# Field Key to Ecological Systems and Target Alliances of the Map Zones 41, 50, 51 (Great Lakes), United States

**NatureServe**
**Terrestrial Ecology Department**
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Grand Sable Dune, Pictured Rocks National Lakeshore, MI, 2007. Photo by Shannon Menard


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## Introduction

The following keys to NatureServe ecological systems cover the areas found in NLCD map zones 41, 50, and 51 (Great Lakes). The systems included in these keys are intended to represent the legend that LANDFIRE will be striving to map for existing vegetation (Figure 1). Some types are in the keys that characteristically occur at small spatial scales (generally <2 ha in size) and hence may not be mappable by the LANDFIRE project. However, we have chosen to be inclusive in the keys, so that the user will have information on these system types for comparison purposes. In some cases they may be important for modeling fire condition class and, given their relative distinctiveness on the landscape, they may indeed be mappable.

Plant names are almost always in Latin and follow the nomenclature of Kartesz (1999). In limited cases, we have included synonyms and/or common names for some taxa.

The keys are dichotomous, which means the user follows the order of the 'couplets' and makes a choice between the two options represented in the couplet. The ordering of the couplets in each key does matter, and the user should choose the option in each couplet that best fits the data or field situation. The users should carefully read both couplets before making the best choice of the two available leads. A choice leads the user to the next couplet to be utilized in the keying process, via a number at the far right, or else leads to a final result (an ecological system or an alliance).

If the choice the user makes leads to a "result", then either an Ecological System or a Vegetation Alliance is named. Alliances are recognizable because "Alliance" is in the name, and they all start with one or more Latin names (e.g. *Pinus strobus* Forest Alliance).

Systems do not include Latin species names in them, and always start with a Biogeographic region (e.g. North-Central Interior or Laurentian-Acadian), and may include plant species or genus common names (e.g. Pine, Oak). Numbers in parentheses placed after the System Name are the EVT (Existing Vegetation Type) codes assigned by Landfire to the Systems.

Some keys or portions of keys may follow a different logic from one another, depending on what ecological or biogeographic variable is best suited to the types included in the key. A group of higher-order couplets or choices guides the user to one of several individual keys for a more specific group of systems. Some systems include a variety of manifestations on the landscape, and these may appear more than once in the key or keys. These examples will be noted by reference to the other examples.

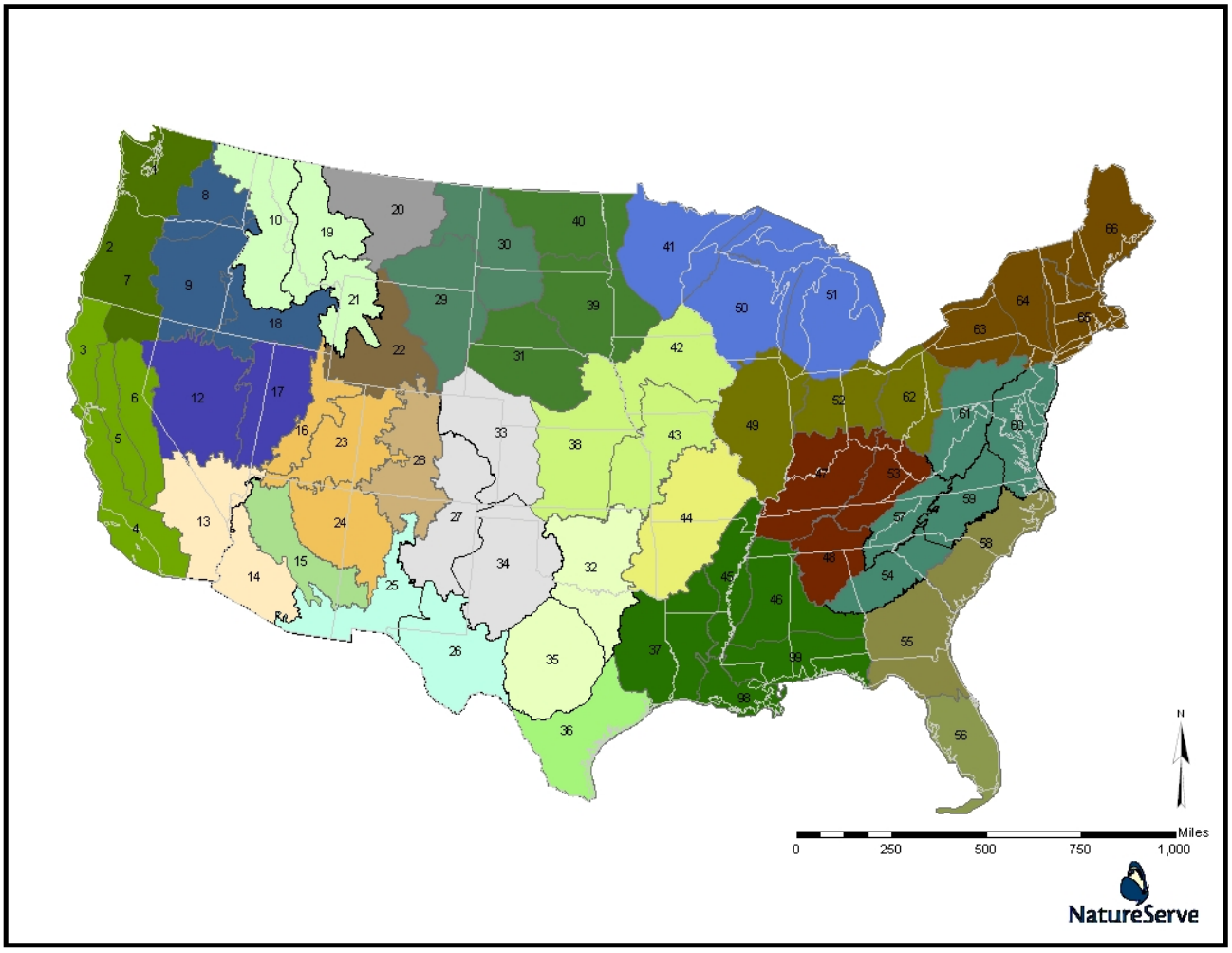


**Figure 1. LANDFIRE map zone clusters with keys to ecological systems and selected alliances.**

The keys to ecological systems use a variety of different variables, which are applied in various sequences, depending on the relative significance of the variable. Variables that are less ambiguous in their application will ideally be used earlier or "higher" in the key. The principal (and more-or-less universal) variables that help provide the upper structure for the key include broad physiognomy (e.g. forested vs. non-forested), broad biogeography (where a map zone is heterogeneous in this respect), and general hydrology (e.g. upland and wetland). Common terms instead of overly jargonistic or technical language is preferred in the key where possible, but some terms may require definition. In our sense of meaning, "wetland" vegetation is that "whose composition is affected by flooding or saturated soil conditions." The term is not used in the sense of a "jurisdictional wetland" which is a more limited as well as a legal meaning of this term.

Systems may occur in the key in several places, if their range of variability would require this. In more detailed (or "lower") places in the key, dominance within vegetation strata may play a role. Tree cover is generally considered first, then that of shrubs, then the herbaceous component. Codominant species within a given strata are important as well, in some cases a System or alliance will have two or more codominant species, which may or may not be present in all stands.

Some terminology is commonly employed throughout the keys that distinguish general spatial characteristics of the vegetation or environmental setting. For example 'matrix' types of vegetation are dominant across the majority of a given landscape, while 'large patch' types tend to occur as distinctive patches, which represent specific environments within the larger 'matrix.' In the western Great Lakes area, elevation is not of much use in distinguishing systems, but soil composition or

latitude may be of some importance. These variables and others are used to provide the framework for the key.

Ideally, the user of the key will be able to locate themselves in relation to the USFS Section and Subsection boundaries, as in some cases this may be the determining factor between two otherwise similar systems. These ecoregional limits are in a sense a general guide, and different systems of classifying ecoregions vary in terms of precisely where these boundaries occur. In many cases, the ecoregional line correlates well with an observable variable in vegetation, topography, soil type, etc., but this may not always be the case and ecotonal areas may occur in some cases near a boundary.

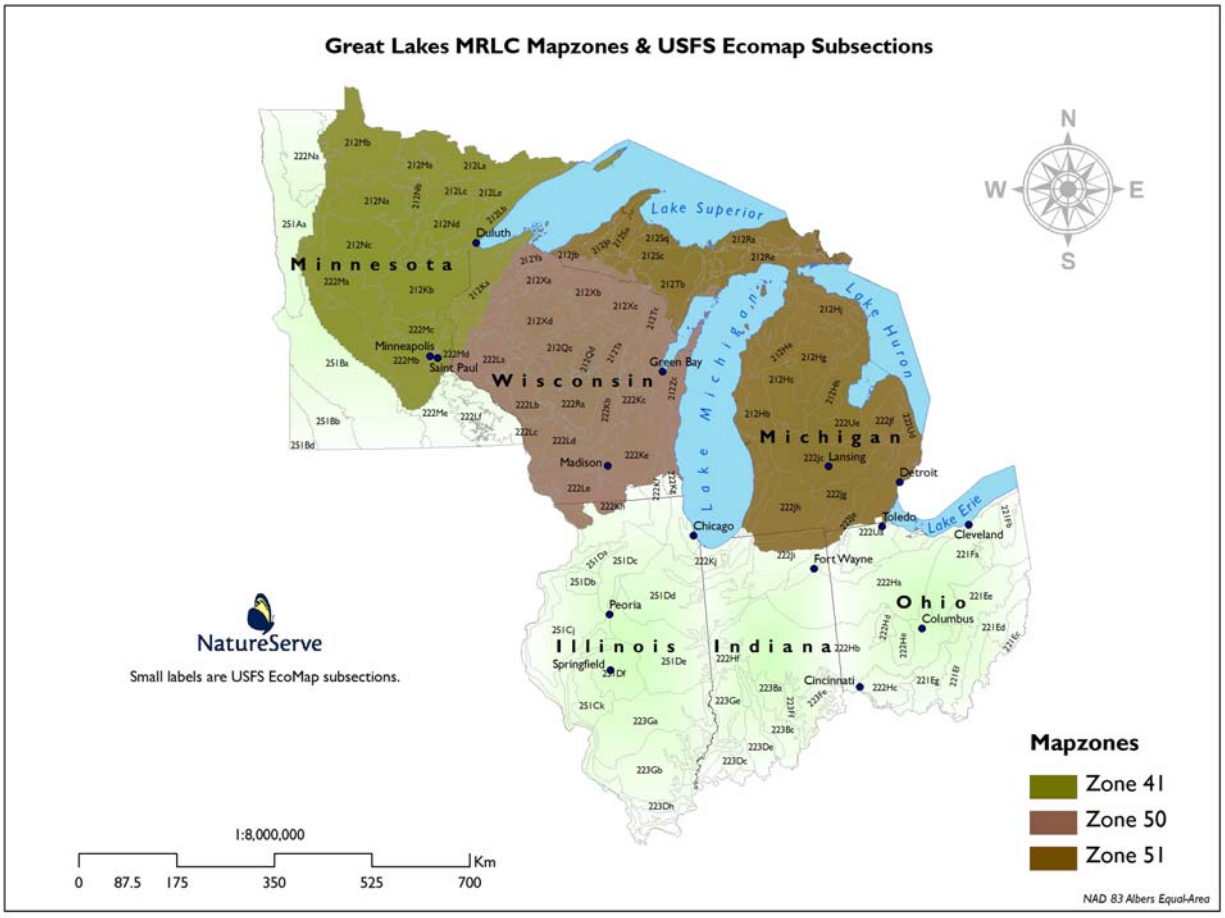


**Figure 2 – USFS Subsections for Mapzones 41, 50, and 51.**

In the section of the document immediately following, we have provided a table showing the LANDFIRE legend units that represent non-natural vegetation and a short description for each of them. They are not formally incorporated into the keys, since they are typically recognizable without the use of a key, or else their floristic composition is so variable as to be not useful in a field key. Our primary purpose was to provide keys for the natural and near-natural vegetation of these zones.

## Land Use, Unvegetated, Semi-natural and Altered Vegetation

| LAND USE OR UNVEGETATED SURFACES | |
|---|---|
| **Open Water** | Open water |
| **Developed** | Generally developed lands. |
| Developed, Open Space | Vegetation (primarily grasses) planted in developed settings for recreation, erosion control, or aesthetic purposes. Impervious surfaces account for less than 20% of total cover. Examples include parks, lawns, golf courses, airport grasses, and industrial site grasses. |
| Developed, Low Intensity | Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20-50% of total cover. These areas most commonly include single-family housing units. |
| Developed, Medium Intensity | Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50-80% of the total cover. These areas most commonly include single-family housing units. |
| Developed, High Intensity | Includes highly developed areas where people reside in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80 to100% of the total cover. |
| **Agriculture** | Generally developed for agricultural uses. |
| Pasture/Hay | These agriculture lands typically have perennial herbaceous cover (e.g. regularly-shaped plantings) used for livestock grazing or the production of hay. There are obvious signs of management such as irrigation and haying that distinguish it from natural grasslands. Identified CRP lands are included in this land cover type. |
| Cultivated Crops and Irrigated Agriculture | These areas used for the production of crops, such as corn, soybeans, small grains, sunflowers, vegetables, and cotton, typically on an annual cycle. Agricultural plant cover is variable depending on season and type of farming. Other areas include more stable land cover of orchards and vineyards. |
| **SEMI-NATURAL / ALTERED VEGETATION** | |
| **Ruderal Vegetation** | Vegetation resulting from succession following significant anthropogenic disturbance of an area. It is generally characterized by unnatural combinations of species (primarily native species, though they often contain slight or substantial numbers and amounts of species alien to the region as well). |
| Ruderal Upland - Old Field | |
| Ruderal Upland – Abandoned Tree Plantation | |
| Ruderal Wetland | |
| **Introduced Vegetation** | Vegetation dominated by introduced species. These are spontaneous, self-perpetuating, and not (immediately) the result of planting, cultivation, or human maintenance. Land occupied by introduced vegetation is generally permanently altered (converted) unless restoration efforts are undertaken. |
| Introduced Upland Vegetation – Treed | Land cover is significantly altered/disturbed by introduced tree species. |
| Introduced Upland Vegetation - Shrub | Land cover is significantly altered/disturbed by introduced woody and/or herbaceous vegetation. |
| Introduced Upland Vegetation – Annual and Biennial Forbland | Land cover is significantly altered/disturbed by introduced annual and biennial forbs. Natural vegetation types are no longer recognizable. |
| Introduced Upland Vegetation - Perennial Grassland and Forbland | Land cover is significantly altered/disturbed by introduced, non-native perennial grasses and forbs. Natural vegetation types are no longer recognizable. |
| Introduced Riparian Vegetation | Land cover is altered/disturbed and dominated by introduced woody vegetation (woodlands and shrublands). Typical riparian trees and shrubs include *Elaeagnus angustifolia, Triadica sebifera,* etc. |
| Introduced Wetland Vegetation | Land cover is altered/disturbed and dominated by introduced wetland vegetation. Species may include *Lythrum salicaria, Phalaris arundinacea, Phragmites australis*, etc. |
| **Modified/Managed Vegetation** | Vegetation resulting from management or modification of natural/near natural; vegetation, but producing a structural and floristic combination not clearly known to have a natural analogue. Modified vegetation may be easily restorable by either management, restoration of ecological processes, and/or succession. |

| | |
|---|---|
| Modified/Managed Upland Vegetation | Land cover is apparently managed/modified and dominated by trees and/or shrubs. Vegetation is a mixture of herbaceous, shrub, and tree species. |
| Recently Burned Forest and Woodland | Land cover is apparently modified by recent fires which have burned forest and woodland vegetation. Vegetation is a mixture of herbaceous, shrub, and tree species. |
| Recently Burned Shrubland | Land cover is apparently modified by recent fires which have shrubland vegetation. Vegetation is a mixture of herbaceous and shrub species. |
| Recently Burned Grassland | Land cover is apparently modified by recent fires which have burned grassland vegetation. Vegetation is a mixture of herbaceous and shrub species. |
| Managed Tree Plantation | Land cover is apparently modified and appears as a managed tree plantation. |
| Recently Logged Timberland | Land cover is apparently modified and appears as logged timberland. |
| Modified/Managed Wetland Vegetation | These areas include created and obviously managed wetlands of varying size resulting from water diversion. Artificial Wetlands will be mapped where obvious built structures may be distinguished from imagery. |

# Key to Map Zones 41, 50, 51 Ecological Systems

This key is intended for identifying Ecological Systems and selected alliances that are found in the Great Lakes Region (NLCD Map Zone 41, 50, 51), which covers eastern Minnesota, all of Michigan and Wisconsin except for small parts in the far south, and small parts of northern Illinois, Indiana, and Ohio.

**Please note the following symbols:**
***** indicates NS ecological system that has been grouped into broader LANDFIRE Map Unit. Included to help clarify key, but crews need to record broader LANDFIRE Map Unit(**)
****** indicates broader LANDFIRE Map Unit.
******* small patch ecological system, NOT being mapped by LANDFIRE and included for completeness of the key.

## KEY TO GROUPS

1a. Total woody canopy cover generally less than 10%..... **2**
1b. Total woody canopy cover generally 10% or more ..... **3**

2a. Total canopy cover (woody and herbaceous vascular plants) generally less than 10%.....**Key A**
2b. Total canopy cover (herbaceous) >10%, some woody species may be present ..... **5**

3a. Wetland forests, woodlands, and shrublands (stands whose composition is affected by flooding or saturated soil conditions; including floodplains and bottomlands as well as seepage forests) .....**Key B**
3b. Upland forests, woodlands, and shrublands (stands whose composition is not affected by flooding or saturated soil conditions) ..... **4**

4a. Land covered in trees, from savannas (10-25% cover of trees, generally >3 m tall with a single main stem and >25% cover graminoids), to woodlands (25-60%) or forests (60-100%) .....**Key C**
4b. Land covered in shrubs, tall or dwarf, at least 10% cover woody vegetation, scattered trees may be present, these less than 10%, and clearly not a savanna.....**Key D**

5a. Wetlands (including pond margins, marshes, sloughs, and wet depressions) .....**Key E**
5b. Uplands (e.g. dune grasslands and shrublands, dry prairies, some examples of scrub) .....
.....**Key F**

## KEY A – SPARSELY VEGETATED SYSTEMS (<10% vascular cover)

1a. Site near and strongly affected by Great Lakes..... 2
1b. Site not near and strongly affected by Great Lakes ..... 4

2a. Rocky shore and/or cliffs..... 3
2b. System dominated by dunes; grasses, shrubs, and/or trees may dominate small areas.....
..... **Great Lakes Dune***
..... **Laurentian-Acadian Sparsely Vegetated Systems (2499)****

3a. Exposed bedrock is acidic igneous, sedimentary, or metamorphic**Great Lakes Acidic Rocky Shore and Cliff***
..... **Laurentian-Acadian Sparsely Vegetated Systems (2499)****
3b. Exposed bedrock is alkaline igneous, sedimentary, or metamorphic .**Great Lakes Alkaline Rocky Shore and Cliff***
..... **Laurentian-Acadian Sparsely Vegetated Systems (2499)****

4a. Cliffs and talus ..... 5
4b. Systems along lake or river shores; usually uplands though may be inundated for brief periods.....**Laurentian-Acadian Rocky Lakeshore***
.....**Laurentian-Acadian Sparsely Vegetated Systems (2499)****

5a. Site in USFS Section 222; exposed bedrock is alkaline..... **Central Interior Calcareous Cliff and Talus*****
5b. Site in USFS Section 212 ..... 6

6a. Exposed bedrock is alkaline..... **Laurentian-Acadian Calcareous Cliff and Talus*****
6b. Exposed bedrock is acidic ..... **Laurentian-Acadian Acidic Cliff and Talus*****

# KEY B – WOODY WETLAND SYSTEMS

1a. Systems on floodplains of medium to large rivers ..... 2
1b. Systems in depressions, along lakeshores, or in areas with seasonally or permanently high water tables ..... 4

2a. Floodplain systems in Provinces 222 or 251; vegetation dominated by *Acer saccharinum, Populus deltoides, Betula nigra, Celtis laevigata, Fraxinus pennsylvanica, Ulmus americana, Platanus occidentalis, Acer negundo, Ulmus rubra, Celtis occidentalis, Fraxinus nigra,*and/or *Salix nigra*..... **North-Central Interior Floodplain***
..... **Central Interior and Appalachian Floodplain Systems (2471)****
2b. Floodplains not in Provinces 222 or 251 ..... 3

3a. Floodplain System in Province 212 dominated by *Populus balamifera, Fraxinus nigra,* and/or *Picea glauca*
.....**Eastern Boreal Floodplain***
..... **Laurentian-Acadian Floodplain Systems (2475)****
3b. Floodplain System in Province 212 dominated by *Fraxinus nigra, Acer saccharinum, Salix nigra, Ulmus americana, Fraxinus pennsylvanica, Populus deltoides,* and/or *Ulmus rubra*
.....**Laurentian-Acadian Floodplain Forest***
..... **Laurentian-Acadian Floodplain Systems (2475)****

4a. Hydrology affected by Great Lakes water level fluctuations ..... 5
4b. Hydrology not affected by Great Lakes water level fluctuations..... 8

5a. System in direct contact with water from main Great Lakes; semi-permanently or permanently flooded vegetation ..... 6
5b. System not in direct contact with water from Great Lakes; associated with dunes ..... 7

6a. System in estuaries and deltas of rivers and streams; water levels directly affected by Great Lakes hydrology
..... **Great Lakes Freshwater Estuary and Delta***
..... **Great Lakes Coastal Marsh Systems (2492)****
6b. System along shoreline of Great Lakes; vegetation is a marsh of emergent or floating leaved plants .....
..... **Northern Great Lakes Coastal Marsh***
..... **Great Lakes Coastal Marsh Systems (2492)****

7a. System limited to swales between dunes; dominant species include *Dasiphora fruticosa, Juncus balticus, J. pelocarpus, J. nodusus,* and/or *Cladium mariscoides*..... **Northern Great Lakes Interdunal Wetlands*****
7b. Mosaic of upland dunes and wetland swales; swales dominated by *Dasiphora fruticosa, Juncus balticus, J. pelocarpus, J. nodusus, and/or Cladium mariscoides*; uplands dominated by sparse grasses near the lake (*Ammophila breviligulata, Schizachyrium scoparium*) and forests (*Pinus banksiana, P. resinosa, P. strobus, Thuja occidentalis*) and shrublands further in (*Juniperus horizontalis, J. communis*)**Great Lakes Dune and Swale (2466)**

8a. Site in Section 212, surface of the System is strongly dominated by peat; often acidic but richer sites (fens) may be neutral to alkaline, *Thuja occidentalis* and/or *Fraxinus nigra* NOT dominant across the System (may be dominant in patches)..... 9
8b. Surface of the System is not strongly dominated by peat; soil is mineral, muck, or a thin layer of organic material over mineral soil..... 12

9a. System has moderate to dense cover of trees; *Picea mariana* and/or *Larix laricina* dominate the tree layer; *Chamaedaphne calyculata, Carex lasiocarpa,* and/or *Carex oligosperma* are common understory components ..... **Boreal-Laurentian Conifer Acid Swamp*** ..... **Boreal Swamp and Bog Systems (2477)****
9b. System dominated by shrubs; patches of forest or woodland may be present on the landscape but do not dominate..... 10

10a. Bog System is a raised peatland dominated by low ericaceous shrubs sometimes with patches of forest; dominant shrubs are *Chamaedaphne calyculata, Ledum groenlandicum, Kalmia angustifolia; Picea mariana* and/or *Larix laricina* are commonly scattered across the landscape..... **Boreal-Laurentian Bog*** ..... **Boreal Swamp and Bog Systems (2477)****
10b. Fen System dominated by patches of ericaceous shrubs and graminoids; dominant shrubs include *Chamaedaphne calyculata, Betula pumila, Dasiphora fruticosa, Myrica gale, Spiraea alba; Thuja occidentalis* may be present, *Picea mariana* very rare to absent..... 11

11a. System is acidic, poor fen; *Chamaedaphne calyculata* is often the dominant shrub but other possible dominants are *Betula pumila* or dwarf *Larix laricina*; common graminoids include *Carex lasiocarpa, C. oligosperma*, and/or *C. utriculata* ..... **Boreal-Laurentian-Acadian Acidic Basin Fen*** ..... **Laurentian-Acadian Shrub-Herbaceous Wetland Systems (2494)****
11b. System is alkaline fen; bedrock is typically limestone; dominant shrubs include *Betula pumila, Dasiphora fruticosa, Myrica gale* and sometimes *Alnus incana; Campylium stellatum* is a diagnostic bryophyte though not always present; scattered *Thuja occidentalis* may occur ..... **Laurentian-Acadian Alkaline Fen*****

12a. Site in Section 212, Subsection 222Kb, or 222Kc..... 13
12b. Site in Section 222 or 251..... 14

13a. System dominated by shrubs including *Alnus incana, Cornus amomum, Cornus sericea*, and/or *Salix* spp. ..... **Laurentian-Acadian Wet Meadow-Shrub Swamp*** ..... **Laurentian-Acadian Shrub-Herbaceous Wetland Systems (2494)****
13b. System dominated by trees including *Acer rubrum, Fraxinus nigra, Thuja occidentalis* and sometimes *Betula alleghaniensis, Populus balsamifera, Populus tremuloides*, and/or *Tsuga canadensis*..... ..... **Laurentian-Acadian Alkaline Conifer-Hardwood Swamp*** ..... **Laurentian-Acadian Swamp Systems****

14a. System is dominated by shrubs; Sphagnum may or may not be abundant..... 15
14b. System is dominated by trees; Sphagnum rare to absent..... 17

15a. Sphagnum and/or marls abundant in System..... 16
15b. Sphagnum rare to absent, System may have a graminoid-dominated center with a shrub-dominated periphery; dominant shrubs include *Cephalanthus occidentalis, Cornus sericea, Salix* spp., and/or *Spiraea tomentosa* ..... ..... **North-Central Interior Wet Meadow-Shrub Swamp*** ..... **Central Interior and Appalachian Herbaceous Wetland Systems (2493)****

16a. System is an acid peatland; dominant shrubs include *Chamaedaphne calyculata* and *Myrica gale*..... ..... **North-Central Interior and Appalachian Acidic Peatland*** ..... **Central Interior and Appalachian Swamp Systems (2479)****
16b. Sytem is an alkaline peatland; dominant shrubs include *Cornus* spp., *Dasiphora fruticosa,* and/or *Salix* spp.; prairie graminoids are often present, including *Andropogon gerardii, Spartina pectinata,* and/or *Carex* spp..... ..... **North-Central Interior Shrub-Graminoid Alkaline Fen*****

17a. System is a flatwoods with seasonally high water which typically becomes very dry in the summer; dominant trees are *Quercus bicolor* and/or *Q. palustris* ..... **North-Central Interior Wet Flatwoods (2518)**
17b. System is a swamp dominated by *Acer rubrum, Fraxinus nigra*, sometimes with *Larix laricina*.....
.....**North-Central Interior and Appalachian Rich Swamp***
..... **Central Interior and Appalachian Swamp Systems (2479)****

# KEY C – FOREST AND WOODLAND SYSTEMS (>10% tree cover)

1a. Systems with >25% tree cover..... 2
1b. Systems with <25% tree cover ..... 15

2a. Systems with >25% conifer cover in the canopy ..... 3
2b. Systems with <25% conifer cover in the canopy..... 8

3a. Most abundant conifers are *Picea glauca* and/or *Abies balsamea*; boreal hardwoods, especially *Populus tremuloides* and/or *Betula papyrifera*, may co-domominate ...**Boreal White Spruce-Fir-Hardwood Forest (2345)**
3b. Most abundant canopy conifers are *Pinus* spp., *Thuja occidentalis*, and/or *Tsuga canadensis*..... 4

4a. Most abundant conifers are *Pinus banksiana* and/or *Picea mariana*; boreal hardwoods, especially *Populus tremuloides* and/or *Betula papyrifera*, may co-domominate ..... 5
4b. Not as above ..... 6

5a. System with closed forest physiognomy (>60% tree canopy) . **Boreal Jack Pine-Black Spruce Forest (2344)**
5b. System with woodland physiognomy (<60% tree canopy) .....**Laurentian Pine-Oak Barrens (2407)**

6a. *Thuja occidentalis* dominant, *Tsuga canadensis* rare to absent .....
.....**Laurentian-Acadian Northern Hardwoods Forest (2302)**
6b. Most abundant conifers are *Pinus strobus, Pinus resinosa, Tsuga canadensis*, and/or *Thuja occidentalis*. If *Thuja occidentalis* is abundant then *Tsuga canadensis* also common..... 7

7a. Most abundant conifer is *Tsuga canadensis; Thuja occidentalis* may be co-dominant .....
.....**Laurentian-Acadian Pine-Hemlock-Hardwood Forest (2366)**
7b. Most abundant conifers are *Pinus strobus* and *Pinus resinosa*..... 8

8a. System dominated by *Pinus strobus* with *Tsuga canadensis, Fagus grandifolia*, and/or *Acer saccharum* common.....**Laurentian-Acadian Pine-Hemlock-Hardwood Forest (2366)**
8b. System dominated by *Pinus strobus* and/or *Pinus resinosa; Acer rubrum, Quercus rubra, Populus tremuloides, Betula papyrifera* may be common .....**Laurentian-Acadian Northern Pine-(Oak) Forest (2362)**

9a. Site found in Province 212; System strongly dominated by boreal hardwoods *Betula papyrifera, Populus balsamifera*, and/or *Populus tremuloides*; other northern hardwoods, *Acer saccharum, Quercus macrocarpa, Tilia americana, Fagus grandifolia*, not common; <15% cover of *Andropogon gerardii, Poa pratensis, Schizachyrium scoparium, Sorgahstrum nutans*, and/or *Sporobolus heterolepis* ..... **Boreal Aspen-Birch Forest (2301)**
9b. Site not as above..... 10

10a. Site in Section 251, 222Ma, 222N, 212Mb, 212Na, or 212Nc; canopy dominated by *Quercus macrocarpa* and/or *Populus tremuloides; Corylus* spp. often common in the understory; site may include a mosaic of forest, woodland, shrubland, and wet or wet-mesic prairie ..... **Eastern Great Plains Tallgrass Aspen Parkland (2331)**
10b. Site not as above..... 11

11a. System canopy dominated by a combination of *Acer saccharum, Betula alleghaniensis, Acer rubrum, Fagus grandifolia, Fraxinus americana, Quercus rubra*, and/or *Tilia americana*; if *Quercus rubra* or *Tilia americana* >50% then at least 20% cover by *Acer saccharum*, *Betula alleghaniensis*, or *Fagus grandifolia* ..... 12
11b. System dominated by *Quercus* spp. or, if in Province 251, *Tilia americana* ..... 14

12a. Site in Province 212 ..... **Laurentian-Acadian Northern Hardwoods Forest (2302)**
12b. Site not in Province 212 ..... 13

13a. Canopy strongly dominated by *Acer saccharum, Betula alleghaniensis*, and/or *Fagus grandifolia* OR canopy dominated by *Acer saccharum* or *Betula alleghaniensis* AND other species any combination of *Fagus grandifolia, Picea glauca, Pinus strobus, Tsuga canadensis* ..... **North-Central Interior Beech-Maple Forest (2313)**
13b. Canopy dominated by a combination of *Acer saccharum, Quercus rubra*, and *Tilia americana*..... ..... **North-Central Interior Maple-Basswood Forest (2314)**

14a. Sites dry; dominated by a combination of *Quercus velutina* and *Quercus ellipsoidalis*..... ..... **North-Central Interior Dry Oak Forest and Woodland (2311)**
14b. Not as above ..... 15

15a. Site in Province 212; dominated by *Quercus macrocarpa* ..... ..... **Laurentian-Acadian Northern Hardwoods Forest (2302)**
15b. Site in Provinces 222 or 251; dominated by a combination of *Quercus alba, Q. macrocarpa, Q. muehlenbergii, Q. rubra*, and *Tilia americana*..... **North-Central Interior Dry-Mesic Oak Forest and Woodland (2310)**

16a. System with shallow soils, usually prominent exposed bedrock ..... 17
16b. System with moderate to deep soils, exposed bedrock not prominent..... 20

17a. System found in the Baraboo Hills of Sauk and Columbia counties, WI; bedrock is quartzite, rhyolite, or sandstone' tree canopy often short and dominated by *Quercus alba* and/or *Carya ovata*.... **North-Central Interior Quartzite Glade*****
17b. System not as above ..... 18

18a. System found in the Paleozoic Plateau, Section 222L on steep slopes; tree canopy patchy over the landscape with some dense areas and some more open to barren; dominant trees are *Pinus strobus, P. resinosa, Quercus muehlenbergii, Q. alba, Q. velutina*, and/or *Juniperus virginiana* ..... **Paleozoic Plateau Bluff and Talus (2517)**
18b. System not in the Paleozoic Plateau, Section 222L ..... 19

19a. System on resistant acidic bedrock; vegetation usually a mosaic of woodlands and open glades; dominant trees are *Pinus strobus, P. banksiana, Picea mariana*, with occasional *Populus tremuloides* and *Quercus rubra*; common understory species include *Danthonia spicata* and *Poa compressa* and common shrubs include *Amelanchier* spp., *Corylus cornuta, Juniperus horizontalis*, and *J. communis*..... **Laurentian Acidic Rocky Outcrop*****
19b. System on limestone or dolomite pavement near the Great Lakes; vegetation is a mosaic of woodlands, shrublands, and grassy meadows; dominant trees are *Juniperus virginiana, Pinus banksiana*, and/or *Thuja occidentalis*; common shrubs are *Dasiphora fruticosa, Juniperus communis* and/or *J. horizontalis* while *Danthonia spicata, Deschampsia caespitosa*, and/or *Schizachyrium scoparium* are common herbaceous species ..... ..... **Great Lakes Alvar (2409)**

20a. Soils sandy/gravelly; *Pinus* spp. >25% or *Quercus ellipsoidalis* and *Quercus velutina* more abundant than *Q. macrocarpa*..... 20
20b. Soils not sandy/gravelly; canopy dominated by *Quercus macrocarpa*, sometimes with *Q. alba*; tallgrass species common in the understory including *Andropogon gerardii, Calamagrostis canadensis, Sorghastrum nutans*, and/or *Schizachyrium scoparium*..... **North-Central Interior Oak Savanna (2394)**

21a. *Pinus banksiana, P. resinosa*, and, rarely, *P. strobus* abundant to dominant (>25%) OR *Quercus ellipsoidalis* >40% canopy cover AND in Province 212 ..... **Laurentian Pine-Oak Barrens (2407)**
21b. Site in Province 222 or 251; canopy dominated by *Quercus ellipsoidalis* and/or *Q. velutina*..... ..... **North-Central Oak Barrens (2395)**

## KEY D – UPLAND SHRUBLAND SYSTEMS (>10% shrub cover)

1a. Site in Section 251, 222Ma, 222N, 212Mb, 212Na, or 212Nc; soil is deep (bedrock not apparent on surface); dominant shrubs include stunted *Populus tremuloides, Corylus* spp., or *Salix petiolaris* ..... **Eastern Great Plains Aspen Parklands (2331)**

1b. System on resistant acidic bedrock, dominants include *Amelanchier* spp., *Corylus cornuta, Juniperus communis, Juniperus horizontalis*, or *Prunus virginiana* ..... **Laurentian Acidic Rocky Outcrop*****

## KEY E – UPLAND HERBACEOUS SYSTEMS (<10% woody cover)

1a. System on deep soils; bedrock not prominent on the surface ..... 2

1b. Site in Section 222L; System on shallow soils, bedrock at or near surface ..... **Paleozoic Plateau Bluff and Talus (2517)**

2a. Soils deep, rich..... 3

2b. Soils sandy, rocky, or gravelly; dominated by tall and mid-grasses, especially *Andropogon gerardii, Bouteloua curtipendula, Bouteloua gracilis, Schizachyrium scoparium*, and/or *Sorghastrum nutans* ..... **North-Central Interior Sand and Gravel Tallgrass Prairie (2412)**

3a. Site NOT in Sections 251A, 251B, 222N, and 222Ma; System dominated by tallgrass species such as *Andropogon gerardii, Sorghastrum nutans, Panicum virgatum*, often with midgrasses such as *Schizachyrium scoparium* and forbs such as *Liatris* spp., *Ratibida* spp., *Echinacea* spp., and *Solidago* spp. ..... **Central Tallgrass Prairie (2421)**

3b. Site in Sections 251A, 251B, 222N, and 222Ma; System dominated by tallgrass species such as *Andropogon gerardii, Sorghastrum nutans*, and/or *Panicum virgatum*, often with midgrasses such as *Hesperostipa spartea, Muhlenbergia richardsonis*, and/or *Schizachyrium scoparium* ..... **Northern Tallgrass Prairie (2420)**

## KEY F – HERBACEOUS WETLAND SYSTEMS

1a. Systems on floodplains of medium to large rivers..... 2

1b. Systems in depressions, along lakeshores, or in areas with seasonally or permanently high water tables ..... 3

2a. Floodplain systems in Provinces 222 or 251; vegetation dominated by .. **North-Central Interior Floodplain*** ..... **Central Interior and Appalachian Floodplain Systems** (2471)**

2b. Floodplain System in Province 212 dominated by .....**Laurentian-Acadian Floodplain Forest*** ..... **Laurentian-Acadian Floodplain Systems** (2475)**

3a. Sites in Section 251..... 4

3b. Sites not in Section 251 ..... 5

4a. System is a single wetland; dominated by a variety of wetland species such as *Carex stricta, C. lacustris, C. atherodes, C. pellita, Calamagrostis canadensis, Spartina pectinata, Sagittaria latifolia, Leerisa oryzoides, Schoenoplectus* spp., *Potamogeton* spp., or *Polygonum* spp. **....Eastern Great Plains Wet Meadow, Prairie, and Marsh (2488)**

4b. System is composed of a series of wetlands separated by intervening upland prairie; dominant species are variable but typically include *Carex lasiocarpa, C. oligosperma*, and/or *Schoenoplectus* spp. **Great Plains Prairie Pothole (2482)**

5a. Sites in Section 222 ..... 6
5b. Sites not in Section 222 ..... 8

6a. System near southern Lake Michigan; dominant species are *Rhynchospora* spp. or *Rhexia virginica*.....
..... **Northern Atlantic Coastal Plain Pondshore*****
6b. System not as above ..... 7

7a. System semi-permanently to permanently flooded; dominated by species such as *Nelumbo lutea, Nuphar lutea, Phragmites australis, Potamogeton* spp., *Schoenoplectus* spp., *Typha* spp., or *Zizania* spp.....
.....**North-Central Interior Freshwater Marsh***
..... **Central Interior and Appalachian Herbaceous Wetland Systems** (2493)**
7b. Site in Subsection 222Kg; system is temporarily flooded on Great Lakes lakeplain; dominated by tallgrass species such as *Andropogon gerardii, Calamagrostis canadensis, Spartina pectinata*; sometimes with patches of *Quercus alba* ..... **Great Lakes Wet-Mesic Lakeplain Prairie (2411)**

8a. Marsh System dominated by species such as *Phragmites australis, Potamogeton* spp., *Nuphar lutea, Nymphaea lutea, Schoenoplectus* spp., *Typha* spp., or *Zizania* spp..... **Laurentian-Acadian Freshwater Marsh***
..... **Laurentian-Acadian Shrub-Herbaceous Wetland Systems** (2494)**
8b. Wet meadow System dominated by species such as *Calamagrostis canadensis, Carex lacustris, C. rostrata, C. stricta, C. utriculata*, or *Phalaris arundinacea*.....**Laurentian-Acadian Wet Meadow-Shrub Swamp***
..... **Laurentian-Acadian Shrub-Herbaceous Wetland Systems** (2494)**