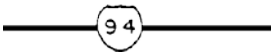
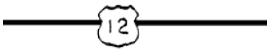
## MAPPING SYMBOLS

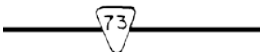
Mapping symbols and definitions that will be standard in the mapping of all Forest Crop Law and Managed Forest Lands are shown below.



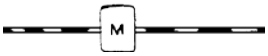

Interstate Highways




Federal Highways




State Highways




County Highways



Town Roads



Unimproved Roads



Trails

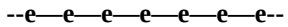


Single Track Railroads



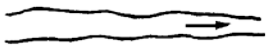
Multiple Track Railroads

Abandoned Railroads

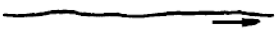


Powerlines

All fence lines

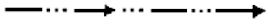


Rivers



Creeks and Streams

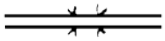
Intermittent Streams



Ditch

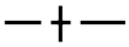
Dike

Dam

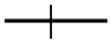


Bridges

Lakes

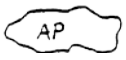


Definitely located section corner



Approximately located section corner

FOREST TYPE LINES:




Natural forest types


Plantations

## DEFINITIONS OF TERMS AND SYMBOLS

FARM LAND - Farm land actively used for agriculture including pasture (excludes farm wood lots).

FOREST LAND - Land at least 10 percent stocked by forest trees, afforested lands, and land formerly forested but now less than 10 percent stocked. This land is capable of producing wood products and is not developed for other uses. The minimum area is one acre; minimum width strip is 120 feet.

COMMERCIAL FOREST LAND - Forest land which is capable of producing 20 cubic feet of merchantable timber per acre per year.

NONCOMMERCIAL FOREST LAND - Forest land which is not capable of producing 20 cubic feet of merchantable timber per acre per year.

RESERVED FOREST LAND - Forest land which has been withdrawn from timber utilization through statute, ordinance, or administrative order.

## TYPE CLASSIFICATION

COVER TYPE - A tract of forest land characterized by the predominance of one or more key species which make up 50 percent or more of the basal area of saw-timber and pole-timber stands, or of the number of trees in seedling and sapling stands. Forest land less than 10 percent stocked with commercial tree species is classified as upland brush, grass or lowland brush.

| Forest Types | Symbol | Definition |
|---|---|---|
| Aspen | A | Aspen comprises 50% or more of the basal area in saw-timber and pole-timber stands, or 50% or more of the stems in sapling and seedling stands. |
| Bottomland hardwoods | BH | Any combination of silver maple, green ash, swamp white oak, American elm, river birch, and cottonwood comprises 50% or more of the basal area in saw-timber and pole-timber stands, or 50% or more of the stems in sapling and seedling stands. Hardwood dominated forests occurring on floodplains and some terraces. |
| White birch | BW | White Birch comprises 50% or more of the basal area in saw-timber and pole-timber stands, or 50% or more of the stems in sapling and seedling stands. |
| White cedar | C | White cedar comprises 50% or more of the basal area in saw-timber and pole-timber stands, or 50% or more of the stems in sapling and seedling stands. In mixed swamp conifer stands, white cedar is predominant. |
| Central hardwoods | CH | Any combination of oaks, hickories, elms, black cherry, hackberry, red maple, white ash, green ash, basswood, and sugar maple, which does not satisfy the defining criteria for NH, MR, or O cover types. The CH type occurs only on uplands within and south of the Tension Zone (southern Wisconsin). |
| Balsam Fir | FB | Balsam fir comprises 50% or more of the basal area in saw-timber and pole-timber stands, or 50% or more of the stems in sapling and seedling stands. In mixed swamp conifer stands, balsam fir is predominant. |

| | | |
|---|---|---|
| Hemlock | H | Hemlock comprises 50% or more of the basal area in saw-timber and pole-timber stands, or 50% or more of the stems in sapling and seedling stands. |
| Miscellaneous Conifers | MC | Conifer forests dominated by uncommon or exotic species: e.g. Eastern red cedar, Scotch pine, Norway spruce, European larch. |
| Miscellaneous Deciduous | MD | Hardwood forests dominated by uncommon or exotic species; e.g. box elder, honey locust, black locust, Norway maple. |
| Red Maple | MR | Red Maple comprises 50% or more of the basal area in saw-timber and pole-timber stands, or 50% or more of the stems in sapling and seedling stands. If soil is poorly drained, then swamp hardwood. |
| Northern Hardwoods | NH | Any combination of sugar maple, beech, basswood, white ash, and yellow birch comprises 50% or more of the basal area in saw-timber and pole- timber stands, or 50% or more of the stems in sapling and seedling |
| Oak | O | Oak comprises 50% or more of the basal area in saw-timber and pole-timber stands, or 50% or more of the stems in saplings and seedling stands. |
| Scrub oak | OX | More than 50% of the basal area in saw-timber and pole-timber stands, or 50% or more of the stems in sapling and seedling stands is comprised of oak with site indices $\leq$50. Typical forest products include only fuelwood and fiber. |
| Red pine | PR | Red pine comprises 50% or more of the basal area in saw-timber and pole-timber stands, or 50% or more of the stems in sapling and seedling stands. In mixed pine stands, red pine is predominant. |
| White pine | PW | White pine comprises 50% or more of the basal area in saw-timber and pole-timber stands, or 50% or more of the stems in sapling and seedling stands. In mixed pine stands, white pine is predominant. |
| Jack pine | PJ | Jack pine comprises 50% or more of the basal area in saw-timber and pole-timber stands, or 50% or more of the stems in sapling and seedlings stands. In mixed pine standards, jack pine is predominant. |
| Black spruce | SB | Black spruce comprises 50% or more of the basal area in saw-timber and pole-timber stands, or 50% or more of the stems in sapling and seedling stands. In mixed swamp conifer stands, black spruce is predominant. |
| Swamp hardwoods | SH | Any combination of black ash, green ash, red maple, silver maple, swamp white oak, and American elm that comprises 50% or more of the basal area in saw-timber and pole-timber stands, or 50% or more of the stems in sapling and seedling stands. This type occurs on wetlands characterized by periodic inundation (fluctuating water table near or above the soil surface) and nearly permanent subsurface water flow. |
| White spruce | SW | White spruce comprises 50% or more of the basal area in saw-timber and pole-timber stands, or 50% or more of the stems in sapling and seedling stands. |
| Tamarack | T | Tamarack comprises 50% or more of the basal area in saw-timber and pole-timber stands, or 50% or more of the stems in sapling and seedling stands. In mixed swamp conifer stands, tamarack is predominant. |
| Black walnut | W | Black walnut comprises 50% or more of the basal area in saw-timber and pole-timber stands, or 50% or more of the stems in sapling and seedling stands. |

| Non-Forest Types | Symbol | Definition |
|---|---|---|
| Upland brush | UB | Upland sites less than 10% stocked with tree species but having 50% or more of the area stocked with taller growing, persistent shrubs. Includes but is not limited to, shrubs such as hazel, gray dogwood, juneberry, sumac, ninebark, prickly ash, etc. |
| **Grass** | These symbols will be used for upland grasses, forbs, and ferns, including abandoned fields less than 10% stocked with tree species. | |
| Grass | GG | Ground cover predominately non-native grasses such as brome, quack, blue grass, timothy, etc. |
| Herbaceous vegetation | GH | Ground cover predominately herbaceous vegetation species such as bracken fern, sweet clover, giant ragweed, stinging nettle, upland aster, goldenrod, prairie dock, etc. |
| Prairie grass | GP | Ground cover predominantly native grasses such as big and little bluestem, Indian grass, etc. |
| Low growing shrubs | GLS | Ground cover predominately low growing woody plants such as blueberry, raspberry, etc. |
| **Marsh** | These symbols should be used for grass or high water table areas. | |
| Muskeg-bog | KB | Bog such as sphagnum moss, cotton grass, leatherleaf, cranberry, Labrador tea, etc. |
| Emergent vegetation | KEV | Coarse emergent marsh vegetation such as cattails, river bulrush, tall sedges, etc. |
| Lowland grass | KG | Ground cover consisting of more than 50% of true grasses such as canary grass, bluejoint, redtop, cordgrass, big bluestem, fire stemmed sedges, etc. |
| Lowland herbaceous vegetation | KH | Ground cover consisting of more than 50% of herbaceous vegetation, such as lowland asters, stinging nettle, wild sunflowers, etc. |
| **Lowland brush** | These symbols will be used for lowland brush on forest lands less than 10% stocked with tree species. | |
| Alder | LBA | More than 50% alder. |
| Bog birch | LBB | More than 50% bog birch. |
| Red dogwood | LBD | More than 50% dogwood, such as silky and red osier. |
| Willows | LBW | More than 50% shrub willow. |
| Water | L | Lakes, ponds and flowages in excess of 40 acres in area, or rivers in excess of 1/8 mile in width. |
| Minor - lake | LM | Water less than 40 acres in area, excluding rivers less than 1/8 mile in width. |
| Minor - stream | LMS | Streams less than 1/8 mile in width. |
| Rights-of-way | ROW | Improved roads, railroads or right-of-way for gas, power or telephone lines. |
| Rock outcrops/ Sand dunes | Z | Rock outcrops including rocky beaches more than 1 acre in extent. Sand dunes including sand beaches, more than 1 acre in extent. |
| Buildings or Improvements | Bld.<br>Bldg.<br>I | Buildings, cabins, secondary homes, or other improvements or improved areas. |

These symbols are not a part of WisFIRS since the land are generally not allowed for entry under the MFL or FCL programs. These symbols should be used to identify adjacent lands of the landowner or adjacent landowners.

| | | |
|---|---|---|
| Other | O/ | Used in conjunction with F, FG, W, Bld, Bldg, I or other mapping symbol to reflect adjacent lands owned by other owners. |
| Farmland | F | Land actively used for agriculture but excluding farm woodlots. |
| Heavily grazed | FG<br>FP | Grazed pastures with fences. Use only as a secondary type symbol. Will most often be used in conjunction with GG, KG, and poorly stocked forest types. |
| Woods | W | Forested lands and woodlots that are not enrolled in the MFL or FCL programs. |
| Buildings or Improvements | Bld.<br>Bldg.<br>I | Buildings, cabins, secondary homes, or other improvements or improved areas. |
| Grass | G | Upland grasses, forbs, and ferns, including abandoned fields less than 10% stocked with tree species. May use more detailed symbols if desired. |
| Marsh | K | Grass or high water table areas. May use more detailed symbols if desired. |

## FOREST STAND SIZE CLASSIFICATION

SAW-TIMBER STANDS - Stands of saw-timber trees having a minimum net basal area of 10 sq. ft./acre. Saw-timber trees are 9.0 inches d.b.h.[1] or larger for softwood species and of 11.0 inches d.b.h. and larger for hardwood species (including aspen).

LARGE SAW-TIMBER STANDS (15+") - Saw-timber stands having more than 50 percent of the basal area in saw timber trees 15.0 inches d.b.h. and larger.

SMALL SAW-TIMBER STANDS (Softwoods 9-15", Hardwoods 11-15") - Saw-timber stands having more than 50 percent of the basal area in saw-timber trees less than 15.0 inches d.b.h.

POLE-TIMBER STANDS (Softwoods 5-9", Hardwoods 5-11") - Stands failing to meet the saw-timber stand specifications, but with a basal area stocking of at least 10 sq. ft./acre in pole-timber and larger trees, at least 50% of which are in pole-timber trees. Pole-timber trees are merchantable trees of softwood species 5.0 - 8.9 inches d.b.h. or hardwood species (including aspen) 5.0 - 10.9 inches d.b.h.

SEEDLING AND SAPLING STANDS (0-5") - Forest stands not qualifying as either saw-timber or pole-timber stands but having a minimum of 200 seedlings or 100 saplings per acre. Seedling and sapling stands are further divided into stocking classes. Stands are considered satisfactorily stocked if 40 percent or more of the growing space is effectively utilized, and poorly stocked when less than 40 percent is utilized. Seedlings and saplings are trees less than 5.0 inches d.b.h. and capable of development into pole-timber trees. As the distinction between seedling and sapling sizes cannot always be distinguished on aerial photos, the two classes have often been combined to form the reproduction (restocking) class (0-5").

NONSTOCKED AREA - Forest land on which less than 10 percent of the growing space is effectively utilized by trees. It is typed as upland brush, grass, or lowland brush.

SIZE CLASSES - The predominant stand of each classified type is designated according to the following size class chart: (The division between pole-timber and small saw-timber is 9 inches for softwoods and 11 inches for hardwoods.)

| Symbol | Class | DBH |
|---|---|---|
| 0 - 5 | Seedling and sapling | 0 - 5″ |
| 5 - 9 or 11 | Pole-timber | 5 - 9″ or 11″ |
| 9 or 11 - 15 | Small saw-timber | 9″ or 11 - 15″ |
| 15+ | Large saw-timber | 15″+ |

STOCKING CLASSES - Forest land stocking classification is based on basal area or number of trees as shown in the following table.

STAND SIZE AND DENSITY CLASSIFICATION

| Size Class | Units Per Acre | Density Classes[3] | | | | |
|---|---|---|---|---|---|---|
| | | 3 | 2 | 1 | | |
| Seedlings [1/] | Trees | 1,501+ [2/] | 601-1,500[2/] | 200 - 600 | | |
| Saplings [1/] | Trees | 901+ | 301 - 900 | 100 - 300 | | |
| Size Class | Units Per Acre [3/] | Density Classes | | | | |
| | | 5 | 4 | 3 | 2 | 1 |
| Pole-timber and Saw-timber | Basal area (sq. ft./acre) | 150+ | 111 - 150 | 71 - 110 | 31 - 70 | 10 - 30 |

1/ Seedlings and saplings should be combined to a reproduction (restocking) class 0-5.
2/ Primarily for natural stands. With uniform spacing such as plantations approximately 600 trees per acre qualifies as good density of stocking.
3/ Minimum “medium” density stocking for tax law eligibility differs slightly and can be found in NR 46.02 (24m).

**TYPE CLASSIFICATION**

Each distinctive stand (cover type) will be assigned a cover type classification. Each forest stand will be given a type classification showing cover type, size class, and density. The primary covert type will be required in all cases. If a secondary and /or understory type are present they may also be recorded.

For mapping purposes, the primary type classification, including size and density for forest stands, shall always be shown. If a secondary and/or understory type is shown, the primary type will be placed first, followed by a slash and then the secondary and/or understory type(s) on the type maps for ready identification. For example: A $5\text{-}11^4$/ NH $5\text{-}11^2$/ PW $0\text{-}5^2$.

The goal of stand typing is to best describe the condition of a stand and some subjectivity may be involved. When determining the primary cover type and size class, if it is unclear as to what type to assign to a stand (e.g. 50 $ft^2$ of aspen & 50 $ft^2$ of oak) the forester should make a determination based on what they think best represents the current and/or anticipated near term stand condition. The cover types as defined in this Appendix typically have a threshold of 50% stocking of a given species, or suite of species, and at times the forester will have to choose the best cover type without meeting these requirements.

Overstories (saw timber and pole timber) are given precedence in primary typing except when the overstory is of poor density and the understory consists of a stand of desirable species. There must be a separation of two density classes before a seedling/sapling size class becomes the primary type and a poor density overstory becomes the secondary type.

Choose only one primary type, one secondary type and one understory type based on basal area (poles & saw timber) or stems / acre (seedlings & saplings). Always try to record a secondary and/or understory type because they provide insight into the species composition of the primary type, and the next successional stage most likely to occur. The secondary and/or understory type data is valuable when reviewing the data in the office. For example:

Primary Type A $5\text{-}11^{4}$
Secondary Type NH $5\text{-}11^{2}$
Understory Type PW $0\text{-}5^{2}$

NOTE: Density is written in numeric characters.

In typing a stand using basal area, use the following procedure to determine the primary type.

1. Determine the cover type based on the highest distribution by basal area of all merchantable trees in a forest type. For seedling and sapling stands, determine the cover type based on the number of seedlings and saplings by forest type. In some cases no one timber type will reach 50% and you will have to choose the type that best represents the stand.

2. Determine the size class based upon the basal area size class distribution of all merchantable trees within the primary cover type determined above. For seedlings and saplings use 0-5.

3. Determine the density code based on the basal area of all merchantable trees in the primary product class (saw timber or pole timber). For saw timber, combine large and small saw timber. For seedlings and sapling stands use the number of trees in the stand.

Secondary and understory types should be identified when present. These cover types typically provide additional clarity as to the species mix and structure present in a stand. Secondary types should be selected based on the size class or density of those trees not used in the primary type. Use only the basal area of the secondary type to determine the density of the secondary type. For seedling/sapling stands it should reflect the total stems/acre in that size class.

To determine the secondary type, use the following procedure.

1. Delete the basal area, size class and timber type used in the primary timber type from consideration in determining the secondary timber type.

2. Determine the cover type based on the highest distribution by basal area of all merchantable trees in the remaining forest type. For seedling and sapling stands, determine the cover type based on the number of seedlings and saplings by forest type. Again, in some cases no one timber type will reach 50% and you will have to choose the type that best represents the stand.

3. Determine the size class based upon the basal area size class distribution of all merchantable trees within the secondary cover type determined above. Again, for seedlings and saplings use 0-5.

4. Determine the density code based on the basal area of all merchantable trees from Steps 2 and 3. For seedlings and sapling stands use the number of trees in the stand.

**Example 1**

Stand Basal Area
15 sq. ft. of large saw timber oak
15 sq. ft. of large saw timber northern hardwoods
45 sq. ft. of small saw timber northern hardwoods
25 sq. ft. of northern hardwood pole timber
10 sq. ft. of aspen pole timber
110 Total Basal Area

| | | |
|---|---|---|
| Primary Cover Type: | NH | The primary cover type is northern hardwood since 85 sq. ft. of the 110 sq. ft. are northern hardwoods, for 77% of the total basal area. Since northern hardwood species make up more than 50% of the basal area, this stand is typed as NH.<br><br>(15 sq. ft. of large NH saw timber + 45 sq. ft. of small NH saw timber + 25 sq. ft. of NH pole timber = 85 sq. ft. of NH.) |
| Size Class: | 11-15 | The size class is 11-15 since the majority of the northern hardwood basal area is in the small saw timber size class.<br><br>(45 sq. ft. of the 85 sq. ft. is in the small saw timber category, which makes up 53% of the total basal area. Conversely, large NH saw timber makes up 18% of the basal area while NH pole timber makes up 29% of the basal area). |
| Density: | 3 | The density code is "3" since a total of 75 sq. ft. are in the saw timber product class.<br><br>(15 sq. ft. of oak saw timber + 15 sq. ft. of northern hardwood large saw timber + 45 sq.ft. of northern hardwood small saw timber = 75 sq. ft. of total basal area.) |
| Determining Secondary Cover Type | | Eliminate the 45 sq. ft. of small saw timber northern hardwoods from consideration in determining the secondary timber type. The secondary timber type will be determined from the following species, basal area and size class:<br><br>15 sq. ft. of large saw timber oak<br>15 sq. ft. of large saw timber northern hardwoods<br>~~45 sq. ft. of small saw timber northern hardwoods~~ (used in primary type)<br>25 sq. ft. of northern hardwood pole timber<br>10 sq. ft. of aspen pole timber<br>65 Remaining Basal Area |
| Secondary Cover Type: | NH | The secondary cover type is northern hardwood since 40 sq. ft. of the remaining 65 sq. ft. of basal area are in northern hardwoods.<br><br>(15 sq. ft. of large saw timber northern hardwoods + 25 sq. ft. of northern hardwood pole timber = 40 sq. ft. of NH.) |
| Size Class | 5-11 | The size class is 5-11 since the majority of remaining northern hardwood basal area is pole timber size.<br><br>(25 sq. ft. of the 40 sq. ft. of northern hardwoods are in the pole timber category making up a majority of the basal area.) |
| Density | 1 | The density code is "1" since a total of 25 sq. ft. of basal area are in the secondary type (NH) and size class (5-11). |

The final cover type of this example is:

| | |
|---|---|
| Primary Type: | NH 11-15[3] |
| Secondary Type: | NH 5-11[2] |

**Example 2**
Stand Basal Area – All merchantable trees are pole timber size (5-11")

90 sq. ft. of aspen
15 sq. ft. of red maple
10 sq. ft. of hard maple
15 sq. ft. of red oak
10 sq. ft. of white ash
140 Total Basal Area, plus

600 seedlings and saplings of white pine

| | | |
|---|---|---|
| Primary Cover Type: | A | The primary cover type is aspen since >50% of basal area in the stand is aspen.<br><br>(90 out of 140 sq. ft. for 64% of the basal area). |
| Size Class: | 5-11 | The size class is 5-11 since all aspen are in the 5-11" size class. |
| Density: | 4 | The density code is "4" since a total of 140 sq. ft. are in the pole timber product class. |
| Determining Secondary Cover Type | | Eliminate the 90 sq. ft. of aspen pole timber from consideration in determining the secondary timber type. The secondary timber type will be determined from the following species, basal area and size class:<br><br>~~90 sq. ft. of aspen~~ (used in primary type)<br>15 sq. ft. of red maple<br>10 sq. ft. of hard maple<br>15 sq. ft. of red oak<br>10 sq. ft. of white ash<br>50 Remaining Basal Area, plus<br><br>600 seedlings and saplings of white pine |
| Secondary Cover Type: | NH | The secondary cover type is northern hardwood since 35 sq. ft. of the remaining 50 sq. ft. of basal area are in northern hardwoods (red maple, hard maple, white ash). |
| Size Class | 5-11 | The size class is 5-11 since all of the remaining northern hardwood species are in the 5-11" size class. |
| Density | 2 | The density code is "2" since a total of 35 sq. ft. are in secondary type (NH) and size class (5-11), being 15 sq. ft. of red maple + 10 sq. ft. of hard maple + 10 sq. ft. of white ash. |
| Understory Cover Type: | PW | The understory cover type is white pine since all 600 seedlings and saplings were determined to be white pine. |
| Size Class: | 0-5 | Seedlings and saplings are part of the 0-5" size class. |
| Density: | 1 | 600 seedlings per acre are part of Density Code 1. |

The final cover type of this example is:
Primary Type: A 5-11[4]
Secondary Type: NH 5-11[2]
Understory Type: PW 0-5[1]

**TIMBER VOLUME**

SAW-TIMBER VOLUME - Net volume of live merchantable saw-timber trees between the stump and a point in the top of the stem at which utilization is limited by large branches, forks, or other defects, or by a diameter inside bark of eight inches. This volume is expressed in terms of board feet by the Scribner log rule. Saw timber has the following minimum specifications (NR 46.02(22)(a), Wis. Admin. Code).

| | |
|---|---|
| Position in tree | Butt or upper |
| Minimum diameter*, small end-Hardwoods | 10.6 |
| Minimum diameter*, small end-Conifers | 9.6 |
| Minimum length, without trim | 8 (except walnut and cherry, which are 4) |
| Sweep allowance*** | ½ of diameter small end for each 8 length |
| Maximum scale deduction for unsound defects | 50% |
| Clear cuttings free of knots or other defects | No requirements |
| Sound or unsound surface defect limitations | Diameter of knots, holes, rot, etc., may not exceed 1/3 diameter of log at point of occurrence. |
| Sound end defects | No requirements |

*Diameter inside bark.

**The maximum trim allowance is 8". Cut products that exceed the 8 trim allowance will be classified as misbucked and will be scaled as saw logs at the next whole foot increment.

***Sweep is defined as the maximum departure distance of a line drawn between the ends of a log from the nearest surface of the log.

CORDWOOD VOLUME - Net volume of live merchantable pole-timber trees from stump to a minimum four-inch top of stem inside bark plus volume in the stem of live saw-timber trees between the merchantable saw-log top and the minimum diameter of four inches inside bark. This volume is expressed in unpeeled cords (4x4x8 feet). Each cord contains 128 cubic feet including wood, air and bark assuming careful piling. Forest products described as cords are further defined to include all cut products not meeting the minimum specifications for saw logs.

CULL TREES - Live trees of saw-timber and pole-timber size with 60 percent or more of their gross volume unusable due to defects or deformities.