

## Understory Plant Species Indicative of Recoverable Oak Savanna and Open Oak Woodland in Southern Wisconsin

The following list was developed to help conservationists identify savanna and open oak woodland remnants that have recently become closed-canopied forests due to lack of fire or other disturbances that control woody growth. The list consists of understory plants that require at least some direct sunlight each day in order to persist in a native plant community over a long time period. Thus the presence of these species in a closed-canopied forest indicates that the canopy has only recently closed in. Wooded sites containing these sufficient populations of these species have the highest potential for being recovered as savannas (10-50% canopy) and/or open oak woodlands (50-80% canopy), given appropriate management (i.e. prescribed fire, mechanical canopy thinning, etc.).

This list is for use in southern Wisconsin and in neighboring regions of southeastern Minnesota, northeastern Iowa and northern Illinois. It is a working list that will be updated as researchers gain more insight into each species' usefulness as an indicator of a recoverable savanna or open woodland.

This list consists of four species categories:

Category 1 species are considered the best indicators of former savannas/woodlands. These species tend to be strongly limited to partial canopy conditions. In more densely-wooded sites, these species are usually in a state of declining vigor due to the ever-increasing canopy closure above them. Their ability to persist in densely-wooded sites depends upon being near a canopy opening such as a woodlot edge, roadside, brushed utility corridor, etc.

Category 2 species are considered moderate indicators of former savannas and/or open woodlands. They are commonly found under partial canopies, but are also important components of either prairies or forests and are more common in prairies or forests than are category 1 species.

Category 3 species are considered marginal indicators of former savannas/woodlands. These species tend to have broad habitat amplitudes, and although they are often typically found in savannas/woodlands, they are just as likely or even more likely to be found in other plant communities.

Category 4 species are tentatively proposed as indicators of former savannas/woodlands. Due to our lack sufficient experience with these species, we chose to list them in a separate, tentative category. Further field investigations should help place these species in one of the above three categories.

This is a preliminary list. It is anticipated that in the future this list will be refined to segregate among species that are indicative of oak openings versus those indicative of oak barrens, or species indicative of savannas versus those indicative of woodlands. For now, it is hoped that this initial working list will be used by field investigators to identify previously unknown sites with savanna/woodland restoration potential.

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## Understory plant species indicative of recoverable oak savanna and open oak woodland in southern Wisconsin

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### Category 1 species - best indicators

|                                     |                           |                                 |                          |
|-------------------------------------|---------------------------|---------------------------------|--------------------------|
| <i>Agastache nepetoides</i>         | Yellow giant hyssop       | <i>Hieracium canadense</i>      | Canada hawkweed          |
| <i>Agastache scrophulariaefolia</i> | Purple giant hyssop       | <i>Hypoxis hirsuta</i>          | Yellow star-grass        |
| <i>Anemone virginiana</i>           | Tall anemone ✕            | <i>Krigia biflora</i>           | False dandelion          |
| <i>Asclepias purpurascens</i>       | Purple milkweed ✕         | <i>Lilium philadelphicum</i>    | Prairie lily             |
| <i>Aster linariifolius</i>          | Flax-leaved aster ✕       | <i>Lupinus perennis</i>         | Wild lupine              |
| <i>Astragalus canadensis</i>        | Canadian milkvetch ✕      | <i>Lysimachia lanceolata</i>    | Lance-leaved loosestrife |
| <i>Aureolaria grandiflora</i>       | Yellow false foxglove ✕   | <i>Lysimachia quadrifolia</i>   | Whorled loosestrife      |
| <i>Aureolaria pedicularia</i>       | Clammy false foxglove     | <i>Oenothera perennis</i>       | Small sundrops           |
| <i>Baptisia leucantha</i>           | White wild indigo         | <i>Oxalis violacea</i>          | Violet wood-sorrel       |
| <i>Baptisia leucophaea</i>          | Cream wild indigo ✕       | <i>Pedicularis canadensis</i>   | Wood betony              |
| <i>Besseyia bullii</i>              | Kitten tails              | <i>Penstemon gracilis</i>       | Slender beard-tongue     |
| <i>Blephilia ciliata</i>            | Ohio horse-mint           | <i>Phlox pilosa</i>             | Prairie phlox            |
| <i>Bromus kalmii</i>                | Prairie brome ✕           | <i>Polemonium reptans</i>       | Jacob's ladder           |
| <i>Cacalia atriplicifolia</i>       | Pale Indian plantain      | <i>Polygala senega</i>          | Seneca snakeroot         |
| <i>Cacalia muhlenbergii</i>         | Great Indian plantain     | <i>Polytaenia nutallii</i>      | Prairie parsley          |
| <i>Camassia scilloides</i>          | Wild hyacinth             | <i>Prenanthes alba</i>          | Lion's foot              |
| <i>Castilleja coccinea</i>          | Indian paintbrush ✕       | <i>Ranunculus fascicularis</i>  | Early buttercup          |
| <i>Ceanothus americana</i>          | New Jersey tea            | <i>Ranunculus rhomboides</i>    | Prairie buttercup        |
| <i>Ceanothus ovatus</i>             | Prairie redroot           | <i>Silene stellata</i>          | Starry campion           |
| <i>Cirsium altissimum</i>           | Woodland thistle          | <i>Solidago hispida</i>         | Hairy goldenrod          |
| <i>Convolvulus spithameus</i>       | Low bindweed              | <i>Taenidia integerrima</i>     | Yellow pimpemel          |
| <i>Cypripedium pubescens</i>        | Large yellow lady-slipper | <i>Tephrosia virginiana</i>     | Goat's rue               |
| <i>Desmodium canadense</i>          | Showy tick-trefoil ✕      | <i>Thaspium trifoliatum</i>     | Meadow parsnip           |
| <i>Dodecatheon meadia</i>           | Shooting star ✕           | <i>Tomanthera auriculata</i>    | Eared false foxglove     |
| <i>Elymus villosus</i>              | Silky wild rye            | <i>Triosteum aurantiacum</i>    | Late horse gentian       |
| <i>Elymus virginicus</i>            | Virginia wild rye ✕       | <i>Triosteum peroliatum</i>     | Early horse gentian      |
| <i>Erigeron pulchellus</i>          | Robin's plantain ✕        | <i>Veronicastrum virginicum</i> | Culver's root            |
| <i>Eupatorium sessilifolium</i>     | Woodland boneset ✕        | <i>Zigadenus elegans</i>        | White camas              |
| <i>Gentiana alba</i>                | Cream gentian ✕           | <i>Zizia aurea</i>              | Golden Alexander         |
| <i>Heuchera americana</i>           | Prairie alum-root         |                                 |                          |

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### Category 2 species - moderate indicators

|                                 |                        |                                  |                            |
|---------------------------------|------------------------|----------------------------------|----------------------------|
| <i>Allium cernuum</i>           | Nodding wild onion     | <i>Gentiana puberulenta</i>      | Downy gentian              |
| <i>Amorpha canescens</i>        | Lead-plant             | <i>Gentianella quinquefolia</i>  | Stiff gentian              |
| <i>Andropogon gerardi</i>       | Big bluestem           | <i>Geum triflorum</i>            | Prairie smoke              |
| <i>Andropogon scoparius</i>     | Little bluestem        | <i>Helianthemum bicknellii</i>   | Rockrose                   |
| <i>Anemone cylindrica</i>       | Thimbleweed            | <i>Helianthemum canadense</i>    | Common rockrose            |
| <i>Anemone patens</i>           | Pasque flower          | <i>Helianthus laetiflorus</i>    | Prairie sunflower          |
| <i>Anemone quinquefolia</i>     | Wood anemone           | <i>Helianthus occidentalis</i>   | Western sunflower          |
| <i>Anemonella thalictroides</i> | Rue anemone            | <i>Heliopsis helianthoides</i>   | False sunflower            |
| <i>Arenaria lateriflora</i>     | Wood sandwort          | <i>Hieracium scabrum</i>         | Rough hawkweed             |
| <i>Asclepias anplexicaulis</i>  | Sand milkweed          | <i>Hystrix patula</i>            | Bottlebrush grass          |
| <i>Asclepias exaltata</i>       | Poke milkweed          | <i>Lathyrus venosus</i>          | Woodland pea               |
| <i>Asclepias tuberosa</i>       | Butterfly weed         | <i>Leersia virginica</i>         | White grass                |
| <i>Asclepias viridiflora</i>    | Short green milkweed   | <i>Liatris cylindracea</i>       | Cylindrical blazing star   |
| <i>Aster azureus</i>            | Sky-blue aster         | <i>Liatris ligulistylis</i>      | Showy blazing star         |
| <i>Aster laevis</i>             | Smooth blue aster      | <i>Lithospermum canescens</i>    | Hoary puccoon              |
| <i>Aster sericeus</i>           | Silky aster            | <i>Lithospermum caroliniense</i> | Hairy puccoon              |
| <i>Aster shortii</i>            | Short's aster          | <i>Lithospermum incisum</i>      | Fringed puccoon            |
| <i>Bouteloua curtipendula</i>   | Side oats grama        | <i>Lobelia spicata</i>           | Pale spiked lobelia        |
| <i>Bouteloua hirsuta</i>        | Hairy gramma grass     | <i>Luzula multiflora</i>         | Common wood-rush           |
| <i>Bromus ciliatus</i>          | Fringed brome          | <i>Orobanche uniflora</i>        | One-flowered broom-rape    |
| <i>Cacalia suaveolens</i>       | Sweet Indian plantain  | <i>Panicum latifolium</i>        | Broad-leaved panic-grass   |
| <i>Callirhoe triangulata</i>    | Clustered poppy mallow | <i>Panicum linearifolium</i>     | Slender-leaved panic-grass |
| <i>Carex brevior</i>            | a sedge                | <i>Penstemon pallidus</i>        | Pale beard-tongue          |
| <i>Cassia fasciculata</i>       | Partridge pea          | <i>Petalostemum candidum</i>     | White prairie clover       |
| <i>Comandra umbellata</i>       | False toadflax         | <i>Potentilla arguta</i>         | Prairie cinquefoil         |
| <i>Coreopsis palmata</i>        | Prairie tickseed       | <i>Pycnanthemum virginianum</i>  | Common mountain mint       |
| <i>Desmodium cuspidatum</i>     | Bracted tick-trefoil   | <i>Solidago nemoralis</i>        | Old-field goldenrod        |
| <i>Eupatorium purpureum</i>     | Purple joe-pye weed    | <i>Solidago speciosa</i>         | Showy goldenrod            |
| <i>Euphorbia corollata</i>      | Flowering spurge       | <i>Sorghastrum nutans</i>        | Indian grass               |
| <i>Galium boreale</i>           | Northern bedstraw      | <i>Sporobolus heterolepis</i>    | Prairie dropseed           |
| <i>Galium circaezans</i>        | Wild licorice          | <i>Viola pedatifida</i>          | Prairie violet             |

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### Category 3 species - associate spp./weak indicators

|                                  |                        |   |                             |
|----------------------------------|------------------------|---|-----------------------------|
| <i>Actaea pachypoda</i>          | White baneberry        | <i>Lysimachia quadriflora</i>             | Narrow-leaved loosestrife   |
| <i>Agrimonia gryposepala</i>     | Tall agrimony          | <i>Oryzopsis racemosa</i>                 | Black-seeded ricegrass      |
| <i>Agropyron trachycaulium</i>   | Slender wheatgrass     | <i>Panicum oligosanthos scribnerianum</i> | Few-flowered panic-grass    |
| <i>Amphicarpa bracteata</i>      | Hog peanut             | <i>Panicum lanuginosum implicatum</i>     | Hairy panic-grass           |
| <i>Apocynum androsaemifolium</i> | Spreading dogbane      | <i>Panicum leibergii</i>                  | Prairie panic-grass         |
| <i>Apocynum cannabinum</i>       | Indian hemp            | <i>Petalostemum purpureum</i>             | Purple prairie clover       |
| <i>Brachyelytrum erectum</i>     | Long-awned wood grass  | <i>Polygala sanguinea</i>                 | Field milkwort              |
| <i>Galium concinnum</i>          | Shining bedstraw       | <i>Ratibida pinnata</i>                   | Yellow coneflower           |
| <i>Helianthus hirsutus</i>       | Oblong sunflower       | <i>Rudbeckia hirta</i>                    | Black-eyed Susan            |
| <i>Helianthus strumosus</i>      | Pale-leaved sunflower  | <i>Sisyrinchium campestre</i>             | Prairie blue-eyed grass     |
| <i>Hieracium longipilum</i>      | Hairy hawkweed         | <i>Smilacina stellata</i>                 | Starry false Solomon's seal |
| <i>Koeleria cristata</i>         | June grass             | <i>Solidago juncea</i>                    | Early goldenrod             |
| <i>Kuhnia eupatorioides</i>      | False boneset          | <i>Solidago rigida</i>                    | Stiff goldenrod             |
| <i>Lathyrus ochroleucus</i>      | Pale pea               | <i>Solidago ulmifolia</i>                 | Elm-leaved goldenrod        |
| <i>Lechea intermedia</i>         | Intermediate pinweed   | <i>Tradescatia ohioensis</i>              | Common spiderwort           |
| <i>Lechea tenuifolia</i>         | Slender-leaved pinweed | <i>Uvularia grandiflora</i>               | Bellwort                    |
| <i>Liatris aspera</i>            | Rough blazing star     | <i>Viola pedata</i>                       | Bird's foot violet          |
| <i>Liatris pycnostachya</i>      | Prairie blazing star   |   |                             |

### Category 4 species - proposed indicator

|                                 |                         |                                    |                     |
|---------------------------------|-------------------------|------------------------------------|---------------------|
| <i>Agrostis perennans</i>       | Autumn bentgrass        | <i>Lespedeza violacea</i>          | Violet bush clover  |
| <i>Asplenium platyneuron</i>    | Ebony spleenwort        | <i>Lespedeza virginica</i>         | Slender bush clover |
| <i>Bromus purgans</i>           | Woodland brome          | <i>Polygala verticillata</i>       | Whorled milkwort    |
| <i>Carex rigosperma</i>         | a sedge                 | <i>Silene antirrhina</i>           | Sleepy catchfly     |
| <i>Corallorhiza odontorhiza</i> | Late coral-root         | <i>Symphoricarpos occidentalis</i> | Wolfberry           |
| <i>Desmodium canescens</i>      | a tick-trefoil          | <i>Trillium recurvatum</i>         | Red trillium        |
| <i>Helianthus decapetalus</i>   | Pale sunflower          | <i>Vicia americana</i>             | American vetch      |
| <i>Lactuca floridana</i>        | Woodland blue lettuce   | <i>Vicia caroliniana</i>           | Wood vetch          |
| <i>Lactuca ludoviciana</i>      | Western prairie lettuce |                                    |                     |

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