# MHs39

## Southern Mesic Maple-Basswood Forest

Rich mesic hardwood forests on loamy soils derived from calcareous till or wind-deposited silt over bedrock. Present on sites that have been historically protected from fires on hummocky stagnation moraines, on till plains along rivers, and on middle or lower slopes of bedrock bluffs.

### Vegetation Structure & Composition

Description is based on summary of vegetation data from 110 plots (relevés).

• **Ground-layer** cover is interrupted to continuous (50–100%); important species include Virginia waterleaf (*Hydrophyllum virginianum*), bloodroot (*Sanguinaria canadensis*), yellow violet (*Viola pubescens*), largeflowered bellwort (*Uvularia grandiflora*), wild leek (*Allium tricoccum*), blue cohosh (*Caulophyllum thalictroides*), and early meadowrue (*Thalictrum dioicum*). Spring ephemeral species such as cut-leaved toothwort (*Cardamine concatenata*) and Dutchman's breeches (*Dicentra cucullaria*) are characteristic.

• Shrub-layer cover is rare to interrupted (5–75%); common species include sugar maple, bitternut hickory, basswood, prickly



gooseberry (*Ribes cynosbati*), and chokecherry (*Prunus virginiana*). • Subcanopy cover is most commonly patchy to interrupted (25–75%); important

species include sugar maple, ironwood, basswood, and bitternut hickory.

• **Canopy** cover is interrupted to continuous (50–100%) and strongly dominated by sugar maple, with basswood, northern red oak, and occasionally red elm and American elm. Bur oak replaces northern red oak in importance in the CGP.

### Landscape Setting & Soils

• Stagnation moraines—Occasional. Present on rolling to hummocky topography with complex slopes. Parent material is strongly calcareous till with little gravel and few stones. Soil surface is loamy and dark colored to about 10in (25cm), indicating former occupation of these sites by oak or aspen woodland. Soils have a very thick clay-loam subsoil horizon, but there is no indication that it perches or retains water for long periods of time. Gray soil colors and deposits of free carbonates are common below the clay-loam horizon, indicating availability of water and nutrients below the clay layer. Soils are well drained. Soil-moisture regime is fresh or very fresh. (Big Woods, Hardwood Hills, and Oak Savanna in MIM; localized along large lakes in MDL and WSU)

• Till plains—Common. Present on rolling topography, with most occurrences on north aspects. Parent material is strongly calcareous, fine-textured till with little gravel and few stones. Soil surface is loamy and dark to about 10in (25cm), indicating former occupation of these sites by oak or aspen woodland. Soils have a very thick clay-loam subsoil horizon but there is no indication that it perches or retains water for long periods of time. Gray soil colors and deposits of free carbonates are common below the clay-loam horizon, indicating availability of water and nutrients below the clay layer. Soils are well drained. Soil-moisture regime is fresh or very fresh. (Big Woods, Hardwood Hills, and Oak Savanna in MIM; localized along large lakes in MDL and WSU; localized along river valleys in CGP)

• Loess-covered or drift-covered bedrock bluffs—Occasional. Most often present on middle and lower slopes with strong affinity for north and northeast aspects. Parent material is wind-deposited silt that is generally deeper than 60in (150cm) over sedimentary bedrock. Flagstone-sized rocks are common just above the bedrock. Soils have dark, organic-rich surface horizons, indicating former occupation of these sites



by oak woodland or prairie. Little clay is available for development of subsoil horizons capable of perching snowmelt and rainfall. Soils are well drained. Soil moisture regime is fresh. (Blufflands in PPL; MIM)

### Natural History

In the past, catastrophic disturbances were rare in MHs39. An analysis of Public Land Survey records indicates the rotation of catastrophic fires was in excess of 1,000 years, and the rotation of catastrophic windthrow was about 680 years.<sup>1</sup> Events that result in partial loss of trees, especially light surface fires, were more common, with an estimated rotation of about 50 years. Based on the historic composition and age structure of these forests, MHs39 had two growth stages separated by a period of transition.

• 0–35 years—Young forests recovering from wind or fire, dominated by northern red oak mixed with basswood, quaking aspen, and some American elm.

• **35–75 years**—A transition period marked by the gradual decline of northern red oak and its replacement by sugar maple. Basswood declines slightly, and quaking aspen is essentially eliminated during this stage. American elm and ironwood increase, and white oak seedlings become established during this period.

• > 75 years—Mature forests mostly of sugar maple mixed evenly with basswood, American elm, ironwood, and northern red oak, and with some white oak in the eastern part of the range of the community.

### Similar Native Plant Community Classes

### MHs38 Southern Mesic Oak-Basswood Forest

MHs38 and MHs39 are very similar, and the ranges of the two classes overlap strongly. MHs38 lacks the spring ephemeral species often present in the herbaceous layer of MHs39 and also is less likely to have large patches of wood nettle (*Laportea canadensis*).

MHa20 Indicator Spacios	(fre	q%)	MHo29 Indicator Spacios	(free	<b>q%</b> )
winsse indicator species	MHs39	MHs38	winsso indicator species	MHs39	MHs38
False rue anemone (Enemion biternatum)	25	2	Northern bedstraw (Galium boreale)	-	23
Dutchman's breeches (Dicentra cucullaria)	44	5	Poison ivy (Toxicodendron rydbergii)	2	57
Cut-leaved toothwort (Cardamine concatenata)	36	4	Paper birch (C)	2	20
White trout lily (Erythronium albidum)	30	4	Canada mayflower (Maianthemum canadense)	4	37
Blue phlox (Phlox divaricata)	36	5	Columbine (Aquilegia canadensis)	5	30
Puttyroot (Aplectrum hyemale)	15	3	Pointed-leaved tick trefoil (Desmodium glutinosum)	) 7	47
Ostrich fern (Matteuccia struthiopteris)	15	3	Wild sarsaparilla (Aralia nudicaulis)	15	54
Stemless blue violets (Viola spp.)*	38	11	Wild grape (Vitis riparia)	12	39

\*Stemless blue violets (Viola sororia and similar Viola spp.)

### MHs49 Southern Wet-Mesic Hardwood Forest

The range of MHs49 overlaps with MHs39 in the southeastern and south-central part of the state, where MHs49 occurs on wet-mesic, level silty alluvium or glacial till. Species adapted to high water tables or species common on heavy, moist soil are common in MHs49. Spring ephemerals are often abundant in both classes.

MHe20 Indicator Species	(fre	q%)	MUado Indiantas Canadas	(free	<b>1%)</b>
MIRS39 Indicator Species	MHs39	MHs49	MHS49 Indicator Species	MHs39	MHs49
Northern red oak (C,U)	55	13	Rock elm (C,U)	1	23
Lady fern (Athyrium filix-femina)	55	13	Appendaged waterleaf*	2	21
Hairy Solomon's seal (Polygonatum pubescens)	22	5	Stinging nettle (Urtica dioica)	5	46
Rattlesnake fern (Botrychium virginianum)	41	10	Hackberry (C)	7	51
Red baneberry (Actaea rubra)	30	8	Hawthorn (Crataegus spp.)	6	33
Early meadow-rue (Thalictrum dioicum)	67	18	Nannyberry (Viburnum lentago)	8	36
Wood anemone (Anemone quinquefolia)	45	13	Tall coneflower (Rudbeckia laciniata)	10	38
Nodding trillium (Trillium cernuum)	25	8	Ambiguous sedge (Carex amphibola)	8	28
Hairy Solomon's seal (Polygonatum pubescens) Rattlesnake tem (Botrychium virginianum) Red baneberry (Actaea rubra) Early meadow-rue (Thailictrum dioicum) Wood anemone (Anemone quinquefolia) Nodding trillium (Trillium cernuum)	22 41 30 67 45 25	5 10 8 18 13 8	Stinging nettle (Urtica dioica) Hackberry (C) Hawthorn (Crataegus spp.) Nannyberry (Viburnum lentago) Tall coneflower (Rudbeckia laciniata) Ambiguous sedge (Carex amphibola)	5 7 6 8 10 8	4 5 3 3 3 2

\*Appendaged waterleaf (Hydrophyllum appendiculatum)

### MHc36 Central Mesic Hardwood Forest (Eastern)

The range of MHc36 overlaps with MHs39 through the central part of Minnesota. MHc36 tends to lack the spring ephemeral species present in the herbaceous layer of MHs39.

<sup>1</sup>Forested communities that extend into the prairie regions of Minnesota tend to have shorter rotations of disturbance from fire (and often wind) on the western edge of their range compared with th eastern part. This probably results from drier climate in the west and being surrounded by prairie vegetation that burns frequently. Because estimated rotations of disturbance for forested communities are calculated from PLS bearing-tree records across the range of the community, and records in the prairie regions are often much sparser than those to the east, disturbance rotations may be much shorter for forest stands in the prairie regions than those presented for the class as a whole.



### MESIC HARDWOOD FOREST SYSTEM Southern Floristic Region



MHs39 Indicator Species	(free	1%)	MHc
initious indicator openies	MHs39	MHc36	mined
Dutchman's breeches (Dicentra cucullaria)	41	-	Large-I
Cut-leaved toothwort (Cardamine concatenata)	30	-	Rose tv
Blue phlox (Phlox divaricata)	36	1	Pale be
Missouri gooseberry (Ribes missouriense)	28	2	Red ma
Hackberry (U)	35	2	Round-
Cleavers (Galium aparine)	66	5	Mounta
Wood nettle (Laportea canadensis)	63	8	Beaked
Stemless blue violets (Viola spp.)*	39	6	Canada
Stemless blue violets (Viola sororia and similar Viola	a spp.)		

MUs26 Indicator Creation	(frei	q%)
MHC36 Indicator Species	MHs39	MHc36
Large-leaved aster (Aster macrophyllus)	-	77
Rose twistedstalk (Streptopus roseus)	1	56
Pale bellwort (Uvularia sessilifolia)	1	54
Red maple (C,U)	1	50
Round-lobed hepatica (Anemone americana)	2	61
Mountain rice grass (Oryzopsis asperifolia)	2	60
Beaked hazelnut (Corylus cornuta)	3	62
Canada mayflower (Maianthemum canadense)	4	51

### Native Plant Community Types in Class • MHs39a Sugar Maple - Basswood - (Bitternut Hickory) Forest

Rich mesic hardwood forests on moderate to steep north-facing slopes on hummocky stagnation moraines, on till plains along the Minnesota River, and on middle and lower slopes on bedrock bluffs. Most often, canopy is strongly dominated by sugar maple with lesser amounts of basswood and, often, northern red oak or bur oak. Ironwood and sugar maple are the most abundant subcanopy species. Sugar maple is also common in the shrub layer with bitternut hickory, prickly gooseberry, chokecherry, and pagoda dogwood (*Cornus alternifolia*). MHs39a is the most widespread of the three community types in MHs39. MHs39a is less likely than MHs39b to have abundant spring ephemerals in the ground layer where the ranges of the two community types overlap in the PPL and is less likely than MHs39c to have abundant wood nettle in the ground layer where the ranges of the stwo types overlap in the Big Woods Subsection of the MIM. Documented in the PPL, MIM, and CGP. Description is based on summary of vegetation data from 62 plots.

### MHs39b Sugar Maple - Basswood - Red Oak - (Blue Beech) Forest

Rich mesic hardwood forests on shady, moist, middle and lower parts of moderate to steep north-facing slopes. Canopy is strongly dominated by sugar maple, with basswood and northern red oak. Ironwood, blue beech, sugar maple, basswood, and bitternut hickory are the most abundant subcanopy species. These same species are also common in the shrub layer with bladdernut (*Staphylea trifolia*), pagoda dogwood, and leatherwood (*Dirca palustris*). Species that help to differentiate MHs39b from the other types in this class include blue beech (*Carpinus caroliniana*) in the canopy and understory, and bladdernut, Wood's sedge (*Carex woodii*), woodland millet grass (*Milium effusum*), shining bedstraw (*Galium concinnum*), mayapple (*Podophyllum peltatum*), bulblet fern (*Cystopteris bulbifera*), interrupted fern (*Osmunda claytoniana*), Virginia spring beauty (*Claytonia virginica*), two-leaved miterwort (*Mitella diphylla*), and hispid buttercup (*Ranunculus hispidus*) in the understory. MHs39b has very high species diversity and provides important habitat for a variety of rare plant species. Restricted to the PPL. Description is based on summary of vegetation data from 10 plots.

### MHs39c Sugar Maple Forest (Big Woods)

Rich mesic hardwood forests on gently sloping sites on hummocky stagnation moraines and also on till plains along the Minnesota River. Canopy is strongly dominated by sugar maple, often with basswood and less frequently with northern red oak, red elm, or American elm. Sugar maple is also abundant in the subcanopy and shrub layer. Other common species in the shrub layer are basswood, bitternut hickory, prickly gooseberry, red-berried elder (*Sambucus racemosa*), and chokecherry. MHs39c has been documented mainly in the Big Woods Subsection of the MIM, where it may overlap with MHs39a. Species that help to differentiate MHs39c in this area include hackberry (especially when present in the canopy), red-berried elder, puttyroot (*Aplectrum hyemale*), giant Solomon's seal (*Polygonatum biflorum*), and hairy Solomon's seal (*Polygonatum pubescens*). MHs39c is also more likely to have dense patches of wood nettle in the ground layer. Documented in the MIM with occasional occurrences in the WSU and MDL. Description is based on summary of vegetation data from 38 plots.





Wolsfeld Woods Scientific and Natural Area, Hennepin County, MN

# MHs39 Southern Mesic Maple-Basswood Forest – Species Frequency and Cover

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Dutchman's breeches (Dicentra cucullaria)       44       Red-berrie         Rattlesnake fern (Botrychlum virginianum)       41       41       1         White avens (Geum caradense)       41       41       1       1         Kidney-leaved buttercup (Ranunculus abortivus)       40       40       6       1         Honewort (Cryptateania caradensis)       40       40       6       5         Stemless blue violets (Viola sororia and similar Viola spp.)       38       6       8         Blue phlox (Phlox divaricata)       36       6       Northem r         Cut-leaved toothwort (Gardamine concatenata)       36       6       Red elmovod         White trout lily (Erythronium abidum)       30       40       6       American         White trout lily (Erythronium abidum)       30       40       8       Biltemut h         Lopseed (Phryma leptostachya)       29       6       Bildack ash         Touch-me-not (Impatiens spp.)       28       6       Green aso	Forbs, Ferns & Fern Allies         Virginia watefaef (Hydrophyllum virginianum)         Bloodroot (Sanguinaria canadensis)         Yellow violet (Viola pubescens)         Large-flowered bellwort (Uvularia grandfilora)         Wild leek (Allum tricoccum)         Blue cohosh (Caulophyllum thalictroides)         Eaty meadow-rue (Thalictrum dioicum)         Clayton's sweet cicely (Osmothiza claytonii)         Zigzag goldenrod (Solidago flexicaulis)         Jack-in-the-pulpit (Arisaema triphyllum))         Lady-in-the-pulpit (Arisaema triphyllum))         Lady-fern (Athyrium filix-fernitna)         Common false Solomori's seal (Smilacina racemosa)         Wild ginger (Asarum canadense)         Common enchanter's nightshade (Circaea lutetiana)         Sharp-lobed hepatica (Anemone acutiloba)         Maldenhair fem (Adiantum pedatum)         Wood anemone (Anemone quinquefolia)         Erect, Smooth, or Illinois carrion-flower*	tring % 85 85 77 75 66 66 66 66 66 66 67 55 55 55 55 55 55 55 55 55 55 55 55 55		Sweet-sce Two-leave False rue Gregariou Hairy Sold Starry Sed Starry Sed Starry Sed Dennsylva Starry Sed Bottlebrus Bottlebrus Bottlebrus Bottlebrus Bottlebrus Bottlebrus Bottlebrus Bottlebrus Prickly go Chokeche Chokeche Chokeche Chokeche	anted bedstraw (G anemone ( <i>Enemic</i> illium ( <i>Trillium cer</i> s black snakeroot s black snakeroot s black snakeroot s black snakeroot sed ( <i>Carex rosea</i> ) (ge ( <i>Carex rosea</i> ) ( <i>Carex rosea</i> ) ( <i>Carex blanda</i> ) ge ( <i>Carex blanda</i> ) ( <i>Carex blanda</i> ) ge ( <i>Carex blanda</i> ) ge ( <i>Carex blanda</i> ) ( <i>Carex blanda</i> ) ge ( <i>Carex blanda</i> ) ( <i>Carex blanda</i> ) ge ( <i>Carex blanda</i> ) ( <i>Carex blanda</i> ) ge ( <i>Carex rosea</i> ) ( <i>Carex blanda</i> ) ge ( <i>Carex blanda</i> ) ( <i>Carex blanda</i> ) ge (	nted bedstraw (Galium trillorum d miterwort (Mitella diphylla) anemone (Enemion biternatum) illium (Trillium cernuum) s black snakeroot (Sanicula gre mno's seal (Polygonatum pube Sedges (Carex rosea) ge (Carex pedunculata) ge (Carex blanda) h grass (Elymus hystrix) ge (Carex blanda) h grass (Elymus hystrix) ese (Parthenccissus spb.) eseberry (Ribes cynosbati) n (Zanthoxylum americanum) n (Zanthoxylum americanum)	nted bedstraw (Galium triflorum) d miterwort (Mitella diphylla) anemone ( <i>Enemion biternatum</i> ) illium ( <i>Trillium cernuum</i> ) s black snakeroot ( <i>Sanicula gregaria</i> ) mon's seal ( <i>Polygonatum pubescens</i> ) <b>Sedges</b> ( <i>Carex podunculata</i> ) ge ( <i>Carex podunculata</i> ) ge ( <i>Carex blanda</i> ) h grass ( <i>Elymus hystrix</i> ) ge ( <i>Carex blanda</i> ) h grass ( <i>Elymus hystrix</i> ) <b>es</b> ( <i>Parthenocissus spb.</i> ) ooseberry ( <i>Ribes cynosbati</i> ) rry ( <i>Prunus virginiana</i> ) n ( <i>Zanthoxylum americanum</i> ) n ( <i>Zanthoxylum americanum</i> )	nted bedstraw (Galium triflorum) d miterwort (Mitella diphylla) anemone ( <i>Enemicin biternatum</i> ) illium ( <i>Trillium cernuum</i> ) s black snakeroot ( <i>Sanicula gregaria</i> ) 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     oseberry (Purus virginiana)       58         ooseberry (Ribes missouriense)       31         31       31
Jack Hernie Public (Anseema inprintin)       59       Bounebuisting tass (c)musting tas (c)musting tass (c)musting tass (c)musting tass (c)mu	Cleavers (Galium aparine) Clayton's sweet cicely (Osmorhiza claytonii) Zigzag goldenrod (Solidago flexicaulis)	8088		Starry sedge (Carex rosea) Long-stalked sedge (Carex Bland sedge (Carex blanda	pedunculata) )				27 26
Lady ten (Abyrum filk/termina)       55       Virgina creeper (Parthenocisus spp.)         Common false Solomoris seal (Smilacina racemosa)       52       • Virgina creeper (Parthenocisus spp.)         Wild ginger (Asarum canadense)       52       • Strubs         Common enchanter's nightshade (Circaea lutetiana)       53       • Conseed (Menispermum canadense)         Maidenhair fern (Adiantum pedatum)       49       • Pickly gooseberry (Ribes cynosbati)         Vid dangen, (Anemone acuiliba)       47       • Pickly gooseberry (Ribes cynosbati)         Dubchman's breeches (Dicentra cucullaria)       45       • Pagoda dogwood (Cornus alternifolia)         Vite avens (Geurn canadense)       44       • Pagoda dogwood (Cornus alternifolia)         White avens (Geurn canadense)       44       • Pagoda dogwood (Cornus alternifolia)         White avens (Geurn canadense)       41       • Pickly ash (Zanthoxylum americanum)         Kidney-leaved buttercup (Ranunculus abortivus)       40       • Sugar maple       91       • • • • • • • • • • • • • • • • • • •	 Jack-in-the-pulpit (Arisaema triphyllum) Wood nettle (Laportea canadensis)	59	:.	Bottlebrush grass (Elymus ) Woody Vines	ystrix)				25
Common enchanter's nightshade ( <i>Circaea lutetiana</i> )       49       Prickly gooseberry ( <i>Ribes cynosbati</i> )         Sharp-lobed hepatica ( <i>Anemone acutiloba</i> )       47       Chokecherry ( <i>Prunus virginiana</i> )         Maidenhair fem ( <i>Adiantum pedatum</i> )       45       Prickly gooseberry ( <i>Prunus virginiana</i> )         Wood anemone ( <i>Anemone quinquefolia</i> )       45       Pagoda dogwood ( <i>Cornus alternifolia</i> )         Erect, Smooth, or Illinois carrion-flower'       44       Prickly ash ( <i>Zanthosxylum americanum</i> )         Dutchman's breeches ( <i>Dicentra cucullaria</i> )       44       Presky ash ( <i>Zanthosxylum americanum</i> )         White avere buttercup ( <i>Ranunculus abortivus</i> )       41       41       Press       Canopy       Super readense)         Kidney-leaved buttercup ( <i>Ranunculus abortivus</i> )       40       41       41       Press       Canopy       Super readense)         Stemless blue violets ( <i>Viola sororia and similar Viola spp.</i> )       36       41       41       41       5       41 <t< td=""><td> Lady fern (<i>Athyrium filix-femina</i>) Common false Solomon's seal (<i>Smilacina racemosa</i>) Wild ginger (<i>Asarum canadense</i>)</td><td>53 52</td><td>:</td><td>Virginia creeper (Parthenoc Canada moonseed (Menisy Shrubs</td><td>issus spp.) ermum canao</td><td>lense)</td><td></td><td></td><td>50 25</td></t<>	 Lady fern ( <i>Athyrium filix-femina</i> ) Common false Solomon's seal ( <i>Smilacina racemosa</i> ) Wild ginger ( <i>Asarum canadense</i> )	53 52	:	Virginia creeper (Parthenoc Canada moonseed (Menisy Shrubs	issus spp.) ermum canao	lense)			50 25
Maidenhair fern (Adiantum pedatum)       45       Pagoda dogwood (Cornus alternifolia)         Wood anemone (Anemone quinquefolia)       45       Pagoda dogwood (Cornus alternifolia)         Erect, Smooth, or Illinois carrion-flower*       45       Phickly ash (Zanthoxylum americanum)         Dutchman's breeches (Dicentra cucullaria)       44       Phickly ash (Zanthoxylum americanum)         Nutle avens (Geum canadense)       41       Prees       Canopy         Kidney-leaved buttercup (Ranunculus abortivus)       41       41       Prees       Canopy         Kidney-leaved buttercup (Ranunculus abortivus)       40       41       41       Prees       Canopy       Subra         Honewort (Cryptotaenia canadensis)       40       40       41	 Common enchanter's nightshade (Circaea lutetiana) Sharp-lobed hepatica (Anemone acutiloba)	49 47	• •	Prickly gooseberry (Ribes c Chokecherry (Prunus virgin	ynosbati) iana)				81 58
Erect, Smooth, or Illinois carrion-flower*       44       Missouri gooseberry ( <i>Ribes missouriense</i> )         Dutchman's breaches ( <i>Dicentra cucullaria</i> )       44       Red-berried elder ( <i>Sambucus racemosa</i> )         Rattlesnake fern ( <i>Batrychium virginianum</i> )       41       Red-berried elder ( <i>Sambucus racemosa</i> )         White avents ( <i>Geurn canadense</i> )       41 <b>Trees Canopy Subca</b> Kidney-leaved buttercup ( <i>Ranunculus abortivus</i> )       40       40       41 <b>Trees Canopy Subca</b> Kidney-leaved buttercup ( <i>Ranunculus abortivus</i> )       40       40       40       40       Sugar maple       91       •••••       87         Bule phlox ( <i>Chola scorria</i> and similar Viola spp.)       36       40       Basswood       90       •••       46         Bule phlox ( <i>Chola carademine concatenata</i> )       36       40       American elm       35       •••       20         White ovol iti ( <i>Cyrtoranium abidum</i> )       30       ••       American elm       35       •••       20         Red baneberty ( <i>Actaea rubra</i> )       30       ••       Bitternut hickory       25       ••       11       •         Touch-me-not ( <i>Impatiens</i> spp.)       28       Bitternut hickory       25       •       12	Maidenhair fern (Adiantum pedatum) Wood anemone (Anemone guinguefolia)	45 45	• •	Pagoda dogwood (Cornus - Prickly ash (Zanthoxylum a	lternifolia) nericanum)				45 31
Battlesnake fen (Botrychium virginianum)411TreesCanopySubsetWhite avens (Geum canadense)4141411 <t< td=""><td> Erect, Smooth, or Illinois carrion-flower* Dutchman's breeches (<i>Dicentra cucullaria</i>)</td><td>44 44</td><td>• •</td><td>Missouri gooseberry (Ribes Red-berried elder (Sambuc</td><td>missouriense us racemosa)</td><td>)</td><td></td><td></td><td>28 27</td></t<>	 Erect, Smooth, or Illinois carrion-flower* Dutchman's breeches ( <i>Dicentra cucullaria</i> )	44 44	• •	Missouri gooseberry (Ribes Red-berried elder (Sambuc	missouriense us racemosa)	)			28 27
Honewort (Cryptotaenia canadensis)40Sugar maple91••••87Stemless blue violets (Viola sororia and similar Viola spp.)38Basswood90•••46Blue phlox (Phlox divaricata)36Northem red oak55••46Cut-leaved toothwort (Cardamine concatenata)36Northem red oak55••20Wild geranium (Geranium maculatum)36American elm35••18White trout lily (Erythronium abidum)30••Ironwood35••18Lopseed (Phryma leptostachya)298Bitternut hickory25••31Touch-me-not (Impatiens spp.)286Bitternut hickory25•12Touch-me-not (Impatiens spp.)286Bitternut hickory25•12	 Rattlesnake fern ( <i>Botrychium virginianum</i> ) White avens ( <i>Geum canadense</i> ) Kidney-leaved buttercup ( <i>Ranunculus abortivus</i> )	40 41 41	• • •	Trees	Canopy freq% cove	r freq%	° . C	nopy cover	anopy Shrub cover freq%
Blue phlox (Phlox divaricata)       36       Northem red oak       55       ••         Cut-leaved toothwort (Cardamine concatenata)       36       Red elin       35       ••       20         Wild geranium (Geranium maculatum)       35       ••       Red elin       35       ••       18         White trout lily (Erythronium albidum)       30       ••       Ironwood       55       ••       18         Red baneberty (Actaea rubra)       30       ••       Ironwood       55       ••       18         Lopseed (Phryma leptostachya)       30       ••       Bitternut hickory       25       ••       31         Touch-me-not (Impatiens spp.)       28       •       Guesta ash       16       •       -	 Honewort (Cryptotaenia canadensis) Stemless blue violets (Viola sororia and similar Viola spp.)	40 38	• •	Sugar maple Basswood	91	• 87 46		. :	• 57 57
Cut-leaved toothwort ( <i>Gardamine concatenata</i> )     36     Het einin     30     20       Wild geranium ( <i>Geranium maculatum</i> )     35     American elm     35     4       White trout lily ( <i>Erythronium albidum</i> )     30     4     Ironwood     35     4       Red baneberry ( <i>Actaea rubra</i> )     30     4     Ironwood     35     4     67       Lopseed ( <i>Phryma leptostachya</i> )     29     Bitternut hickory     25     4     12       Touch-me-not ( <i>Inpatiens</i> spp.)     28     Green ash     16     4     -	Blue phlox (Phlox divaricata)	36	•	Northern red oak	អ ហ៊ី •	<b>.</b>		3.	37
White four lily (Erythronium albidum)     30     •••     Ironwood     35     •     67       Red baneberry (Actaea rubra)     30     ••     Bitternut hickory     25     ••     31       Lopseed (Phryma leptostachya)     29     •     Black ash     25     •     12       Touch-me-not (Impatiens spp.)     28     •     Green ash     16     •     -	 Cut-leaved toothwort (Cardamine concatenata) Wild geranium (Geranium maculatum)	35 G	. :	Red elm American elm	ය ය •	• 20		.:	• •
Hed Daneberry ( <i>Acraea rubra</i> )     30     Buternut incrvity     25     •     31       Lopseed ( <i>Phryma leptostachya</i> )     29     •     Black ash     25     •     12       Touch-me-ind ( <i>Impatiens</i> spp.)     28     •     Green ash     16     •     -       Touch-me-ind ( <i>Impatiens</i> spp.)     27     •     Black ash     16     •     -	White trout iliy (Erythronium albidum)	8 8 8		Ironwood Bittomut biology	ម្ភ សូ ខ្ល	67		: :	39 7
Touch-me-not (Impatiens spp.) 28  Green ash 16  Green ash	Red baneberry (Actaea rubra) Lopseed (Phryma leptostachya)	29 29	••	Bitternut hickory Black ash	25	• 31 12		.:	• 75 18
	Touch-me-not (Impatiens spp.)	28	• •	Green ash Blue beech	16	т, <b>ч</b>			· 28

\*Erect, Smooth, or Illinois carrion-flower (Smilax ecirrata, S. herbacea, or S. illinoensis)

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