* variant
## *Acer-Tilia/Sanguinaria* habitat type, *Desmodium* variant

### (Sugar maple-Basswood/Blue cohosh, Wood nettle variant and Sugar maple-Basswood/Bloodroot, Pointed-leaf tick-trefoil variant)

**Distribution:**
Primarily in Pierce county and adjacent portions of St Croix, Dunn and Pepin counties. Natural Subdivision 6a. Most of the area of these habitat types has been converted to agriculture. Woodlands occur primarily in drainages and on slopes.

**Similar habitat types:** ACaCi (Region 2, northern)

**Landform and soils:**
Silt loam over acid till (ground moraine). **ATiCa-La** is found most often on gentle slopes, flats or broad summits with deep soils; aspect is predominantly north and east. **ATiSa-De** is usually on steeper slopes and S-W aspect. Silt cap often thinner with clayey subsoil. **Mesic/very rich** sites.

**Vegetation:**
**Common forest cover types**: Both types are usually dominated by *sugar maple* and *basswood. Red oak* or *bitternut hickory* are common associates. *White oak, ironwood (Ostrya)* or *red maple* are more common on the **ATiSa-De**. *White ash* is rare in comparison with mesic forests in other regions.

**Shrub and small tree layer**: Shrub layer is not well developed on either of these two variants when tree canopy is closed. Most common are *gooseberry, choke cherry* and *alternate-leaf dogwood. Ironwood* is often abundant on **ATiSa-De.**

**Ground flora characteristics**: The mesic-rich site species group is well represented in both variants although total herb coverage tends to be low. Most characteristic are *bloodroot, blue cohosh, sharp-lobed hepatica, wild ginger*, and *trillium. Wood nettle* was found on about half of the study stands on the **ATiCa-La**, but coverages were high (10-20%). The following group is much better represented on the **ATiSa-De**: *pointed-leaf tick trefoil, wild geranium, big-leaf aster, black snakeroot, green briar* and *zigzag goldenrod.*

**Disturbance and succession:**
In presettlement time the area described here was dominated by *sugar maple basswood* forest and was surrounded by oak openings, oak savanna or prairie. There are no consistent soil differences among these presettlement vegetation types to account for the variation. Fire history appears to be the primary cause. *Maple-basswood* forests appear to be stable on these habitat types. Stands dominated by any other species, especially oaks, are also being replaced by maple-basswood wherever adequate seed sources exist.



Previous View

# ATiCa-La

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Osmorhiza claytoni | Sweet cicely | 79 | 0.45 |
| Trillium spp. | Trilliums | 79 | 0.43 |
| Sanguinaria canadensis | Bloodroot | 79 | 0.36 |
| Caulophyllum thalictroides | Blue cohosh | 72 | 0.61 |
| Thalictrum dioicum | Early meadow rue | 65 | 1.25 |
| Parthenocissus quinquefolia | Virginia creeper | 62 | 1.13 |
| Viola pensylvanica | Smooth yellow violet | 62 | 0.57 |
| Hepatica acutiloba | Sharp-lobed hepatica | 58 | 0.76 |
| Circaea quadrisulcata | Enchanter's nightshade | 58 | 1.78 |
| Amphicarpa bracteata | Hog peanut | 55 | 0.41 |
| Solidago flexicaulis | Zigzag goldenrod | 55 | 0.62 |
| Laportea canadensis | Wood nettle | 55 | 19.94 |
| Asarum canadense | Wild ginger | 55 | 3.12 |
| Dryopteris spinulosa | Spinulose shield fern | 51 | 1.46 |
| Arisaema atrorubens | Jack-in-the-pulpit | 48 | 0.28 |
| Sanicula marilandica | Black snakeroot | 48 | 1.76 |
| Grasses spp. | Grasses | 48 | 1.69 |
| Uvularia grandiflora | Large-flowered bellwort | 48 | 0.56 |
| Actaea spp. | Baneberries | 48 | 0.90 |
| Ranunculus hispidus | Hispid buttercup | 48 | 0.39 |
| Adiantum pedatum | Maidenhair fern | 44 | 3.07 |
| Mitella diphylla | Miterwort | 41 | 0.43 |
| Botrychium virginianum | Rattlesnake fern | 41 | 0.14 |
| Smilax herbacea | Carrion flower | 37 | 0.19 |
| Smilacina racemosa | False solomon's seal | 34 | 0.64 |
| Allium tricoccum | Wild leek | 34 | 0.35 |
| Ranunculus spp. | Buttercups | 31 | 1.20 |
| Anemone quinquefolia | Wood anemone | 27 | 0.29 |
| Polygonatum pubescens | Hairy solomon's seal | 27 | 0.22 |
| Viola spp. | Violets | 27 | 0.47 |
| Galium triflorum | Sweet-scented bedstraw | 27 | 0.16 |
| Uvularia sessilifolia | Sessile-leaved bellwort | 27 | 0.29 |
| Geranium maculatum | Wild geranium | 24 | 3.27 |
| **Shrubs** | | | |
| Ribes spp. | Gooseberries | 75 | 2.32 |
| Prunus virginiana | Chokecherry | 65 | 1.81 |
| Cornus alternifolia | Alternate-leaved dogwood | 51 | 1.65 |
| Viburnum lentago | Nannyberry | 20 | 0.35 |
| **Tree Seedlings** | | | |
| Carya cordiformis | Bitternut hickory | 93 | 0.86 |
| Acer saccharum | Sugar maple | 82 | 3.98 |
| Ulmus americana | American elm | 72 | 1.50 |
| Tilia americana | Basswood | 37 | 0.98 |
| Quercus rubra | Northern red oak | 20 | 0.10 |



Previous View

# ATiSa-De

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Solidago flexicaulis | Zigzag goldenrod | 92 | 1.70 |
| Sanguinaria canadensis | Bloodroot | 92 | 0.48 |
| Sanicula marilandica | Black snakeroot | 92 | 1.30 |
| Osmorhiza claytoni | Sweet cicely | 85 | 0.49 |
| Thalictrum dioicum | Early meadow rue | 85 | 1.00 |
| Uvularia grandiflora | Large-flowered bellwort | 82 | 0.38 |
| Geranium maculatum | Wild geranium | 78 | 1.14 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 78 | 1.20 |
| Smilax herbacea | Carrion flower | 78 | 0.28 |
| Adiantum pedatum | Maidenhair fern | 75 | 1.03 |
| Mitella diphylla | Miterwort | 75 | 0.78 |
| Asarum canadense | Wild ginger | 75 | 3.01 |
| Amphicarpa bracteata | Hog peanut | 71 | 2.08 |
| Trillium spp. | Trilliums | 71 | 0.32 |
| Aster macrophyllus | Large-leaved aster | 67 | 3.88 |
| Hepatica acutiloba | Sharp-lobed hepatica | 64 | 0.76 |
| Circaea quadrisulcata | Enchanter's nightshade | 60 | 0.45 |
| Caulophyllum thalictroides | Blue cohosh | 57 | 0.26 |
| Grasses spp. | Grasses | 57 | 2.82 |
| Smilacina racemosa | False solomon's seal | 57 | 0.80 |
| Dryopteris spinulosa | Spinulose shield fern | 53 | 3.31 |
| Ranunculus hispidus | Hispid buttercup | 53 | 0.50 |
| Parthenocissus quinquefolia | Virginia creeper | 50 | 1.31 |
| Solidago spp. | Goldenrods | 50 | 0.35 |
| Viola pensylvanica | Smooth yellow violet | 50 | 0.49 |
| Actaea spp. | Baneberries | 46 | 0.29 |
| Ranunculus spp. | Buttercups | 46 | 0.18 |
| Galium concinnum | Shining bedstraw | 42 | 0.31 |
| Aralia nudicaulis | Wild sarsaparilla | 42 | 2.60 |
| Anemone quinquefolia | Wood anemone | 39 | 0.33 |
| Botrychium virginianum | Rattlesnake fern | 39 | 0.19 |
| Helianthus spp. | Sunflowers | 39 | 0.45 |
| Phryma leptostachya | Lopseed | 35 | 0.20 |
| Osmunda claytoniana | Interrupted fern | 32 | 6.24 |
| Polygonatum pubescens | Hairy solomon's seal | 28 | 0.29 |
| Vitis riparia | Riverbank grape | 28 | 0.46 |
| Athyrium filix-femina | Lady fern | 25 | 0.73 |
| Arisaema atrorubens | Jack-in-the-pulpit | 25 | 0.10 |
| Uvularia sessilifolia | Sessile-leaved bellwort | 21 | 0.18 |
| Rhus radicans | Poison ivy | 21 | 0.27 |
| Fragaria vesca | Wood strawberry | 21 | 0.35 |
| Polemonium reptans | Greek valerian | 21 | 0.35 |
| Prenanthes alba | White lettuce | 21 | 0.10 |



Previous View

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Shrubs** | | | |
| Ribes spp. | Gooseberries | 89 | 1.38 |
| Prunus virginiana | Chokecherry | 85 | 0.85 |
| Cornus alternifolia | Alternate-leaved dogwood | 78 | 1.57 |
| Xanthoxylum americanum | Prickly ash | 39 | 0.59 |
| Rubus spp. | Blackberries/raspberries | 32 | 0.42 |
| Corylus cornuta | Beaked hazelnut | 32 | 1.44 |
| Amelanchier spp. | Juneberry | 28 | 0.41 |
| Viburnum lentago | Nannyberry | 28 | 0.22 |
| Lonicera canadensis | American fly honeysuckle | 28 | 0.29 |
| Corylus americana | Hazel-nut | 28 | 1.25 |
| Viburnum rafinesquianum | Downy arrowwood | 21 | 0.75 |
| Crataegus spp. | Hawthorns | 21 | 1.07 |
| **Tree Seedlings** | | | |
| Acer saccharum | Sugar maple | 89 | 3.82 |
| Quercus rubra | Northern red oak | 67 | 0.28 |
| Ostrya virginiana | Ironwood | 67 | 1.50 |
| Carya cordiformis | Bitternut hickory | 67 | 0.72 |
| Tilia americana | Basswood | 60 | 0.68 |
| Prunus serotina | Black cherry | 53 | 0.30 |
| Ulmus americana | American elm | 50 | 0.62 |
| Fraxinus pennsylvanica | Green ash | 25 | 0.17 |



Previous View

# Occurrence of Tree Species on Habitat Types of Region 6

Size classes: SE - seedlings; SA - saplings; MT - medium trees (4-10" DBH); LT - large trees (>10" DBH). Numbers are frequency of occurrence: *<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%.

| | PVGy | | | | PVRh | | | | PVHa | | | | PVCr | | | | ArDe-V | | | | ArCi | | | | ArCi-Ph | | | | AArVb | | | | ATiSa-De | | | | ATiCa-La | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT |
| Jack pine | 1A | 1A | 2B | 1B | | | 1B | 1B | | * | * | * | 1A | | 1A | * | | | | | | | | | * | | | | | | | | | | | | | | | |
| Bur oak | * | * | | | | | | | * | * | * | | | * | * | | * | * | * | * | * | * | * | | | | * | * | | | | | | * | * | * | * | | | | |
| Northern pin oak | 3A | 2A | 3C | 3C | 3A | 1A | 1B | 2B | 3A | 1A | 3B | 3C | 2A | 2A | 2B | 2C | * | 1A | 1B | 1D | | | * | 1C | * | * | * | * | | | | | | | | * | | | | |
| Trembling aspen | * | | *B | *B | 1A | | 1A | * | * | * | * | * | | | | | | | | | 1A | * | 1B | 1C | * | | * | * | | | | | | | | | | | | |
| Bigtooth aspen | 2A | * | 1A | 1B | 2A | * | 1B | 1A | 2A | 1B | 2B | 2C | * | 1A | 1B | 1D | 2A | 1A | 1A | 1D | 1A | | 1A | 1C | 2A | * | 1A | 1C | 2A | | 2B | 2C | * | * | 1C | 1C | * | | | * |
| Red pine | 1A | 1A | 1B | 1B | | * | 1A | 1B | * | * | * | 1B | | | | | | | * | * | | | | | | | | | | | | | | | | | | | | |
| Black oak | * | * | 1D | 1C | 1A | | | * | * | | 1A | 1D | 1A | 1A | 1B | 2D | 2A | 1A | 2A | 2D | 1A | | 1C | 1D | 1A | * | 1B | 2D | | | | | | | * | | | | | |
| Black walnut | | | | | | | | | | | | | | | | | | | | | | | * | * | | | | | | | | | | | * | | | | | |
| Paper birch | * | * | * | | 1A | 2A | 2A | 1A | 1A | 1A | 2A | * | * | | 1A | | | * | * | | | * | * | | | * | * | 1B | | | 2B | 1A | | | * | | | * | * |
| Black ash | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2A | | | | * | | | | | | | |
| Northern red oak | * | * | * | * | * | | | | 1A | * | 1B | 1C | | | * | * | 2A | 1A | 2B | 2D | 1A | 1A | 2C | 2D | 1A | 1A | 2B | 3D | 3A | 2A | 4B | 3D | 2A | * | 1B | 2C | * | * | * | 2D |
| White pine | 3A | 3A | 2B | 1D | 4A | 3B | 3B | 3D | 3A | 2A | 2B | 1C | 2A | 2B | 2B | 2C | 1A | 1B | 2A | 1C | * | * | * | | * | | * | * | | | | | * | | * | * | | | | |
| White oak | 3A | 2B | 2B | 1A | 3A | 2A | 1A | 1C | 4A | 2A | 3B | 2C | 4A | 3A | 4B | 2C | 4A | 3B | 3A | 3B | 2A | 2A | 3C | 2C | 2A | 1A | 2B | 2B | 1A | | 3B | 3C | * | | 2B | 2C | | | | 1C |
| Butternut | | | | | | | | | | | | | | | | | * | * | * | | | | | | * | * | * | * | | | | | 1A | | * | * | | | * | |
| Swamp white oak | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Shagbark hickory | * | | | | | | | | | | | | | | | | 2A | 2B | * | | | | | | 2A | 2B | 2B | 1C | | | | | | | | | | | | |
| Black cherry | 3A | 2A | * | | 3A | * | | | 3A | 1A | * | | 4A | 4B | 1A | | 4A | 4A | 1A | * | 4A | 3B | 2B | * | 4A | 3A | 2B | 1B | 3A | 1A | | | 2A | 1A | 1B | * | | * | * | |
| Box elder | * | | | | | | | | | | | | * | | | | 1A | | | | 1A | 1B | * | | 2A | 2A | * | | | | | | * | | | | | * | | |
| Hackberry | | | | | | | | | | | | | | | | | | | | | | | | | | * | | | | | | | | | | | | | | |
| Elms | | | | | * | * | | | * | | | | * | 1A | | | 1A | | | | | | | | 3A | 2B | 1B | | | 1A | 1A | | 1A | * | | | | | | |
| American elm | | | | | | | | | | | | | | | | | | | | | 2A | 2B | 1C | | | | | | 1A | | | | 1A | 1B | 1B | * | 3A | 2A | 1B | * |
| White ash | | | | | | | | | * | * | | | * | * | | | 1A | 1B | * | * | | | | | 1A | 1A | * | | 1A | 1A | 1A | | 1B | 1B | * | | 1A | | 1B | * |
| Green ash | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1A | 1A | * | | 1A | * | | |
| Yellow birch | | | | | * | | * | | | | | | | | | | | | | | | | | | | | | | | | | | | * | | | * | 1A | * |
| Bitternut hickory | * | * | | | | | | | * | * | | | 1A | 1B | | | 1A | 1A | | | * | | | | 1A | 1B | 1B | | | | | | 2A | 1A | 1C | | 4A | 2A | 2C | 1B |
| Red maple | 3A | 3B | 2B | * | 4A | 4C | 4C | 2B | 4A | 4C | 4C | 2B | 3A | 3B | 2C | * | 4A | 4C | 4B | 1A | 4A | 4B | 3C | 1C | 3A | 4C | 3C | 2B | 3A | 3B | 2D | 1B | * | 1A | 1B | * | | * | * | * |
| American hornbeam | | | | | | | | | 1A | 1B | | | | | | | 1A | 2B | | | | | | | * | * | | | 1A | 3B | | | 1A | 1B | | | * | 1B | | |
| Ironwood | | | | | | | | | * | * | | | * | | | | * | 1B | * | | | | | | 1A | 1A | * | * | 3A | 3B | | | 3A | 4C | 3B | | * | 2B | * | |
| Basswood | * | | | | | | | | | | | | * | * | * | | * | 1A | * | * | * | 1A | * | | 2A | 1B | 1B | 1B | 2A | 2A | 1A | | 3A | 3A | 2B | 2C | 2A | 2A | 2B | 2C |
| Eastern hemlock | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | * | * |
| American beech | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sugar maple | | | | | | | | | | * | * | | | | | | * | 1A | 1A | | | | * | | * | 1C | * | 1B | 3A | 3C | 3B | 1B | 4A | 4B | 3C | 3D | 3A | 4C | 4C | 4D |



Previous View

# Understory Species with Potential Diagnostic Value for Distinguishing among the Habitat Types in Region 6

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%.

| Scientific Name | Common Name | PVGy PVCr | | PVRh PVHa | | ArDe-V AArVb | | ArCi ArCi-Ph | | ATiSa-De ATiCa-La | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Herbs** | | | | | | | | | | | |
| Euphorbia corollata | Flowering spurge | 1 A | 1 A | | | | | | | | |
| Clintonia borealis | Yellow beadlilly | | | 1 A | | | | | | | |
| Coptis groenlandica | Goldthread | | | 1 A | | | | | | | |
| Cornus canadensis | Bunchberry | | | 1 A | * | | | | | | |
| Osmunda cinnamomea | Cinnamon fern | | | 2 C | | | | | | | * |
| Lycopodium obscurum | Ground-pine | | | 2 A | 1 A | | * | * | | | |
| Mitchella repens | Partridgeberry | | * | 2 A | 1 A | | * | | | | |
| Rubus hispidus | Swamp dewberry | | | 3 A | 1 A | | | | | | |
| Goodyera pubescens | Downy rattlesnake plantain | * | * | | * | 1 A | * | * | * | | |
| Gaultheria procumbens | Wintergreen | 2 A | * | 2 A | 3 A | | * | | | | |
| Apocynum androsaemifolium | Spreading dogbane | 2 A | 2 A | 1 A | 1 A | 1 A | | | 1 A | | |
| Trientalis borealis | Starflower | 1 A | 1 A | 3 A | 2 A | * | 1 A | 1 A | * | | |
| Lysimachia quadrifolia | Whorled loosestrife | 2 A | 1 A | * | 2 A | 2 A | 1 A | | * | | |
| Pteridium aquilinum | Braken fern | 3 C | 3 B | 2 B | 3 B | 3 B | 2 A | 2 A | 1 A | * | |
| Maianthemum canadense | Wild lily-of-the-valley | 2 A | 3 A | 3 A | 2 A | 1 A | 1 A | 2 A | 1 A | | |
| Uvularia sessilifolia | Sessile-leaved bellwort | 2 A | 2 A | 3 A | 3 A | 2 A | 2 A | 2 A | 2 A | * | 1 A |
| Aralia nudicaulis | Wild sarsaparilla | 1 A | 3 A | 3 A | 3 A | 3 A | 3 A | * | 2 A | 1 A | * |
| Aster macrophyllus | Large-leaved aster | 1 A | 1 A | 1 A | 2 A | 2 A | 3 A | 1 A | 1 A | 2 A | * |
| Smilacina racemosa | False solomon's seal | 1 A | 3 A | * | * | 2 A | 1 A | 1 A | 1 A | 2 A | 1 A |
| Anemone quinquefolia | Wood anemone | * | * | 1 A | * | 1 A | 2 A | 1 A | * | 1 A | 1 A |
| Streptopus roseus | Rosey twisted stalk | * | | | * | * | 1 A | | * | | * |
| Fragaria vesca | Wood strawberry | * | * | | | 1 A | 1 A | 1 A | * | * | * |
| Potentilla simplex | Common cinquefoil | * | * | | * | 1 A | * | | 1 A | | |
| Hepatica americana | Round-lobed hepatica | | * | | | 1 A | 2 A | | | | |
| Smilax tamnoides | Bristly greenbrier | | 1 A | * | 1 A | * | 1 A | * | * | * | |
| Pyrola spp. | Pyrolas | | 1 A | * | * | 1 A | * | * | 1 A | | |
| Vitis riparia | Riverbank grape | | 1 A | | | 1 A | | 1 A | 2 A | 1 A | |
| Lathyrus ochroleucus | Pale vetchling | | 1 A | | | 2 A | | | * | | |
| Osmunda claytoniana | Interrupted fern | | | 1 A | 1 A | 1 A | 2 A | | 1 A | 1 B | |
| Rhus radicans | Poison ivy | | * | | | * | | 1 A | 1 A | * | |
| Athyrium filix-femina | Lady fern | | | | | * | | | 1 A | * | |
| Aralia racemosa | Spikenard | | | | | | * | | 1 A | * | |
| Galium boreale | Northern bedstraw | | * | | | * | 1 A | 1 A | 1 A | | |
| Desmodium nudiflorum | Naked-flowered tick trefoil | | | | | 2 A | | | 1 A | | |
| Desmodium glutinosum | Pointed-leaved tick trefoil | | * | | | 3 A | 3 A | 2 A | 3 A | 3 A | * |
| Geranium maculatum | Wild geranium | | * | | | 2 A | 1 A | 2 A | 3 A | 3 A | * |
| Smilax herbacea | Carrion flower | | * | | | 1 A | | 1 A | 2 A | 3 A | 1 A |
| Polygonatum pubescens | Hairy solomon's seal | | * | | | 1 A | 3 A | * | * | 1 A | 1 A |
| Parthenocissus quinquefolia | Virginia creeper | | 2 A | * | | 2 A | * | 3 A | 3 A | 1 A | 2 A |
| Dryopteris spinulosa | Spinulose shield fern | | 1 A | * | | 1 A | 2 A | 1 A | 2 A | 2 A | 2 A |
| Amphicarpa bracteata | Hog peanut | | | | | 2 A | 2 A | 2 A | 3 A | 2 A | 2 A |
| Thalictrum dioicum | Early meadow rue | | | | | * | 2 A | * | 1 A | 3 A | 2 A |
| Circaea quadrisulcata | Enchanter's nightshade | | | | | * | 1 A | 3 A | 3 A | 2 A | 2 A |



Previous View

| Scientific Name | Common Name | PVGy | PVCr | PVRh | PVHa | ArDe-V | AArVb | ArCi | ArCi-Ph | ATiSa-De | ATiCa-La |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Galium triflorum | Sweet-scented bedstraw | | * | | | 1 A | 1 A | 1 A | 3 A | | 1 A |
| Osmorhiza claytoni | Sweet cicely | | | | | 2 A | 1 A | 2 A | 3 A | 3 A | 3 A |
| Uvularia grandiflora | Large-flowered bellwort | | | | | * | * | * | 2 A | 3 A | 1 A |
| Sanicula marilandica | Black snakeroot | | | | | * | 1 A | * | 2 A | 3 A | 1 A |
| Phryma leptostachya | Lopseed | | | | | 1 A | | | 3 A | 1 A | * |
| Actaea spp. | Baneberries | | | | | | | 1 A | 1 A | 1 A | 1 A |
| Arisaema atrorubens | Jack-in-the-pulpit | | | | | | | | 1 A | * | 1 A |
| Adiantum pedatum | Maidenhair fern | | | | | | | | 1 A | 2 A | 1 A |
| Botrychium virginianum | Rattlesnake fern | | | | | | | | 1 A | 1 A | 1 A |
| Viola pensylvanica | Smooth yellow violet | | | | | | 1 A | * | | 1 A | 2 A |
| Ranunculus spp. | Buttercups | | | | | | * | * | | 1 A | 1 A |
| Galium concinnum | Shining bedstraw | | | | | * | | | | 1 A | * |
| Solidago flexicaulis | Zigzag goldenrod | | | | | | * | | | 3 A | 2 A |
| Trillium spp. | Trilliums | | | | | | 2 A | | | 2 A | 3 A |
| Caulophyllum thalictroides | Blue cohosh | | | | | | * | | | 2 A | 2 A |
| Hepatica acutiloba | Sharp-lobed hepatica | | | | | | 1 A | | | 2 A | 2 A |
| Galium asprellum | Cleavers | | | | | | | * | | * | * |
| Ranunculus hispidus | Hispid buttercup | | | | | | | | | 2 A | 1 A |
| Mitella diphylla | Miterwort | | | | | | | | | 2 A | 1 A |
| Asarum canadense | Wild ginger | | | | | | | | | 2 A | 2 A |
| Sanguinaria canadensis | Bloodroot | | | | | | | | | 3 A | 3 A |
| Geum lacinatum | Rough avens | | | | | | | | 1 A | | |
| Urtica procera | Tall nettle | | | | | | | | 1 A | | |
| Agrimonia gryposepala | Agrimony | | | | | | | | 1 A | | |
| Allium tricoccum | Wild leek | | | | | | | | | * | 1 A |
| Laportea canadensis | Wood nettle | | | | | | | | | | 2 C |
| **Shrubs** | | | | | | | | | | | |
| Amorpha canescens | Lead plant | * | 1 A | | | | | | | | |
| Gaylussacia baccata | Black huckleberry | 3 B | 1 A | 2 B | 2 A | 1 A | | | | | |
| Vaccinium angustifolium | Low sweet blueberry | 3 A | 3 A | 3 A | 3 A | 3 A | 2 A | 1 A | * | | |
| Ilex verticillata | Winterberry | * | 2 A | 3 A | 1 A | * | * | 1 A | * | | |
| Amelanchier spp. | Juneberry | 3 A | 3 A | 3 A | 3 A | 3 A | * | 2 A | 2 A | 1 A | |
| Diervilla lonicera | Bush honeysuckle | 1 A | 1 A | | 2 A | 2 A | 2 A | * | 1 A | * | |
| Corylus cornuta | Beaked hazelnut | * | 1 A | * | 1 A | * | 2 A | * | * | 1 A | * |
| Corylus americana | Hazel-nut | 1 A | 2 A | * | * | 3 B | 2 A | 2 A | 2 A | 1 A | |
| Viburnum acerifolium | Maple-leaved viburnum | * | * | | 2 A | 1 A | 3 A | * | * | * | |
| Rubus spp. | Blackberries/raspberries | 2 A | 3 A | 1 A | 2 A | 3 A | 1 A | 3 A | 3 A | 1 A | |
| Prunus virginiana | Chokecherry | * | 3 A | | | 3 A | 2 A | 3 A | 2 A | 3 A | 2 A |
| Ribes spp. | Gooseberries | | * | | | * | 2 A | 2 A | 2 A | 3 A | 2 A |
| Cornus alternifolia | Dogwood (altlv) | | | * | * | * | 1 B | * | * | 3 A | 2 A |
| Viburnum rafinesquianum | Downy arrowwood | | * | | | 1 A | 1 A | * | | * | |
| Crataegus spp. | Hawthorns | | * | | 1 A | 1 A | * | | * | * | |
| Cornus racemosa | Gray dogwood | | 3 A | | | 2 A | | 1 A | 2 A | | |
| Hamamelis virginiana | Witch hazel | | | | 2 A | | 1 A | | | | |
| Aronia melanocarpa | Black chokeberry | | | 1 A | * | | | | | | |
| Salix humilis | Prairie willow | | | | | | | | 1 A | | |
| Lonicera canadensis | American fly honeysuckle | | | | | | 2 A | | | 1 A | |
| Xanthoxylum americanum | Prickly ash | | * | | | | | 1 A | * | 1 A | * |
| Viburnum lentago | Nannyberry | | | | | * | * | 1 A | 1 A | 1 A | * |
| Sambucus canadensis | Common elder | | | | | | | | 2 A | | |



Previous View

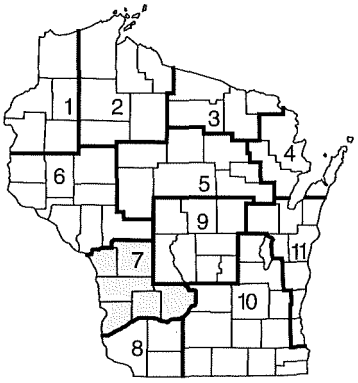
# Region 7

## Extent, topography, geology and soils

Region 7 represents the central portion of the Driftless Area. It includes LaCrosse, Monroe, Vernon, Crawford, Richland and Sauk counties. All but the northern margin of this region is within the Natural Subdivisions 6a and 6b. Much of this hilly country is highly dissected by river valleys (coulees), with no evidence of glaciation. This region has the longest and steepest slopes of any region in the state. Dolomite is the predominant bedrock occurring near the surface on ridge tops and upper side slopes and sandstone is the predominant rock exposed on the steep valley sides.

The soils of this region are formed partly from the underlying bedrock and partly from a two to four foot thick blanket of windblown silty layer (loess). The surface layer is dominantly silt loam. Typical subsoils are silty clay loam, or clay in areas of dolomitic bedrock, and sandy loam, loamy sand or sand in areas of sandstone bedrock.

The northern extreme of region 7 extends into Natural Subdivision 6c, which is characterized by rolling terrain with sandstone bedrock and covering of a mixture of leeched loess and sandstone residuum. (See region 6 for description of specific soils).



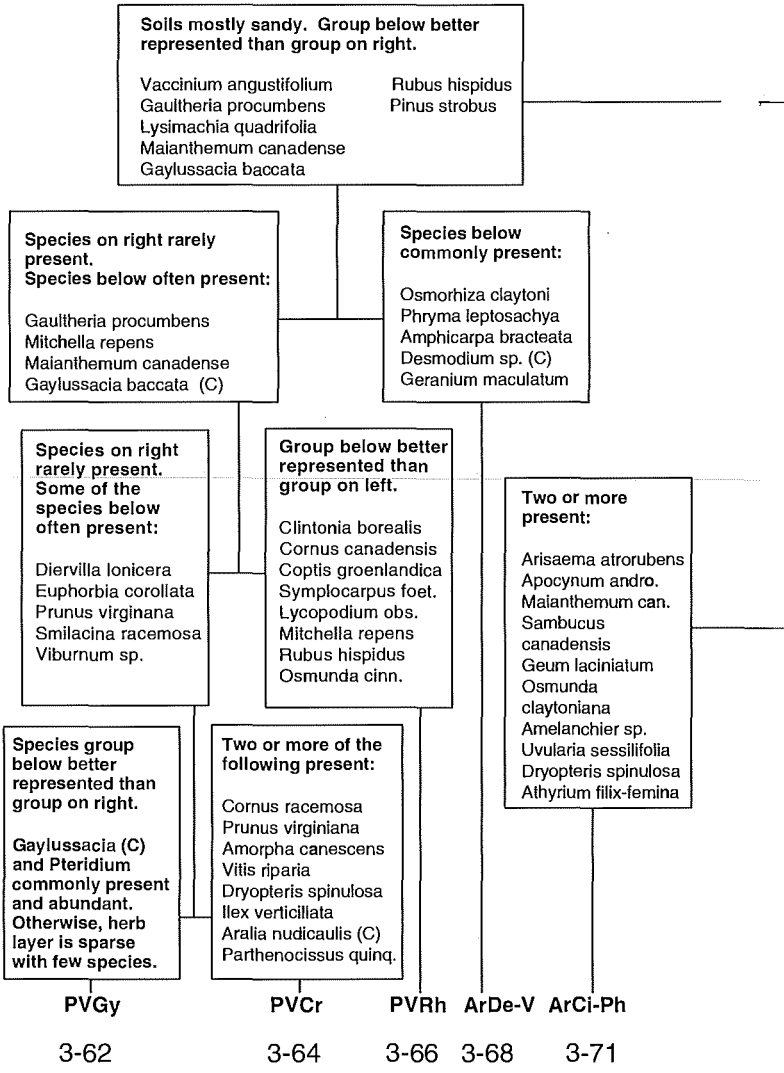

## Forest vegetation

As in most areas of southern Wisconsin the climate and soils are suitable for the development of mesic deciduous forests. However, except for the scattered fire-protected landscape positions the presettlement vegetation in southern Wisconsin consisted of prairies, oak savannas, oak openings and oak forests. In great contrast to the general pattern region 7 contained one of the three largest blocks of southern mesic forest found in the state. In this case, the approximately 1000 square mile wedge of land between the Wisconsin and Kickapoo Rivers escaped the fires that maintained savannas in the surrounding areas. The natural subdivision 6a is based entirely on the presettlement presence of sugar maple basswood forest.



Previous View

# Key to Habitat Types of Region 7 - Scientific Names



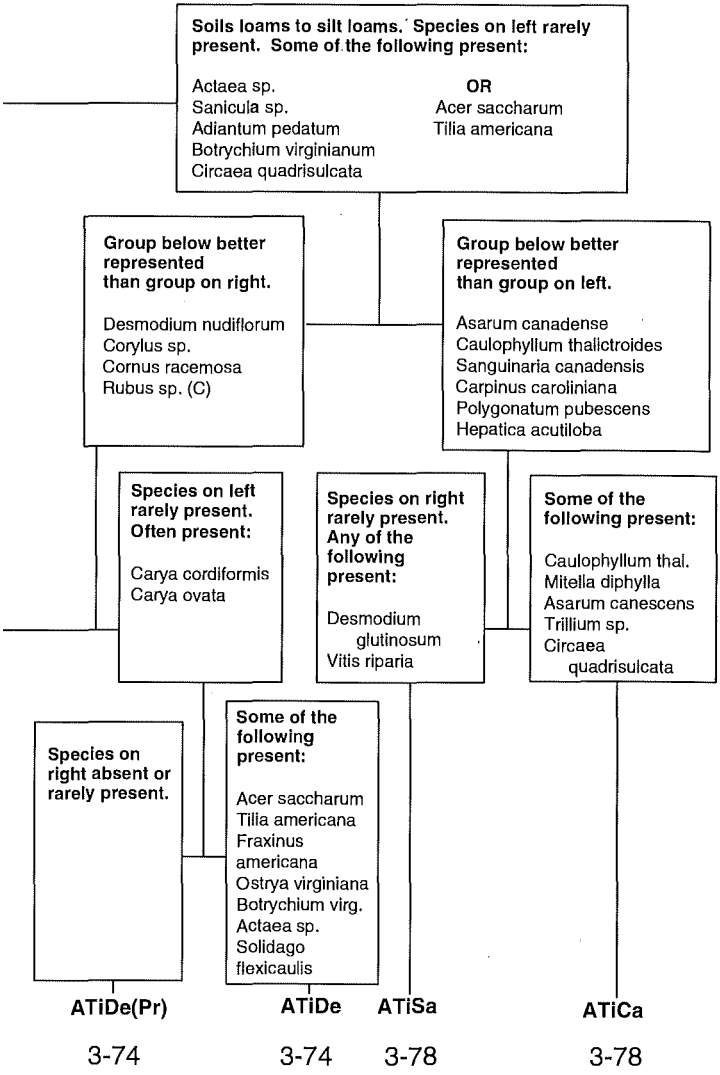

**Group below well represented:** Several species are found rather than any one being common.

**Poorly represented:** Usually no more than one species from the group present. Abundance may be low or high.

**(C)** - Common: >1%



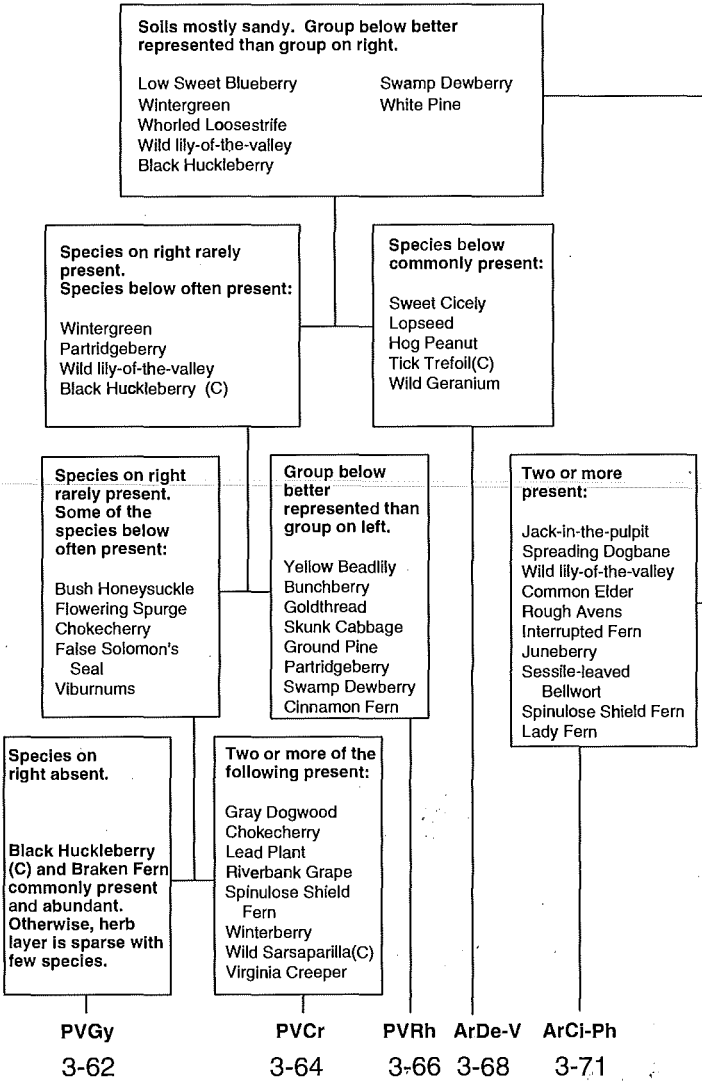
Previous View






Previous View

# Key to Habitat Types of Region 7 - Common Names

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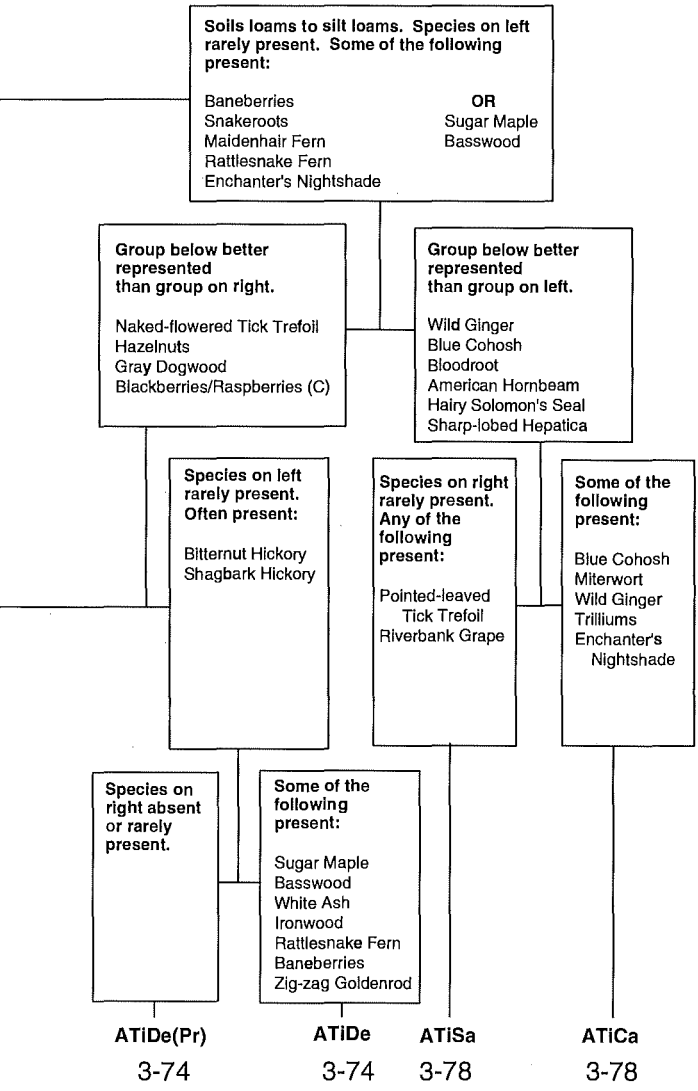
Previous View






Previous View

# Comparison of Major Floristic Differences Between Closely Related Habitat Types in Region 7

| | | PVGy | PVCr |
|---|---|---|---|
| Gaylussacia baccata | Black huckleberry | 83,7 | 47,1 |
| Lysimachia quadrifolia | Whorled loosestrife | 69 | 35 |
| Gaultheria procumbens | Wintergreen | 55 | 17 |
| Epigaea repens | Trailing arbutus | 23 | . |
| Smilacina racemosa | False solomon's seal | 42 | 88 |
| Aralia nudicaulis | Wild sarsaparilla | 48 | 76 |
| Cornus racemosa | Gray dogwood | 7 | 76 |
| Prunus virginiana | Chokecherry | 12 | 76 |
| Ilex verticillata | Winterberry | 21 | 52 |
| Parthenocissus quinq. | Virginia creeper | 5 | 52 |
| Amorpha canescens | Lead plant | 10 | 35 |
| Smilax tamnoides | Bristly greenbrier | 5 | 35 |

| | | PVCr | ArDe-V |
|---|---|---|---|
| Maianthemum canadense | Wild lily-of-the-valley | 76 | 38 |
| Amorpha canescens | Lead plant | 35 | 4 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 11 | 90 |
| Geranium maculatum | Wild geranium | 23 | 71 |
| Amphicarpa bracteata | Hog peanut | 5 | 61 |
| Osmorhiza claytoni | Sweet cicely | . | 57 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 5 | 52 |
| Phryma leptostachya | Lopseed | . | 33 |

| | | PVRh | ArDe-V |
|---|---|---|---|
| Trientalis borealis | Starflower | 100 | 14 |
| Ilex verticillata | Winterberry | 93 | 23 |
| Rubus hispidus | Swamp dewberry | 87 | . |
| Maianthemum canadense | Wild lily-of-the-valley | 81 | 38 |
| Mitchella repens | Partridgeberry | 75 | 9 |
| Gaylussacia baccata | Black huckleberry | 76 | 47 |
| Gaultheria procumbens | Wintergreen | 62 | . |
| Osmunda cinnamomea | Cinnamon fern | 62 | . |
| Lycopodium obscurum | Ground-pine | 56 | . |
| Cornus canadensis | Bunchberry | 50 | . |
| Coptis groenlandica | Goldthread | 43 | . |
| Desmodium glutinosum | Pointed-leaved tick trefoil | . | 90 |
| Diervilla lonicera | Bush honeysuckle | . | 71 |
| Geranium maculatum | Wild geranium | . | 71 |
| Smilacina racemosa | False solomon's seal | 12 | 71 |
| Cornus racemosa | Gray dogwood | . | 66 |
| Parthenocissus quinq. | Virginia creeper | 12 | 66 |
| Amphicarpa bracteata | Hog peanut | . | 61 |
| Osmorhiza claytoni | Sweet cicely | . | 57 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | . | 52 |
| Viburnum acerifolium | Maple-leaved viburnum | . | 38 |

| | | ArCi-Ph | ATiDe(Pr) |
|---|---|---|---|
| Circaea quadrisulcata | Enchanter's nightshade | 93 | 63 |
| Dryopteris spinulosa | Spinulose shield fern | 65 | 36 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 45 | 27 |
| Carya ovata | Shagbark hickory | 41 | 81 |
| Galium concinnum | Shining bedstraw | 8 | 72 |
| Carya cordiformis | Bitternut hickory | 21 | 72 |
| Dioscorea villosa | Wild yam root | 10 | 45 |



Previous View

| | | ArCi-Ph | ATiSa |
|---|---|---|---|
| Circaea quadrisulcata | Enchanter's nightshade | 93 | 15 |
| Acer rubrum | Red maple | 76 | . |
| Corylus americana | Hazel-nut | 73 | 10 |
| Sambucus canadensis | Common elder | 54 | . |
| Amelanchier spp. | Juneberry | 54 | . |
| Pteridium aquilinum | Braken fern | 36 | . |
| Maianthemum canadense | Wild lily-of-the-valley | 34 | . |
| Apocynum androsaemifolium | Spreading dogbane | 32 | . |
| Acer saccharum | Sugar maple | 8 | 100 |
| Sanguinaria canadensis | Bloodroot | 8 | 89 |
| Botrychium virginianum | Rattlesnake fern | 41 | 73 |
| Solidago flexicaulis | Zigzag goldenrod | 6 | 68 |
| Viburnum acerifolium | Maple-leaved viburnum | 19 | 47 |

| | | ArCi-Ph | ATiCa |
|---|---|---|---|
| Geranium maculatum | Wild geranium | 91 | 64 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 91 | 35 |
| Rubus spp. | Blackberries/raspberries | 85 | 21 |
| Corylus americana | Hazel-nut | 73 | . |
| Cornus racemosa | Gray dogwood | 69 | 7 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 45 | . |
| Sanguinaria canadensis | Bloodroot | 8 | 96 |
| Solidago flexicaulis | Zigzag goldenrod | 6 | 82 |
| Adiantum pedatum | Maidenhair fern | 30 | 71 |
| Polygonatum pubescens | Hairy solomon's seal | 17 | 71 |
| Actaea spp. | Baneberries | 32 | 60 |
| Arisaema atrorubens | Jack-in-the-pulpit | 32 | 60 |
| Caulophyllum thal. | Blue cohosh | 6 | 64 |
| Cornus alternifolia | Alternate-leaved dogwood | 15 | 64 |
| Trillium spp. | Trilliums | 6 | 57 |
| Viola pensylvanica | Smooth yellow violet | 2 | 50 |
| Asarum canadense | Wild ginger | 2 | 39 |
| Hepatica acutiloba | Sharp-lobed hepatica | . | 39 |
| Mitella diphylla | Miterwort | . | 35 |

| | | ATiDe | ATiDe(Pr) |
|---|---|---|---|
| Tilia americana | Basswood | 81 | 18 |
| Botrychium virginianum | Rattlesnake fern | 77 | 36 |
| Fraxinus americana | White ash | 66 | 9 |
| Xanthoxylum americanum | Prickly ash | 62 | 27 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 62 | 27 |
| Acer saccharum | Sugar maple | 55 | . |
| Adiantum pedatum | Maidenhair fern | 55 | 27 |
| Actaea spp. | Baneberries | 40 | 9 |
| Prunus serotina | Black cherry | 51 | 100 |
| Rubus spp. | Blackberries/raspberries | 48 | 100 |
| Ribes spp. | Gooseberries | 74 | 90 |
| Smilacina racemosa | False solomon's seal | 29 | 63 |
| Corylus americana | Hazel-nut | 29 | 63 |
| Circaea quadrisulcata | Enchanter's nightshade | 29 | 63 |
| Agrimonia gryposepala | Agrimony | 7 | 54 |
| Pteridium aquilinum | Braken fern | 11 | 45 |

*continued...*



Previous View

*...continued*

| | | ATiDe | ATiSa |
|---|---|---|---|
| Desmodium glutinosum | Pointed-leaved tick trefoil | 96 | 68 |
| Parthenocissus quinq. | Virginia creeper | 81 | 47 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 62 | 10 |
| Actaea spp. | Baneberries | 40 | 15 |
| Lysimachia quadrifolia | Whorled loosestrife | 25 | . |
| Sanguinaria canadensis | Bloodroot | 29 | 89 |
| Polygonatum pubescens | Hairy solomon's seal | 7 | 63 |

| | | ATiCa | ATiSa |
|---|---|---|---|
| Circaea quadrisulcata | Enchanter's nightshade | 82 | 15 |
| Caulophyllum thal. | Blue cohosh | 64 | 21 |
| Cornus alternifolia | Alternate-leaved dogwood | 64 | 26 |
| Arisaema atrorubens | Jack-in-the-pulpit | 60 | 36 |
| Actaea spp. | Baneberries | 60 | 15 |
| Trillium spp. | Trilliums | 57 | 10 |
| Viola pensylvanica | Smooth yellow violet | 50 | 15 |
| Hepatica acutiloba | Sharp-lobed hepatica | 39 | 10 |
| Asarum canadense | Wild ginger | 40 | 15 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 35 | 68 |
| Ostrya virginiana | Ironwood | 39 | 57 |
| Vitis riparia | Riverbank grape | 21 | 57 |
| Carya ovata | Shagbark hickory | 7 | 47 |

| | | PVGy | PVRh |
|---|---|---|---|
| Apocynum andro. | Spreading dogbane | 75 | 31 |
| Rosa spp. | Roses | 71 | . |
| Lysimachia quadrifolia | Whorled loosestrife | 69 | 18 |
| Diervilla lonicera | Bush honeysuckle | 44 | . |
| Trientalis borealis | Starflower | 41 | 100 |
| Euphorbia corollata | Flowering spurge | 35 | . |
| Ilex verticillata | Winterberry | 21 | 93 |
| Rubus hispidus | Swamp dewberry | 3 | 87 |
| Mitchella repens | Partridgeberry | 7 | 75 |
| Osmunda cinnamomea | Cinnamon fern | . | 62 |
| Lycopodium obscurum | Ground-pine | 7 | 56 |
| Cornus canadensis | Bunchberry | . | 50 |
| Coptis groenlandica | Goldthread | . | 43 |
| Clintonia borealis | Yellow beadlilly | 1 | 37 |
| Osmunda claytoniana | Interrupted fern | 1 | 31 |



Previous View

| | | PVCr | PVRh |
|---|---|---|---|
| Smilacina racemosa | False solomon's seal | 88 | 12 |
| Cornus racemosa | Gray dogwood | 76 | . |
| Prunus virginiana | Chokecherry | 76 | 6 |
| Corylus americana | Hazel-nut | 64 | 25 |
| Rosa spp. | Roses | 58 | . |
| Parthenocissus quinq. | Virginia creeper | 52 | 12 |
| Diervilla lonicera | Bush honeysuckle | 47 | . |
| Trientalis borealis | Starflower | 47 | 100 |
| Rubus hispidus | Swamp dewberry | 5 | 87 |
| Gaylussacia baccata | Black huckleberry | 47,1 | 75,7 |
| Mitchella repens | Partridgeberry | 17 | 75 |
| Gaultheria procumbens | Wintergreen | 17 | 62 |
| Osmunda cinnamomea | Cinnamon fern | . | 62 |
| Lycopodium obscurum | Ground-pine | . | 56 |
| Cornus canadensis | Bunchberry | . | 50 |
| Coptis groenlandica | Goldthread | . | 43 |
| Clintonia borealis | Yellow beadlilly | . | 37 |
| Osmunda claytoniana | Interrupted fern | . | 31 |
| Aronia melanocarpa | Black chokeberry | 5 | 31 |

| | | ArDe-V | ArCi-Ph |
|---|---|---|---|
| Vaccinium angust. | Low sweet blueberry | 85 | 13 |
| Pteridium aquilinum | Braken fern | 85,6 | 36,1 |
| Lathyrus ochroleucus | Pale vetchling | 61 | 23 |
| Gaylussacia baccata | Black huckleberry | 47 | . |
| Osmorhiza claytoni | Sweet cicely | 57 | 93 |
| Circaea quadrisulcata | Enchanter's nightshade | 23 | 93 |
| Phryma leptostachya | Lopseed | 33 | 82 |
| Sambucus canadensis | Common elder | 9 | 54 |

| | | ArCi-Ph | ATiDe |
|---|---|---|---|
| Circaea quadrisulcata | Enchanter's nightshade | 93 | 29 |
| Osmorhiza claytoni | Sweet cicely | 93 | 59 |
| Galium triflorum | Sweet-scented bedstraw | 76 | 3 |
| Sambucus canadensis | Common elder | 54 | . |
| Amelanchier spp. | Juneberry | 54 | 7 |
| Pyrola spp. | Pyrolas | 41 | 3 |
| Diervilla lonicera | Bush honeysuckle | 36 | . |
| Athyrium filix-femina | Lady fern | 34 | 3 |
| Maianthemum canadense | Wild lily-of-the-valley | 34 | . |
| Xanthoxylum americanum | Prickly ash | 10 | 62 |
| Solidago flexicaulis | Zig-zag goldenrod | 6 | 48 |

*continued...*



Previous View

*...continued*

| | | ArDe-V | ATiDe |
|---|---|---|---|
| Acer rubrum | Red maple | 95 | 11 |
| Vaccinium angust. | Low sweet blueberry | 85 | 3 |
| Pteridium aquilinum | Braken fern | 86,6 | 11.1 |
| Amelanchier spp. | Juneberry | 85,6 | 7 |
| Corylus americana | Hazel-nut | 80 | 29 |
| Smilacina racemosa | False solomon's seal | 71 | 29 |
| Diervilla lonicera | Bush honeysuckle | 71 | . |
| Lathyrus ochroleucus | Pale vetchling | 61 | . |
| Uvularia sessilifolia | Sessile-leaved bellwort | 57 | 18 |
| Gaylussacia baccata | Black huckleberry | 47 | . |
| Phryma leptostachya | Lopseed | 33 | 88 |
| Sanicula marilandica | Black snakeroot | 23 | 85 |
| Vitis riparia | Riverbank grape | 28 | 66 |
| Uvularia grandiflora | Large-flowered bellwort | 23 | 66 |
| Adiantum pedatum | Maidenhair fern | 9 | 55 |
| Solidago flexicaulis | Zigzag goldenrod | . | 48 |
| Actaea spp. | Baneberries | 9 | 40 |
| Botrychium virginianum | Rattlesnake fern | 4 | 77 |

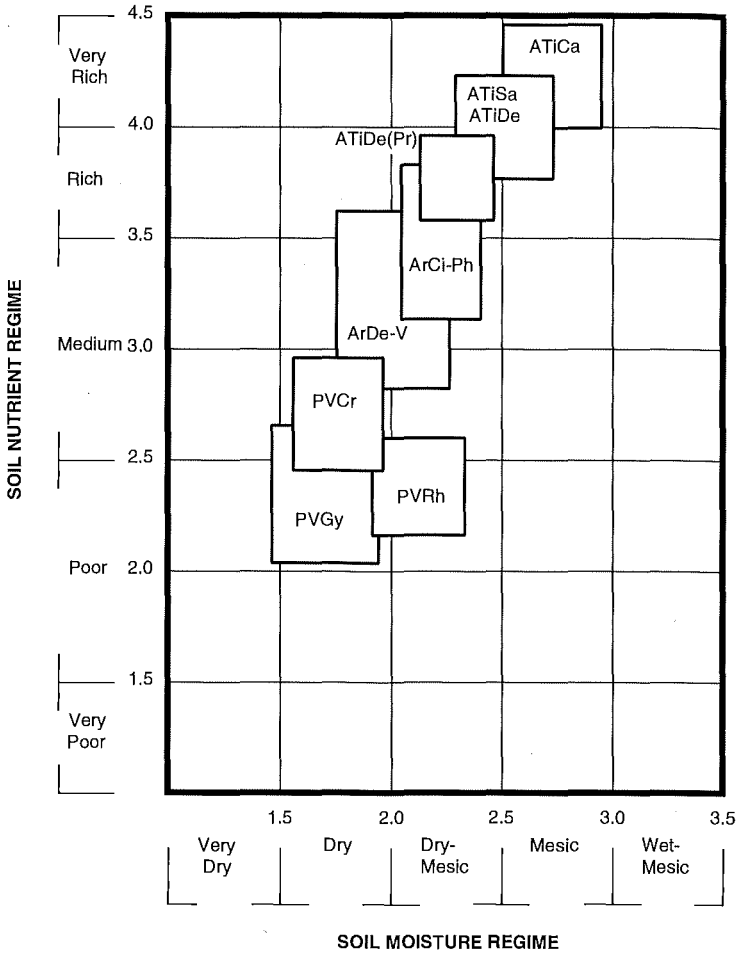
| | | ATiDe(Pr) | ATiSa |
|---|---|---|---|
| Ribes spp. | Gooseberries | 90,12 | 78,1 |
| Corylus americana | Hazel-nut | 63 | 10 |
| Circaea quadrisulcata | Enchanter's nightshade | 63 | 15 |
| Helianthus spp. | Sunflowers | 54 | . |
| Agrimonia gryposepala | Agrimony | 54 | . |
| Sanguinaria canadensis | Bloodroot | 9 | 89 |
| Adiantum pedatum | Maidenhair fern | 27 | 68 |
| Solidago flexicaulis | Zigzag goldenrod | . | 68 |
| Polygonatum pubescens | Hairy solomon's seal | . | 63 |
| Ostrya virginiana | Ironwood | 9 | 57 |
| Thalictrum dioicum | Early meadow rue | 9 | 57 |
| Viburnum acerifolium | Maple-leaved viburnum | 9 | 47 |

| | | ATiDe(Pr) | ATiCa |
|---|---|---|---|
| Desmodium glutinosum | Pointed-leaved tick trefoil | 100 | 35 |
| Rubus spp. | Blackberries/raspberries | 100 | 21 |
| Carya ovata | Shagbark hickory | 81 | 7 |
| Corylus americana | Hazel-nut | 63 | . |
| Cornus racemosa | Gray dogwood | 63 | 7 |
| Pteridium aquilinum | Braken fern | 45 | . |
| Acer saccharum | Sugar maple | . | 96 |
| Sanguinaria canadensis | Bloodroot | 9 | 96 |
| Solidago flexicaulis | Zigzag goldenrod | . | 82 |
| Polygonatum pubescens | Hairy solomon's seal | . | 71 |
| Dryopteris spinulosa | Spinulose shield fern | 36 | 71 |
| Adiantum pedatum | Maidenhair fern | 27,1 | 71,4 |
| Cornus alternifolia | Alternate-leaved dogwood | 18 | 64 |
| Caulophyllum thalictroides | Blue cohosh | 9 | 64 |
| Actaea spp. | Baneberries | 9 | 60 |
| Arisaema atrorubens | Jack-in-the-pulpit | 9 | 60 |
| Hepatica acutiloba | Sharp-lobed hepatica | . | 39 |
| Asarum canadense | Wild ginger | . | 39.8 |



Previous View

# Relationship of Habitat Types to Soil Moisture and Nutrient Regimes in Region 7






Previous View

# PVGy

## *Pinus strobus/Vaccinium-Gaylussacia*

## (White pine/Blueberry-Huckleberry)

**Distribution:**
Most prevalent in Region 6, but also in northern parts of Region 7.
Natural subdivision 4a.

**Similar Types:** PVCr, PVHa

**Landform And Soils:**
Nearly level sand plains with sandstone buttes. Soil is sand or loamy sand, usually more than 3-4 feet deep. Well to excessively well drained. Representative soils are Tarr and Boone sand and loamy sand. The type is classified as **very dry to dry/poor nutrient**. Typical **PVGy** is found on flats and lower slopes. On steep upper slopes, S-SW aspects and narrow ridges a **xeric sub-type** of **PVGy** should be recognized. No plants consistently reflect these xeric conditions, but tree growth is strongly limited.

**Vegetation:**
**Common Forest Cover Types**: Various mixtures of *pines (jack, red, white), pin oak, black oak and white oak* occur. Pines exhibit normal growth, but oaks only attain small stature and poor form. *Red maple* is present mostly as saplings. In the literature these communities are usually referred to as pine and oak barrens.

**Shrub And Small Tree Layer**: This layer is absent or poorly developed except for *huckleberry.* The following species are often present, but with low coverages: *serviceberry, black cherry, blackberries* and *raspberries. Red maple* and *black cherry* are often dominant.

**Ground Flora Characteristics**: Except for *bracken fern*, herbs are largely absent or sparsely distributed. Most commonly found are: *common milkweed, whorled loosestrife* and *wild lily-of-the-valley.* Others, with even lower constancy are *wild sarsaparilla, false solomon's seal*, and *starflower.* Because only the most drought and low-nutrient tolerant species occur on the extreme end of this gradient plants cannot be used to further distinguish between "normal" and even more xeric sites. Therefore, when vegetation keys out to **PVGy** on steep upper slopes, S-SW aspects or narrow ridges, the site must be considered as a **xeric sub-type** of **PVGy** type.

**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 vigorous development in the seedling and sapling layers. *White oak* also appears to regenerate well enough to remain as a permanent associate. *Red pine, jack pine,* and *black oak* would become less common. *Red maple* and *black cherry* are often well represented in the sapling layer but attain only small tree size on this type and can be expected to persist as understory associates.



Previous View

# PVGy

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Pteridium aquilinum | Braken fern | 91 | 15.71 |
| Sedges spp. | Sedges | 85 | 3.26 |
| Apocynum andro. | Spreading dogbane | 75 | 0.51 |
| Lysimachia quadrifolia | Whorled loosetrife | 69 | 0.56 |
| Maianthemum canadense | Wild lily-of-the-valley | 64 | 0.85 |
| Uvularia sessilifolia | Sessile-leaved bellwort | 64 | 0.50 |
| Gaultheria procumbens | Wintergreen | 55 | 0.58 |
| Aralia nudicaulis | Wild sarsaparilla | 48 | 1.24 |
| Grasses spp. | Grasses | 44 | 1.58 |
| Smilacina racemosa | False solomon's seal | 42 | 0.50 |
| Trientalis borealis | Starflower | 41 | 0.63 |
| Euphorbia corollata | Flowering spurge | 35 | 0.50 |
| Aster macrophyllus | Large-leaved aster | 28 | 0.66 |
| Anemone quinquefolia | Wood anemone | 23 | 0.50 |
| Epigaea repens | Trailing arbutus | 23 | 0.50 |
| Potentilla simplex | Common cinquefoil | 21 | 0.50 |
| Goodyera pubescens | Downy rattlesnake plantain | 19 | 0.50 |
| Aster sagittifolius | Arrow-leaved aster | 19 | 0.50 |
| **Shrubs** | | | |
| Vaccinium angust. | Low sweet blueberry | 98 | 2.87 |
| Amelanchier spp. | Juneberry | 87 | 0.96 |
| Gaylussacia baccata | Black huckleberry | 83 | 7.38 |
| Rosa spp. | Roses | 71 | 0.56 |
| Rubus spp. | Blackberries/raspberries | 66 | 2.09 |
| Diervilla lonicera | Bush honeysuckle | 44 | 0.50 |
| Corylus americana | Hazel-nut | 41 | 1.37 |
| Corylus cornuta | Beaked hazelnut | 21 | 2.75 |
| Ilex verticillata | Winterberry | 21 | 0.50 |
| **Tree Seedlings** | | | |
| Acer rubrum | Red maple | 78 | 1.25 |
| Prunus serotina | Black cherry | 67 | 0.76 |
| Pinus strobus | White pine | 67 | 1.41 |
| Quercus ellipsoidalis | Northern pin oak | 66 | 0.84 |
| Quercus alba | White oak | 55 | 1.69 |
| Populus grandidentata | Bigtooth aspen | 30 | 0.65 |

# PVCr

## *Pinus strobus/Vaccinium-Cornus racemosa*
## (White pine/Blueberry-Gray dogwood)

**Distribution:**
Primarily in northern parts of Region 7 and throughout Region 6. Closely associated with Natural Subdivisions 4a and 6c.

**Similar types:** PVGy, PVHa

**Landform and soils:**
Rolling to hilly topography with sandstone outcrops. Soils are either thin loam or silt loam over deep sand, or over bedrock. Soil example is Eleva sandy loam. This type is classified as **dry/medium nutrient**.

**Vegetation:**
**Common forest cover types**: Mixtures of *white oak, black oak, pin oak* and *white pine* are most common. *Jack pine* is frequently present. *Red oak* is generally absent. *Red maple* is common and grows better than it does on **PVGy**, but less well than on **ArDe-V**. *Black cherry* is almost always present as saplings, but does not develop well into larger size class.

**Shrub and small tree layer**: This layer is much better represented on this type than it is on **PVGy**. Most diagnostic in this respect are *gray dogwood* and *choke cherry. Black cherry* is also better represented on **PVCr**. Other important species are *blackberries* and *raspberries, hazel* and *Serviceberry.*

**Ground flora characteristics**: Herbaceous layer is poorly developed on this type. A few species are better represented on this type than they are on the **PGy** and are useful for identification. These are *wild sarsaparilla, true solomon's seal* and *Virginia creeper.*

**Disturbance and succession:**
All tree species occurring on this type are adapted to fire disturbance. The relative frequency and intensity of fire probably controlled community composition in presettlement time. There is no evidence to suggest that in the absence of fire the same species, with the exception of *jack pine,* could not maintain themselves on this type. *White pine,* because of its much larger stature and longer life span than other species, is presumed to be a potential dominant.



Previous View

# PVCr

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Sedges spp. | Sedges | 100 | 2.24 |
| Smilacina racemosa | False solomon's seal | 88 | 0.50 |
| Pteridium aquilinum | Braken fern | 88 | 10.63 |
| Maianthemum canadense | Wild lily-of-the-valley | 76 | 0.69 |
| Aralia nudicaulis | Wild sarsaparilla | 76 | 3.69 |
| Uvularia sessilifolia | Sessile-leaved bellwort | 58 | 1.00 |
| Apocynum andro. | Spreading dogbane | 58 | 0.50 |
| Parthenocissus quinq. | Virginia creeper | 52 | 0.78 |
| Aster macrophyllus | Large-leaved aster | 47 | 0.81 |
| Trientalis borealis | Starflower | 47 | 0.50 |
| Lysimachia quadrifolia | Whorled loosetrife | 35 | 0.50 |
| Smilax tamnoides | Bristly greenbrier | 35 | 0.50 |
| Lathyrus ochroleucus | Pale vetchling | 29 | 0.50 |
| Pyrola spp. | Pyrolas | 29 | 0.50 |
| Vitis riparia | Riverbank grape | 29 | 0.50 |
| Dryopteris spinulosa | Spinulose shield fern | 29 | 0.50 |
| Euphorbia corollata | Flowering spurge | 29 | 0.50 |
| Grasses spp. | Grasses | 29 | 0.50 |
| Goodyera pubescens | Downy rattlesnake plantain | 23 | 0.50 |
| Galium triflorum | Sweet-scented bedstraw | 23 | 0.50 |
| Galium boreale | Northern bedstraw | 23 | 0.50 |
| Geranium maculatum | Wild geranium | 23 | 0.50 |
| Smilax herbacea | Carrion flower | 23 | 0.50 |
| Fragaria vesca | Wood strawberry | 23 | 0.50 |
| **Shrubs** | | | |
| Rubus spp. | Blackberries/raspberries | 88 | 2.63 |
| Amelanchier spp. | Juneberry | 88 | 1.33 |
| Vaccinium angust. | Low sweet blueberry | 82 | 1.21 |
| Cornus racemosa | Gray dogwood | 76 | 1.81 |
| Prunus virginiana | Chokecherry | 76 | 0.88 |
| Corylus americana | Hazel-nut | 64 | 2.27 |
| Rosa spp. | Roses | 58 | 0.75 |
| Ilex verticillata | Winterberry | 52 | 0.50 |
| Gaylussacia baccata | Black huckleberry | 47 | 1.13 |
| Diervilla lonicera | Bush honeysuckle | 47 | 1.44 |
| Amorpha canescens | Lead plant | 35 | 0.50 |
| Corylus cornuta | Beaked hazelnut | 29 | 1.00 |
| Crataegus spp. | Hawthorns | 23 | 0.50 |
| **Tree Seedlings** | | | |
| Quercus alba | White oak | 100 | 1.94 |
| Prunus serotina | Black cherry | 100 | 2.94 |
| Acer rubrum | Red maple | 70 | 0.71 |
| Pinus strobus | White pine | 52 | 0.78 |
| Quer. ellipsoidalis | Northern pin oak | 47 | 0.81 |
| Quercus velutina | Black oak | 23 | 1.13 |



Previous View

# PVRh

## *Pinus strobus/Vaccinium-Rubus hispidus*

## (White pine/Blueberry-Dewberry)

**Distribution:**
Mostly in Jackson county (E of Black River). Natural Subdivision 4a.

**Similar types:** PVGy, PVHa

**Landform and soils:**
Nearly level sand plains with sandstone buttes. Similar topography and surface soil as described for **PVGy.** However, on **PVRh** sites ground water influence is near the surface - usually within 3 feet. Soil examples are Fairchild, Iron run and Merrillan. In spite of ground water influence vegetation on these sandy soils is decidedly xerophytic. The type is classified as **dry-mesic/poor nutrient.**

**Vegetation:**
**Common forest cover types**: *White pine, red maple* and *pin oak,* in various mixtures, are most common dominants in current stands. *White oak* and *jack pine* are common associates, *red oak* is usually absent.

**Shrub and small tree layer**: This layer is generally absent of poorly developed. *Huckleberry* is often conspicuous but other species have low coverage. Those with high constancy are *black cherry, serviceberry* and *winterberry (Ilex). Winterberry* is best represented on this type. Conspicuously rare are *gray dogwood, chokecherry* and *hazel.* All of these are usually well represented on dry and dry-mesic sites.

**Ground flora characteristics**: The following group of species with moderate individual constancy values readily distinguish this type from other types in this region: *Partridgeberry, swamp dewberry, starflower, ground pine (Lycopodium obscurum), goldthread, bunchberry* and *yellow beadlily.* These species are characteristic members of northern forests and are rarely found in southern habitat types. *Cinnamon fern* sometimes dominates herb layer, especially where ground water is near the surface.

**Disturbance and succession**: Records of presettlement conditions show *white pine* as the dominant species on this habitat type. *Red maple* and *pin oak* were probably always present, but assumed dominance after *white pine* was logged off. Since then *white pine* seed source has slowly increased and *white pine* regeneration is now common in many stands.



Previous View

# PVRh

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Trientalis borealis | Starflower | 100 | 0.50 |
| Aralia nudicaulis | Wild sarsaparilla | 87 | 0.86 |
| Rubus hispidus | Swamp dewberry | 87 | 1.71 |
| Maianthemum canadense | Wild lily-of-the-valley | 81 | 2.58 |
| Uvularia sessilifolia | Sessile-leaved bellwort | 81 | 0.69 |
| Mitchella repens | Partridgeberry | 75 | 0.50 |
| Pteridium aquilinum | Braken fern | 75 | 9.13 |
| Gaultheria procumbens | Wintergreen | 62 | 0.50 |
| Osmunda cinnamomea | Cinnamon fern | 62 | 20.00 |
| Lycopodium obscurum | Ground-pine | 56 | 0.50 |
| Sedges spp. | Sedges | 56 | 0.50 |
| Cornus canadensis | Bunchberry | 50 | 1.44 |
| Coptis groenlandica | Goldthread | 43 | 3.29 |
| Grasses spp. | Grasses | 37 | 0.50 |
| Clintonia borealis | Yellow beadlilly | 37 | 0.50 |
| Aster macrophyllus | Large-leaved aster | 37 | 0.50 |
| Apocynum andro. | Spreading dogbane | 31 | 0.50 |
| Anemone quinquefolia | Wood anemone | 31 | 0.50 |
| Osmunda claytoniana | Interrupted fern | 31 | 1.50 |
| Cypripedium acaule | Pink lady's slipper | 25 | 1.13 |
| Viola spp. | Violets | 25 | 0.50 |
| Symplocarpus foetidus | Skunk cabbage | 25 | 4.75 |
| Dryopteris spinulosa | Spinulose shield fern | 25 | 1.75 |
| Pyrola spp. | Pyrolas | 18 | 0.50 |
| Lysimachia quadrifolia | Whorled loosestrife | 18 | 0.50 |
| Prenanthes alba | White lettuce | 18 | 0.50 |
| **Shrubs** | | | |
| Ilex verticillata | Winterberry | 93 | 1.50 |
| Vaccinium angust. | Low sweet blueberry | 87 | 0.86 |
| Amelanchier spp. | Juneberry | 81 | 0.69 |
| Gaylussacia baccata | Black huckleberry | 75 | 6.63 |
| Rubus spp. | Blackberries/raspberries | 43 | 2.57 |
| Aronia melanocarpa | Black chokeberry | 31 | 0.60 |
| Corylus americana | Hazel-nut | 25 | 0.50 |
| Corylus cornuta | Beaked hazelnut | 25 | 0.50 |
| **Tree Seedlings** | | | |
| Acer rubrum | Red maple | 93 | 0.83 |
| Pinus strobus | White pine | 81 | 2.38 |
| Quercus ellipsoidalis | Northern pin oak | 75 | 0.50 |
| Prunus serotina | Black cherry | 75 | 0.50 |
| Quercus alba | White oak | 68 | 0.95 |
| Populus grandidentata | Bigtooth aspen | 37 | 0.50 |



Previous View

# ArDe-V

## *Acer rubrum/Desmodium* habitat type, *Vaccinium* variant (Red maple/Pointed-leaf tick trefoil, Blueberry variant)

**Distribution:**
In northern and western parts of Habitat type Region 7 and throughout Region 6. Also scattered in other counties of Natural Subdivision 6c.

**Similar types:** PVCr

**Landform and soils:**
Rolling to hilly topography with sandstone and sometimes dolomitic bedrock. Soils are sandy loam to loam (typical example: Hixton loam). This type represents a distinct **transition between dry and dry-mesic sites.**

**Vegetation:**
**Major forest cover types**: *White oak* and *red maple* are the most common dominants in stands that were sampled, but *red oak* is sometimes present. *Pin oak* or *black oak* are much less common than they or on **PVCr** type. *White pine* is often present.

**Shrub and small tree layer**: This layer is usually well represented. Major species in decreasing order of average coverage are: *Hazel, blackberries* and *raspberries, serviceberry, black cherry, gray dogwood* and *bush honeysuckle. Red maple* saplings often dominate this layer.

**Ground flora characteristics**: Number of species and total herb coverage is higher than on other dry types of this region. *Blueberry* occurs here with small coverage and helps to distinguish **ArDe-V** from **ArCi** and other dry-mesic and mesic types. The species that best distinguishes this type from drier types is *pointed-leaf tick trefoil.* Other diagnostic species with lower constancies are *sweet cicely, wild geranium* and *hog peanut.* Best represented species are *bracken fern, big-leaf aster, tick trefoil, wild sarsaparilla* and *Virginia creeper.*

**Disturbance and succession**: Presettlement fire regime favored development of oak communities. *Red oak* is not reproducing adequately in current stands even when *red oak* is dominant in the overstory. *White oak,* however, shows some ability to persist. The most successfully reproducing species is red maple. Based on understory composition and soil characteristics we conclude that *sugar maple* is not a potential climax dominant on this type. *Red maple* is the most shade tolerant species that is well adapted to these sites and is presumed to be climax. It is also possible that *white pine* can again become a permanent member of communities on this type once it can be established as a seed source. Competitive relationship between *white pine* and *red maple* on this type has not been established, however, it appears that under a disturbance regime of moderate fire frequency the two species would co-exist.

# ArDe-V

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Sedges spp. | Sedges | 95 | 0.63 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 90 | 2.18 |
| Pteridium aquilinum | Braken fern | 85 | 6.31 |
| Aralia nudicaulis | Wild sarsaparilla | 76 | 1.13 |
| Smilacina racemosa | False solomon's seal | 71 | 0.67 |
| Geranium maculatum | Wild geranium | 71 | 0.67 |
| Parthenocissus quinquefolia | Virginia creeper | 66 | 1.89 |
| Amphicarpa bracteata | Hog peanut | 61 | 0.50 |
| Lathyrus ochroleucus | Pale vetchling | 61 | 0.50 |
| Osmorhiza claytoni | Sweet cicely | 57 | 0.50 |
| Aster macrophyllus | Large-leaved aster | 57 | 4.25 |
| Uvularia sessilifolia | Sessile-leaved bellwort | 57 | 1.92 |
| Lysimachia quadrifolia | Whorled loosestrife | 57 | 0.50 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 52 | 2.27 |
| Goodyera pubescens | Downy rattlesnake plantain | 47 | 0.50 |
| Grasses spp. | Grasses | 47 | 0.50 |
| Pyrola spp. | Pyrolas | 47 | 0.50 |
| Galium triflorum | Sweet-scented bedstraw | 42 | 0.50 |
| Dryopteris spinulosa | Spinulose shield fern | 42 | 0.50 |
| Smilax herbacea | Carrion flower | 38 | 0.50 |
| Apocynum androsaemifolium | Spreading dogbane | 38 | 0.81 |
| Maianthemum canadense | Wild lily-of-the-valley | 38 | 0.50 |
| Anemone quinquefolia | Wood anemone | 38 | 0.50 |
| Potentilla simplex | Common cinquefoil | 33 | 0.50 |
| Fragaria vesca | Wood strawberry | 33 | 0.50 |
| Asclepias spp. | Milkweeds | 33 | 0.50 |
| Solidago spp. | Goldenrods | 33 | 0.50 |
| Phryma leptostachya | Lopseed | 33 | 0.50 |
| Osmunda claytoniana | Interrupted fern | 28 | 1.33 |
| Hepatica americana | Round-lobed hepatica | 28 | 0.50 |
| Polygonatum pubescens | Hairy solomon's seal | 28 | 0.50 |
| Vitis riparia | Riverbank grape | 28 | 0.50 |
| Viola spp. | Violets | 23 | 0.50 |
| Circaea quadrisulcata | Enchanter's nightshade | 23 | 0.50 |
| Rhus radicans | Poison ivy | 23 | 0.50 |
| Uvularia grandiflora | Large-flowered bellwort | 23 | 0.50 |
| Smilax tamnoides | Bristly greenbrier | 23 | 0.50 |
| Sanicula marilandica | Black snakeroot | 23 | 0.50 |
| **Shrubs** | | | |
| Rubus spp. | Blackberries/raspberries | 100 | 3.79 |
| Vaccinium angustifolium | Low sweet blueberry | 85 | 0.50 |
| Amelanchier spp. | Juneberry | 85 | 4.44 |
| Corylus americana | Hazel-nut | 80 | 7.50 |
| Prunus virginiana | Chokecherry | 80 | 0.65 |
| Diervilla lonicera | Bush honeysuckle | 71 | 0.83 |

*continued...*



Previous View

*...continued*

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| Cornus racemosa | Gray dogwood | 66 | 1.89 |
| Rosa spp. | Roses | 66 | 0.50 |
| Gaylussacia baccata | Black huckleberry | 47 | 0.75 |
| Viburnum acerifolium | Maple-leaved viburnum | 38 | 0.81 |
| Viburnum rafinesquianum | Downy arrowwood | 28 | 0.92 |
| Ilex verticillata | Winterberry | 23 | 1.00 |
| Ribes spp. | Gooseberries | 23 | 0.50 |
| **Tree Seedlings** | | | |
| Prunus serotina | Black cherry | 95 | 1.38 |
| Acer rubrum | Red maple | 95 | 1.13 |
| Quercus alba | White oak | 80 | 0.94 |
| Quercus velutina | Black oak | 38 | 0.50 |
| Quercus rubra | Northern red oak | 38 | 0.50 |
| Carya ovata | Shagbark hickory | 33 | 0.86 |
| Populus grandidentata | Bigtooth aspen | 33 | 0.50 |
| Carya cordiformis | Bitternut hickory | 23 | 0.50 |
| Ulmus spp | Elms | 23 | 0.50 |
| Crataegus spp. | Hawthorns | 28 | 0.50 |



Previous View

# ArCi-Ph

## *Acer rubrum/Circaea* habitat type, *Phryma* variant (Red maple/Enchanters nightshade, Lopseed variant)

### Distribution:

**ArCi-Ph** occurs throughout Region 7 and also in parts of adjacent Region 6. Natural Subdivision 6c .

**Similar types**: ArCi (Region 6), ATiDe, ATiDe(Pr)

### Landform and soils:

On rolling to hilly sandstone terrain, particularly where thin silt loam cap is present. **Dry-mesic, medium to rich.**

### Vegetation:

**Major forest cover types**: *Red oak, white oak* and *red maple*, in relatively pure stands or in mixtures, are most common. Mesic hardwoods (*sugar maple, basswood, white ash*) or *shagbark hickory* sporadically occur in some stands.

**Shrub and small tree layer**: This layer is usually well developed. Principal species in descending order of average coverage are: *blackberry/raspberry, hazel, gooseberry, gray dogwood, serviceberry,* and *choke cherry*. However, red maple and black cherry saplings often dominate this layer.

**Ground flora characteristics**: **ArCi-Ph** is distinguished from drier types of this region by generally lacking *blueberry* and *huckleberry*. Similarly, it is distinguished from the mesic types by general lack of the *blue cohosh* ecological species group (see Table 6.2). Most characteristic species are *nightshade, Virginia creeper, sweet cicely, wild geranium,* and *gooseberries*.

**Disturbance and succession**: As is the case with several other plant association described in this field guide the climax nature of this community type has not been adequately studied. The soils do not appear different from those that support tolerant mesic species in other parts of the region. However, these species are generally not found in this community type and *red maple* is presently the most common species capable of reproducing in present oak stands. For these reasons the type is referred to as "community type" rather than habitat type and *red maple* can perhaps be viewed as a "pseudo-climax" until *sugar maple* seed source once again becomes common on sites where fire once controlled community dynamics.



Previous View

# ArCi-Ph

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Circaea quadrisulcata | Enchanter's nightshade | 93 | 1.88 |
| Osmorhiza claytoni | Sweet cicely | 93 | 1.26 |
| Geranium maculatum | Wild geranium | 91 | 2.15 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 91 | 1.98 |
| Amphicarpa bracteata | Hog peanut | 84 | 1.77 |
| Phryma leptostachya | Lopseed | 82 | 1.21 |
| Sedges spp. | Sedges | 78 | 0.50 |
| Parthenocissus quinquefolia | Virginia creeper | 76 | 2.73 |
| Galium triflorum | Sweet-scented bedstraw | 76 | 0.57 |
| Viola spp. | Violets | 71 | 0.50 |
| Aralia nudicaulis | Wild sarsaparilla | 69 | 1.44 |
| Dryopteris spinulosa | Spinulose shield fern | 65 | 1.65 |
| Sanicula marilandica | Black snakeroot | 63 | 0.59 |
| Vitis riparia | Riverbank grape | 58 | 0.59 |
| Smilax herbacea | Carrion flower | 56 | 0.50 |
| Uvularia grandiflora | Large-flowered bellwort | 56 | 0.69 |
| Uvularia sessilifolia | Sessile-leaved bellwort | 52 | 0.60 |
| Grasses spp. | Grasses | 47 | 0.61 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 45 | 0.62 |
| Smilacina racemosa | False solomon's seal | 43 | 0.63 |
| Pyrola spp. | Pyrolas | 41 | 0.63 |
| Botrychium virginianum | Rattlesnake fern | 41 | 0.50 |
| Pteridium aquilinum | Braken fern | 36 | 1.09 |
| Athyrium filix-femina | Lady fern | 34 | 1.72 |
| Maianthemum canadense | Wild lily-of-the-valley | 34 | 0.81 |
| Urtica procera | Tall nettle | 32 | 0.50 |
| Geum lacinatum | Rough avens | 32 | 0.50 |
| Actaea spp. | Baneberries | 32 | 0.67 |
| Arisaema atrorubens | Jack-in-the-pulpit | 32 | 0.50 |
| Apocynum androsaemifolium | Spreading dogbane | 32 | 0.50 |
| Osmunda claytoniana | Interrupted fern | 30 | 1.89 |
| Thalictrum dioicum | Early meadow rue | 30 | 0.50 |
| Potentilla simplex | Common cinquefoil | 30 | 0.50 |
| Adiantum pedatum | Maidenhair fern | 30 | 0.50 |
| Aralia racemosa | Spikenard | 30 | 2.93 |
| Agrimonia gryposepala | Agrimony | 30 | 0.50 |
| Rhus radicans | Poison ivy | 28 | 4.65 |
| Aster macrophyllus | Large-leaved aster | 28 | 0.69 |
| Solidago spp. | Goldenrods | 28 | 0.54 |
| Galium boreale | Northern bedstraw | 26 | 0.50 |
| Lysimachia quadrifolia | Whorled loosestrife | 23 | 0.50 |
| Lathyrus ochroleucus | Pale vetchling | 23 | 0.50 |
| Anemone quinquefolia | Wood anemone | 23 | 0.50 |
| Fragaria vesca | Wood strawberry | 21 | 0.50 |
| Smilax tamnoides | Bristly greenbrier | 21 | 0.50 |



Previous View

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Shrubs** | | | |
| Rubus spp. | Blackberries/raspberries | 84 | 4.94 |
| Corylus americana | Hazel-nut | 73 | 2.10 |
| Prunus virginiana | Chokecherry | 71 | 0.95 |
| Cornus racemosa | Gray dogwood | 69 | 1.27 |
| Ribes spp. | Gooseberries | 60 | 2.25 |
| Sambucus canadensis | Common elder | 54 | 0.60 |
| Amelanchier spp. | Juneberry | 54 | 1.18 |
| Rosa spp. | Roses | 45 | 0.86 |
| Diervilla lonicera | Bush honeysuckle | 36 | 0.94 |
| Viburnum lentago | Nannyberry | 34 | 0.50 |
| Salix humilis | Prairie willow | 26 | 0.50 |
| Corylus cornuta | Beaked hazelnut | 23 | 2.95 |
| **Tree Seedlings** | | | |
| Prunus serotina | Black cherry | 91 | 0.74 |
| Acer rubrum | Red maple | 76 | 0.94 |
| Ulmus spp | Elms | 60 | 0.68 |
| Carya ovata | Shagbark hickory | 41 | 0.76 |
| Quercus alba | White oak | 36 | 0.68 |
| Populus grandidentata | Bigtooth aspen | 34 | 0.50 |
| Acer negundo | Box elder | 32 | 0.50 |
| Tilia americana | Basswood | 30 | 0.50 |
| Quercus rubra | Northern red oak | 23 | 0.50 |
| Carya cordiformis | Bitternut hickory | 21 | 0.75 |

# ATiDe and ATiDe(Pr)
## *Acer saccharum-Tilia/Desmodium* (Sugar maple-Basswood/Tick trefoil) and *Prunus serotina* (Black cherry) phase

### Distribution:
Primarily LaCrosse, western Vernon and Richland and Crawford counties. Natural subdivision 6d.

### Landform and soils:
Rolling to hilly topography. Silt loam on cherty clay residuum or silt loam over sandstone on valley walls. All slope aspects, but perhaps more frequently on S and SW. **Dry-mesic, nutrient rich** sites.

**Similar types:** ArCi, ArCi-Ph, (ATiDe-Ha, ATiDe—In Baraboo section).

### Vegetation:
**Common forest cover types**: *Sugar maple, basswood* and *red oak* are primary dominants in current stands on the **ATiDe** type. The *Prunus* (**Pr**) phase is dominated by *red* and *white oak* with some *black oak*, and *slippery elm*. *Maple* and *basswood* are virtually absent. (See disturbance and succession below).

**Shrub and small tree layer**: **ATiDe** has relatively sparse shrub layer. **Pr** phase is usually dominated by *gooseberry (Ribes sp.)* Other common species are *blackberries, black cherry, hazel* and *gray dogwood.*

**Ground flora characteristics**: Species with high constancy values on both types are: *Pointed-leaf tick trefoil, wild geranium, lopseed, black snakeroot, Virginia creeper, hog peanut, riverbank grape*, and *sweet cicely*. The following species are much better represented on the **ATiDe** than on the **Pr** phase: *Rattlesnake fern, naked-flower tick trefoil, maidenhair fern, zig-zag goldenrod*, and *red baneberry*. Species more often present on the **Pr** phase are: *Agrimony, bracken fern, false solomon's seal* and *enchanter's nightshade.*

**Disturbance and succession**: Most stands representing the **ATiDe** type were dominated by *sugar maple-basswood* in presettlement time. The stands of the **Pr** phase, on the other hand, developed from oak openings or communities dominated by shrubs. Although there are no mesic hardwoods (e.g. *sugar maple, basswood, white ash*) present in most of current stands, the soils and understory vegetation suggest that these species are lacking only because of absence of seed source. The **Prunus phase** is therefore viewed only as a developmental phase and not as a different site type.



Previous View

# ATiDe

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 96 | 1.43 |
| Geranium maculatum | Wild geranium | 92 | 0.52 |
| Phryma leptostachya | Lopseed | 88 | 0.43 |
| Sanicula marilandica | Black snakeroot | 85 | 0.32 |
| Parthenocissus quinquefolia | Virginia creeper | 81 | 3.17 |
| Botrychium virginianum | Rattlesnake fern | 77 | 0.36 |
| Rhus radicans | Poison ivy | 77 | 1.42 |
| Amphicarpa bracteata | Hog peanut | 74 | 0.64 |
| Grasses spp. | Grasses | 66 | 0.62 |
| Smilax herbacea | Carrion flower | 66 | 0.35 |
| Uvularia grandiflora | Large-flowered bellwort | 66 | 0.63 |
| Vitis riparia | Riverbank grape | 66 | 0.70 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 62 | 1.02 |
| Osmorhiza claytoni | Sweet cicely | 59 | 0.44 |
| Adiantum pedatum | Maidenhair fern | 55 | 0.69 |
| Solidago flexicaulis | Zigzag goldenrod | 48 | 0.37 |
| Galium concinnum | Shining bedstraw | 44 | 0.35 |
| Actaea spp. | Baneberries | 40 | 0.10 |
| Galium asprellum | Cleavers | 40 | 0.42 |
| Aralia nudicaulis | Wild sarsaparilla | 40 | 0.98 |
| Aralia racemosa | Spikenard | 37 | 1.46 |
| Dryopteris spinulosa | Spinulose shield fern | 33 | 1.71 |
| Thalictrum dioicum | Early meadow rue | 29 | 1.02 |
| Smilacina racemosa | False solomon's seal | 29 | 0.29 |
| Campanula rapunculoides | Creeping bellflower | 29 | 0.29 |
| Sanguinaria canadensis | Bloodroot | 29 | 0.54 |
| Dioscorea villosa | Wild yam root | 29 | 0.22 |
| Circaea quadrisulcata | Enchanter's nightshade | 29 | 0.29 |
| Smilax tamnoides | Bristly greenbrier | 29 | 0.47 |
| Lysimachia quadrifolia | Whorled loosestrife | 25 | 0.31 |
| Ranunculus spp. | Buttercups | 22 | 0.35 |
| Helianthus spp. | Sunflowers | 22 | 0.43 |
| Aquilegia canadensis | Wild columbine | 22 | 0.18 |
| **Shrubs** | | | |
| Ribes spp. | Gooseberries | 74 | 1.02 |
| Xanthoxylum americanum | Prickly ash | 62 | 1.35 |
| Rubus spp. | Blackberries/raspberries | 48 | 1.29 |
| Prunus virginiana | Chokecherry | 44 | 0.51 |
| Cornus racemosa | Gray dogwood | 40 | 1.25 |
| Cornus alternifolia | Alternate-leaved dogwood | 37 | 1.12 |
| Viburnum acerifolium | Maple-leaved viburnum | 29 | 1.01 |
| Corylus americana | Hazel-nut | 29 | 2.39 |
| Viburnum lentago | Nannyberry | 22 | 0.35 |

*continued...*



Previous View

*...continued*

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Tree Seedlings** | | | |
| Carya cordiformis | Bitternut hickory | 96 | 0.80 |
| Tilia americana | Basswood | 81 | 0.85 |
| Fraxinus americana | White ash | 66 | 1.82 |
| Quercus rubra | Northern red oak | 62 | 0.34 |
| Carya ovata | Shagbark hickory | 59 | 0.56 |
| Ulmus americana | American elm | 59 | 0.62 |
| Ostrya virginiana | Ironwood | 55 | 1.33 |
| Acer saccharum | Sugar maple | 55 | 1.14 |
| Prunus serotina | Black cherry | 51 | 0.28 |
| Quercus alba | White oak | 37 | 0.44 |



Previous View

# ATiDe(Pr)

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 100 | 1.43 |
| Phryma leptostachya | Lopseed | 90 | 0.35 |
| Parthenocissus quinquefolia | Virginia creeper | 90 | 1.17 |
| Osmorhiza claytoni | Sweet cicely | 81 | 0.49 |
| Amphicarpa bracteata | Hog peanut | 72 | 0.35 |
| Galium concinnum | Shining bedstraw | 72 | 0.47 |
| Geranium maculatum | Wild geranium | 72 | 0.47 |
| Vitis riparia | Riverbank grape | 72 | 1.01 |
| Smilacina racemosa | False solomon's seal | 63 | 0.24 |
| Rhus radicans | Poison ivy | 63 | 0.87 |
| Sanicula marilandica | Black snakeroot | 63 | 0.87 |
| Circaea quadrisulcata | Enchanter's nightshade | 63 | 0.46 |
| Helianthus spp. | Sunflowers | 54 | 0.67 |
| Agrimonia gryposepala | Agrimony | 54 | 0.10 |
| Smilax herbacea | Carrion flower | 45 | 0.20 |
| Pteridium aquilinum | Braken fern | 45 | 1.36 |
| Dioscorea villosa | Wild yam root | 45 | 0.10 |
| Aralia nudicaulis | Wild sarsaparilla | 45 | 0.88 |
| Uvularia grandiflora | Large-flowered bellwort | 45 | 0.40 |
| Botrychium virginianum | Rattlesnake fern | 36 | 0.22 |
| Dryopteris spinulosa | Spinulose shield fern | 36 | 0.22 |
| Anemone virginiana | Thimble weed | 36 | 0.22 |
| Grasses spp. | Grasses | 27 | 0.60 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 27 | 0.43 |
| Aster spp. | Asters | 27 | 0.43 |
| Adiantum pedatum | Maidenhair fern | 27 | 0.27 |
| Fragaria vesca | Wood strawberry | 27 | 5.23 |
| Ranunculus spp. | Buttercups | 27 | 0.27 |
| **Shrubs** | | | |
| Rubus spp. | Blackberries/raspberries | 100 | 1.99 |
| Ribes spp. | Gooseberries | 90 | 12.00 |
| Corylus americana | Hazel-nut | 63 | 1.56 |
| Cornus racemosa | Gray dogwood | 63 | 1.49 |
| Prunus virginiana | Chokecherry | 54 | 0.52 |
| Rosa spp. | Roses | 45 | 0.10 |
| Xanthoxylum americanum | Prickly ash | 27 | 1.23 |
| Viburnum lentago | Nannyberry | 27 | 0.43 |
| Lonicera canadensis | American fly honeysuckle | 27 | 0.10 |
| **Tree Seedlings** | | | |
| Prunus serotina | Black cherry | 100 | 0.37 |
| Carya ovata | Shagbark hickory | 81 | 0.64 |
| Carya cordiformis | Bitternut hickory | 72 | 0.36 |
| Quercus rubra | Northern red oak | 63 | 0.17 |
| Acer negundo | Box elder | 54 | 0.52 |
| Ulmus americana | American elm | 54 | 1.40 |
| Quercus alba | White oak | 45 | 0.20 |
| Acer rubrum | Red maple | 27 | 0.60 |



Previous View

# ATiCa and ATiSa

## *Acer saccharum-Tilia/Caulophyllum*
## (Sugar maple-Basswood/Blue cohosh)
## and
## *Acer saccharum-Tilia/Sanguinaria*
## (Sugar maple-Basswood/Bloodroot)

**Distribution:**
Primarily Richland county and eastern parts of Vernon and Crawford counties. Also in parts of Sauk county. Natural Subdivision 6a.

**Similar habitat types:** ATiCa-AI (Baraboo Section)

**Landform and soils:**
Rolling to steep terrain. Silt loams over cherty red clay over dolomite and sandstone. **ATiCa** is strongly associated with N and E aspects and represents **mesic, nutrient very rich** sites while **ATiSa** is more typical of S and SW aspects and represents a transition from **mesic to dry-mesic** conditions.

**Vegetation:**
**Major forest cover types**: Most stands on both of these habitat types are dominated by *sugar maple* and *basswood. Red oak* is well represented only in the larger diameter classes (>10 inches dbh). *Bitternut hickory* and *ironwood* are the only other common associates. *White oak* is less common.

**Shrub and small tree layer**: Shrubs are poorly represented on these types. If this layer is well developed it is comprised largely of saplings of canopy tree species. The only shrubs commonly found here are *gooseberries, alternate-leaf dogwood* and *prickly ash.*

**Ground flora characteristics**: Both types contain many understory species typical of mesic sites in all regions, e.g.: *bloodroot, large-flowered bellwort, rattlesnake fern, maidenhair fern.* However, many other mesic species have distinctly higher constancies on **ATiCa** than **ATiSa** type. These are: *blue cohosh, jack-in-the-pulpit, baneberry, trillium, sharp-lobed hepatica*, and *wild ginger.* On the other hand, **ATiSa** is further distinguished from **ATiCa** by higher constancies of *tick trefoil* and *riverbank grape* as well as *shagbark hickory, ironwood (Ostrya)* and *basswood.*

**Disturbance and succession**: These two habitat types repre-



Previous View

sent the largest block of presettlement mesic forest in SW Wisconsin. Dominance of *sugar maple-basswood* forest cannot be attributed to any particular site conditions although they are clearly best developed on N and E aspects and on deep silt loams. Many similar sites in the region are occupied by oak communities and they entirely lack mesic hardwoods. Historic exclusion of fires due to natural fire barriers or other reasons is considered to be the primary cause of this vegetation pattern. Heavy cutting, grazing and other disturbances resulted in an increase of oaks and other intolerant species on many sites. However, oaks are not regenerating in these stands. *Sugar maple, basswood* and especially *ironwood (Ostrya)* are most common seedlings and saplings. Bitternut hickory is also present in many stands. *White ash* is much less common than it is in the mesic and dry-mesic forests in the eastern part of the state, especially in region 11.



Previous View

# ATiSa

Understory species in order of decreasing constancy, with average coverage

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Geranium maculatum | Wild geranium | 94 | 0.46 |
| Sanguinaria canadensis | Bloodroot | 89 | 0.49 |
| Phryma leptostachya | Lopseed | 78 | 0.72 |
| Uvularia grandiflora | Large-flowered bellwort | 73 | 0.66 |
| Osmorhiza claytoni | Sweet cicely | 73 | 0.42 |
| Botrychium virginianum | Rattlesnake fern | 73 | 0.59 |
| Grasses spp. | Grasses | 73 | 0.91 |
| Solidago flexicaulis | Zigzag goldenrod | 68 | 0.93 |
| Adiantum pedatum | Maidenhair fern | 68 | 1.18 |
| Amphicarpa bracteata | Hog peanut | 68 | 1.93 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 68 | 1.05 |
| Sanicula marilandica | Black snakeroot | 68 | 0.37 |
| Galium concinnum | Shining bedstraw | 63 | 0.35 |
| Smilax herbacea | Carrion flower | 63 | 0.31 |
| Polygonatum pubescens | Hairy solomon's seal | 63 | 0.14 |
| Thalictrum dioicum | Early meadow rue | 57 | 0.81 |
| Smilacina racemosa | False solomon's seal | 57 | 0.42 |
| Aster spp. | Asters | 57 | 0.37 |
| Vitis riparia | Riverbank grape | 57 | 0.37 |
| Dryopteris spinulosa | Spinulose shield fern | 52 | 0.88 |
| Parthenocissus quinquefolia | Virginia creeper | 47 | 2.51 |
| Rhus radicans | Poison ivy | 42 | 0.52 |
| Aralia nudicaulis | Wild sarsaparilla | 36 | 0.31 |
| Dioscorea villosa | Wild yam root | 36 | 0.24 |
| Arisaema atrorubens | Jack-in-the-pulpit | 36 | 0.31 |
| Viola spp. | Violets | 31 | 0.18 |
| Galium asprellum | Cleavers | 31 | 0.10 |
| Aquilegia canadensis | Wild columbine | 31 | 0.92 |
| Ranunculus spp. | Buttercups | 31 | 0.18 |
| Anemone virginiana | Thimble weed | 26 | 0.10 |
| Smilax tamnoides | Bristly greenbrier | 26 | 0.20 |
| Aralia racemosa | Spikenard | 21 | 1.55 |
| Ranunculus hispidus | Hispid buttercup | 21 | 0.22 |
| Fragaria vesca | Wood strawberry | 21 | 0.22 |
| Caulophyllum thalictroides | Blue cohosh | 21 | 0.10 |
| **Shrubs** | | | |
| Ribes spp. | Gooseberries | 78 | 0.30 |
| Prunus virginiana | Chokecherry | 57 | 0.64 |
| Xanthoxylum americanum | Prickly ash | 52 | 0.35 |
| Viburnum acerifolium | Maple-leaved viburnum | 47 | 3.21 |
| Cornus alternifolia | Alternate-leaved dogwood | 26 | 1.46 |
| Rubus spp. | Blackberries/raspberries | 21 | 0.35 |
| Cornus racemosa | Gray dogwood | 21 | 0.10 |



Previous View

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Tree Seedlings** | | | |
| Acer saccharum | Sugar maple | 100 | 2.37 |
| Carya cordiformis | Bitternut hickory | 94 | 0.60 |
| Tilia americana | Basswood | 78 | 0.46 |
| Quercus rubra | Northern red oak | 73 | 0.24 |
| Prunus serotina | Black cherry | 63 | 0.15 |
| Ostrya virginiana | Ironwood | 57 | 1.85 |
| Fraxinus americana | White ash | 57 | 0.50 |
| Carya ovata | Shagbark hickory | 47 | 0.27 |
| Carpinus caroliniana | American hornbeam | 36 | 2.86 |
| Quercus alba | White oak | 31 | 0.10 |
| Fraxinus pennsylvanica | Green ash | 26 | 1.08 |
| Ulmus americana | American elm | 21 | 0.10 |



Previous View

# ATiCa

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Sanguinaria canadensis | Bloodroot | 96 | 0.43 |
| Osmorhiza claytoni | Sweet cicely | 85 | 0.37 |
| Sanicula marilandica | Black snakeroot | 85 | 1.21 |
| Uvularia grandiflora | Large-flowered bellwort | 82 | 1.50 |
| Solidago flexicaulis | Zigzag goldenrod | 82 | 1.35 |
| Circaea quadrisulcata | Enchanter's nightshade | 82 | 0.47 |
| Polygonatum pubescens | Hairy solomon's seal | 71 | 0.35 |
| Botrychium virginianum | Rattlesnake fern | 71 | 0.30 |
| Adiantum pedatum | Maidenhair fern | 71 | 3.91 |
| Dryopteris spinulosa | Spinulose shield fern | 71 | 3.16 |
| Geranium maculatum | Wild geranium | 64 | 0.32 |
| Caulophyllum thal.ictroides | Blue cohosh | 64 | 0.67 |
| Phryma leptostachya | Lopseed | 64 | 0.54 |
| Parthenocissus quinquefolia | Virginia creeper | 64 | 1.04 |
| Arisaema atrorubens | Jack-in-the-pulpit | 60 | 0.22 |
| Smilax herbacea | Carrion flower | 60 | 0.36 |
| Actaea spp. | Baneberries | 60 | 0.31 |
| Amphicarpa bracteata | Hog peanut | 57 | 0.59 |
| Trillium spp. | Trilliums | 57 | 0.29 |
| Thalictrum dioicum | Early meadow rue | 50 | 2.31 |
| Viola pensylvanica | Smooth yellow violet | 50 | 0.80 |
| Smilacina racemosa | False solomon's seal | 46 | 0.55 |
| Hepatica acutiloba | Sharp-lobed hepatica | 39 | 0.55 |
| Galium concinnum | Shining bedstraw | 39 | 0.19 |
| Asarum canadense | Wild ginger | 39 | 8.05 |
| Galium asprellum | Cleavers | 39 | 0.28 |
| Smilax tamnoides | Bristly greenbrier | 35 | 0.15 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 35 | 0.49 |
| Mitella diphylla | Miterwort | 35 | 2.03 |
| Grasses spp. | Grasses | 32 | 0.27 |
| Viola spp. | Violets | 32 | 1.02 |
| Aralia racemosa | Spikenard | 32 | 6.99 |
| Ranunculus spp. | Buttercups | 32 | 0.32 |
| Osmunda claytoniana | Interrupted fern | 28 | 1.61 |
| Rhus radicans | Poison ivy | 25 | 0.24 |
| Aralia nudicaulis | Wild sarsaparilla | 25 | 3.20 |
| Podophyllum peltatum | Mayapple | 21 | 0.18 |
| Vitis riparia | Riverbank grape | 21 | 0.10 |



Previous View

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Shrubs** | | | |
| Ribes spp. | Gooseberries | 85 | 0.41 |
| Cornus alternifolia | Alternate-leaved dogwood | 64 | 2.00 |
| Prunus virginiana | Chokecherry | 57 | 0.56 |
| Xanthoxylum americanum | Prickly ash | 42 | 0.22 |
| Viburnum acerifolium | Maple-leaved viburnum | 32 | 2.83 |
| Rubus spp. | Blackberries/raspberries | 21 | 0.18 |
| Hamamelis virginiana | Witch hazel | 21 | 10.52 |
| **Tree Seedlings** | | | |
| Carya cordiformis | Bitternut hickory | 100 | 0.68 |
| Acer saccharum | Sugar maple | 96 | 2.25 |
| Quercus rubra | Northern red oak | 57 | 0.13 |
| Fraxinus americana | White ash | 57 | 0.50 |
| Tilia americana | Basswood | 46 | 0.48 |
| Prunus serotina | Black cherry | 42 | 0.22 |
| Ostrya virginiana | Ironwood | 39 | 0.24 |
| Ulmus americana | American elm | 39 | 0.41 |
| Carpinus caroliniana | American hornbeam | 32 | 0.53 |
| Fraxinus pennsylvanica | Green ash | 25 | 0.73 |



Previous View

# Understory Species with Potential Diagnostic Value for Distinguishing the Habitat Types of Region 7

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%.

| Scientific Name | Common Name | PVGy PVCr | | PVRh ArDe-V | | ArCi-Ph | | ATiDe(Pr) ATiDe | | ATiSa | ATiCa |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Herbs** | | | | | | | | | | | |
| Euphorbia corollata | Flowering spurge | 1 A | 1 A | | | | | | | | |
| Mitchella repens | Partridgeberry | | * | 2 A | | | | | | | |
| Clintonia borealis | Yellow beadlilly | | | 1 A | | | | | | | |
| Coptis groenlandica | Goldthread | | | 1 A | | | | | | | |
| Cornus canadensis | Bunchberry | | | 1 A | | | | | | | |
| Lycopodium obscurum | Ground-pine | | | 2 A | | | | | | | |
| Osmunda cinnamomea | Cinnamon fern | | | 2 C | | | | | | | |
| Rubus hispidus | Swamp dewberry | | | 3 A | | | | | | | |
| Osmunda claytoniana | Interrupted fern | | | 1 A | 1 A | 1 A | | | | | 1 A |
| Prenanthes alba | White lettuce | | | * | * | * | | | | * | |
| Goodyera pubescens | Downy rattlesn. plantain | * | * | | 1 A | * | | | | | |
| Potentilla simplex | Common cinquefoil | * | * | | 1 A | 1 A | | | | | |
| Streptopus roseus | Rosey twisted stalk | * | | | * | * | | | | | |
| Aster sagittifolius | Arrow-leaved aster | * | * | | * | * | | | | | |
| Gaultheria procumbens | Wintergreen | 2 A | * | 2 A | | | | | | | |
| Trientalis americana | Starflower | 1 A | 1 A | 3 A | * | * | | | | | |
| Sedges spp. | Sedges | 3 A | 3 A | 2 A | 3 A | 3 A | | | | | |
| Apocynum andro. | Spreading dogbane | 2 A | 2 A | 1 A | 1 A | 1 A | | | | | |
| Anemone quinquefolia | Wood anemone | * | * | 1 A | 1 A | * | | | | | |
| Maianthemum canad. | Wild lily-of-the-valley | 2 A | 3 A | 3 A | 1 A | 1 A | | | | | |
| Aster macrophyllus | Large-leaved aster | 1 A | 1 A | 1 A | 2 A | 1 A | | | | | * |
| Lysimachia quadrifolia | Whorled loosetrife | 2 A | 1 A | * | 2 A | * | * | | | | |
| Smilacina stellata | Star-flwrd. solomon's seal | * | * | | * | | * | | | | |
| Pteridium aquilinum | Braken fern | 3 C | 3 B | 2 B | 3 B | 1 A | * | 1 A | | | |
| Aquilegia canadensis | Wild columbine | * | * | | * | * | * | | 1 A | | |
| Fragaria vesca | Wood strawberry | * | * | | 1 A | * | * | 1 B | * | | |
| Uvularia sessilifolia | Sessile-leaved bellwort | 2 A | 2 A | 3 A | 2 A | 2 A | * | | * | | |
| Aralia nudicaulis | Wild sarsaparilla | 1 A | 3 A | 3 A | 3 A | 2 A | 1 A | 1 A | 1 A | * | |
| Smilacina racemosa | False solomon's seal | 1 A | 3 A | * | 2 A | 1 A | 1 A | 2 A | 2 A | 1 A | |
| Grasses spp. | Grasses | 1 A | 1 A | 1 A | 1 A | 1 A | 2 A | 1 A | 2 A | 1 A | |
| Pyrola spp. | Pyrolas | | 1 A | * | 1 A | 1 A | | | | | |
| Parthenocissus quinq. | Virginia creeper | | 2 A | * | 2 A | 3 A | 3 A | 3 A | 1 A | 2 A | |
| Smilax tamnoides | Bristly greenbrier | | 1 A | * | * | * | 1 A | | 1 A | 1 A | |
| Athyrium filix-femina | Lady fern | | | | * | 1 A | | | | | * |
| Lathyrus ochroleucus | Pale vetchling | | 1 A | | 2 A | * | | | | | |
| Galium boreale | Northern bedstraw | | * | | * | 1 A | | | | | |
| Hepatica americana | Round-lobed hepatica | | * | | 1 A | | | | | | |
| Galium triflorum | Sweet-scnt. bedstraw | | * | | 1 A | 3 A | | | | * | |
| Solidago spp. | Goldenrods | | | | 1 A | 1 A | * | * | | | |
| Urtica procera | Tall nettle | | | | | 1 A | | | | | |
| Campanula rapuncul. | Creeping bellflower | | | | | | 1 A | | | | |



Previous View

| Scientific Name | Common Name | PVGy | PVCr | PVRh | ArDe-V | ArCl-Ph | ATiDe | ATiDe(Pr) | ATiSa | ATiCa |
|---|---|---|---|---|---|---|---|---|---|---|
| Helianthus spp. | Sunflowers | | | | | | * | 2A | | |
| Desmodium nudiflorum | Naked-flwrd. tick trefoil | | | | 2A | 1A | 2A | 1A | * | |
| Viola spp. | Violets | | * | * | * | 2A | * | | 1A | 1A |
| Dryopteris spinulosa | Spinulose shield fern | | 1A | * | 1A | 2A | 1A | 1A | 2A | 2A |
| Vitis riparia | Riverbank grape | | 1A | | 1A | 2A | 2A | 2A | 2A | * |
| Smilax herbacea | Carrion flower | | * | | 1A | 2A | 2A | 1A | 2A | 2A |
| Desmodium glutinosum | Pointed-lvd. tick trefoil | | * | | 3A | 3A | 3A | 3A | 2A | 1A |
| Geranium maculatum | Wild geranium | | * | | 2A | 3A | 3A | 2A | 3A | 2A |
| Circaea quadrisulcata | Enchanter's nightshade | | | | * | 3A | 1A | 2A | * | 3A |
| Rhus radicans | Poison ivy | | * | | * | 1A | 3A | 2A | 1A | * |
| Amphicarpa bracteata | Hog peanut | | | | 2A | 3A | 2A | 2A | 2A | 2A |
| Uvularia grandiflora | Large-flwrd. bellwort | | | | * | 2A | 2A | 1A | 2A | 3A |
| Phryma leptostachya | Lopseed | | | | 1A | 3A | 3A | 3A | 3A | 2A |
| Sanicula marilandica | Black snakeroot | | | | * | 2A | 3A | 2A | 2A | 3A |
| Polygonatum pubes. | Hairy solomon's seal | | * | | 1A | * | | | 2A | 2A |
| Osmorhiza claytoni | Sweet cicely | | | | 2A | 3A | 2A | 3A | 2A | 3A |
| Adiantum pedatum | Maidenhair fern | | | | | 1A | 2A | 1A | 2A | 2A |
| Botrychium virginianum | Rattlesnake fern | | | | | 1A | 3A | 1A | 2A | 2A |
| Dioscorea villosa | Wild yam root | | | | | * | 1A | 1A | 1A | * |
| Aster spp. | Asters | | | | | | * | 1A | 2A | * |
| Galium concinnum | Shining bedstraw | | | | * | | 1A | 2A | 2A | 1A |
| Ranunculus spp. | Buttercups | | | | | | * | 1A | 1A | 1A |
| Anemone virginiana | Thimble weed | | | | | | | 1A | 1A | * |
| Agrimonia gryposepala | Agrimony | | | | | 1A | | 2A | | * |
| Thalictrum dioicum | Early meadow rue | | | | * | 1A | 1A | | 2A | 1A |
| Aralia racemosa | Spikenard | | | | | 1A | 1A | | * | 1B |
| Actaea spp. | Baneberries | | | | | 1A | 1A | | * | 2A |
| Arisaema atrorubens | Jack-in-the-pulpit | | | | | 1A | * | | 1A | 2A |
| Solidago flexicaulis | Zigzag goldenrod | | | | | | 1A | | 2A | 3A |
| Caulophyllum thal. | Blue cohosh | | | | | | * | | * | 2A |
| Sanguinaria canaden. | Bloodroot | | | | | | 1A | | 3A | 3A |
| Galium asprellum | Cleavers | | | | | | 1A | | 1A | 1A |
| Viola pensylvanica | Smooth yellow violet | | | | | | * | | * | 1A |
| Hepatica acutiloba | Sharp-lobed hepatica | | | | | | | | * | 1A |
| Trillium spp. | Trilliums | | | | | | | | * | 2A |
| Asarum canadense | Wild ginger | | | | | | | | * | 1B |
| Polemonium reptans | Greek valerian | | | | | | | | * | * |
| Ranunculus hispidus | Hispid buttercup | | | | | | | | * | * |
| Eupatorium rugosum | White snakeroot | | | | | | | * | | * |
| Laportea canadensis | Wood nettle | | | | | | | | | * |
| Podophyllum peltatum | Mayapple | | | | | | | | | * |
| Allium tricoccum | Wild leek | | | | | | | | | * |
| Cryptotaenia can. | Honewort | | | | | | | | | * |
| Hydrophyllum virgin. | Virginia waterleaf | | | | | | | | | * |
| Mitella diphylla | Miterwort | | | | | | | | | 1A |

*continued...*



Previous View

*...continued*

| Scientific Name | Common Name | PVGy PVCr | | PVRh ArDe-V | | ArCi-Ph | ATiDe(Pr) ATiDe | | ATiSa | ATiCa |
|---|---|---|---|---|---|---|---|---|---|---|
| **Shrubs** | | | | | | | | | | |
| Amorpha canescens | Lead plant | * | 1 A | | | | | | | |
| Aronia melanocarpa | Black chokeberry | | | 1 A | | | | | | |
| Gaylussacia baccata | Black huckleberry | 3 B | 1 A | 2 B | 1 A | | | | | |
| Amelanchier spp. | Juneberry | 3 A | 3 A | 3 A | 3 A | 2 A | | | | |
| Vaccinium angust. | Low sweet blueberry | 3 A | 3 A | 3 A | 3 A | * | | | | |
| Ilex verticillata | Winterberry | * | 2 A | 3 A | * | * | | | | |
| Corylus cornuta | Beaked hazelnut | * | 1 A | * | * | * | | * | | |
| Rosa spp. | Roses | 2 A | 2 A | | 2 A | 1 A | * | 1 A | | |
| Diervilla lonicera | Bush honeysuckle | 1 A | 1 A | | 2 A | 1 A | | * | * | |
| Corylus americana | Hazel-nut | 1 A | 2 A | * | 3 B | 2 A | 1 A | 2 A | * | |
| Viburnum acerifolium | Maple-lvd. viburnum | * | * | | 1 A | * | 1 A | | 1 A | 1 A |
| Prunus virginiana | Chokecherry | * | 3 A | | 3 A | 2 A | 1 A | 2 A | 2 A | 2 A |
| Rubus spp. | Blackber./raspber. | 2 A | 3 A | 1 A | 3 A | 3 A | 1 A | 3 A | * | * |
| Crataegus spp. | Hawthorns | | * | | 1 A | * | | | | |
| Viburnum raf. | Downy arrowwood | | * | | 1 A | | | | * | |
| Sambucus canaden. | Common elder | | | | | 2 A | | | | |
| Lonicera canadensis | Amer. fly honeysuckle | | | | | | * | 1 A | * | |
| Cornus racemosa | Gray dogwood | | 3 A | | 2 A | 2 A | 1 A | 2 A | * | |
| Cornus alternifolia | Alternate-lvd dogwood | | | * | * | * | 1 A | * | 1 A | 2 A |
| Ribes spp. | Gooseberries | | * | | * | 2 A | 2 A | 3 B | 3 A | 3 A |
| Viburnum lentago | Nannyberry | | | | * | 1 A | * | 1 A | | * |
| Xanthoxylum amer. | Prickly ash | | * | | | * | 2 A | 1 A | 2 A | 1 A |



Previous View

# Occurrence of Tree Species on Habitat Types of Region 7

Size classes: SE - seedlings; SA - saplings; MT - medium trees (4-10" DBH); LT - large trees (>10" DBH). Numbers are frequency of occurrence: *<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%.

| | PVGy | | | | PVCr | | | | PVRh | | | | ArDe-V | | | | ArCi-Ph | | | | ATiDe(Pr) | | | | ATiDe | | | | ATiSa | | | | ATiCa | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT |
| Jack pine | 1 A | 1 A | 2 B | 1 B | 1 A | | 1 A | * | | | 1 B | 1 B | | | | | * | | | | | | | | | | | | * | | | | | | | |
| Bur oak | * | * | | | | * | * | | | | | | * | * | * | * | | | * | * | * | * | 1 B | * | | | * | * | | | * | * | | | | |
| Northern pin oak | 3 A | 2 A | 3 C | 3 C | 2 A | 2 A | 2 B | 2 C | 3 A | 1 A | 1 B | 2 B | * | 1 A | 1 B | 1 D | * | * | * | * | | | | | | | | | * | * | * | * | | | | |
| Trembling aspen | * | | * | * | | | | | 1 A | | 1 A | * | | | | | * | | * | * | | | * | * | | | | | * | | * | * | | | | |
| Bigtooth aspen | 2 A | * | 1 A | 1 B | * | 1 A | 1 B | 1 D | 2 A | * | 1 B | 1 A | 2 A | 1 A | 1 A | 1 D | 2 A | * | 1 A | 1 C | * | 1 A | * | | * | * | * | 1 C | 2 A | * | 1 A | 1 C | * | | | * |
| Red pine | 1 A | 1 A | 1 B | 1 B | | | | | | * | 1 A | 1 B | | | * | * | | | | | | | | * | | | | | | | | | | | | |
| Black oak | * | * | 1 D | 1 C | 1 A | 1 A | 1 B | 2 D | 1 A | | | * | 2 A | 1 A | 2 A | 2 D | 1 A | * | 1 B | 2 D | 1 A | 1 B | 1 C | 2 D | * | | * | * | 1 A | * | 1 B | 2 D | | | | |
| Black walnut | | | | | | | | | | | | | | | | | | | | | | | * | * | * | | | | | | | | | | | * |
| Paper birch | * | * | * | | * | | 1 A | | 1 A | 2 A | 2 A | 1 A | | * | * | | | * | * | 1 B | | | | * | | | * | * | | * | * | 1 B | | | | |
| Black ash | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Northern red oak | * | * | * | * | | | * | * | * | | | | 2 A | 1 A | 2 B | 2 D | 1 A | 1 A | 2 B | 3 D | 2 A | 1 A | 2 B | 3 D | 1 A | 1 A | 3 B | 3 D | 1 A | 1 A | 2 B | 3 D | 2 A | * | 1 B | 3 C |
| White pine | 3 A | 3 A | 2 B | 1 D | 2 A | 2 B | 2 B | 2 C | 4 A | 3 B | 3 B | 3 D | 1 A | 1 B | 2 A | 1 C | * | | * | * | | | | | | | | | * | | * | * | | | | |
| White oak | 3 A | 2 B | 2 B | 1 A | 4 A | 3 A | 4 B | 2 C | 3 A | 2 A | 1 A | 1 C | 4 A | 3 B | 3 A | 3 B | 2 A | 1 A | 2 B | 2 B | 2 A | 2 A | 2 C | 3 B | 1 A | * | 2 B | 1 C | 2 A | 1 A | 2 B | 2 B | | | 1 A | 1 C |
| Butternut | | | | | | | | | | | | | * | * | * | | * | * | * | * | | | | | | | | | * | * | * | * | * | | * | 1 B |
| Swamp white oak | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Shagbark hickory | * | | | | | | | | | | | | 2 A | 2 B | * | | 2 A | 2 B | 2 B | 1 C | 3 A | 2 B | 2 B | 1 C | 3 A | 2 A | 1 B | 1 B | 2 A | 2 B | 2 B | 1 C | * | 1 B | * | 1 B |
| Black cherry | 3 A | 2 A | * | | 4 A | 4 B | 1 A | | 3 A | * | | | 4 A | 4 A | 1 A | * | 4 A | 3 A | 2 B | 1 B | 4 A | 3 A | 2 B | * | 2 A | 1 A | * | * | 4 A | 3 A | 2 B | 1 B | 2 A | * | * | * |
| Box elder | * | | | | * | | | | | | | | 1 A | | | | 2 A | 2 A | * | | 3 A | 2 B | | | 1 A | | | | 2 A | 2 A | * | | | | | |
| Hackberry | | | | | | | | | | | | | | | | | | * | | | | | | | | | | | | * | | | | | | |
| Elms | | | | | * | 1 A | | | * | * | | | 1 A | | | | 3 A | 2 B | 1 B | | | | | | | | | | 3 A | 2 B | 1 B | | | | | |
| American elm | | | | | | | | | | | | | | | | | | | | | 3 A | 3 B | 2 B | 1 B | 2 A | 2 A | * | | | | | | 1 A | 1 A | 1 B | |
| White ash | | | | | * | * | | | | | | | 1 A | 1 B | * | * | 1 A | 1 A | * | | * | 1 A | 1 A | | 3 A | 2 A | 1 B | 1 B | 1 A | 1 A | * | | 3 A | 1 B | 1 B | 1 B |
| Green ash | | | | | | | | | | | | | | | | | | | | | | | | | * | * | | * | | | | | 2 A | 1 A | * | |
| Yellow birch | | | | | | | | | * | | * | | | | | | | | | | | | | | | | | | | | | | | * | * | |
| Bitternut hickory | * | * | | | 1 A | 1 B | | | | | | | 1 A | 1 A | | | 1 A | 1 B | 1 B | | 3 A | 2 A | 2 B | * | 4 A | 3 A | 1 B | | 1 A | 1 B | 1 B | | 3 A | 2 A | 2 B | 1 B |
| Red maple | 3 A | 3 B | 2 B | * | 3 A | 3 B | 2 C | * | 4 A | 4 C | 4 C | 2 B | 4 A | 4 C | 4 B | 1 A | 3 A | 4 C | 3 C | 2 B | 2 A | 2 B | 2 B | 1 B | * | 1 A | 1 C | * | 3 A | 4 C | 3 C | 2 B | * | * | * | |
| American hornbeam | | | | | | | | | | | | | 1 A | 2 B | | | * | * | | | | | | | * | 1 B | | | * | * | | | 2 A | 1 A | | |
| Ironwood | | | | | * | | | | | | | | * | 1 B | * | | 1 A | 1 A | * | * | * | | | | 3 A | 4 B | 1 B | | 1 A | 1 A | * | * | 2 A | 3 B | 2 A | * |
| Basswood | * | | | | * | * | * | | | | | | * | 1 A | * | * | 2 A | 1 B | 1 B | 1 B | 1 A | 2 A | | | 3 A | 3 A | 2 C | 2 C | 2 A | 1 B | 1 B | 1 B | 2 A | 2 A | 2 B | 3 C |
| Eastern hemlock | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| American beech | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sugar maple | | | | | | | | | | | | | * | 1 A | 1 A | | * | 1 C | * | 1 B | | * | * | | 3 A | 3 B | 3 C | 2 C | * | 1 C | * | 1 B | 4 A | 4 C | 4 C | 3 D |



Previous View

# Baraboo Hills Section

This section is treated separately for several reasons. Although it lies in Region 7, the Baraboo Range (also called Baraboo Hills or Baraboo Bluffs) represents a unique physiographic unit with implications for climate, soils, natural disturbance regimes and patterns of human land use. For all these reasons it has also received more attention from ecologists. A cooperative project between The Nature Conservancy and the Wisconsin Department of Natural Resources provided opportunity for more intensive vegetation sampling of the Baraboo Hills than was possible for the rest of Region 7. Keeping Baraboo data and interpretations separate will make this field guide easier to use as a management tool and will facilitate future research.

## Extent, topography, geology and soils

The Baraboo Range, located in Sauk County, is a large outcrop (monadnock) of Precambrian quartzite. It forms an elliptical formation approximately 25 miles long (east to west) with an average width of 5 miles. Greatest relief is attained in the vicinity of Devils Lake where several bluffs, with associated tallus, rise 500 feet above the base. The range is bordered in the east by the Wisconsin River bottomlands of the Central Plain and in the west by the dissected sandstone and dolomite hills of the Western Upland. The eastern one third of the Range was glaciated, while the remainder of it was not. The hilly portions of the glaciated region are overlain by till while the valleys contain extensive outwash plains and outwash terraces.

The soils are primarily silt loams and secondarily loams, sandy loams and sands. The silt loams of the Baraboo Range developed in 20-40 inches of loess over quartzite bedrock in the unglaciated portion, and over till in the glaciated part. The Range influences local precipitation patterns and there is considerable variation in the length of growing season.

## Forest vegetation

In presettlement time oak savanna and oak forests dominated approximately two thirds of the Baraboo Hills region. Prairies and other type of forests accounted for the remainder. Sugar maple - basswood forests occurred in scattered locations, in landscape positions that were protected from fire for long periods of time. In a few locations relics of more northern forest type was found. These relics con-



Previous View

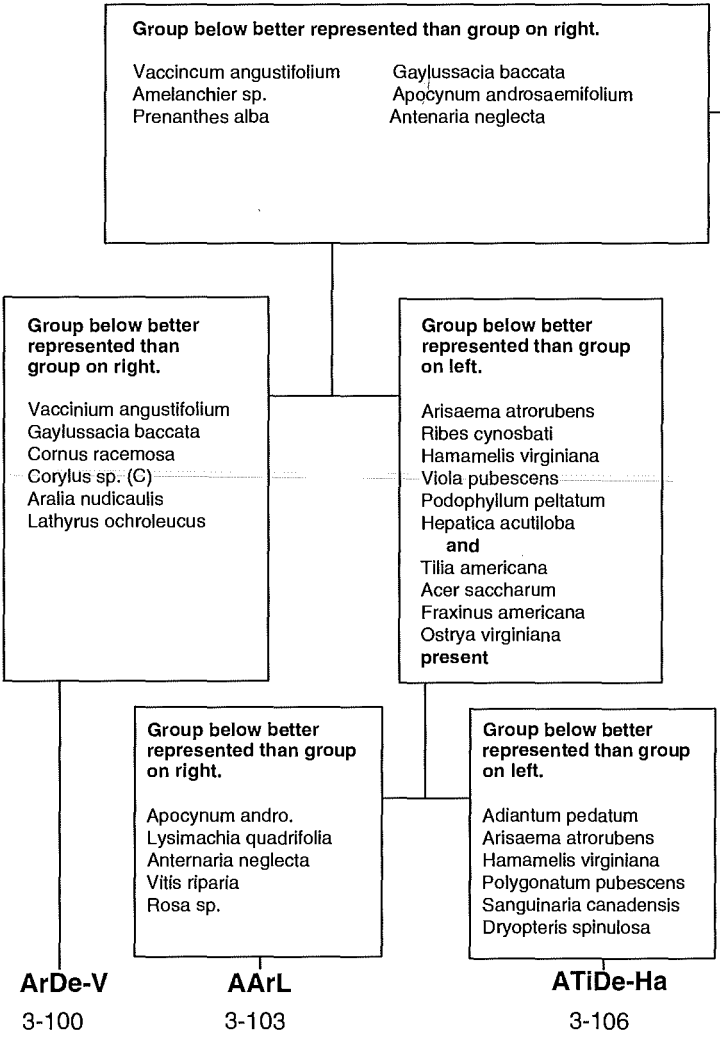
tained hemlock, yellow birch and a number of understory species characteristic of northern forest. White pine also occurred in a few isolated patches and as scattered trees on extesive tallus slopes. On the droughtiest sands mixtures of oak and jack pine were found.

The Baraboo Range today represents the largest contiguous block of forest and woodland in southern Wisconsin. Although the extent of forest cover in the Baraboo Range has not changed greatly since early settlement, the composition of forest communities has been drastically altered. In addition to clearing for homesteads, forests have been cut for diverse uses such as lumber, railroad ties, roundwood for specific products, fuel for lime kilns, charcoal, and others. Each of these uses had a different effect on subsequent forest development and present composition. In general, red oak has become much more prominent in postsettlement forests than it was before, but it is not regenerating without disturbance. Red maple, black cherry and ironwood *(Ostrya)* are the most prominent species in the smaller size classes. These species were not well represented in presettlement forests. Shagbark hickory is another species gaining prominence in oak forests. Sugar maple and basswood abundance has been greatly reduced in their former locations, but these species are again gaining a foothold where fires, grazing and heavy cutting have been eliminated.



Previous View

## Key to Habitat Types of the Baraboo Hills Section - Scientific Names



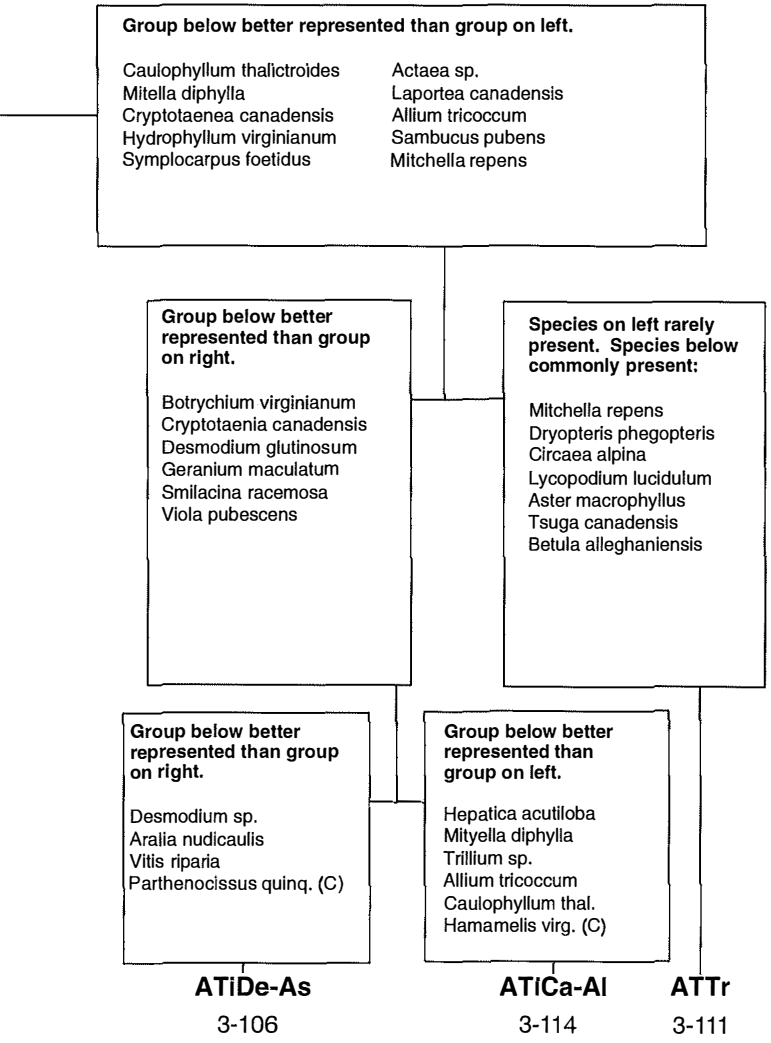

**Group below well represented:** Several species are found rather than any one being common.

**Poorly represented:** Usually no more than one species from the group present. Abundance may be low or high.

**(C)** - Common: >1%



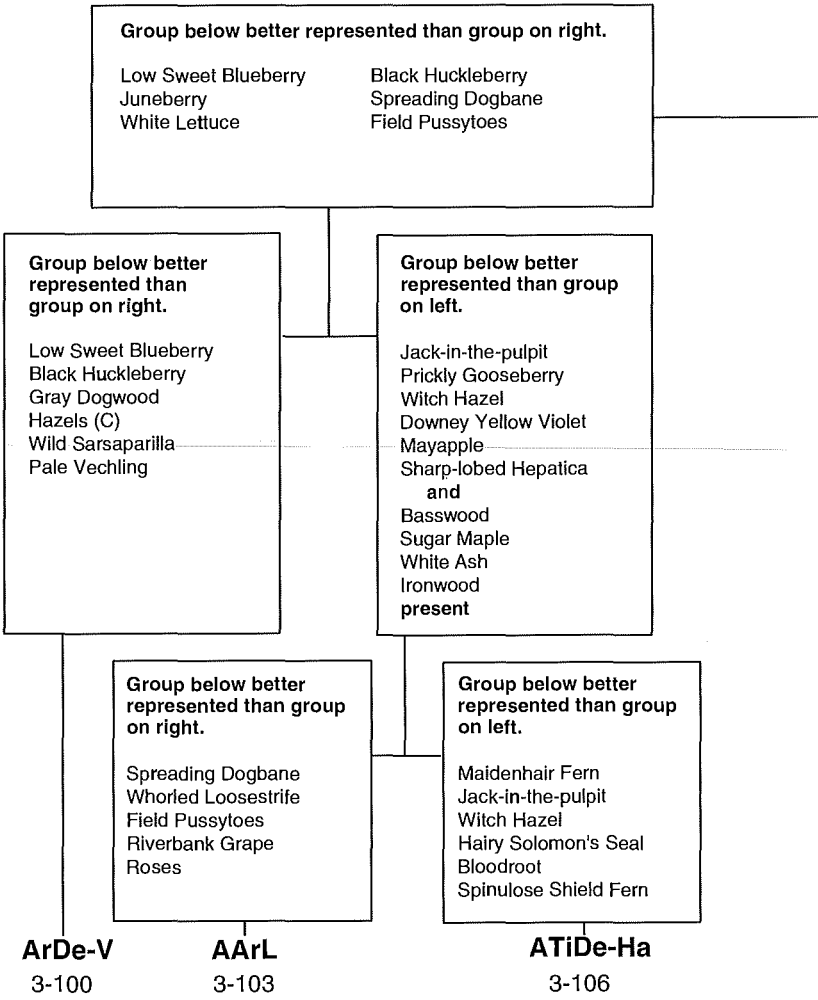
Previous View






Previous View

## Key to Habitat Types of the Baraboo Hills Region - Common Names



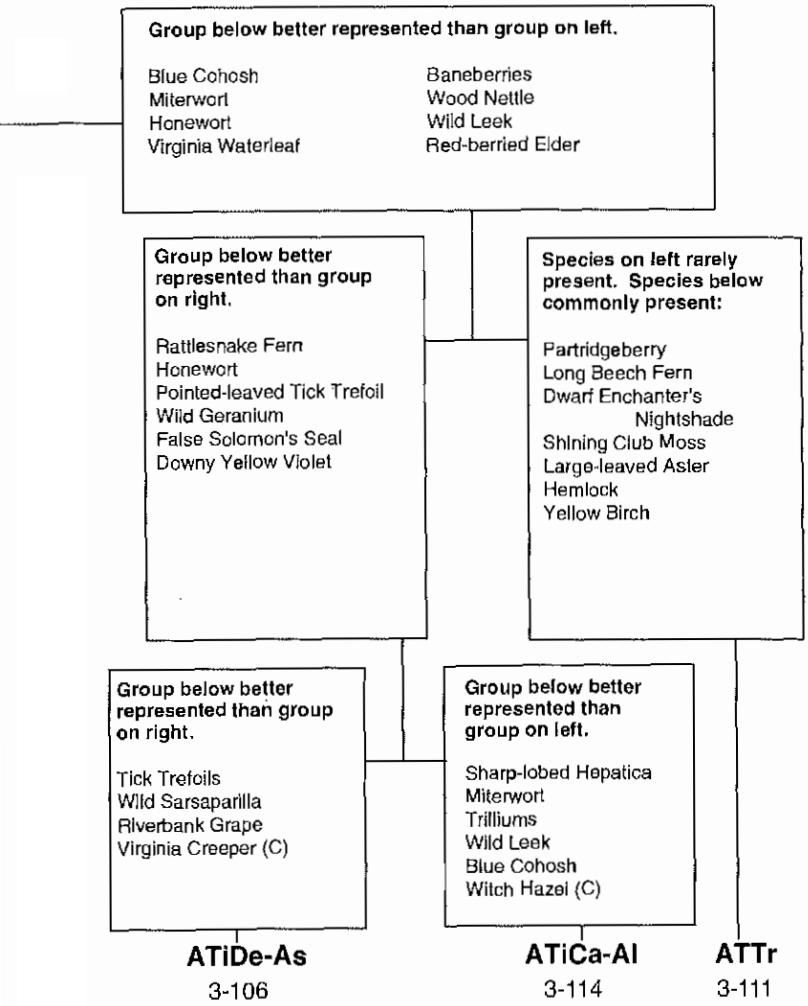

**Group below well represented:** Several species are found rather than any one being common.

**Poorly represented:** Usually no more than one species from the group present. Abundance may be low or high.

**(C)** - Common: >1%



Previous View






Previous View

# Comparison of Major Floristic Differences Between Closely Related Habitat Types in Baraboo Hills

| | | ArDe-V | AArL |
|---|---|---|---|
| Vaccinium angust. | Low sweet blueberry | 85 | 4 |
| Aralia nudicaulis | Wild sarsaparilla | 76 | 32 |
| Diervilla lonicera | Bush honeysuckle | 71 | 25 |
| Cornus racemosa | Gray dogwood | 66 | 18 |
| Lathyrus ochroleucus | Pale vetchling | 61 | 14 |
| Uvularia sessilifolia | Sessile-leaved bellwort | 57 | 18 |
| Gaylussacia baccata | Black huckleberry | 47 | 7 |
| Phryma leptostachya | Lopseed | 33 | 82 |
| Viburnum acerifolium | Maple-leaved viburnum | 38,1 | 79,8 |
| Circaea quadrisulcata | Enchanter's nightshade | 23 | 79 |
| Ranunculus abortivus | Small-flowered crowfoot | 4 | 61 |
| Conopholis americana | Squawroot | . | 61 |
| Podophyllum peltatum | Mayapple | 4 | 54 |
| Ribes cynosbati | Prickly gooseberry | . | 50 |
| Arisaema atrorubens | Jack-in-the-pulpit | 4 | 46 |

| | | AArL | ATiDe-Ha |
|---|---|---|---|
| Apocynum andro. | Spreading dogbane | 64 | 4 |
| Potentilla simplex | Common cinquefoil | 61 | 12 |
| Pteridium aquilinum | Braken fern | 43,6 | 15,1 |
| Polygonatum pubescens | Hairy solomon's seal | 32 | 81 |
| Hamamelis virginiana | Witch hazel | 25,1 | 77,10 |
| Dioscorea villosa | Wild yam root | 14 | 65 |
| Smilax tamnoides | Bristly greenbrier | 11 | 62 |
| Dryopteris spinulosa | Spinulose shield fern | 11 | 54 |
| Sanguinaria canadensis | Bloodroot | 11 | 54 |
| Adiantum pedatum | Maidenhair fern | 7 | 50 |

| | | AArL | ATiDe-As |
|---|---|---|---|
| Arisaema atrorubens | Jack-in-the-pulpit | 46 | 94 |
| Actaea spp. | Baneberries | 11 | 71 |
| Dioscorea villosa | Wild yam root | 14 | 68 |
| Adiantum pedatum | Maidenhair fern | 7 | 65 |
| Thalictrum dioicum | Early meadow rue | 21 | 52 |
| Caulophyllum thal. | Blue cohosh | 7 | 45 |
| Panax quinquefolius | Ginseng | 4 | 42 |
| Sanguinaria canadensis | Bloodroot | 11 | 42 |
| Amelanchier spp. | Juneberry | 82 | 19 |
| Apocynum andro. | Spreading dogbane | 64 | 10 |
| Potentilla simplex | Common cinquefoil | 61 | 10 |
| Lysimachia quadrifolia | Whorled loosestrife | 54 | 10 |
| Antennaria neglecta | Field pussytoes | 50,10 | 13,1 |
| Pteridium aquilinum | Braken fern | 43,6 | 16,1 |

| | | ATiDe-Ha | ATiCa-Al |
|---|---|---|---|
| Amelanchier spp. | Juneberry | 81 | 21 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 73 | 25 |
| Aster macrophyllus | Large-leaved aster | 62 | 33 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 62 | 4 |
| Actaea spp. | Baneberries | 38 | 92 |

*continued...*



Previous View

*...continued*

| | | | |
|---|---|---|---|
| Caulophyllum thal. | Blue cohosh | 27 | 92 |
| Athyrium fillix-femina | Lady fern | 38 | 83 |
| Hepatica acutiloba | Sharp-lobed hepatica | 23 | 75 |
| Mitella diphylla | Miterwort | 8 | 58 |
| Allium tricoccum | Wild leek | 4 | 54 |
| Hydrophyllum virgin. | Virginia waterleaf | . | 50 |

| | | ATiDe-As | ATiCa-Al |
|---|---|---|---|
| Desmodium glutinosum | Pointed-leaved tick trefoil | 84,4 | 25,1 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 58 | 4 |
| Caulophyllum thal. | Blue cohosh | 45 | 92 |
| Sanguinaria canadensis | Bloodroot | 42 | 88 |
| Hepatica acutiloba | Sharp-lobed hepatica | 10 | 75 |
| Mitella diphylla | Miterwort | 6 | 58 |
| Allium tricoccum | Wild leek | 3 | 54 |
| Hydrophyllum virgin. | Virginia waterleaf | 13 | 50 |
| Hamamelis virginiana | Witch hazel | 13,1 | 46,15 |

| | | ATiDe-As | ATTr |
|---|---|---|---|
| Geranium maculatum | Wild geranium | 94 | . |
| Amphicarpa bracteata | Hog peanut | 90 | . |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 84 | . |
| Phryma leptostachya | Lopseed | 81 | 25 |
| Dioscorea villosa | Wild yam root | 68 | . |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 58 | . |
| Viola pubescens | Downy yellow violet | 58 | . |
| Botrychium virginianum | Rattlesnake fern | 45 | . |
| Panax quinquefolius | Ginseng | 42 | . |
| Athyrium fillix-femina | Lady fern | 39.2 | 100,17 |
| Maianthemum canadense | Wild lily-of-the-valley | 16 | 100 |
| Osmunda claytoniana | Interrupted fern | 29 | 75 |
| Hamamelis virginiana | Witch hazel | 13,1 | 75,6 |
| Sambucus pubens | Red-berried elder | 6 | 75 |
| Streptopus roseus | Rosey twisted stalk | 6 | 75 |
| Symplocarpus foetidus | Skunk cabbage | 3 | 75 |
| Lycopodium lucidulum | Shining club-moss | . | 75 |
| Mitchella repens | Partridgeberry | . | 75 |
| Trientalis borealis | Starflower | . | 50 |
| Tsuga canadensis | Eastern hemlock | . | 50 |

| | | ArDe-V | ATiDe-Ha |
|---|---|---|---|
| Vaccinium angust. | Low sweet blueberry | 85 | 12 |
| Pteridium aquilinum | Braken fern | 85 | 15 |
| Corylus americana | Hazel-nut | 80 | 23 |
| Aralia nudicaulis | Wild sarsaparilla | 76 | 38 |
| Diervilla lonicera | Bush honeysuckle | 71 | 8 |
| Cornus racemosa | Gray dogwood | 66 | 4 |
| Lathyrus ochroleucus | Pale vetchling | 61 | 8 |
| Viburnum acerifolium | Maple-leaved viburnum | 38,1 | 92,9 |
| Ranunculus abortivus | Small-flowered crowfoot | 4 | 85 |
| Polygonatum pubescens | Hairy solomon's seal | 28 | 81 |
| Anemone quinquefolia | Wood anemone | 38 | 77 |
| Circaea quadrisulcata | Enchanter's nightshade | 23 | 77 |
| Hamamelis virginiana | Witch hazel | 4,1 | 77,10 |
| Viola pubescens | Downy yellow violet | 4 | 73 |
| Dioscorea villosa | Wild yam root | 9 | 65 |
| Smilax tamnoides | Bristly greenbrier | 23 | 62 |
| Podophyllum peltatum | Mayapple | 4 | 54 |

*continued...*



Previous View

*...continued*

| | | ArDe-V | ATiDe-Ha |
|---|---|---|---|
| Sanguinaria canadensis | Bloodroot | 9 | 54 |
| Adiantum pedatum | Maidenhair fern | 9 | 50 |
| Botrychium virginianum | Rattlesnake fern | 4 | 50 |
| Ribes cynosbati | Prickly gooseberry | . | 50 |
| Thalictrum dioicum | Early meadow rue | 19 | 46 |
| Panax quinquefolius | Ginseng | . | 31 |

| | | AArL | ATiCa-Al |
|---|---|---|---|
| Acer rubrum | Red maple | 100 | 38 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 89,5 | 25,1 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 86,4 | 4,1 |
| Apocynum andro. | Spreading dogbane | 64 | . |
| Potentilla simplex | Common cinquefoil | 61 | 8 |
| Vitis riparia | Riverbank grape | 61 | 13 |
| Lysimachia quadrifolia | Whorled loosestrife | 54 | . |
| Pteridium aquilinum | Braken fern | 43 | . |
| Rhus radicans | Poison ivy | 43 | 8 |
| Polygonatum pubescens | Hairy solomon's seal | 32 | 88 |
| Viola pubescens | Downy yellow violet | 39 | 88 |
| Arisaema atrorubens | Jack-in-the-pulpit | 46 | 79 |
| Uvularia grandiflora | Large-flowered bellwort | 32 | 71 |
| Solidago flexicaulis | Zigzag goldenrod | 36 | 67 |
| Trillium spp. | Trilliums | . | 63 |

| | | ATiDe-Ha | ATiDe-As |
|---|---|---|---|
| Ranunculus abortivus | Small-flowered crowfoot | 85 | 45 |
| Amelanchier spp. | Juneberry | 81 | 19 |
| Hamamelis virginiana | Witch hazel | 77,10 | 13,1 |
| Prenanthes alba | White lettuce | 62 | 29 |
| Smilax tamnoides | Bristly greenbrier | 62 | 29 |
| Dryopteris spinulosa | Spinulose shield fern | 54 | 29 |
| Parthenocissus quinq. | Virginia creeper | 73,2 | 97,12 |
| Actaea spp. | Baneberries | 38 | 71 |
| Vitis riparia | Riverbank grape | 12 | 55 |
| Galium aparine | Cleavers | 12 | 45 |

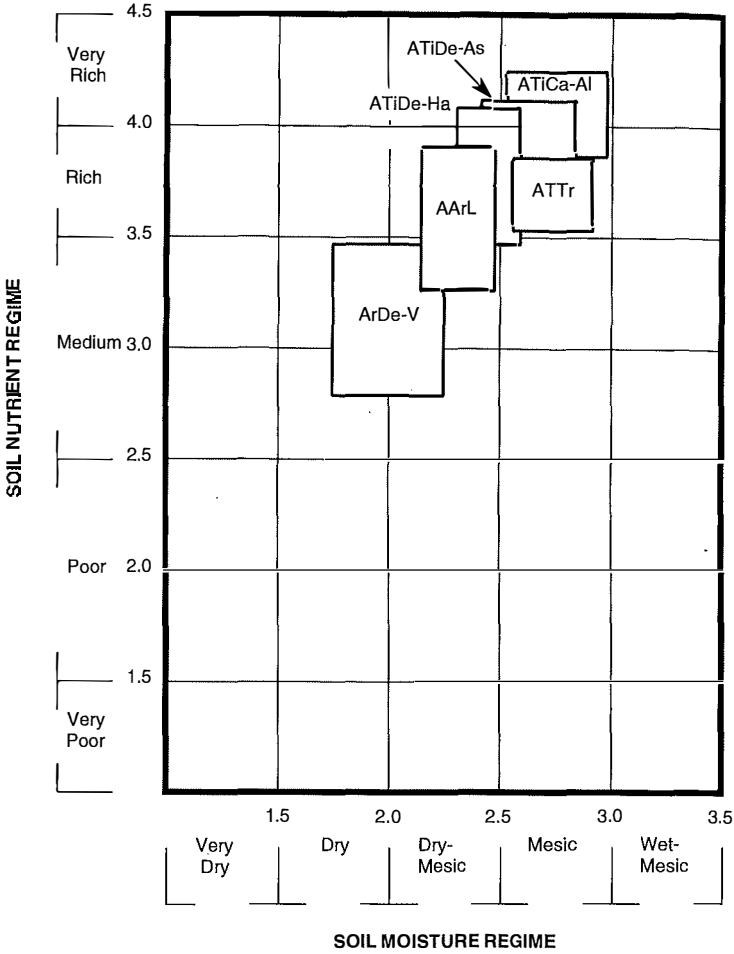
| | | ATiDe-Ha | ATTr |
|---|---|---|---|
| Viburnum acerifolium | Maple-leaved viburnum | 92,9 | 50,1 |
| Geranium maculatum | Wild geranium | 77 | . |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 73 | . |
| Viola pubescens | Downy yellow violet | 73 | . |
| Amphicarpa bracteata | Hog peanut | 69 | . |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 62 | . |
| Maianthemum canadense | Wild lily-of-the-valley | 15 | 100 |
| Lycopodium lucidulum | Shining club-moss | 15 | 75 |
| Streptopus roseus | Rosey twisted stalk | 8 | 75 |
| Mitchella repens | Partridgeberry | 4 | 75 |
| Sambucus pubens | Red-berried elder | . | 75 |
| Symplocarpus foetidus | Skunk cabbage | . | 75 |
| Circaea alpina | Dwarf enchanter's nightshade | . | 50 |

| | | ATiCa-Al | ATTr |
|---|---|---|---|
| Geranium maculatum | Wild geranium | 88 | . |
| Viola pubescens | Downy yellow violet | 88 | . |
| Botrychium virginianum | Rattlesnake fern | 71 | . |
| Amphicarpa bracteata | Hog peanut | 63 | . |
| Smilacina racemosa | False solomon's seal | 63 | . |
| Allium tricoccum | Wild leek | 54 | . |



Previous View

# Relationship of Habitat Types to Soil Moisture and Nutrient Regimes in Baraboo Hills Section






Previous View

# ArDe-V

## *Acer rubrum/Desmodium* habitat type, *Vaccinium* variant (Red maple/Pointed-leaf tick trefoil-Blueberry variant)

**Distribution:**
In northern and western parts of Habitat type Region 7 and throughout Region 6. Also scattered in other counties of Natural Subdivision 6c.

**Similar types:** PVCr

**Landform and soils:**
Rolling to hilly topography with sandstone and sometimes dolomitic bedrock. Soils are sandy loam to loam (typical example: Hixton loam). This type represents a distinct **transition between dry** and **dry-mesic sites.**

**Vegetation:**
**Major forest cover types**: *White oak* and *red maple* are the most common dominants in stands that were sampled, but *red oak* is sometimes present. *Pin oak* or *black oak* are much less common than they or on **PVCr** type. *White pine* is often present.

**Shrub and small tree layer**: This layer is usually well represented. Major species in decreasing order of average coverage are: *Hazel, blackberries* and *raspberries, serviceberry, black cherry, gray dogwood* and *bush honeysuckle*. *Red maple* saplings often dominate this layer.

**Ground flora characteristics**: Number of species and total herb coverage is higher than on other dry types of this region. *Blueberry* occurs here with small coverage and helps to distinguish **ArDe-V** from **ArCi** and other dry-mesic and mesic types. Species that best distinguishes this type from drier types is *pointed-leaf tick trefoil.* Other diagnostic species with lower constancies are *sweet cicely, wild geranium* and *hog peanut*. Best represented species are *bracken fern*, *big-leaf aster, tick trefoil, wild sarsaparilla* and *Virginia creeper.*

**Disturbance and succession**: Presettlement fire regime favored development of oak communities. *Red oak* is not reproducing adequately in current stands even when *red oak* is dominant in the overstory. *White oak,* however, shows some ability to persist. The most successfully reproducing species is *red maple*. Based on understory composition and soil characteristics we conclude that *sugar maple* is not a potential climax dominant on this type. *Red maple* is the most shade tolerant species that is well adapted to these sites and is presumed to be climax. It is also possible that *white pine* can again become a permanent member of communities on this type once it can be established as a seed source. Competitive relationship between *white pine* and *red maple* on this type has not been established, however, it appears that under a disturbance regime of moderate fire frequency the two species would co-exist.



Previous View

# ArDe-V

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Sedges spp. | Sedges | 95 | 0.63 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 90 | 2.18 |
| Pteridium aquilinum | Braken fern | 85 | 6.31 |
| Aralia nudicaulis | Wild sarsaparilla | 76 | 1.13 |
| Smilacina racemosa | False solomon's seal | 71 | 0.67 |
| Geranium maculatum | Wild geranium | 71 | 0.67 |
| Parthenocissus quinquefolia | Virginia creeper | 66 | 1.89 |
| Amphicarpa bracteata | Hog peanut | 61 | 0.50 |
| Lathyrus ochroleucus | Pale vetchling | 61 | 0.50 |
| Osmorhiza claytoni | Sweet cicely | 57 | 0.50 |
| Aster macrophyllus | Large-leaved aster | 57 | 4.25 |
| Uvularia sessilifolia | Sessile-leaved bellwort | 57 | 1.92 |
| Lysimachia quadrifolia | Whorled loosestrife | 57 | 0.50 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 52 | 2.27 |
| Goodyera pubescens | Downy rattlesnake plantain | 47 | 0.50 |
| Grasses spp. | Grasses | 47 | 0.50 |
| Pyrola spp. | Pyrolas | 47 | 0.50 |
| Galium triflorum | Sweet-scented bedstraw | 42 | 0.50 |
| Dryopteris spinulosa | Spinulose shield fern | 42 | 0.50 |
| Smilax herbacea | Carrion flower | 38 | 0.50 |
| Apocynum androsaemifolium | Spreading dogbane | 38 | 0.81 |
| Maianthemum canadense | Wild lily-of-the-valley | 38 | 0.50 |
| Anemone quinquefolia | Wood anemone | 38 | 0.50 |
| Potentilla simplex | Common cinquefoil | 33 | 0.50 |
| Fragaria vesca | Wood strawberry | 33 | 0.50 |
| Asclepias spp. | Milkweeds | 33 | 0.50 |
| Solidago spp. | Goldenrods | 33 | 0.50 |
| Phryma leptostachya | Lopseed | 33 | 0.50 |
| Osmunda claytoniana | Interrupted fern | 28 | 1.33 |
| Hepatica americana | Round-lobed hepatica | 28 | 0.50 |
| Polygonatum pubescens | Hairy solomon's seal | 28 | 0.50 |
| Vitis riparia | Riverbank grape | 28 | 0.50 |
| Viola spp. | Violets | 23 | 0.50 |
| Circaea quadrisulcata | Enchanter's nightshade | 23 | 0.50 |
| Rhus radicans | Poison ivy | 23 | 0.50 |
| Uvularia grandiflora | Large-flowered bellwort | 23 | 0.50 |
| Smilax tamnoides | Bristly greenbrier | 23 | 0.50 |
| Sanicula marilandica | Black snakeroot | 23 | 0.50 |
| **Shrubs** | | | |
| Rubus spp. | Blackberries/raspberries | 100 | 3.79 |
| Vaccinium angustifolium | Low sweet blueberry | 85 | 0.50 |
| Amelanchier spp. | Juneberry | 85 | 4.44 |
| Corylus americana | Hazel-nut | 80 | 7.50 |
| Prunus virginiana | Chokecherry | 80 | 0.65 |
| Diervilla lonicera | Bush honeysuckle | 71 | 0.83 |

*continued...*



Previous View

*...continued*

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| Cornus racemosa | Gray dogwood | 66 | 1.89 |
| Rosa spp. | Roses | 66 | 0.50 |
| Gaylussacia baccata | Black huckleberry | 47 | 0.75 |
| Viburnum acerifolium | Maple-leaved viburnum | 38 | 0.81 |
| Viburnum rafinesquianum | Downy arrowwood | 28 | 0.92 |
| Ilex verticillata | Winterberry | 23 | 1.00 |
| Ribes spp. | Gooseberries | 23 | 0.50 |
| **Tree Seedlings** | | | |
| Prunus serotina | Black cherry | 95 | 1.38 |
| Acer rubrum | Red maple | 95 | 1.13 |
| Quercus alba | White oak | 80 | 0.94 |
| Quercus velutina | Black oak | 38 | 0.50 |
| Quercus rubra | Northern red oak | 38 | 0.50 |
| Carya ovata | Shagbark hickory | 33 | 0.86 |
| Populus grandidentata | Bigtooth aspen | 33 | 0.50 |
| Carya cordiformis | Bitternut hickory | 23 | 0.50 |
| Ulmus spp | Elms | 23 | 0.50 |
| Crataegus spp. | Hawthorns | 28 | 0.50 |



Previous View

# AArL

## *Acer saccharum-Acer rubrum/Lysimachia quadrifolia*
## (Sugar maple-Red maple/Whorled loosestrife)

**Distribution:**
Observed almost exclusively on the western, unglaciated portion of Baraboo Range.

**Similar types**: ATiDe, ArCi-Ph

**Landform and soils:**
This type is found on a great variety of combinations of soils and landforms. The common characteristic of all sites in this group is a **dry-mesic** condition. Most often this is due to sandy or shallow soils. If soil is silt loam it is always shallow. Also S and W aspects and upper slope positions are more common than other landscape positions.

**Vegetation:**
**Common forest cover types:** *Red oak, white oak* and *red maple* predominate. *Shagbark hickory, black cherry* and *ironwood* are frequent associates. Also present may be *big-tooth aspen, white pine* and less frequently, the mesic hardwoods.

**Shrub and small tree layer:** The following shrubs are best represented: *Maple-leaf viburnum, black cherry, blackberries* and *serviceberry. Red maple* and *ironwood* are the most common saplings.

**Ground flora characteristics:** The best represented ground species are those typical of dry-mesic sites, *e.g.*: *Hog peanut, tick trefoil* (both pointed-leaf and naked-flowered) and *riverbank grape.* Also characteristic, but with lower constancy values are: *whorled loosestrife, dogbane, bracken fern, pussytoes,* and *big-leaf aster.*

**Disturbance and succession**: Floristic composition of this plant association reflects both the relatively dry conditions, and also frequent disturbance. All tree species mentioned above under "common forest cover types" are reproducing to some extent on these dry-mesic sites. Under current climatic conditions and in the absence of fire, *red maple* and *ironwood* appear to be on their way to replacing current oak stands. However, it appears that in time *sugar maple, white ash* and *basswood* may become more important. We named this association *Acer saccharum-A. rubrum* community type (instead of *Acer saccharum* habitat type), because the composition of potential climax communities on this site type is uncertain.



Previous View

# AArL

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Geranium maculatum | Wild geranium | 100 | 0.83 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 89 | 4.97 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 86 | 4.43 |
| Amphicarpa bracteata | Hog peanut | 82 | 3.20 |
| Circaea quadrisulcata | Enchanter's nightshade | 79 | 0.54 |
| Parthenocissus quinq. | Virginia creeper | 79 | 0.98 |
| Anemone quinquefolia | Wood anemone | 68 | 0.36 |
| Apocynum androsaemifolium | Spreading dogbane | 64 | 0.64 |
| Aster macrophyllus | Large-leaved aster | 61 | 6.51 |
| Conopholis americana | Squawroot | 61 | 0.52 |
| Osmorhiza claytoni | Sweet cicely | 61 | 0.73 |
| Potentilla simplex | Common cinquefoil | 61 | 0.27 |
| Ranunculus abortivus | Small-flowered crowfoot | 61 | 0.32 |
| Vitis riparia | Riverbank grape | 61 | 2.11 |
| Prenanthes alba | White lettuce | 57 | 0.13 |
| Smilacina racemosa | False solomon's seal | 57 | 0.41 |
| Lysimachia quadrifolia | Whorled loosestrife | 54 | 0.65 |
| Podophyllum peltatum | Mayapple | 54 | 1.61 |
| Antennaria neglecta | Field pussytoes | 50 | 10.12 |
| Arisaema atrorubens | Jack-in-the-pulpit | 46 | 0.25 |
| Pteridium aquilinum | Braken fern | 43 | 5.67 |
| Rhus radicans | Poison ivy | 43 | 2.15 |
| Grasses spp. | Grasses | 39 | 0.23 |
| Viola pubescens | Downy yellow violet | 39 | 0.23 |
| Solidago flexicaulis | Zigzag goldenrod | 36 | 0.25 |
| Aralia nudicaulis | Wild sarsaparilla | 32 | 0.15 |
| Galium aparine | Cleavers | 32 | 0.58 |
| Polygonatum pubescens | Hairy solomon's seal | 32 | 0.32 |
| Uvularia grandiflora | Large-flowered bellwort | 32 | 0.26 |
| Asclepias exaltata | Poke milkweed | 29 | 0.65 |
| Botrychium virginianum | Rattlesnake fern | 29 | 0.16 |
| Solidago ulmifolia | Elm-leaved goldenrod | 25 | 0.80 |
| Aster lateriflorus | Calico or starved aster | 21 | 0.66 |
| Galium concinnum | Shining bedstraw | 21 | 1.23 |
| Pyrola spp. | Pyrolas | 21 | 2.58 |
| Solidago spp. | Goldenrods | 21 | 0.26 |
| Thalictrum dioicum | Early meadow rue | 21 | 0.18 |
| Phryma leptostachya | Lopseed | 82 | 0.61 |
| **Shrubs** | | | |
| Amelanchier spp. | Juneberry | 82 | 1.09 |
| Rubus spp. | Blackberries/raspberries | 82 | 4.20 |
| Prunus virginiana | Chokecherry | 79 | 1.31 |
| Viburnum acerifolium | Maple-leaved viburnum | 79 | 8.25 |
| Rosa spp. | Roses | 61 | 0.24 |
| Corylus americana | Hazel-nut | 50 | 3.30 |
| Ribes cynosbati | Prickly gooseberry | 50 | 0.90 |



Previous View

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| Cornus alternifolia | Alternate-leaved dogwood | 39 | 1.54 |
| Viburnum rafinesquianum | Downy arrowwood | 36 | 4.39 |
| Xanthoxylum americanum | Prickly ash | 32 | 2.13 |
| Diervilla lonicera | Bush honeysuckle | 25 | 2.30 |
| Hamamelis virginiana | Witch hazel | 25 | 1.00 |
| Lonicera canadensis | American fly honeysuckle | 25 | 0.24 |
| **Tree Seedlings** | | | |
| Acer rubrum | Red maple | 100 | 2.41 |
| Prunus serotina | Black cherry | 100 | 2.45 |
| Quercus rubra | Northern red oak | 100 | 1.28 |
| Fraxinus americana | White ash | 93 | 6.72 |
| Quercus alba | White oak | 86 | 0.99 |
| Carya ovata | Shagbark hickory | 82 | 0.90 |
| Carya cordiformis | Bitternut hickory | 79 | 1.22 |
| Ulmus spp. | Elms | 75 | 0.24 |
| Ostrya virginiana | Ironwood | 68 | 3.70 |
| Acer saccharum | Sugar maple | 46 | 1.51 |
| Populus grandidentata | Bigtooth aspen | 46 | 0.51 |
| Crataegus spp. | Hawthorns | 39 | 0.28 |
| Tilia americana | Basswood | 32 | 0.15 |
| Pinus strobus | White pine | 21 | 0.35 |



Previous View

# ATiDe-Ha and ATiDe-As

## *Acer saccharum-Tilia/Desmodium* habitat type, *Hamamelis* variant

## Sugar maple-Basswood/Tick trefoil-Witch hazel variant and *Arisaema* (Jack-in-the pulpit) variant

### Distribution:

Throughout Baraboo Hills. The ***Hamamelis*** variant is more prevalent in the western, un-glaciated portion and ***Arisaema*** variant in the eastern glaciated section. Divisions 6a and 5c (Natural Divisions Map).

**Similar types**: ATiDe (Region 7) and ATiFrVb (Region 10).

### Landform and soils:

Silt loams of varying depth on many topographic positions. Vegetation reflects **dry-mesic, nutrient rich** conditions for the *Hamamelis* variant and **mesic to dry-mesic, nutrient rich** for the *Arisaema* variant.

### Vegetation:

**Common forest cover types:** Any combination of *red oak*, *white oak*, *sugar maple* usually accounts for majority of canopy coverage. *Basswood* and *white ash* are present with much lower frequencies. *Oaks* usually dominate the largest diameter classes and *maples* the smaller. On the ***Arisaema*** variant red maple tends to be somewhat better represented than is *sugar maple*.

**Shrub and small tree layer:** This layer is somewhat less well developed than it is on other dry-mesic sites. However, the ***Hamamelis*** variant generally has a strong representation of *witch hazel* or *maple-leaf viburnum.* (Only the latter is common on the Arisaema variant). The only other commonly present shrubs are *black cherry, choke cherry* and *serviceberry* (on the Arisaema variant only). *Red maple* and *ironwood* (***Ostrya***) can also be well represented. *Wild currants* and *gooseberries* are present but generally not abundant.

**Ground flora characteristics:** With the exception of *Virginia creeper* on the ***Arisaema*** variant, herb layer is rather sparse. Species with highest presence percentages on both variants are: *Jack-in-the-pulpit, enchanter's nightshade, wild geranium, tick trefoil, hog peanut* and *sweet clcely.* Other floristic differences between the two variants are shown in the comparison tables accompanying the key.

**Disturbance and succession:** The complex topography of the Baraboo region strongly affected fire disturbance in presettlement time as well as land use pattern following the settlement. Thus, great differences in composition and age structure are found among current forest communities. However, definite successional trends are evident everywhere. Depending on the seed source only three species represent the vast majority of advance regeneration. These are: *Red maple, sugar maple* and *ironwood. Ironwood* is somewhat more prominent on the ***Hamamelis*** variant. *Basswood, white ash* and *bitternut hickory* saplings each occurred on about 25 to 35 percent of sampled stands. The ***Arisaema*** variant tends to have a greater number of species represented in the sapling layer than does the ***Hamamelis*** variant. *Red maple* and *ironwood* usually invade oak stands ahead of *sugar maple.* It appears that these two species will dominate the stand in the future because oak reproduction is very sparse or nonexistent. However, once the *sugar maple* seed source becomes well established this species gradually assumes dominance.



Previous View

# ATiDe-Ha

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Ranunculus abortivus | Small-flowered crowfoot | 85 | 0.48 |
| Arisaema atrorubens | Jack-in-the-pulpit | 81 | 0.66 |
| Polygonatum pubescens | Hairy solomon's seal | 81 | 0.66 |
| Anemone quinquefolia | Wood anemone | 77 | 0.45 |
| Circaea quadrisulcata | Enchanter's nightshade | 77 | 0.88 |
| Geranium maculatum | Wild geranium | 77 | 0.98 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 73 | 1.04 |
| Parthenocissus quinquefolia | Virginia creeper | 73 | 2.43 |
| Viola pubescens | Downy yellow violet | 73 | 0.38 |
| Amphicarpa bracteata | Hog peanut | 69 | 2.06 |
| Dioscorea villosa | Wild yam root | 65 | 0.38 |
| Aster macrophyllus | Large-leaved aster | 62 | 0.98 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 62 | 1.01 |
| Osmorhiza claytoni | Sweet cicely | 62 | 0.41 |
| Prenanthes alba | White lettuce | 62 | 0.22 |
| Smilax tamnoides | Bristly greenbrier | 62 | 0.25 |
| Uvularia grandiflora | Large-flowered bellwort | 58 | 0.56 |
| Dryopteris spinulosa | Spinulose shield fern | 54 | 1.75 |
| Phryma leptostachya | Lopseed | 54 | 0.27 |
| Podophyllum peltatum | Mayapple | 54 | 0.80 |
| Sanguinaria canadensis | Bloodroot | 54 | 0.62 |
| Smilacina racemosa | False solomon's seal | 54 | 0.35 |
| Adiantum pedatum | Maidenhair fern | 50 | 1.18 |
| Botrychium virginianum | Rattlesnake fern | 50 | 0.17 |
| Thalictrum dioicum | Early meadow rue | 46 | 0.95 |
| Galium concinnum | Shining bedstraw | 42 | 0.45 |
| Grasses spp. | Grasses | 42 | 1.02 |
| Monotropa uniflora | Indian pipe | 42 | 0.14 |
| Actaea spp. | Baneberries | 38 | 0.25 |
| Aralia nudicaulis | Wild sarsaparilla | 38 | 0.68 |
| Athyrium filix-femina | Lady fern | 38 | 1.36 |
| Conopholis americana | Squawroot | 38 | 0.69 |
| Uvularia sessilifolia | Sessile-leaved bellwort | 38 | 0.35 |
| Goodyera pubescens | Downy rattlesnake plantain | 31 | 0.16 |
| Osmunda claytoniana | Interrupted fern | 31 | 2.02 |
| Panax quinquefolius | Ginseng | 31 | 0.22 |
| Caulophyllum thalictroides | Blue cohosh | 27 | 0.24 |
| Solidago flexicaulis | Zigzag goldenrod | 27 | 0.31 |
| Asclepias exaltata | Poke milkweed | 23 | 0.10 |
| Hepatica acutiloba | Sharp-lobed hepatica | 23 | 3.31 |
| Pyrola elliptica | Shinleaf | 23 | 0.18 |
| **Shrubs** | | | |
| Amelanchier spp. | Juneberry | 81 | 0.33 |
| Prunus virginiana | Chokecherry | 81 | 1.04 |

*continued...*



Previous View

*...continued*

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| Hamamelis virginiana | Witch hazel | 77 | 9.51 |
| Rubus spp. | Blackberries/raspberries | 54 | 0.30 |
| Ribes cynosbati | Prickly gooseberry | 50 | 0.63 |
| Cornus alternifolia | Alternate-leaved dogwood | 35 | 0.47 |
| Crataegus spp. | Hawthorns | 35 | 0.15 |
| Viburnum rafinesquianum | Downy arrowwood | 35 | 0.58 |
| Corylus americana | Hazel-nut | 23 | 1.23 |
| Lonicera dioica | Smooth-leaved honeysuckle | 23 | 0.10 |
| **Tree Seedlings** | | | |
| Prunus serotina | Black cherry | 100 | 0.66 |
| Quercus rubra | Northern red oak | 100 | 0.65 |
| Carya cordiformis | Bitternut hickory | 96 | 0.74 |
| Acer rubrum | Red maple | 92 | 0.63 |
| Fraxinus americana | White ash | 92 | 2.97 |
| Viburnum acerifolium | Maple-leaved viburnum | 92 | 8.67 |
| Acer saccharum | Sugar maple | 88 | 10.90 |
| Ostrya virginiana | Ironwood | 85 | 2.16 |
| Tilia americana | Basswood | 81 | 0.44 |
| Carya ovata | Shagbark hickory | 73 | 0.89 |
| Ulmus spp | Elms | 69 | 0.32 |
| Populus grandidentata | Bigtooth aspen | 54 | 0.35 |
| Quercus alba | White oak | 50 | 0.36 |
| Carpinus caroliniana | American hornbeam | 38 | 2.56 |



Previous View

# ATiDe-As

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Circaea quadrisulcata | Enchanter's nightshade | 97 | 2.88 |
| Parthenocissus quinquefolia | Virginia creeper | 97 | 12.23 |
| Arisaema atrorubens | Jack-in-the-pulpit | 94 | 1.09 |
| Geranium maculatum | Wild geranium | 94 | 4.50 |
| Amphicarpa bracteata | Hog peanut | 90 | 1.82 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 84 | 4.12 |
| Phryma leptostachya | Lopseed | 81 | 0.67 |
| Actaea spp. | Baneberries | 71 | 0.58 |
| Osmorhiza claytoni | Sweet cicely | 71 | 1.14 |
| Podophyllum peltatum | Mayapple | 71 | 3.55 |
| Dioscorea villosa | Wild yam root | 68 | 0.47 |
| Uvularia grandiflora | Large-flowered bellwort | 68 | 0.56 |
| Adiantum pedatum | Maidenhair fern | 65 | 0.90 |
| Polygonatum pubescens | Hairy solomon's seal | 65 | 0.61 |
| Anemone quinquefolia | Wood anemone | 61 | 0.54 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 58 | 1.10 |
| Viola pubescens | Downy yellow violet | 58 | 1.23 |
| Vitis riparia | Riverbank grape | 55 | 0.61 |
| Conopholis americana | Squawroot | 52 | 0.40 |
| Thalictrum dioicum | Early meadow rue | 52 | 2.18 |
| Aralia nudicaulis | Wild sarsaparilla | 45 | 1.41 |
| Botrychium virginianum | Rattlesnake fern | 45 | 0.27 |
| Caulophyllum thalictroides | Blue cohosh | 45 | 0.82 |
| Galium aparine | Cleavers | 45 | 0.93 |
| Ranunculus abortivus | Small-flowered crowfoot | 45 | 0.31 |
| Rhus radicans | Poison ivy | 45 | 0.86 |
| Smilacina racemosa | False solomon's seal | 45 | 0.42 |
| Grasses spp. | Grasses | 42 | 0.88 |
| Panax quinquefolius | Ginseng | 42 | 0.17 |
| Sanguinaria canadensis | Bloodroot | 42 | 0.51 |
| Aster macrophyllus | Large-leaved aster | 39 | 0.86 |
| Athyrium filix-femina | Lady fern | 39 | 2.23 |
| Cryptotaenia canadensis | Honewort | 35 | 2.20 |
| Sanicula gregaria | Clustered snakeroot | 35 | 0.99 |
| Viola pensylvanica | Smooth yellow violet | 35 | 1.24 |
| Dryopteris spinulosa | Spinulose shield fern | 29 | 0.96 |
| Galium triflorum | Sweet-scented bedstraw | 29 | 0.91 |
| Geum canadense | White avens | 29 | 0.26 |
| Osmunda claytoniana | Interrupted fern | 29 | 4.22 |
| Prenanthes alba | White lettuce | 29 | 0.10 |
| Ranunculus recurvatus | Hooked crowfoot | 29 | 0.58 |
| Smilax tamnoides | Bristly greenbrier | 29 | 0.32 |
| Solidago flexicaulis | Zigzag goldenrod | 29 | 0.32 |
| Galium asprellum | Cleavers | 26 | 0.35 |
| Agrimonia gryposepala | Agrimony | 23 | 0.10 |
| Smilax herbacea | Carrion flower | 23 | 0.10 |

*continued...*



Previous View

*...continued*

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Shrubs** | | | |
| Viburnum acerifolium | Maple-leaved viburnum | 84 | 5.26 |
| Ribes cynosbati | Prickly gooseberry | 77 | 0.97 |
| Rubus spp. | Blackberries/raspberries | 77 | 1.99 |
| Prunus virginiana | Chokecherry | 68 | 2.23 |
| Cornus alternifolia | Alternate-leaved dogwood | 52 | 0.43 |
| Corylus americana | Hazel-nut | 39 | 0.59 |
| Rosa spp. | Roses | 29 | 0.15 |
| Xanthoxylum americanum | Prickly ash | 29 | 0.37 |
| Viburnum lentago | Nannyberry | 23 | 2.71 |
| Viburnum rafinesquianum | Downy arrowwood | 23 | 0.17 |
| **Tree Seedlings** | | | |
| Carya cordiformis | Bitternut hickory | 94 | 0.81 |
| Prunus serotina | Black cherry | 94 | 2.87 |
| Fraxinus americana | White ash | 84 | 3.73 |
| Ulmus spp | Elms | 84 | 2.84 |
| Acer rubrum | Red maple | 81 | 1.60 |
| Quercus rubra | Northern red oak | 71 | 0.25 |
| Tilia americana | Basswood | 61 | 0.48 |
| Acer saccharum | Sugar maple | 58 | 10.21 |
| Ostrya virginiana | Ironwood | 48 | 3.02 |
| Carya ovata | Shagbark hickory | 45 | 0.62 |
| Quercus alba | White oak | 42 | 1.32 |
| Fraxinus pennsylvanic | Green ash | 39 | 3.43 |
| Populus grandidentata | Bigtooth aspen | 29 | 0.15 |
| Juglans cinerea | Butternut | 26 | 0.16 |
| Celtis occidentalis | Hackberry | 23 | 2.44 |



Previous View

# ATTr

## *Acer saccharum-Tsuga/Trientalis*
## (Sugar maple-Hemlock/Starflower)

**Distribution:**
This type represents the relic northern forest found only in a few location in the unglaciated part of the Baraboo Range.

**Similar types:** ATiCa-Al

**Landform and soils:**
Cool protected ravines. Other characteristics not different from ATICa-Al type.

**Vegetation:**
**Common forest cover types:** All of these relic stands are dominated by *sugar maple,* but *hemlock* and *yellow birch* are always present. Other associated species are *white pine, white ash, bitternut hickory, basswood* or *red oak.*

**Shrub and small tree layer:** This layer is not well developed. Best represented are *witch hazel* an saplings of *ironwood* and *red maple. Mountain maple,* a typical northern shrub, is sometimes present.

**Ground flora characteristics:** this type contains both the species of typically southern affinity and some characteristic members of northern communities. The common southern species include: *Enchanter's nightshade, Virginia creeper, sweet cicely, sharp-lobed hepatica, mayapple* and *Virginia waterleaf.* The characteristic northern species, seldom found in other southern communities are: *Partridgeberry, starflower, shiny clubmoss* (*Lycopodium*), and *oak fern.* Additional species that are much better represented in northern forests include: *Big-leaf aster, wild lily-of-the-valley* and *rosey twisted stalk.*

**Disturbance and succession:** It is uncertain what kind of disturbance favors hemlock regeneration in this region. At this time *sugar maple* and *yellow birch* are reproducing most successfully, but *hemlock* reproduction is insignificant. Perhaps tip-up mounds created by infrequent severe windstorms, or periodic fire is needed. High white tail deer populations have also been suggested as possible cause for lack of *hemlock* reproduction.



Previous View

# ATTr

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Anemone quinquefolia | Wood anemone | 100 | 0.35 |
| Arisaema atrorubens | Jack-in-the-pulpit | 100 | 0.35 |
| Athyrium filix-femina | Lady fern | 100 | 17.02 |
| Circaea quadrisulcata | Enchanter's nightshade | 100 | 0.10 |
| Maianthemum canadense | Wild lily-of-the-valley | 100 | 1.67 |
| Osmorhiza claytoni | Sweet cicely | 100 | 0.22 |
| Parthenocissus quinquefolia | Virginia creeper | 100 | 9.57 |
| Polygonatum pubescens | Hairy solomon's seal | 100 | 0.47 |
| Actaea spp. | Baneberries | 75 | 0.27 |
| Aster macrophyllus | Large-leaved aster | 75 | 1.07 |
| Lycopodium lucidulum | Shining club-moss | 75 | 0.27 |
| Mitchella repens | Partridgeberry | 75 | 2.03 |
| Osmunda claytoniana | Interrupted fern | 75 | 2.20 |
| Sanguinaria canadensis | Bloodroot | 75 | 0.27 |
| Streptopus roseus | Rosey twisted stalk | 75 | 0.43 |
| Symplocarpus foetidus | Skunk cabbage | 75 | 0.27 |
| Aralia nudicaulis | Wild sarsaparilla | 50 | 0.10 |
| Caulophyllum thalictroides | Blue cohosh | 50 | 0.35 |
| Circaea alpina | Dwarf enchanter's nightshade | 50 | 0.35 |
| Dryopteris phegopteris | Longbeech fern | 50 | 0.35 |
| Dryopteris spinulosa | Spinulose shield fern | 50 | 0.10 |
| Dryopteris thelypteris | Marsh shield fern | 50 | 0.35 |
| Hepatica acutiloba | Sharp-lobed hepatica | 50 | 0.10 |
| Mitella diphylla | Miterwort | 50 | 0.10 |
| Monotropa uniflora | Indian pipe | 50 | 0.10 |
| Polypodium virginianum | Polypodium virginianum | 50 | 0.35 |
| Smilax herbacea | Carrion flower | 50 | 0.10 |
| Trientalis borealis | Starflower | 50 | 0.35 |
| Trillium spp. | Trilliums | 50 | 0.10 |
| Viola incognita | Large-leaved white violet | 50 | 1.55 |
| Adiantum pedatum | Maidenhair fern | 25 | 3.00 |
| Adlumia fungosa | Climbing fumitory | 25 | 0.10 |
| Aquilegia canadensis | Wild columbine | 25 | 0.10 |
| Aralia racemosa | Spikenard | 25 | 0.10 |
| Cystopteris fragilis | Brittle fern | 25 | 0.10 |
| Dentaria laciniata | Cut-leaved toothwort | 25 | 0.10 |
| Fragaria spp. | Wild strawberries | 25 | 0.10 |
| Goodyera pubescens | Downy rattlesnake plantain | 25 | 0.10 |
| Goodyera spp. | Rattlesnake plantains | 25 | 0.10 |
| Hydrophyllum virginianum | Virginia waterleaf | 25 | 0.10 |
| Lactuca spp. | Wild lettuce | 25 | 0.10 |
| Phryma leptostachya | Lopseed | 25 | 0.10 |
| Pilea pumila | Clearweed or richweed | 25 | 0.10 |
| Podophyllum peltatum | Mayapple | 25 | 0.10 |
| Ranunculus abortivus | Small-flowered crowfoot | 25 | 0.10 |
| Sanicula marilandica | Black snakeroot | 25 | 0.10 |



Previous View

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| Solidago flexicaulis | Zigzag goldenrod | 25 | 0.60 |
| Thalictrum dioicum | Early meadow rue | 25 | 0.10 |
| Uvularia grandiflora | Large-flowered bellwort | 25 | 0.60 |
| Viola spp. | Violets | 25 | 0.10 |
| Vitis riparia | Riverbank grape | 25 | 0.10 |
| **Shrubs** | | | |
| Hamamelis virginiana | Witch hazel | 75 | 6.03 |
| Sambucus pubens | Red-berried elder | 75 | 0.60 |
| Amelanchier spp. | Juneberry | 50 | 0.10 |
| Diervilla lonicera | Bush honeysuckle | 50 | 0.10 |
| Ribes cynosbati | Prickly gooseberry | 50 | 0.35 |
| Viburnum acerifolium | Maple-leaved viburnum | 50 | 0.10 |
| Acer spicatum | Mountain maple | 25 | 0.60 |
| Prunus virginiana | Chokecherry | 25 | 0.10 |
| Cornus alternifolia | Alternate-leaved dogwood | 25 | 0.10 |
| Corylus cornuta | Beaked hazelnut | 25 | 0.60 |
| Rubus spp. | Blackberries/raspberries | 25 | 0.10 |
| Xanthoxylum americanum | Prickly ash | 25 | 0.10 |
| **Tree Seedlings** | | | |
| Acer saccharum | Sugar maple | 100 | 1.67 |
| Carya cordiformis | Bitternut hickory | 100 | 0.22 |
| Fraxinus americana | White ash | 100 | 0.35 |
| Prunus serotina | Black cherry | 100 | 0.10 |
| Acer rubrum | Red maple | 75 | 5.23 |
| Betula alleghaniensis | Yellow birch | 75 | 5.07 |
| Tilia americana | Basswood | 75 | 0.10 |
| Ostrya virginiana | Ironwood | 50 | 7.55 |
| Quercus rubra | Northern red oak | 50 | 0.35 |
| Tsuga canadensis | Eastern hemlock | 50 | 7.80 |
| Quercus alba | White oak | 25 | 0.10 |
| Pinus strobus | White pine | 25 | 0.10 |



Previous View

# ATiCa-Al

## *Acer saccharum-Tilia/Caulophyllum* habitat type, *Allium* variant

## (Sugar maple-Basswood/Blue cohosh (Wild leek variant))

**Distribution:**
The 24 stands representing this type all came from the western, unglaciated part of the Baraboo Range. However, it is possible that the type also exists in the eastern parts where site conditions are similar.

**Similar types**: ATiCa (Region 7).

**Landform and soils:**
Primarily on deep soils and on N and E slopes and often on lower slope positions. **Mesic, nutrient rich** and **very rich** sites.

**Vegetation:**
**Common forest cover types:** *Sugar maple* is dominant in most stands. *Basswood, bitternut hickory,* and less frequently, *white ash* are principal associates. *Red* and *white oak* are usually represented only in the larger diameter classes. In contrast to dry-mesic types in the same area *red maple* is much less important.

**Shrub and small tree layer:** This layer is not well developed. Only small coverage of *black cherry, choke cherry, maple-leaf viburnum* or *gooseberries* is common. The only exception is a relatively high presence of *witch hazel* in some stands. In such cases it is important not to confuse the site with the ATiDe-Ha type.

**Ground flora characteristics:** As on all mesic habitat types, a number of species with distinct tendency for occurrence on rich, mesic sites is found on this type, although individual constancy values are moderate. Some of these are: *Red baneberry, lady fern, blue cohosh, sharp-lobed hepatica, trillium, miterwort* and *wild leek.*

It is important to note that the name wild leek (*Allium*) is used only to distinguish the Baraboo variant of ATiCa from the ATiCa type that occurs elsewhere in Region 7. Although wild leek has a constancy value of only 54% on the ATiCa-Al variant it is generally absent on the ATiCa.

The best represented ground layer species are: *Enchanter's nightshade, wild geranium, Virginia creeper, blue cohosh, sweet cicely, lady fern* and *sharp-lobed hepatica.*

**Disturbance and succession:** The ATiCa-Al association represents the most stable, self-perpetuating community type in the Baraboo region. It reflects landscapes that for various reasons were not heavily influence by presettlement fires. *Sugar maple* is the most aggressively reproducing species, but adequate advance regeneration of *basswood, white ash, bitternut hickory* and *red maple* is generally present to perpetuate mixed composition.



Previous View

# ATiCa-Al

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Actaea spp. | Baneberries | 92 | 0.57 |
| Caulophyllum thalictroides | Blue cohosh | 92 | 1.69 |
| Circaea quadrisulcata | Enchanter's nightshade | 92 | 2.36 |
| Parthenocissus quinquefolia | Virginia creeper | 92 | 3.08 |
| Geranium maculatum | Wild geranium | 88 | 1.48 |
| Polygonatum pubescens | Hairy solomon's seal | 88 | 0.73 |
| Sanguinaria canadensis | Bloodroot | 88 | 0.85 |
| Viola pubescens | Downy yellow violet | 88 | 0.85 |
| Athyrium filix-femina | Lady fern | 83 | 1.77 |
| Osmorhiza claytoni | Sweet cicely | 83 | 1.36 |
| Ranunculus abortivus | Small-flowered crowfoot | 83 | 0.32 |
| Arisaema atrorubens | Jack-in-the-pulpit | 79 | 0.62 |
| Adiantum pedatum | Maidenhair fern | 75 | 0.97 |
| Hepatica acutiloba | Sharp-lobed hepatica | 75 | 3.34 |
| Botrychium virginianum | Rattlesnake fern | 75 | 0.48 |
| Phryma leptostachya | Lopseed | 71 | 0.54 |
| Uvularia grandiflora | Large-flowered bellwort | 71 | 0.91 |
| Solidago flexicaulis | Zigzag goldenrod | 67 | 0.56 |
| Amphicarpa bracteata | Hog peanut | 63 | 0.23 |
| Smilacina racemosa | False solomon's seal | 63 | 0.56 |
| Trillium spp. | Trilliums | 63 | 0.40 |
| Anemone quinquefolia | Wood anemone | 58 | 0.31 |
| Mitella diphylla | Miterwort | 58 | 0.56 |
| Podophyllum peltatum | Mayapple | 58 | 0.97 |
| Allium tricoccum | Wild leek | 54 | 0.41 |
| Thalictrum dioicum | Early meadow rue | 54 | 1.00 |
| Hydrophyllum virginianum | Virginia waterleaf | 50 | 1.03 |
| Dryopteris spinulosa | Spinulose shield fern | 46 | 3.47 |
| Dioscorea villosa | Wild yam root | 42 | 0.40 |
| Cryptotaenia canadensis | Honewort | 38 | 0.49 |
| Galium concinnum | Shining bedstraw | 38 | 2.13 |
| Galium triflorum | Sweet-scented bedstraw | 38 | 0.27 |
| Smilax tamnoides | Bristly greenbrier | 38 | 0.16 |
| Aster macrophyllus | Large-leaved aster | 33 | 0.23 |
| Galium aparine | Cleavers | 33 | 0.35 |
| Grasses spp. | Grasses | 33 | 0.65 |
| Osmunda claytoniana | Interrupted fern | 33 | 2.45 |
| Ranunculus recurvatus | Hooked crowfoot | 33 | 0.22 |
| Maianthemum canadense | Wild lily-of-the-valley | 29 | 0.46 |
| Sanicula gregaria | Clustered snakeroot | 29 | 0.73 |
| Uvularia sessilifolia | Sessile-leaved bellwort | 29 | 0.17 |
| Aralia racemosa | Spikenard | 25 | 0.10 |
| Campanula americana | Tall bellflower | 25 | 0.10 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 25 | 0.27 |

*continued...*



Previous View

*...continued*

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| Laportea canadensis | Wood nettle | 25 | 13.62 |
| Panax quinquefolius | Ginseng | 25 | 0.18 |
| Sanicula marilandica | Black snakeroot | 25 | 3.23 |
| Viola incognita | Large-leaved white violet | 25 | 0.18 |
| Asarum canadense | Wild ginger | 21 | 3.86 |
| Geum canadense | White avens | 21 | 0.30 |
| Polemonium reptans | Greek valerian | 21 | 0.30 |
| Smilax herbacea | Carrion flower | 21 | 0.20 |
| Streptopus roseus | Rosey twisted stalk | 21 | 0.10 |
| Viola pensylvanica | Smooth yellow violet | 21 | 0.20 |
| **Shrubs** | | | |
| Prunus virginiana | Chokecherry | 83 | 0.37 |
| Ribes cynosbati | Prickly gooseberry | 71 | 0.68 |
| Viburnum acerifolium | Maple-leaved viburnum | 71 | 0.54 |
| Cornus alternifolia | Alternate-leaved dogwood | 50 | 0.18 |
| Rubus spp. | Blackberries/raspberries | 50 | 0.14 |
| Hamamelis virginiana | Witch hazel | 46 | 14.81 |
| Xanthoxylum americanum | Prickly ash | 25 | 0.75 |
| Amelanchier spp. | Juneberry | 21 | 0.10 |
| Sambucus canadensis | Common elder | 21 | 0.10 |
| Sambucus pubens | Red-berried elder | 21 | 0.30 |
| **Tree Seedlings** | | | |
| Carya cordiformis | Bitternut hickory | 96 | 1.93 |
| Acer saccharum | Sugar maple | 92 | 13.37 |
| Fraxinus americana | White ash | 83 | 1.67 |
| Prunus serotina | Black cherry | 79 | 0.18 |
| Ulmus spp | Elms | 75 | 1.66 |
| Quercus rubra | Northern red oak | 58 | 0.24 |
| Tilia americana | Basswood | 50 | 0.18 |
| Carpinus caroliniana | American hornbeam | 42 | 3.81 |
| Ostrya virginiana | Ironwood | 42 | 0.49 |
| Acer rubrum | Red maple | 38 | 0.16 |
| Carya ovata | Shagbark hickory | 33 | 0.16 |
| Quercus alba | White oak | 29 | 0.51 |



Previous View

# Occurrence of Tree Species on Habitat Types of the Baraboo Hills Section

Size classes: SE - seedlings; SA - saplings; MT - medium trees (4-10" DBH); LT - large trees (>10" DBH). Numbers are frequency of occurrence: *<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%.

| | ArDe-V | | | | AArL | | | | ATiDe-Ha | | | | ATiDe-As | | | | ATiCa-Al | | | | ATTr | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT |
| Jack pine | | | | | | | | | | | | | | | | | | | | | | | | |
| Bur oak | * | * | * | * | | | | | | | | | | | | | | | | | | | | |
| Northern pin oak | * | 1A | 1B | 1D | | | | | | | | | * | | * | * | | | | | | | | |
| Trembling aspen | | | | | * | | | * | | | | | * | | | * | | | | | | | | |
| Bigtooth aspen | 2A | 1A | 1A | 1D | 1A | * | * | 2B | 1A | | 1A | 2B | 1A | | * | 2B | | | | 1B | | | | |
| Red pine | | | * | * | | | | | | | | | | | | | | | | | | | | |
| Black oak | 2A | 1A | 2A | 2D | * | | * | * | | | | | | | | | | | | | | | | |
| Black walnut | | | | | | | | | | | | | | | | | | | | * | | | | |
| Paper birch | | * | * | | | * | * | | | | * | | | | * | | | * | * | 1B | | | | |
| Black ash | | | | | | | | | | | | | | * | * | | * | | | | | | | |
| Northern red oak | 2A | 1A | 2B | 2D | 1A | 1B | 3B | 4C | 2A | * | 1B | 4D | 1A | * | 2B | 3D | 1A | | * | 2C | | | | 2B |
| White pine | 1A | 1B | 2A | 1C | 1A | 2B | 1B | 1B | | | | | | * | 1A | 1B | | * | | * | | | | 2B |
| White oak | 4A | 3B | 3A | 3B | 2A | 1B | 3B | 4C | 1A | * | 1B | 3C | * | * | 2B | 3C | * | | 1A | 1C | | | 1A | |
| Butternut | * | * | * | | | | | * | | | * | * | * | | * | * | | | * | * | | | | |
| Swamp white oak | | | | | | | | | | | | | | | | | | | | | | | | |
| Shagbark hickory | 2A | 2B | * | | 2A | 3B | 2B | 1B | 2A | 1A | 1A | 1A | 1A | 1A | 1A | * | 1A | 1B | 1A | * | | | | |
| Black cherry | 4A | 4A | 1A | * | 2A | 3A | 2A | 1A | 3A | 1A | | * | 2A | 2A | 2B | | 2A | * | * | 1A | 1A | | | |
| Box elder | 1A | | | | | | | | * | | | | * | * | * | | | | | | | | | |
| Hackberry | | | | | | * | | | | | | | * | 1A | | * | * | * | * | * | | | | |
| Elms | 1A | | | | | | * | | | | | | | 2B | 2B | * | | * | * | * | | | | |
| American elm | | | | | | 1A | * | * | | | | | | * | | * | * | * | | * | | | | |
| White ash | 1A | 1B | * | * | 2B | 3A | 1B | | 3A | 2A | 1A | 1A | 2B | 2B | 2B | 1B | 2A | 2A | 1B | 1B | 3A | 1A | 1A | 1B |
| Green ash | | | | | | | | | | | | | | 1B | * | * | | * | * | * | | | | |
| Yellow birch | | | | | | | | | | | | | | | | | * | 1B | 1B | 1C | 2B | 3A | 2B | 2C |
| Bitternut hickory | 1A | 1A | | | 2A | 1A | * | * | 3A | 2A | 1B | | 2A | 2A | 1A | * | 2A | 2A | 2B | 1B | 2A | 1A | 1A | |
| Red maple | 4A | 4C | 4B | 1A | 2A | 4B | 4C | 2B | 2A | 3B | 2C | 2C | 1A | 3C | 3C | 3C | 1A | 1B | 1C | 1B | 2B | 1A | | 1A |
| American hornbeam | 1A | 2B | | | | | | | 1A | * | | | * | * | * | | * | 2B | | | | 1A | | |
| Ironwood | * | 1B | * | | 2A | 4C | 2B | | 3A | 4C | 1B | | 1B | 2B | 1B | | 1A | 3B | 1B | | 2B | 1B | 1B | |
| Basswood | * | 1A | * | * | * | 1A | * | | 2A | 1A | 1A | 2B | 2A | 2B | 2B | 2C | 1A | 2A | 2B | 2B | 1A | 2A | | 1A |
| Eastern hemlock | | | | | | | | | | | | | | | | | * | * | * | * | 2B | 1A | 3A | 3D |
| American beech | | | | | | | | | | | | | | | | | | | | | | | | |
| Sugar maple | * | 1A | 1A | | 1A | 2B | 1B | * | 3B | 4B | 3C | 3C | 2B | 2C | 2C | 2C | 3B | 4C | 4C | 3D | 4A | 2B | 2B | 3D |



Previous View

# Understory Species with Potential Diagnostic Value for Distinguishing Among the Habitat Types in the Baraboo Hills Section

Number 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%.

| Scientific Name | Common Name | ArDe-V | ATiDe-Ha AArL | | ATiDe-As | ATTr ATiCa-Al | |
|---|---|---|---|---|---|---|---|
| **Herbs** | | | | | | | |
| Hepatica americana | Round-lobed hepatica | 1 A | | | | | |
| Fragaria vesca | Wood strawberry | 1 A | | | | | |
| Lathyrus ochroleucus | Pale vetchling | 2 A | * | | | | |
| Uvularia sessilifolia | Sessile-leaved bellwort | 2 A | * | 1 A | * | | 1 A |
| Pteridium aquilinum | Braken fern | 3 B | 1 B | * | * | | |
| Potentilla simplex | Common cinquefoil | 1 A | 2 A | * | * | | |
| Apocynum andro. | Spreading dogbane | 1 A | 2 A | | * | | |
| Lysimachia quadrifolia | Whorled loosestrife | 2 A | 2 A | * | * | | |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 2 A | 3 A | 2 A | 2 A | | |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 3 A | 3 A | 2 A | 3 A | | * |
| Aralia nudicaulis | Wild sarsaparilla | 3 A | 1 A | 1 A | 1 A | 1 A | * |
| Aster macrophyllus | Large-leaved aster | 2 A | 2 B | 2 A | 1 A | 2 A | 1 A |
| Phryma leptostachya | Lopseed | 1 A | 3 A | 2 A | 3 A | * | 2 A |
| Anemone quinquefolia | Wood anemone | 1 A | 2 A | 3 A | 2 A | 3 A | 2 A |
| Polygonatum pubescens | Hairy solomon's seal | 1 A | 1 A | 3 A | 2 A | 3 A | 3 A |
| Circaea quadrisulcata | Enchanter's nightshade | * | 3 A | 3 A | 3 A | 3 A | 3 A |
| Vitis riparia | Riverbank grape | 1 A | 2 A | * | 2 A | * | * |
| Maianthemum canadense | Wild lily-of-the-valley | 1 A | * | * | * | 3 A | 1 A |
| Dryopteris spinulosa | Spinulose shield fern | 1 A | * | 2 A | 1 A | 1 A | 1 A |
| Uvularia grandiflora | Large-flowered bellwort | * | 1 A | 2 A | 2 A | * | 2 A |
| Thalictrum dioicum | Early meadow rue | * | * | 1 A | 2 A | * | 2 A |
| Athyrium filix-femina | Lady fern | * | * | 1 A | 1 A | 3 C | 3 A |
| Geranium maculatum | Wild geranium | 2 A | 3 A | 3 A | 3 A | | 3 A |
| Amphicarpa bracteata | Hog peanut | 2 A | 3 A | 2 A | 3 A | | 2 A |
| Smilacina racemosa | False solomon's seal | 2 A | 2 A | 2 A | 1 A | | 2 A |
| Smilax tamnoides | Bristly greenbrier | * | * | 2 A | 1 A | | 1 A |
| Solidago flexicaulis | Zigzag goldenrod | | 1 A | 1 A | 1 A | * | 2 A |
| Hepatica acutiloba | Sharp-lobed hepatica | | * | * | * | 1 A | 2 A |
| Podophyllum peltatum | Mayapple | | 2 A | 2 A | 2 A | * | 2 A |
| Ranunculus abortivus | Small-flowered crowfoot | | 2 A | 3 A | 1 A | * | 3 A |
| Arisaema atrorubens | Jack-in-the-pulpit | | 1 A | 3 A | 3 A | 3 A | 3 A |
| Actaea spp. | Baneberries | | * | 1 A | 2 A | 2 A | 3 A |
| Sanguinaria canadensis | Bloodroot | | * | 2 A | 1 A | 2 A | 3 A |
| Caulophyllum thal. | Blue cohosh | | | 1 A | 1 A | 1 A | 3 A |
| Viola pubescens | Downy yellow violet | | 1 A | 2 A | 2 A | | 3 A |
| Botrychium virginianum | Rattlesnake fern | | 1 A | 1 A | 1 A | | 2 A |
| Dioscorea villosa | Wild yam root | | * | 2 A | 2 A | | 1 A |
| Adiantum pedatum | Maidenhair fern | | | 1 A | 2 A | * | 2 A |
| Geum canadense | White avens | | * | | 1 A | | * |
| Cryptotaenia can. | Honewort | | | | 1 A | | 1 A |



Previous View

| Scientific Name | Common Name | ArDe-V | AArL | ATiDe-Ha | ATiDe-As | ATTr | ATiCa-Al |
|---|---|---|---|---|---|---|---|
| Ranunculus recurvatus | Hooked crowfoot | | | * | 1 A | | 1 A |
| Sanicula gregaria | Clustered snakeroot | | * | | 1 A | | 1 A |
| Panax quinquefolius | Ginseng | | | 1 A | 1 A | | * |
| Streptopus roseus | Rosey twisted stalk | * | | | | 2 A | * |
| Mitchella repens | Partridgeberry | | | | | 2 A | |
| Lycopodium lucidulum | Shining club-moss | | | * | | 2 A | |
| Trientalis borealis | Starflower | * | | * | | 1 A | * |
| Symplocarpus foetidus | Skunk cabbage | | | | | 2 A | * |
| Hydrophyllum virgin. | Virginia waterleaf | | | | * | * | 1 A |
| Mitella diphylla | Miterwort | | | | | 1 A | 2 A |
| Trillium spp. | Trilliums | | | * | | 1 A | 2 A |
| Allium tricoccum | Wild leek | | | | | | 2 A |
| Asarum canadense | Wild ginger | | | | | | * |
| **Shrubs** | | | | | | | |
| Vaccinium angustifolium | Low sweet blueberry | 3 A | | * | | | |
| Gaylussacia baccata | Black huckleberry | 1 A | | | | | |
| Cornus racemosa | Gray dogwood | 2 A | * | | * | | |
| Diervilla lonicera | Bush honeysuckle | 2 A | * | | * | 1 A | |
| Viburnum rafinesquianum | Downy arrowwood | 1 A | 1 A | 1 A | * | | * |
| Corylus americana | Hazel-nut | 3 B | 1 A | * | 1 A | | * |
| Amelanchier spp. | Juneberry | 3 A | 3 A | 3 A | * | 1 A | * |
| Viburnum acerifolium | Maple-leaved viburnum | 1 A | 3 B | 3 B | 3 B | 1 A | 2 A |
| Cornus alternifolia | Alternate-leaved dogwood | * | 1 A | 1 A | 2 A | * | 1 A |
| Ribes cynosbati | Prickly gooseberry | | 1 A | 1 A | 3 A | 1 A | 2 A |
| Hamamelis virginiana | Witch hazel | | * | 3 B | * | 2 B | 1 B |
| Sambucus pubens | Red-berried elder | | | | | 2 A | * |



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# Region 8

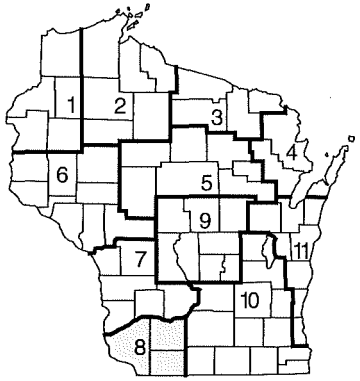
## Extent, topography, geology and soils

Region 8 represents the southern most portion of Wisconsin's Driftless Area. It is bounded by the Mississippi River in the west and Wisconsin Rivers in the north. It includes Grant, Iowa and Lafayette counties.

In this part of the driftless region loess, one to four feet thick, overlies cherty red clay on dolomite bedrock ridges. Many sandstone valley sides are blanketed with loam and silt-loam materials. The most important soils are Tama, Dodgeville, Fayette, Dubuque and Palsgrove silt loams. The entire region falls within natural subdivision 6d. (For further description of the driftless area refer to region 7).

## Forest vegetation

Presettlement vegetation was strongly controlled by fire disturbance. It consisted of oak savanna and oak forest of bur, white and black oak. Prairie occupied the ridge tops and the outwash terraces of principal river valleys. Red and white pine relicts were present on some north-facing sandstone bluffs. However, the climate and soils of the region are clearly capable of supporting mesic forests. Throughout the region pockets of sugar maple-basswood forests existed on fire-protected landscapes.

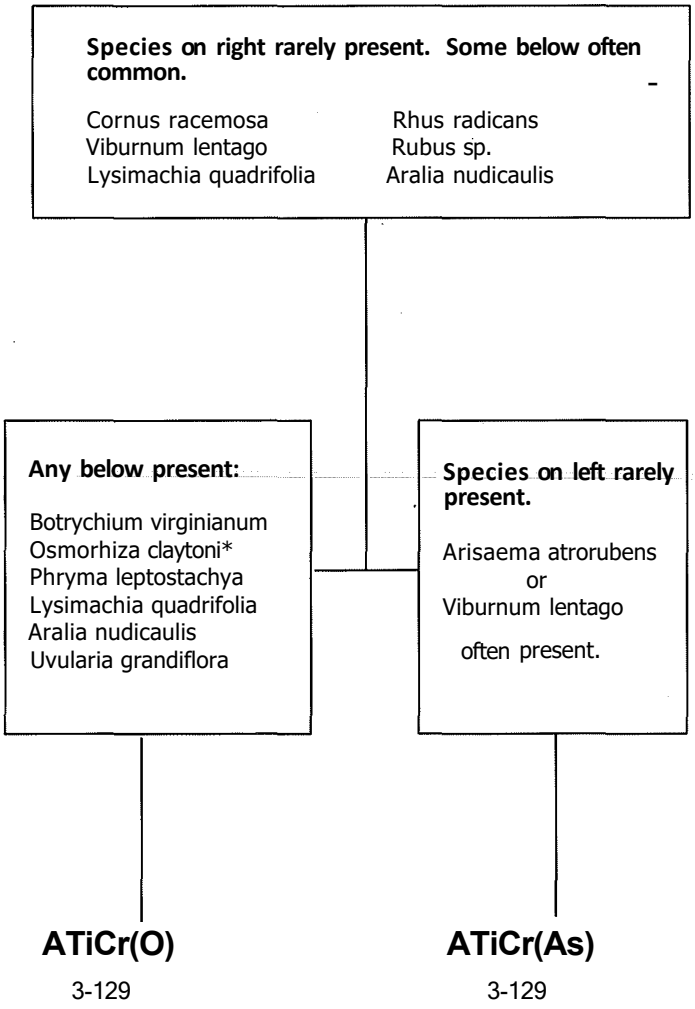



Most of the region is currently in agriculture. Forests are found almost entirely on steeper slopes, but considerable acreage of farm land is increasingly reverting to forest. Although the 81 stands sampled in this region represent a range of forest cover types, they all fall into only two site type categories i.e. dry-mesic, nutrient rich and mesic, nutrient rich to very rich sites. Drier and less fertile sites, of course, do exist in the region, but vegetation is usually severerly disturbed and forest stands with normal stocking and canopy closure are difficult to find. However, such sites are easy to identify by direct observation. They are generally characterized by a combination of any of the following factors: Shallow soils, steep upper slopes and narrow ridges, S and SW exposure and sandy texture.



Previous View

## Key to Habitat Types of Region 8 - Scientific Names




**Group below well represented:** Several species are found rather than any one being common.

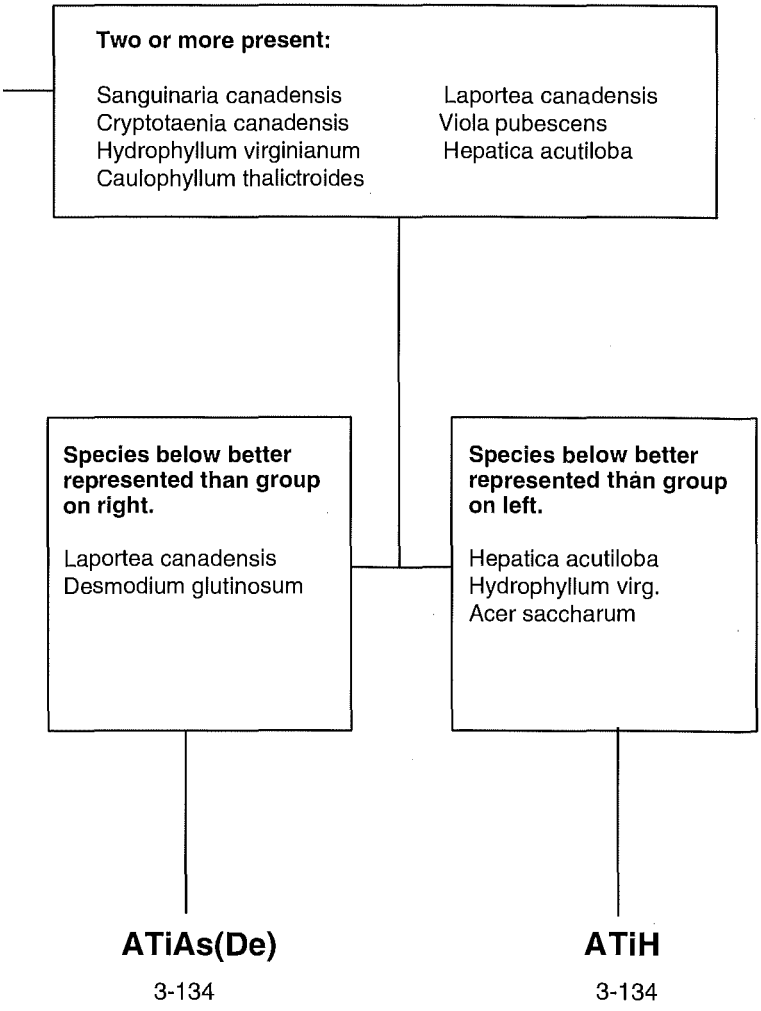
**Poorly represented:** Usually no more than one species from the group present. Abundance may be low or high.

* - This species carries the most weight.

(C)-Common: >1%



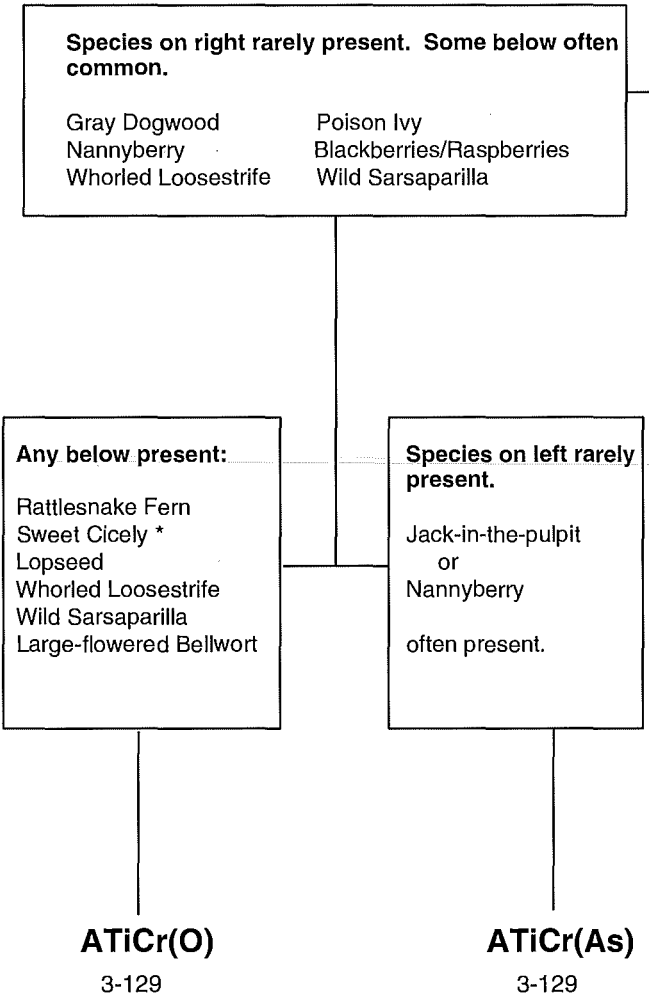
Previous View






Previous View

## Key to Habitat Types of Region 8 - Common Names




**Group below well represented:** Several species are found rather than any one being common.

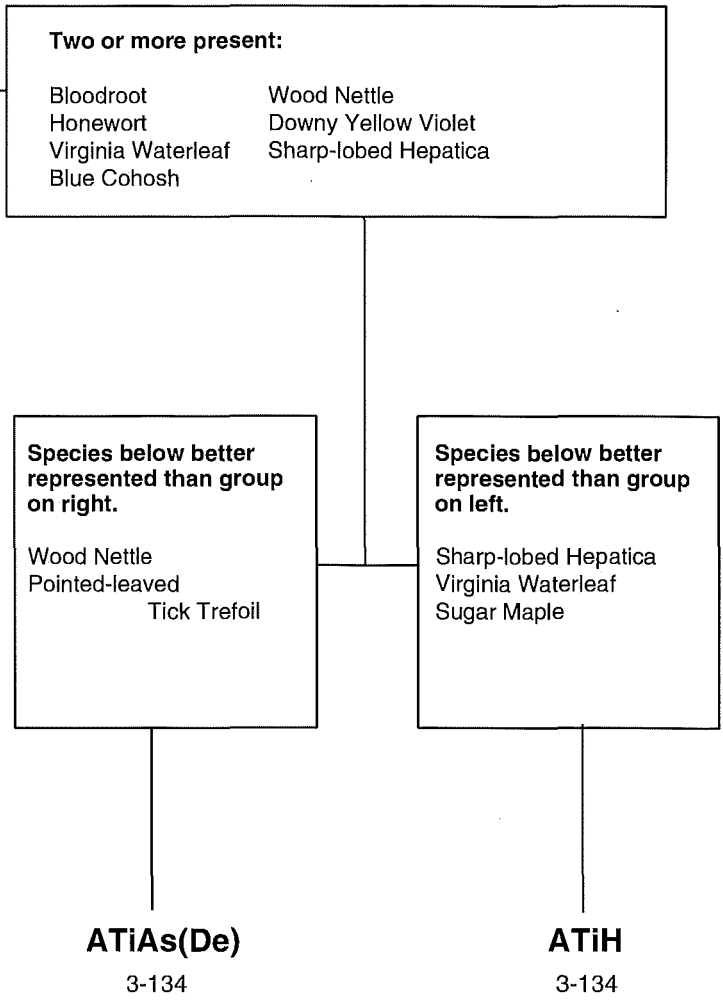
**Poorly represented:** Usually no more than one species from the group present. Abundance may be low or high.

* - This species carries the most weight.

**(C)** - Common: >1%



Previous View






Previous View

# Comparison of Major Floristic Differences Between Closely Related Habitat Types in Region 8

| | | ATiCr(O) | ATiCr(As) |
|---|---|---|---|
| Phryma leptostachya | Lopseed | 90 | 31 |
| Osmorhiza claytoni | Sweet cicely | 87 | 5 |
| Amphicarpa bracteata | Hog peanut | 72 | 36 |
| Corylus cornuta | Beaked hazelnut | 66,9 | 31,1 |
| Botrychium virginianum | Rattlesnake fern | 66 | 5 |
| Sanicula marilandica | Black snakeroot | 60 | . |
| Aralia nudicaulis | Wild sarsaparilla | 45 | . |
| Lysimachia quadrifolia | Whorled loosestrife | 42 | . |
| Viburnum lentago | Nannyberry | 15 | 73 |
| Arisaema atrorubens | Jack-in-the-pulpit | 12 | 68 |

| | | ATiCr(O) | ATiH |
|---|---|---|---|
| Rubus spp. | Blackberries/raspberries | 93.9 | 44,1 |
| Cornus racemosa | Gray dogwood | 87,4 | 11,1 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 81,8 | 44,1 |
| Rhus radicans | Poison ivy | 72,4 | 11,1 |
| Sanicula marilandica | Black snakeroot | 60 | . |
| Aralia nudicaulis | Wild sarsaparilla | 45 | 11 |
| Lysimachia quadrifolia | Whorled loosestrife | 42 | . |
| Hepatica acutiloba | Sharp-lobed hepatica | . | 100 |
| Hydrophyllum virgin. | Virginia waterleaf | 6,1 | 88,21 |
| Podophyllum peltatum | Mayapple | 18 | 88 |
| Arisaema atrorubens | Jack-in-the-pulpit | 12 | 88 |
| Actaea spp. | Baneberries | 24 | 77 |
| Cryptotaenia can. | Honewort | 27,1 | 55,3 |
| Viola pubescens | Downy yellow violet | 15 | 55 |
| Caulophyllum thal. | Blue cohosh | 12 | 55 |
| Thalictrum dioicum | Early meadow rue | . | 33 |

| | | ATiCr(As) | ATiH |
|---|---|---|---|
| Rubus spp. | Blackberries/raspberries | 94,7 | 44,1 |
| Cornus racemosa | Gray dogwood | 73,6 | 11,1 |
| Viburnum lentago | Nannyberry | 73 | . |
| Corylus americana | Hazel-nut | 42 | 11 |
| Corylus cornuta | Beaked hazelnut | 31 | . |
| Hepatica acutiloba | Sharp-lobed hepatica | 5 | 100 |
| Hydrophyllum virgin. | Virginia waterleaf | 15,1 | 88,21 |
| Osmorhiza claytoni | Sweet cicely | 5 | 88 |
| Podophyllum peltatum | Mayapple | 57,2 | 88,7 |
| Botrychium virginianum | Rattlesnake fern | 5 | 77 |
| Uvularia grandiflora | Large-flowered bellwort | 5 | 77 |
| Viola pensylvanica | Smooth yellow violet | 26 | 66 |
| Caulophyllum thal. | Blue cohosh | 15 | 55 |
| Cryptotaenia can. | Honewort | . | 55 |
| Sanicula gregaria | Clustered snakeroot | 21.1 | 55.6 |



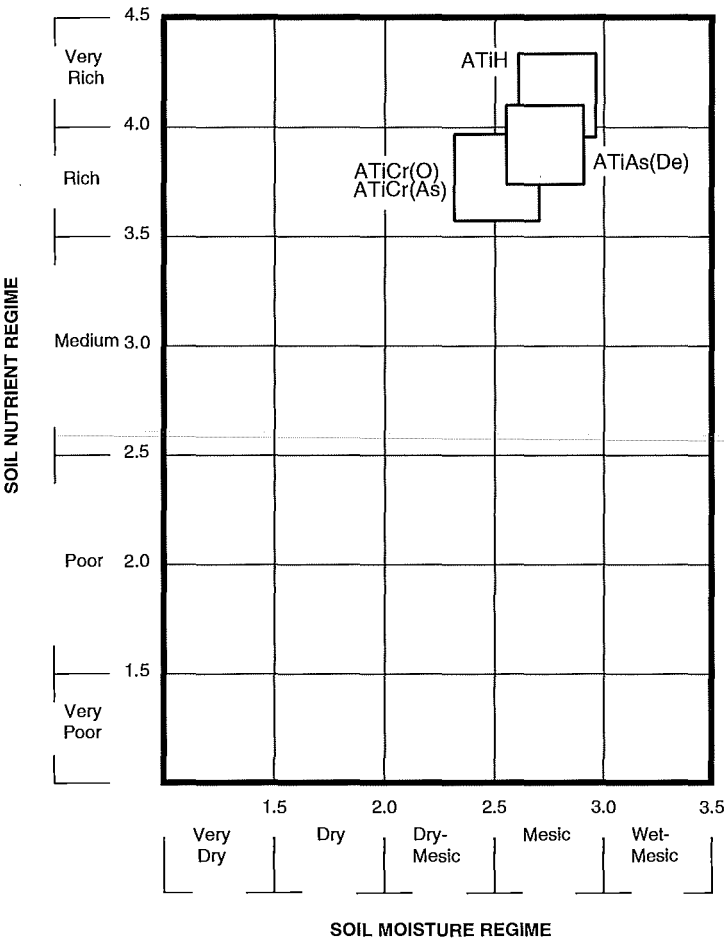
Previous View

| | | ATiCr(O) | ATiAs(De) |
|---|---|---|---|
| Rubus spp. | Blackberries/raspberries | 93.9 | 73,1 |
| Cornus racemosa | Gray dogwood | 87 | 31 |
| Rhus radicans | Poison ivy | 72 | 26 |
| Lysimachia quadrifolia | Whorled loosestrife | 42 | . |
| Potentilla simplex | Common cinquefoil | 33 | . |
| Fragaria vesca | Wood strawberry | 33 | . |
| Arisaema atrorubens | Jack-in-the-pulpit | 12 | 100 |
| Cryptotaenia can. | Honewort | 27 | 78 |
| Podophyllum peltatum | Mayapple | 18 | 78 |
| Viola pubescens | Downy yellow violet | 15 | 78 |
| Laportea canadensis | Wood nettle | 12 | 63 |
| Sanicula gregaria | Clustered snakeroot | 21 | 52 |
| Caulophyllum thal. | Blue cohosh | 12 | 42 |

| | | ATiCr(As) | ATiAs(De) |
|---|---|---|---|
| Cornus racemosa | Gray dogwood | 73,6 | 31,1 |
| Viburnum lentago | Nannyberry | 73 | 5 |
| Corylus americana | Hazel-nut | 42,4 | 10,1 |
| Phryma leptostachya | Lopseed | 31 | 89 |
| Botrychium virginianum | Rattlesnake fern | 5 | 84 |
| Osmorhiza claytoni | Sweet cicely | 5,1 | 84,5 |
| Cryptotaenia can. | Honewort | . | 78 |
| Laportea canadensis | Wood nettle | 5 | 63 |
| Sambucus pubens | Red-berried elder | 5 | 57 |
| Caulophyllum thal. | Blue cohosh | 15 | 42 |

| | | ATiH | ATiAs(De) |
|---|---|---|---|
| Hepatica acutiloba | Sharp-lobed hepatica | 100 | . |
| Hydrophyllum virgin. | Virginia waterleaf | 88,21 | 21,1 |
| Viola pensylvanica | Smooth yellow violet | 66 | 26 |
| Desmodium glutinosum | Pointed-lvd tick trefoil | 44,1 | 87,5 |
| Smilacina racemosa | False solomon's seal | 44 | 78 |
| Laportea canadensis | Wood nettle | 11 | 63 |
| Sambucus pubens | Red-berried elder | 22 | 57 |
| Corylus cornuta | Beaked hazelnut | . | 42 |
| Smilax tamnoides | Bristly greenbrier | 11 | 42 |

# Relationship of Habitat Types to Soil Moisture and Nutrient Regimes in Region 8






Previous View

# ATiCr(O) and ATiCr(As)
## *Acer saccharum-Tilia/Cornus racemosa* (*Osmorhiza* Phase) Sugar maple-Basswood/Gray dogwood (Sweet cicely Phase) and *Arisaema* (Jack-in -the-pulpit) Phase

**Distribution:**
Throughout Grant, Iowa, Lafayette and western Dane counties. Natural Subdivision 6d.

**Similar types:** ATiFrVb (Region 10).

**Landform and soils:**
The region as a whole can be characterized as undulating to hilly landscape dominated by silt loams and loams over cherty red clay, dolomite and sandstone. Because topographic, geologic and soil factors compensate for one another in many ways no specific landscape pattern can be associated with these types. Never the less floristic composition clearly reflects **dry-mesic, nutrient rich** sites. It is important to note that most of flat to rolling terrain is currently in agricultural use. Wooded areas are largely restricted to steeper slopes and narrow drainages.

**Vegetation:**
**Common forest cover types**: *Red oak* and *white oak* are principal dominants on both habitat type phases. *Elm* is the only other common associate. *Bitternut hickory, white ash, basswood* or *sugar maple* are sometimes found on the **Arisaema** phase.

**Shrub and small tree layer**: This layer is exceptionally well developed on these types. Most prominent species are: *wild currants* and *gooseberries, choke cherry, blackberries, black cherry, gray dogwood, elms* and *hazel. Ironwood (Ostrya)* is more common on the **Arisaema** phase.

**Ground flora characteristics**: Common species that are well represented on both phases are: *Virginia creeper, enchanter's nightshade, pointed-leaf tick trefoil* and *wild geranium*. The following species occur with relatively high constancy on the **Osmorhiza** phase and are absent or rare on the **Arisaema** phase: *sweet cicely, lopseed, rattlesnake fern, black snakeroot*, and *wild sarsaparilla*. Present with higher frequency on the **Arisaema** phase are: *Jack-in-the pulpit, mayapple* and *nannyberry*.

**Disturbance and succession**: The vegetation of the entire region 11 was strongly controlled by fire disturbance in presettle-



Previous View

ment time. The **ATiCr** plant association represents former oak openings and mixed oak woodlands. We are not certain what kind of mature communities would develop on these sites in the absence of disturbance. Nevertheless, soil characteristics and understory flora strongly suggest that succession by species normally associated with mesic forests is likely. For this reason the type was classified as ***Acer-Tilia*** even though these species are not present in most current stands. The **Osmorhiza** and **Arisaema** phases are distinguished here primarily to facilitate further studies on the development of these communities. While both phases clearly represent successional vegetation they display some striking floristic differences that may provide clues to mechanisms controlling successional process in this climatic region.



Previous View

# ATiCr(O)

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Parthenocissus quinquefolia | Virginia creeper | 96 | 16.02 |
| Phryma leptostachya | Lopseed | 90 | 1.16 |
| Osmorhiza claytoni | Sweet cicely | 87 | 2.33 |
| Vitis riparia | Riverbank grape | 87 | 1.42 |
| Circaea quadrisulcata | Enchanter's nightshade | 87 | 1.82 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 81 | 8.13 |
| Grasses spp. | Grasses | 78 | 0.89 |
| Rhus radicans | Poison ivy | 72 | 4.13 |
| Amphicarpa bracteata | Hog peanut | 72 | 1.79 |
| Geum canadense | White avens | 72 | 0.77 |
| Geranium maculatum | Wild geranium | 69 | 8.67 |
| Galium triflorum | Sweet-scented bedstraw | 66 | 1.55 |
| Botrychium virginianum | Rattlesnake fern | 66 | 0.37 |
| Smilacina racemosa | False solomon's seal | 63 | 0.55 |
| Smilax herbacea | Carrion flower | 63 | 0.38 |
| Sanicula marilandica | Black snakeroot | 60 | 1.86 |
| Anemone quinquefolia | Wood anemone | 57 | 0.34 |
| Galium aparine | Cleavers | 54 | 0.29 |
| Agrimonia gryposepala | Agrimony | 51 | 0.67 |
| Ranunculus abortivus | Small-flowered crowfoot | 51 | 0.19 |
| Viola pensylvanica | Smooth yellow violet | 45 | 0.55 |
| Aralia nudicaulis | Wild sarsaparilla | 45 | 6.45 |
| Lysimachia quadrifolia | Whorled loosestrife | 42 | 0.84 |
| Galium asprellum | Cleavers | 42 | 0.76 |
| Adiantum pedatum | Maidenhair fern | 39 | 1.55 |
| Dryopteris spinulosa | Spinulose shield fern | 39 | 3.40 |
| Aster spp. | Asters | 36 | 0.88 |
| Smilacina stellata | Star-flowered solomon's seal | 36 | 0.51 |
| Potentilla simplex | Common cinquefoil | 33 | 0.45 |
| Fragaria vesca | Wood strawberry | 33 | 0.67 |
| Prenanthes alba | White lettuce | 30 | 0.15 |
| Uvularia grandiflora | Large-flowered bellwort | 30 | 1.41 |
| Solidago spp. | Goldenrods | 27 | 0.32 |
| Cryptotaenia canadesis | Honewort | 27 | 0.70 |
| Dioscorea villosa | Wild yam root | 24 | 0.22 |
| Actaea spp | Baneberries | 24 | 0.10 |
| Ranunculus recurvatus | Hooked crowfoot | 21 | 0.17 |
| Aquilegia canadensis | Wild columbine | 21 | 0.73 |
| Sanicula gregaria | Clustered snakeroot | 21 | 2.86 |
| **Shrubs** | | | |
| Prunus virginiana | Chokecherry | 96 | 4.01 |
| Rubus spp. | Blackberries/raspberries | 93 | 8.94 |
| Ribes cynosbati | Prickly gooseberry | 93 | 7.39 |
| Cornus racemosa | Gray dogwood | 87 | 3.69 |

*continued...*



Previous View

*... continued*

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| Xanthoxylum americanum | Prickly ash | 75 | 6.76 |
| Corylus cornuta | Beaked hazelnut | 66 | 9.93 |
| Amelanchier spp. | Juneberry | 39 | 4.98 |
| Rosa spp. | Roses | 36 | 0.15 |
| Sambucus pubens | Red-berried elder | 24 | 0.16 |
| Corylus americana | Hazel-nut | 21 | 3.27 |
| **Tree Seedlings** | | | |
| Prunus serotina | Black cherry | 93 | 3.12 |
| Ulmus spp | Elms | 87 | 3.18 |
| Carya ovata | Shagbark hickory | 84 | 1.23 |
| Quercus rubra | Northern red oak | 81 | 1.03 |
| Quercus alba | White oak | 63 | 1.69 |
| Acernegundo | Box elder | 54 | 0.41 |
| Carya cordiformis | Bitternut hickory | 54 | 1.10 |
| Tilia americana | Basswood | 42 | 1.65 |
| Acer rubrum | Red maple | 36 | 3.39 |
| Fraxinus americana | White ash | 36 | 4.23 |
| Acer saccharum | Sugar maple | 30 | 2.61 |
| Populus grandidentata | Bigtooth aspen | 21 | 0.66 |



Previous View

# ATiCr(As)

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Parthenocissus quinquefolia | Virginia creeper | 100 | 11.33 |
| Geranium maculatum | Wild geranium | 94 | 5.90 |
| Circaea quadrisulcata | Enchanter's nightshade | 94 | 3.24 |
| Vitis riparia | Riverbank grape | 78 | 0.33 |
| Arisaema atrorubens | Jack-in-the-pulpit | 68 | 0.89 |
| Rhus radicans | Poison ivy | 63 | 0.43 |
| Podophyllum peltatum | Mayapple | 57 | 1.60 |
| Smilacina racemosa | False solomon's seal | 57 | 0.64 |
| Grasses spp. | Grasses | 52 | 1.84 |
| Anemone quinquefolia | Wood anemone | 52 | 0.20 |
| Geum canadense | White avens | 52 | 0.41 |
| Dryopteris spinulosa | Spinulose shield fern | 52 | 1.70 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 52 | 3.76 |
| Dioscorea villosa | Wild yam root | 47 | 0.27 |
| Smilax herbacea | Carrion flower | 47 | 0.16 |
| Galium aparine | Cleavers | 42 | 0.47 |
| Actaea spp. | Baneberries | 31 | 0.27 |
| Phryma leptostachya | Lopseed | 31 | 0.10 |
| Viola pensylvanica | Smooth yellow violet | 26 | 0.20 |
| Ranunculus abortivus | Small-flowered crowfoot | 26 | 0.20 |
| Galium triflorum | Sweet-scented bedstraw | 26 | 0.20 |
| Sanicula gregaria | Clustered snakeroot | 21 | 0.60 |
| Viola pubescens | Downy yellow violet | 21 | 0.22 |
| Potentilla simplex | Common cinquefoil | 21 | 0.22 |
| Agrimonia gryposepala | Agrimony | 21 | 0.22 |
| Sanguinaria canadensis | Bloodroot | 21 | 0.10 |
| **Shrubs** | | | |
| Corylus americana | Hazel-nut | 42 | 4.01 |
| Amphicarpa bracteata | Hog peanut | 36 | 0.31 |
| Rubus spp. | Blackberries/raspberries | 94 | 6.67 |
| Ribes cynosbati | Prickly gooseberry | 89 | 6.78 |
| Prunus virginiana | Chokecherry | 78 | 3.22 |
| Cornus racemosa | Gray dogwood | 73 | 5.63 |
| Viburnum lentago | Nannyberry | 73 | 0.34 |
| Xanthoxylum americanum | Prickly ash | 52 | 5.25 |
| Cornus alternifolia | Alternate-leaved dogwood | 31 | 0.35 |
| Corylus cornuta | Beaked hazelnut | 31 | 0.83 |
| Amelanchier spp. | Juneberry | 21 | 1.55 |
| **Tree Seedlings** | | | |
| Prunus serotina | Black cherry | 94 | 2.33 |
| Carya cordiformis | Bitternut hickory | 89 | 1.10 |
| Quercus rubra | Northern red oak | 84 | 0.41 |
| Ulmus spp | Elms | 68 | 0.66 |
| Tilia americana | Basswood | 52 | 3.23 |
| Fraxinus americana | White ash | 36 | 1.49 |
| Quercus alba | White oak | 26 | 0.40 |
| Populus grandidentata | Bigtooth aspen | 21 | 0.35 |
| Acer negundo | Box elder | 21 | 0.82 |
| Juglans nigra | Black walnut | 21 | 0.35 |



Previous View

# ATiH and ATiAs(De)
## *Acer saccharum-Tilia/Hydrophillum*
## (Sugar maple-Basswood/Virginia waterleaf)
## and
## *Acer saccharum-Tilia/Arisaema* (*Desmodium* Phase)
## (Sugar maple-Basswood/Jack-in-the-pulpit)
## (Tick trefoil Phase)

**Distribution:**
Grant county (primarily on the Mississippi valley slopes), Lafayette county (south of the "Military Ridge") and parts of western Iowa county. Natural Subdivision 6d.

**Similar types:** ATiFrCa (Region 10), ATiCa (Region 7).

**Landform and soils:**
(See **ATiCr** type for general description). Although topographic, geologic and soil factors strongly compensate for one another so that every habitat type can be found on a variety of landscape positions, The **ATiH** and **ATiAs(De)** types are strongly associated with north and east slope aspects. In addition the **ATiH** type is most common on lower slopes and **ATiAs(De)** on mid to upper slopes. Both types are classified as **mesic, nutrient very rich.**

**Vegetation:**
**Common forest cover types:** *sugar maple* and *red oak* are principal dominants on the **ATiH** type. *White oak, American elm* and *bitternut hickory* are common associates. *Basswood* and *white ash* are not well represented. On the **ATiAs(De)** type *white oak, elm, red oak* and *black cherry* most often share dominance. *Sugar maple* is generally less well represented than on **ATiH** type.

**Shrub and small tree layer**: The lack of a dense shrub layer generally distinguishes the mesic types of this region from the dry-mesic ones. *Wild currants* and *gooseberries* are the principal shrub species and are much more common on the **ATiAs(De)** type.

**Ground flora characteristics**: The two types share most of the common understory flora. Some of the best represented species are: *wild geranium, enchanter's nightshade, sweet cicely, mayapple, jack-in-the-pulpit, rattlesnake fern, lopseed* and *greenbrier*. The most conspicuous differences between the two types are strong representation of *Virginia waterleaf* and *sharp-lobed hepatica* on



Previous View

the **ATiH** type and *tick-trefoil* and *wood nettle* on the **ATiAs(De)** type.

**Disturbance and succession**: Records of presettlement vegetation indicate that sample stands comprising these two mesic habitat types were not different from those of the dry-mesic sites in terms of dominant tree species. All were dominated by oaks either as oak openings or oak forests. Never the less, it appears that fires were considerably less frequent or less intense on these sites because fire sensitive mesic hardwoods are today well represented at least on the **ATiH** habitat type. Stands of the **ATiAs(De)** type do indicate stronger fire influence. The 19 stands in our sample comprising the **ATiAs(De)** type are not yet dominated by shade tolerant mesic hardwoods, but the trends in that direction are clearly apparent. For this reason the type was designated as a phase (characterized by *Desmodium*). We do not know what the composition of a mature association would be on this habitat type, because no such stands were found. Thus no **ATiAs** habitat type was delineated at this time.

# ATiH

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Geranium maculatum | Wild geranium | 100 | 4.22 |
| Hepatica acutiloba | Sharp-lobed hepatica | 100 | 2.30 |
| Circaea quadrisulcata | Enchanter's nightshade | 88 | 4.14 |
| Galium aparine | Cleavers | 88 | 0.10 |
| Hydrophyllum virginianum | Virginia waterleaf | 88 | 21.04 |
| Grasses spp. | Grasses | 88 | 0.84 |
| Osmorhiza claytoni | Sweet cicely | 88 | 2.51 |
| Podophyllum peltatum | Mayapple | 88 | 6.54 |
| Arisaema atrorubens | Jack-in-the-pulpit | 88 | 0.60 |
| Ranunculus abortivus | Small-flowered crowfoot | 88 | 0.22 |
| Actaea spp. | Baneberries | 77 | 0.17 |
| Botrychium virginianum | Rattlesnake fern | 77 | 0.24 |
| Anemone quinquefolia | Wood anemone | 77 | 0.24 |
| Phryma leptostachya | Lopseed | 77 | 0.24 |
| Parthenocissus quinquefolia | Virginia creeper | 77 | 4.84 |
| Sanguinaria canadensis | Bloodroot | 77 | 0.53 |
| Uvularia grandiflora | Large-flowered bellwort | 77 | 0.31 |
| Smilax herbacea | Carrion flower | 77 | 0.39 |
| Dryopteris spinulosa | Spinulose shield fern | 66 | 0.27 |
| Viola pensylvanica | Smooth yellow violet | 66 | 0.35 |
| Vitis riparia | Riverbank grape | 55 | 0.10 |
| Caulophyllum thalictroides | Blue cohosh | 55 | 0.88 |
| Adiantum pedatum | Maidenhair fern | 55 | 0.78 |
| Sanicula gregaria | Clustered snakeroot | 55 | 6.06 |
| Dioscorea villosa | Wild yam root | 55 | 0.10 |
| Viola pubescens | Downy yellow violet | 55 | 0.78 |
| Cryptotaenia canadensis | Honewort | 55 | 3.08 |
| Geum canadense | White avens | 55 | 0.20 |
| Aster spp. | Asters | 44 | 0.35 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 44 | 0.22 |
| Trillium cernuum | Nodding trillium | 44 | 0.35 |
| Smilacina racemosa | False solomon's seal | 44 | 0.22 |
| Amphicarpa bracteata | Hog peanut | 33 | 0.10 |
| Prenanthes alba | White lettuce | 33 | 0.10 |
| Galium triflorum | Sweet-scented bedstraw | 33 | 0.27 |
| Thalictrum dioicum | Early meadow rue | 33 | 6.03 |
| Polygonum virginianum | Virginia knot-weed | 33 | 0.10 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 22 | 0.10 |
| Polygonatum pubescens | Hairy solomon's seal | 22 | 0.35 |
| Ranunculus recurvatus | Hooked crowfoot | 22 | 0.10 |
| Aralia racemosa | Spikenard | 22 | 0.35 |
| Panax quinquefolius | Ginseng | 22 | 0.35 |
| Solidago ulmifolia | Elm-leaved goldenrod | 22 | 0.35 |



Previous View

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Shrubs** | | | |
| Ribes cynosbati | Prickly gooseberry | 100 | 3.21 |
| Prunus virginiana | Chokecherry | 88 | 1.01 |
| Rubus spp. | Blackberries/raspberries | 44 | 0.10 |
| Cornus alternifolia | Alternate-leaved dogwood | 44 | 0.10 |
| Sambucus canadensis | Common elder | 33 | 0.10 |
| Xanthoxylum americanum | Prickly ash | 33 | 0.27 |
| Viburnum rafinesquianum | Downy arrowwood | 22 | 0.10 |
| Sambucus pubens | Red-berried elder | 22 | 0.10 |
| **Tree Seedlings** | | | |
| Acer saccharum | Sugar maple | 88 | 3.24 |
| Ulmus spp | Elms | 77 | 0.17 |
| Carya cordiformis | Bitternut hickory | 66 | 0.10 |
| Ostrya virginiana | Ironwood | 66 | 0.10 |
| Prunus serotina | Black cherry | 66 | 0.18 |
| Quercus rubra | Northern red oak | 66 | 0.27 |
| Fraxinus americana | White ash | 55 | 3.18 |
| Tilia americana | Basswood | 55 | 0.30 |
| Carya ovata | Shagbark hickory | 55 | 0.40 |
| Carpinus caroliniana | American hornbeam | 22 | 0.35 |
| Quercus alba | White oak | 22 | 0.10 |



Previous View

# ATiAs(De)

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Circaea quadrisulcata | Enchanter's nightshade | 100 | 7.06 |
| Arisaema atrorubens | Jack-in-the-pulpit | 100 | 0.87 |
| Geranium maculatum | Wild geranium | 89 | 4.61 |
| Grasses spp. | Grasses | 89 | 0.45 |
| Parthenocissus quinquefolia | Virginia creeper | 89 | 7.82 |
| Phryma leptostachya | Lopseed | 89 | 0.59 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 89 | 5.34 |
| Osmorhiza claytoni | Sweet cicely | 84 | 5.46 |
| Botrychium virginianum | Rattlesnake fern | 84 | 0.29 |
| Smilax herbacea | Carrion flower | 78 | 0.37 |
| Podophyllum peltatum | Mayapple | 78 | 6.64 |
| Smilacina racemosa | False solomon's seal | 78 | 0.75 |
| Viola pubescens | Downy yellow violet | 78 | 1.49 |
| Cryptotaenia canadensis | Honewort | 78 | 2.45 |
| Geum canadense | White avens | 73 | 0.97 |
| Ranunculus abortivus | Small-flowered crowfoot | 73 | 0.31 |
| Dryopteris spinulosa | Spinulose shield fern | 68 | 1.62 |
| Galium aparine | Cleavers | 68 | 0.78 |
| Laportea canadensis | Wood nettle | 63 | 0.87 |
| Vitis riparia | Riverbank grape | 57 | 1.59 |
| Anemone quinquefolia | Wood anemone | 52 | 0.25 |
| Sanicula gregaria | Clustered snakeroot | 52 | 7.99 |
| Amphicarpa bracteata | Hog peanut | 52 | 0.64 |
| Adiantum pedatum | Maidenhair fern | 47 | 0.32 |
| Uvularia grandiflora | Large-flowered bellwort | 47 | 0.38 |
| Aster spp. | Asters | 47 | 0.21 |
| Actaea spp. | Baneberries | 42 | 0.35 |
| Caulophyllum thalictroides | Blue cohosh | 42 | 2.15 |
| Smilax tamnoides | Bristly greenbrier | 42 | 0.22 |
| Galium triflorum | Sweet-scented bedstraw | 42 | 0.65 |
| Sanguinaria canadensis | Bloodroot | 42 | 0.47 |
| Ranunculus recurvatus | Hooked crowfoot | 42 | 0.16 |
| Smilacina stellata | Star-flowered solomon's seal | 31 | 0.10 |
| Rhus radicans | Poison ivy | 26 | 1.36 |
| Polygonum virginianum | Virginia knot-weed | 26 | 0.20 |
| Dioscorea villosa | Wild yam root | 26 | 0.78 |
| Galium asprellum | Cleavers | 26 | 0.40 |
| Sanicula marilandica | Black snakeroot | 26 | 4.34 |
| Viola pensylvanica | Smooth yellow violet | 26 | 0.98 |
| Solidago spp. | Goldenrods | 26 | 0.20 |
| Agrimonia gryposepala | Agrimony | 21 | 0.10 |
| Panax quinquefolius | Ginseng | 21 | 0.10 |
| Thalictrum dioicum | Early meadow rue | 21 | 0.82 |
| Hydrophyllum virgin. | Virginia waterleaf | 21 | 0.35 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 21 | 0.22 |



Previous View

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Shrubs** | | | |
| Ribes cynosbati | Prickly gooseberry | 89 | 13.96 |
| Rubus spp. | Blackberries/raspberries | 73 | 0.38 |
| Prunus virginiana | Chokecherry | 63 | 1.03 |
| Sambucus pubens | Red-berried elder | 57 | 0.33 |
| Xanthoxylum americanum | Prickly ash | 42 | 0.65 |
| Corylus cornuta | Beaked hazelnut | 42 | 2.51 |
| Cornus racemosa | Gray dogwood | 31 | 0.67 |
| **Trees Seedlings** | | | |
| Ulmus spp | Elms | 94 | 3.04 |
| Carya ovata | Shagbark hickory | 68 | 0.25 |
| Prunus serotina | Black cherry | 63 | 0.75 |
| Acer saccharum | Sugar maple | 57 | 2.99 |
| Carya cordiformis | Bitternut hickory | 57 | 2.12 |
| Quercus rubra | Northern red oak | 52 | 0.10 |
| Fraxinus americana | White ash | 52 | 3.76 |
| Ostrya virginiana | Ironwood | 42 | 2.51 |
| Tilia americana | Basswood | 26 | 0.10 |
| Quercus alba | White oak | 21 | 0.10 |
| Acer negundo | Box elder | 21 | 0.22 |



Previous View

# Occurrence of Tree Species on Habitat Types of Region 8

Size classes: SE - seedlings; SA - saplings; MT - medium trees (4-10" DBH); LT - large trees (>10" DBH). Numbers are frequency of occurrence: *<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%.

| | ATiCr(O) | | | | ATiCr(As) | | | | ATiAs(De) | | | | ATiH | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT |
| Jack pine | | | | | | | | | | | | | | | | |
| Bur oak | * | | * | 1 C | | | | * | * | 1 A | * | 1 D | | | | 1 D |
| Northern pin oak | | | * | * | * | | | 1 D | | | | * | | | | |
| Trembling aspen | | | * | | | | | * | | | | | | | | |
| Bigtooth aspen | 1 A | 1 A | 1 A | * | 1 A | * | | * | 1 A | | | 1 D | 1 A | | | 1 B |
| Red pine | | | * | | | | | | | | | | | | | |
| Black oak | * | | * | 1 C | | | | * | | | | * | | | | 1 D |
| Black walnut | 1 A | | * | * | 1 A | 1 A | 1 B | 1 D | * | 1 A | 1 C | 1 C | 1 A | | 1 B | 1 B |
| Paper birch | | * | 1 C | * | | | | | | | | | | | | |
| Black ash | | * | | | | | | | * | 1 A | | | 1 A | | 1 B | |
| Northern red oak | 3 A | 1 A | 2 B | 3 D | 2 A | 2 A | 2 B | 3 D | 1 A | 1 B | 1 B | 2 C | 1 A | | 1 B | 3 D |
| White pine | | * | * | * | | 1 A | * | * | | | | | | | | |
| White oak | 2 A | 1 B | 3 B | 3 D | 1 A | 2 B | 3 C | 3 C | | 1 B | 1 B | 3 C | | | 2 B | 1 B |
| Butternut | * | * | | | 1 A | * | 1 B | 1 C | | * | | 1 B | 1 A | | 1 B | 1 B |
| Swamp white oak | * | | * | * | | | | | | | | | | | | |
| Shagbark hickory | 3 A | 3 B | 1 C | * | * | 1 B | 2 B | * | 1 A | | * | * | 1 A | 1 A | 1 B | |
| Black cherry | 4 A | 3 B | 2 B | * | 4 A | 3 B | 1 B | | 2 A | 1 B | 2 A | 2 B | 3 A | 1 A | 1 B | 1 A |
| Box elder | 2 A | 2 B | * | | 1 A | 1 B | | | 1 A | 1 A | 1 B | | | | | |
| Hackberry | | * | | | * | 1 B | | | 2 A | 2 B | 1 C | 1 B | 1 A | | | |
| Elms | 3 A | 3 C | 2 B | 1 B | 3 A | 3 B | 3 B | 1 C | 3 A | 3 C | 3 C | 2 D | 2 A | 2 B | 2 B | 2 B |
| American elm | | | | | | | | | | | | | | | | |
| White ash | 2 A | 1 B | 1 B | * | 2 A | 1 B | 1 A | 2 C | 2 A | 2 A | 1 B | 2 C | 2 A | 2 B | 1 A | 1 B |
| Green ash | * | * | * | | * | * | * | | | | | | 1 A | 1 B | | |
| Yellow birch | | | | | | | * | | | | | | | | | |
| Bitternut hickory | 3 A | 2 B | * | * | 4 A | 2 C | 1 B | 1 C | 3 A | 3 B | 1 A | | 3 A | 2 B | 2 B | 1 D |
| Red maple | 2 A | 2 C | 1 D | * | * | 1 C | | | * | * | * | * | | | | |
| American hornbeam | * | * | | | | | | | | * | * | | 1 A | 1 C | | |
| Ironwood | * | 1 C | * | | 2 A | 2 C | 2 C | | 2 A | 3 C | 2 C | | 3 A | 4 C | 2 C | |
| Basswood | 2 A | 2 B | 1 B | * | 2 A | 2 C | 2 C | 2 B | * | 2 B | 2 B | 1 C | 1 A | 1 A | 1 C | 2 C |
| Eastern hemlock | | | | | | | | | | | | | | | | |
| American beech | | | | | | | | | | | | | | | | |
| Sugar maple | 2 A | 1 B | 1 C | * | 2 B | 2 B | 2 D | 1 D | 2 A | 2 C | 2 C | 1 D | 4 A | 4 D | 4 D | 2 D |



Previous View

# Understory Species with Potential Diagnostic Value for Distinguishing among the Habitat Types in Region 8

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%.

| Scientific Name | Common Name | ATiCr(O) | ATiCr(As) | ATiAs(De) | ATiH |
|---|---|---|---|---|---|
| **Herbs** | | | | | |
| Lysimachia quadrifolia | Whorled loosestrife | 1 A | | | |
| Fragaria vesca | Wood strawberry | 1 A | * | | |
| Potentilla simplex | Common cinquefoil | 1 A | * | | |
| Sanicula marilandica | Black snakeroot | 2 A | | 1 A | |
| Aralia nudicaulis | Wild sarsaparilla | 1 B | | | * |
| Parthenocissus quinque. | Virginia creeper | 3 C | 3 B | 3 B | 3 A |
| Desmodium glutinosum | Pointed-lvd. tick trefoil | 3 B | 2 A | 3 B | 1 A |
| Circaea quadrisulcata | Enchanter's nt.shade | 3 A | 3 A | 3 B | 3 A |
| Phryma leptostachya | Lopseed | 3 A | 1 A | 3 A | 3 A |
| Vitis riparia | Riverbank grape | 3 A | 3 A | 2 A | 2 A |
| Geranium maculatum | Wild geranium | 2 B | 3 B | 3 A | 3 A |
| Anemone quinquefolia | Wood anemone | 2 A | 2 A | 2 A | 3 A |
| Ranunculus abortivus | Small-flwrd. crowfoot | 2 A | 1 A | 2 A | 3 A |
| Smilax herbacea | Carrion flower | 2 A | 1 A | 3 A | 3 A |
| Galium aparine | Cleavers | 2 A | 1 A | 2 A | 3 A |
| Geum canadense | White avens | 2 A | 2 A | 2 A | 2 A |
| Amphicarpa bracteata | Hog peanut | 2 A | 1 A | 2 A | 1 A |
| Galium triflorum | Sweet-scent. bedstraw | 2 A | 1 A | 1 A | 1 A |
| Smilacina racemosa | False solomon's seal | 2 A | 2 A | 3 A | 1 A |
| Rhus radicans | Poison ivy | 2 A | 2 A | 1 A | * |
| Agrimonia gryposepala | Agrimony | 2 A | * | * | * |
| Viola pensylvanica | Smooth yellow violet | 1 A | 1 A | 1 A | 2 A |
| Adiantum pedatum | Maidenhair fern | 1 A | 1 A | 1 A | 2 A |
| Dryopteris spinulosa | Spinulose shield fern | 1 A | 2 A | 2 A | 2 A |
| Galium asprellum | Cleavers | 1 A | * | 1 A | * |
| Podophyllum peltatum | Mayapple | * | 2 A | 3 B | 3 B |
| Actaea spp. | Baneberries | * | 1 A | 1 A | 3 A |
| Arisaema atrorubens | Jack-in-the-pulpit | * | 2 A | 3 A | 3 A |
| Sanguinaria canadensis | Bloodroot | * | * | 1 A | 3 A |
| Sanicula gregaria | Clustered snakeroot | * | * | 2 B | 2 B |
| Caulophyl. thalictroides | Blue cohosh | * | * | 1 A | 2 A |
| Viola pubescens | Downy yellow violet | * | * | 3 A | 2 A |
| Dioscorea villosa | Wild yam root | * | 1 A | 1 A | 2 A |
| Ranunculus recurvatus | Hooked crowfoot | * | * | 1 A | * |
| Botrychium virginianum | Rattlesnake fern | 2 A | | 3 A | 3 A |
| Osmorhiza claytoni | Sweet cicely | 3 A | | 3 B | 3 A |
| Uvularia grandiflora | Large-flwrd. bellwort | 1 A | | 1 A | 3 A |
| Cryptotaenia can. | Honewort | 1 A | | 3 A | 2 A |
| Smilacina stellata | Star-flwrd. solomon's seal | 1 A | | 1 A | * |
| Desmodium nudiflorum | Naked-flwrd. tick trefoil | * | | * | * |
| Smilax tamnoides | Bristly greenbrier | * | | 1 A | * |
| Laportea canadensis | Wood nettle | * | | 2 A | * |



Previous View

| Scientific Name | Common Name | ATiCr(O) | ATiCr(As) | ATiAs(De) | ATiH |
|---|---|---|---|---|---|
| Hydrophyl. virginianum | Virginia waterleaf | | * | * | 3 C |
| Thalictrum dioicum | Early meadow rue | | * | * | 1 B |
| Polygonum virginianum | Virginia knot-weed | | * | 1 A | 1 A |
| Trillium cernuum | Nodding trillium | | * | | 1 A |
| Aralia racemosa | Spikenard | * | | | * |
| Panax quinquefolius | Ginseng | | | * | * |
| Polygonatum pubes. | Hairy solomon's seal | | | * | * |
| Allium tricoccum | Wild leek | | | * | * |
| Alliaria officinalis | Garlic mustard | | | * | * |
| Hepatica acutiloba | Sharp-lobed hepatica | | | | 3 A |
| **Shrubs** | | | | | |
| Viburnum lentago | Nannyberry | * | 2 A | | |
| Amelanchier spp. | Juneberry | 1 A | * | | * |
| Viburnum acerifolium | Maple-leaved viburnum | * | * | | * |
| Viburnum rafinesquianum | Downy arrowwood | * | 1 A | | * |
| Rosa spp. | Roses | 1 A | 1 A | * | |
| Corylus cornuta | Beaked hazelnut | 2 B | 1 A | 1 A | |
| Ribes cynosbati | Prickly gooseberry | 3 B | 3 B | 3 B | 3 A |
| Rubus spp. | Blackber./raspber. | 3 B | 3 B | 2 A | 1 A |
| Prunus virginiana | Chokecherry | 3 A | 3 A | 2 A | 3 A |
| Cornus racemosa | Gray dogwood | 3 A | 2 B | 1 A | * |
| Xanthoxylum amer. | Prickly ash | 2 B | 2 B | 1 A | 1 A |
| Cornus alternifolia | Alt.-lvd. dogwood | * | 1 A | * | 1 A |
| Corylus americana | Hazel-nut | * | 1 A | * | * |
| Sambucus pubens | Red-berried elder | * | | 2 A | * |
| Sambucus canadensis | Common elder | | | | 1 A |



Previous View

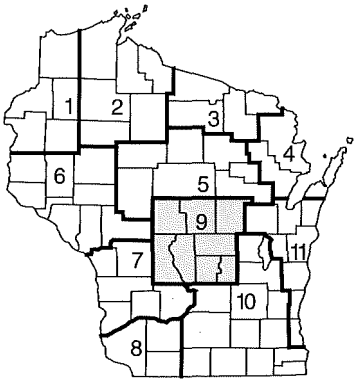
# Region 9

## Extent, topography, geology and soils

This region is centered on the Natural Division 4, generally known as the Central Plains, although of the eight counties it encompasses only Adams, Marquette and Waushara are almost entirely within the sandy plains of Division 4. The remaining five (Juneau, Wood, Portage Waupaca and Green) all extend, to one degree or another, into one of the five neighboring Natural Divisions. Thus, it is especially important that the user of this field guide within region 9 also carefully examine the Natural Divisions map and choose the appropriate habitat type identification key.

Natural Division 4 is divided into two major subdivisions. The western portion (subdivision 4a) is unglaciated lake plain, nearly level, with numerous sandstone buttes, especially in Adams county. Droughty and infertile soils prevail, but there are extensive areas of high water table occupied by swamp forests, sedge meadows and shrub carr. Plainfield sand is the most common soil on the uplands.

Subdivision 4b represents the glaciated portion of Natural Division 4 and encompasses the level to rolling pitted outwash and morainic ridges. Plainfield loamy sand is the dominant soil of the




outwash plains. Soils of the moraines include sandy loam with slight accumulation of clay in the subsoil. The Wyocena soil is a typical example.

## Forest vegetation

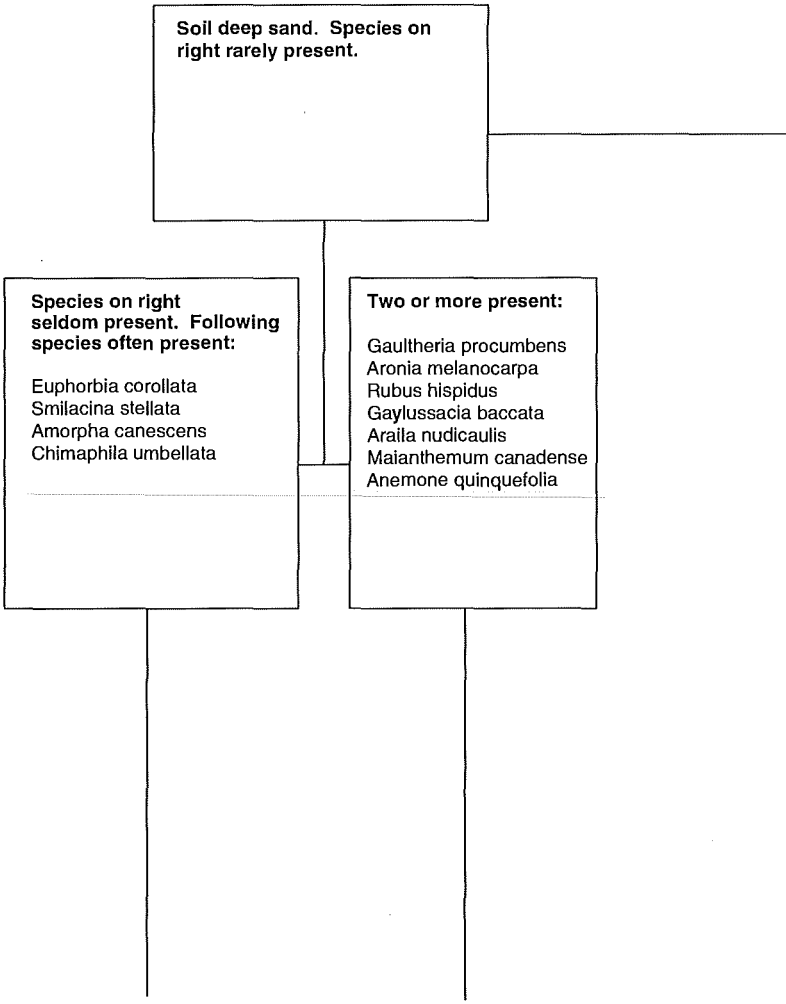
The presettlement vegetation included oak savanna, pine-oak barrens and extensive wetland communities. Fire maintained pine barrens were especially well represented in subdivision 4a, while oak savanna and oak openings were more common in subdivision 4b. Red pine, white pine, and red oak were also found on more favorable sites. Dry-mesic forests of sugar maple, basswood and white ash occurred only along the extreme north and east portions of the region on loamy soils of glacial till and where fires were much less frequent than in the rest of the region. True mesic forests were rare if not entirely absent.

The same species dominate today's forests although in different mixtures and in different proportions. On the driest sites black oak, northern pin oak and white oak prevail. Red oak, white pine and red maple occur only sporadically, but are much better represented on the somewhat better dry-mesic sites. Jack pine is not reproducing well in the absence of fire, but oaks, red maple and white pine show strong ability to maintain themselves. White pine in particularly is becoming better represented in many parts of the region than it was in presettlement time. The only other species reproducing successfully is black cherry, but it generally does not mature into a well formed tree. Sugar maple is generally absent even on the best dry-mesic sites, but white ash, basswood, red maple and shagbark hickory numbers increasing.



Previous View

# Key to Habitat Types of Region 9 - Scientific Names



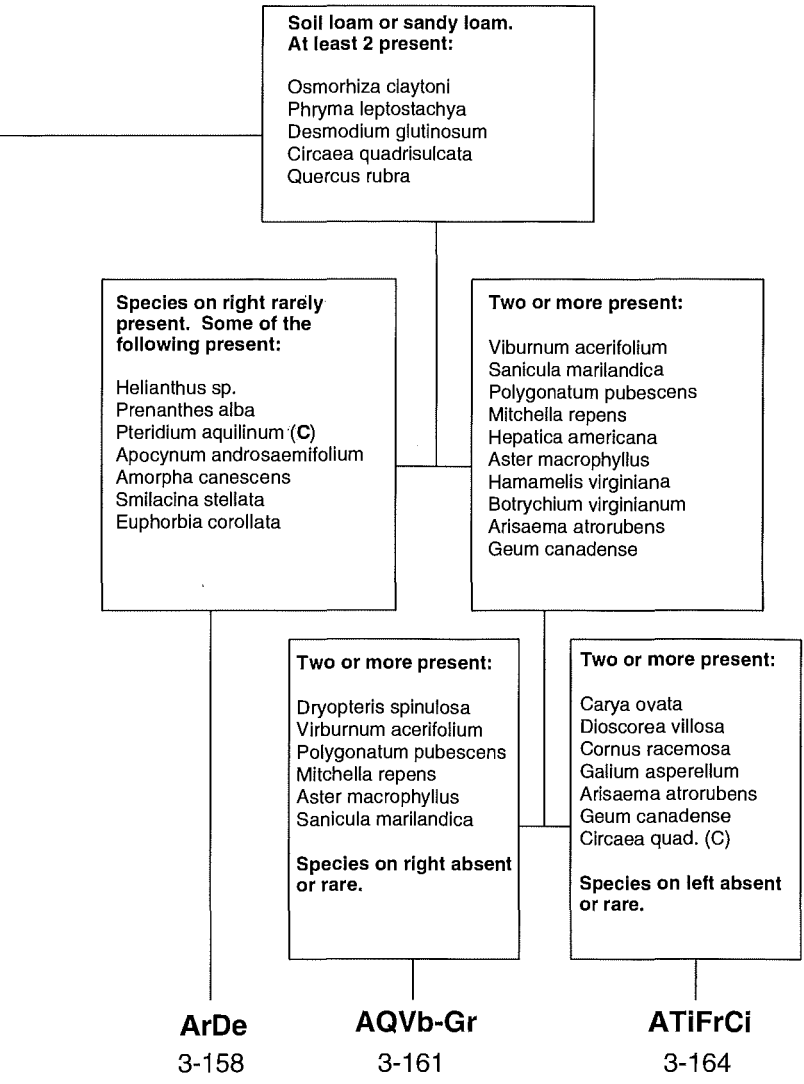

**Group below well represented:** Several species are found rather than any one being common.

**Poorly represented:** Usually no more than one species from the group present. Abundance may be low or high.

***** - This species carries the most weight. **(C)** - Common: >1%



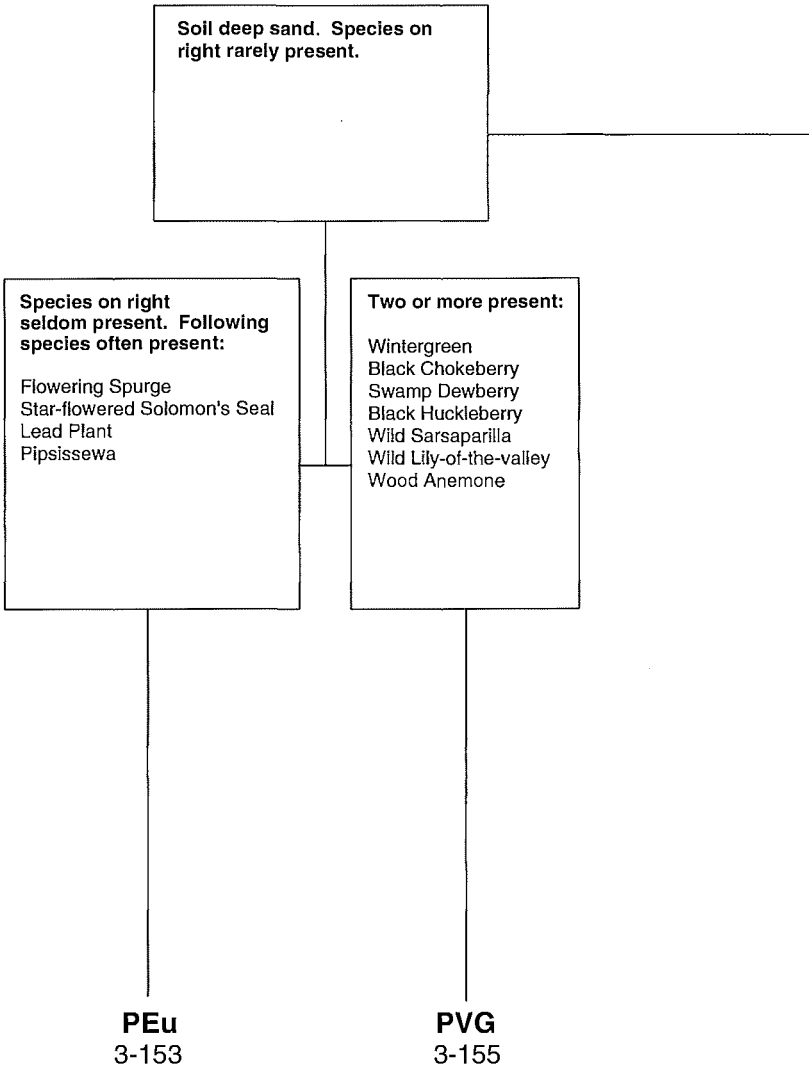
Previous View






Previous View

# Key to Habitat Types of Region 9 - Common Names



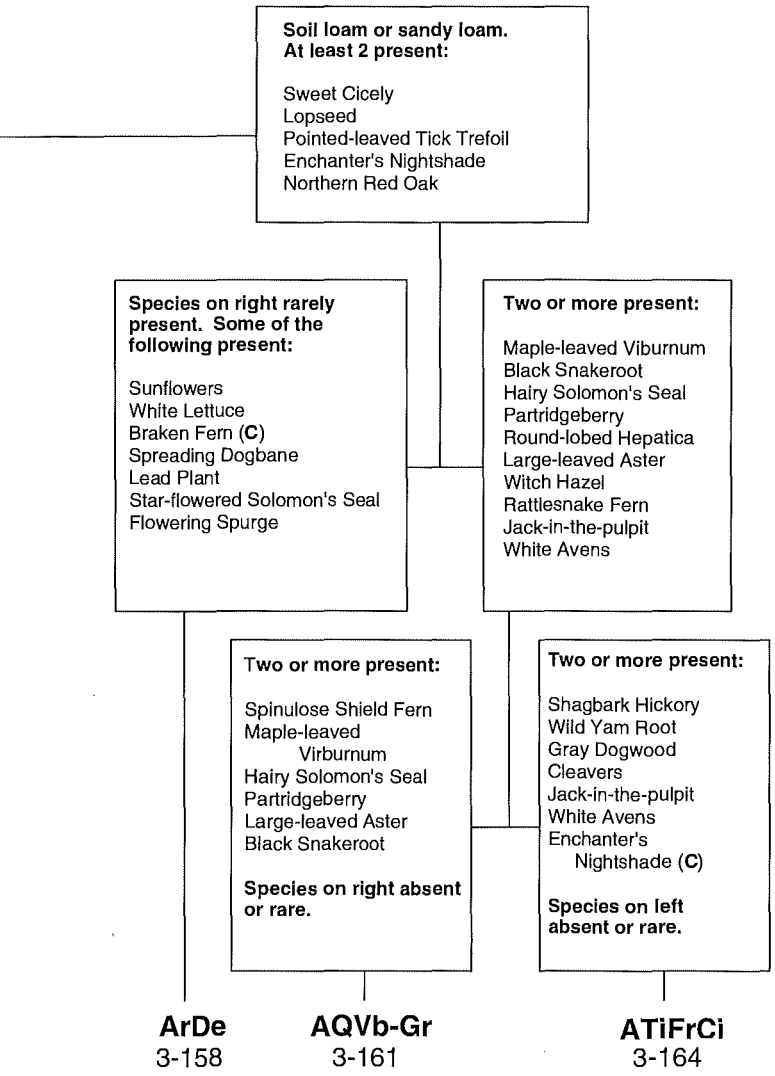

**Group below well represented:** Several species are found rather than any one being common.

**Poorly represented:** Usually no more than one species from the group present. Abundance may be low or high.

* - This species carries the most weight. **(C)** - Common: >1%



Previous View


Soil loam or sandy loam.
At least 2 present:
Sweet Cicely
Lopseed
Pointed-leaved Tick Trefoil
Enchanter's Nightshade
Northern Red Oak
Species on right rarely present. Some of the following present:
Sunflowers
White Lettuce
Braken Fern (C)
Spreading Dogbane
Lead Plant
Star-flowered Solomon's Seal
Flowering Spurge
Two or more present:
Maple-leaved Viburnum
Black Snakeroot
Hairy Solomon's Seal
Partridgeberry
Round-lobed Hepatica
Large-leaved Aster
Witch Hazel
Rattlesnake Fern
Jack-in-the-pulpit
White Avens
Two or more present:
Spinulose Shield Fern
Maple-leaved Virburnum
Hairy Solomon's Seal
Partridgeberry
Large-leaved Aster
Black Snakeroot
Species on right absent or rare.
Two or more present:
Shagbark Hickory
Wild Yam Root
Gray Dogwood
Cleavers
Jack-in-the-pulpit
White Avens
Enchanter's Nightshade (C)
Species on left absent or rare.
ArDe
3-158
AQVb-Gr
3-161
ATiFrCi
3-164

# Comparison of Major Floristic Differences Between Closely Related Habitat Types of Region 9

| | | PEu | PVG |
|---|---|---|---|
| Euphorbia corollata | Flowering spurge | 80 | 7 |
| Amorpha canescens | Lead plant | 58 | 2 |
| Chimaphila umbellata | Pipsissewa | 51 | 4 |
| Fragaria vesca | Wood strawberry | 38 | 2 |
| Smilacina stellata | Star-flowered solomon's seal | 33 | 9 |
| Maianthemum canadense | Wild lily-of-the-valley | 38 | 89 |
| Gaultheria procumbens | Wintergreen | 13 | 70 |
| Smilax tamnoides | Bristly greenbrier | 2 | 56 |
| Aralia nudicaulis | Wild sarsaparilla | 7 | 54 |
| Anemone quinquefolia | Wood anemone | 9 | 43 |
| Mitchella repens | Partridgeberry | 2 | 43 |
| Trientalis borealis | Starflower | 11 | 43 |
| Dryopteris spinulosa | Spinulose shield fern | 11 | 41 |
| Ilex verticillata | Winterberry | 7 | 39 |
| Aronia melanocarpa | Black chokeberry | . | 37 |
| Lysimachia quadrifolia | Whorled loosestrife | 9 | 35 |
| Lycopodium obscurum | Ground-pine | . | 30 |

| | | ArDe | AQVb-Gr |
|---|---|---|---|
| Pteridium aquilinum | Braken fern | 63,6 | 33,1 |
| Smilacina stellata | Star-flowered solomon's seal | 49 | . |
| Smilax herbacea | Carrion flower | 38 | . |
| Amorpha canescens | Lead plant | 33 | . |
| Viburnum acerifolium | Maple-leaved viburnum | 8,1 | 100,12 |
| Anemone quinquefolia | Wood anemone | 17 | 100 |
| Dryopteris spinulosa | Spinulose shield fern | 14 | 92 |
| Smilax tamnoides | Bristly greenbrier | 11 | 92 |
| Sanicula marilandica | Black snakeroot | 9 | 92 |
| Aster macrophyllus | Large-leaved aster | 11 | 75 |
| Phryma leptostachya | Lopseed | 24 | 75 |
| Thalictrum dioicum | Early meadow rue | 9 | 75 |
| Cornus alternifolia | Alternate-leaved dogwood | 7 | 58 |
| Mitchella repens | Partridgeberry | 7 | 58 |
| Trientalis borealis | Starflower | 4 | 58 |
| Viburnum raf. | Downy arrowwood | 4 | 58 |
| Hepatica americana | Round-lobed hepatica | 3 | 58 |
| Botrychium virginianum | Rattlesnake fern | 5 | 50 |

| | | PVG | ArDe |
|---|---|---|---|
| Gaultheria procumbens | Wintergreen | 70 | . |
| Gaylussacia baccata | Black huckleberry | 61,12 | 13,2 |
| Smilax tamnoides | Bristly greenbrier | 56 | 11 |
| Mitchella repens | Partridgeberry | 43 | 7 |
| Trientalis borealis | Starflower | 43 | 4 |
| Amphicarpa bracteata | Hog peanut | 4 | 72 |
| Desmodium glutinosum | Pointed-lvd tick trefoil | 7,1 | 66,4 |
| Osmorhiza claytoni | Sweet cicely | 15 | 63 |
| Vitis riparia | Riverbank grape | 11 | 51 |
| Smilacina stellata | Star-flowered solomon's seal | 9 | 49 |
| Chimaphila umbellata | Pipsissewa | 4 | 38 |



Previous View

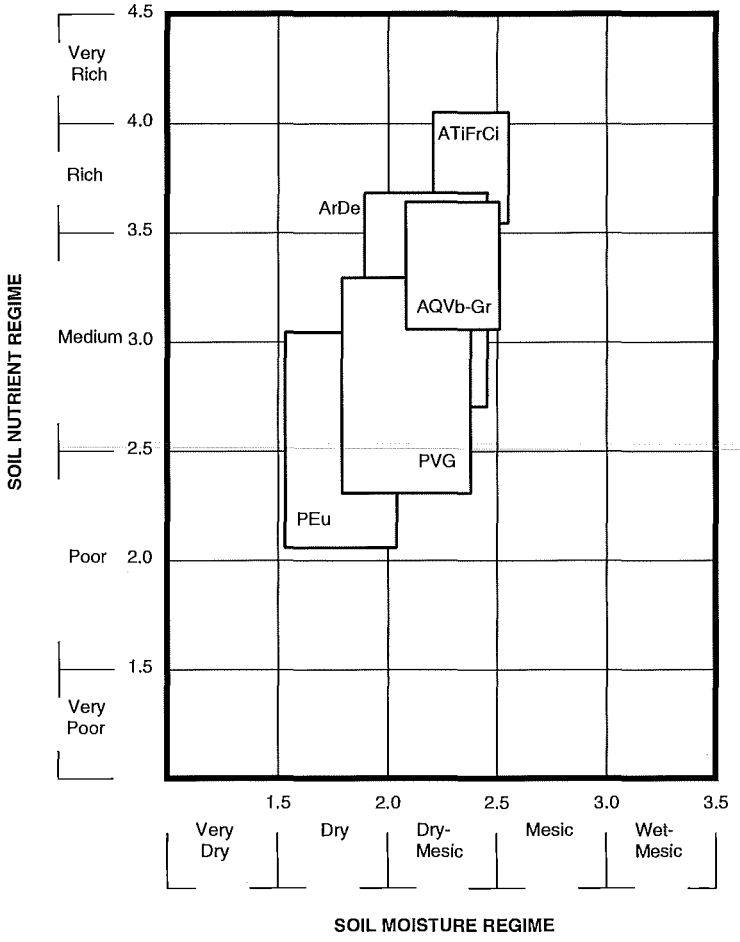
| | | ArDe | ATiFrCi |
|---|---|---|---|
| Pteridium aquilinum | Braken fern | 64,6 | 9,1 |
| Polygonatum pubescens | Hairy solomon's seal | 51 | . |
| Smilacina stellata | Star-flowered solomon's seal | 49 | 18 |
| Chimaphila umbellata | Pipsissewa | 38 | . |
| Circaea quadrisulcata | Enchanter's nightshade | 22,1 | 100,7 |
| Geum canadense | White avens | 3 | 91 |
| Phryma leptostachya | Lopseed | 24 | 91 |
| Smilax herbacea | Carrion flower | 38 | 91 |
| Arisaema atrorubens | Jack-in-the-pulpit | . | 73 |
| Impatiens capensis | Jewelweed | . | 55 |
| Smilax tamnoides | Bristly greenbrier | 11 | 55 |
| Athyrium filix-femina | Lady fern | 8,1 | 45,8 |
| Botrychium virginianum | Rattlesnake fern | 5 | 45 |
| Solanum dulcamara | Bittersweet nightshade | 17 | 45 |

| | | ATiFrCi | AQVb-Gr |
|---|---|---|---|
| Circaea quadrisulcata | Enchanter's nightshade | 100,7 | 33,1 |
| Geum canadense | White avens | 91 | 8 |
| Smilax herbacea | Carrion flower | 91 | . |
| Vitis riparia | Riverbank grape | 91 | 33 |
| Arisaema atrorubens | Jack-in-the-pulpit | 73 | 17 |
| Cornus racemosa | Gray dogwood | 73 | 8 |
| Carya ovata | Shagbark hickory | 64 | 8 |
| Solanum dulcamara | Bittersweet nightshade | 45 | . |
| Viburnum acerifolium | Maple-leaved viburnum | 18,1 | 100,12 |
| Dryopteris spinulosa | Spinulose shield fern | 9 | 92 |
| Sanicula marilandica | Black snakeroot | 18 | 92 |
| Aster macrophyllus | Large-leaved aster | 9,1 | 75,9 |
| Polygonatum pubescens | Hairy solomon's seal | . | 75 |
| Cornus alternifolia | Alternate-leaved dogwood | 9 | 58 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 9 | 58 |
| Hepatica americana | Round-lobed hepatica | . | 58 |
| Mitchella repens | Partridgeberry | . | 58 |
| Uvularia grandiflora | Large-flowered bellwort | 9 | 58 |
| Carpinus caroliniana | American hornbeam | . | 50 |
| Hamamelis virginiana | Witch hazel | . | 33 |



Previous View

# Relationship of Habitat Types to Soil Moisture and Nutrient Regimes in Region 9






Previous View

# PEu
## *Pinus strobus/Euphorbia corollata*
## (White pine/Flowering spurge)

**Distribution**:
Throughout region 9, primarily Natural Subdivisions 4a and 4b.

**Similar habitat types:** PVG, PVGy (regions 6 and 7)

**Landform and soils:**
Level sand plains (lacustrine and outwash) with sandstone buttes and sometimes on rolling pitted outwash. Deep sands and loamy sands. **Very dry to dry, nutrient poor sites.**

**Vegetation:**
**Common forest cover types**: Various mixtures of *pin oak, black oak, white oak, jack pine, red pine* or *white pine. Red oak* is conspicuously absent.

**Shrub and small tree layer**: Most prominent shrub is *hazel.* Seedlings and saplings of *white oak, black cherry* and *red maple* often comprise the majority of coverage. *Huckleberry* and *blueberry* sometimes have high coverage, but their constancy is low. This is rather unusual, especially for *blueberry* which is normally the most conspicuous low shrub on sandy soils of all other regions.

**Ground flora characteristics**: *grasses*, *sedges* and *bracken fern* are usually predominant ground cover. Other species have poor representation. With the exception of *grasses* and *sedges* only two herbaceous species had constancy values over 50% (*flowering spurge* and *false solomon's seal*). *Flowering spurge* and *lead plant* best distinguish **PEu** type from other dry, infertile habitat types.

**Disturbance and succession**: In presettlement time **PEu** habitat type was dominated by a variety of community types apparently reflecting differences in fire regime. Prairie, pine barrens, oak barrens, oak savanna and oak forest were all represented.
It appears that even in the absence of fire all tree species present in current stands are capable of persisting on this site type. *White oak* is regenerating most successfully, but *black* and even *pin oak* show considerable presence in the understory. Where seed source exists *white pine* easily regenerates in mixed oak stands and must be considered a potential future dominant.



Previous View

# PEu

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Grasses spp. | Grasses | 82 | 27.986 |
| Euphorbia corollata | Flowering spurge | 80 | 1.797 |
| Smilacina racemosa | False solomon's seal | 58 | 2.038 |
| Chimaphila umbellata | Pipsissewa | 51 | 2.183 |
| Polygonatum pubescens | Hairy solomon's seal | 44 | 1.655 |
| Fragaria vesca | Wood strawberry | 38 | 1.106 |
| Maianthemum canadense | Wild lily-of-the-valley | 38 | 3.982 |
| Pteridium aquilinum | Braken fern | 38 | 11.071 |
| Sedges spp. | Sedges | 36 | 7.012 |
| Smilacina stellata | Star-flowered solomon's seal | 33 | 1.267 |
| Uvularia sessilifolia | Sessile-leaved bellwort | 29 | 0.700 |
| Parthenocissus quinquefolia | Virginia creeper | 24 | 1.727 |
| Pyrola spp. | Pyrolas | 22 | 0.930 |
| Apocynum androsaemifolium | Spreading dogbane | 20 | 2.189 |
| Apocynum medium | Intermediate dogbane | 20 | 1.667 |
| **Shrubs** | | | |
| Corylus spp. | Hazelnuts | 87 | 9.851 |
| Prunus virginiana | Chokecherry | 73 | 2.503 |
| Amelanchier spp. | Juneberry | 69 | 1.990 |
| Rubus spp. | Blackberries/raspberries | 62 | 2.089 |
| Amorpha canescens | Lead plant | 58 | 1.908 |
| Rosa spp. | Roses | 53 | 1.375 |
| Vaccinium angustifolium | Low sweet blueberry | 53 | 5.658 |
| Gaylussacia baccata | Black huckleberry | 22 | 23.960 |
| **Tree Seedlings** | | | |
| Quercus velut./ellip. | Scrub oak | 98 | 3.391 |
| Prunus serotina | Black cherry | 93 | 4.657 |
| Quercus alba | White oak | 80 | 4.586 |
| Acer rubrum | Red maple | 73 | 1.788 |
| Pinus strobus | White pine | 49 | 2.627 |
| Pinus banksiana | Jack pine | 20 | 1.667 |
| Salix spp. | Willow | 20 | 1.933 |



Previous View

# PVG
## *Pinus/Vaccinium-Gaultheria*
## (White pine/Blueberry-wintergreen)

**Distribution**:
Throughout region 9, primarily Natural Subdivisions 4a and 4b

**Similar habitat types:** PEu, PVGy (regions 6 and 7)

**Landform and soils:**
Level sand plains (lacustrine and outwash) with sandstone buttes and sometimes on rolling pitted outwash. Loamy sands and sandy loam over sand. In contrast to **PEu** ground water influence may be a factor. **Dry to dry-mesic, poor to medium nutrient sites.**

**Vegetation:**
**Common forest cover types:** Various mixtures of *pin oak, black oak, white oak, jack pine, red pine* or *white pine.* In contrast to **PEu,** *red oak* is sometimes present on **PVG.** *Red maple* is also better represented here.

**Shrub and small tree layer:** This layer is moderately well developed. Principal species are *red maple* and *black cherry* seedlings and saplings, *huckleberry, serviceberry, choke cherry, blackberries, blueberry* and *hazel.*

**Ground flora characteristics:** The herbaceous layer is somewhat better developed than it is on the **PEu** type, both in terms of species number and total coverage. Species with highest constancy and coverage values are: *bracken fern, wild lily-of-the valley, sedges* and *grasses, sessile bellwort, false solomon's seal, wild sarsaparilla,* and *wood anemone.* In addition the following group of species with low to moderate constancy values distinguishes **PVG** from **PEu** type: *partridgeberry, starflower, spinusose shield fern, black chokeberry,* and *winterberry (Ilex).*

**Disturbance and succession:** In presettlement time **PVG** habitat type was dominated by a variety of community types apparently reflecting differences in fire regime. Prairie, pine barrens, oak barrens, oak savanna and oak forest were all represented. It appears that even in the absence of fire all tree species present in current stands are capable of persisting on this site type. *White oak* is regenerating most successfully, but *black* and even *pin oak* show considerable presence in the understory. Where seed source exists white pine easily regenerates in mixed oak stands and must be considered a potential future dominant.



Previous View

# PVG

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Maianthemum canadense | Wild lily-of-the-valley | 89 | 2.938 |
| Pteridium aquilinum | Braken fern | 74 | 11.020 |
| Gaultheria procumbens | Wintergreen | 70 | 1.429 |
| Sedges spp. | Sedges | 69 | 2.065 |
| Grasses spp. | Grasses | 67 | 5.756 |
| Uvularia sessilifolia | Sessile-leaved bellwort | 63 | 1.400 |
| Smilacina racemosa | False solomon's seal | 59 | 1.253 |
| Smilax tamnoides | Bristly greenbrier | 56 | 0.913 |
| Aralia nudicaulis | Wild sarsaparilla | 54 | 1.855 |
| Anemone quinquefolia | Wood anemone | 43 | 0.591 |
| Mitchella repens | Partridgeberry | 43 | 2.496 |
| Trientalis borealis | Starflower | 43 | 0.448 |
| Dryopteris spinulosa | Spinulose shield fern | 41 | 2.668 |
| Apocynum androsaemifolium | Spreading dogbane | 37 | 0.565 |
| Lysimachia quadrifolia | Whorled loosestrife | 35 | 0.389 |
| Polygonatum pubescens | Hairy solomon's seal | 35 | 1.305 |
| Viola spp. | Violets | 35 | 0.768 |
| Lycopodium obscurum | Ground-pine | 30 | 0.712 |
| Rubus hispidus | Swamp dewberry | 26 | 0.521 |
| Osmunda claytoniana | Interrupted fern | 24 | 2.777 |
| Osmunda regalis | Flowering fern | 24 | 1.885 |
| Parthenocissus quinquefolia | Virginia creeper | 24 | 0.846 |
| Galium spp. | Bedstaws | 22 | 1.200 |
| Rhus radicans | Poison ivy | 22 | 0.950 |
| Aster macrophyllus | Large-leaved aster | 20 | 2.864 |
| Pyrola spp. | Pyrolas | 20 | 0.545 |
| **Shrubs** | | | |
| Amelanchier spp. | Juneberry | 96 | 3.275 |
| Vaccinium angustifolium | Low sweet blueberry | 93 | 2.798 |
| Corylus spp. | Hazelnuts | 74 | 3.560 |
| Rubus spp. | Blackberries/raspberries | 63 | 2.050 |
| Gaylussacia baccata | Black huckleberry | 61 | 11.964 |
| Prunus virginiana | Chokecherry | 52 | 2.275 |
| Ilex verticillata | Winterberry | 39 | 1.300 |
| Aronia melanocarpa | Black chokeberry | 37 | 0.450 |
| Diervilla lonicera | Bush honeysuckle | 22 | 0.592 |
| Rhamnus alnifolia | Alder-leaved buckthorn | 22 | 2.000 |
| Ribes spp. | Gooseberries | 20 | 0.145 |



Previous View

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Tree Seedlings** | | | |
| Acer rubrum | Red maple | 98 | 3.006 |
| Quercus alba | White oak | 91 | 2.251 |
| Prunus serotina | Black cherry | 89 | 3.148 |
| Pinus strobus | White pine | 59 | 1.928 |
| Quercus velut./ellip. | Scrub oak | 50 | 1.004 |
| Quercus rubra | Northern red oak | 35 | 1.832 |
| Ulmus spp | Elms | 28 | 0.813 |
| Populus tremuloides | Trembling aspen | 26 | 1.179 |
| Populus grandidentata | Bigtooth aspen | 22 | 0.950 |



Previous View

# ArDe

## *Acer rubrum/Desmodium* Community Type (Red maple/Pointed-leaf tick trefoil)

**Distribution:**
Throughout region 9, more frequently in Natural Subdivision 4b than in 4a.

**Similar habitat types**: ArDe-V (regions 6 and 7)

**Landform and soils:**
Nearly level to slightly rolling outwash plains. Soils are somewhat more loamy (e.g. sandy loam) than those of closely associated **PVG** and **PEu** types. **Dry to dry-mesic/medium nutrient sites.**

**Vegetation:**
**Common forest cover types:** Red oak-white oak mixtures are most common. *Pin oak* and *black oak* are often present but do not dominate. *Red maple* and *black cherry* are common associates and usually constitute most of the reproduction. *Shagbark hickory* is also frequently present and is reproducing. *White pine* is rare.

**Shrub and small tree layer:** Shrub layer is usually well developed and consists of *black cherry, choke cherry, blackberries, hazel,* and *service berry.*

**Ground flora characteristics:** Collectively, the following group of species clearly distinguish **ArDe** type from dryer, less fertile types in this region: *Sweet cicely, pointed-leaf tick trefoil, hog peanut, riverbank grape,* and *Virginia creeper.* Also noteworthy is general absence of *wintergreen, huckleberry,* and *blueberry.*

**Disturbance and succession:** Soil characteristics and understory composition suggest nearly ideal conditions for *white pine* dominance on this type. However, due to lack of abundant seed source *white pine* is not well represented in current stands. The most shade tolerant species currently reproducing is *red maple,* thus the community type bears its name. However, it appears that *white pine* could become established as a dominant overstory species with continued exclusion of fire. Planting of *white pine* to establish seed source could also accelerate the process.



Previous View

# ArDe

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Smilacina racemosa | False solomon's seal | 79 | 1.983 |
| Amphicarpa bracteata | Hog peanut | 72 | 4.473 |
| Grasses spp. | Grasses | 70 | 11.868 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 66 | 4.198 |
| Osmorhiza claytoni | Sweet cicely | 63 | 1.588 |
| Pteridium aquilinum | Braken fern | 63 | 6.117 |
| Parthenocissus quinquefolia | Virginia creeper | 59 | 2.389 |
| Viola spp. | Violets | 54 | 0.722 |
| Polygonatum pubescens | Hairy solomon's seal | 51 | 1.708 |
| Vitis riparia | Riverbank grape | 51 | 2.444 |
| Pyrola spp. | Pyrolas | 49 | 1.686 |
| Smilacina stellata | Star-flowered solomon's seal | 49 | 1.495 |
| Galium spp. | Bedstaws | 43 | 2.055 |
| Maianthemum canadense | Wild lily-of-the-valley | 43 | 2.488 |
| Geranium spp. | Geranium | 41 | 2.458 |
| Chimaphila umbellata | Pipsissewa | 38 | 1.672 |
| Rhus radicans | Poison ivy | 38 | 5.010 |
| Smilax herbacea | Carrion flower | 38 | 0.976 |
| Sedges spp. | Sedges | 36 | 3.904 |
| Fragaria vesca | Wood strawberry | 34 | 0.815 |
| Aralia nudicaulis | Wild sarsaparilla | 33 | 4.820 |
| Apocynum medium | Intermediate dogbane | 32 | 1.900 |
| Uvularia sessilifolia | Sessile-leaved bellwort | 30 | 0.596 |
| Geranium maculatum | Wild geranium | 29 | 1.559 |
| Helianthus divaricatus | Woodland sunflower | 28 | 2.086 |
| Helianthus spp. | Sunflowers | 28 | 0.619 |
| Phryma leptostachya | Lopseed | 24 | 0.833 |
| Circaea quadrisulcata | Enchanter's nightshade | 22 | 1.018 |
| Galium asprellum | Cleavers | 22 | 0.394 |
| Asclepias spp. | Milkweeds | 21 | 1.288 |
| Prenanthes alba | White lettuce | 21 | 0.319 |
| Apocynum androsaemifolium | Spreading dogbane | 20 | 0.393 |
| Euphorbia corollata | Flowering spurge | 20 | 0.880 |
| **Shrubs** | | | |
| Rubus spp. | Blackberries/raspberries | 92 | 5.007 |
| Prunus virginiana | Chokecherry | 83 | 3.624 |
| Corylus spp. | Hazelnuts | 80 | 9.851 |
| Amelanchier spp. | Juneberry | 74 | 1.720 |
| Amorpha canescens | Lead plant | 33 | 1.152 |
| Rosa spp. | Roses | 47 | 1.275 |
| Vaccinium angustifolium | Low sweet blueberry | 36 | 1.700 |
| Cornus spp. | Dogwoods | 32 | 4.100 |
| Cornus racemosa | Gray dogwood | 28 | 3.886 |

*continued...*

*...continued*

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Tree Seedlings** | | | |
| Prunus serotina | Black cherry | 97 | 4.673 |
| Quercus alba | White oak | 96 | 3.096 |
| Acer rubrum | Red maple | 78 | 2.720 |
| Quercus rubra | Northern red oak | 53 | 1.833 |
| Pinus strobus | White pine | 39 | 4.020 |
| Quercus velut./ellip. | Scrub oak | 39 | 2.293 |
| Ulmus spp | Elms | 33 | 0.376 |
| Carya ovata | Shagbark hickory | 32 | 1.154 |
| Acer negundo | Box elder | 24 | 2.461 |



Previous View

# AQVb-Gr

## *Acer Saccharum-Quercus/Viburnum acerifolium habitat type, Geranium maculatum* variant (Sugar maple-oak/maple-leaf viburnum; Wild geranium variant)

### Distribution:

Eastern Portage county and throughout Waupaca county. Primarily Natural Subdivision 4b .

**Similar types**: AQVb (Region 5)

### Landform and soils:

Typically on ice-contact topography (recessional, or disintegration moraines, pitted outwash). Soil is typically sandy loam or loamy sand if subsoil is till. **Dry-mesic/ medium nutrient sites.**

### Vegetation:

**Common forest cover types:** *Red oak, white oak* and *red maple* share dominance in most stands. *White pine* was found in about half of the stands. *White ash, basswood* and *sugar maple* are sometimes present. *Shagbark hickory* is not a member of this type.

**Shrub and small tree layer:** Maple-leaved viburnum is typically the most common shrub. *Witch hazel* is less common than it is on the **AQVb** type NW of region 9. Other frequently present shrubs are *black cherry, service berry, alternate-leaved dogwood* and *red elderberry. Poison ivy* often has very high coverage.

**Ground flora characteristics:** Species with highest constancy and average coverage values are: *Hog peanut, big-leaf aster, meadow rue, sweet cicely, pointed-leaf tick trefoil* and *wild geranium.*

**Disturbance and succession: AQVb-Gr** is a variant of a plant association that occurs with somewhat different floristic composition in every glaciated part of the state, particularly north of the floristic tension zone. It is most often associated with ice-contact geology that gives rise to **dry-mesic/ medium nutrient** conditions. Records of presettlement vegetation show that white pine was usually a major if not dominant component. *Red oak, red maple* and often *basswood, white ash* and *sugar maple* were present as a second canopy. Past logging and fires have practically eliminated *white pine* and usually the mesic hardwoods. Thus, most current stands are dominated by *red oak* and *red maple,* with frequent admixtures of aspen and paper birch. **AQVb** sites appear to be sub-optimal for *sugar maple* growth, thus oak competes more successfully here than it does on more mesic sites. However, in absence of disturbance and without management tolerant mesic hardwoods would probably dominate this type.



Previous View

# AQVb-Gr

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Amphicarpa bracteata | Hog peanut | 100 | 7.475 |
| Anemone quinquefolia | Wood anemone | 100 | 0.350 |
| Osmorhiza claytoni | Sweet cicely | 100 | 1.317 |
| Sedges spp. | Sedges | 100 | 2.358 |
| Dryopteris spinulosa | Spinulose shield fern | 92 | 1.900 |
| Geranium maculatum | Wild geranium | 92 | 0.682 |
| Sanicula marilandica | Black snakeroot | 92 | 0.236 |
| Smilax tamnoides | Bristly greenbrier | 92 | 0.464 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 83 | 5.870 |
| Aster macrophyllus | Large-leaved aster | 75 | 8.911 |
| Phryma leptostachya | Lopseed | 75 | 0.589 |
| Polygonatum pubescens | Hairy solomon's seal | 75 | 0.544 |
| Thalictrum dioicum | Early meadow rue | 75 | 1.289 |
| Viola spp. | Violets | 75 | 0.267 |
| Grasses spp. | Grasses | 67 | 1.137 |
| Smilacina racemosa | False solomon's seal | 67 | 0.837 |
| Aralia nudicaulis | Wild sarsaparilla | 58 | 9.986 |
| Desmodium nudiflorum | Naked-flowered tick trefoil | 58 | 1.629 |
| Hepatica americana | Round-lobed hepatica | 58 | 1.214 |
| Mitchella repens | Partridgeberry | 58 | 0.800 |
| Parthenocissus quinquefolia | Virginia creeper | 58 | 2.857 |
| Trientalis borealis | Starflower | 58 | 0.457 |
| Uvularia grandiflora | Large-flowered bellwort | 58 | 0.657 |
| Botrychium virginianum | Rattlesnake fern | 50 | 0.750 |
| Maianthemum canadense | Wild lily-of-the-valley | 50 | 0.517 |
| Rhus radicans | Poison ivy | 50 | 15.400 |
| Uvularia sessilifolia | Sessile-leaved bellwort | 50 | 0.267 |
| Actaea spp. | Baneberries | 42 | 0.100 |
| Galium triflorum | Sweet-scented bedstraw | 42 | 0.880 |
| Pyrola spp. | Pyrolas | 42 | 0.200 |
| Circaea quadrisulcata | Enchanter's nightshade | 33 | 0.950 |
| Trillium spp. | Trilliums | 33 | 0.475 |
| Pteridium aquilinum | Braken fern | 33 | 1.675 |
| Viola pubescens | Downy yellow violet | 33 | 0.100 |
| Vitis riparia | Riverbank grape | 33 | 0.600 |
| Apocynum androsaemifolium | Spreading dogbane | 25 | 0.267 |
| Asclepias spp. | Milkweeds | 25 | 0.267 |
| Aster sagittifolius | Arrow-leaved aster | 25 | 0.100 |
| Athyrium filix-femina | Lady fern | 25 | 1.067 |
| Lycopodium lucidulum | Shining club-moss | 25 | 0.433 |
| Monotropa uniflora | Indian pipe | 25 | 0.100 |
| Ranunculus abortivus | Small-flowered crowfoot | 25 | 0.100 |



Previous View

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Shrubs** | | | |
| Viburnum acerifolium | Maple-leaved viburnum | 100 | 12.108 |
| Rubus spp. | Blackberries/raspberries | 83 | 0.880 |
| Amelanchier spp. | Juneberry | 75 | 0.967 |
| Prunus virginiana | Chokecherry | 75 | 2.244 |
| Corylus spp. | Hazelnuts | 67 | 5.988 |
| Ribes spp. | Gooseberries | 67 | 2.813 |
| Cornus alternifolia | Alternate-leaved dogwood | 58 | 0.243 |
| Viburnum rafinesquianum | Downy arrowwood | 58 | 2.371 |
| Sambucus canadensis | Common elder | 50 | 9.383 |
| Diervilla lonicera | Bush honeysuckle | 42 | 0.780 |
| Hamamelis virginiana | Witch hazel | 33 | 12.000 |
| Rosa spp. | Roses | 33 | 0.100 |
| Vaccinium angustifolium | Low sweet blueberry | 25 | 0.267 |
| **Tree Seedlings** | | | |
| Acer rubrum | Red maple | 100 | 0.267 |
| Prunus serotina | Black cherry | 100 | 0.792 |
| Pinus strobus | White pine | 58 | 1.143 |
| Quercus alba | White oak | 58 | 0.171 |
| Quercus rubra | Northern red oak | 58 | 0.171 |
| Carpinus caroliniana | American hornbeam | 50 | 3.067 |
| Fraxinus americana | White ash | 50 | 8.117 |
| Populus grandidentata | Bigtooth aspen | 50 | 0.350 |
| Acer saccharum | Sugar maple | 42 | 0.680 |
| Crataegus spp. | Hawthorns | 42 | 0.780 |
| Ostrya virginiana | Ironwood | 42 | 3.860 |
| Ulmus spp | Elms | 33 | 0.100 |
| Quercus velut./ellip. | Scrub oak | 25 | 0.100 |
| Tilia americana | Basswood | 25 | 1.400 |



Previous View

# ATiFrCi

## *Acer saccharum-Tilia-Fraxinus/Circaea quadrisulcata community type*

## (Sugar maple-basswood-white ash/ Enchanter's nightshade)

**Distribution:**
Primarily in the glaciated part of the region, Natural Subdivisions 4b and 5c.

**Similar types**: ArCi (Region 6), ArCi-Ph (Region 7)

**Landform and soils**:
The glaciated portion of habitat type region 9 is characterized by complex mixtures or juxtapositions of greatly differing glacial deposits. **ATiFrCi** type is found where soil parent material is more loamy than is typical for pitted outwash, or where particle size stratification results in increased moisture in the profile. Based on vegetative characteristics this type is classified as **dry-mesic/nutrient rich.**

**Vegetation:**
**Common forest cover types:** *White oak* and *red maple* are most common dominants. Important associates, at least in some stands, are *shagbark hickory, white ash* and *basswood. Sugar maple* is sometimes present. In region 9, all species listed here, except *oak* and *red maple* occur only on **ATiFrCi** and **AQVb-Gr** types.

**Shrub and small tree layer:** Shrub layer is relatively well developed and consists of *black cherry, choke cherry, hazel* and *serviceberry.*

**Ground flora characteristics:** The most common species are: *Pointed-leaf tick trefoil, enchanter's nightshade, sweet cicely, Virginia creeper, riverbank grape,* and *wild geranium.* Communities on this type also contain several species that are absent or uncommon on other habitat types in region 9 (except for **AQVb-Gr**). Some of these are: *White avens, jack-in-the-pulpit, touch-me-not, lopseed, enchanter's nightshade, carrion flower, bristly greenbrier, rattlesnake fern,* and *lady fern.*

**Disturbance and succession:** It is almost certain that current species composition on this type is the result of past fire disturbance. Soil characteristics and understory flora suggest that tolerant mesic hardwoods are well suited to this type and are currently absent only because of lack of adequate seed source. For this reason this community type was placed into *sugar maple* habitat type series.



Previous View

# ATiFrCi

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Circaea quadrisulcata | Enchanter's nightshade | 100 | 7.10 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 100 | 4.86 |
| Geum canadense | White avens | 91 | 1.17 |
| Parthenocissus quinquefolia | Virginia creeper | 91 | 6.83 |
| Phryma leptostachya | Lopseed | 91 | 0.93 |
| Sedges spp. | Sedges | 91 | 0.74 |
| Smilax herbacea | Carrion flower | 91 | 0.78 |
| Vitis riparia | Riverbank grape | 91 | 0.40 |
| Galium asprellum | Cleavers | 82 | 0.38 |
| Geranium maculatum | Wild geranium | 82 | 2.73 |
| Osmorhiza claytoni | Sweet cicely | 82 | 2.41 |
| Amphicarpa bracteata | Hog peanut | 73 | 4.74 |
| Arisaema atrorubens | Jack-in-the-pulpit | 73 | 0.77 |
| Uvularia sessilifolia | Sessile-leaved bellwort | 73 | 0.22 |
| Viola spp. | Violets | 73 | 1.25 |
| Smilacina racemosa | False solomon's seal | 64 | 0.39 |
| Aster lateriflorus | Calico or starved aster | 55 | 0.52 |
| Galium boreale | Northern bedstraw | 55 | 0.18 |
| Impatiens capensis | Jewelweed | 55 | 0.67 |
| Smilax tamnoides | Bristly greenbrier | 55 | 0.35 |
| Athyrium filix-femina | Lady fern | 45 | 7.32 |
| Botrychium virginianum | Rattlesnake fern | 45 | 0.30 |
| Maianthemum canadense | Wild lily-of-the-valley | 45 | 0.40 |
| Potentilla simplex | Common cinquefoil | 45 | 0.30 |
| Solanum dulcamara | Bittersweet nightshade | 45 | 0.10 |
| Solidago spp. | Goldenrods | 45 | 0.30 |
| Anemone quinquefolia | Wood anemone | 36 | 0.35 |
| Apocynum androsaemifolium | Spreading dogbane | 36 | 0.10 |
| Aralia nudicaulis | Wild sarsaparilla | 36 | 1.20 |
| Prenanthes alba | White lettuce | 36 | 0.10 |
| Thalictrum dioicum | Early meadow rue | 36 | 2.27 |
| Trientalis borealis | Starflower | 36 | 0.10 |
| Actaea spp. | Baneberries | 27 | 1.23 |
| Arctium minus | Common burdock | 27 | 0.27 |
| Fragaria vesca | Wood strawberry | 27 | 0.27 |
| Helianthus spp. | Sunflowers | 27 | 0.27 |
| Heuchera richardsonii | Rough heuchera | 27 | 0.10 |
| Laportea canadensis | Wood nettle | 27 | 1.23 |
| **Shrubs** | | | |
| Corylus spp. | Hazelnuts | 82 | 4.22 |
| Cornus racemosa | Gray dogwood | 73 | 0.89 |
| Rubus spp. | Blackberries/raspberries | 73 | 1.97 |
| Prunus virginiana | Chokecherry | 64 | 4.57 |
| Ribes spp. | Gooseberries | 64 | 0.87 |
| Amelanchier spp. | Juneberry | 55 | 9.47 |

*continued...*



Previous View

*...continued*

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| Ilex verticillata | Winterberry | 36 | 1.07 |
| Sambucus canadensis | Common elder | 27 | 0.10 |
| Xanthoxylum americanum | Prickly ash | 27 | 11.00 |
| **Tree Seedlings** | | | |
| Acer rubrum | Red maple | 91 | 0.25 |
| Prunus serotina | Black cherry | 82 | 0.91 |
| Ulmus spp | Elms | 82 | 0.59 |
| Quercus alba | White oak | 73 | 0.53 |
| Quercus rubra | Northern red oak | 73 | 0.10 |
| Carya ovata | Shagbark hickory | 64 | 0.93 |
| Tilia americana | Basswood | 64 | 0.17 |
| Fraxinus americana | White ash | 55 | 1.72 |
| Acer negundo | Box elder | 36 | 0.82 |



Previous View

# Occurrence of Tree Species on Habitat Types of the Region 9

Size classes: SE - seedlings; SA - saplings; MT - medium trees (4-10" DBH); LT - large trees (>10" DBH). Numbers are frequency of occurrence: *<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%.

| | PEu | | | | PVG | | | | ArDe | | | | ATlFrCi | | | | AQVb-Gr | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT |
| Jack pine | * | 1A | 1B | * | * | | * | * | | | * | * | | | | | | | | |
| Bur oak | * | 1A | * | * | | * | * | * | | * | 1B | * | | * | | | | | | |
| Northern pin oak | 1A | 2B | 3C | 3C | 1A | 1B | 2C | 2D | * | * | 1C | 1C | | | * | * | * | | | |
| Trembling aspen | * | * | * | | 1A | * | | * | * | * | * | * | * | | | * | | | | |
| Bigtooth aspen | * | 1A | * | * | 1A | * | 1B | 1B | * | * | * | * | | | | | 2A | 1A | 2B | 2C |
| Red pine | | | * | | | * | * | * | | | * | * | | | | | | | * | 2B |
| Black oak | * | 1B | 2C | 3C | * | * | * | 1D | * | 1B | 1C | 2C | | * | 1A | 2B | | | | * |
| Black walnut | | | | | | | | | | | | | | | | | | | | |
| Paper birch | | | | | * | * | 1B | * | | | | | * | | | | | | * | |
| Black ash | | | | | | * | * | | | | | | | | | | | | | |
| Northern red oak | | * | * | * | 1A | 1A | 1B | 1C | 1A | 2B | 2C | 2D | 2A | * | 1A | 2C | 2A | 1B | 2B | 2D |
| White pine | * | 2B | 2B | 1C | 1A | 2B | 2B | 2C | * | 2B | 1B | 1C | | | | | | 1A | 2B | 3C |
| White oak | 1B | 3B | 3C | 2C | 2A | 2B | 2B | 3C | 2A | 3B | 3C | 3C | 2A | 2C | 3B | 4C | 2A | 1A | 1B | 3B |
| Butternut | | | | | * | | | | * | * | * | | * | | | | | | | |
| Swamp white oak | | | | | | | | | | | | | | | | | | | | |
| Shagbark hickory | | * | | | * | * | | | 1A | 1B | 1B | * | 3A | 2A | 2B | 2B | * | | | |
| Black cherry | 1B | 4B | 1B | | 3A | 2B | 1B | | 2B | 4B | 2B | * | 4A | 3B | 2B | 2B | 4A | 2A | 1B | |
| Box elder | * | * | | | | | | | 1A | 1B | * | | 2A | 2A | 1B | | 1A | | | |
| Hackberry | | | | | | | | | | | | | | | | | | | | * |
| Elms | * | * | * | | * | * | * | * | 1A | 1A | | | 3A | 3B | 2B | * | * | | | |
| American elm | | | | | | | | | | * | * | | | | | | | | | |
| White ash | * | * | * | | * | * | * | * | * | * | * | | 3A | 2B | 2B | 2C | 2B | 2B | 1B | * |
| Green ash | | | | | | | | | | | | | | | | | | | | |
| Yellow birch | | | | | | * | * | | | | | | | | | | | | | |
| Bitternut hickory | * | * | | | | * | | | * | * | * | | * | | | | * | * | | |
| Red maple | 1A | 2B | * | * | 2A | 4C | 4C | 3C | 2A | 2B | 2B | 1B | 3A | 3B | 3C | 3C | 2A | 4C | 4D | 3C |
| American hornbeam | | | | | * | * | | | | | | | | | | | 2A | 2A | | |
| Ironwood | | | | | * | * | | | * | * | * | | | 1C | | | 2A | 2C | 1B | |
| Basswood | | * | * | | | | | * | * | * | * | * | 3A | 2C | 2C | 2C | 1A | 1A | * | |
| Eastern hemlock | | | | | | | * | | | | | | | | | | | | | 1B |
| American beech | | | | | | | | | | | | | | | | | | | | |
| Sugar maple | | | | | | | | | | | | | | | | | 2A | 1C | 1B | * |



Previous View

# Understory Species with Potential Diagnostic Value for Distinguishing among the Habitat Types of Region 9

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%.

| Scientific Name | Common Name | PEu | PVG | ArDe | ATiFrCi | AQVb-Gr |
|---|---|---|---|---|---|---|
| **Herbs** | | | | | | |
| Lycopodium obscurum | Ground-pine | | 1 A | | | |
| Lysimachia quadrifolia | Whorled loosestrife | | 1 A | | | |
| Rubus hispidus | Swamp dewberry | | 1 A | | | |
| Euphorbia corollata | Flowering spurge | 3 A | | * | | |
| Chimaphila umbellata | Pipsissewa | 2 A | | 1 A | | |
| Apocynum medium | Intermediate dogbane | * | | 1 A | | |
| Smilacina stellata | Star-flwd. solomon's seal | 1 A | | 1 A | * | |
| Fragaria vesca | Wood strawberry | 1 A | | 1 A | 1 A | |
| Gaultheria procumbens | Wintergreen | * | 2 A | | | |
| Prenanthes alba | White lettuce | * | * | * | 1 A | |
| Pteridium aquilinum | Braken fern | 1 B | 2 B | 2 B | | 1 A |
| Polygonatum pubescens | Hairy solomon's seal | 1 A | 1 A | 2 A | | 2 A |
| Pyrola spp. | Pyrolas | * | * | 1 A | | 1 A |
| Rhus radicans | Poison ivy | * | * | 1 B | | 1 C |
| Dryopteris spinulosa | Spinulose shield fern | * | 1 A | * | | 3 A |
| Smilacina racemosa | False solomon's seal | 2 A | 2 A | 3 A | 2 A | 2 A |
| Maianthemum canadense | Wild lily-of-the-valley | 1 A | 3 A | 1 A | 1 A | 1 A |
| Uvularia sessilifolia | Sessile-leaved bellwort | 1 A | 2 A | 1 A | 2 A | 1 A |
| Vitis riparia | Riverbank grape | * | * | 2 A | 3 A | 1 A |
| Apocynum androsaemifolium | Spreading dogbane | * | 1 A | * | 1 A | * |
| Trientalis borealis | Starflower | * | 1 A | * | 1 A | 2 A |
| Smilax tamnoides | Bristly greenbrier | | 2 A | * | 2 A | 3 A |
| Anemone quinquefolia | Wood anemone | | 1 A | * | 1 A | 3 A |
| Aralia nudicaulis | Wild sarsaparilla | | 2 A | 1 A | 1 A | 2 B |
| Desmodium glutinosum | Pointed-lvd. tick trefoil | | | 2 A | 3 A | 3 B |
| Circaea quadrisulcata | Enchanter's nightshade | | | * | 3 B | 1 A |
| Desmodium nudiflorum | Naked-flwrd. tick trefoil | | | * | | 2 A |
| Aralia racemosa | Spikenard | | | | * | * |
| Aster macrophyllus | Large-leaved aster | | * | * | | 2 B |
| Geranium maculatum | Wild geranium | | * | 1 A | 3 A | 3 A |
| Osmorhiza claytoni | Sweet cicely | | * | 2 A | 3 A | 3 A |
| Mitchella repens | Partridgeberry | | 1 A | | | 2 A |
| Smilax herbacea | Carrion flower | | * | 1 A | 3 A | |
| Galium asprellum | Cleavers | | * | * | 3 A | * |
| Helianthus divaricatus | Woodland sunflower | | | 1 A | | |
| Solanum dulcamara | Bittersweet nightshade | | | * | 1 A | |
| Galium boreale | Northern bedstraw | | | * | 2 A | |
| Amphicarpa bracteata | Hog peanut | | | 2 A | 2 A | 3 B |
| Phryma leptostachya | Lopseed | | | * | 3 A | 2 A |
| Geum canadense | White avens | | | | 3 A | |
| Potentilla simplex | Common cinquefoil | | | | 1 A | |
| Impatiens capensis | Jewelweed | | | | 2 A | |
| Laportea canadensis | Wood nettle | | | | 1 A | |
| Heuchera richardsonii | Rough heuchera | | | | 1 A | |



Previous View

| Scientific Name | Common Name | ATiCr(O) | ATiCr(As) | | ATiAs(De) | ATiH |
|---|---|---|---|---|---|---|
| Aster lateriflorus | Calico or starved aster | | | | 2 A | |
| Botrychium virginianum | Rattlesnake fern | | | | 1 A | 1 A |
| Sanicula marilandica | Black snakeroot | | | | * | 3 A |
| Actaea spp. | Baneberries | | | | 1 A | 1 A |
| Arisaema atrorubens | Jack-in-the-pulpit | | | | 2 A | * |
| Thalictrum dioicum | Early meadow rue | | | | 1 A | 2 A |
| Athyrium filix-femina | Lady fern | | * | | 1 B | * |
| Uvularia grandiflora | Large-flowered bellwort | | | | | 2 A |
| Viola pubescens | Downy yellow violet | | | | | 1 A |
| Trillium spp. | Trilliums | | | | | 1 A |
| Galium triflorum | Sweet-scent. bedstraw | | | | | 1 A |
| Hepatica americana | Round-lobed hepatica | | | | | 2 A |
| **Shrubs** | | | | | | |
| Aronia melanocarpa | Black chokeberry | | 1 A | | | |
| Amorpha canescens | Lead plant | 2 A | | 1 A | | |
| Gaylussacia baccata | Black huckleberry | * | 2 B | * | | |
| Cornus racemosa | Gray dogwood | * | * | 1 A | 2 A | |
| Amelanchier spp. | Juneberry | 2 A | 3 A | 2 A | 2 B | 2 A |
| Prunus virginiana | Chokecherry | 2 A | 2 A | 3 A | 2 A | 2 A |
| Vaccinium angustifolium | Low sweet blueberry | 2 B | 3 A | 1 A | * | * |
| Ilex verticillata | Winterberry | | 1 A | * | 1 A | * |
| Xanthoxylum americanum | Prickly ash | | | * | 1 B | * |
| Viburnum rafinesquianum | Downy arrowwood | | | | * | 2 A |
| Sambucus canadensis | Common elder | | | | 1 A | 1 B |
| Viburnum acerifolium | Maple-leaved viburnum | | * | | * | 3 B |
| Diervilla lonicera | Bush honeysuckle | | * | | | 1 A |
| Cornus alternifolia | Alt.-leaved dogwood | | * | | | 2 A |
| Hamamelis virginiana | Witch hazel | | | | | 1 B |
| Crataegus spp. | Hawthorns | | | | | 1 A |

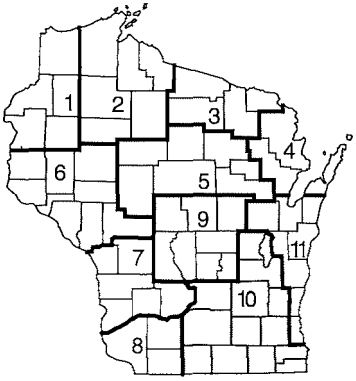
# Region 10

## Extent, topography, geology and soils

Region 10 encompasses 13 counties, comprising the major portion of SE Wisconsin. It extends from the western boarders of the tier of counties along Lake Michigan west, to include Winnebago, Fond du Lac, Columbia, Dane and Green counties. Over 90 percent of the region is within the natural division 5. Only the extreme western portions of Dane and Green counties extend into subdivision 6, which is part of the driftless region.

Natural division 5 is characterized on the east by a series of morainic ridges paralleling Lake Michigan, including the Kettle Moraine complex. Prominent in the south are terminal moraines, sandy outwash and older ground moraine. The northern margin is characterized by extensive glaciofluvial deposits, while ground moraine and drumlin fields occupy the large central section.

Glacial deposits over most of the region are covered with one to three feet of loess (wind-blown silt) which largely negates the potential differences in soil parent material. Thus, soils in this region are predominantly nutrient-rich loams and silt loams with high moisture holding capacity.




## Forest vegetation

The combination of Wisconsin climate and soil conditions described above clearly favor the development of mesic deciduous forests. However, differences in fire regimes historically resulted in many types of vegetation communities, including prairie, oak savanna, oak opening, oak forest and sugar maple-basswood-white ash dominated southern mesic forest. Natural subdivision 5b was delineated entirely on the basis of presence of southern mesic forest in presettlement time. Soils within this subdivision do not differ from those of surrounding area in any way that could account for differences in forest composition. (Major soil series are Theresa, Dodge and Miami). Dominance of sugar maple, basswood and white ash was attained in protected loca-



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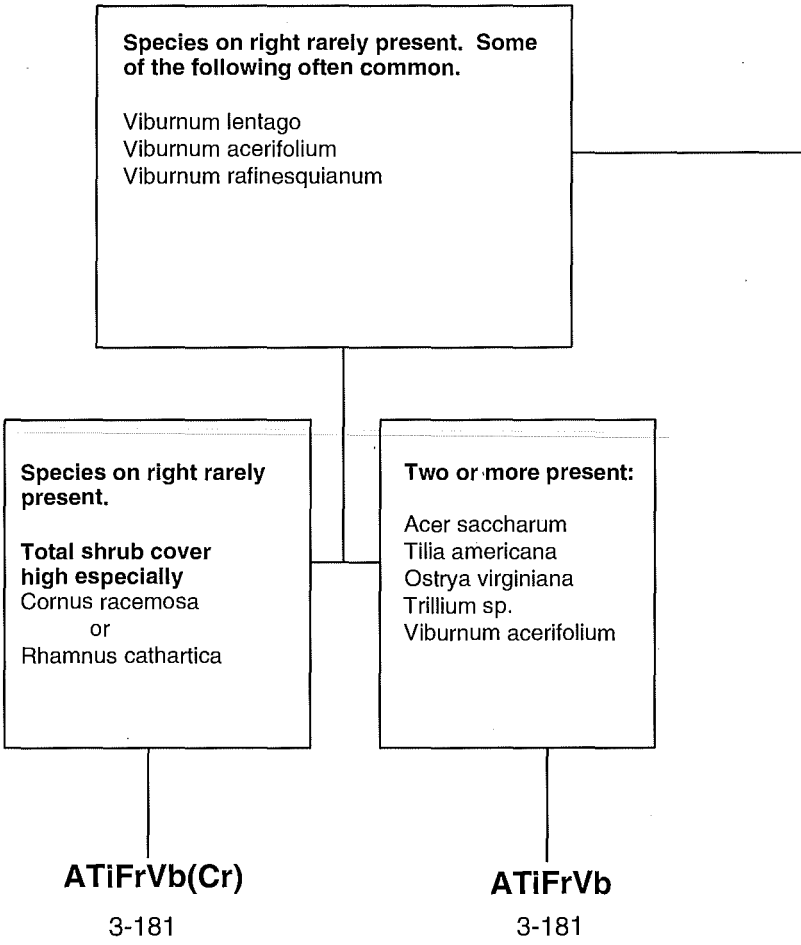
tions such as those lying leeward of rivers, lakes and wetlands that served as fire breaks. In Jefferson county, for example, the Bark River on the south and Crawfish River on the west shielded the mesic forest from fires that maintained savanna elsewhere.

Natural subdivision 5c represents those parts of region 9 where fires in presettlement time maintained oak forests, oak savannas, oak openings and prairies. Most of this area is currently in agriculture. However, scattered woodlands remain. The composition of current stands depends largely on the time that had elapsed since disturbance and on proximity of seed sources of mesic hardwoods.



Previous View

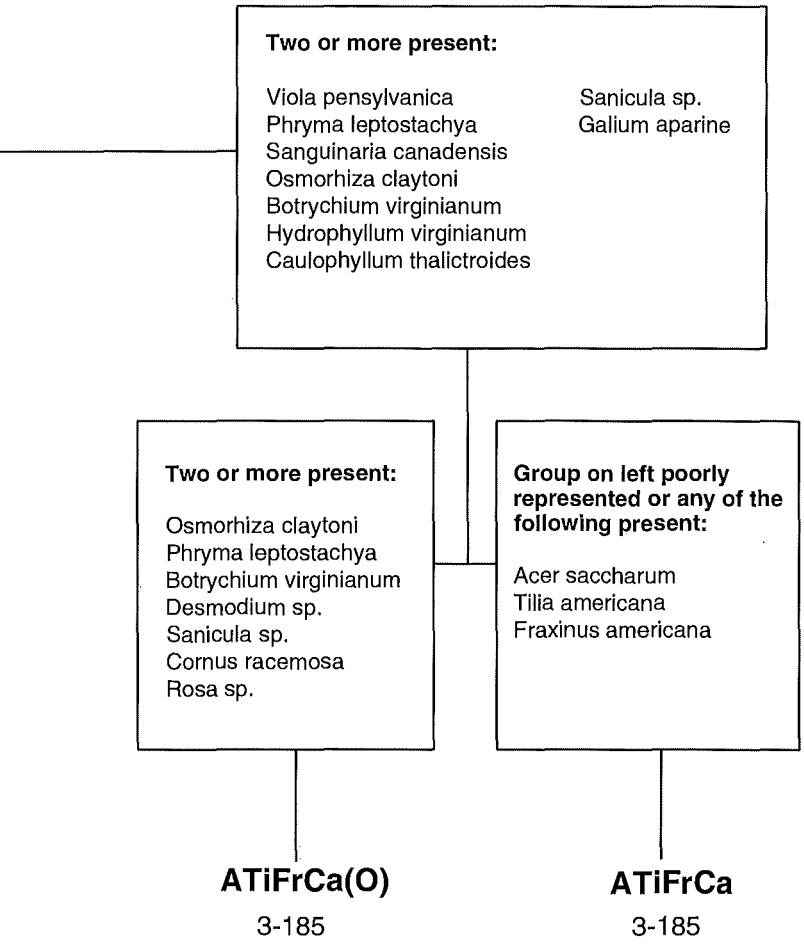



**Group below well represented:** Several species are found rather than any one being common.

**Poorly represented:** Usually no more than one species from the group present. Abundance may be low or high.



Previous View



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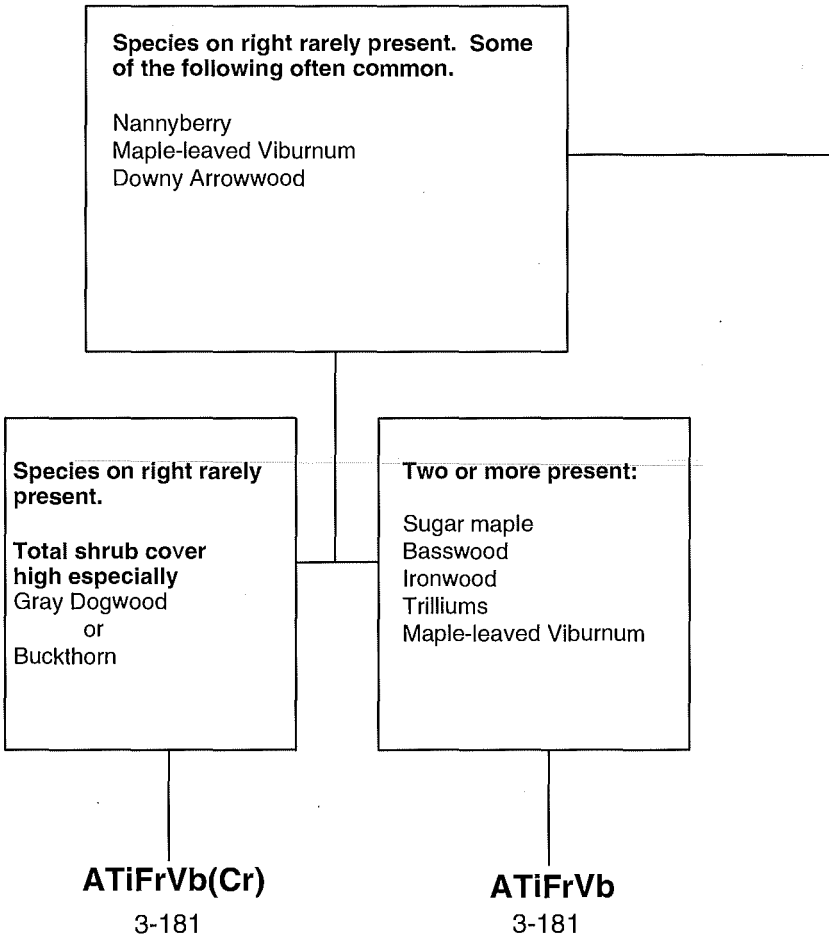
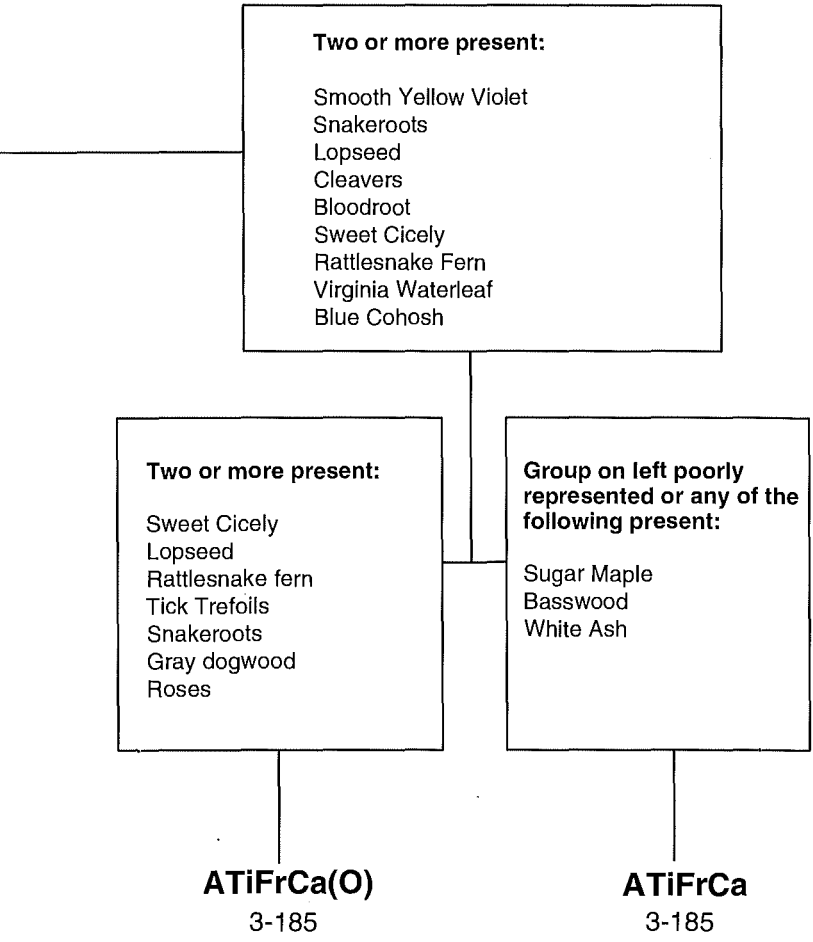



**Group below well represented:** Several species are found rather than any one being common.
**Poorly represented:** Usually no more than one species from the group present. Abundance may be low or high.



Previous View



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# Comparison of Major Floristic Differences Between Closely Related Habitat Types in Region 10

| | | ATiFrVb(Cr) | ATiFrVb |
|---|---|---|---|
| Cornus racemosa | Gray dogwood | 89 | 56 |
| Rhamnus cathartica | Common buckthorn | 75 | 39 |
| Viburnum lentago | Nannyberry | 62 | 39 |
| Corylus cornuta | Beaked hazelnut | 34 | 4 |
| Acer saccharum | Sugar maple | 6 | 87 |
| Tilia americana | Basswood | 20 | 66 |
| Trillium cernuum | Nodding trillium | 6 | 56 |
| Viburnum acerifolium | Maple-leaved viburnum | 20 | 43 |
| Actaea spp. | Baneberries | 6 | 31 |
| Thalictrum dioicum | Early meadow rue | 13 | 31 |

| | | ATiFrVb(Cr) | ATiFrCa |
|---|---|---|---|
| Cornus racemosa | Gray dogwood | 89,10 | 10,1 |
| Parthenocissus quinq. | Virginia creeper | 89 | 68 |
| Rhamnus cathartica | Common buckthorn | 75 | 34 |
| Viburnum raf. | Downy arrowwood | 55 | 10 |
| Amelanchier spp. | Juneberry | 37,8 | 2,1 |
| Acer saccharum | Sugar maple | 6,2 | 81,13 |
| Carya cordiformis | Bitternut hickory | 17 | 63 |
| Viola pensylvanica | Smooth yellow violet | 6 | 60 |
| Sanguinaria canadensis | Bloodroot | . | 52 |
| Smilax herbacea | Carrion flower | 17 | 52 |
| Caulophyllum thal. | Blue cohosh | . | 50 |
| Actaea spp. | Baneberries | 6 | 44 |
| Hydrophyllum virgin. | Virginia waterleaf | . | 31 |

| | | ATiFrVb | ATiFrCa |
|---|---|---|---|
| Vitis riparia | Riverbank grape | 83 | 36 |
| Cornus racemosa | Gray dogwood | 56 | 10 |
| Viburnum raf. | Downy arrowwood | 47 | 10 |
| Viburnum acerifolium | Maple-leaved viburnum | 43 | 5 |
| Amelanchier spp. | Juneberry | 39 | 2 |
| Viola pensylvanica | Smooth yellow violet | 10 | 60 |
| Sanguinaria canadensis | Bloodroot | 25 | 52 |
| Caulophyllum thal. | Blue cohosh | 27 | 50 |
| Hydrophyllum virgin. | Virginia waterleaf | 8 | 31 |



Previous View

| | | ATiFrVb(Cr) | ATiFrCa(O) |
|---|---|---|---|
| Fraxinus americana | White ash | 68,14 | 33,1 |
| Viburnum lentago | Nannyberry | 62,6 | 25,1 |
| Viburnum raf. | Downy arrowwood | 55 | 11 |
| Phryma leptostachya | Lopseed | 3 | 77 |
| Smilax herbacea | Carrion flower | 17 | 72 |
| Osmorhiza claytoni | Sweet cicely | 3 | 69 |
| Botrychium virginianum | Rattlesnake fern | . | 63 |
| Sanicula marilandica | Black snakeroot | 6,1 | 25,6 |
| Cryptotaenia can. | Honewort | . | 22 |

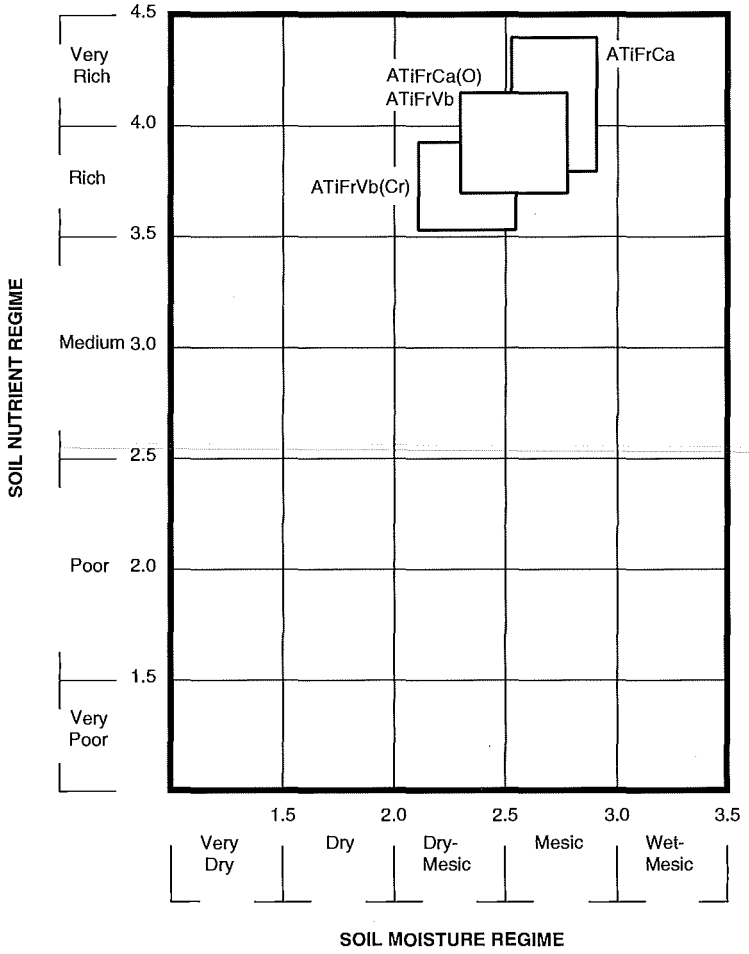
| | | ATiFrVb | ATiFrCa(O) |
|---|---|---|---|
| Fraxinus americana | White ash | 93,8 | 33,1 |
| Acer saccharum | Sugar maple | 87 | 25 |
| Arisaema atrorubens | Jack-in-the-pulpit | 83 | 36 |
| Tilia americana | Basswood | 66 | 16 |
| Trillium cernuum | Nodding trillium | 56 | 8 |
| Cornus alternifolia | Alternate-leaved dogwood | 45 | 5 |
| Viburnum acerifolium | Maple-leaved viburnum | 43 | 2 |
| Thalictrum dioicum | Early meadow rue | 31 | 8 |
| Phryma leptostachya | Lopseed | 2 | 77 |
| Smilax herbacea | Carrion flower | 33 | 72 |
| Galium aparine | Cleavers | 2 | 69 |
| Osmorhiza claytoni | Sweet cicely | 2 | 69 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 18 | 66 |
| Botrychium virginianum | Rattlesnake fern | 2 | 63 |
| Amphicarpa bracteata | Hog peanut | 14 | 47 |
| Sanicula marilandica | Black snakeroot | 2,1 | 25,6 |

| | | ATiFrCa | ATiFrCa(O) |
|---|---|---|---|
| Arisaema atrorubens | Jack-in-the-pulpit | 94,9 | 36.1 |
| Acer saccharum | Sugar maple | 81 | 25 |
| Tilia americana | Basswood | 76 | 16 |
| Fraxinus americana | White ash | 65 | 33 |
| Trillium cernuum | Nodding trillium | 60 | 8 |
| Sanguinaria canadensis | Bloodroot | 52 | 5 |
| Caulophyllum thal. | Blue cohosh | 50 | 16 |
| Thalictrum dioicum | Early meadow rue | 42 | 8 |
| Hydrophyllum virgin. | Virginia waterleaf | 31 | 5 |
| Parthenocissus quinq. | Virginia creeper | 68,4 | 94,11 |
| Rubus spp. | Blackberries/raspberries | 34 | 80 |
| Phryma leptostachya | Lopseed | 28 | 77 |
| Vitis riparia | Riverbank grape | 36 | 75 |
| Osmorhiza claytoni | Sweet cicely | 26 | 69 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 18 | 66 |
| Botrychium virginianum | Rattlesnake fern | 10 | 63 |
| Rhamnus cathartica | Common buckthorn | 34,3 | 61,13 |
| Xanthoxylum amer. | Prickly ash | 18 | 50 |
| Smilacina stellata | Star-flwrd solomon's seal | 21 | 44 |



Previous View

# Relationship of Habitat Types to Soil Moisture and Nutrient Regimes in Region 10



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# ATiFrVb and ATiFrVb(Cr)

## *Acer saccharum-Tilia-Fraxinus/Viburnum sp.* (Sugar maple-Basswood-white ash/Viburnum) and *Cornus racemosa* (Gray dogwood) Phase

**Distribution:**
**ATiFrVb** is most extensive in Washington and Waukesha counties, and in western parts of Dodge and Fond du Lac counties (Natural Division 5b). The ***Cornus* (Cr) phase** can be found in the same area, but is more prevalent west and south of the area described above. It is strongly associated with Natural Subdivision 5c.

**Similar types**: AFrDe (Region 11), **ATiCr(O)** (region 8).

**Landform and soils:**
Both the type proper and the phase occur on a variety of landform and soil combinations. Loams and silt loams over brown calcareous till, with rolling topography predominate. If soil is silt loam the subsoil is usually gravely, sandy or rocky. The combined effect of soil and landform creates **dry-mesic** conditions, but soils are **nutrient-rich**. Although our study did not examine landscape in terms of susceptibility to fire the vegetation of the **Cornus phase** reflects greater degree of fire disturbance than does the **ATiFrVb** type.

**Vegetation:**
**Common forest cover types**: The most characteristic feature of the **ATiFrVb** type is the presence of shade tolerant mesic hardwoods (*sugar maple, basswood* or *white ash)* even though *red* or *white oak* are often dominate the largest diameter classes. Stands of the **Cornus phase** are generally dominated by *white* or *red oak*, but *black cherry, American or slippery elm* and *shagbark hickory* are frequently present. Mesic hardwoods are absent except for sporadic occurrence of *white ash* seedlings or saplings.

**Shrub and small tree layer**: Stands of the **ATiFrVb** type have relatively moderate shrub layer. *Choke cherry* is usually most abundant. Other species with medium constancy levels are *black cherry, elm, gooseberries, arrowwood, maple-leaf viburnum* and *prickly ash.* On the other hand, the characteristic feature of the **Cornus** phase is a dense shrub layer. *Gray dogwood* (*Cornus racemosa*) has the highest constancy and strong representation. *Common buckthorn*, however, often dominates this layer.

Other important species are: *Nanyberry, choke cherry, black cherry* and *wild currants* and *gooseberries.*

**Ground flora characteristics**: The following species represent the highest constancies and coverage in both types: *Virginia creeper, wild geranium, enchanter's nightshade* and *riverbank grape.* Several species that are well represented on dry-mesic sites in most southern regions are conspicuously absent or rare on this type. They include: *sweet cicely, lopseed, tick trefoil* and *black snakeroot.* In contrast with tree and shrub species only a handful of herbaceous species have been observed that occur preferentially on one or the other type, but the all have relatively low constancy values to be of practical value for field identification.

**Disturbance and succession**: The **ATiFrVb** association and the **Cornus phase** appear to represent a site type with same or very similar biological potential i.e. dry-mesic nutrient rich conditions. However, the ***Cornus*** phase may be representing landscape positions that were historically more fire prone than those characterized by the **ATiFrVb** plant association. Presettlement records of vegetation show that the ***Cornus*** phase sites were occupied by *oak* forests or *oak* openings. We presume that current *mixed oak* stands on these sites would succeed to *white ash, basswood* and *sugar maple* if seed source were available. Most stands, however, do not currently contain appreciable seed source of these mesic species. The species most frequently present, and successfully regenerating are *black cherry, slippery elm* and *shagbark hickory.* If any of the mesic species is present usually it is usually *white ash.*



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# ATiFrVb(Cr)

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Smilacina racemosa | False solomon's seal | 93 | 3.83 |
| Parthenocissus quinquefolia | Virginia creeper | 89 | 15.44 |
| Vitis riparia | Riverbank grape | 89 | 1.56 |
| Circaea quadrisulcata | Enchanter's nightshade | 86 | 2.69 |
| Geranium maculatum | Wild geranium | 82 | 4.46 |
| Arisaema atrorubens | Jack-in-the-pulpit | 58 | 1.92 |
| Geum canadense | White avens | 58 | 0.30 |
| Grasses spp. | Grasses | 51 | 1.14 |
| Rhus radicans | Poison ivy | 44 | 2.92 |
| Podophyllum peltatum | Mayapple | 34 | 4.62 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 31 | 0.27 |
| Alliaria officinalis | Garlic mustard | 31 | 2.24 |
| Smilacina stellata | Star-flowered solomon's seal | 31 | 0.53 |
| Agrimonia gryposepala | Agrimony | 27 | 0.16 |
| Anemone quinquefolia | Wood anemone | 27 | 0.22 |
| Ranunculus abortivus | Small-flowered crowfoot | 24 | 0.17 |
| Amphicarpa bracteata | Hog peanut | 20 | 0.10 |
| Asclepias exaltata | Poke milkweed | 20 | 0.10 |
| Celestrus scandens | Climbing bittersweet | 20 | 0.18 |
| Potentilla simplex | Common cinquefoil | 20 | 0.10 |
| **Shrubs** | | | |
| Prunus virginiana | Chokecherry | 96 | 8.82 |
| Cornus racemosa | Gray dogwood | 89 | 9.44 |
| Rhamnus cathartica | Common buckthorn | 75 | 22.87 |
| Viburnum lentago | Nannyberry | 62 | 5.82 |
| Ribes cynosbati | Prickly gooseberry | 58 | 8.44 |
| Viburnum rafinesquianum | Downy arrowwood | 55 | 1.98 |
| Rosa spp. | Roses | 55 | 0.28 |
| Rubus spp. | Blackberries/raspberries | 55 | 2.92 |
| Xanthoxylum americanum | Prickly ash | 37 | 5.14 |
| Amelanchier spp. | Juneberry | 37 | 8.36 |
| Corylus cornuta | Beaked hazelnut | 34 | 5.01 |
| Cornus alternifolia | Alternate-leaved dogwood | 24 | 9.77 |
| Lonicera canadensis | American fly honeysuckle | 20 | 6.20 |
| Viburnum acerifolium | Maple-leaved viburnum | 20 | 2.67 |
| **Tree Seedlings** | | | |
| Prunus serotina | Black cherry | 89 | 4.55 |
| Fraxinus americana | White ash | 68 | 13.52 |
| Carya ovata | Shagbark hickory | 62 | 0.51 |
| Ulmus spp | Elms | 51 | 0.75 |
| Quercus alba | White oak | 34 | 0.25 |
| Quercus rubra | Northern red oak | 34 | 0.20 |
| Acer negundo | Box elder | 31 | 0.32 |
| Acer rubrum | Red maple | 31 | 0.64 |
| Tilia americana | Basswood | 20 | 0.20 |



Previous View

# ATiFrVb

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Circaea quadrisulcata | Enchanter's nightshade | 97 | 2.03 |
| Vitis riparia | Riverbank grape | 83 | 0.70 |
| Arisaema atrorubens | Jack-in-the-pulpit | 83 | 2.39 |
| Smilacina racemosa | False solomon's seal | 83 | 5.61 |
| Geum canadense | White avens | 64 | 0.23 |
| Geranium maculatum | Wild geranium | 64 | 6.68 |
| Parthenocissus quinquefolia | Virginia creeper | 62 | 9.08 |
| Trillium cernuum | Nodding trillium | 56 | 0.37 |
| Grasses spp. | Grasses | 54 | 0.92 |
| Podophyllum peltatum | Mayapple | 45 | 3.36 |
| Rhus radicans | Poison ivy | 37 | 0.59 |
| Ranunculus abortivus | Small-flowered crowfoot | 35 | 0.19 |
| Smilax herbacea | Carrion flower | 33 | 0.16 |
| Actaea spp. | Baneberries | 31 | 0.62 |
| Thalictrum dioicum | Early meadow rue | 31 | 3.19 |
| Caulophyllum thalictroides | Blue cohosh | 27 | 0.22 |
| Sanguinaria canadensis | Bloodroot | 25 | 0.14 |
| Potentilla simplex | Common cinquefoil | 22 | 1.76 |
| Polygonatum pubescens | Hairy solomon's seal | 22 | 0.28 |
| Alliaria officinalis | Garlic mustard | 20 | 2.85 |
| **Shrubs** | | | |
| Prunus virginiana | Chokecherry | 97 | 12.00 |
| Ribes cynosbati | Prickly gooseberry | 77 | 5.23 |
| Cornus racemosa | Gray dogwood | 56 | 3.08 |
| Viburnum rafinesquianum | Downy arrowwood | 47 | 2.89 |
| Xanthoxylum americanum | Prickly ash | 47 | 6.83 |
| Rubus spp. | Blackberries/raspberries | 47 | 0.40 |
| Cornus alternifolia | Alternate-leaved dogwood | 45 | 3.41 |
| Viburnum acerifolium | Maple-leaved viburnum | 43 | 2.90 |
| Viburnum lentago | Nannyberry | 39 | 0.64 |
| Amelanchier spp. | Juneberry | 39 | 3.52 |
| Rhamnus cathartica | Common buckthorn | 39 | 1.45 |
| Lonicera canadensis | American fly honeysuckle | 35 | 0.70 |
| Rosa spp. | Roses | 22 | 0.15 |
| Viburnum trilobum | Highbush cranberry | 20 | 2.56 |
| **Tree Seedlings** | | | |
| Fraxinus americana | White ash | 93 | 8.44 |
| Prunus serotina | Black cherry | 93 | 4.08 |
| Acer saccharum | Sugar maple | 87 | 14.59 |
| Ulmus spp | Elms | 83 | 0.81 |
| Tilia americana | Basswood | 66 | 1.66 |
| Carya ovata | Shagbark hickory | 60 | 0.99 |
| Quercus rubra | Northern red oak | 54 | 0.50 |
| Carya cordiformis | Bitternut hickory | 47 | 0.50 |
| Ostrya virginiana | Ironwood | 37 | 0.62 |
| Acer rubrum | Red maple | 31 | 0.24 |



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# ATiFrCa and ATiFrCa(O)

## *Acer saccharum-Tilia-Fraxinus/Caulophyllum* (Sugar maple-Basswood-White ash/Blue cohosh) and *Osmorhiza* (Sweet cicely) Phase

**Distribution:**
The **ATiFrCa** type is best represented in Fon du Lac and eastern parts of Dodge, Jefferson and Waukesha counties. (Natural Subdivision 5b). Also scattered in Green and Rock Counties (Natural Subdivision 5d). The **Osmorhiza** phase is found primarily west of area described above, but can occur anywhere within region 10.

**Similar types:** ATiAs(De), ATiH (region 8).

**Landform and soils:**
Both the type proper and the phase occur on a variety of landform and soil combinations. Silt loams and loams over brown calcareous till, with rolling topography predominate. The combined effect of soil and landform creates **mesic, nutrient-rich** and **very rich** conditions. Although our study did not examine landscape in terms of susceptibility to fire the vegetation of the **Osmorhiza** phase reflects greater degree of fire disturbance than does the **ATiFrCa** type.

**Vegetation:**
**Common forest cover types**: Average stand composition on the **ATiFrCa** is similar to that on **ATiFrVb** and **ATiFrVb(Cr)** types. *Sugar maple, basswood* and *white ash*, with *red oak* in the largest size classes, share dominance in most stands. *Bitternut* and *shagbark hickory* are often present in small numbers. The **Osmorhiza** phase lacks mesic hardwoods. Stands are mixtures of *red oak, white oak, American* and *slippery elm, black cherry* and *shagbark hickory*.

**Shrub and small tree layer:** This layer is generally not well developed on the **ATiFrCa.** Only *choke cherry* is frequently well represented. *Wild currants* and *gooseberries* are present with relatively low abundance. The **Osmorhiza** phase, on the other hand, is often dominated by shrubs. In addition to species listed above *common buckthorn, blackberries, gray dogwood* and *prickly ash* are often well represented.



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**Ground flora characteristics**: Herb layer is well represented, both in number of species and coverage, unless the tree canopy or the sapling layer is exceptionally dense. The most common and well represented species are: *enchanter's nightshade, false solomon's seal, wild geranium, white avens, Virginia creeper* and *mayapple.* Species better represented on the **ATiFrCa** type are: *Jack-in-the-pulpit, trillium, bloodroot, meadow rue, Virginia waterleaf* and *blue cohosh.* More frequently present, or more abundant, on the **Osmorhiza** phase are: *sweet cicely, Virginia creeper, riverbank grape, lopseed, tick trefoil* and *rattlesnake fern.* Because no species of high constancy occurs exclusively on any one habitat type it is often necessary to use a group of species with only moderate constancies but high preference as characterizing species for the type. However, for convenience only one species is used in naming the type. Thus *blue cohosh* with a constancy value of only 50% on the **ATiFrCa** type was chosen for naming the type as a representative of an ecological species group with high preference for mesic sites. Virtual absence of the *blue cohosh* ecological species group from the **Osmorhiza** phase is presumed to be related to fire history (see further discussion below).

**Disturbance and succession**: The **ATiFrCa** association and the **Osmorhiza** phase appear to represent a site type with same or very similar biological potential i.e. mesic nutrient rich to very rich conditions. However, the **Osmorhiza** phase may be representing landscape positions that were historically more fire prone than those characterized by the **ATiFrCa** plant association. Presettlement records of vegetation show that the **Osmorhiza** phase sites were occupied by oak forests or oak openings. We presume that current mixed oak stands on these sites would succeed to *white ash, basswood* and *sugar maple* if seed source were available. Most stands, however, do not currently contain appreciable seed source of these mesic species. The species most frequently present, and successfully regenerating are *American* and *slippery elm, black cherry* and *shagbark hickory.* If any of the mesic species is present usually it is *white ash.*



Previous View

# ATiFrCa(O)

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Circaea quadrisulcata | Enchanter's nightshade | 97 | 6.01 |
| Parthenocissus quinquefolia | Virginia creeper | 94 | 11.26 |
| Smilacina racemosa | False solomon's seal | 88 | 1.27 |
| Geum canadense | White avens | 83 | 1.17 |
| Phryma leptostachya | Lopseed | 77 | 0.65 |
| Vitis riparia | Riverbank grape | 75 | 0.89 |
| Geranium maculatum | Wild geranium | 75 | 7.71 |
| Smilax herbacea | Carrion flower | 72 | 0.48 |
| Osmorhiza claytoni | Sweet cicely | 69 | 2.02 |
| Galium aparine | Cleavers | 69 | 0.86 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 66 | 1.67 |
| Botrychium virginianum | Rattlesnake fern | 63 | 0.34 |
| Grasses spp. | Grasses | 61 | 1.97 |
| Anemone quinquefolia | Wood anemone | 58 | 0.50 |
| Ranunculus abortivus | Small-flowered crowfoot | 52 | 0.16 |
| Podophyllum peltatum | Mayapple | 50 | 6.77 |
| Rhus radicans | Poison ivy | 50 | 1.55 |
| Amphicarpa bracteata | Hog peanut | 47 | 0.62 |
| Smilacina stellata | Star-flowered solomon's seal | 44 | 0.47 |
| Viola pensylvanica | Smooth yellow violet | 38 | 0.73 |
| Arisaema atrorubens | Jack-in-the-pulpit | 36 | 1.18 |
| Agrimonia gryposepala | Agrimony | 33 | 0.22 |
| Viola pubescens | Downy yellow violet | 33 | 1.42 |
| Dioscorea villosa | Wild yam root | 33 | 0.22 |
| Dryopteris spinulosa | Spinulose shield fern | 25 | 1.23 |
| Sanicula marilandica | Black snakeroot | 25 | 6.08 |
| Uvularia grandiflora | Large-flowered bellwort | 25 | 0.86 |
| Cryptotaenia canadensis | Honewort | 22 | 2.03 |
| Galium triflorum | Sweet-scented bedstraw | 22 | 0.52 |
| Actaea spp. | Baneberries | 22 | 0.16 |
| **Shrubs** | | | |
| Prunus virginiana | Chokecherry | 97 | 4.82 |
| Ribes cynosbati | Prickly gooseberry | 91 | 11.32 |
| Rubus spp. | Blackberries/raspberries | 80 | 3.59 |
| Rhamnus cathartica | Common buckthorn | 61 | 12.65 |
| Cornus racemosa | Gray dogwood | 52 | 3.85 |
| Xanthoxylum americanum | Prickly ash | 50 | 10.96 |
| Rosa spp. | Roses | 44 | 0.59 |
| Viburnum lentago | Nannyberry | 25 | 0.53 |
| Sambucus canadensis | Common elder | 22 | 0.16 |
| Corylus americana | Hazel-nut | 22 | 4.01 |

*continued...*



Previous View

*...continued*

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Tree Seedlings** | | | |
| Prunus serotina | Black cherry | 88 | 1.58 |
| Ulmus spp | Elms | 86 | 2.75 |
| Carya ovata | Shagbark hickory | 69 | 0.38 |
| Acer negundo | Box elder | 47 | 0.25 |
| Quercus alba | White oak | 44 | 0.34 |
| Quercus rubra | Northern red oak | 38 | 0.10 |
| Fraxinus americana | White ash | 33 | 0.63 |
| Carya cordiformis | Bitternut hickory | 33 | 1.27 |
| Acer saccharum | Sugar maple | 25 | 11.68 |



Previous View

# ATiFrCa

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Circaea quadrisulcata | Enchanter's nightshade | 97 | 6.71 |
| Smilacina racemosa | False solomon's seal | 94 | 4.18 |
| Arisaema atrorubens | Jack-in-the-pulpit | 94 | 5.08 |
| Geranium maculatum | Wild geranium | 81 | 10.26 |
| Geum canadense | White avens | 78 | 0.74 |
| Parthenocissus quinquefolia | Virginia creeper | 68 | 4.18 |
| Grasses spp. | Grasses | 65 | 0.40 |
| Podophyllum peltatum | Mayapple | 63 | 4.70 |
| Viola pensylvanica | Smooth yellow violet | 60 | 1.91 |
| Trillium cernuum | Nodding trillium | 60 | 1.09 |
| Smilax herbacea | Carrion flower | 52 | 1.21 |
| Sanguinaria canadensis | Bloodroot | 52 | 0.63 |
| Caulophyllum thalictroides | Blue cohosh | 50 | 1.05 |
| Actaea spp. | Baneberries | 44 | 0.13 |
| Thalictrum dioicum | Early meadow rue | 42 | 5.70 |
| Vitis riparia | Riverbank grape | 36 | 0.34 |
| Amphicarpa bracteata | Hog peanut | 36 | 0.83 |
| Ranunculus abortivus | Small-flowered crowfoot | 31 | 0.22 |
| Hydrophyllum virginianum | Virginia waterleaf | 31 | 2.28 |
| Anemone quinquefolia | Wood anemone | 28 | 0.15 |
| Phryma leptostachya | Lopseed | 28 | 0.59 |
| Dryopteris spinulosa | Spinulose shield fern | 28 | 2.12 |
| Osmorhiza claytoni | Sweet cicely | 26 | 0.54 |
| Allium tricoccum | Wild leek | 23 | 0.27 |
| Rhus radicans | Poison ivy | 21 | 4.19 |
| Alliaria officinalis | Garlic mustard | 21 | 17.10 |
| Smilacina stellata | Star-flowered solomon's seal | 21 | 0.22 |
| **Shrubs** | | | |
| Prunus virginiana | Chokecherry | 89 | 10.60 |
| Ribes cynosbati | Prickly gooseberry | 73 | 3.73 |
| Rhamnus cathartica | Common buckthorn | 34 | 3.24 |
| Rubus spp. | Blackberries/raspberries | 34 | 0.36 |
| Cornus alternifolia | Alternate-leaved dogwood | 23 | 4.06 |
| Sambucus pubens | Red-berried elder | 21 | 0.16 |
| Viburnum lentago | Nannyberry | 21 | 0.16 |
| **Tree Seedlings** | | | |
| Acer saccharum | Sugar maple | 81 | 13.18 |
| Ulmus spp | Elms | 78 | 3.04 |
| Tilia americana | Basswood | 76 | 0.64 |
| Fraxinus americana | White ash | 65 | 5.36 |
| Carya cordiformis | Bitternut hickory | 63 | 1.48 |
| Prunus serotina | Black cherry | 63 | 0.79 |
| Carya ovata | Shagbark hickory | 47 | 0.88 |
| Quercus rubra | Northern red oak | 36 | 0.21 |
| Acer negundo | Box elder | 31 | 0.47 |
| Ostrya virginiana | Ironwood | 21 | 0.29 |



Previous View

# Occurrence of Tree Species on Habitat Types of Region 10

Size classes: SE - seedlings; SA - saplings; MT - medium trees (4-10" DBH); LT - large trees (>10" DBH). Numbers are frequency of occurrence: *<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%.

| | ATiFrVb(Cr) | | | | ATiFrVb | | | | ATiFrCa(O) | | | | ATiFrCa | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT |
| Jack pine | | | | | | | | | | | | | | | | |
| Bur oak | | * | * | * | | | | | * | | * | 1C | * | | | * |
| Northern pin oak | | | | * | | | | | | | | * | | | | |
| Trembling aspen | * | | * | | | | | | * | | | | | | | |
| Bigtooth aspen | * | * | * | * | 1A | * | * | * | | | * | | | | * | * |
| Red pine | | | | | | | | | | | | | | | | |
| Black oak | * | | 1A | 1C | | | | | | * | * | 1D | | | * | |
| Black walnut | * | * | | * | * | * | | | | * | * | * | * | | | * |
| Paper birch | | | | | | * | * | | | | | | | | | |
| Black ash | * | * | | | * | * | | | * | * | * | | * | * | * | |
| Northern red oak | * | 1A | 2B | 2D | 1A | * | 1B | 3D | 1A | 1B | 1B | 2C | 1A | | 1B | 3C |
| White pine | | | | | | | | | | | * | * | | | | |
| White oak | *A | 1B | 3B | 4D | | | 1B | 3D | 1A | * | 1B | 3D | | | * | 1C |
| Butternut | | * | | | | | | | * | * | * | * | | | | |
| Swamp white oak | * | * | * | * | | | | | * | | * | * | * | | * | * |
| Shagbark hickory | 2A | 3B | 2C | 2C | 2A | 1A | 1B | 1C | 3A | 2A | 2B | 1C | 2A | 1A | 1C | 1C |
| Black cherry | 3B | 4B | 3B | 1B | 4A | 3B | 2B | * | 3A | 3B | 2C | 1C | 2A | 1A | 1B | 1B |
| Box elder | 2A | 2A | * | | 1A | * | * | | 2A | 2B | * | | 2A | 1B | * | |
| Hackberry | | | | | | | | | * | * | | | * | * | * | * |
| Elms | 2A | 3C | 2B | 1C | 3A | 3C | 2B | * | 3A | 3D | 3C | 2C | 3A | 3C | 3B | 2B |
| American elm | | | | | | | | | | | | | | | | |
| White ash | 3B | 3C | 2B | 1B | 4B | 3B | 2B | 1B | 1A | 1B | 1C | 1B | 3B | 2B | 2B | 2C |
| Green ash | | | | * | * | | | * | * | * | | | * | * | * | * |
| Yellow birch | | | | | | | | | | | | | | | | |
| Bitternut hickory | 1A | 1C | * | | 2A | 1A | * | | 2A | 2C | 1C | * | 2A | 2B | 1B | * |
| Red maple | 1A | 2C | 1C | 1B | 1A | 2B | 1B | * | | * | * | * | * | * | * | * |
| American hornbeam | * | * | * | | * | * | * | | * | * | | | * | * | * | * |
| Ironwood | * | 1B | * | | 2A | 3C | 1C | | * | 1C | * | | 1A | 1A | 2B | * |
| Basswood | 1A | 1B | 1C | * | 3A | 2B | 2B | 2C | 1A | 2B | 1C | * | 3A | 2B | 2C | 2C |
| Eastern hemlock | | | | | | | | | | | | | | | | |
| American beech | | | | | * | * | * | * | | | | | * | * | | |
| Sugar maple | * | 1C | * | * | 4B | 4C | 3D | 3D | 1C | 1C | * | * | 3B | 3D | 3C | 2D |



Previous View

# Understory Species with Potential Diagnostic Value for Distinguishing Among the Habitat Types in Region 10

Number 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%.

| Scientific Name | Common Name | ATiFrVb(Cr) ATiFrVb | | ATiFrCa(O) ATiFrCa | |
|---|---|---|---|---|---|
| **Herbs** | | | | | |
| Apocynum androsaemifolium | Spreading dogbane | * | | | |
| Ranunculus recurvatus | Hooked crowfoot | | * | | |
| Hepatica americana | Round-lobed hepatica | * | * | | |
| Triosteum aurantiacum | Orange-fruited horse gentain | * | * | | |
| Agrimonia gryposepala | Agrimony | 1 A | | 1 A | |
| Alliaria officinalis | Garlic mustard | 1 A | * | * | * |
| Smilacina stellata | Star-flowered solomon's seal | 1 A | * | 1 A | * |
| Rhus radicans | Poison ivy | 1 A | 1 A | 1 A | * |
| Circaea quadrisulcata | Enchanter's nightshade | 3 A | 3 A | 3 B | 3 B |
| Parthenocissus quinquefolia | Virginia creeper | 3 C | 2 B | 3 B | 2 A |
| Geranium maculatum | Wild geranium | 3 A | 2 B | 2 B | 3 B |
| Smilacina racemosa | False solomon's seal | 3 A | 3 B | 3 A | 3 A |
| Vitis riparia | Riverbank grape | 3 A | 3 A | 2 A | 1 A |
| Arisaema atrorubens | Jack-in-the-pulpit | 2 A | 3 A | 1 A | 3 B |
| Geum canadense | White avens | 2 A | 2 A | 3 A | 3 A |
| Podophyllum peltatum | Mayapple | 1 A | 1 A | 1 B | 2 A |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 1 A | * | 2 A | * |
| Anemone quinquefolia | Wood anemone | 1 A | * | 2 A | 1 A |
| Amphicarpa bracteata | Hog peanut | * | * | 1 A | 1 A |
| Smilax herbacea | Carrion flower | * | 1 A | 2 A | 2 A |
| Ranunculus abortivus | Small-flowered crowfoot | * | 1 A | 2 A | 1 A |
| Dioscorea villosa | Wild yam root | * | * | 1 A | * |
| Actaea spp. | Baneberries | | 1 A | * | 1 A |
| Viola pensylvanica | Smooth yellow violet | | * | 1 A | 2 A |
| Viola pubescens | Downy yellow violet | | * | 1 A | * |
| Allium tricoccum | Wild leek | | * | * | * |
| Caulophyllum thalictroides | Blue cohosh | | 1 A | * | 1 A |
| Polygonatum pubescens | Hairy solomon's seal | | * | * | * |
| Osmorhiza claytoni | Sweet cicely | | | 2 A | 1 A |
| Sanicula gregaria | Clustered snakeroot | | | * | * |
| Galium aparine | Cleavers | | | 2 A | * |
| Uvularia grandiflora | Large-flowered bellwort | | | * | * |
| Cryptotaenia canadensis | Honewort | | | * | * |
| Phryma leptostachya | Lopseed | | | 3 A | 1 A |
| Botrychium virginianum | Rattlesnake fern | | | 2 A | * |
| Thalictrum dioicum | Early meadow rue | * | 1 A | | 1 B |
| Dryopteris spinulosa | Spinulose shield fern | * | | * | 1 A |
| Sanguinaria canadensis | Bloodroot | | * | | 2 A |

*continued...*



Previous View

| Scientific Name | Common Name | ATiFrVb(Cr) | ATiFrVb | ATiFrCa(O) | ATiFrCa |
|---|---|---|---|---|---|
| Trillium cernuum | Nodding trillium | | 2 A | | 2 A |
| Smilax tamnoides | Bristly greenbrier | | * | | * |
| Sanicula marilandica | Black snakeroot | | | * | |
| Adiantum pedatum | Maidenhair fern | | | * | |
| Hydrophyllum virginianum | Virginia waterleaf | | | | 1 A |
| Hepatica acutiloba | Sharp-lobed hepatica | | | | * |
| **Shrubs** | | | | | |
| Amelanchier spp. | Juneberry | 1 B | 1 A | | |
| Viburnum acerifolium | Maple-leaved viburnum | * | 1 A | | |
| Cornus alternifolia | Alternate-leaved dogwood | * | 1 A | | * |
| Viburnum trilobum | Highbush cranberry | * | * | | * |
| Corylus americana | Hazel-nut | * | | * | |
| Corylus cornuta | Beaked hazelnut | 1 B | | * | * |
| Rosa spp. | Roses | 2 A | * | 1 A | * |
| Lonicera canadensis | American fly honeysuckle | * | 1 A | * | * |
| Viburnum rafinesquianum | Downy arrowwood | 2 A | 1 A | * | * |
| Viburnum lentago | Nannyberry | 2 B | 1 A | * | * |
| Xanthoxylum americanum | Prickly ash | 1 B | 1 B | 1 B | * |
| Cornus racemosa | Gray dogwood | 3 B | 2 A | 2 A | * |
| Prunus virginiana | Chokecherry | 3 B | 3 B | 3 A | 3 B |
| Rubus spp. | Blackberries/raspberries | 2 A | 1 A | 3 A | 1 A |
| Ribes cynosbati | Prickly gooseberry | 2 B | 3 B | 3 B | 2 A |
| Rhamnus cathartica | Common buckthorn | 2 C | 1 A | 2 B | 1 A |



Previous View

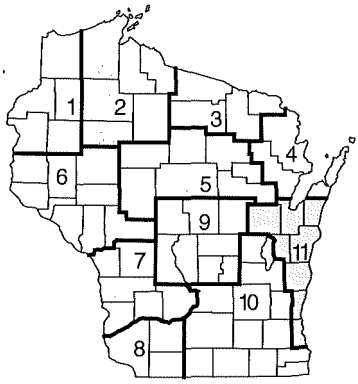
# Region 11

## Extent, topography, geology and soils

Region 11 encompasses Milwaukee, Ozaukee, Sheboygan, Calumet, Manitowoc, Outagamie, Brown and Kewaunee counties. The region is centered on Natural Division 3 (primarily subdivision 3c with small inclusions of subdivisions 3a and 3b). Natural division 3 is characterized primarily by level to rolling topography, reflecting the glacial Lake Michigan clay and silt deposits. The dominant soils are Kewaunee, (over till) and Oshkosh (over lacustrine silts and clays). Another important characteristic of natural division 3 is the presence of American beech, a species of eastern deciduous forests that reaches its western limits within this division.

The western edge of region 11 extends into natural subdivisions 5a and 5b. Most characteristic in this part of natural division 5 is a series of morainic ridges paralleling Lake Michigan, including the Kettle Moraine system. (For further description of natural division 5 see habitat type region 10).

It is important to note, that because of combination of lake-effect climate and predominance of fine-textured soils, mesic and dry-mesic, nutrient-rich sites prevail on the uplands of this region.




Many types of wetlands are also common, but dry sites occur only sporadically on local glacial outwashes, narrow, gravely eskers and occasional limestone outcrops with thin soils.

About 60 percent of this area is currently in cropland, 15 percent in pasture and 25 percent in wetland and forest.

## Forest vegetation

Most of this region was originally covered by northern mesic forest of sugar maple, beech, yellow birch, elm and some hemlock and white pine in northern parts and closer to Lake Michigan. Because the floristic tension zone in this part of the state runs almost directly north to south from near Green Bay to Milwaukee there is a conspicuous change in forest composition



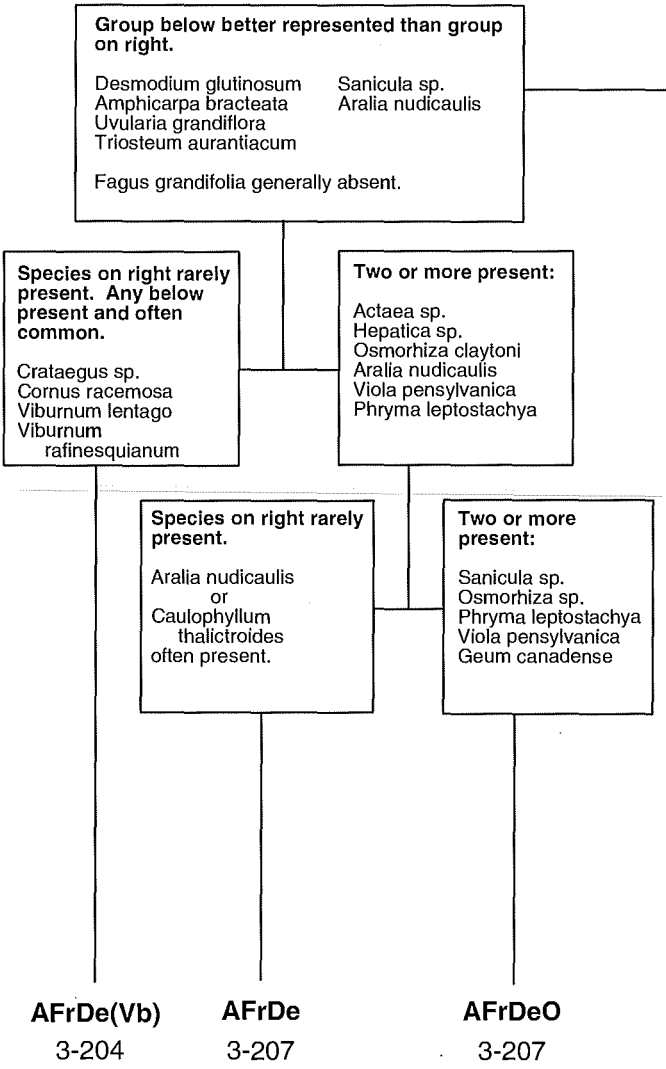
Previous View

toward the western margin of the region. Beech, hemlock and yellow birch disappear and white ash, basswood white oak and red oak become the principal associates of sugar maple, in forming southern mesic and dry mesic forests. Because wild fires in presettlement time were much less frequent in this region than they were in other parts of southern Wisconsin, oak forests without some presence of tolerant mesic hardwoods are not common. Therefore, regardless of current forest cover type, in the absence of management that favors less tolerant species, most stands are succeeding to sugar maple, ash, basswood or beech.



Previous View

## Key to Habitat Types of Region 11 - Scientific Names

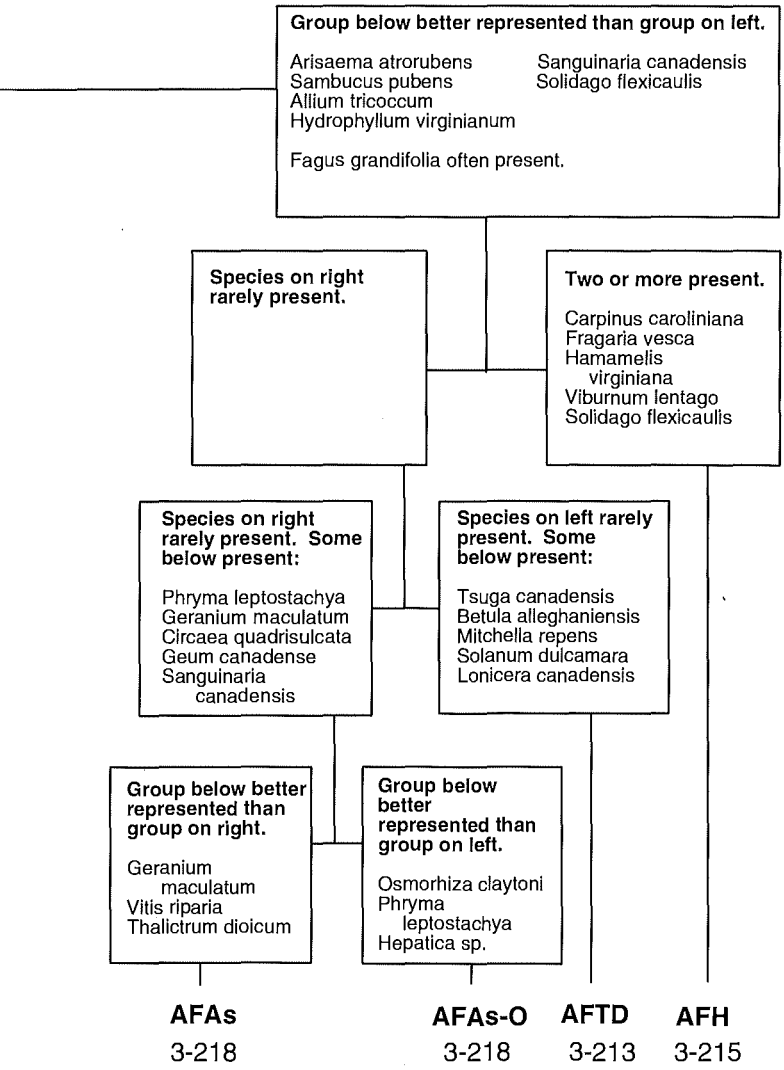



**Group below well represented:** Several species are found rather than any one being common.

**Poorly represented:** Usually no more than one species from the group present. Abundance may be low or high.



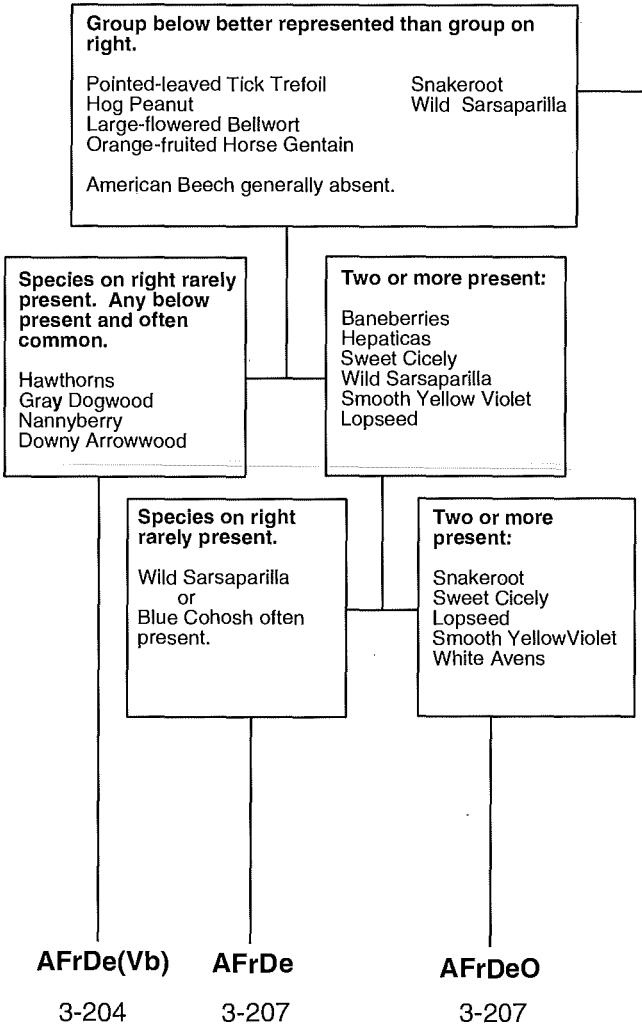
Previous View






Previous View

## Key to Habitat Types of Region 11 - Common Names

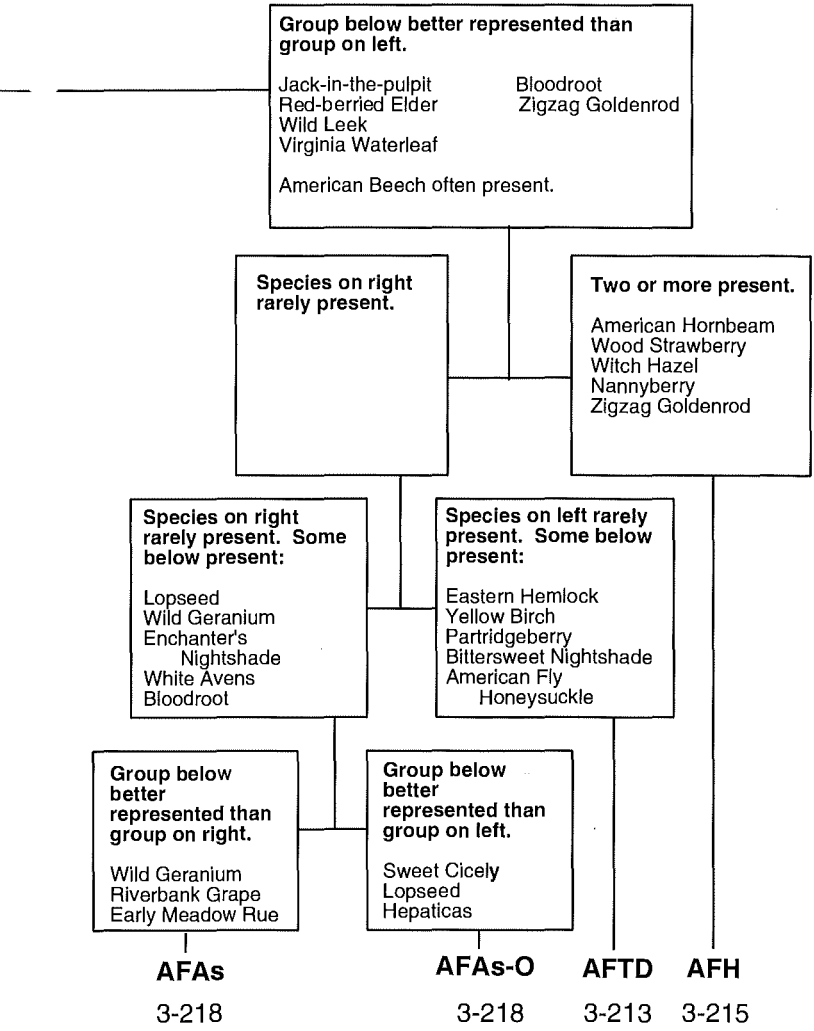



**Group below well represented:** Several species are found rather than any one being common.

**Poorly represented:** Usually no more than one species from the group present. Abundance may be low or high.



Previous View






Previous View

# Comparison of Major Floristic Differences Between Closely Related Habitat Types in Region 11

| | | AFrDe(Vb) | AFrDe |
|---|---|---|---|
| Viburnum acerifolium | Maple-leaved viburnum | 100 | 70 |
| Viburnum raf. | Downy arrowwood | 85 | 52 |
| Ulmus spp | Elms | 78 | 29 |
| Cornus racemosa | Gray dogwood | 64 | 5 |
| Rubus spp. | Blackberries/raspberries | 64 | 29 |
| Crataegus spp. | Hawthorns | 57 | . |
| Lonicera spp. | Honeysuckles | 57 | 5 |
| Viburnum lentago | Nannyberry | 50 | 23 |
| Parthenocissus quinq. | Virginia creeper | 35 | . |
| Aralia nudicaulis | Wild sarsaparilla | 14 | 82 |
| Actaea spp. | Baneberries | 28 | 76 |
| Caulophyllum thal. | Blue cohosh | . | 70 |
| Hepatica americana | Round-lobed hepatica | 7 | 70 |
| Botrychium virginianum | Rattlesnake fern | . | 47 |
| Podophyllum peltatum | Mayapple | 7 | 47 |
| Maianthemum canadense | Wild lily-of-the-valley | 7 | 35 |

| | | AFrDeO | AFH |
|---|---|---|---|
| Uvularia grandiflora | Large-flowered bellwort | 72 | 6 |
| Amphicarpa bracteata | Hog peanut | 72 | 26 |
| Osmorhiza claytoni | Sweet cicely | 65 | 20 |
| Phryma leptostachya | Lopseed | 58 | . |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 51 | . |
| Sanicula marilandica | Black snakeroot | 44 | 6 |
| Botrychium virginianum | Rattlesnake fern | 41 | . |
| Geranium maculatum | Wild geranium | 58,1 | 93,8 |
| Arisaema atrorubens | Jack-in-the-pulpit | 24 | 80 |
| Circaea quadrisulcata | Enchanter's nightshade | 62,1 | 80,5 |
| Viburnum lentago | Nannyberry | 20 | 80 |
| Fagus grandifolia | American beech | 24 | 73 |
| Hydrophyllum virgin. | Virginia waterleaf | . | 73 |
| Carpinus caroliniana | American hornbeam | 10 | 66 |
| Cornus racemosa | Gray dogwood | 17 | 66 |
| Dryopteris spinulosa | Spinulose shield fern | 31 | 60 |
| Fragaria vesca | Wood strawberry | 13 | 60 |
| Hamamelis virginiana | Witch hazel | 20,8 | 60,14 |
| Parthenocissus quinq. | Virginia creeper | 20,1 | 53,7 |
| Solidago flexicaulis | Zigzag goldenrod | . | 53 |
| Allium tricoccum | Wild leek | 13 | 46 |
| Caulophyllum thal. | Blue cohosh | 17 | 46 |
| Sanguinaria canadensis | Bloodroot | 20 | 46 |
| Solanum dulcamara | Bittersweet nightshade | 3 | 33 |



Previous View

| | | AFAs | AFAs-O |
|---|---|---|---|
| Circaea quadrisulcata | Enchanter's nightshade | 97 | 63 |
| Vitis riparia | Riverbank grape | 71 | 9 |
| Geranium maculatum | Wild geranium | 52 | 13 |
| Osmorhiza claytoni | Sweet cicely | 7 | 81 |
| Hepatica acutiloba | Sharp-lobed hepatica | 18 | 68 |
| Phryma leptostachya | Lopseed | 15 | 54 |
| Maianthemum canadense | Wild lily-of-the-valley | 18 | 45 |
| Aster macrophyllus | Large-leaved aster | 10,1 | 40,6 |
| Botrychium virginianum | Rattlesnake fern | 5 | 40 |

| | | AFAs-O | AFH |
|---|---|---|---|
| Sambucus pubens | Red-berried elder | 86 | 20 |
| Osmorhiza claytoni | Sweet cicely | 81 | 20 |
| Phryma leptostachya | Lopseed | 54 | . |
| Botrychium virginianum | Rattlesnake fern | 40 | . |
| Uvularia grandiflora | Large-flowered bellwort | 36 | 6 |
| Geranium maculatum | Wild geranium | 13,1 | 93,8 |
| Crataegus spp. | Hawthorns | . | 92 |
| Viburnum lentago | Nannyberry | 4 | 80 |
| Arisaema atrorubens | Jack-in-the-pulpit | 36 | 80 |
| Hydrophyllum virgin. | Virginia waterleaf | 36 | 73 |
| Cornus racemosa | Gray dogwood | 4 | 66 |
| Fragaria vesca | Wood strawberry | 9 | 60 |
| Hamamelis virginiana | Witch hazel | 9,2 | 60,14 |
| Solidago flexicaulis | Zigzag goldenrod | 9 | 53 |
| Viburnum raf. | Downy arrowwood | . | 46 |

| | | AFrDe(Vb) | AFrDeO |
|---|---|---|---|
| Geranium maculatum | Wild geranium | 92 | 58 |
| Viburnum raf. | Downy arrowwood | 85 | 31 |
| Cornus racemosa | Gray dogwood | 64 | 17 |
| Viburnum lentago | Nannyberry | 50 | 20 |
| Actaea spp. | Baneberries | 28 | 68 |
| Hepatica acutiloba | Sharp-lobed hepatica | 7 | 58 |
| Phryma leptostachya | Lopseed | 7 | 58 |
| Geum canadense | White avens | 21 | 51 |
| Botrychium virginianum | Rattlesnake fern | . | 41 |
| Arisaema atrorubens | Jack-in-the-pulpit | . | 24 |

| | | AFrDe | AFrDeO |
|---|---|---|---|
| Aralia nudicaulis | Wild sarsaparilla | 82 | 20 |
| Caulophyllum thal. | Blue cohosh | 70 | 17 |
| Asclepias exaltata | Poke milkweed | 58 | 3 |
| Apocynum andro. | Spreading dogbane | 35 | . |
| Viola pensylvanica | Smooth yellow violet | 11 | 68 |
| Osmorhiza claytoni | Sweet cicely | 29 | 65 |
| Circaea quadrisulcata | Enchanter's nightshade | 29 | 62 |
| Phryma leptostachya | Lopseed | 23 | 58 |
| Geum canadense | White avens | 11 | 51 |
| Galium asprellum | Cleavers | . | 48 |

*continued...*



Previous View

*...continued*

| | | AFrDe | AFrDeO |
|---|---|---|---|
| Smilax tamnoides | Bristly greenbrier | 17 | 48 |
| Sanicula marilandica | Black snakeroot | 17 | 44 |

| | | AFH | AFAs |
|---|---|---|---|
| Viburnum lentago | Nannyberry | 80 | 26 |
| Hydrophyllum virgin. | Virginia waterleaf | 73 | 34 |
| Maianthemum canadense | Wild lily-of-the-valley | 66 | 18 |
| Carpinus caroliniana | American hornbeam | 66 | 7 |
| Fragaria vesca | Wood strawberry | 60 | 7 |
| Hamamelis virginiana | Witch hazel | 60,14 | 10,5 |
| Aster macrophyllus | Large-leaved aster | 60 | 10 |
| Viburnum acerifolium | Maple-leaved viburnum | 53 | 28 |
| Solidago flexicaulis | Zigzag goldenrod | 53 | 13 |
| Viburnum raf. | Downy arrowwood | 46 | 7 |
| Hepatica acutiloba | Sharp-lobed hepatica | 40 | 18 |

| | | AFAs-O | AFTD |
|---|---|---|---|
| Hepatica acutiloba | Sharp-lobed hepatica | 68 | 8 |
| Circaea quadrisulcata | Enchanter's nightshade | 63 | 25 |
| Sanguinaria canadensis | Bloodroot | 54 | . |
| Phryma leptostachya | Lopseed | 54 | 16 |
| Geum canadense | White avens | 45 | 8 |
| Botrychium virginianum | Rattlesnake fern | 40 | 16 |
| Hydrophyllum virgin. | Virginia waterleaf | 36 | 8 |
| Maianthemum canadense | Wild lily-of-the-valley | 45 | 100 |
| Dryopteris spinulosa | Spinulose shield fern | 36 | 91 |
| Solanum dulcamara | Bittersweet nightshade | 4 | 50 |
| Lonicera canadensis | American fly honeysuckle | 9 | 41 |



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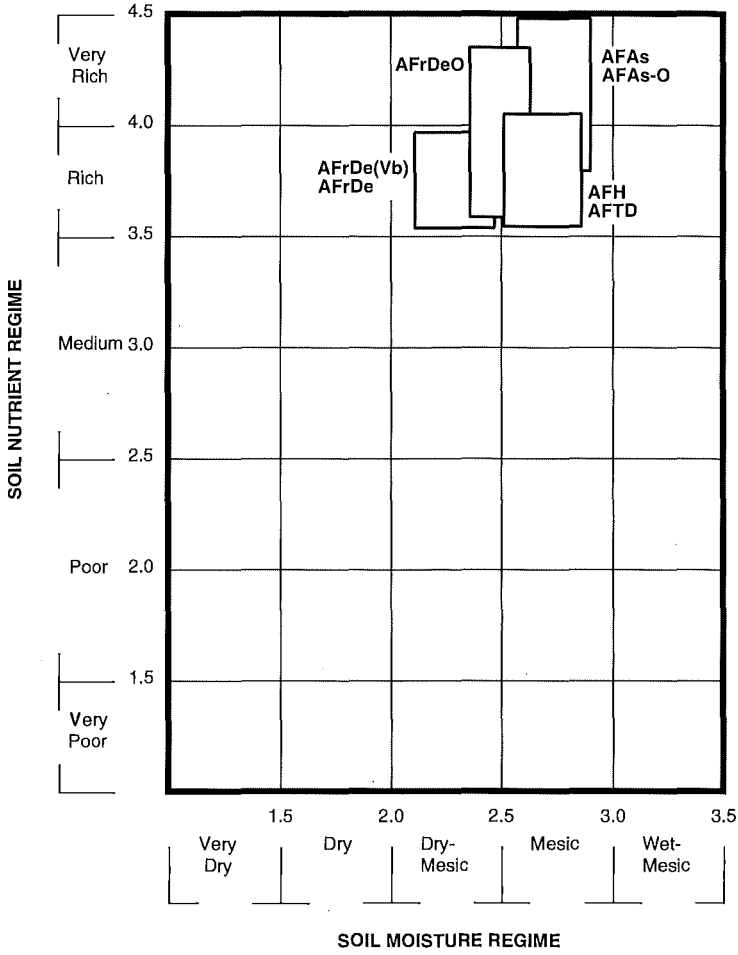
# Relationship of Habitat Types to Soil Moisture and Nutrient Regimes in Region 11



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# AFrDe(Vb)
## *Acer saccharum-Fraxinus/Desmodium* habitat type, (*Viburnum* phase) (Sugar maple-White ash/Tick-trefoil [Maple-leaf viburnum phase])

**Distribution:**
Predominantly in western Sheboygan county but also western Manitowoc and Washington counties. Entirely Natural Subdivision 5b.

**Similar types:** AFrDe, AFrDeO (Region 11), ATiFrVb (Region 10).

**Landform and soils:**
Silt loams and loams over brown calcareous till. Rolling to steep kettle moraine topography common. Closely associated with the two **AFrDe** variants. **Dry-mesic/nutrient rich sites.**

**Vegetation:**
**Common forest cover types**: The **Viburnum** phase of **AFrDe** habitat type is usually dominate by various mixtures of *red oak, white oak, red maple* and *big-tooth aspen*. When *sugar maple* and *white ash* are present they are typically in the smaller size classes. *Basswood* is uncommon.

**Shrub and small tree layer**: The **Viburnum** phase generally has the most vigorous shrub layer of any type in this region. The following species are frequently represented with high coverage: *choke cherry, black cherry, maple-leaf viburnum, arrowwood, wild currants and gooseberries, gray dogwood, blackberries* and *raspberries*. On the other hand, there is a conspicuous lack of *buckthorn* and *Japanese honeysuckle*.

**Ground flora characteristics**: In contrast to shrub and small tree layer herbaceous species are not well represented. Those with highest constancies are: *riverbank grape, wild geranium, meadow rue, trillium* and *big-leaf aster*. Sometimes *tick-trefoil* and *hog peanut* are well represented.

**Disturbance and succession**: The **Viburnum** phase is interpreted to be a disturbance phase of the **AFrDe** habitat type. Both, the tree layer and understory vegetation clearly indicate past disturbance. According to maps of presettlement vegetation some stands are developing in place of former oak savanna or oak openings, but others are logged-over maple-ash-basswood forests. *White ash* regeneration is observed in many stands where *sugar maple* is lacking. It appears that in the absence of disturbance ash dominated communities will precede *sugar maple-basswood* forests in many places.



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# AFrDe(Vb)

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Vitis riparia | Riverbank grape | 100 | 2.31 |
| Geranium maculatum | Wild geranium | 92 | 2.62 |
| Trillium cernuum | Nodding trillium | 92 | 0.41 |
| Grasses spp. | Grasses | 85 | 10.91 |
| Triosteum aurantiacum | Orange-fruited horse gentain | 71 | 0.10 |
| Thalictrum dioicum | Early meadow rue | 71 | 4.63 |
| Aster macrophyllus | Large-leaved aster | 64 | 5.77 |
| Polygonatum pubescens | Hairy solomon's seal | 64 | 0.59 |
| Smilax herbacea | Carrion flower | 64 | 0.10 |
| Smilacina racemosa | False solomon's seal | 57 | 0.29 |
| Amphicarpa bracteata | Hog peanut | 57 | 4.14 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 57 | 8.81 |
| Uvularia grandiflora | Large-flowered bellwort | 42 | 0.18 |
| Prenanthes alba | White lettuce | 42 | 0.10 |
| Parthenocissus quinquefolia | Virginia creeper | 35 | 3.18 |
| Circaea quadrisulcata | Enchanter's nightshade | 35 | 0.10 |
| Dryopteris spinulosa | Spinulose shield fern | 35 | 0.30 |
| Ranunculus abortivus | Small-flowered crowfoot | 35 | 0.10 |
| Osmorhiza claytoni | Sweet cicely | 28 | 0.95 |
| Actaea spp. | Baneberries | 28 | 0.22 |
| Agrimonia gryposepala | Agrimony | 28 | 0.10 |
| Rhus radicans | Poison ivy | 28 | 0.22 |
| Conopholis americana | Squawroot | 28 | 0.10 |
| Galium asprellum | Cleavers | 21 | 0.27 |
| Geum canadense | White avens | 21 | 0.10 |
| Smilax tamnoides | Bristly greenbrier | 21 | 0.27 |
| Celestrus scandens | Climbing bittersweet | 21 | 0.10 |
| **Shrubs** | | | |
| Prunus virginiana | Chokecherry | 100 | 9.37 |
| Viburnum acerifolium | Maple-leaved viburnum | 100 | 3.96 |
| Ribes cynosbati | Prickly gooseberry | 92 | 4.29 |
| Viburnum rafinesquianum | Downy arrowwood | 85 | 2.88 |
| Amelanchier spp. | Juneberry | 85 | 2.19 |
| Cornus racemosa | Gray dogwood | 64 | 1.23 |
| Rubus spp. | Blackberries/raspberries | 64 | 2.40 |
| Crataegus spp. | Hawthorns | 57 | 0.95 |
| Lonicera spp. | Honeysuckles | 57 | 1.31 |
| Cornus alternifolia | Alternate-leaved dogwood | 57 | 0.95 |
| Viburnum lentago | Nannyberry | 50 | 2.79 |
| Hamamelis virginiana | Witch hazel | 21 | 17.53 |
| Rosa spp. | Roses | 21 | 0.27 |

*continued...*



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*...continued*

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Tree Seedlings** | | | |
| Fraxinus americana | White ash | 100 | 10.20 |
| Prunus serotina | Black cherry | 100 | 4.47 |
| Ostrya virginiana | Ironwood | 92 | 2.66 |
| Carya ovata | Shagbark hickory | 92 | 1.31 |
| Quercus rubra | Northern red oak | 78 | 0.37 |
| Ulmus spp | Elms | 78 | 0.59 |
| Acer saccharum | Sugar maple | 78 | 0.90 |
| Acer rubrum | Red maple | 78 | 0.19 |
| Tilia americana | Basswood | 64 | 0.86 |
| Populus grandidentata | Bigtooth aspen | 50 | 0.31 |
| Quercus alba | White oak | 28 | 0.10 |
| Populus tremuloides | Trembling aspen | 28 | 0.35 |
| Carya cordiformis | Bitternut hickory | 21 | 0.43 |



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# AFrDe and AFrDeO

## *Acer saccharum-Fraxinus americana/ Desmodium glutinosum*
## *Acer saccharum-Fraxinus americana/ Desmodium-Osmorhiza*
## (Sugar maple-white ash/Tick-trefoil Sugar maple-White ash/Tick-trefoil-Sweet cicely)

**Distribution:**
Predominantly in western Sheboygan county but also western Manitowoc and Washington counties. Entirely Natural Subdivision 5b.

**Similar types**: AFrDe(Vb) (Region 11), ATiFrVb (Region 10).

**Landform and soils:**
Silt loams and loams over brown calcareous till. Rolling to steep kettle moraine topography common. The **AFrDe** represents **dry-mesic/nutrient rich** sites and **AFrDeO** slightly **more mesic** and somewhat **richer** sites. These differences are expressed either in terms of soil depth, texture or topographic position. Because all of these factors compensate for each other no uniform descriptions of the two site types are possible.

**Vegetation:**
**Common forest cover types**: *Sugar maple* is usually dominant and well represented in all size classes. *Red oak* is well represented only in the largest diameter classes. *White ash* and *basswood* are the only other important associates. *American beech* is occasionally found on these types, but is far more prevalent east and north of the kettle moraine region. In contrast to mesic and dry-mesic forests in the western part of the state *white ash* is significantly more important in region 11 and *bitternut hickory* is less important.

**Shrub and small tree layer**: Shrub layer is moderately well developed, although where openings in the canopy occur tree seedlings and saplings dominate. Shrubs with high constancy and moderate coverage are *wild currants* and *gooseberies, choke cherry, black cherry, maple-leaf viburnum* and *serviceberry*.

**Ground flora characteristics:**
Large number of herb species can be found on these types but total coverage varies greatly, depending on density of tree canopy. Where canopy gaps are filled with thickets of *sugar maple* reproduction few herbs are found. The two types share most of the



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same flora but each also contains species that have significantly different constancies. The **AFrDe** type has a higher frequency of *wild sarsaparilla, common milkweed* and *blue cohosh* while the **AFrDeO** type has higher frequency of *sweet cicely (Osmorhiza), enchanter's nightshade, lopseed, bristly greenbrier, black snakeroot, smooth yellow violet*, and *white avens*.

**Disturbance and succession:** In terms of community dynamics the two habitat types do not appear to differ. In absence of stand-replacing disturbance *sugar maple* dominated communities develop. *Basswood* and especially *white ash* are reproducing well in canopy gaps and are considered to be permanent associates. *Red* and *white oak* do not play important role on these types in absence of disturbance. In fire protected landscapes *sugar maple-white ash-basswood* communities were probably stable in presettlement time.



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# AFrDe

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Grasses spp. | Grasses | 100 | 10.75 |
| Polygonatum pubescens | Hairy solomon's seal | 100 | 0.82 |
| Vitis riparia | Riverbank grape | 94 | 0.93 |
| Trillium cernuum | Nodding trillium | 94 | 0.44 |
| Aster macrophyllus | Large-leaved aster | 94 | 4.47 |
| Geranium maculatum | Wild geranium | 88 | 0.79 |
| Smilax herbacea | Carrion flower | 82 | 0.31 |
| Aralia nudicaulis | Wild sarsaparilla | 82 | 1.89 |
| Actaea spp. | Baneberries | 76 | 0.44 |
| Amphicarpa bracteata | Hog peanut | 76 | 3.36 |
| Uvularia grandiflora | Large-flowered bellwort | 76 | 1.85 |
| Caulophyllum thalictroides | Blue cohosh | 70 | 1.67 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 70 | 3.72 |
| Hepatica americana | Round-lobed hepatica | 70 | 0.63 |
| Smilacina racemosa | False solomon's seal | 64 | 2.07 |
| Triosteum aurantiacum | Orange-fruited horse gentain | 58 | 0.15 |
| Asclepias exaltata | Poke milkweed | 58 | 0.10 |
| Ranunculus abortivus | Small-flowered crowfoot | 58 | 0.15 |
| Thalictrum dioicum | Early meadow rue | 52 | 7.80 |
| Botrychium virginianum | Rattlesnake fern | 47 | 0.16 |
| Podophyllum peltatum | Mayapple | 47 | 5.88 |
| Rhus radicans | Poison ivy | 47 | 0.10 |
| Prenanthes alba | White lettuce | 41 | 0.51 |
| Dryopteris spinulosa | Spinulose shield fern | 41 | 0.51 |
| Lactuca spp. | Wild lettuce | 41 | 0.10 |
| Apocynum androsaemifolium | Spreading dogbane | 35 | 0.27 |
| Galium triflorum | Sweet-scented bedstraw | 35 | 0.20 |
| Galium circaezans | Wild licorice | 35 | 0.18 |
| Anemone virginiana | Thimble weed | 35 | 0.18 |
| Maianthemum canadense | Wild lily-of-the-valley | 35 | 0.27 |
| Adiantum pedatum | Maidenhair fern | 29 | 6.16 |
| Circaea quadrisulcata | Enchanter's nightshade | 29 | 0.10 |
| Osmorhiza claytoni | Sweet cicely | 29 | 0.20 |
| Ranunculus hispidus | Hispid buttercup | 29 | 0.30 |
| Phryma leptostachya | Lopseed | 23 | 0.10 |
| Sanguinaria canadensis | Bloodroot | 23 | 4.80 |
| Veronicastrum virginicum | Culver's root | 23 | 0.10 |
| **Shrubs** | | | |
| Ribes cynosbati | Prickly gooseberry | 94 | 2.31 |
| Prunus virginiana | Chokecherry | 88 | 4.02 |
| Viburnum acerifolium | Maple-leaved viburnum | 70 | 0.71 |
| Viburnum rafinesquianum | Downy arrowwood | 52 | 0.21 |
| Cornus alternifolia | Alternate-leaved dogwood | 52 | 1.18 |
| Xanthoxylum americanum | Prickly ash | 47 | 2.21 |

*continued...*



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*...continued*

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| Amelanchier spp. | Juneberry | 47 | 0.22 |
| Symphoricarpos albus | Snowberry | 35 | 0.67 |
| Rubus spp. | Blackberries/raspberries | 29 | 0.10 |
| Viburnum lentago | Nannyberry | 23 | 0.10 |
| **Tree Seedlings** | | | |
| Acer saccharum | Sugar maple | 100 | 4.41 |
| Fraxinus americana | White ash | 100 | 7.37 |
| Ostrya virginiana | Ironwood | 88 | 1.04 |
| Tilia americana | Basswood | 88 | 0.39 |
| Prunus serotina | Black cherry | 82 | 0.90 |
| Quercus rubra | Northern red oak | 82 | 0.28 |
| Carya ovata | Shagbark hickory | 76 | 0.67 |
| Acer rubrum | Red maple | 52 | 0.10 |
| Populus grandidentata | Bigtooth aspen | 35 | 0.18 |
| Ulmus spp | Elms | 29 | 0.10 |
| Carya cordiformis | Bitternut hickory | 23 | 0.22 |
| Juglans cinerea | Butternut | 23 | 0.22 |



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# AFrDeO

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Trillium cernuum | Nodding trillium | 96 | 0.47 |
| Grasses spp. | Grasses | 93 | 7.10 |
| Polygonatum pubescens | Hairy solomon's seal | 82 | 1.24 |
| Uvularia grandiflora | Large-flowered bellwort | 72 | 0.94 |
| Amphicarpa bracteata | Hog peanut | 72 | 1.90 |
| Aster macrophyllus | Large-leaved aster | 72 | 3.79 |
| Vitis riparia | Riverbank grape | 68 | 0.42 |
| Actaea spp. | Baneberries | 68 | 0.81 |
| Viola pensylvanica | Smooth yellow violet | 68 | 0.42 |
| Ranunculus abortivus | Small-flowered crowfoot | 65 | 0.31 |
| Osmorhiza claytoni | Sweet cicely | 65 | 0.79 |
| Circaea quadrisulcata | Enchanter's nightshade | 62 | 0.78 |
| Geranium maculatum | Wild geranium | 58 | 1.04 |
| Hepatica acutiloba | Sharp-lobed hepatica | 58 | 0.82 |
| Phryma leptostachya | Lopseed | 58 | 0.65 |
| Smilax herbacea | Carrion flower | 58 | 0.62 |
| Smilacina racemosa | False solomon's seal | 55 | 0.47 |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 51 | 1.68 |
| Geum canadense | White avens | 51 | 0.17 |
| Smilax tamnoides | Bristly greenbrier | 48 | 0.79 |
| Galium asprellum | Cleavers | 48 | 0.21 |
| Sanicula marilandica | Black snakeroot | 44 | 0.25 |
| Thalictrum dioicum | Early meadow rue | 44 | 6.50 |
| Maianthemum canadense | Wild lily-of-the-valley | 41 | 0.55 |
| Botrychium virginianum | Rattlesnake fern | 41 | 0.59 |
| Anemone quinquefolia | Wood anemone | 41 | 0.71 |
| Triosteum aurantiacum | Orange-fruited horse gentain | 31 | 0.21 |
| Podophyllum peltatum | Mayapple | 31 | 5.77 |
| Prenanthes alba | White lettuce | 31 | 0.27 |
| Dryopteris spinulosa | Spinulose shield fern | 31 | 0.42 |
| Solidago spp. | Goldenrods | 27 | 0.35 |
| Arisaema atrorubens | Jack-in-the-pulpit | 24 | 0.10 |
| Parthenocissus quinquefolia | Virginia creeper | 20 | 0.67 |
| Sanguinaria canadensis | Bloodroot | 20 | 0.75 |
| Aralia nudicaulis | Wild sarsaparilla | 20 | 1.15 |
| Galium triflorum | Sweet-scented bedstraw | 20 | 0.75 |
| **Shrubs** | | | |
| Ribes cynosbati | Prickly gooseberry | 100 | 4.02 |
| Prunus virginiana | Chokecherry | 93 | 4.10 |
| Amelanchier spp. | Juneberry | 79 | 1.09 |
| Viburnum acerifolium | Maple-leaved viburnum | 72 | 3.01 |
| Xanthoxylum americanum | Prickly ash | 48 | 2.01 |
| Lonicera spp. | Honeysuckles | 41 | 0.59 |
| Rubus spp. | Blackberries/raspberries | 41 | 0.95 |

*continued...*



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*...continued*

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| Cornus alternifolia | Alternate-leaved dogwood | 37 | 0.55 |
| Viburnum rafinesquianum | Downy arrowwood | 31 | 0.21 |
| Viburnum lentago | Nannyberry | 20 | 0.18 |
| Hamamelis virginiana | Witch hazel | 20 | 7.63 |
| **Trees Seedlings** | | | |
| Acer saccharum | Sugar maple | 100 | 8.57 |
| Fraxinus americana | White ash | 96 | 5.29 |
| Tilia americana | Basswood | 89 | 1.11 |
| Ostrya virginiana | Ironwood | 89 | 1.78 |
| Prunus serotina | Black cherry | 82 | 1.39 |
| Quercus rubra | Northern red oak | 79 | 0.55 |
| Carya ovata | Shagbark hickory | 65 | 0.52 |
| Ulmus spp | Elms | 62 | 1.73 |
| Carya cordiformis | Bitternut hickory | 48 | 1.55 |
| Quercus alba | White oak | 24 | 0.17 |
| Acer rubrum | Red maple | 24 | 0.10 |
| Fagus grandifolia | American beech | 24 | 0.59 |



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# AFTD

## *Acer saccharum-Fagus-Tsuga/Dryopteris spinulosa*
## (Sugar maple-American beech-Hemlock/ Spinulose shield fern)

### Distribution:
Manitowoc, Brown and Kewaunee counties (best represented in eastern parts, Natural Subdivision 3c).

**Similar types**: AFAs-O (occurs in same area).

### Landform and soils:
Level to rolling topography, recessional moraines or other ice-contact glacial deposits. Soils are predominantly sandy loam or loamy sand. Some sites with deep sand and within close proximity of Lake Michigan also fit this type floristically. In spite of relatively coarse soils vegetation on these sites reflects **mesic, medium to rich nutrient conditions**.

### Vegetation:
**Common forest cover types:** *Sugar maple* and *beech* are principal dominants in most stands. In contrast to **AFAs** types, *basswood* and *white ash* are absent or rare, while *hemlock* and *yellow birch* are often present. *Black cherry* is sometimes present as a tree, while on other habitat types it is found only in the sapling and seedling layer.

**Shrub and small tree layer**: This layer is not well developed in most stands. *Elderberry, choke cherry, black cherry* and *gooseberries* are the only shrubs with common occurrence. *Sugar maple* saplings most often fill this layer. *Ironwood* (*Ostrya*) is also much less common than it is on other mesic types of region 11.

**Ground flora characteristics**: Floristically, **AFTD** type has the appearance of a transitional community between the southern and northern mesic type. Several characteristically southern species are rare or no longer present on this type (*e.g.*: *Sharp-lobed hepatica, lopseed, enchanter's nightshade, wild geranium, white avens, Virginia creeper*, and *mayapple*). Conversely, a few predominantly northern species attain high constancy or coverage (*e.g.*: *Spinulose shield fern, wild lily-of-the valley, partridgeberry, big-leaf aster* and *fly-honeysuckle*).

**Disturbance and succession**: This is the only habitat type in region 11 where the occurrence of *sugar maple* reproduction does not rank ahead of *American beech*. Significant presence of *yellow birch* and *white ash* saplings was also found, but *hemlock* reproduction was nil. Without major disturbance *beech* and *sugar maple* will continue to dominate. Significant increases of *hemlock* and *yellow birch* cannot be expected unless seed source is substantially increased through management. (Also see this section under **AFAsHa** type description).



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# AFTD

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Maianthemum canadense | Wild lily-of-the-valley | 100 | 1.03 |
| Polygonatum pubescens | Hairy solomon's seal | 91 | 1.38 |
| Dryopteris spinulosa | Spinulose shield fern | 91 | 4.78 |
| Actaea spp. | Baneberries | 83 | 1.03 |
| Viola pensylvanica | Smooth yellow violet | 83 | 0.83 |
| Grasses spp. | Grasses | 75 | 0.64 |
| Osmorhiza claytoni | Sweet cicely | 66 | 0.71 |
| Smilacina racemosa | False solomon's seal | 66 | 0.35 |
| Trillium cernuum | Nodding trillium | 66 | 0.41 |
| Arisaema atrorubens | Jack-in-the-pulpit | 66 | 0.95 |
| Ranunculus abortivus | Small-flowered crowfoot | 58 | 0.17 |
| Solanum dulcamara | Bittersweet nightshade | 50 | 0.18 |
| Sedges spp. | Sedges | 50 | 7.78 |
| Galium asprellum | Cleavers | 41 | 0.78 |
| Allium tricoccum | Wild leek | 41 | 0.30 |
| Hepatica americana | Round-lobed hepatica | 33 | 0.35 |
| Impatiens capensis | Jewelweed | 33 | 7.55 |
| Aster macrophyllus | Large-leaved aster | 33 | 1.55 |
| Mitchella repens | Partridgeberry | 33 | 3.83 |
| Caulophyllum thalictroides | Blue cohosh | 33 | 16.42 |
| Aralia nudicaulis | Wild sarsaparilla | 25 | 20.90 |
| Circaea quadrisulcata | Enchanter's nightshade | 25 | 0.10 |
| Vitis riparia | Riverbank grape | 25 | 0.27 |
| Aralia racemosa | Spikenard | 25 | 0.27 |
| **Shrubs** | | | |
| Sambucus pubens | Red-berried elder | 100 | 2.88 |
| Prunus virginiana | Chokecherry | 91 | 2.16 |
| Ribes cynosbati | Prickly gooseberry | 75 | 1.56 |
| Rubus spp. | Blackberries/raspberries | 58 | 0.51 |
| Lonicera canadensis | American fly honeysuckle | 41 | 0.68 |
| Viburnum acerifolium | Maple-leaved viburnum | 41 | 3.76 |
| Ribes lacustre | Bristly black currant | 25 | 0.27 |
| Hamamelis virginiana | Witch hazel | 25 | 1.23 |
| **Tree Seedlings** | | | |
| Acer saccharum | Sugar maple | 100 | 13.15 |
| Fagus grandifolia | American beech | 100 | 3.60 |
| Fraxinus americana | White ash | 100 | 5.88 |
| Prunus serotina | Black cherry | 83 | 1.51 |
| Quercus rubra | Northern red oak | 66 | 0.65 |
| Tilia americana | Basswood | 58 | 0.31 |
| Acer rubrum | Red maple | 41 | 0.30 |
| Ostrya virginiana | Ironwood | 33 | 0.95 |
| Betula alleghaniensis | Yellow birch | 25 | 0.10 |
| Tsuga canadensis | Eastern hemlock | 25 | 5.07 |



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# AFH

## *Acer saccharum-Fagus/Hydrophyllum*
## (Sugar maple-Beech/Virginia waterleaf)

**Distribution:**
Sheboygan, Manitowoc and Brown counties and eastern part of Ozaukee county. (Natural Subdivision 3c).

**Similar types:** AFAs, AFAs-O

**Landform and soils:**
Loams and silt loams over red clay calcareous till. Level to rolling topography. This type is intermixed with **AFAs** and **AFAs-O** types, most commonly on lower topographic positions, or where there is only thin loamy layer over clay. In all cases surface drainage is somewhat impaired. **Mesic/nutrient rich** sites.

**Vegetation:**
**Common forest cover types**: *sugar maple* and *white ash* usually dominate. *American Beech* presence is sporadic. Compared with the **AFAs** types *basswood* is less common while *red oak* and, to some extent, *red maple* are present more often. *Ironwood* (*Ostrya*) is common in the understory.

**Shrub and small tree layer**: Species with highest constancy are *wild currants* and *gooseberries, choke cherry, black cherry* and *nannyberry.* Somewhat less frequently present but more characteristic species of this type are *witch hazel* and *blue beech* (*Carpinus*) which often occur in scattered clumps. *Maple-leaf viburnum* and *gray dogwood* were present in about 60% of the stands. Conspicuously absent are *beaked* and *American hazel.*

**Ground flora characteristics**: *wild geranium, enchanter's nightshade* and *Virginia waterleaf* most often constitute the majority of herbaceous cover. Other frequent species are: *trillium, solomon's seal, baneberry, jack-in-the-pulpit, white avens* and *wood strawberry.*

**Disturbance and succession**: Mesic forests are everywhere the most stable of forest community types in a sense that one or the other of the usual two to four canopy species regenerates in any canopy gap. *Sugar maple* almost always dominates the regeneration layer, but other associated tolerant species are also represented to a varying degree. Records of presettlement vegetation suggest that *American beech* was once better represented within its botanical range than it is today. The factors responsible for the differences in regeneration success between *sugar maple* and *American beech* have not been adequately studied in Wisconsin. Current successional trends on the **AFH** type point to continuation of *sugar maple* dominance and strong participation of *white ash* and *American beech.* Other species are relatively unimportant.



Previous View

# AFH

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Geranium maculatum | Wild geranium | 93 | 7.59 |
| Grasses spp. | Grasses | 86 | 2.33 |
| Circaea quadrisulcata | Enchanter's nightshade | 80 | 4.52 |
| Smilacina racemosa | False solomon's seal | 80 | 1.67 |
| Geum canadense | White avens | 80 | 0.63 |
| Arisaema atrorubens | Jack-in-the-pulpit | 80 | 0.63 |
| Actaea spp. | Baneberries | 80 | 0.35 |
| Hydrophyllum virginianum | Virginia waterleaf | 73 | 3.21 |
| Polygonatum pubescens | Hairy solomon's seal | 73 | 0.15 |
| Trillium cernuum | Nodding trillium | 73 | 1.29 |
| Maianthemum canadense | Wild lily-of-the-valley | 66 | 0.35 |
| Viola pensylvanica | Smooth yellow violet | 66 | 3.76 |
| Fragaria vesca | Wood strawberry | 60 | 0.21 |
| Dryopteris spinulosa | Spinulose shield fern | 60 | 2.57 |
| Aster macrophyllus | Large-leaved aster | 60 | 1.56 |
| Solidago flexicaulis | Zigzag goldenrod | 53 | 0.22 |
| Vitis riparia | Riverbank grape | 53 | 0.59 |
| Smilax herbacea | Carrion flower | 53 | 0.22 |
| Parthenocissus quinquefolia | Virginia creeper | 53 | 6.76 |
| Allium tricoccum | Wild leek | 46 | 0.24 |
| Caulophyllum thalictroides | Blue cohosh | 46 | 0.31 |
| Thalictrum dioicum | Early meadow rue | 46 | 0.51 |
| Sanguinaria canadensis | Bloodroot | 46 | 0.24 |
| Podophyllum peltatum | Mayapple | 40 | 6.03 |
| Hepatica acutiloba | Sharp-lobed hepatica | 40 | 0.67 |
| Galium triflorum | Sweet-scented bedstraw | 33 | 1.36 |
| Ranunculus hispidus | Hispid buttercup | 33 | 0.10 |
| Solanum dulcamara | Bittersweet nightshade | 33 | 0.10 |
| Prenanthes alba | White lettuce | 33 | 0.10 |
| Agrimonia gryposepala | Agrimony | 26 | 0.22 |
| Amphicarpa bracteata | Hog peanut | 26 | 3.95 |
| Ranunculus abortivus | Small-flowered crowfoot | 26 | 0.10 |
| Mitchella repens | Partridgeberry | 20 | 0.43 |
| Triosteum aurantiacum | Orange-fruited horse gentain | 20 | 0.10 |
| Athyrium filix-femina | Lady fern | 20 | 0.43 |
| Lactuca spp | Wild lettuce | 20 | 0.27 |
| Impatiens capensis | Jewelweed | 20 | 0.10 |
| Osmorhiza claytoni | Sweet cicely | 20 | 1.07 |
| Hepatica americana | Round-lobed hepatica | 20 | 0.10 |
| Sedges spp. | Sedges | 20 | 11.00 |
| Epipactis helleborine | Helleborine | 20 | 0.27 |

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Shrubs** | | | |
| Ribes cynosbati | Prickly gooseberry | 100 | 3.60 |
| Prunus virginiana | Chokecherry | 93 | 7.72 |
| Viburnum lentago | Nannyberry | 80 | 2.67 |
| Cornus racemosa | Gray dogwood | 66 | 1.02 |
| Hamamelis virginiana | Witch hazel | 60 | 13.81 |
| Amelanchier spp. | Juneberry | 53 | 4.68 |
| Viburnum acerifolium | Maple-leaved viburnum | 53 | 1.01 |
| Xanthoxylum americanum | Prickly ash | 53 | 2.21 |
| Rubus spp. | Blackberries/raspberries | 46 | 0.24 |
| Viburnum rafinesquianum | Downy arrowwood | 46 | 0.66 |
| Lonicera canadensis | American fly honeysuckle | 26 | 1.08 |
| Viburnum trilobum | Highbush cranberry | 26 | 0.10 |
| Rubus parviflorus | White-flowering raspberry | 26 | 4.20 |
| Cornus alternifolia | Alternate-leaved dogwood | 20 | 0.60 |
| Rosa spp. | Roses | 20 | 0.10 |
| Sambucus pubens | Red-berried elder | 20 | 0.10 |
| Ribes spp. | Gooseberries | 20 | 0.10 |
| **Tree Seedlings** | | | |
| Acer saccharum | Sugar maple | 100 | 3.54 |
| Tilia americana | Basswood | 93 | 1.48 |
| Fraxinus americana | White ash | 93 | 7.25 |
| Quercus rubra | Northern red oak | 86 | 0.37 |
| Prunus serotina | Black cherry | 80 | 0.83 |
| Ostrya virginiana | Ironwood | 73 | 1.12 |
| Fagus grandifolia | American beech | 73 | 0.98 |
| Acer rubrum | Red maple | 73 | 0.15 |
| Crataegus spp. | Hawthorns | 66 | 0.49 |
| Carpinus caroliniana | American hornbeam | 66 | 5.01 |
| Carya cordiformis | Bitternut hickory | 66 | 0.35 |
| Ulmus spp | Elms | 60 | 0.27 |
| Fraxinus nigra | Black ash | 46 | 0.24 |
| Quercus bicolor | Swamp white oak | 26 | 0.10 |
| Quercus alba | White oak | 20 | 0.10 |
| Carya ovata | Shagbark hickory | 20 | 0.10 |



Previous View

# AFAs and AFAs-O

## *Acer saccharum-Fagus/Arisaema* (Sugar maple-American beech/Jack-in-the-pulpit) and *Osmorhiza* (Sweet cicely) variant

**Distribution:**
Sheboygan, Manitowoc and Brown counties and eastern part of Ozaukee county. Natural Subdivision 3c).

**Similar types**: AFH, AFTD (Primarily Kewaunee and Door counties, Natural Subdivision 3b).

**Landform and soils:**
Level to rolling topography. **AFAs** type most common on loams and silt loams over red-clay calcareous till. **AFAs-O** is more common on loams and sandy loams on recessional moraines and other ice-contact glacial deposits. Very rocky soil profile. **Mesic/ nutrient rich and very rich sites.**

**Vegetation:**
**Common forest cover types**: Various mixtures of *sugar maple, white ash, American beech* and *basswood* predominate. Presence of *beech* is the most important characteristic. *Red oak* is much less frequent than on **AFrDe** types.

**Shrub and small tree layer**: Shrub species are not numerous or well represented on this type. Only *black cherry, elderberry* and *wild currants/gooseberries* are common. Tree saplings generally dominate this layer.

**Ground flora characteristics**: Several species, typical of rich mesic forests of all regions, are much better represented on this type than on the **Acer-Fraxinus** types of region 11. Some of these are: *Virginia waterleaf, zig-zag goldenrod, bloodroot, jack-in-the-pulpit, blue cohosh, wild leek* and *sharp-lobed hepatica.*

Floristic differences between **AFAs** and the **Osmorhiza variant** while not great suggest some ecological difference that may be important. We draw this conclusion on the basis of data from relatively large number of stands of each type. The **Osmorhiza** variant has significantly higher constancy values for the following species: *sharp-lobed hepatica, sweet cicely, rattlesnake fern, large-leaf aster*, and *wild lily-of-the-valley.* Conversely, the **AFAs** has better representation of *enchanter's nightshade, riverbank grape, wild geranium* and *jack-in-the-pulpit.*

**Disturbance and succession**:
See description under AFH type.



Previous View

# AFAs

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Circaea quadrisulcata | Enchanter's nightshade | 97 | 3.06 |
| Actaea spp. | Baneberries | 81 | 1.38 |
| Trillium cernuum | Nodding trillium | 81 | 0.68 |
| Arisaema atrorubens | Jack-in-the-pulpit | 78 | 2.27 |
| Smilacina racemosa | False solomon's seal | 73 | 5.36 |
| Vitis riparia | Riverbank grape | 71 | 0.32 |
| Geum canadense | White avens | 68 | 0.94 |
| Grasses spp. | Grasses | 65 | 0.28 |
| Geranium maculatum | Wild geranium | 52 | 4.60 |
| Parthenocissus quinquefolia | Virginia creeper | 52 | 1.81 |
| Caulophyllum thalictroides | Blue cohosh | 52 | 0.69 |
| Viola pensylvanica | Smooth yellow violet | 47 | 2.97 |
| Podophyllum peltatum | Mayapple | 47 | 4.17 |
| Sanguinaria canadensis | Bloodroot | 47 | 0.38 |
| Sedges spp. | Sedges | 47 | 11.58 |
| Allium tricoccum | Wild leek | 44 | 0.51 |
| Polygonatum pubescens | Hairy solomon's seal | 42 | 0.38 |
| Thalictrum dioicum | Early meadow rue | 39 | 6.01 |
| Dryopteris spinulosa | Spinulose shield fern | 39 | 0.43 |
| Hydrophyllum virginianum | Virginia waterleaf | 34 | 0.88 |
| Ranunculus abortivus | Small-flowered crowfoot | 26 | 0.20 |
| Smilax herbacea | Carrion flower | 23 | 0.10 |
| Amphicarpa bracteata | Hog peanut | 23 | 0.53 |
| Solanum dulcamara | Bittersweet nightshade | 23 | 0.16 |
| Epipactis helleborine | Helleborine | 23 | 0.16 |
| **Shrubs** | | | |
| Prunus virginiana | Chokecherry | 100 | 9.55 |
| Ribes cynosbati | Prickly gooseberry | 92 | 4.64 |
| Rubus spp. | Blackberries/raspberries | 55 | 0.17 |
| Sambucus pubens | Red-berried elder | 50 | 2.38 |
| Cornus alternifolia | Alternate-leaved dogwood | 39 | 1.97 |
| Xanthoxylum americanum | Prickly ash | 28 | 3.43 |
| Viburnum acerifolium | Maple-leaved viburnum | 28 | 0.24 |
| Viburnum lentago | Nannyberry | 26 | 0.78 |
| Cornus racemosa | Gray dogwood | 23 | 2.13 |
| Lonicera canadensis | American fly honeysuckle | 21 | 2.04 |
| **Tree Seedlings** | | | |
| Acer saccharum | Sugar maple | 100 | 15.41 |
| Fraxinus americana | White ash | 97 | 9.04 |
| Tilia americana | Basswood | 78 | 0.56 |
| Prunus serotina | Black cherry | 78 | 2.29 |
| Ulmus spp. | Elms | 71 | 2.03 |
| Carya cordiformis | Bitternut hickory | 63 | 1.67 |
| Fagus grandifolia | American beech | 57 | 3.30 |
| Ostrya virginiana | Ironwood | 55 | 0.42 |
| Quercus rubra | Northern red oak | 50 | 0.46 |
| Carya ovata | Shagbark hickory | 28 | 0.76 |

# AFAs-O

Understory species in order of decreasing constancy, with average coverage.

| Scientific name | Common name | Constancy % | Coverage % |
|---|---|---|---|
| **Herbs** | | | |
| Actaea spp. | Baneberries | 95 | 0.82 |
| Viola pensylvanica | Smooth yellow violet | 90 | 2.13 |
| Polygonatum pubescens | Hairy solomon's seal | 86 | 0.59 |
| Osmorhiza claytoni | Sweet cicely | 81 | 1.63 |
| Smilacina racemosa | False solomon's seal | 77 | 1.75 |
| Caulophyllum thalictroides | Blue cohosh | 72 | 0.68 |
| Trillium cernuum | Nodding trillium | 68 | 1.94 |
| Grasses spp. | Grasses | 68 | 0.47 |
| Hepatica acutiloba | Sharp-lobed hepatica | 68 | 2.90 |
| Circaea quadrisulcata | Enchanter's nightshade | 63 | 1.34 |
| Sanguinaria canadensis | Bloodroot | 54 | 0.43 |
| Phryma leptostachya | Lopseed | 54 | 0.51 |
| Ranunculus abortivus | Small-flowered crowfoot | 50 | 0.25 |
| Maianthemum canadense | Wild lily-of-the-valley | 45 | 0.78 |
| Geum canadense | White avens | 45 | 0.25 |
| Galium asprellum | Cleavers | 45 | 0.35 |
| Allium tricoccum | Wild leek | 45 | 0.40 |
| Aster macrophyllus | Large-leaved aster | 40 | 6.29 |
| Botrychium virginianum | Rattlesnake fern | 40 | 0.21 |
| Uvularia grandiflora | Large-flowered bellwort | 36 | 0.71 |
| Arisaema atrorubens | Jack-in-the-pulpit | 36 | 0.29 |
| Parthenocissus quinquefolia | Virginia creeper | 36 | 2.15 |
| Dryopteris spinulosa | Spinulose shield fern | 36 | 0.65 |
| Hydrophyllum virginianum | Virginia waterleaf | 36 | 0.65 |
| Smilax herbacea | Carrion flower | 27 | 0.10 |
| Podophyllum peltatum | Mayapple | 22 | 0.30 |
| Amphicarpa bracteata | Hog peanut | 22 | 0.20 |
| Anemone quinquefolia | Wood anemone | 22 | 3.66 |
| Galium circaezans | Wild licorice | 22 | 0.10 |
| Solidago spp. | Goldenrods | 22 | 0.50 |
| Sedges spp. | Sedges | 22 | 3.18 |
| **Shrubs** | | | |
| Ribes cynosbati | Prickly gooseberry | 90 | 1.85 |
| Sambucus pubens | Red-berried elder | 86 | 1.27 |
| Prunus virginiana | Chokecherry | 81 | 4.72 |
| Rubus spp. | Blackberries/raspberries | 50 | 0.15 |
| Viburnum acerifolium | Maple-leaved viburnum | 40 | 2.13 |
| Xanthoxylum americanum | Prickly ash | 31 | 4.84 |
| Cornus alternifolia | Alternate-leaved dogwood | 27 | 0.18 |
| **Tree Seedlings** | | | |
| Acer saccharum | Sugar maple | 95 | 12.32 |
| Fraxinus americana | White ash | 90 | 2.47 |
| Fagus grandifolia | American beech | 86 | 3.40 |
| Prunus serotina | Black cherry | 81 | 0.69 |
| Ostrya virginiana | Ironwood | 72 | 0.83 |
| Tilia americana | Basswood | 72 | 0.47 |
| Quercus rubra | Northern red oak | 45 | 0.10 |
| Ulmus spp | Elms | 40 | 0.80 |
| Carya cordiformis | Bitternut hickory | 40 | 0.38 |



Previous View

# Occurrence of Tree Species on Habitat Types of Region 11

Size classes: SE - seedlings; SA - saplings; MT - medium trees (4-10" DBH); LT - large trees (>10" DBH). Numbers are frequency of occurrence: *<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%.

| | AFrDe(Vb) | | | | AFrDe | | | | AFrDeO | | | | AFH | | | | AFAs | | | | AFAs-O | | | | AFTD | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT | SE | SA | MT | LT |
| Jack pine | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bur oak | | | * | | | | | * | | | | | | | | * | * | * | * | | | | | | | | | |
| Northern pin oak | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trembling aspen | 2 A | * | * | 1 C | * | | | | * | | | * | 1 A | 1 A | * | * | * | | | * | | | | | | | | |
| Bigtooth aspen | 2 A | 1 A | 1 B | 2 C | 2 A | 1 A | 1 B | 1 D | 1 A | 1 A | 1 B | 1 C | 1 A | | 1 B | * | * | | * | | | | | | | | | |
| Red pine | | | | | | | * | * | | | | | | | | | | | | | | | | | | | | |
| Black oak | | | | * | | | | | | | | * | | | | | | | | | | | | | | | | |
| Black walnut | | | | | | | | | | | | | | | | | * | * | | | | | | | | | | |
| Paper birch | | | 1 B | | * | * | 2 B | * | | * | 1 B | * | | | 2 B | 2 C | | | * | 1 A | | * | | | | | 2 A | 1 B |
| Black ash | | | | | 1 A | * | | | | | | | 2 A | 2 A | * | | 1 A | 1 A | * | | * | | | | 1 A | | | |
| Northern red oak | 2 A | 1 A | 3 C | 4 C | 1 A | * | 3 C | 4 D | 2 A | 1 A | 2 B | 3 C | 3 A | * | 2 B | 3 C | 1 A | * | 1 B | 2 C | 1 A | * | * | 2 B | * | | * | 1 B |
| White pine | | | | | | | | | | | * | * | | | 1 A | 3 B | | | * | * | | | | * | | | * | 1 B |
| White oak | * | * | 2 C | 2 B | * | | 2 A | 1 C | * | | 1 A | 2 B | * | * | 1 A | 2 C | | | * | * | | | | | | | | |
| Butternut | | | | * | 1 A | | | | 1 A | | | | | | | | * | | | * | | | | | | | | |
| Swamp white oak | | | | | | | | | | | * | | 1 A | | * | | | * | | | | | | | | | | |
| Shagbark hickory | 4 A | 2 B | 2 C | 1 B | 3 A | 2 A | 1 B | * | 2 A | * | 2 B | * | * | | | | 1 A | 1 A | 1 B | * | | * | | | | | | |
| Black cherry | 4 A | 3 A | 1 B | * | 3 A | 1 A | 1 B | | 3 A | 1 B | * | | 4 A | 2 A | 1 B | | 4 A | 2 A | 1 B | 1 B | 3 A | 1 A | 1 B | * | 4 A | 1 A | * | 1 B |
| Box elder | * | | | | | | | | 1 A | * | * | | * | * | | | 1 A | * | | | | | | | | | | |
| Hackberry | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Elms | 3 A | 2 A | | | * | | * | | 2 A | 1 B | 1 B | * | 3 A | 1 B | | | 3 A | 2 B | 1 B | * | 2 A | 1 A | 1 B | * | | | * | |
| American elm | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| White ash | 4 B | 4 C | 2 B | 1 B | 4 B | 4 B | 3 C | 2 B | 4 B | 3 B | 2 B | 2 C | 4 B | 3 B | 3 C | 3 C | 4 B | 3 B | 2 B | 2 C | 4 A | 2 B | 1 B | 2 B | 4 B | 1 C | 1 B | 2 B |
| Green ash | | | | | | | | | | | | | * | * | | | * | | | | | | | | | | | |
| Yellow birch | | | * | * | | | | | | | | * | | | | | | | * | | | | | | * | * | 1 A | 2 C |
| Bitternut hickory | 1 A | * | | | * | | 1 A | | 2 A | 1 B | 1 B | * | 3 A | 2 A | 1 B | | 3 A | 1 B | 1 B | 1 C | 2 A | 1 A | 1 B | * | * | | | |
| Red maple | 3 A | 3 C | 3 C | 1 C | 2 A | 2 B | 3 C | | 1 A | 1 A | 1 C | | 2 A | 2 B | 3 C | 2 C | * | * | 1 B | * | | * | 1 B | * | * | 1 B | 3 B | 2 C |
| American hornbeam | | * | | | * | * | | | * | * | | | 3 B | 3 B | | | * | 1 A | * | * | | * | * | | * | | | |
| Ironwood | 4 A | 4 C | 2 B | | 3 A | 3 B | 1 B | | 4 A | 3 C | 2 B | | 3 A | 4 C | 3 C | | 2 A | 2 B | 1 B | | 2 A | 2 B | 1 B | * | 1 A | 2 B | 1 B | |
| Basswood | 2 A | 3 A | 1 B | 1 A | 3 A | 3 B | 2 B | 2 B | 4 A | 3 B | 2 B | 2 B | 4 A | 3 B | 2 C | 2 C | 3 A | 2 B | 2 B | 2 C | 2 A | 2 A | 1 B | 2 B | 2 A | * | 1 A | 1 C |
| Eastern hemlock | | | | | | | | | | * | * | | | | | | | | * | * | * | * | * | * | 1 B | 2 A | 3 B | 2 B |
| American beech | | 1 A | * | * | * | | | | 1 A | 1 B | 1 B | 1 B | 3 A | 3 B | 3 C | 3 B | 2 A | 2 B | 2 C | 2 C | 4 A | 4 B | 2 B | 3 C | 4 A | 4 B | 3 B | 3 C |
| Sugar maple | 3 A | 4 B | 3 C | 2 C | 4 A | 4 C | 4 C | 3 D | 4 B | 4 C | 4 C | 3 D | 4 A | 4 C | 4 C | 3 C | 4 B | 4 C | 4 C | 4 D | 4 B | 4 C | 4 C | 4 D | 3 B | 4 C | 4 C | 3 D |



Previous View

# Understory Species with Potential Diagnostic Value for Distinguishing Among the Habitat Types of Region 11

Number 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%.

| Scientific Name | Common Name | AFrDe(Vb) AFrDe | | AFrDeO | AFAs-O AFAs | | AFTD | AFH |
|---|---|---|---|---|---|---|---|---|
| **Herbs** | | | | | | | | |
| Agrimonia gryposepala | Agrimony | 1 A | | | | | | 1 A |
| Conopholis americana | Squawroot | 1 A | * | | | | | |
| Asclepias exaltata | Poke milkweed | * | 2 A | | | | | |
| Apocynum androsaemifolium | Spreading dogbane | * | 1 A | | | | | |
| Aralia racemosa | Spikenard | * | | * | | | * | |
| Adiantum pedatum | Maidenhair fern | | 1 B | * | | | | |
| Anemone virginiana | Thimble weed | | 1 A | * | | | | |
| Sanicula marilandica | Black snakeroot | | * | 1 A | | | | |
| Galium circaezans | Wild licorice | | 1 A | * | | * | | |
| Rhus radicans | Poison ivy | 1 A | 1 A | * | | | | * |
| Desmodium nudiflorum | Naked-flowered tick trefoil | * | * | * | | | | |
| Prenanthes alba | White lettuce | 1 A | 1 A | 1 A | | | | 1 A |
| Desmodium glutinosum | Pointed-leaved tick trefoil | 2 B | 2 A | 2 A | | | | |
| Triosteum aurantiacum | Orange-fruited horse gentain | 2 A | 2 A | 1 A | | | * | |
| Osmorhiza claytoni | Sweet cicely | 1 A | 1 A | 2 A | | 3 A | 2 A | * |
| Aralia nudicaulis | Wild sarsaparilla | * | 3 A | * | | | * C | |
| Smilax tamnoides | Bristly greenbrier | * | * | 1 A | * | | | * |
| Geranium maculatum | Wild geranium | 3 A | 3 A | 2 A | 2 A | * | | 3 B |
| Thalictrum dioicum | Early meadow rue | 2 A | 2 B | 1 B | 1 B | * | | 1 A |
| Vitis riparia | Riverbank grape | 3 A | 3 A | 2 A | 2 A | | * | 2 A |
| Amphicarpa bracteata | Hog peanut | 2 A | 3 A | 2 A | * | * | | 1 A |
| Uvularia grandiflora | Large-flowered bellwort | 1 A | 3 A | 2 A | * | 1 A | | |
| Trillium cernuum | Nodding trillium | 3 A | 3 A | 3 A | 3 A | 2 A | 2 A | 2 A |
| Aster macrophyllus | Large-leaved aster | 2 B | 3 A | 2 A | * | 1 B | 1 A | 2 A |
| Polygonatum pubescens | Hairy solomon's seal | 2 A | 3 A | 3 A | 1 A | 3 A | 3 A | 2 A |
| Actaea spp. | Baneberries | 1 A | 3 A | 2 A | 3 A | 3 A | 3 A | 3 A |
| Smilacina racemosa | False solomon's seal | 2 A | 2 A | 2 A | 2 B | 3 A | 2 A | 3 A |
| Ranunculus abortivus | Small-flowered crowfoot | 1 A | 2 A | 2 A | 1 A | 1 A | 2 A | 1 A |
| Dryopteris spinulosa | Spinulose shield fern | 1 A | 1 A | 1 A | 1 A | 1 A | 3 A | 2 A |
| Viola pensylvanica | Smooth yellow violet | * | * | 2 A | 1 A | 3 A | 3 A | 2 A |
| Circaea quadrisulcata | Enchanter's nightshade | 1 A | 1 A | 2 A | 3 A | 2 A | * | 3 A |
| Maianthemum canadense | Wild lily-of-the-valley | | 1 A | 1 A | * | 1 A | 3 A | 2 A |
| Parthenocissus quinquefolia | Virginia creeper | 1 A | | * | 2 A | 1 A | * | 2 B |
| Smilax herbacea | Carrion flower | 2 A | 3 A | 2 A | * | 1 A | | 2 A |
| Geum canadense | White avens | * | * | 2 A | 2 A | 1 A | | 3 A |
| Hepatica acutiloba | Sharp-lobed hepatica | | * | 2 A | * | 2 A | | 1 A |
| Phryma leptostachya | Lopseed | | * | 2 A | * | 2 A | * | |
| Hepatica americana | Round-lobed hepatica | | 2 A | * | | | 1 A | * |
| Podophyllum peltatum | Mayapple | | 1 B | 1 B | 1 A | * | | 1 B |
| Sanguinaria canadensis | Bloodroot | | * | * | 1 A | 2 A | | 1 A |
| Solidago flexicaulis | Zigzag goldenrod | | * | | * | | | 2 A |
| Hydrophyllum virginianum | Virginia waterleaf | | | | 1 A | 1 A | | 2 A |

*continued...*



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*...continued*

| Scientific Name | Common Name | AFrDe(Vb) AFrDe | | AFrDeO | AFAs-O AFAs | | AFTD | AFH |
|---|---|---|---|---|---|---|---|---|
| Arisaema atrorubens | Jack-in-the-pulpit | | * | * | 3 A | 1 A | 2 A | 3 A |
| Caulophyllum thalictroides | Blue cohosh | | 2 A | * | 2 A | 2 A | 1 C | 1 A |
| Allium tricoccum | Wild leek | | * | * | 1 A | 1 A | 1 A | 1 A |
| Galium triflorum | Sweet-scented bedstraw | | 1 A | * | | * | | 1 A |
| Botrychium virginianum | Rattlesnake fern | | 1 A | 1 A | | 1 A | * | |
| Solanum dulcamara | Bittersweet nightshade | | | | * | | 1 A | 1 A |
| Impatiens capensis | Jewelweed | | | | | | 1 B | * |
| Mitchella repens | Partridgeberry | | | | | | 1 A | * |
| Ranunculus hispidus | Hispid buttercup | | 1 A | | | | * | 1 A |
| Fragaria vesca | Wood strawberry | | | * | | | | 2 A |
| **Shrubs** | | | | | | | | |
| Symphoricarpos albus | Snowberry | | 1 A | | | | | |
| Viburnum rafinesquianum | Downy arrowwood | 3 A | 2 A | 1 A | | | | 1 A |
| Amelanchier spp. | Juneberry | 3 A | 1 A | 3 A | * | | | 2 A |
| Viburnum acerifolium | Maple-leaved viburnum | 3 A | 2 A | 2 A | 1 A | 1 A | 1 A | 2 A |
| Cornus alternifolia | Alternate-leaved dogwood | 2 A | 2 A | 1 A | 1 A | 1 A | * | * |
| Cornus racemosa | Gray dogwood | 2 A | | * | * | | | 2 A |
| Xanthoxylum americanum | Prickly ash | | 1 A | 1 A | 1 A | 1 A | | 2 A |
| Hamamelis virginiana | Witch hazel | * | * | * | * | | * | 2 B |
| Sambucus pubens | Red-berried elder | | | | 1 A | 3 A | 3 A | * |
| Lonicera canadensis | American fly honeysuckle | | * | | * | | 1 A | 1 A |
| Crataegus spp. | Hawthorns | * | | | | | | 2 A |
| Viburnum trilobum | Highbush cranberry | | | | * | | | 1 A |
| Rubus parviflorus | White-flowering raspberry | | | | | | 1 A | |



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# Summary of Forest Community Dynamics and Implications for Management

In order to understand current trends in composition of existing forest communities and to develop management plans for achieving desired objectives it is necessary to examine the history of the development of various forest types.

Forest composition of any area is controlled primarily by climate, soil properties and disturbance regimes. Over prolonged periods without major disturbance forest communities tend to become dominated by species that are tolerant of shade and other conditions of understory environment. This tolerance allows for the development of advance regeneration which can eventually capture relatively small canopy openings created by the death of individual trees. On mesic to dry-mesic, nutrient rich sites, throughout Wisconsin, sugar maple is the most successful species to accomplish this. Common associates of sugar maple under such conditions are basswood, white ash and, in some regions, yellow birch and American beech. On drier, less fertile sites, red maple or white pine usually fill this role. Some larger-scale disturbance than the dying of individual trees is required to perpetuate other, less shade tolerant species such as oaks, pines, aspen and birch.

In northern Wisconsin extensive fires were relatively rare in pre Euro-American settlement period and mesic hardwood dominated forests were widespread. However, throughout much of southern Wisconsin (south of the floristic "tension zone") fire was a regular disturbance agent for at least 5000 years prior to Euro-American settlement. Because of differential sensitivity of tree species to fire damage, the communities in existence prior to Euro-American settlement were clearly related to the frequency and intensity of fires. All mesic hardwoods, particularly sugar maple, are easily killed by fire at all stages of growth. Oaks, on the other hand, have many adaptations to fire environment. Saplings and seedlings of all oak species native to Wisconsin sprout readily when tops are killed, while old oak trees have relatively thick bark which protects them from fire damage. These old trees are not easily killed and thus remain on the landscape and serve as seed source.

Under the presettlement fire regime in southern Wisconsin mesic forests could persist only on those landscapes where fires were less frequent and less severe. Vegetation maps based on records from original land



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surveys show that such forests occurred where rivers, lakes or wetlands formed firebreaks against fires driven by the prevailing southwesterly winds. Landscapes subject to moderate fire frequency supported oak forests, while those more frequently burned supported oak openings or other savanna types.

It must be emphasized that conditions that shaped most of the forest communities we see today in southern Wisconsin no longer exist. Therefore we cannot expect to see similar forests in the future without management.

## Dry-mesic and Mesic Sites

**Figure 4.1** illustrates how forests are expected to change under continuous fire suppression and how management can redirect some of the pathways.

Boxes **A** through **H** represent forest cover types most typically found on mesic and dry-mesic sites today and the arrows indicate observed and expected change in composition.

The most widespread vegetation types at the time of Euro-American settlement were oak opening and oak savanna (box **A**). Because these oak communities had relatively open canopies and were relatively free of shrubs and advance regeneration of other tree species, oak regeneration quickly appeared as wild fires were stopped by settlers. Thus the first generation forests, following the cessation of fire, were generally mixed oak (box **B**). If these forests were utilized for wood and subjected to light grazing, oak composition was maintained for some time. However, with time a number of moderately tolerant species (e.g.: black cherry, slippery elm, shagbark hickory, and sometimes red maple and ironwood) invaded oak woodlands forming mixed community commonly seen today (box **C**). These mixed communities typically lack any appreciable oak seedlings and saplings, because light conditions are no longer adequate. If only partial cutting of oaks is practiced the composition eventually shifts toward dominance of mid-tolerant, invading species listed above (box **E**). This type of woodlands are common throughout southern Wisconsin and some foresters refer to them as "central hardwoods". Their principal characteristic is virtual absence of oaks, as well as the mesic hardwoods.

Further development of these mixed forest communities depends largely on the type of forest management and on presence or absence of seed source of more shade tolerant hardwoods such as sugar maple, basswood, American beech, white ash and bitternut hickory. In the absence of any of these species the composition of mixed "central hardwoods" changes only in response to cutting practices or other distur-



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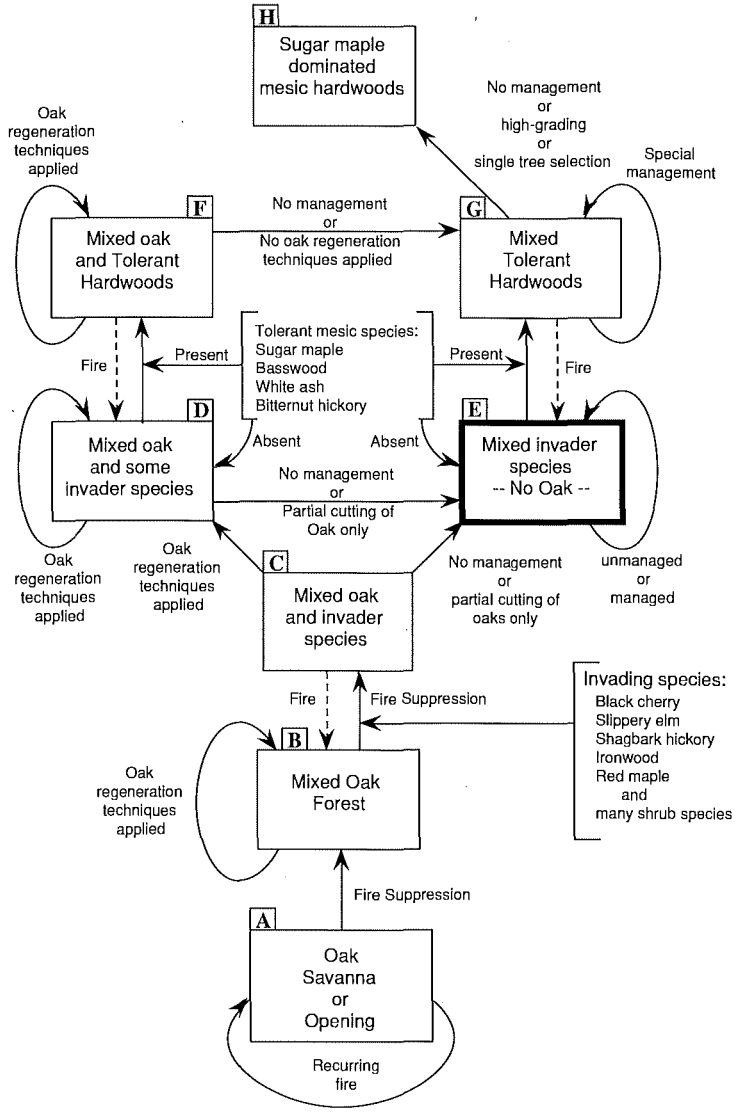
## Figure 4.1. Forest Community Dynamics (with and without management) on Mesic and Dry-Mesic Sites in Southern Wisconsin



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bances, but only the mid-tolerant species named above play a role. No significant participation of oaks can be expected. However, if seed source of any of the tolerant hardwoods is present these species slowly invade the mixed hardwoods and with time largely displace them (box **G**). In terms of economic value mixed forests of sugar maple, basswood, ash and bitternut hickory are preferred to "central hardwoods." However, this mixture of tolerant hardwoods is itself not a compositionally stable community. Exclusion of management, or application of single-tree selection technique gradually transform mixed forests into sugar maple dominated communities (box **H**).

There is one other important forest type found on mesic and dry-mesic sites in parts of southern Wisconsin: mixed oak (red and white) and tolerant mesic hardwoods (box **F**). This type is particularly common in Region 7 and in the northern unit of the Kettle-Moraine State Forest (Region 11). There appear to be two principal ways this type of forest developed. The majority of this forest type is found in those areas that experienced less frequent historic fires and were part of the presettlement vegetation. However, other such communities developed as tolerant mesic hardwoods invaded oak forests that had their origin in savanna or oak openings as described above (boxes **A-D**). Many of these forests today contain some of the highest quality red and white oak, but without proper management are rapidly succeeding to tolerant hardwoods.

## Dry Sites

Perhaps the most important characteristic of dry, nutrient-poor to nutrient-medium sites is that they do not support any of the tree species that are ranked near the top of the shade tolerance scale (e.g. sugar maple, American beech, basswood, ironwood, hemlock). Species composition of these forest communities is even more strongly controlled by disturbance regimes than it is on the mesic and dry-mesic sites.

**Figure 4.2** illustrates the most commonly found forest types and relationships among them as influenced by various disturbance regimes. Any of the seven forest cover types (boxes **A-G**) can represent a pioneer stage under a favorable combination of fire disturbance and availability of seed sources. However, subsequent successional development follows somewhat limited and more predictable pathways.

In presettlement time fairly extensive areas of pine, oak, or pine-oak "barrens" existed (box **B**). These were apparently maintained by fire cycles of different lengths. Where fires were most frequent mixed "scrub oak" communities were found because



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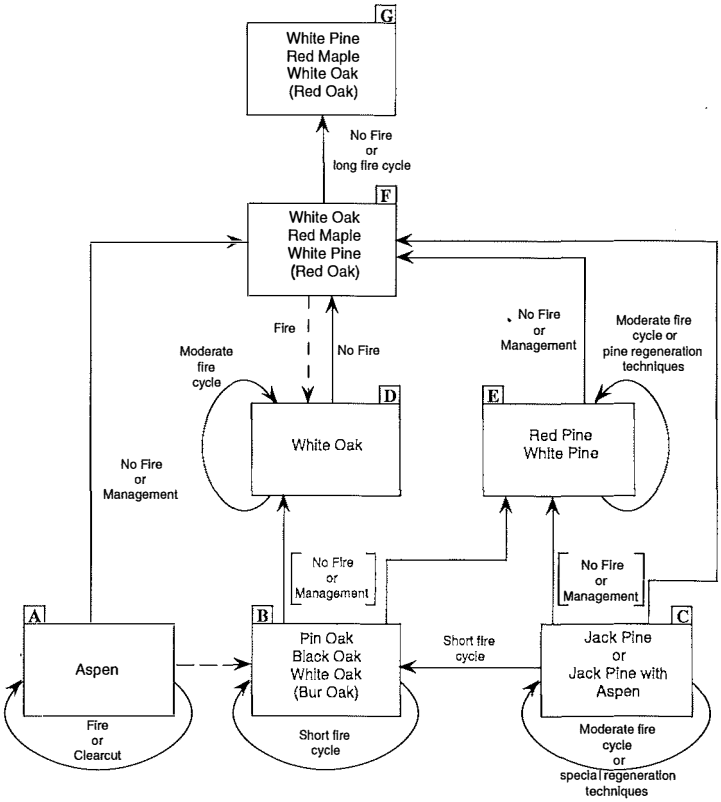
## Figure 4.2. Forest Community Dynamics on Dry Sites in Southern Wisconsin (with or without management)




pine seed sources were eliminated by fire while oak species were able to resprout. If fire cycle is lengthened, or eliminated, and the original oak community contained white oak, the community will gradually shift toward white oak dominance (box **D**) because white oak is considerably more shade tolerant than are other oak species. As pin oak, bur oak and black oak drop out ot the community red maple and white pine appear in the understory, providing nearby seed source exists. Black cherry is also a common invader, but on these sites rarely develops beyond a sapling size. If



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fire suppression continues a mixed forest of white oak, red maple, white pine and, in some cases, red oak develops (box **F**). Once such a forest is established it can maintain itself in the absence of fire because all member species are moderately shade tolerant and forests on these sites generally do not develop as dense canopies as are possible on the more mesic sites. However, relative proportions and spatial distribution of species can be expected to vary as a function of canopy dynamics and seed source proximity. Because of its superior stature and longevity white pine is expected to maintain itself in the upper canopy with red maple and oaks comprising the second canopy (box **G**). This type of forest community can also be maintained by a relatively long fire cycle. If white oak were not present in the "original" community the white oak stage (box **D**) would be skipped.

Where fire cycle was longer (perhaps 20-80 years) jack pine communities often developed (box **C**). It is not clear what conditions were responsible for the lack of oaks in such communities. It appears that jack pine communities can be maintained only under fire cycles of moderate length. Increased fire frequency would gradually eliminate jack pine seed source as well as jack pine seedlings and saplings and would probably lead to the development of an "oak barren" (box **B**). On the other hand, an extended period without fire allows for the encroachment by red pine, white pine, red maple or white oak (box **E** or **F**).

Aspen communities, particularly big-tooth aspen, also occur on these sites (box **A**). As in the case of jack pine it is not known precisely what conditions lead to the initial development of pure aspen communities. Once in place, they can only be maintained by fire or clearcutting. In the absence of such disturbances aspen communities rapidly succeed to red maple, white pine, white oak or a mixture of these (box **F**). Red and jack pine do not invade aspen communities of normal densities. However, white, black and pin oaks do slowly encroach on aspen stands and they eventually assume dominance. Fire can be expected to speed up this process.

Because wild fires are no longer a significant factor in shaping today's forests silvicultural techniques must be applied any time the direction of change, as depicted in **Figure 4.2,** does not lead to desired conditions or does not meet owner's management objectives.



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# Management Implicatons

This guide is not intended as a manual for specific management prescriptions, because these depend on management objectives and a host of other 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 a forest community.

In this section habitat types are grouped on the basis of their ecological similarities important for management. Types from different regions (and sometimes from the same region) that differ in the specifics of floristic composition, but are presumed to have similar potential for growth of tree species and community dynamics, were grouped together. The emphasis here is on trees, because they represent the dominant component of forest ecosystems and are generally the focus of management activities regardles of management goals.

## Habitat Type Group 1 (Dry sites; White pine habitat type series): PVGy, PEu, PVCr, PVG

***Site characteristics***: These types represent sandy, dry, nutrient poor to medium sites. Parent material is either outwash deposits or residual material over sandstone. Terrain is generally flat to gently rolling except for the PVGy and PVCr type which also occur on steep slopes and narrow ridges.

***Principal cover types***: Almost any mixture of the following species can be found: pin oak, white oak, black oak, jack pine, red pine, white pine, aspen and red maple. The oaks and red maple are present with highest constancy. Red oak is generally absent.

***Regeneration***: Red maple, white oak, pin oak and black cherry are generally best represented in the sapling layer. White pine regenerates well under any cover type on these habitat types where seed source is present. Jack pine, aspen and bur oak appear to be more dependent on fire or logging for regeneration.

***Growth potential:*** From the forestry standpoint the three pine species have the highest potential, although red, and especially white pine, show only moderate



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to poor growth compared with their potential on dry-mesic habitat types. White oak, black oak, pin oak and big-tooth aspen also reach merchantable size, but only as pulpwood or fuel wood. Red maple and especially black cherry seldom grow beyond the sapling or small pole size.

***Other management considerations***: From the ecological point of view there are many reasons for maintaining the presence of other, less productive 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 susceptable to catastrophic destruction by insects, disease or severe climatic conditions.

## Habitat Type Group 2 (Dry and dry-mesic sites with seasonal influance of ground water; White pine habitat type series): PVHa, PVRh

***Site characteristics:*** These two habitat types occur on same soil parent material as habitat types of group 1 (sand), but are subject to seasonally high water table. PVHa occurs on rolling terrain controlled by bedrock. Seasonal soil saturation occurs in the C horizon as a result of impeded drainage due to a layer of shaly residuum. The PVRh type, on the other hand, occurs on level topography where local ground water table is near the surface (usually within 1-3 feet).

***Principal cover types:*** Red maple, pin oak, white oak, aspen and white pine, in various mixtures, are most common. White pine is somewhat better represented on the PVRh type and red oak sometimes occurs on the PVHa. Black cherry is much less common on both types than it is on habitat types of group 1.

***Regeneration:*** Red maple is the best represented sapling on both types. If seed source is available white pine is often the second best represented sapling on the PRh type. White oak and pin oak are the only other commonly occurring saplings.

***Growth potential:*** White pine, red maple, aspen and white birch clearly show better growth on



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these types than on types of group 2.

***Other management considerations:*** Although clearcutting is commonly used to regenerate the intolerant species, it should be used with caution on the PVRh type because of possibility of "swamping" the site as a result of reduced transpiration. Regeneration of most species is often difficult under such conditions. Various forms of shelterwood cutting, or a system of small, scattered openings, are better suited for these habitat types. In addition, any silvicultural activity should probably be restricted to winter.

## Habitat Type Group 3
## (Dry-mesic sites; Red maple habitat type series): ArDe, ArDe-V, ArCi, ArCi-Ph, AArVb, AArL, AQVb-Gr

***Site characteristics:*** A wide range of soil/site combinations support these habitat types. Deep loamy sands or shallow loams and silt loams over sand or bedrock are most common. The sites are characterized by dry-mesic medium-nutrient conditions.

***Principal cover types:*** Various mixtures of white oak, red oak, black oak and red maple are most characteristic. White pine and black cherry are frequent associates. A feature that strongly distinguishes this group from group 2 is the sporadic occurrence of some of the mesic hardwoods (sugar maple, basswood, white ash, ironwood) although these are generally not well represented.

***Regeneration:*** Red maple is the best adapted species to replace all others in the absence of disturbance. White oak, and even red oak, often show appreciable regeneration. White pine saplings can also be very prolific if local seed sources exist.

***Growth potential:*** The species that reach at least moderate growth potential on these types are red oak, white oak and red maple. Near optimal growth can be expected for white pine, red pine, black oak and big-tooth aspen. Of the mesic hardwoods basswood and white ash appear to grow better than does sugar maple.

***Other management considerations:*** These habitat types probably offer the best opportunities for continuous management of valuable red and white oak, because competition from the mesic hardwoods, if they occur at all, is least intense. In many areas white pine seed source is



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entirely lacking, either due to pre-settlement fire regime or subsequent logging.

Re-introduction of this species could expand management options because white pine has similar light requirements as the oaks. Because stands on these types entirely lack a conifer component the addition of white pine would expand wildlife opportunities and biodiversity.

## Habitat Type Group 4
## (Dry-mesic to mesic sites; Sugar maple-Basswood and Sugar maple-White ash habitat type series; post-savanna phases): AFrDe(Vb), ATiFrVb(Cr), ATiFrCa(O), ATiDe(Pr), ATiCr(O), ATiCr(As), ATiAs(De)

***Site characteristics:*** The types in this group occur over a variety of landforms, but generaly share in common moderately deep to deep silt loams or loams. Thus site conditions are generally dry-mesic to mesic, nutrient-rich to very rich. As such, these site types are capable of supporting the moisture and nutrient demanding mesic hardwoods (sugar maple, basswood, white ash). The basis for this group is a common presettlement fire regime, which virtually eliminated the fire-sensitive mesic hardwoods from the landscape. Plant associations representing these types are therefore considered phases because these communities are still undergoing floristic change in the fire-free environment.

***Principal cover types:*** White oak and red oak dominate most current stands. American or slippery elm, black cherry, shagbark and bitternut hickory are the most common associates. Sugar maple, basswood or white ash occur sporadically, but may locally be well represented.

***Regeneration:*** Where seed sources of mesic hardwoods are still lacking the principal species in the sapling layer are elms, black cherry and shagbark hickory. Bitternut hickory and ironwood can also be well represented. Where mesic hardwoods are present, white ash or basswood are generally better represented than is sugar maple.

***Growth potential:*** All species naturally ocurring on these types have high growth potential if regeneration requirements are met.

***Other management considerations:*** Because high quality red and white oaks often occur on these types it is assumed, by some, that oak can be maintained by simple one-cut shelterwood method, if not by conserva-



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tive "selective" cutting. However, oak stands on these types almost universally lack adequate advance regeneration that could take advantage of openings thus created. To successfully regenerate oak on these sites advance regeneration must first be established, by simultaneously opening the canopy and controlling competing understory vegetation. Once oak seedlings establish adequate root system they can outgrow competing vegetation if given enough light.

Sometimes too much emphasis is placed on oak regeneration and other potentially valuable species are ignored. White ash, hickories or basswood are often present in the understory and respond well to release. They are also easier to regenerate through shelterwood cutting than are the oaks.

## Habitat Type Group 5
## (Dry-mesic and mesic sites; Sugar maple-Basswood and Sugar maple-White ash habitat type series): AFrDeO, AFrDe, ATiFrVb, ATiFrCi, ATiFrCa, ATiDe, ATiDe-Ha, ATiDe-As, ATiSa, ATiSa-De, ATiCa, ATiCa-Al, ATiCa-La, ATiH

***Site characteristics:*** These types represent the same landforms and soils as the preceding group, but for various reasons were not subject to frequent fires in presettlement times. Shade tolerant (and fire-sensitive) mesic hardwoods are therefore present in most stands.

***Principal cover types:*** Sugar maple, basswood or white ash are nearly always present but not necessarily dominant. Red and white oak are often well represented, particularly in the largest diameter classes. Bitternut hickory, black cherry, elm and ironwood may also be prominant.

***Regeneration:*** Predominance of sugar maple in the seedling and sapling layer is almost universal. Other important species in the sapling layer, depending on the habitat type and disturbance history, are basswood, white ash, bitternut hickory, ironwood and American elm. Other, less shade-tolerant species, and particularly the oaks are not significantly represented in the regeneration layer.

***Growth potential:*** All naturally occuring species on these types have high growth potential if regeneration requirements are met.

***Other management considerations:*** While all stands on these habitat types can easily be regenerated by a variety of silvi-



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cultural techniques, most partial cutting techniques progressivey lead toward dominance of sugar maple. If greater tree species diversity, and subsequently higher overall biodiversity is desired, a combination of silvicultural techniques, such as shelterwood and group selection, can be applied.

## Habitat Type Group 6 (Mesic sites; Sugar maple-American beech habitat type series): AFAs, AFAs-O, AFH

***Site characteristics:*** These types occur on calcareous till and lacustrine clays in a narrow zone (3-4 townships wide) in the proximity of Lake Michigan shoreline. This area lies east of the tension zone, which in this region runs north to south. The types are classified as mesic and nutrient-rich to very rich.

***Principal cover types:*** Sugar maple is generally the most dominant species but American beech is also strongly represented. White ash, basswood and red oak are common associates, but white oak is much less frequent than it is on other mesic types in this region. Black cherry, bitternut hickory and sometimes white pine, are other minor associates.

***Regeneration:*** Sugar maple, beech, white ash, basswood and ironwood comprise the majority in the sapling layer. Oak regeneration is absent.

***Growth potential:*** All naturally occurring species have high growth potential.

***Other management considerations:*** Because in Wisconsin, American beech occurs naturally in a very limited area there are ecological, and possibly economic reasons, to maintain it in managed forests.

## Habitat Type Group 7 (Mesic sites; Sugar maple-American beech-Hemlock habitat type series): AFTD

***Site characteristics:*** No specific site characteristics have been identified for this habitat type, but it is limited to the proximity of Lake Michigan shoreline (similar to habitat type group 6) and it often occurs on lacustrine sands over clay.



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***Principal cover types:*** This type supports distinctly northern mesic forests. Sugar maple and Americn beech tend to dominate, but presence of hemlock and yellow birch distinguish it from the southern mesic forest. White oak and hickories are generally absent and red maple and white birch are better represented than they are on the southern mesic types.

***Regeneration:*** Sugar maple and beech consistently make up the majority of seedlings and saplings. Hemlock, ironwood and red maple have a constancy of about 50% and yellow birch occurs only sporadically.

***Growth potential:*** All species mentioned above have high growth potential on this type.

***Other management considerations:*** It is not entirely clear how hemlock and yellow birch regenerated historically. Under present conditions neither species regenerates well on thick humus and litter layers that usually develop where beech is well represented. Tip-up mounds of mineral soil created by wind throw have been shown to be favorable sites for establishment of both hemlock and yellow birch. However, such wind throws do not occur frequently enough to maintain appreciable numbers of these species in present forests. Mechanical soil scarification is usually necessary to maintain hemlock and yellow birch in maple-beech dominated forests.



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# Appendix

## Explanation of Tables and Figures in this Section

**Table 6.1**. Relationships among habitat types, habitat type phases and variants within and among regions. Within a region and moisture group types are arranged from top to bottom in order of increasing soil nutrient status. When comparing types across the regions, those on the same line are most similar to each other. Note that this table simply shows how habitat types are grouped and presented in this field guide. Regional boundaries are set to make the system easier to use. In practice, habitat types described for one region will also be found in portions of adjacent regions.

**Table 6.2.** Ecological species groups. The concept of ecological species groups is based on observations of co-occurrence of species in similar environments in a particular climatic region. Understory species indicating similar site conditions—for example, moisture, nutrients, acidity, etc. are grouped together, named for a characteristic species of the group, and termed "ecological species groups."

This table shows four ecological species groups (and three subgroups) representing the moisture gradient from dry to mesic. The table can be used to quickly assign a site to a position on the moisture gradient without the use of specific identification keys. For example, if only members of groups 1 and 2 are present the site is classified as "dry." A dry-mesic site will likely contain some members of group 2 and some of group 3 (but not many of group 1). Relative presence of subgroups A, B, and C will further identify the position on the broader dry-mesic portion. Finally, mesic sites will contain some members of group 4 and some of group 3. Relative representation of the three subgroups will again help determine whether the site is strongly mesic, or intermediate between mesic and dry mesic. A good estimate of the potential forest productivity and successional trends of a community (or a site) classified in this way can be gleaned from Figures 6.1, 6.2, and 6.3.

**Table 6.3**. Alphabetical listing of understory species occurrence across all habitat types. This table offers the quickest reference on the expected occurrence of a specific species on various habitat types.

**Table 6.4**. Index to abbreviations of habitat type names. This table also shows numbers of reference stands used as a basis for delineation and description of each habitat type.

**Figure 6.1**. Occurrence of major tree species across habitat types representing the moisture-nutrient gradient. This figure shows average representation for major species only. Note that not all species occur on every habitat type listed under the segments of moisture-nutrient gradient. For region and habitat type specific information see "Occurrence of Tree Species" tables in section 3.

**Figure 6.2**. Occurrence of tree saplings across habitat types representing the moisture-nutrient gradient.



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Note that not all species occur on every habitat type listed under the segments of moisture-nutrient gradient. Because this figure shows the average presence and abundance for all habitat types and all cover types associated with a given moisture-nutrient segment, it is useful primarily to distinguish species with strong and weak potential for natural regeneration, in general. For region and habitat type specific information see "Occurrence of Tree Species" tables in section 3.

**Figure 6.3.** Relative growth potential of major tree species across the moisture-nutrient gradient. As would be expected, all species grow best on the richer sites in the absence of competition. However, the less shade tolerant species can be maintained on the richer sites only through management. This probably applies to all species in this figure, with relative tolerance value less than 7. (Relative shade tolerance values are shown at the ends of horizontal bars). The less tolerant species can be managed much more easily on dry-mesic and dry sites. Also note that not all species occur on every habitat type listed under the segments of moisture-nutrient gradient. For region and habitat type specific information see "Occurrence of Tree Species" tables in section 3.



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**Table 6.1 Relationships among habitat types, habitat type phases and variants within and among regions. Within a region and moisture group, types are arranged from top to bottom in order of increasing soil nutrient status. When comparing types across the regions, those on the same line are most similar to each other.**

| | Region 6 | Region 7 | Baraboo | Region 8 | Region 9 | Region 10 | Region 11 |
|---|---|---|---|---|---|---|---|
| DRY | PVGy | PVGy | | | PEu | | |
| | PVHa | | | | | | |
| | PVCr | PVCr | | | PVG | | |
| DRY | PVRh | PVRh | | | | | |
| | ArDe-V | ArDe-V | ArDe-V | | ArDe | | |
| | ArCi | | | | AQVb-Gr | | |
| | ArCi-Ph | ArCi-Ph | | | | | |
| | AArVb | | AArL | | | | |
| MESIC | | ATiDe(Pr) | ATiDe-Ha | ATiCr(O) | ATiFrCi | ATiFrVb(Cr) | AFrDe(Vb) |
| | | | ATiDe-As | ATiCr(As) | | ATiFrVb | AFrDe |
| | | ATiDe | | | | | AFrDeO |
| | | | | | | | |
| | | | | | | | |
| | | | ATTr | | | | AFTD |
| MESIC | ATiSa-De | ATiSa | | ATiAs(De) | | ATiFrCa(O) | |
| | ATiCa-La | ATiCa | ATiCa-Al | ATiH | | ATiFrCa | |
| | | | | | | | AFH |
| | | | | | | | AFAs |
| | | | | | | | AFAs-O |



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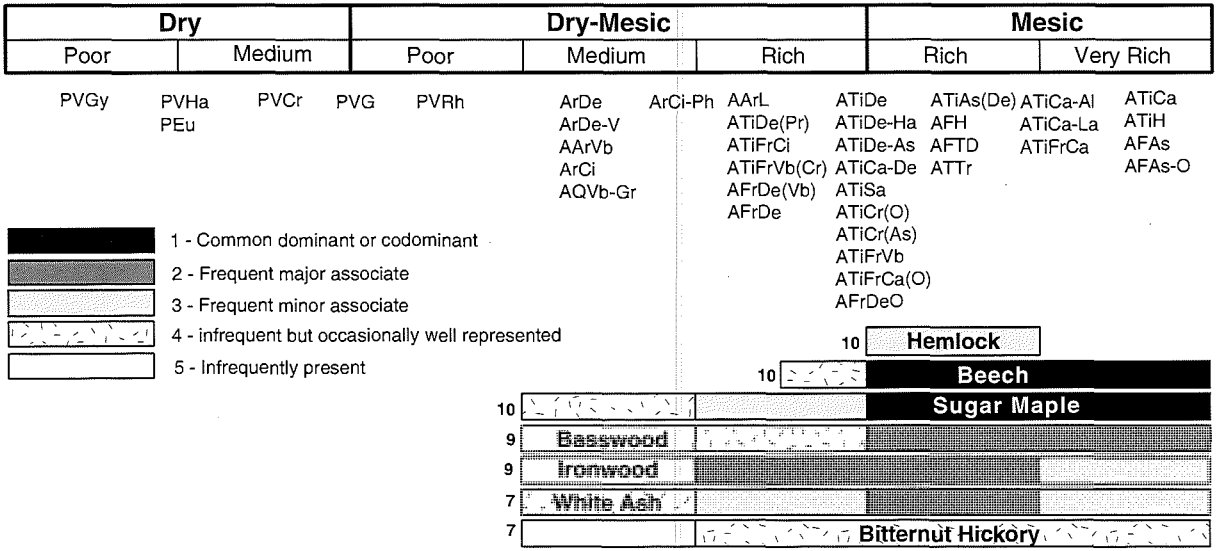
## Figure 6.1. Occurrence of tree species across habitat types representing the moisture-nutrient gradient. Categories are based on average representation in reference stands making up the habitat type groups on various segments of the gradient.

The following criteria were used (constancy % / coverage %): **1,** 51-100/<16; **2,** 25-50/>16; **3,** 25-50/5-15; **4,** 10-25/>5; **5,** <16%. Numbers in front of bars are relative shade tolerance values: 1, least tolerant: 10, most tolerant.



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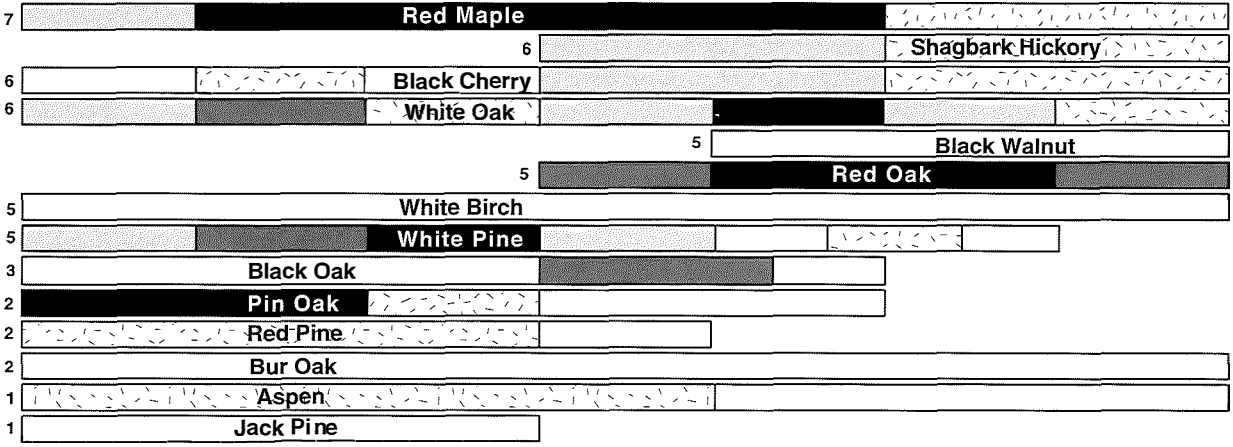




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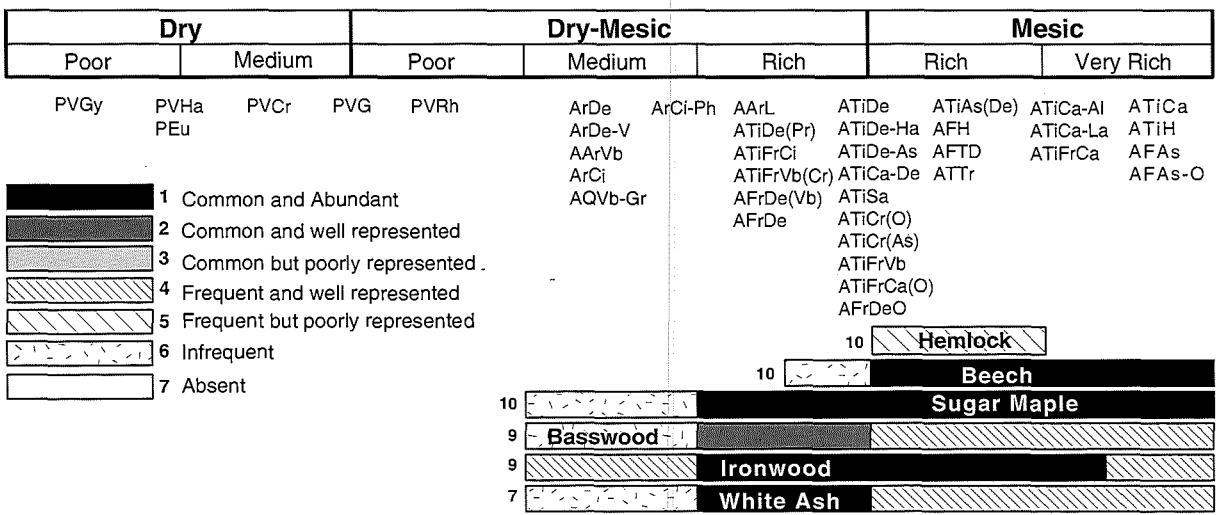
## Figure 6.2. Occurrence of tree saplings across habitat types representing the moisture-nutrient gradient. Categories are based on average representation in reference stands making up the habitat type groups on various segments of the gradient.

The following criteria were used (constancy % / coverage %): **1,** 51-100/>20; **2,** 51-100/5-15; **3,** 51-100/<5; **4,** 26-50?>5; **5,** 26-50/<5; **6,** <25/any. Numbers in front of bars are relative shade tolerance values: 1, least tolerant: 10, most tolerant.



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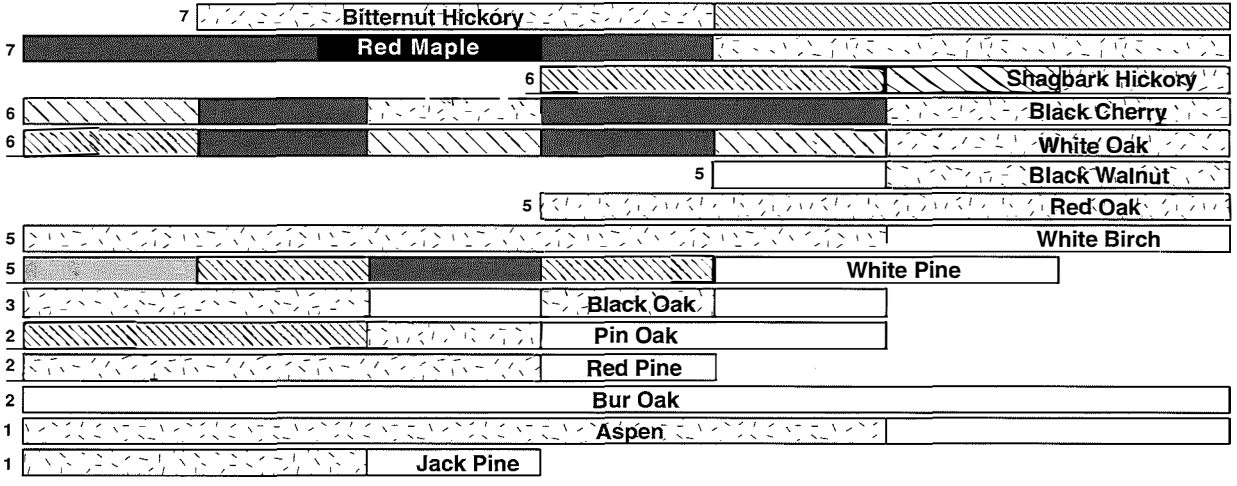




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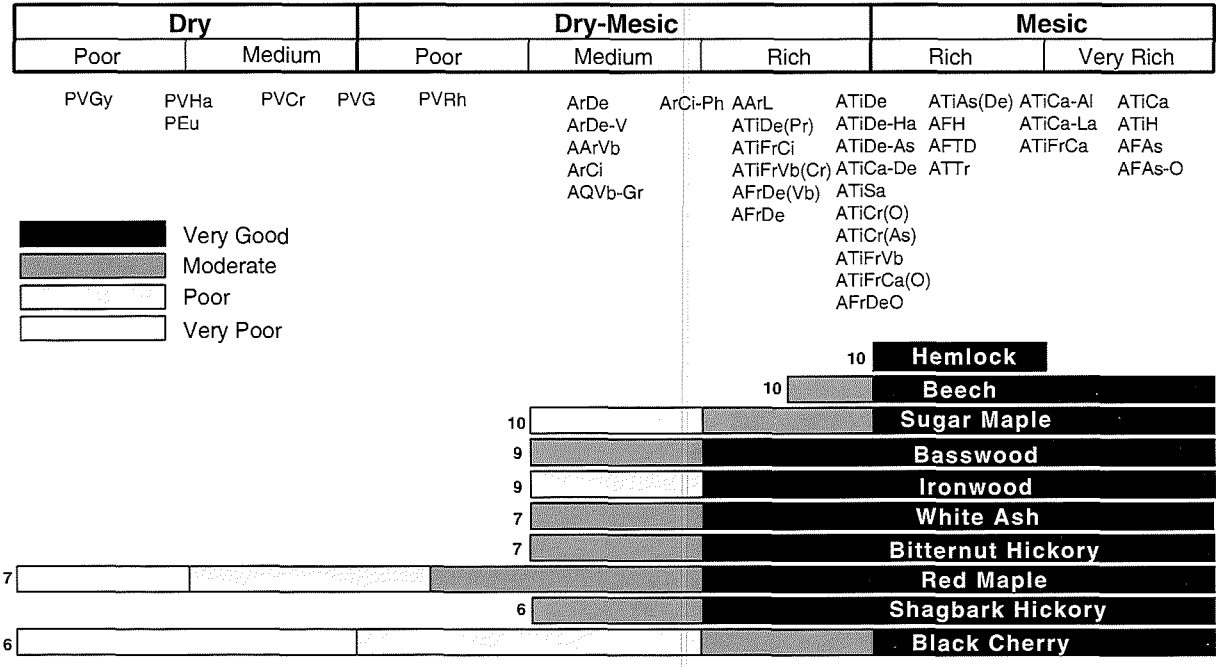
## Figure 6.3. Relative growth potential of major tree species across the moisture-nutrient gradient.

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



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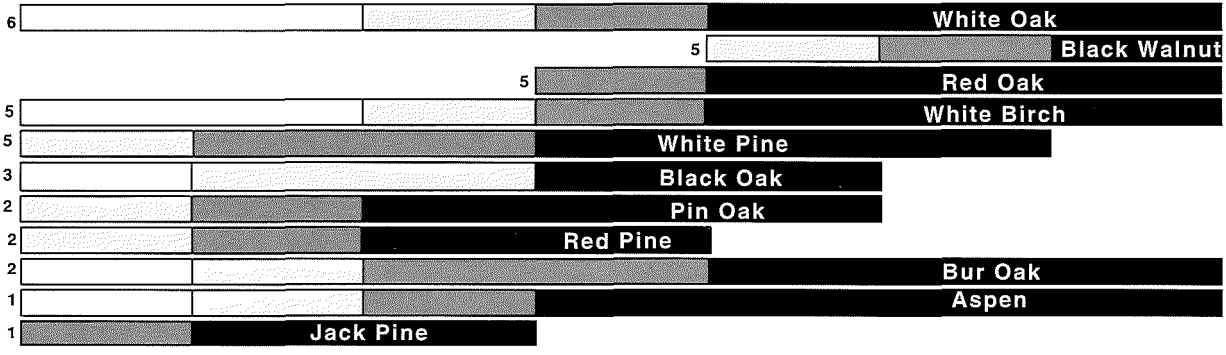




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# Synopsis of Ecological and Silvicultural Characteristics of Selected Tree Species

This section is intended for non-professional users, or anyone not familiar with the Lake States forests.

The pattern of the distribution of tree species along a range of environments, their growth rates and their role in forest community development are largely a function of their ecological properties (e.g. requirements for moisture, nutrients and light, their rooting habits, seed production, dissemination and germination, etc.). Detailed knowledge of such properties for individual species is growing, but is still fragmented and far from complete. What we refer to as silvicultural characteristics is nothing more than those ecological properties that we understand well enough to consider them when we manipulate forest vegetation (application of silviculture).

The following brief descriptions attempt to characterize individual species only in terms of their most conspicuous ecological behavior under Wisconsin conditions. Knowledge of special values of each species to humans and to other organisms is, of course, also required for management, but such information is too extensive for inclusion in this guide, and can be found in many other sources.

## White Ash

Together with basswood, white ash is the most common associate of sugar maple dominated communities. It has high requirements for soil moisture and nutrients. On optimal sites it is among the fastest growing hardwoods and it consistently produces straight, branch-free stems. The root system is not deep, but wide-spreading and fibrous.

White ash is moderately shade tolerant, especially when in seedling and sapling stages. However, abundant reproduction is generally found only in canopy gaps. In natural stands white ash seldom represents more than ten percent of total composition. However, shelterwood or group-selection cutting systems can increase its representation. Because of thin bark and superficial root system white ash is easily damaged by fire.

## Trembling (Quaking) Aspen

Aspen has the widest range of distribution of all North American trees. Although ubiquitous in Wisconsin it is far more characteristic of northern than southern forest region. Its most notable ecological characteristic is the ability to rapidly invade cut-over and burned-over areas. It establishes on all types of soils except the droughtiest sands and stagnant swamps. However, its perpetuation depends entirely on recurrence of disturbance. Because of its extreme intolerance to shade it is readily replaced by many tree species in the absence of disturbance. Once in place, aspen reproduces almost entirely by sprouting from extensive superficial root systems (root suckering). Although sprouts several feet tall are found in almost every stand where aspen is present, they seldom grow to tree size unless the canopy is opened by cutting or natural disturbance. Because most tree species that succeed aspen have greater longevity, and aspen's



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sprouting ability declines with age, aspen tends to drop out of the stand after only one generation. However, enough scattered individual trees, or small clones, generally remain on the landscape to supply seed for colonizing newly disturbed sites. Because aspen is very susceptible to fire it was not very abundant in southern Wisconsin in presettlement time.

### Largetooth (Big-tooth) Aspen

This species is similar to trembling aspen, except for larger, coarsely-toothed leaves and distinct yellowish-brown bark. It also grows to a somewhat larger size. It has somewhat greater drought tolerance than trembling aspen and is better represented of the two species in southern Wisconsin.

### Basswood

This is a large tree with a fairly straight trunk, heavy symmetrical crown, and extensive, fibrous root system. Together with white ash it is the principal associate of sugar maple on the mesic, nutrient rich sites, both in northern and southern forests. However, it seldom represents more than 10-20 percent of total composition. It reproduces readily by stump sprouting, resulting in high proportion of multiple stemmed trees in many stands. Reproduction from seed is limited, but reasons for this are not fully known. Basswood foliage is exceptionally high in mineral nutrients making this species one of the best soil improvers.

### American Beech

Beech occurs throughout the eastern deciduous forest region of the United States and it reaches its western limits of distribution in eastern Wisconsin and Upper Michigan. In southern Wisconsin it is confined to Habitat Type Region 11.

Together with sugar maple it ranks as the most shade tolerant hardwood in Wisconsin. It most commonly occurs in association with sugar maple, hemlock and yellow birch. Its moisture and nutrient requirements appear also to be similar to those of sugar maple although its limited western distribution suggests that it may require somewhat moister climate.

Beech periodically produces heavy seed crop, but because seed is heavily utilized by many animals (e.g. black bear, birds, rodents, weevils) beech reproduction is generally not as abundant as that of sugar maple. However, its persistence in the community is enhanced by its ability to reproduce by stump sprouting and by root suckers. It is well adapted for management by shelterwood systems. Historically, beech occurrence in southern Wisconsin might also have been limited by fires because the thin bark and surface root systems make beech highly susceptible to fire damage.

### Paper Birch

Next to aspen, paper birch is the most notable pioneer tree species throughout the boreal, and the cooler parts of temperate regions. It propagates chiefly by seed which is carried great distances by wind. It is highly light demanding but somewhat less drought tolerant than aspen. It develops best on mesic sandy loams with moderate nutrient levels. It also occurs on wet soils, bogs and rock outcrops, but in these environments it deteriorates at an early age. Near its warm limit of distribution, which includes southern Wisconsin, it is

most often confined to cooler slopes. Although intolerant of shade, birch seedlings sometimes survive in canopy gaps and unlike aspen, scattered birch trees are rather common across the landscape.

### Yellow Birch

This birch differs significantly from all other members of the birch family in both, ecological characteristics, and wood properties. All other species of birch are aggressive pioneers while yellow birch is an important member of mature communities of sugar maple, hemlock and beech on moist but only moderately fertile sites. It does especially well on soils influenced by seepage, but not on poorly drained muck or peat.

Yellow birch is moderately shade tolerant, but its regeneration requirements are not completely understood. Partial cuttings have yielded good results in numerous trials. As a "faithful companion" of hemlock and sugar maple, yellow birch is primarily a tree of the north. In southern Wisconsin it occurs only sporadically.

### Eastern Redcedar

Eastern redcedar is the most widely distributed conifer of tree size in the Eastern United States, but in Wisconsin it occurs only in the approximately southern half of the state. It grows on a wide variety of soils, from dry rock outcrops to swampy land. In Wisconsin, it is most abundant on dry, exposed sites and abandoned fields. Particularly conspicuous are the so called cedar glades, characterized by thin rocky soils and intermittent rock outcrops. These are most common in the "driftless region".

Eastern redcedar is among the first to invade abandoned fields and areas cleared for pasture. Its presence is almost a sure indicator of grazed land. Fruit is a berry-like cone, eaten by many species of wildlife and seed dissemination by animals is probably the primary cause of rapid expansion of the species into abandoned farmland. Although it is considered intolerant of shade it readily invades oak woodlands on drier sites and responds well when openings in the canopy occur. However, on more productive sites redcedar is eventually replaced by various hardwood species.

### Black Cherry

Black cherry is an important wildlife tree and is highly valued for its wood. For best development, it requires cool and moist summer growing conditions. In Wisconsin, these conditions are generally not met. Nevertheless, black cherry is found in Wisconsin across the entire moisture-nutrient gradient, but its importance and ecological role varies greatly. Because the seed is distributed primarily by birds and mammals, black cherry seedlings can be found in almost every stand. However, black cherry is very intolerant of shade and further growth is possible only if canopy openings occur. On mesic sites where growth potential is best, tolerant species generally outcompete black cherry saplings and mature, well developed trees are found only sporadically. On dry-mesic and dry sites, generally dominated by oaks and pines, light conditions are somewhat better and black cherry seedlings and saplings are often numerous. However, on



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such sites black cherry does not reach large size and on the driest habitat types it may not advance past the sapling size. On the other hand, when stands are opened up to encourage oak regeneration these cherry saplings present strong competition to oak.

### American Elm

This is a tall beautiful tree with symmetrical crown, curved branches and extensive fibrous root system. It is perhaps better known as a shade tree in cities and parks than as a typical forest tree. However, before its numbers were severely reduced by the introduced Dutch elm disease, American elm was a common member of many forest types. It has a very wide ecological amplitude, but for optimal growth it requires ample moisture and nutrients. Today it occurs for the most part only as a minor component of the tree stratum, but its light seed and moderate shade tolerance make it a very successful invader in many stands. Together with black cherry, ironwood and red maple it is one of the principal understory competitors in many oak forests, especially where sugar maple and its mesic associates, white ash and basswood, are absent. Its close relative, *slippery* or *red elm*, often plays this role on drier sites.

### Eastern Hemlock

Hemlock is a tree of moist and moderately cold climate. In Wisconsin it is largely limited to the northern half of the State. It reaches its western limits of geographic distribution in Douglas and Washburn counties. In the southern half of the state it is restricted to the proximity of Lake Michigan, primarily north of Sheboygan. It also occurs in a few isolated locations in the Baraboo range and along the Wisconsin River.

It is one of the most shade tolerant of the eastern conifers and it commonly occurs in association with tolerant hardwoods such as sugar maple, yellow birch and American beech. It requires ample moisture, but only moderate levels of mineral nutrients. Therefore it is most often found on relatively coarse soils but in cooler, moister topographic positions such as ravines and north facing slopes. It tolerates extreme acidity and in pure stands promotes accumulation of acid raw humus, which in turn impedes regeneration of many species. For successful natural reproduction, hemlock requires protection of the canopy and is most successfully regenerated by partial cutting. There is also some evidence that successful regeneration depends on reasonably low deer populations.

### Bitternut Hickory

Bitternut is most easily distinguished from its closest Wisconsin relative, the shagbark hickory, by its smooth rather then "shaggy" bark. Its range also extends considerably further north and north-west than does shagbark's. Throughout its wide geographic range it occurs on a great variety of soils, but in Wisconsin it shows strong preference for mesic, moderate to rich sites. In most silvicultural literature bitternut is characterized as intolerant of shade. This designation, however, is somewhat misleading in view of the successional strategy of this species. Although bitternut seedlings do not grow much in height under low light conditions they have a tendency to persist. Because of great resprouting ability seedlings can survive browsing,

breakage, drought and fire. Top dieback and resprouting can occur repeatedly with each successive shoot attaining a larger size and developing a stronger root system than its predecessors. In this way advance reproduction often accumulates and responds well to crown openings caused by natural disturbance or silvicultural treatments. This reproduction strategy probably accounts for rather wide distribution, but low densities of bitternut in Wisconsin. Seed dissemination is almost entirely by gravity; the fruit is thought to be generally distasteful to wildlife.

### Shagbark Hickory

Shagbark is one of the two Wisconsin's native hickories (bitternut hickory is the other), and it occurs only in the southern part of the State. Throughout the Eastern United States it is a common associate of oak dominated forests. It is medium light demanding, but tolerates considerable shading when young. It also has high sprouting ability. While it has a relatively high requirement for mineral nutrients it is very drought resistant. The combination of these traits make it a successful invader of exposed south slopes and abandoned pastures, as well as persistent member of forest communities where oaks are not regenerating. The great resistance of hickory against uprooting or breakage by wind make this tree a highly valuable stabilizer of forest stands, especially farm woodlots.

### Ironwood (Eastern Hophornbeam)

Ironwood is found throughout the eastern deciduous forest region and therefore occupies a wide range of niches. In Wisconsin it is largely restricted to mesic and dry-mesic, nutrient-rich sites and is most commonly associated with other typical mesic hardwoods such as sugar maple, basswood, white ash and beech. It is highly shade tolerant and advance reproduction is almost always present. In southern Wisconsin it is often the primary invader of oak communities where sapling competition presents problems in oak regeneration attempts. Because of its relatively small size and extremely hard wood it has historically been considered an undesirable species. In management considerations, more interest has been given to eradicating it than to improving its growth. However, it has considerable wildlife value, and an important role in nutrient cycling.

### Red Maple

This is generally a medium-sized tree that grows rapidly, but is relatively short-lived. It has an unusually wide range in regard to light, temperature, nutrient and moisture requirements. It is found on gravely and sandy soils as well as on loams and soils influenced by ground water. It occurs as an incidental associate in many types of mature communities, but also acts as a pioneer on cut-over and burned-over areas, and it readily invades other types of pioneer communities, such as aspen, pines and oaks. However, red maple does not compete well with sugar maple on mesic, nutrient-rich habitat types.

Red maple was apparently not an important component of Wisconsin's forests in pre-settlement time. However, in today's fire-free environment it appears to be the most successful invader on sites where sugar maple is limited.



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Although economically less desirable than oaks or pines, red maple serves an important ecological role particularly on less fertile soils. It is more efficient than are pines or oaks in extracting mineral nutrients from the soil and its readily decomposable leaf litter contributes significantly toward improvement of soil fertility. These important functions should be considered by resource managers.

### Sugar Maple

This is ecologically and economically one of the most important tree species in Wisconsin. Although it is most common in the northern part of the state, its significance in southern Wisconsin has been increasing ever since wild fires have been brought under control following the American-European settlement. It is found predominantly on deep, well-drained soils rich in mineral nutrients. On sandy soils, or other soils deficient in nutrients, it deteriorates at an early age regardless of the supply of available moisture. It is sensitive to impeded aeration of soil and is never found on organic soils.

Sugar maple has a very high capacity for natural reproduction by either seed or sprouts. Because it is also the most shade tolerant hardwood it is capable of replacing any other species in a successional process. Because sugar maple produces litter rich in nutrients it is considered one of the best soil-conserving or soil-improving trees, enabling other species to attain their best development.

### Black Oak

This is one of the most common oaks in southern Wisconsin, but in most respects it is considered inferior to red and white oak. It is highly drought tolerant and light demanding. It is largely confined to loamy and sandy soils of the forest-prairie transition zones. However, black oak is important as a pioneer on burned-over and sandy soils, where it prevents wind erosion and enriches the soil in organic matter. It is also a source of food for many species of wildlife.

### Bur Oak

Bur oak is one of the most drought resistant of the North American oaks. Its range extends furthest west and north-west of any eastern oak species. In Wisconsin bur oak is found across the full range of sites. On deep silt loams it attains very large size but it also occurs as "scrub oak" on the droughtiest sands. In presettlement time it was best represented in the transition zone between the prairie and the forest. It was also the principal tree of "oak savanna and oak openings". Historically it was maintained on the landscape by frequent fires which eliminated or reduced the shade tolerant, but fire sensitive species such as sugar maple, white ash and basswood. In absence of disturbance bur oak is being replaced by various species depending on the site and seed source. On mesic sites white ash, basswood and sugar maple are the ultimate invaders. On dry and dry-mesic sites a large number of species are capable of replacing bur oak. Most common are white and black oak, hickories, elms, ironwood and black cherry. In today's stands bur oak is most frequently found as scattered individuals of open-grown, limby form surrounded by any of the species listed above.

## Northern Pin Oak

This species, also known as Hills oak or simply "scrub oak" is generally a small tree or a shrub, occurring on some of the droughtiest and nutrient poor sites. It is highly intolerant of shade, but has strong resprouting ability and is thus one of the best adapted species to fire regime. In the absence of fire it can be replaced by many species, (e.g. red maple, white pine, white oak), but on the droughtiest sites it is able to persist, because on these sites potential competitors simply do not meet their growth requirements. Pin oak readily hybridizes with black and red oaks and identification is often difficult. Although pin oak has traditionally been discriminated against in favor of pines, it is an important soil improver and is valuable to wildlife. For these and other reasons it deserves to be considered in management planning.

## Northern Red Oak

Next to black walnut, red oak is currently the most economically valuable tree species in the Lake States. Its botanical range is similar to that of white oak, although in Wisconsin it extends throughout the State and into Upper Michigan and Ontario. It has many characteristics of a northern species, such as frost resistance and tolerance of acidic soils. On optimal sites it is the fastest growing oak. It reaches its best development on relatively moist and rich soils, but it also performs well on dry-mesic, medium nutrient sites. In northern Wisconsin and Upper Michigan it also occurs in "scrub" form on the driest sandy soils commonly in mixtures with jack pine, red pine and red maple. However, in southern Wisconsin such sites are most often occupied by white, black, or pin oak, and red oak is generally absent.

Although red oak is considered to be moderately shade tolerant (but less so than white oak), it does not regenerate well on mesic and dry-mesic sites. Shelterwood system of management is often suggested, but experience shows that some form of understory competition control is also necessary until oak seedlings are well established.

## White Oak

White oak is one of the most important and impressive of all the numerous oak species of America. Its botanical range covers almost the entire U.S. east of the Mississippi, but in Wisconsin it occurs only in approximately the southern two thirds of the State.

For optimal development it requires high moisture and nutrient conditions, but it also occurs in stunted or even "scrub" form on some of the poorest sandy soils. Although only moderately shade tolerant it is the most tolerant oak in Wisconsin. On dry and some dry-mesic habitat types it reproduces adequately to remain a component throughout the successional process, but on optimal sites its reproduction is nil in undisturbed stands. In presettlement time oaks were able to persist on rich sites because frequent ground fires kept the understory free of competition. This was so because all tolerant mesic hardwoods are fire sensitive, while oak seedlings and saplings repeatedly resprout when the tops are killed by fire. Most of the present oak forests are succeeding to other species unless they are managed in a



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way to assure oak regeneration. Any management attempt to regenerate oak species on optimal sites must include adequate canopy openings and control of understory competition.

### Jack Pine

Of the three native Wisconsin pines jack pine has the widest geographic distribution. It is primarily a northern species and in southern Wisconsin seldom approaches its growth potential. Everywhere it occurs it is a pronounced pioneer, highly light demanding and resistant to drought and frost. It has low requirements for organic matter and nutrients. It grows reasonably well on coarse sands and rocky ridges, and very well on sandy loams of glacial outwashes. Jack pine also occurs on wet sites including bogs, but under these conditions it exhibits poor growth and short longevity.

Jack pine is a prolific producer of seed and often invades cut-over areas. Forest fires speed natural regeneration by opening cones. Without disturbance jack pine does not regenerate and is easily succeeded by various species of only moderate shade tolerance such as white pine, black cherry, various oaks and many others.

### Red Pine

The botanical range of red pine is much smaller than that of jack pine and is centered on the northern Lake States. In terms of light, moisture and nutrient requirements red pine is intermediate between jack and white pines. However, it does not tolerate high water table and poor aeration. In contrast to jack pine, natural red pine regeneration is often found in moderately dense pure or mixed pine stands, although not to the same extent as is white pine. Red pine has much greater longevity than jack pine and mature trees can survive moderate intensity fires and persist as seed sources for 200 years or more. However, few such trees exist today because of early logging.

Red pine does not naturally occur on the more productive loams and silt loams, because on these soils it is easily outcompeted by numerous hardwood species or by white pine if hardwood seed sources are absent. If planted on such sites, aggressive competition control is required.

### White Pine

Historically, white pine has been considered the single most important tree species not only in the Lake States, but throughout the northeastern forest region. There is, however, a misconception held by many, that more or less pure white pine forests covered the region. Such forests did exist in scattered locations, but far more commonly white pine occurred in mixtures with many other species. In contrast to red and jack pines, white pine does occur on richer soils, but only under certain conditions. While it requires higher moisture and nutrient conditions for optimal growth than do red and jack pines it is considerably more shade tolerant and it grows well enough on the poorer sites to be capable of attaining climax status in absence of stand-replacing fires. On the moister and richer habitat types it often becomes established following a disturbance and because of its great longevity (sometimes as high as 400 years) and large size, persists through mid-successional stages. Ultimately, however, it is replaced by

shade tolerant hardwoods and sometimes hemlock.

Early logging and accompanying fires greatly reduced white pine seed source in Wisconsin. However, white pine trees are now reaching seedbaring age in many areas and natural reproduction is occurring in most forest cover types on dry and dry-mesic habitat types.

It is important to note that in southern Wisconsin white pine occurred only in isolated areas in presettlement time, presumably due to frequent fires. However, it appears to be well suited for this region, especially on the sandier soils.

### Black Walnut

Black walnut is perhaps the most famous eastern tree for its valuable wood. In Wisconsin, it is found scattered throughout the southern half of the state. While it can be found on almost any soil, it develops to its reputable size and quality only on the richest silt loams, typically in moist ravines and on alluvial flats. On such sites it often occurs in groups, elsewhere it is typically scattered in various mixtures. Walnut litter is injurious to many other plants.



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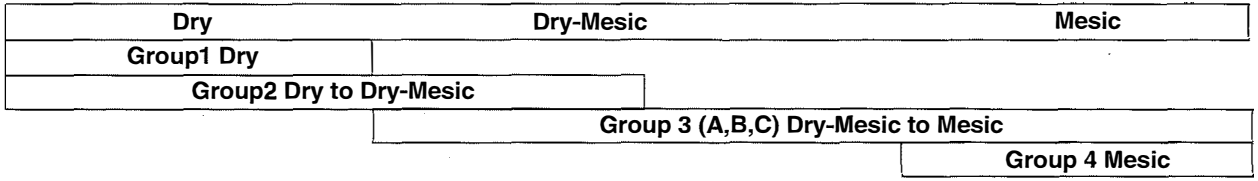
## Table 6.2 Ecological species groups useful for classifying sites into three broad categories: dry, dry-mesic, mesic.




**Group 1: Vaccinium angustifolium group**
Vaccinium angustifolium
Gaylussacia baccata
Amorpha canescens
Gaultheria procumbens
Chimaphila umbellata
Euphorbia corollata

**Group 2: Pteridium aquilinum group**
Pteridium aquilinum
Aster macrophyllus
Uvularia sessilifolia
Apocynum androsaemifolium
Lysimachia quadrifolia
Potentilla simplex
Diervilla lonicera
Amelanchier sp.
Cornus racemosa

**Group 3:**

**A. Desmodium glutinosum subgroup** (Represented stronger on the dry-mesic end)
Desmodium glutinosum
Sanicula marilandica
Amphicarpa bracteata
Parthenocissus quinquefolia
Vitis riparia
Aralia nudicaulis
Viburnum acerifolium

**B. Arisaema atrorubens subgroup** (Represented stronger on the mesic end)
Arisaema atrorubens
Actaea sp.
Adiantum pedatum
Botrychium virginianum
Uvularia grandiflora
Viola pubescens
Cryptotaenia canadensis
Solidago flexicaulis
Sambucus pubens

**C. Osmorhiza claytoni subgroup** (Represented evenly across the gradient)
Osmorhiza claytoni
Circaea quadrisulcata
Phryma leptostachya
Geranium maculatum
Dryopteris spinulosa

**Group 4: Caulophyllum thalictroides group**
Caulophyllum thalictroides
Hydrophyllum virginianum
Hepatica acutiloba
Trillium sp.
Mitella diphylla
Sanguinaria canadensis
Laportea canadensis
Allium tricoccum
Asarum canadense



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# Table 6.3 Occurrence of Understory Species on Various Habitat Types

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%.

| Scientific Name | Common Name | Region 6 | | | | | | | | | | Region 7 | | | | Baraboo | | | | | Region 8 | | | | | Region 9 | | | | Region 10 | | | | | | Region 11 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PVGy | | PVCr | | ArDe-V | | ArCi-Ph | | ATiSa-De | | ATiDe(Pr) | | ATiSa | | AArL | | ATiDe-As | | ATiCa-Al | ATiCr(O) | ATiAs(De) | | PEu | | ArDe | | ATiFrCi | ATiFrVb(Cr) | | ATiFrCa(O) | | AFrDe(Vb) | | AFrDeO | | AFH | | AFAs-O | |
| | | PVHa | | PVRh | | ArCi | | AArVb | | ATiCa-La | | ATiDe | | ATiCa | | ATiDe-Ha | | ATTr | | | ATiCr(As) | | ATiH | PVG | | AQVb-Gr | | | ATiFrVb | | ATiFrCa | | AFrDe | | AFTD | | AFAs | | | |
| Acer spicatum | Mountain maple | | | | | | | | | * | | | | | | | | * | | | | | | | | | | | | | | | | * | | | | | | |
| Actaea spp. | Baneberries | | | | | | 1A | 1A | | 1A | 1A | | 1A | * | 2A | * | 1A | 2A | 2A | 3A | * | 1A | 1A | 3A | | | 1A | 1A | | | 1A | * | 1A | 1A | 3A | 2A | 3A | 3A | 3A | 3A | |
| Adiantum pedatum | Maidenhair fern | | | | | | | 1A | | 2A | 1A | 1A | 2A | 2A | 2A | | 1A | 2A | * | 2A | 1A | 1A | 1A | 2A | | | | | | | * | | | 1B | * | | | | | |
| Agrimonia gryposepala | Agrimony | | | | | | | 1A | | | | 2A | | | * | * | | * | | | 2A | * | * | * | | | | | 1A | | 1A | | 1A | | | 1A | | | | |
| Alliaria officinalis | Garlic mustard | | | | | | | | | | | | | | | | | | | | | | *C | *B | | | | | 1A | * | * | *C | | | | | | | | |
| Allium tricoccum | Wild leek | | | | | | | | | * | 1A | | | * | | | | | | 2A | | | * | * | | | | | | * | * | * | | * | * | 1A | 1A | 1A | 1A | |
| Amelanchier spp. | Juneberry | 3A | 3A | 3A | 3A | 3A | 2A | 2A | * | 1A | | | | | | 3A | 3A | * | 1A | * | 1A | * | | * | 2A | 3A | 2A | 2A | 2B | 1B | 1A | | 3A | 1A | 3A | | 2A | * | | |
| Amorpha canescens | Lead plant | * | | 1A | | | | | | | | | | | | | | | | | | | | | 2A | | 1A | | | | | | | | | | | | | |
| Amphicarpa bracteata | Hog peanut | | | | | 2A | 2A | 3A | 2A | 2A | 2A | 2A | 2A | 2A | 2A | 3A | 2A | 3A | | 2A | 2A | 1A | 2A | 1A | | | 2A | 3B | 2A | | * | * | 1A | 1A | 2A | 3A | 2A | | 1A | * | * |
| Anemone quinquefolia | Wood anemone | * | * | * | 1A | 1A | 1A | * | 2A | 1A | 1A | | | | | 2A | 3A | 2A | 3A | 2A | 2A | 2A | 2A | 3A | 1A | * | 3A | 1A | | 1A | * | 2A | 1A | * | * | 1A | * | | * | * | |
| Anemone virginiana | Thimble weed | | | | | | | | | | | 1A | | 1A | * | | | | | | | | | | | | | | | | | | | 1A | * | | | | | |
| Antennaria neglecta | Field pussytoes | * | | * | | | | | | | | | | | | 1B | | * | | * | | | | | | | | | | | | | | | | | | | | |
| Apocynum androsaemifolium | Spreading dogbane | 2A | 1A | 2A | 1A | 1A | | 1A | | | | | | | | 2A | | * | | | | *B | | * | 1A | * | * | 1A | | * | | | | * | 1A | | | | | |
| Aquilegia canadensis | Wild columbine | * | | * | | * | * | * | | | | | * | 1A | | | | | * | | * | * | | | | * | | | | | | | | | * | | | | | |
| Aralia nudicaulis | Wild sarsaparilla | 1A | 3A | 3A | 3A | 3A | * | 2A | 3A | 1A | * | 1A | 1A | 1A | * | 1A | 1A | 1A | 1A | * | 1B | | | * | 2A | 1A | 2B | 1A | | | | | | * | 3A | * | *C | | | | |
| Aralia racemosa | Spikenard | | | | | | | 1A | * | * | | | 1A | * | 1B | | | * | * | * | * | | | * | | | * | * | | | | | | * | | * | * | | | | |
| Arisaema atrorubens | Jack-in-the-pulpit | | | | | | | 1A | | * | 1A | | * | 1A | 2A | 1A | 3A | 3A | 3A | 3A | * | 2A | 3A | 3A | | | | * | 2A | 2A | 3A | 1A | 3B | | * | * | 2A | 3A | 3A | 1A | |
| Aronia melanocarpa | Black chokeberry | | * | | 1A | | | | | | | | | | | | | | | | | | | | 1A | | | | | | | | | | | | | | | |
| Asarum canadense | Wild ginger | | | | | | | | | 2A | 2A | | | * | 1B | | | | | * | | | | | | | | | | | | | | | | | | | | |
| Asclepias spp. | Milkweeds | | | * | | 1A | * | * | | * | | | | | | 1A | * | * | | | | | | * | | * | * | | * | | | | | * | 2A | | | | | |
| Aster macrophyllus | Large-leaved aster | 1A | 2A | 1A | 1A | 2A | 1A | 1A | 3A | 2A | * | | | * | | 2B | 2A | 1A | 2A | 1A | | | * | | * | * | 2B | | | | | | | 2B | 3A | 2A | 1A | 2A | * | 1B |
| Aster sagittifolius | Arrow-leaved aster | * | * | * | | * | | * | * | | | | | | | | | | | | | | | | | * | * | * | | | | | | | | | | | | |
| Athyrium filix-femina | Lady fern | | | | | * | | 1A | | * | | | | | * | * | 1A | 1A | 3C | 3A | | | | | * | | * | 1B | | | | | | | | * | * | | |
| Botrychium virginianum | Rattlesnake fern | | | | | | | 1A | | 1A | 1A | 1A | 3A | 2A | 2A | 1A | 1A | 1A | | 2A | 2A | | 3A | 3A | | | 1A | 1A | | | 2A | * | | | 1A | 1A | * | | | 1A |
| Caulophyllum thalictroides | Blue cohosh | | | | | | | | * | 2A | 2A | | * | * | 2A | | 1A | 1A | 1A | 3A | * | * | 1A | 2A | | | | * | | | 1A | * | 1A | | 2A | * | 1C | 1A | 2A | 2A |
| Ceanothus americanus | New jersy tea | | | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Celestrus scandens | Climbing bittersweet | | | | | | | | | | | | | | | | | | | | | * | | | | | | | * | * | | | | * | * | * | | * | | |
| Chimaphila umbellata | pipsissewa | * | | * | | | | | | | | | | | | | | | | | | | | 2A | | 1A | | | | | | | | | | | | | | |
| Circaea quadrisulcata | Enchanter's nightshade | | | | | * | 3A | 3A | 1A | 2A | 2A | 2A | 1A | * | 3A | 3A | 3A | 3A | 3A | 3A | 3A | 3A | 3B | 3A | | | * | 1A | 3B | | 3A | 3A | 3B | 3B | 1A | 1A | 2A | * | 3A | 3A | 2A |
| Clintonia borealis | Yellow beadlilly | | | | 1A | | | | | | | | | | | | | | | | | | | | * | | | | | | | | | | | | | | |
| Comptonia peregrina | Sweetfern | * | | | | | | | | | | | | | | | | | | | | | | * | | | | | | | | | | | | | | | |
| Conopholis americana | Squawroot | | | | | | | | | | | | | | | 2A | 1A | 2A | | * | | | | | | | | | | | | | | 1A | * | | | | | |
| Coptis groenlandica | Goldthread | | | | 1A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cornus alternifolia | Alternate-leaved dogwood | | * | | * | * | * | * | 1B | 3A | 2A | * | 1A | 1A | 2A | 1A | 1A | 2A | * | 1A | * | 1A | * | 1A | | * | | 2A | | *B | 1A | | * | 2A | 2A | 1A | * | * | 1A | 1A |
| Cornus canadensis | Bunchberry | | * | | 1A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cornus racemosa | Gray dogwood | | | 3A | | 2A | 1A | 2A | | | | 2A | 1A | * | | * | | * | | | 3A | 2B | 1A | * | * | * | 1A | | 2A | 3B | 2A | 2A | * | 2A | | * | | 2A | * | |
| Cornus rugosa | Round-leaved dogwood | | | | | * | | * | | | | | | | | * | * | * | | | | | | | | | | | | | | | | | | | | | |
| Cornus spp. | Dogwoods | | | | | | | | | | | | | | | | | | | | | | | * | | 1A | | | | | | | | | | | | | | |
| Corylus americana | Hazel-nut | 1A | * | 2A | * | 3B | 2A | 2A | 2A | 1A | | 2A | 1A | * | | 1A | * | 1A | | * | * | 1A | * | * | | | | | | * | | * | | | | | | | | |
| Corylus cornuta | Beaked hazelnut | * | 1A | 1A | * | * | * | * | 2A | 1A | * | * | | | | | | | * | * | 2B | 1A | 1A | | | | | | 1B | | | * | * | * | | * | | | | |
| Corylus spp. | Hazelnuts | | | | | | | | | | | | | | | | | | | | | | | 3B | 2A | 3B | 2B | 3A | | | | | | | | | | | | |
| Crataegus spp. | Hawthorns | | 1A | * | | 1A | | * | * | * | | | | | | 1A | 1A | * | | | | | | | | 1A | | | | | | | | * | | 2A | | | | |
| Cryptotaenia can. | Honewort | | | | | | | | | | | | | | * | | | 1A | | 1A | 1A | | 3A | 2A | | | | | | | * | * | | | | | | | * | |
| Cypripedium acaule | Pink lady's slipper | | | | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cypripedium calceolus | Yellow lady's slipper | | | | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Desmodium glutinosum | Pointed-leaved tick trefoil | | | * | | 3A | 2A | 3A | 3A | 3A | * | 3A | 3A | 2A | 1A | 3A | 2A | 3A | | * | 3B | 2A | 3B | 1A | | | 2A | 3B | 3A | 1A | * | 2A | * | 2B | 2A | 2A | | | | |
| Desmodium nudiflorum | Naked-flowered tick trefoil | | | | | 2A | | 1A | | | | 1A | 2A | * | | 3A | 2A | 2A | | | *B | | * | * | | | *B | 2A | | | | | | | * | * | * | | | | |
| Diervilla lonicera | Bush honeysuckle | 1A | 2A | 1A | | 2A | * | 1A | 2A | * | | *B | | * | | * | | * | 1A | | | | | | * | | 1A | | | | | | | * | | | | | | |
| Dioscorea villosa | Wild yam root | | | | | | | * | | | | 1A | 1A | 1A | * | * | 2A | 2A | | 1A | * | 1A | 1A | 2A | | | * | | | * | | 1A | * | | * | * | | | | |
| Dirca palustris | Leatherwood | | | | | | | | * | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| Scientific Name | Common Name | Region 6 | | | | | | | | | | Region 7 | | | | Baraboo | | | | | Region 8 | | | | Region 9 | | | | Region 10 | | | | Region 11 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PVGy | PVHa | PVCr | PVRh | ArDe-V | ArCi | ArCi-Ph | AArVb | ATiSa-De | ATiCa-La | ATiDe(Pr) | ATiDe | ATiSa | ATiCa | AArL | ATiDe-Ha | ATiDe-As | ATTr | ATiCa-Al | ATiCr(O) | ATiAs(De) | ATiCr(As) | ATiH | PEu | PVG | ArDe | AQVb-Gr | ATiFrCi | ATiFrVb(Cr) | ATiFrVb | ATiFrCa(O) | ATiFrCa | AFrDe(Vb) | AFrDe | AFrDeO | AFTD | AFH | AFAs | AFAs-O |
| Dryopteris spinulosa | Spinulose shield fern | | | 1A | * | 1A | 1A | 2A | 2A | 2A | 2A | 1A | 1A | 2A | 2A | * | 2A | 1A | 1A | 1A | 1A | 2A | 2A | 2A | * | 1A | * | 3A | | * | | * | 1A | 1A | 1A | 1A | 3A | 2A | 1A | 1A |
| Epigaea repens | Trailing arbutus | * | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Epipactis helleborine | Helleborine | | | | | | | | | | | | | | | | | | | | | | | | | | | | | * | | | | * | * | * | | |
| Euphorbia corollata | Flowering spurge | 1A | | 1A | | | | | | | | | | | | | | | | | | | | | 3A | | * | | | | | | | | | | | | |
| Fragaria vesca | Wood strawberry | * | | * | | 1A | 1A | * | 1A | * | * | 1B | * | * | | * | | | * | | 1A | * | | | 1A | | 1A | 1A | * | | * | | | | * | | 2A | | |
| Galium aparine | Cleavers | | | | | | | | | | | | | | | 1A | * | 1A | | 1A | 2A | 1A | 2A | 3A | | | | | | | 2A | * | | | | | | | |
| Galium asprellum | Cleavers | | | | | | * | | | * | * | | 1A | 1A | 1A | | | 1A | | | 1A | * | 1A | * | | * | * | * | 3A | * | * | | | * | | 1A | 1A | | * | 1A |
| Galium boreale | Northern bedstraw | | | * | | * | 1A | 1A | 1A | | | | | | | | | | | | | | | | | | * | | 2A | | | | | * | * | | | | | |
| Galium circaezans | Wild licorice | | | | | | | | | | | | | | | * | * | * | | | | | | | | | | | | | | | | 1A | * | | | | * |
| Galium concinnum | Shining bedstraw | | | | | * | | | | 1A | * | 2A | 1A | 2A | 1A | * | 1A | * | | 1A | | | | | | | | | | | | | | | * | | | | | |
| Galium triflorum | Sweet-scented bedstraw | | | * | | 1A | 1A | 3A | 1A | | 1A | | | * | | * | | 1A | | 1A | 2A | 1A | 1A | 1A | | | 1A | | * | * | * | | | | 1A | * | | 1A | | * |
| Gaultheria procumbens | Wintergreen | 2A | 3A | * | 2A | | | | * | | | | | | | | | | | | | | | | * | 2A | | | | | | | | | | | | | |
| Gaylussacia baccata | Black huckleberry | 3B | 2A | 1A | 2B | 1A | | | | | | | | | | | | | | | | | | | *C | 2B | * | | | | | | | | | | | | |
| Geranium maculatum | Wild geranium | | | * | | 2A | 2A | 3A | 1A | 3A | * | 2A | 3A | 3A | 2A | 3A | 3A | 3A | | 3A | 2B | 3B | 3A | 3A | | * | 1A | 3A | 3A | 3A | 2B | 2B | 3B | 3A | 3A | 2A | | 3B | 2A | * |
| Geum canadense | White avens | | | | | | | 1A | | | | | | | | * | | 1A | | * | 2A | 2A | 2A | 2A | | | | 3A | 2A | 2A | 3A | 3A | * | * | 2A | | 3A | 2A | 1A |
| Goodyera pubescens | Downy rattlesnake plantain | * | * | * | | 1A | * | * | * | | | | | | | * | 1A | | * | | | | | | | | * | | | | | | | | | | | | |
| Grasses spp. | Grasses | 1A | 2A | 1A | 1A | 1A | 2A | 1A | 3A | 2A | 1A | 1A | 2A | 2A | 1A | 1A | 1A | 1A | | 1A | 3A | 2A | 3A | 3A | 3C | 2B | 2B | 2A | | 2A | 2A | 2A | 2A | 3B | 3B | 3B | 2A | 3A | 2A | 2A |
| Hamamelis virginiana | Witch hazel | | 2A | | | | | | 1A | | | | | * | *B | * | 3B | * | 2B | 1B | | | | | | | 1B | | | *B | | | *C | *B | *B | * | 2B | * | |
| Helianthus spp. | Sunflowers | | | | | | * | | 1A | 1A | * | 2A | * | | | * | | | | | | | | | * | | 1A | | 1A | | | | | | | | | | |
| Hepatica acutiloba | Sharp-lobed hepatica | | | | | | | | 1A | 2A | 2A | | | * | 1A | * | * | * | 1A | 2A | | | | 3A | | | | | | | | | * | | * | 2A | | 1A | * | 2A |
| Hepatica americana | Round-lobed hepatica | | | * | | 1A | | | 2A | | | | | | | | | | | | | | | | | | | 2A | * | * | | | | 2A | * | 1A | * | | |
| Heuchera richardsonii | Rough heuchera | * | | | | | | * | | | | | | | | * | | | | | | | | | | | | 1A | | | | | | | | | | | |
| Hydrophyllum virginianum | Virginia waterleaf | | | | | | | | | | * | | | | * | | | * | * | 1A | | * | * | 3C | | | | | | | | | | | | | 2A | 1A | 1A |
| Ilex verticillata | Winterberry | * | 1A | 2A | 3A | * | 1A | * | * | | | | | | | | | * | | | | | | | | 1A | * | * | 1A | | | | 1A | | | | | | |
| Impatiens capensis | Jewelweed | | | | | | | | | | * | | | | * | | | | | | | | | | | | | | | | | | | | | 1B | * | | |
| Laportea canadensis | Wood nettle | | | | | | | | | | 2C | | | | * | | | * | | *B | | | 2A | * | | | | 2A | | | | | | | | | *B | | |
| Lathyrus ochroleucus | Pale vetchling | | | 1A | | 2A | | * | | | | | | | | * | | | | | | | | | | | | 1A | | | | | | | | | | | |
| Lonicera canadensis | American fly honeysuckle | | | | | | | | 2A | 1A | | 1A | * | * | | * | | * | | | | * | | * | | | | | *B | 1A | * | * | | * | | 1A | 1A | * | |
| Lonicera spp. | Honeysuckles | | | | | | | | | | | | | | | * | * | * | | * | | | | | | | | | | | | | 2A | | 1A | | | | |
| Lycopodium clavatum | Common club-moss | | | | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lycopodium lucidulum | Shining club-moss | | | | | | | | | | | | | | | | * | | 2A | | | | | | | | | * | | | | | | | | | | | |
| Lycopodium obscurum | Ground-pine | | 1A | | 2A | | * | | * | | | | | | | | | | | | | | | | | 1A | | | | | | | | | | | | | |
| Lysimachia quadrifolia | Whorled loosestrife | 2A | 2A | 1A | * | 2A | | * | 1A | | | | * | | | 2A | * | * | | | | A | | | | 1A | | | | | | | | | | | | | |
| Maianthemum canadense | Wild lily-of-the-valley | 2A | 2A | 3A | 3A | 1A | 2A | 1A | 1A | | | | | | | * | * | * | 3A | 1A | | | | | 1A | 3A | 1A | 1A | 1A | | | | | | 1A | 1A | 3A | 2A | * | 1A |
| Mitchella repens | Partridgeberry | | 1A | * | 2A | | | | * | | | | | | | | | | 2A | | | | | | | 1A | | 2A | | | | | | | | | 1A | * | | |
| Mitella diphylla | Miterwort | | | | | | | | | 2A | 1A | | | | 1A | | | | 1A | 2A | | | | | | | | | | | | | | | | | | *B | | |
| Osmorhiza claytoni | Sweet cicely | | | | | 2A | 2A | 3A | 1A | 3A | 3A | 3A | 2A | 2A | 3A | 2A | 2A | 2A | 3A | 3A | 3A | | 3B | 3A | | * | 2A | 3A | 3A | | | | 2A | 1A | 1A | 1A | 2A | 2A | * | | 3A |
| Osmunda cinnamomea | Cinnamon fern | | | | 2C | | | | | | * | | | | | | | | | | | | | | | *B | | | | | | | | | | | | | |
| Osmunda claytoniana | Interrupted fern | | 1A | | 1A | 1A | | 1A | 2A | 1B | | | | | 1A | | 1A | 1A | 2A | 1A | | | | | | * | | * | | | | | | | | | | | |
| Panax quinquefolius | Ginseng | | | | | | | | | | | | | | | | 1A | 1A | | * | | * | * | | | | | | | | | | | | | | | | * |
| Parthenocissus quinq. | Virginia creeper | | | 2A | * | 2A | 3A | 3A | * | 1A | 2A | 3A | 3A | 1A | 2A | 3A | 2A | 3B | 3B | 3A | 3C | 3B | 3B | 3A | * | * | 2A | 2A | 3B | 3C | 2B | 3B | 2A | 1A | | * | * | 2B | 2A | 1A |
| Phryma leptostachya | Lopseed | | | | | 1A | | 3A | | 1A | * | 3A | 3A | 3A | 2A | 3A | 2A | 3A | * | 2A | 3A | 1A | 3A | 3A | | | * | 2A | 3A | | | 3A | 1A | | * | 2A | * | | * | 2A |
| Podophyllum peltatum | Mayapple | | | | | | | | | | | | | | * | 2A | 2A | 2A | * | 2A | *B | 2A | 3B | 3B | | | | | 1A | 1A | 1B | 2A | | 1B | 1B | | 1B | 1A | * |
| Polygonatum pubescens | Hairy solomon's seal | | | * | | 1A | * | * | 3A | 1A | 1A | | | 2A | 2A | 1A | 3A | 2A | 3A | 3A | | | * | * | 1A | 1A | 2A | 2A | | | | * | * | * | 2A | 3A | 3A | 3A | 2A | 1A | 3A |
| Potentilla simplex | Common cinquefoil | * | * | * | | 1A | | 1A | * | | | | | | | 2A | * | * | | | 1A | * | | 1A | | | | | * | * | * | | | * | * | | | | | |
| Prenanthes alba | White lettuce | | | | * | * | 1A | * | * | * | | | | * | | 2A | 2A | 1A | | * | A | * | * | 1A | * | * | * | | 1A | | * | | | 1A | 1A | 1A | | 1A | | |
| Prunus virginiana | Chokecherry | * | | 3A | | 3A | 3A | 2A | 2A | 3A | 2A | 2A | 1A | 2A | 2A | 3A | 3A | 2A | * | 3A | 3A | 3A | 2A | 3A | 2A | 2A | 3A | 2A | 2A | 3B | 3B | 3A | 3B | 3B | 3A | 3A | 3A | 3B | 3B | 3A |
| Pteridium aquilinum | Braken fern | 3C | 3B | 3B | 2B | 3B | 2A | 1A | 2A | * | | 1A | * | | | 1B | * | * | | | | | | | 1B | 2B | 2B | 1A | | | | | | | | | | | |
| Pyrola spp. | Pyrolas | | * | 1A | * | 1A | * | 1A | * | | | | | | | * | | * | | | | | | | * | * | 1A | 1A | | | | | | | | | | | |
| Ranunculus abortivus | Small-flowered crowfoot | | | | | | | | | | | | | | | 2A | 3A | 1A | * | 3A | 2A | 1A | 2A | 3A | | | | * | * | | | | | | | | | | | |
| Ranunculus hispidus | Hispid buttercup | | | | | | | | | 2A | 1A | | | * | * | | | | | | | | | | | | | | * | | 1A | | | | 1A | | * | 1A | | |
| Ranunculus recurvatus | Hooked crowfoot | | | | | | | | | | | | | | | | * | 1A | | 1A | * | * | 1A | * | | | | | | * | | | | * | | * | | | |
| Ranunculus spp. | Buttercups | | | | | | * | | * | 1A | 1A | 1A | * | 1A | 1A | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rhamnus cathartica | Common buckthorn | | | | * | | | | | | | | | | | | | | | | * | *B | | | | | | * | 2C | 1A | 2B | 1A | | | | | * | | |



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Previous View

| Scientific Name | Common Name | Region 6 | | | | | | | | | | Region 7 | | | | Baraboo | | | | | Region 8 | | | | Region 9 | | | | Region 10 | | | | Region 11 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PVGy | PVCr | ArDe-V | ArCi-Ph | ATiSa-De | | | | | | ATiDe(Pr) | ATiSa | | | AArL | ATiDe-As | | ATiCa-Al | | ATiCr(O) | ATiAs(De) | | | PEu | ArDe | | | ATiFrVb(Cr) | ATiFrCa(O) | | | AFrDe(Vb) | AFrDeO | AFH | | AFAs-O | |
| | | PVHa | PVRh | ArCi | AArVb | ATiCa-La | | | | | | ATiDe | ATiCa | | | ATiDe-Ha | ATTr | | | | ATiCr(As) | ATiH | | | PVG | AQVb-Gr | | | ATiFrVb | ATiFrCa | | | AFrDe | AFTD | AFAs | | | |
| Rhamnus frangula | Alder buckthorn | | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rhus radicans | Poison ivy | | * | * | 1A | 1A | | * | | | | 2A | 3A | 1A | * | 1A | | 1A | | | 2A | 2A | 1A | * | * | * | 1B | 1C | | 1A | 1A | 1A | * | 1A | 1A | * | | * | |
| Ribes cynosbati | Prickly gooseberry | | | | | | | | | | | | | | | 1A | 1A | 3A | 1A | 2A | 3B | 3B | 3B | 3A | | | | | 2B | 3B | 3B | 2A | 3A | 3A | 3A | 2A | 3A | 3A | 3A |
| Ribes spp. | Gooseberries | | * | * | 2A | 2A | 2A | 3A | 2A | | | 3B | 2A | 3A | 3A | | | | | | | | | | * | * | * | 2A | 2A | | | | | | | | * | | |
| Rosa spp. | Roses | 2A | * 2A | 2A | * | 1A | | | | | | 1A | * | | | 2A | * | 1A | | | 1A | 1A | * | | 2A | * | 1A | 1A | * | 2A | * | 1A | * | * | * | * | * | | |
| Rubus hispidus | Swamp dewberry | | 1A | 3A | | | | | | | | | | | | | | | | | | | | | 1A | | | | | | | | | | | | | |
| Rubus spp. | Blackberries/raspberries | 2A | 2A | 3A | 1A | 3A | 3A | 3A | 1A | 1A | | 3A | 1A | * | * | 3A | 2A | 3A | * | 1A | 3B | 3B | 2A | 1A | 2A | 2A | 3B | 3A | 2A | 2A | 1A | 3A | 1A | 2A | 1A | 1A | 2A | 1A | 2A | 1A |
| Sambucus canadensis | Common elder | | | | 2A | | | | | | | | | | | | | * | | * | | | | 1A | | | 1B | 1A | | | * | | | | | | | |
| Sambucus pubens | Red-berried elder | | | | * | | | | | | * | | | | | | | | 2A | * | * | | 2A | * | | | | | | | * | * | | | 3A | * | 1A | 3A |
| Sanguinaria canadensis | Bloodroot | | | | | | | 3A | 3A | | | | 1A | 3A | 3A | * | 2A | 1A | 2A | 3A | * | * | 1A | 3A | | | | | | * | | 2A | | * | * | 1A | 1A | 2A |
| Sanicula gregaria | Clustered snakeroot | | | | | | | | | | | | | | | * | | 1A | | 1A | * | * | 2B | 2B | | | | | | | * | *C | | * | | | | |
| Sanicula marilandica | Black snakeroot | | | * | * | 2A | 1A | 3A | 1A | | | 2A | 3A | 2A | 3A | | * | * | * | * | 2A | | 1A | | | | 3A | * | | | *B | | | * | 1A | | | | |
| Sedges spp. | Sedges | 3A | 3A | 3A | 2A | 3A | | 3A | | | | | | | | | | | | | | | | | 1B | 2A | 1A | 3A | 3A | | | * | *C | *B | 1B | *B | 1B | * |
| Smilacina racemosa | False solomon's seal | 1A | * | 3A | * | 2A | 1A | 1A | 1A | 2A | 1A | 2A | 1A | 2A | 1A | 2A | 2A | 1A | | 2A | 2A | 2A | 3A | 1A | 2A | 2A | 3A | 2A | 2A | 3A | 3B | 3A | 3A | 2A | 2A | 2A | 3A | 2B | 3A |
| Smilacina stellata | Star-flowered solomon's seal | * | | * | * | * | | | | | | | * | | | * | | | | | 1A | | 1A | * | 1A | | 1A | | * | 1A | * | 1A | * | | | * | * | * | |
| Smilax herbacea | Carrion flower | | | * | 1A | 1A | 2A | | 3A | 1A | | 1A | 2A | 2A | 2A | * | * | * | 1A | * | 2A | 1A | 3A | 3A | | * | 1A | | 3A | * | 1A | 2A | 2A | 2A | 3A | 2A | | 2A | * | 1A |
| Smilax tamnoides | Bristly greenbrier | | 1A | 1A | * | * | * | * | 1A | * | | | 1A | 1A | 1A | * | 2A | 1A | | 1A | * | | 1A | * | | 2A | * | 3A | 2A | | * | | * | * | * | 1A | | * | * |
| Solanum dulcamara | Bittersweet nightshade | | | | | | | | | | | | | | | | | | | | | | | | | | * | | 1A | | | | | | 1A | 1A | * | |
| Solidago flexicaulis | Zigzag goldenrod | | | | | | * | 3A | 2A | | | | 1A | 2A | 3A | 1A | 1A | 1A | * | 2A | | | | | | | | | | | | | | * | | 2A | * | |
| Solidago spp. | Goldenrods | | | 1A | * | 1A | 1A | 1A | * | | * | * | | | | * | * | * | | | 1A | | 1A | * | | | * | | 1A | | | | | 1A | * | | * | * |
| Streptopus roseus | Rosey twisted stalk | * | * | * | | * | 1A | | * | | | | | | | | | | 2A | * | | | | | | | | | | | | | | | * | | | |
| Symplocarpus foetidus | Skunk cabbage | | | | * | | | | | | | | | | | | | | 2A | * | | | | | | | | | | | | | | | | | | |
| Symphoricarpos albus | Snowberry | | | | | | | * | * | | * | | | | | | | | | | | | | | | | | | | | | | | 1A | | | | | |
| Thalictrum dioicum | Early meadow rue | | | * | * | 1A | 2A | 3A | 2A | | | 1A | 2A | 1A | | * | 1A | 2A | * | 2A | | * | * | 1B | | | 2A | 1A | | * | 1A | | 1B | 2A | 2B | 1B | | 1A | 1B | * |
| Trientalis borealis | Starflower | 1A | 2A | 1A | 3A | * | 1A | * | 1A | | | | | | | | * | | 1A | * | | | | | * | 1A | * | 2A | 1A | | | | | | | | | | |
| Trillium cernuum | Nodding trillium | | | | | | | | | | | | | | | | | | | | | * | | 1A | | | | | | 2A | | 2A | 3A | 3A | 3A | 2A | 2A | 3A | 2A |
| Trillium spp. | Trilliums | | | | | | 2A | 2A | 3A | | | | * | 2A | | | * | | 1A | 2A | | | | | | | 1A | | | | | | | | | | | | |
| Triosteum aurantiacum | Orange-fruited horse gentain | | | | | | | | | | | | | | | | | | | | * | | | * | | | | | * | * | | | 2A | 2A | 1A | | * | |
| Uvularia grandiflora | Large-flowered bellwort | | | * | * | 2A | * | 3A | 1A | | 1A | 2A | 2A | 3A | | 1A | 2A | 2A | * | 2A | 1A | | 1A | 3A | | | | 2A | | | | * | * | | 1A | 3A | 2A | | * | 1A |
| Uvularia sessilifolia | Sessile-leaved bellwort | 2A | 3A | 2A | 3A | 2A | 2A | 2A | 2A | * | 1A | | * | * | | * | 1A | * | | 1A | | | | | 1A | 2A | 1A | 1A | 2A | | | | | | | | | |
| Vaccinium angustifolium | Low sweet blueberry | 3A | 3A | 3A | 3A | 3A | 1A | * | 2A | | | | | | | | * | | | | | | | | 2B | 3A | 1A | * | * | | | | | | | | | | |
| Viburnum acerifolium | Maple-leaved viburnum | * | 2A | * | | 1A | * | * | 3A | * | | | 1A | 1A | 1A | 3B | 3B | 3B | 1A | 2A | * | * | | * | | * | | 3B | * | * | 1A | | | 3A | 2A | 2A | 1A | 2A | 1A | 1A |
| Viburnum lentago | Nannyberry | | | | * | 1A | 1A | * | 1A | * | 1A | * | | * | | | * | * | | | * | 2A | | | | | | | 2B | 1A | * | * | 1A | * | * | | 3A | 1A | |
| Viburnum rafinesquianum | Downy arrowwood | | * | 1A | * | | 1A | * | | | | | * | | | 1A | 1A | * | | * | * | 1A | | * | | | 2A | * | 2A | 1A | * | * | 3A | 2A | 1A | | 1A | |
| Viburnum trilobum | Highbush cranberry | | | | | | | | | | | | | | | | | | | | | | | | | | | | * | * | | * | | | | | 1A | * | |
| Viola pensylvanica | Smooth yellow violet | | | | * | | 1A | 1A | 2A | | | * | * | 1A | | * | | 1A | | * | 1A | 1A | 1A | 2A | | | | | | * | 1A | 2A | * | * | 2A | 3A | 2A | 1A | 3A |
| Viola pubescens | Downy yellow violet | | | | | | | * | | | | * | | | | 1A | 2A | 2A | | 3A | * | * | 3A | 2A | | | 1A | | | * | 1A | * | | * | | * | * | | |
| Viola spp. | Violets | | * | * | * | 1A | 2A | * | | 1A | | | * | 1A | 1A | | | | * | | | | | | * | 1A | 2A | 2A | 2A | | | | | | | | | | |
| Vitis riparia | Riverbank grape | | 1A | | 1A | 1A | 2A | | 1A | | | 2A | 2A | 2A | * | 2A | * | 2A | * | * | 3A | 3A | 2A | 2A | * | * | 2A | 1A | 3A | 3A | 3A | 2A | 1A | 3A | 3A | 2A | * | 2A | 2A | |
| Xanthoxylum americanum | Prickly ash | | * | | 1A | * | | 1A | * | | | 1A | 2A | 2A | 1A | 1A | * | 1A | * | * | 2B | 2B | 1A | 1A | | | * | * | 1B | 1B | 1B | 1B | *B | | 1A | 1A | | 2A | 1A | 1A |



Previous View

## Table 6.4. Index to Abbreviations of Habitat Type Names and Distribution of Reference Stands

| Type abbrev. | Name | Region | # Ref. Stands | Page |
|---|---|---|---|---|
| AArL | Acer saccharum-Acer rubrum/Lysimachia | B* | 33 | 3-103 |
| AArVb | Acer saccharum-Acer rubrum/Viburnum | 6 | 7 | 3- 38 |
| AFAs | Acer-Fagus/Arisaema | 11 | 37 | 3-218 |
| AFAs-O | Acer-Fagus/Arisaema-Osmorhiza variant | 11 | 22 | 3-218 |
| AFH | Acer-Fagus/Hydrophyllum | 11. | 15 | 3-215 |
| AFrDe | Acer-Fraxinus/Desmodium | 11 | 17 | 3-207 |
| AFrDe(Vb) | Acer-Fraxinus/Desmodium-Viburnum phase | 11 | 14 | 3-204 |
| AFrDeO | Acer-Fraxinus/Desmodium-Osmorhiza | 11 | 29 | 3-207 |
| AFTD | Acer-Fagus-Tsuga/Dryopteris | 11 | 12 | 3-213 |
| AQVb-Gr | Acer-Quercus/Viburnum-Geranium variant | 9 | 12 | 3-161 |
| ArCi | Acer rubrum/Circaea | 6 | 26 | 3- 34 |
| ArCi-Ph | Acer rubrum/Circaea-Phryma variant | 6,7 | 46 | 3- 34 |
| ArDe | Acer rubrum/Desmodium | 9 | 27 | 3-158 |
| ArDe-V | Acer rubrum/Desmodium-Vaccinium variant | 6,7,B | 31 | 3- 31 |
| ATiAs(De) | Acer-Tilia/Arisaema-Desmodium phase | 8 | 26 | 3-134 |
| ATiCa | Acer-Tilia/Caulophyllum | 7 | 33 | 3- 78 |
| ATiCa-Al | Acer-Tilia/Caulophyllum-Allium variant | B | 24 | 3-114 |
| ATiCa-La | Acer-Tilia/Caulophyllum-Laportea variant | 6 | 29 | 3- 40 |
| ATiCr(As) | Acer-Tilia/Cornus-Arisaema phase | 8 | 12 | 3-128 |
| ATiCr(O) | Acer-Tilia/Cornus-Osmorhiza phase | 8 | 27 | 3-128 |
| ATiDe | Acer-Tilia/Desmodium | 7 | 27 | 3- 74 |
| ATiDe(Pr) | Acer-Tilia/Desmodium-Prunus phase | 7 | 11 | 3- 74 |
| ATiDe-As | Acer-Tilia/Desmodium-Arisaema variant | B | 31 | 3-106 |
| ATiDe-Ha | Acer-Tilia/Desmodium Hamamelis variant | B | 26 | 3-106 |
| ATiFrCa | Acer-Tilia-Fraxinus/Caulophyllum | 10 | 38 | 3-185 |
| ATiFrCa(O) | Acer-Tilia-Fraxinus/Caulo.-Osmorhiza phase | 10 | 36 | 3-185 |
| ATiFrCi | Acer-Tilia-Fraxinus/Circaea | 9 | 11 | 3-164 |
| ATiFrVb | Acer-Tilia-Fraxinus/Viburnum | 10 | 48 | 3-181 |
| ATiFrVb(Cr) | Acer-Tilia-Fraxinus/Viburnum-Cornus phase | 10 | 29 | 3-181 |
| ATiH | Acer-Tilia/Hydrophyllum | 8 | 15 | 3-134 |
| ATiSa | Acer-Tilia/Sanguinaria | 7 | 19 | 3- 78 |
| ATiSa-De | Acer-Tilia/Sanguinaria-Desmodium variant | 6 | 41 | 3- 40 |
| ATTr | Acer-Tsuga/Trientalis | B | 4 | 3-111 |
| PEu | Pinus/Euphorbia | 9 | 15 | 3-153 |
| PVCr | Pinus/Vaccinium-Cornus | 6,7 | 17 | 3- 27 |
| PVG | Pinus/Vaccinium-Gaultheria | 9 | 30 | 3-155 |
| PVGy | Pinus/Vaccinium-Gaylussacia | 6,7 | 71 | 3- 23 |
| PVHa | Pinus/Vaccinium-Hamamelis | 6 | 62 | 3- 25 |
| PVRh | Pinus/Vaccinium Rubus hispidus | 6,7 | 16 | 3- 29 |

B* = Baraboo



Previous View

## References


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Pfister, R., B. L. Kovalchik, S. F. Arno and R. C. Presby. 1977. Forest Habitat Types of Montana. USDA Forest Service Gen. Tech. Report INT-34.

USDA Forest Service. 1989. Proceedings - Land Classifications Based on Vegetation: Applications for Management. Gen. Tech. Report INT-257.

# Plant Identification

This section will assist you with identification of the species used in the habitat type keys and some additional forest plants which are either very common, or might be confused with the key species. However, it is not intended as a complete guide to flora. Consult other references when needed. Species are arranged alphabetically, by scientific name.

## 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.

Billington, Cecil. 1949. Shrubs of Michigan. (Same publisher as above). 339 pp.

Newcomb, Lawrence. 1977. Newcomb's Wildfower Guide. Little, Brown and Co. Boston, Mass. 490 pp.

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Previous View

# Index to Common Names of Understory Species Used in the Keys or Habitat Type Descriptions





Previous View

Previous View

# Index to Scientific Names of Understory Species Used in the Keys or Habitat Type Descriptions





Previous View

Previous View

## Index To Scientific Names of Trees Used in Habitat Types Descriptions

| Common Name | Scientific Name |
|---|---|
| Ash, Black | Fraxinus nigra |
| Ash, Green | Fraxinus pennsylvanica |
| Ash, White | Fraxinus americana |
| Aspen, Bigtooth | Populus grandidentata |
| Aspen, Trembling | Populus tremuloides |
| Basswood | Tilia americana |
| Beech, American | Fagus grandifolia |
| Birch, White | Betula papyrifera |
| Birch, Yellow | Betula alleghaniensis |
| Box elder | Acer negundo |
| Butternut | Juglans cinerea |
| Cherry, Black | Prunus serotina |
| Elm, American | Ulmus americana |
| Elm, Rock | Ulmus thomasii |
| Elm, Slippery | Ulmus rubra |
| Hackberry | Celtis occidentalis |
| Hemlock, Eastern | Tsuga canadensis |
| Hickory, Bitternut | Carya cordiformis |
| Hickory, Shagbark | Carya ovata |
| Hornbeam, American | Carpinus caroliniana |
| Ironwood (Eastern Hophornbeam) | Ostrya virginiana |
| Maple, Red | Acer rubrum |
| Maple, Sugar | Acer saccharum |
| Oak, Black | Quercus velutina |
| Oak, Bur | Quercus macrocarpa |
| Oak, Northern Pin | Quercus ellipsoidalis |
| Oak, Northern Red | Quercus rubra |
| Oak, Swamp White | Quercus bicolor |
| Oak, White | Quercus alba |
| Pine, Jack | Pinus banksiana |
| Pine, Red | Pinus resinosa |
| Pine, White | Pinus strobus |
| Redcedar, Eastern | Juniperis virginiana |
| Walnut, Black | Juglans nigra |



Previous View

**Actaea rubra (Ait.) Willd.**
Red Baneberry

- Berries usually red, but sometimes white.
- Easily confused wtih a similar species A. pachypoda, but the two occur in similar environments and distinction for habitat type classification purposes is not necessary.

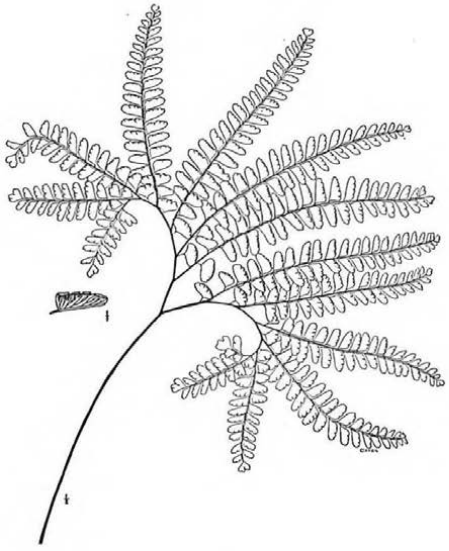
Herb



Previous View

**Adiantum pedatum L.**
Maidenhair Fern

- Most common on mesic and nutrient-rich habitat types



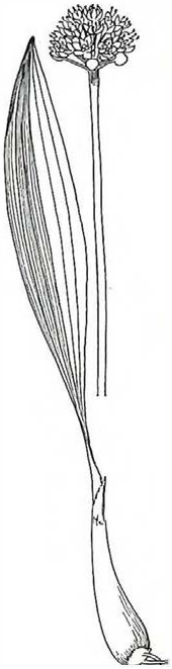
Herb



Previous View

**Allium tricoccum Ait.**
Wild Leek

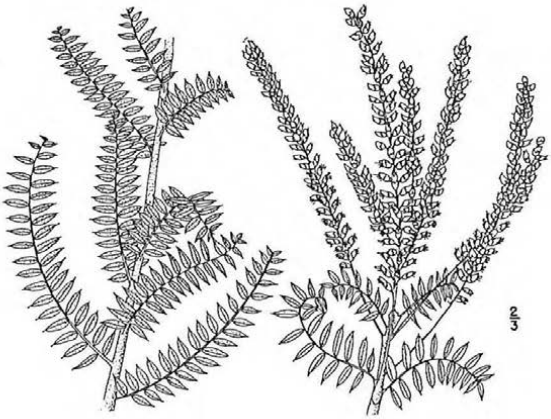
- Leaves die and disappear by mid-June but seed heads remain visible all summer.
- When leaves are crushed they emit a strong onion odor.
- Occurs only on the richest habitat types in all Regions.



Herb

**Amorpha canescens Pursh.**
Lead-plant

- An erect shrub up to 3' tall, but often mistaken for an herb.
- Stems and leaves downy-pubescent.
- This is typically a prairie plant, but is also found in some forests in the prairie-forest transition zones.




Shrub



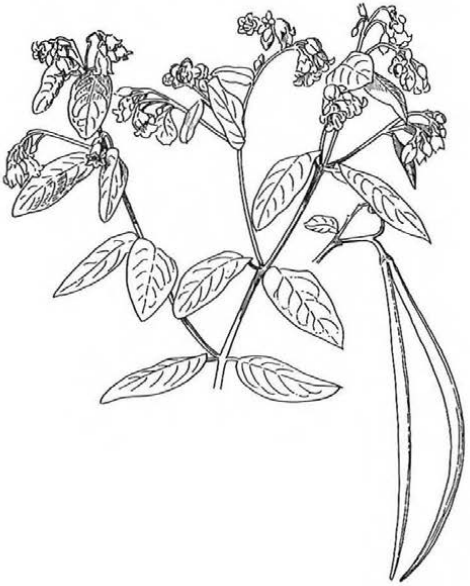
Previous View

**Amphicarpa bracteata (L.) Fern.**
Hog-peanut

- Low twining or trailing perennial.
- Occurs on many habitat types, but is especially common on dry-mesic ones.

**Apocynum androsaemifolium L.**
Spreading Dogbane

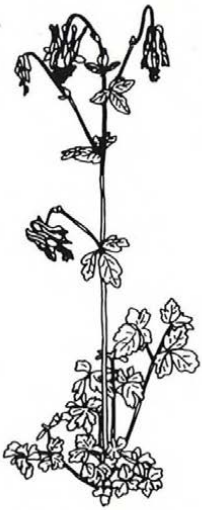
- Up to 4' tall, often reddish-stemmed perennial.
- Milky juice.
- Best represented on drier habitat types.



Herb



Previous View



**Aquilegia canadensis L.**
Wild Columbine

- Sometimes confused with Thalictrum dioicum (early meadowrue) if flowers not present, but Thalictrum is found on dry-mesic to mesic habitat types while Aquilegia occurs on much drier habitat types.

Herb



Previous View

**Aralia nudicaulis L.**
Wild Sarsaparilla

- Tall herb, up to 2.5'
- Fruit borne on a single stem from base of plant.

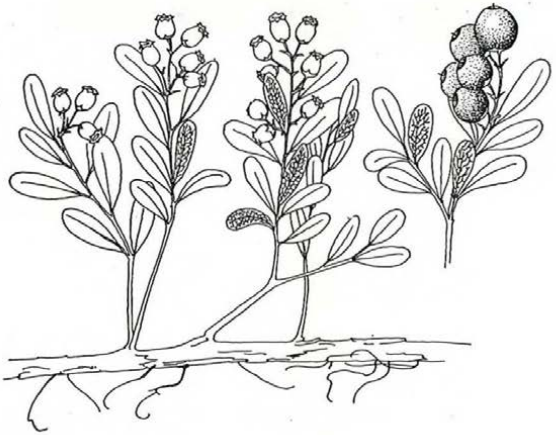
Herb



Previous View

**Arctostaphylos uva-ursi (L.) Spreng.**
Bearberry

- Found on very dry habitat types.



Dwarf shrub



Previous View

**Arisaema atrorubens (Ait.) Blume**
Jack-in-the-pulpit

- Flower forms a "pulpit and canopy" appearance.
- Venation joined at leaf margin as distinguished from trillium in which it is not.
- Most common on mesic habitat types.

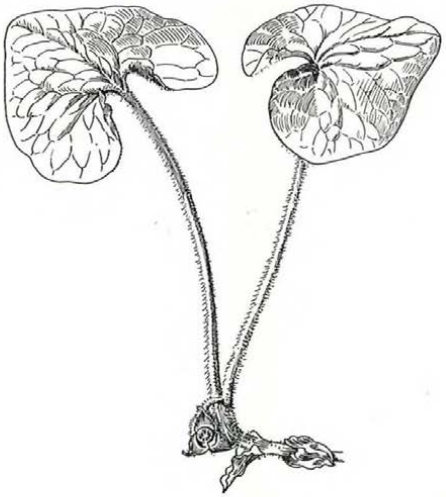
Herb



Previous View

**Asarum canadense L.**
Wild Ginger

- Low, creeping, hairy perennial.
- Spicy and aromatic.
- Mesic and rich habitat types.



Herb



Previous View

**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, most often not present.

Herb



Previous View

**Athyrium felix-femina (L.) Roth**
Lady fern

- Has the appearance of spinulose shield fern.
- All fronds (leaves) die in winter, base of fronds scaly or nearly smooth with dark brown or reddish brown scales, as distinguished from spinulose shield fern which has some living fronds throughout the winter and has light brown scales at base of fronds.
- Found on many mesic habitat types.

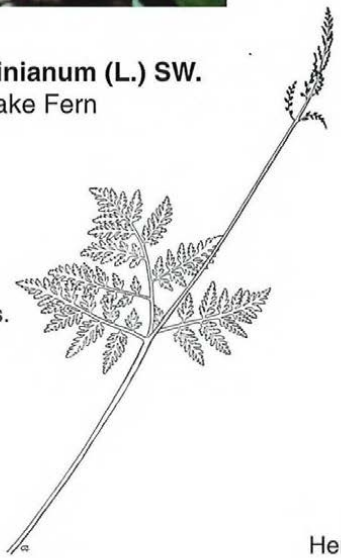
Herb



Previous View

**Botrychium virginianum (L.) SW.**
Rattlesnake Fern

- A rather "fleshy" herb.
- The normally conspicuous sporebearing stalk not always present.
- Mesic to dry-mesic habitat types.

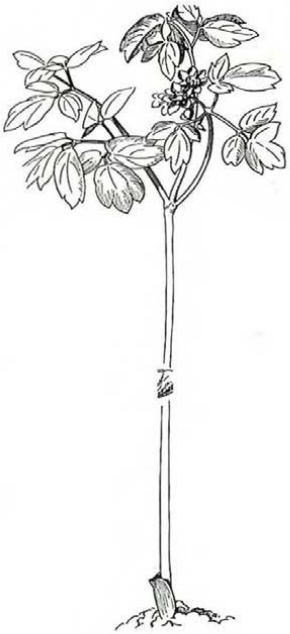


Herb



Previous View

**Caulophyllum thalictroides (L.) Michx.**
Blue Cohosh



- Tall herb, up to 3'.
- Begins to turn yellow in August, often hard to find in September.
- Indicates very good site.

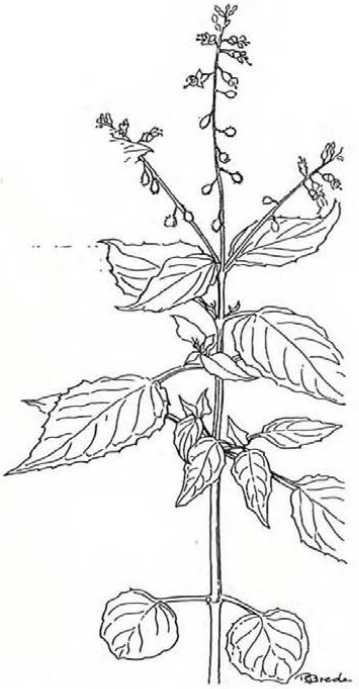
**Chimaphila umbellata (L.) Bart**
Prince's Pine (Pipsissewa)

- Leaves shining on upper surface.
- Dry, nutrient-poor habitat types.

Dwarf shrub



Previous View



**Circaea quadrisulcata (Maxim.) Franch. & Sav.**
Enchanter's Nightshade

- 1-2' tall plant. Leaves opposite and shallowly toothed (2-4" long).
- One of the most common plants in southern Wisconsin forests.

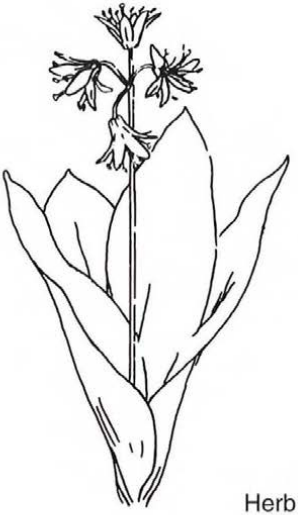
Herb



Previous View

**Clintonia borealis (A.T.) Raf.**
Yellow Beadlily

- Flowers yellow, fruit dark blue.
- Mostly northern,.



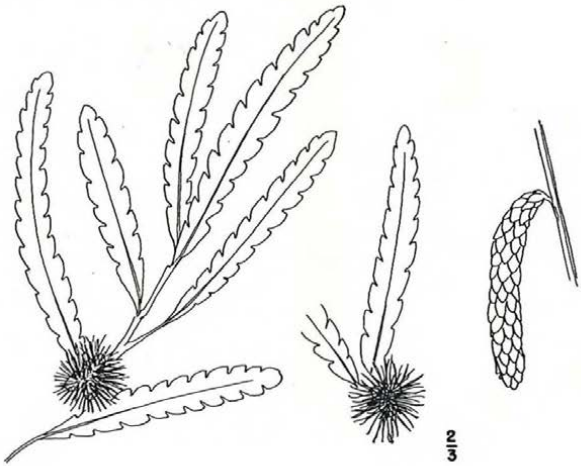
Herb



Previous View

**Comptonia peregrina (L.) Coult.**
Sweet-fern

- Aromatic shrub, found almost entirely on the driest, nutrient-poor habitat types.
- Often abundant following a fire.



Shrub



Previous View

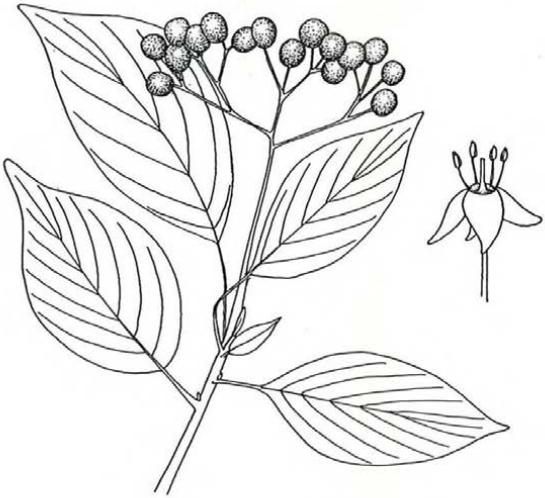
**Coptis groenlandica (Oeder) Fern.**
Gold Thread

- Has golden yellow threadlike rootstalk.
- Found on somewhat poorly drained soils.

Herb

**Cornus alternifolia L.F.**
Alternate-leaved Dogwood

- Medium to large shrub (up to 10' tall).
- The only dogwood species with alternate leaves.
- Most common on mesic to dry-mesic habitat types.



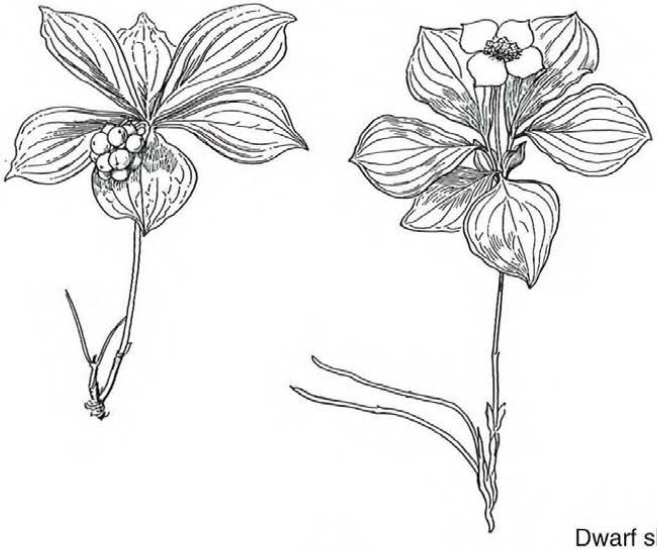
Shrub



Previous View

**Cornus canadensis L.**
Bunchberry

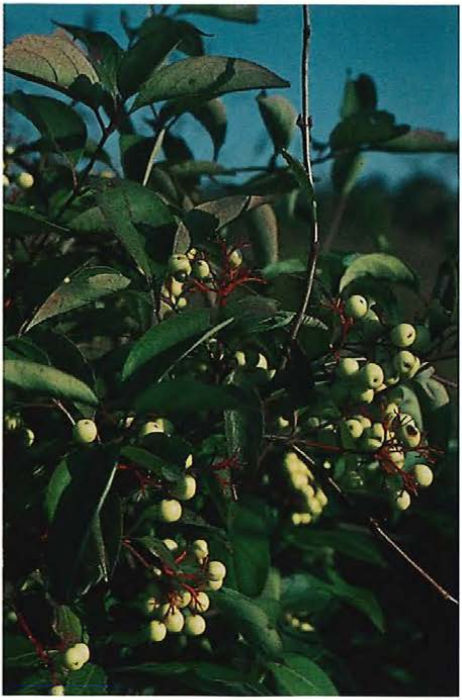
- Mostly northern
- Most common on poorly drained sites.



Dwarf shrub



Previous View



**Cornus racemosa Lam.**
Gray Dogwood

- A 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. Also C. racemosa typically occurs on dry sites and C. stolonifera on wet.

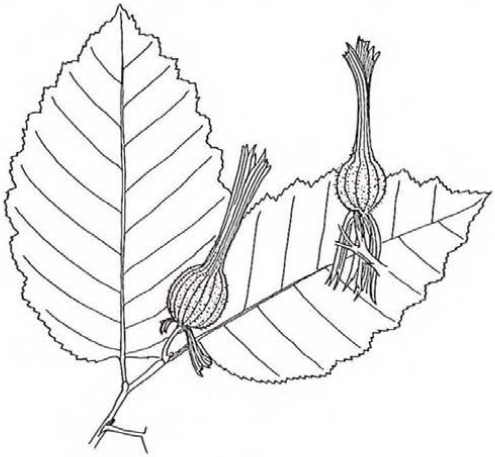
Shrub



Previous View

**Corylus cornuta Marsh.**
Hazel (Beaked Hazel)

- Tall shrub up to 15 feet.
- American hazelnut (C. americana) is similar, but fruit has no tubular beak as shown on these illustrations.
- Most common on sandy soils, but can be found on all upland soils.



Shrub



Previous View

**Cryptotaenia canadensis L. DC.**
Wild Chervil or honewort

- Smooth perennial to 3' tall.
- Best represented on rich, mesic sites.

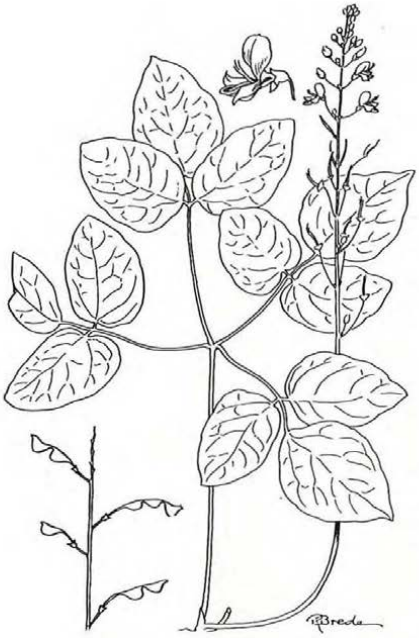
Herb



Previous View

**Desmodium glutinosum (Muhl) Wood**
Pointed-leaved Tick Trefoil

- Tall herb, up to 3'.
- Best represented on dry-mesic sites.



**Desmodium Nudiflorum L. DC.**
Naked-flowered Tick Trefoil

- A perennial 1-3' tall.
- Forked at the base giving rise to a leafless flowering stem and a leafy stem.
- Best represented on dry-mesic to dry sites.

**Diervilla lonicera Mill.**
Bush-honeysuckle

- Small shrub, usually less than 3' tall.
- Occurs as single stems or dense bushes.
- Often abundant on dry to dry-mesic habitat types.
- Mostly northern.

Shrub



Previous View

**Dryopteris spinulosa (O.F. Mull.) 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 winter—they do not for lady fern.

Herb



Previous View

**Euphorbia corollata L.**
Flowering Spurge

- Slender perennial (up to 3' tall) with a whorle of leaves near the top.
- Milkyand sticky juice.
- Dry habitat types.

Herb



Previous View

**Fragaria vesca L.**
Wood strawberry

- Similar to common field or wild strawberry, but leaves with more pronounced veins.

Herb



Previous View

**Gaultheria procumbens L.**
Wintergreen

- Low-growing evergreen shrub with a wintergreen odor and taste when crushed.
- Characteristic of dry and some wet, nutrient-poor habitat types.
- Mostly northern

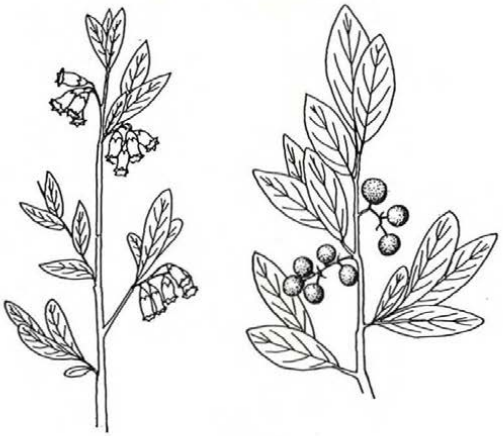
Dwarf shrub



Previous View

**Gaylussacia Baccata (Wang.) K.Koch**
Black Huckelberry

- A much branched shrub 1-4' tall.
- Fruit resembles common blueberry, but occurs in grape-like bunches.
- Leaves and fruit color are variable.
- Best represented on dry, nutrient-poor sites.



Shrub



Previous View

**Geranium maculatum L.**
Wild Geranium

- One of the most common plants in southern Wisconsin's forests.

Herb



Previous View

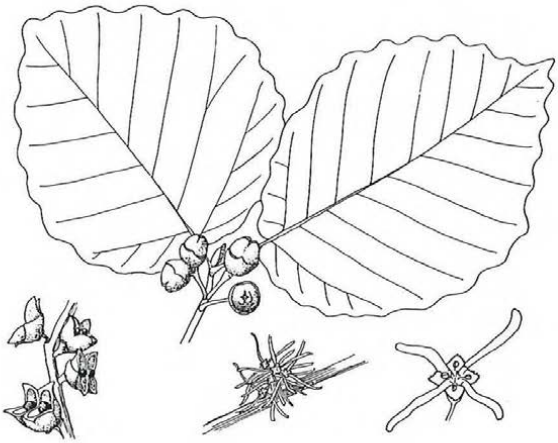
**Geum canadense Jacq.**
White avens

- A perennial up to 3' tall, arising from a basal rosette.
- Best represented on richer sites.

Herb

**Hamamelis virginiana L.**
Common Witch Hazel

- Tall shrub
- Flowers in the fall, or early winter



Shrub



Previous View

**Hepatica acutiloba D.C.**
Sharp-lobed Hepatica

- Similar to Hepatica americana (round-lobed hepatica), but the blades of the leaves are usually longer than broad and the 3 divisions are more sharply pointed.
- The two species seldom grow together. H. Acutiloba occutrs on the richest habitat types, while H. americana has a wider distribution on poor to medium sites.



Previous View

**Hepatica americana (D.C.) Ker.**
Round-lobed Hepatica

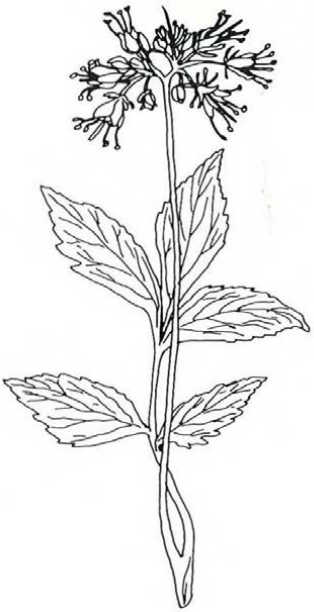
- Leaves usually broader than long, with 3 broad, blunt to rounded lobes.
- Do not confuse with Hepatica acutiloba, compare descriptions.

Herb



Previous View

**Hydrophyllum virginianum L.**
Virginian Waterleaf



- 1-2' tall herb with rather weak stems.
- Leaves mostly basal, 5-7 lobed, often mottled as though water stained.
- Found primarily on mesic, nutrient-rich habitat types.

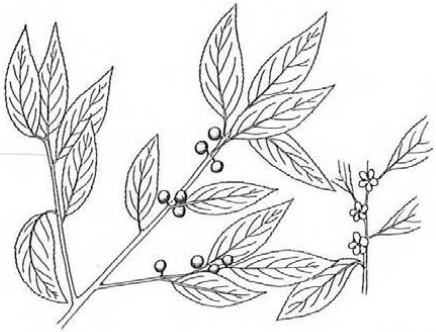
Herb



Previous View

**Ilex verticillata (L.) Gray.**
Winterberry

- A shrub 3-12' tall.
- Bright red berries appear in October and persist into winter.
- Finely toothed (serrate) leaves.
- Most common on wet-mesic sites.



Shrub



Previous View

**Laportea canadensis (L.) Wedd.**
Wood Nettle

- The only nettle with alternate leaves.
- Most common on mesic to wet-mesic, nutrient-rich habitat types, especially on silt loams.
- Boehmeria cylindrica (false nettle) is similar but has opposite leaves and no stinging hairs. The two species sometimes occur together.

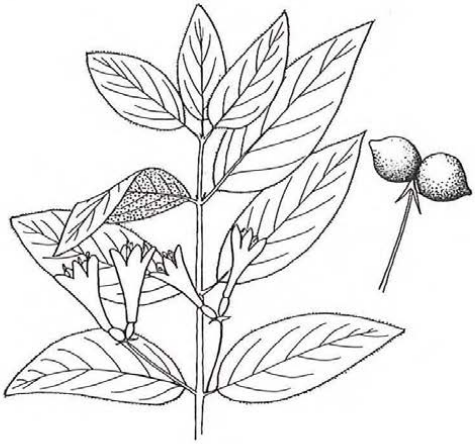
Herb



Previous View

**Lonicera canadensis Marsh**
American Fly Honeysuckle

- Pubescent under leaves when young, nearly smooth when mature.



Shrub



Previous View

**Lycopodium obscurum L.**
Ground-pine

- Main stem creeping horizontally, deep in the soil.
- Aerial stems scatteed, erect, tree-like form.
- Mostly northern.

Herb



Previous View

**Lysimachia quadrifolia L.**
Whorled Loosestrife

- Found mostly on the driest habitat types.

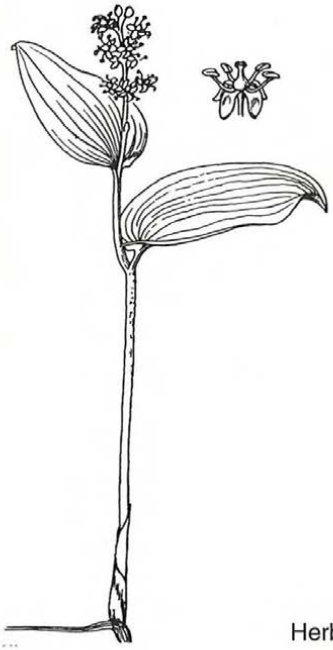
Herb



Previous View

**Maianthemum canadense Desf.**
Wild Lily-of-the-valley

- Single leaf when not fruiting, two leaves when fruiting.
- Mostly northern.



Herb

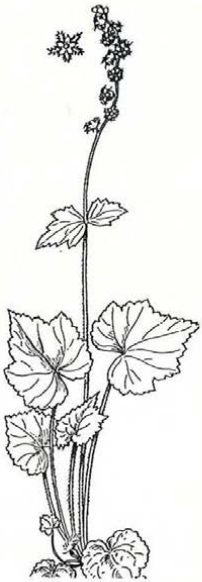


Previous View

**Mitchella repens L.**
Partridge-berry

- Small plant; slender paired leaves without serration, whitish along the main veins.
- Mostly northern.

Herb

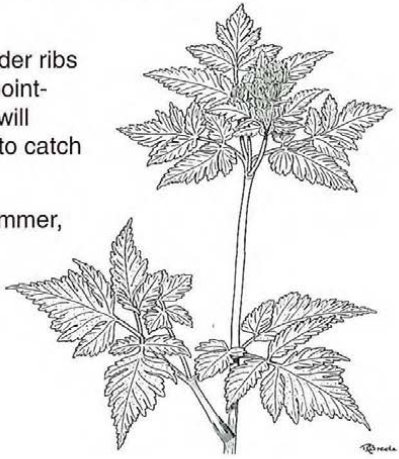


**Mitella diphylla L.**
Miterwort

- A slender, erect plant (up to 2' tall), with a single pair of opposite leaves at or near the middle of the stem.

**Osmorhiza claytoni (Michx.) C.B. Clark**
Sweet Cicely

- Can be confused with white baneberry.
- Somewhat pubescent compound (3's to 5's) leaves.
- White flowers in spring.
- Fruit linear, black, with slender ribs covered with stiff, upward-pointing appressed bristles that will cause seed, when mature, to catch on clothing.
- Mature plant dies in late summer, but new basal leaves develop that remain green throughout the winter and spring.



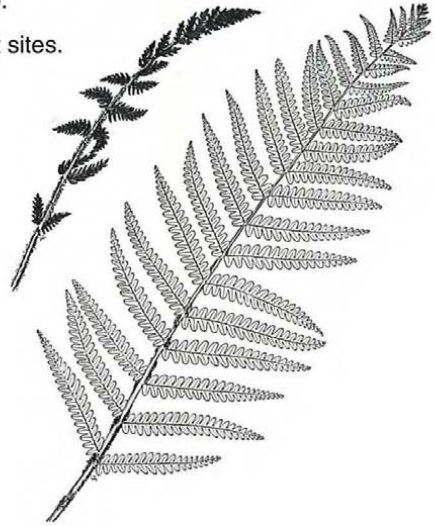
Herb



Previous View

**Osmunda cinnamomea L.**
Cinnamon fern

- A large fern (up to 5' tall).
- Similar to interrupted fern but fertile fronds (leaves) occur in the center of a clump.
- Wet-mesic to wet sites.



Herb



Previous View

**Osmunda claytoniana L.**
Interrupted fern

- A large fern (up to 4' tall).
- The "interrupted" leaf, shown in the drawing, found only on fertile fronds (leaves.)
- Often abundant in moist microsites but is also common on some dry-mesic sites.

Herb



Previous View

**Parthenocissus quinquefolia (L.) Planch.**
Virginia Creeper

- A trailing or climbing vine. Stem often covered by forest litter and leaves appear to represent single plants.

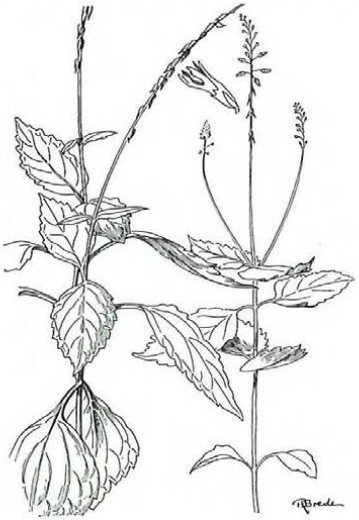
Herb



Previous View

**Phryma leptostachya L.**
Lopseed

- Slender perennial up to 3' tall.
- One of the most common plants on dry-mesic to mesic habitat types.



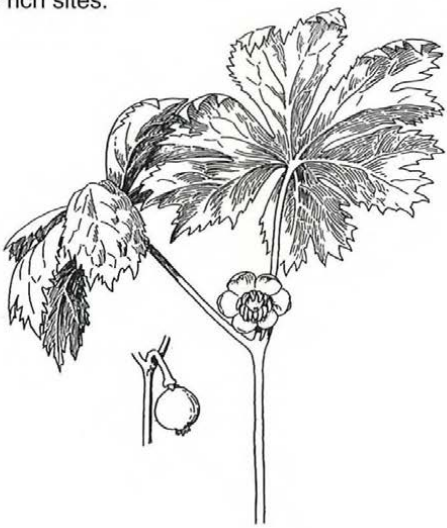
Herb



Previous View

**Podophyllum peltatum L.**
May-apple

- Conspicuous umbrellalike leaves.
- Medium to rich sites.



Herb



Previous View

**Polygonatum pubescens (Willd.) Pursh**
Hairy Solomon Seal

- Fragile leaf with stiff-hair along veins beneath as distinguished from rosey twisted-stalk which is finely hairy (comblike) along leaf margin.
- Flowers from leaf axils as distinguished from false solomon seal which flowers in a terminal inflorescence.
- Common on many habitat types.

Herb



Previous View

**Prenanthes alba L.**
White lettuce

- Tall perennial (to 4') with milky sap
- Most common on richer sites.

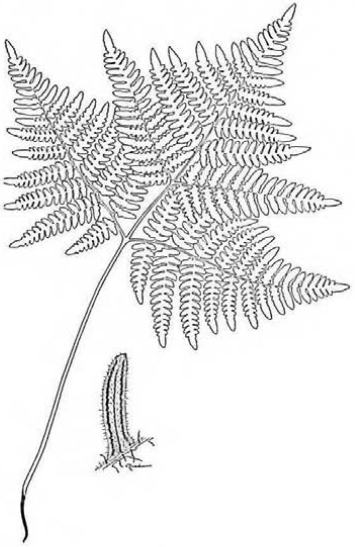
Herb



Previous View

**Pteridium aquilinum var. latiusculum (Brake)**
Bracken Fern

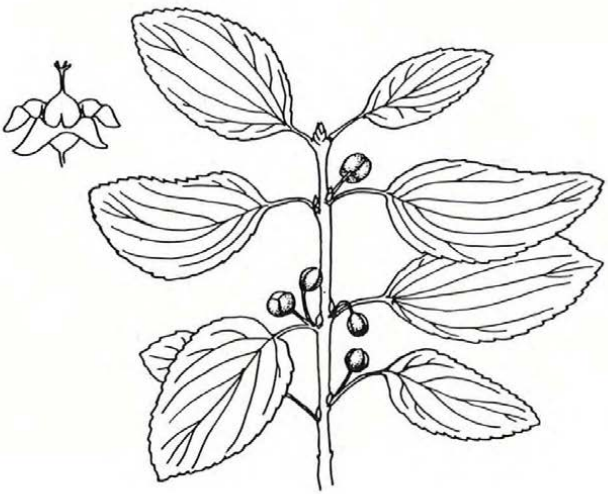
- Tall fern (2-4')
- Common on many dry to dry-mesic habitat types.



Herb



Previous View

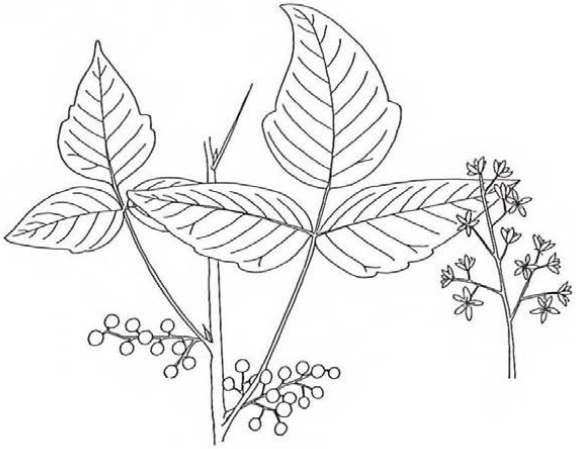


**Rhamnus cathartica L.**
Common Buckthorn

- A tall shrub (6-20').
- Escaped from hedges and landscape plantings—can be a nuisance in some woodlands.
- Most common on former oak savanna sites.

**Rhus radicans L.**
Poison ivy

- Low shrub or climbing vine.
- Leaves shiny.
- Fruit cream-colored "berries."

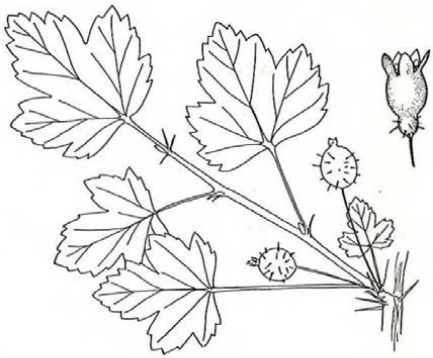


Shrub



Previous View

**Ribes cynosbati L.**
Prickly Gooseberry



- Small shrub (1-4' tall).
- Spines on nodes and fruits.
- Difficult to distinguish from many other species of Ribes.
- Best represented on nutrient-rich sites.

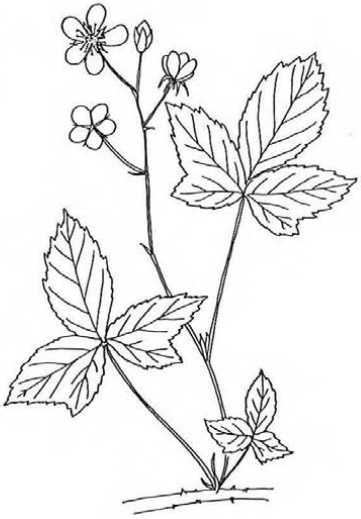
Shrub



Previous View

**Rubus Hispidus L.**
Swamp Dewberry

- Small trailing plant with spines.
- Leaves dark-green, somewhat shiny, often persisting through winter.
- Sites with poor drainage.



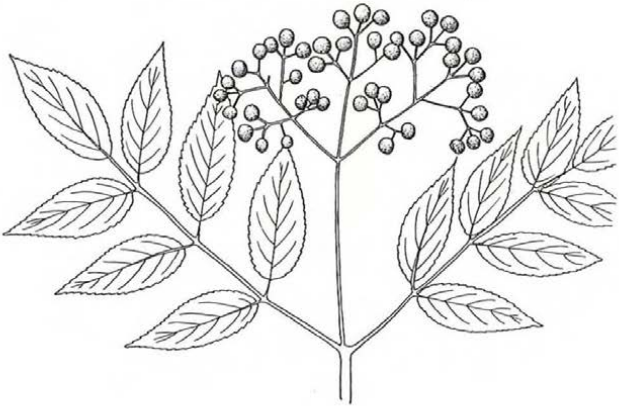
Dwarf shrub



Previous View

**Sambucus canadensis L.**
Common Elder

- A tall shrub (3-12').
- Flowers white, fruit black.
- Mostly on mesic sites.



Shrub



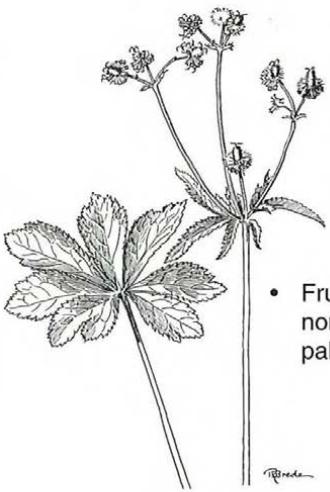
Previous View

**Sanguinaria canadensis L.**
Bloodroot

- Stem juice red to reddish-orange.
- Found primarily on mesic, nutrient-rich habitat types.



Previous View



**Sanicula marilandica L.**
Black Snakeroot

- Fruiting plant can be up to 4 feet tall; non-fruiting plant consists of one palmate leaf.

Herb



Previous View

**Smilacina racemosa (L.) Desf.**
False Solomon's Seal

- Do not confuse with rosey twisted-stalk or hairy solomon's seal. flowers on false solomon's seal are borne in a terminal inflorescence while latter two are borne in leaf axils.

Herb



Previous View

**Smilacina stellata (L.) Desf.**
Star-flowered Solomon's Seal

- Leaves sessile to nearly clasping at the base.
- Most often found on dry habitat types.

Herb



Previous View

**Smilax herbacea L.**
Carrion flower

- Arching or climbing plant with ill-smelling flowers.
- Similar to Smilax tamnoides (bristly greenbrier), which has bristly or spiny stems.

Vine



Previous View

**Solanum dulcamara L.**
Bittersweet nightshade

- Perennial vine (poisonous).
- Most often found in moist clearings, but also in some mesic forests.

Herb



Previous View

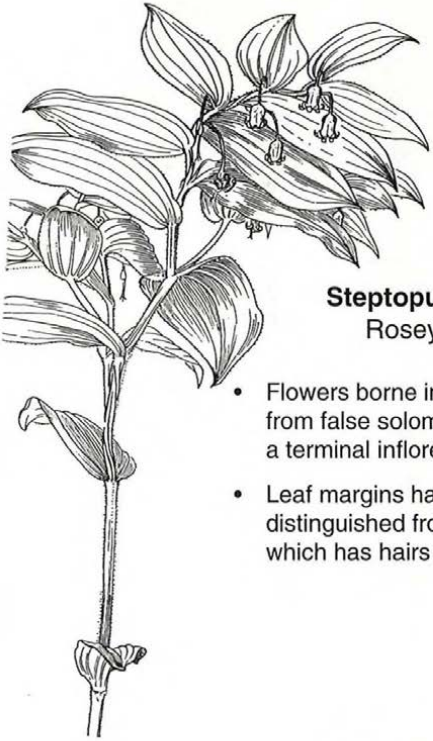
**Solidago flexicaulis L.**
Zigzag or Broad-leaved Goldenrod

- Stem zigzags and is somewhat angled; 1-3' tall.
- Most common on richer sites.

Herb



Previous View



**Steptopus roseus Michx.**
Rosey Twisted-stalk

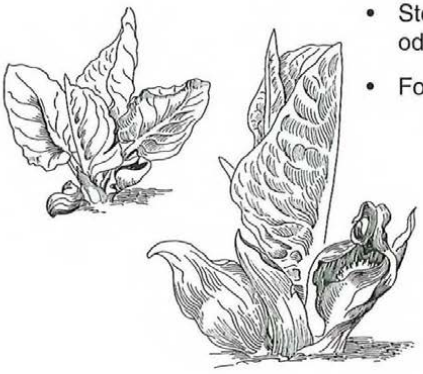
- Flowers borne in leaf axils as distinguished from false solomon seal which are borne in a terminal inflorescence.
- Leaf margins has stiff hair (comblike) as distinguished from hairy solomon seal which has hairs along veins beneath leaf.

Herb



Previous View

**Symplocarpus foetidus (L.) Nutt.**
Skunk-cabbage

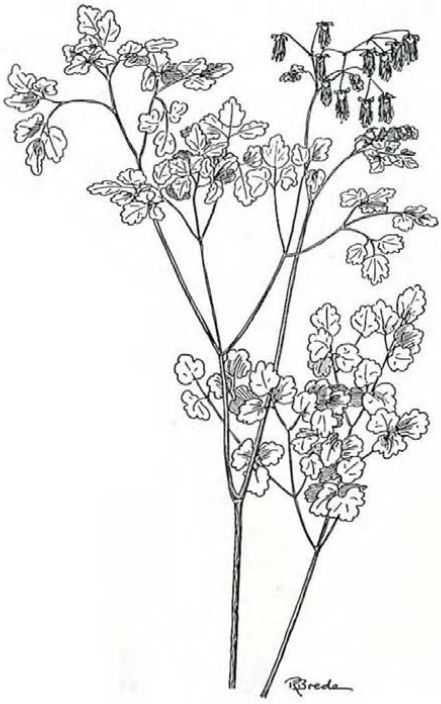


- Stemless plant with skunklike odor.
- Found only on some wet sites.

Herb



Previous View




**Thalictrum diocum**
Early Meadow Rue

- Tall herb, up to 3'.
- Can be confused with Aquilegia sp. (columbine) when flowers not present.

**Trientalis borealis Raf.**
Starflower

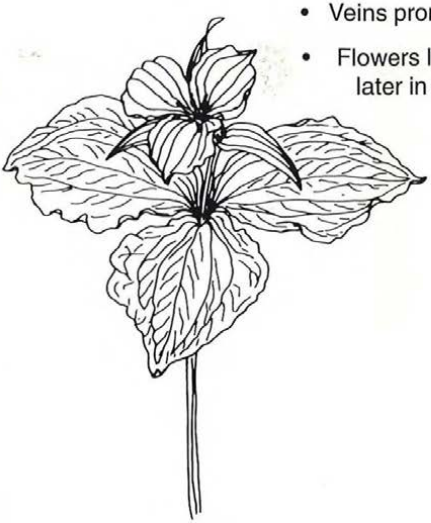
- Distinctly elongated lanceolate leaves, clustered at the top of a slender stem.
- Found on many northern habitat types, rare in southern Wisconsin.

Herb



Previous View

**Trillium grandiflorum (Michx.) Salisb.**
Large-flowered Trillium

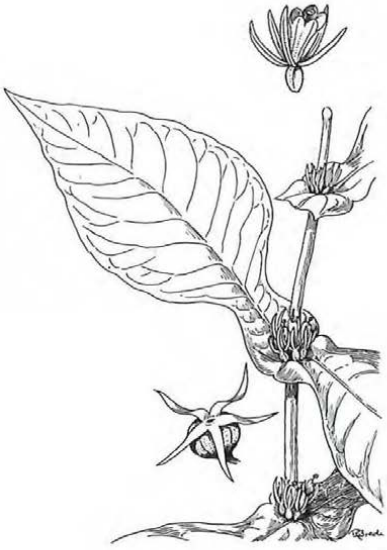


- Veins prominent and netted.
- Flowers large, white, turning pink later in season.
- Leaves somewhat resemble those of Arisaema atrorubens (Jack-in-the-pulpit) but secondary veins in the latter join along the margin.

Herb



Previous View



**Triosteum aurantiacum L.**
Orange-fruited horse gentian

- Tall herb (2-4').
- Leaves egg-shaped.
- Fruit red to orange, resembling a small, hard tomato.

*Note: This illustration is a closely related T. perfoliatum. T. aurantiacum has clasping rather than perfoliated petioles.*

**Urtica spp.**
Stinging nettle (Tall nettle)

- Erect herb up to 4' tall with stinging hairs.
- Most common on mesic to wet-mesic, nutrient-rich habitat types..

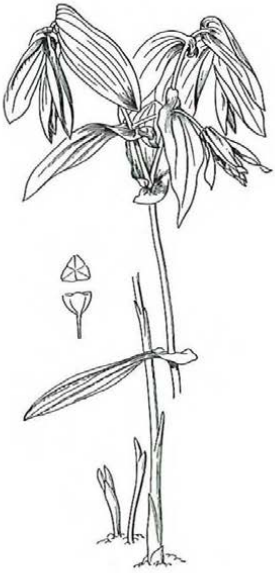
Herb



Previous View

**Uvularia grandiflora Sm.**
Large-flowered Bellwort

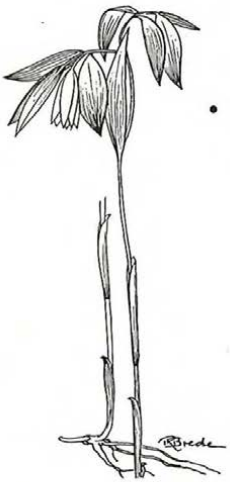
- Leaves perfoliate (stem passes through the base of the leaf).
- Flowers bell-shaped, yellow.
- Mesic to dry mesic, nutrient medium to rich habitat types.



Herb



Previous View



**Uvularia sessilifolia L.**
Sessile Bellwort or Wild Oats

- Similar to *Uvularia grandiflora,* but leaves sessile instead of perfoliate. Plant smaller and leaves narrower.

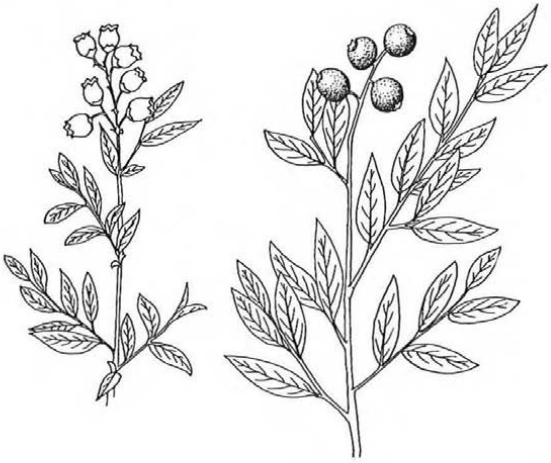
Herb



Previous View

**Vaccinium angustifolium (Ait.) Gray**
Low Sweet Blueberry

- Low shrub with glabrous green stems and leaves with finely serrate leaf margins as distinguished from Canada blueberry which has pubescent stems and smooth leaf margins.
- Found on sandy soils.



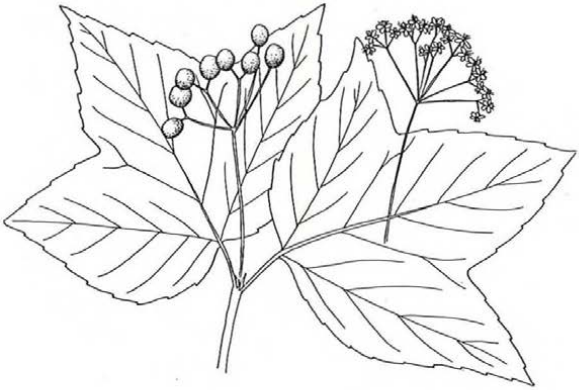
Shrub

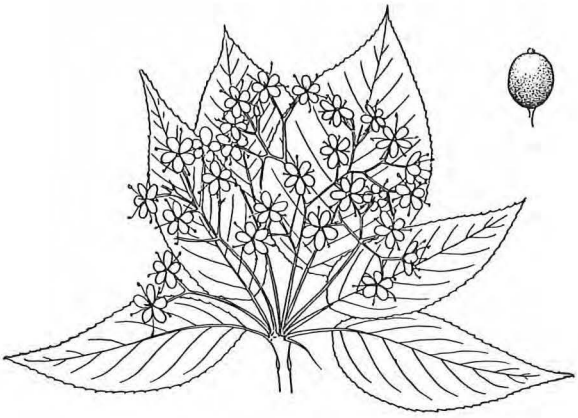


Previous View

**Viburnum acerifolium L.**
Mapleleaf Viburnum

- Leaf has a maple shape.
- Medium shrub (3-6 feet).
- Most common on dry-mesic habitat types.



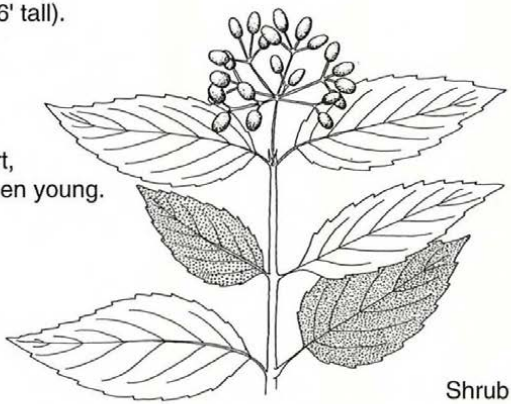


**Viburnum lentago L.**
Nannyberry

- A large shrub or small tree.
- Finely toothed, pointed leaves.
- Most common on richer and moist sites.

**Viburnum rafinesquianum Schult.**
Downy Arrowwood

- Low shrub (up to 6' tall).
- Leaves opposite, margin coarsely toothed.
- Petioles very short, with soft down when young.



Shrub

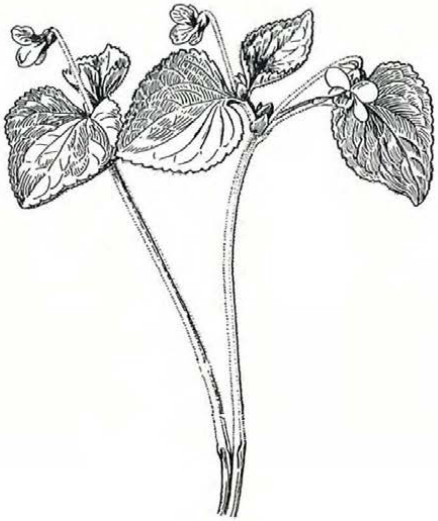


Previous View

**Viola pensylvanica Michx.**
Smooth Yellow Violet

- Multi-branched glabrous violet having basal leaves as distinguished from downy violet which is pubescent and does not have basal leaves.

Herb



**Viola pubescens Ait.**
Downy Yellow Violet

- Downy stem, leaves, and seed capsule. Has no basal leaves.
- Should not be confused with smooth yellow violet which is glabrous and has basal leaves.

Herb



Previous View

**Vitis Riparia Michx.**
River-bank Grape

- A large climbing or trailing vine.
- In spite of its name it is commonly found in forests.

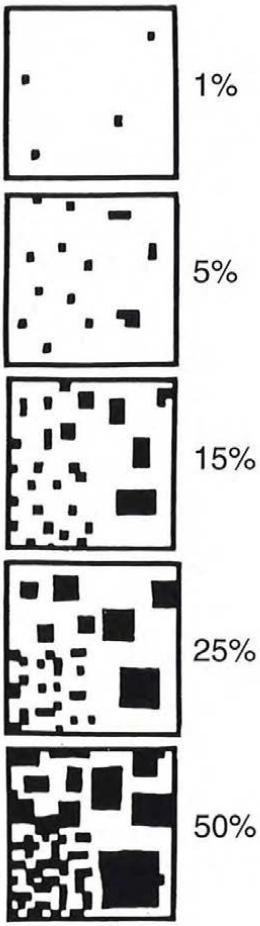
Vine



Previous View

**Figure 7.1. Guide for estimating plant coverage.**

Each quarter of any one square has the same amount of black.






Previous View

Previous View