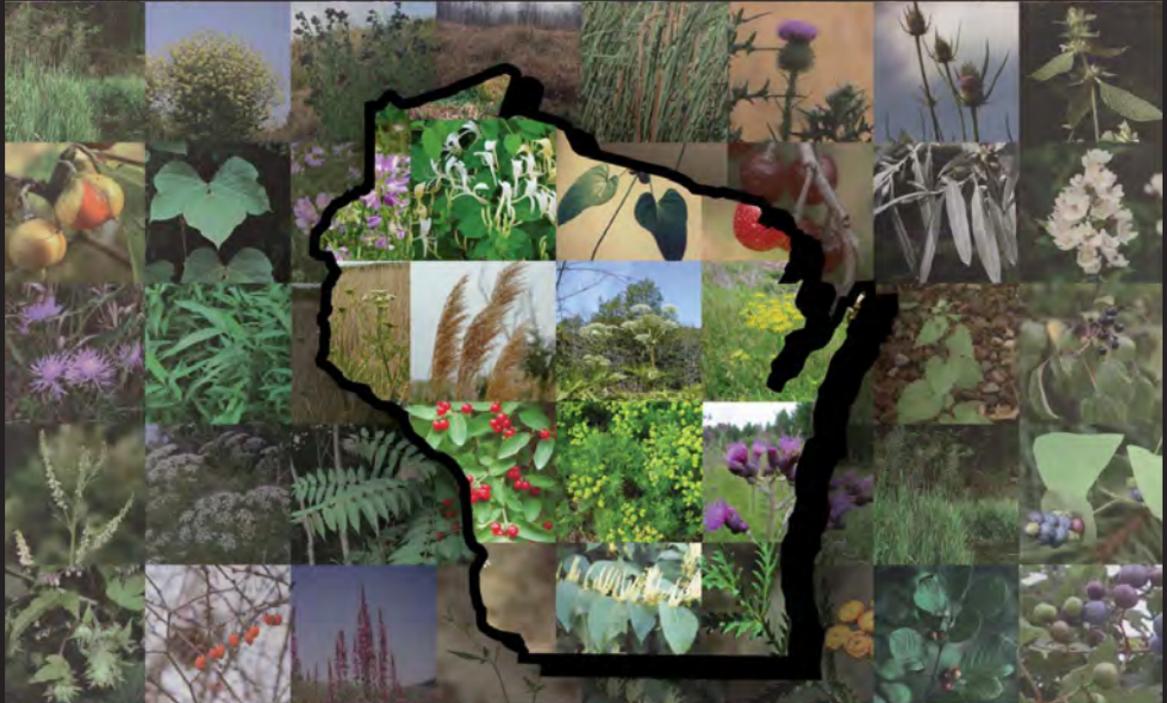


A FIELD GUIDE TO INVASIVE PLANTS IN WISCONSIN



Edited by: Thomas Boos, Kelly Kearns, Art Kitchen, Courtney LeClair,
Brendon Panke, Bryn Scriver, Patricia Trochlell, Bernadette Williams, & Brock Woods

This guide was adapted from *A Field Guide to Invasive Plants of the Midwest* by the Midwest Invasive Plant Network (MIPN) and from *Minnesota Invasive Non-Native Terrestrial Plants: an Identification Guide for Natural Resource Managers* by the Minnesota DNR.

Additional editing and assistance was provided by Jerry Doll, Mark Renz, Rick Schulte, and Olivia Witthun.

Illustrations by Bernadette Williams. Design and layout by Dylan Dettmann, Luke Mich, and Bonnie Reichert.

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Prohibited=P	Restricted=R	Prohibited/Restricted=P/R	Not Regulated=N

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Prohibited=P

Restricted=R

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Prohibited/Restricted=P/R

Not Regulated=N

Introduction to the Field Guide

There has long been a need for a photographic field guide providing basic information on the major terrestrial invasive plants in Wisconsin. With the development of the Wisconsin Invasive Species Identification, Classification and Control Rule – NR 40, Wisconsin has, for the first time, a legal list of invasive species including 60 plants that are featured in this guide. Also featured in this guide are some species that are not regulated under NR 40 as of September 2009 for various reasons. They were included because they have been observed to be invasive in parts of Wisconsin or in other regions of the U.S. that are similar to Wisconsin.

The bulk of this guide is made up of photos and text to describe species, including characteristics to aid in identification; characteristics to tell the invasive species apart from look-alike species, and limited control information.

To supplement the control information we have provided Appendix B which has an overview of control methods, a list of herbicides referenced in the text, guidance for prioritizing control work, suggested timing of controls for select species, and suggested mowing times for select species.

Appendix A contains additional species regulated by NR 40 with photos that are helpful for identification, but no text, as they are not as likely to be found by most users of this guide. These species are either not yet known in the state or are known to be in very restricted areas. If you suspect you have found one of these species, please report them to the Wisconsin Department of Natural Resources (WDNR) as instructed on page 2.

NR 40 Invasive Species Identification, Classification and Control Rule

To assist with minimizing the introduction and spread of invasive species in Wisconsin, the state legislature authorized the WDNR to develop a comprehensive invasive species program and rule to identify, classify, and control invasive species. The rule became effective September 2009. It establishes a science-based assessment and classification system designed to help WDNR staff and others prioritize their actions regarding invasive species. The purpose is to be more efficient and cost-effective by ensuring that energy and resources are spent on those species and populations with the greatest likelihood of harm and the greatest opportunity for control. The rule provides flexibility allowing citizens, businesses, and governments to continue operations without undue restrictions.

The rule establishes two legal categories—"prohibited" and "restricted." For each species there is a map indicating how and where the species is regulated.

Prohibited species ("P") (red maps) are not currently found in Wisconsin, with the exception of small pioneer stands. They may not be transported, possessed, transferred (including sale), or introduced. The goal is to contain prohibited species wherever they may be found in the state.

Reporting prohibited species: When prohibited species are found, the WDNR should be contacted immediately at 608-267-5066 or at invasive.species@wi.gov. For reporting instructions go to <http://dnr.wi.gov>, search "Reporting Invasive Species." On the web page choose Terrestrial, Wetland, or Aquatic for your particular species and follow instructions. Verifying species accurately is crucial, and submitting a specimen or detailed photographs (digital preferred) is necessary.

Restricted species (“R”) (orange maps) are already established in the state. They may not be transported, transferred (including sale), or introduced. If they are already on your property, you are encouraged, but not required, to remove them.

Reporting restricted species: Use instructions on the web page above for reporting these Terrestrial, Wetland, or Aquatic species.

Some species are split-listed (“P/R”). A split-listed species is prohibited in areas of the state where it is not known to be established and restricted in areas where it is known to be established. The maps for these species show where in Wisconsin each species is prohibited (red) or restricted (orange). Report split-listed species where prohibited.

People should take reasonable precautions to minimize the spread of regulated (ie. prohibited and restricted) species, such as following Best Management Practices for invasive species (see page 5). If reasonable precautions are taken, incidental or unknowing transport, transfer, or introduction may not be considered a violation of NR 40. Some activities, such as possession or transport for identification, disposal, control, education and research may be allowed, though permits are often required. For more information, call WDNR or search “Invasives Rule” on the WDNR website, where you’ll find up-to-date NR 40 details.

Some species that are not regulated (“N”) (white maps) as of September 2009 were included in this guide because they have been observed to be invasive in parts of Wisconsin or other regions of the U.S. that are similar to Wisconsin. It would be helpful to report those species not yet found in Wisconsin, though it is not necessary to report widespread species; control is encouraged but not required. Check the WDNR “Invasives” web page for current status of unregulated species.

Mile-a-minute *Polygonum perfoliatum* (*Persicaria perfoliata*)



Mile-a-minute *Polygonum perfoliatum* (*Persicaria perfoliata*)



P

Mile-a-minute is an herbaceous, fast-growing, climbing, annual vine. At the time of printing, there are no known populations in Wisconsin.

Leaves: Alternate, light-green leaves in the shape of an equilateral triangle grow on trailing, reddish stems up to 25' long. Small, downward-pointing barbs are on the underside of the leaves and stem, along with circular, cup-shaped, leafy bracts called ocreas (see photo) that grow at the base of each leaf stalk.

Flowers: Inconspicuous, closed, self-pollinating, white flowers are borne on short racemes that emerge from the center of each ocrea. Blooms late spring.

Fruits & seeds: Metallic-blue, 0.2" diameter, berry-like fruits develop June-October on short, terminal clusters along the stem. Seeds are viable up to 3 years.

Ecological threats:

- It colonizes damp, open woodlands, wet meadows, stream banks and roadsides in the northeast and mid-Atlantic states.
- It climbs over native vegetation to form a thick canopy of leaves that reduces sunlight to the plants below.
- Seeds are readily dispersed by birds, ants, small mammals and by water. Seeds can float, producing new infestations throughout a watershed.
- Mile-a-minute is a threat to reforestation efforts and forest regeneration.

Control:

- Manual/Mechanical: Wearing gloves and protective clothing, hand-pull whole plants (including roots) before seed development. Bag or burn plant material after air-drying.
- Chemical: Foliar spray with a pre-emergent chemical to kill new seedlings in the spring. Shift to a post-emergent chemical, such as glyphosate or triclopyr, to treat missed plants later in the season. Monitor and re-treat areas April-July in subsequent years until the seed bank is exhausted.

Flowering rush *Butomus umbellatus*



Flowering rush *Butomus umbellatus*



P

Flowering rush is a perennial wetland and aquatic herb that forms dense stands along lake shores and stream corridors.

Leaves: Emergent leaves are stiff, narrow, triangular in cross-section and 1-5' tall, rising up to 3' above the waterline. In deep water, the plant produces submerged leaves that are flexible and limp (see photo).

Flowers: Terminal umbels appear on tall stems. Each whitish-pink flower is 0.75-1" wide, has dark red veins and is made up of 3 petals and 3 sepals on a short, 2-3" flower stalk. Blooms July-September.

Fruits & seeds: Flowers mature in late summer to form capsules containing three or more seeds. Most plants in the Great Lakes region produce infertile seeds.

Roots: The fibrous root system produces multiple underground rhizomes and small, pea-sized bulblets (see photo). These readily detach from the root system to develop into new plants. This is the primary mechanism of reproduction, often spreading due to disturbance.

Similar species: There are many native species that look similar to flowering rush when not in bloom. Easiest to identify when flowering.

Ecological threats:

- Flowering rush forms dense vegetative stands along lakeshores, streams and in wetlands. It prefers shallow, slow-moving water that fluctuates seasonally from mudflat to over 6' of depth.
- It can escape from water gardens.
- It potentially threatens economically and culturally important species, such as wild rice.

Control:

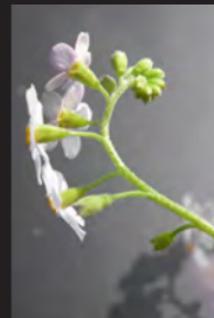
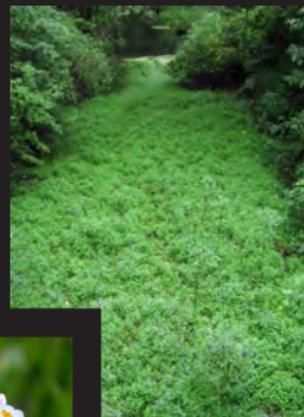
- Manual/Mechanical: Hand-pull or dig small infestations, making sure to remove and bag all root fragments and bulblets. Follow-up and monitor for several years to treat any residual growth.
- Chemical: Foliar spray an aquatic formulated, non-selective herbicide and surfactant with a sticker agent to improve absorption. Difficult to keep herbicide on narrow leaves.

Forget-me-not, woodland *Myosotis sylvatica*
Forget-me-not, marsh *Myosotis scorpioides*

Woodland Forget-Me-Not



Marsh Forget-Me-Not



Forget-me-not, woodland *Myosotis sylvatica*

Forget-me-not, marsh *Myosotis scorpioides*



N

Both forget-me-not species are herbaceous perennials, 6-24" in height with fuzzy stems. *M. scorpioides* is found in large mats in and along streams and wetlands, growing low to the ground and spreading by above-ground stolons. *M. sylvatica* grows more erect and is typically found in rich, shaded woodlands.

Leaves: Both have alternate, evergreen leaves that are oblong, 1-3" long, and stalkless.

Flowers: Forget-me-nots have terminal, branched clusters of blue, pink or white, 5-petaled, flat flowers, often with a yellow eye. *M. sylvatica* has long calyx lobes; *M. scorpioides* has short calyx lobes. *M. sylvatica* blooms in late spring to early summer while *M. scorpioides* blooms in mid-summer.

Fruits & seeds: Both form numerous small, angled nutlets that contain the seeds, in mid-to-late summer. The brown to black seeds are smooth, shiny and oblong. Seed production is high.

Similar species: The rare native, *M. laxa*, can be distinguished by its upright form and aquatic habitat.

Ecological threats:

- Both species spread readily by seed and form monocultures that can exclude native groundcover species.
- *M. scorpioides* is potentially more invasive in Wisconsin due to its more widespread geographic distribution and its tendency to establish in wetland and stream corridors.

Control:

- **Manual/Mechanical:** Hand-pull or dig, removing all plant parts.
- **Chemical:** Foliar spray *M. sylvatica* using a 0.5% solution of glyphosate plus surfactant in July-October. Several years of additional control and monitoring will be required.

Garden valerian *Valeriana officinalis*



Garden valerian *Valeriana officinalis*



N

Garden valerian is an herbaceous, perennial herb growing 2-4' tall, in a variety of open habitats. Stout, green to reddish, hollow stems are finely ribbed and hairy, especially at the nodes. It has long been cultivated for its ornamental and medicinal use.

Leaves: Up to 8" long, opposite, and pinnately-divided into 11-21 lance-shaped leaflets. Leaves are sharply toothed and have short leaf stalks or are stalkless. Most leaves grow at the base of the stem.

Flowers: Fragrant, tiny, white turning to pink flowers are borne in large, branched, umbel-shaped clusters. Blooms May-August.

Fruits & seeds: Seeds are 0.2" long, smooth with feathery hairs that aid in wind dispersal.

Roots: Shallow, fibrous root system with many short, tuberous rhizomes.

Ecological threats:

- It escapes from gardens and grows in wet meadows, grasslands, open woodlands and roadsides; and can tolerate both wet and dry soils.
- It typically establishes in disturbed sites, but is capable of moving into adjacent natural areas, displacing native plants.
- Reproduction by seeds, stolons and rhizomes allows it to form dense colonies.

Control:

- Manual/Mechanical: Mow or dig prior to seed set, being sure to remove roots, rhizomes, and rosettes of immature plants.
- Chemical: Foliar spray using herbicides such as glyphosate, triclopyr, and 2,4-D.

Hairy willow herb *Epilobium hirsutum*



Hairy willow herb *Epilobium hirsutum*

P/R



Hairy willow herb is a 3-6' tall, perennial herb with fine, soft hairs covering the entire plant. Stems are tall and branching, producing axillary buds at the base that elongate into creeping stolons. Grows in open, moist habitats.

Leaves: Opposite and stalkless, with sharply-toothed edges and a prominent central vein. They are oblong-lance shaped, 2-5" long and widest below the mid-point.

Flowers: Numerous, 0.75" wide, rose-colored flowers arise from the leaf axils. Each flower has 4 notched petals, 4 sepals and a white four-lobed stigma (see photo) rising above the bloom. Blooms mid-late summer.

Fruits & seeds: Fruit is a 2-3" long, tubular capsule, containing many small, oblong, flattened seeds, each with a tuft of silky white hairs that aids in wind dispersal.

Roots: Large root system with branching rhizomes that grow up to 2' long.

Similar species: Native fireweed (*Epilobium angustifolium*) can be distinguished from hairy

willow herb by its alternate leaves and multiple stalked flowers arranged into a terminal raceme.

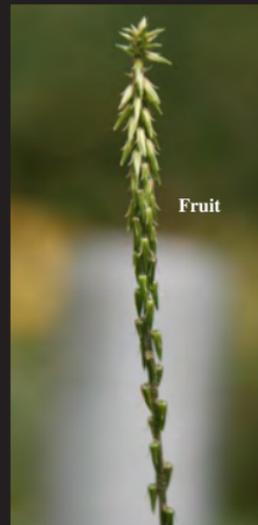
Ecological threats:

- Hairy willow herb forms dense, monotypic stands that can be found in open riparian areas along streams, ditch banks, wetlands and moist waste places.
- Infestations of this plant have been documented in undisturbed wet prairies and other natural areas, the seed easily spreading by wind, water or transport by humans or animals.

Control:

- Manual/Mechanical: Hand pull or dig, removing all plant parts. Mowing within 3 weeks of flowering can effectively eliminate annual seed production. Avoid control activities once seed has matured.
- Chemical: Foliar spray a broad-spectrum herbicide that is able to translocate into the roots and rhizomes, such as glyphosate or imazapyr.

Japanese chaff flower *Achyranthes japonica*



Japanese chaff flower *Achyranthes japonica*



Japanese chaff flower is an upright, branching, perennial forb that grows in dense patches in moist areas. The slightly hairy, 2-5' stems dry to a straw color and persist in the fall and winter, aiding in identification. At the time of publication, there are no known populations occurring in Wisconsin.

Leaves: Dark-green, opposite, entire and ovate with prominent veins.

Flowers: Small, dull-green flowers lack petals and occur on short terminal spikes that elongate as they age. Lateral flower spikes often form alongside the terminal spike. Blooms late summer.

Fruits & seeds: Downward-flexing seeds develop in early fall. Each seed has 2 stiff, arching bracts that help it to remain on the stalk into winter. Seeds mature in late fall with high production and viability.

Similar species: Native lop-seed (*Phryma leptostachya*) has similar fruit but is shorter, less dense and has toothed leaf edges.

Ecological threats:

- Japanese chaff flower invades lowlands and riparian areas along streams and ditches, facilitating spread downstream through aquatic transport of seed.
- It also invades trails, roadsides and field edges. Seeds can be transported readily on fur or clothes.
- The dense, vigorous growth form and extensive root system give this plant a competitive advantage over native species.
- It is capable of producing 16,000 seeds per square meter.

Control:

- **Manual/Mechanical:** Hand-pull small populations of newly established plants.
- **Chemical:** Foliar spray before or at the onset of flowering, using either glyphosate or triclopyr at a 2% solution. Spraying after seed set is not as effective and risks spreading the seed on shoes and clothing. Several years of additional control and monitoring will be required.

Jewelweed, ornamental *Impatiens glandulifera*
Jewelweed, Balfour's *Impatiens balfourii*

Ornamental jewelweed



Balfour's jewelweed



Jewelweed, ornamental *Impatiens glandulifera*

Jewelweed, Balfour's *Impatiens balfourii*



N

Both jewelweed species are upright, branching annuals that grow in moist areas. Stems of both species are fleshy and succulent, often tinged with red. Balfour's jewelweed grows to a height of 2-3'. The taller, ornamental jewelweed, also known as policeman's helmet, grows 4-6' in height.

Leaves: Both have simple, lance-ovate, toothed leaves with prominent leaf veins. *I. balfourii* leaves are alternate and *I. glandulifera* leaves are opposite or whorled on more robust stems.

Flowers: Both *Impatiens* have singular pink, white or lavender flowers with fused petals and a terminal spur. Flowers hang like a pendant from a long stalk. The terminal spur in *I. balfourii* is long and tapered, while in *I. glandulifera* it is abrupt and recurved. Blooms late spring through summer.

Fruits & seeds: Similar to our native *Impatiens*, the stubby, 0.5-2" long, pencil-shaped seed pods develop in late summer and mature in the fall. Brown, dried pods spring open at the slightest touch, releasing numerous black, oval seeds. Both species self-seed freely, producing up to

800 seeds per plant. Seeds can remain viable for up to 3 years.

Similar species: The native *Impatiens* species have orange to yellow flowers, alternate leaves and can reach 2-6' in height.

Ecological threats:

- *I. glandulifera* prefers moist, riparian stream banks and wetlands. Its robust growth can shade out native, understory vegetation.
- *I. glandulifera* is able to reproduce asexually from stem fragments as well as by seed, allowing it to spread rapidly through a watershed.
- *I. balfourii* spreads rapidly in moist, shady areas.
- Both species have been planted as ornamentals and have naturalized in Wisconsin.

Control:

- Manual/Mechanical: Hand-pull plants, being careful to remove all plant parts.
- Chemical: Foliar spray with a 2% aquatic formulated glyphosate solution. Several years of additional control and monitoring will be required.

Lesser celandine *Ranunculus ficaria*



Lesser celandine *Ranunculus ficaria*



N

Lesser celandine, also known as fig buttercup, is a 4-12" tall, herbaceous perennial of moist areas. It forms dense patches at the ground layer in late winter through spring. The plant dies back to the ground in June. This species is unrelated to greater celandine (*Chelidonium majus*).

Leaves: Small, waxy, shiny, kidney to heart-shaped leaves with short stalks emerge from a basal rosette in early spring before canopy trees leaf out.

Flowers: Numerous, 1" wide, bright yellow, glossy flowers are borne singly on delicate stalks. The showy flowers have 8-12 petals arrayed around a central disk. Blooms early April.

Fruits & seeds: Small, whitish bulbils form in the stem axils of each plant (see photo). These bulbils readily detach from the stem to develop into new plants, often some distance away. Up to 70 seeds per flower mature in June.

Roots: Finger-like tubers branch from fibrous roots. They often become detached due to disturbance.

Similar species: Native marsh marigold (*Caltha palustris*) grows 8-24" tall, has larger leaves and upright stems. It's found in wetter areas than lesser celandine.

Ecological threats:

- Lesser celandine invades mesic to wet woodlands. Occasionally it is found in sandy upland areas in full to partial sunlight, and disturbed areas where it out-competes native spring ephemerals.
- It easily spreads by above-ground bulbils, below-ground tubers and seed.
- It can readily escape from gardens.
- It is poisonous to livestock and humans.

Control:

- **Manual/Mechanical:** Hand-dig individual plants with a trowel, being careful to remove all bulbils and tubers. Mechanical control is not recommended.
- **Chemical:** Foliar spray systemic herbicides, such as glyphosate, in early spring when plants are actively growing. Monitor site in subsequent years for residual control.

Moneywort *Lysimachia nummularia*



Moneywort *Lysimachia nummularia*



N

Moneywort, also called “creeping Jenny”, is a low-growing, herbaceous perennial of moist areas. Smooth, trailing stems can rapidly grow up to 2' long, branching and overlapping to form an extensive mat. Adventitious roots commonly form at the leaf nodes and anchor the stem to the soil surface. Herbivores generally avoid this plant due to its bitter-tasting foliage.

Leaves: Round to ovate, penny-sized leaves occur in pairs.

Flowers: Numerous, 1” wide, upturned, 5-petaled, yellow flowers grow in the leaf axils. Blooms late spring-early summer.

Fruits & seeds: The fruit consists of a 0.5” long, egg-shaped, 5-chambered capsule that encloses many small seeds. Seeds are often infertile and are not persistent in the soil.

Ecological threats:

- Moneywort invades open riparian areas, shorelines, floodplains and moist to mesic, partially-shaded woodlands. It can form extensive ground layer vegetative mats.
- Moneywort can outcompete native herbaceous plants by climbing over and shading them out.
- Stem fragments have the ability to root and start new populations. Aquatic transport can spread populations downstream.
- It can easily escape from gardens into the natural environment where it can spread quickly.

Control:

- Manual/Mechanical: Hand-dig, bag and remove all plant parts for small infestations.
- Chemical: Foliar spray with an aquatic formulated herbicide with residual control, like imazapyr. Several years of additional control and monitoring will be required.

Seaside goldenrod *Solidago sempervirens*



Seaside goldenrod *Solidago sempervirens*



Seaside goldenrod is a 2-8' tall, perennial, herbaceous forb native to coastal habitats associated with saline soils or areas subject to salt spray. Stems are smooth to slightly hairy.

Leaves: Abundant, succulent, waxy, lance-shaped, dark-green leaves are entire and alternate. Large, strap-like basal leaves are up to 20" long.

Flowers: Large, yellow flower clusters form a pyramidal inflorescence. Flowers mature from the top down. Blooms August-November.

Fruits & seeds: Seaside goldenrod is a prolific seeder. Small, brownish seeds have fine, white feathery hairs that aid in wind dispersal.

Roots: Woody root crowns emerge from a shallow, fibrous root system.

Similar species: The key features to help identify seaside goldenrod from other native goldenrods are the large basal leaves; abundant, succulent stem leaves; and pyramidal inflorescence.

Ecological threats:

- Wind-blown seeds are the primary dispersal mechanism. Seaside goldenrod is also capable of reproducing asexually through root division and stem fragments.
- This species has a competitive advantage in dry to wet, open habitats with a high level of salt in the soil, such as roadsides.

Control:

- Manual/Mechanical: Mow in the summer months to prevent seed formation. Dig individual plants to eliminate small infestations.
- Chemical: Foliar spray using an herbicide containing the active ingredient picloram. Several years of additional control and monitoring will be required.

Watercress *Nasturtium officinale*



Watercress *Nasturtium officinale*



N

Watercress is an aquatic, perennial herb that grows in cold, nutrient-rich, flowing water. It grows in full sun to partial shade, and is typically associated with springs or groundwater seeps. The 4-18" tall, erect or spreading plants float in a tangled mat at the water surface. The smooth, branching stems are able to produce roots at the nodes that help anchor the plant. The plant is edible and also eaten by wildlife.

Leaves: Alternate, evergreen leaves grow throughout the winter. They are pinnately divided into 3-11 stalkless, ovate to lance-shaped leaflets. The terminal leaflet is longer than the other leaflets.

Flowers: Numerous, white, 4-parted flowers are arranged in a terminal raceme on individual flower stalks that rise above the leaves. The flowers are 0.2" wide. Blooms May-October.

Fruits & seeds: Long, thin seed pods are produced in mid-summer and contain 2 rows of seeds. The small, orange seeds are egg-shaped to spherical.

Roots: Rhizomatous root network.

Ecological threats:

- Watercress impacts cold-water streams by producing a vegetative mat that covers areas of open water, reduces stream flow and alters aquatic habitat.
- Plant fragments reproduce vegetatively, allowing new infestations to develop some distance away from a source population.

Control:

- **Manual/Mechanical:** Hand-pull, rake, or mechanically remove plants. Dispose of the material in a location away from surface water. Repeat removal, working downstream from headwater infestations.
- **Chemical:** Foliar spray with an aquatic formulation of glyphosate herbicide and surfactant. Watercress is difficult to control with herbicides in fast-moving water.

Yellow iris *Iris pseudacorus*



Yellow iris *Iris pseudacorus*



Yellow iris is a 2-4' tall, herbaceous perennial found along shorelines throughout Wisconsin.

Leaves: Broad, sword-like, up to 4' long, pointed and erect. Also 1-1.5" wide with a raised central ridge on each side. Leaves and shoots grow from the root base or rhizome buds.

Flowers: Multiple, 3" wide, yellow to cream-colored flowers are borne on thick stems. The flower consists of 3 showy sepals, 3 flattened styles, and 3 short, erect petals that are much smaller than the sepals or styles. Blooms April-June.

Fruits & seeds: The fruit is a 3-4" long, cylindrical capsule, enclosing several rows of D-shaped, flattened seeds. Seeds are released from late summer to winter when the capsule dries and splits open.

Roots: Mats of fibrous roots and pink-fleshed, densely crowded rhizomes spread laterally in the soil, forming dense, monotypic clumps.

Similar species: Native *Iris* species can be differentiated by the blue to purple color of the bloom.

Ecological threats:

- Yellow iris invades wetlands, ditches and along shorelines of lakes and streams, often in water up to 10" deep.
- Yellow iris spreads by rhizomes and seeds. Seeds are buoyant and readily disperse downstream to form new plants.
- This species can escape from water gardens.
- It is not used as a food source by wildlife, as all parts of the plant are poisonous.

Control:

- **Manual/Mechanical:** Hand-dig small populations, removing the entire rhizome root system. Clip and remove seed pods to prevent offsite movement of seeds.
- **Chemical:** Foliar spray using an aquatic formulated broad-spectrum herbicide, like glyphosate. Several years of additional control and monitoring will be required.

Giant reed *Arundo donax*



Giant reed *Arundo donax*



Giant reed is a perennial, clump-forming, rhizomatous grass growing 9-30' tall in open, upland to lowland areas. Stems are smooth and hollow between joints. At the time of publication, there are no known naturalized populations occurring in Wisconsin.

Leaves: 12-30" long, 1-2" wide, tapered to a sharp point, and alternate on the stem in a distinct 2-ranked pattern (see photo). Leaf sheaths have a membranous ligule and a wide base that clasps the stem.

Flowers: Terminal, plume-like, cream-colored panicles of whorled, stalked flowers. Flower heads are feathery and up to 3' long. Blooms July-September.

Fruits & seeds: Each seed has long hairs. It is believed that all plants in North America are sterile.

Roots: Branching, knotty, tuberous rhizomes develop on fibrous roots, forming a thick mat. Rhizomes can grow as deep as 4-6' and can resprout after disturbance.

Similar species: Common reed, *Phragmites australis*, grows 3-20' tall. Leaves are not 2-ranked and have a ligule with a fringe of hairs.

Ecological threats:

- It invades wetlands, riparian floodplains, and stream banks; forms monotypic stands that crowd out native plants and alters wildlife habitat.
- It spreads by rhizome or stem fragments.
- It modifies local ecosystems by increasing fire frequency and intensity, lowering water tables, and blocking or impeding stream flow.
- Cultivars developed for ornamental use increase the risk of escape into natural areas.

Control:

- Manual/Mechanical: Remove stems and rhizomes to reduce small populations.
- Chemical: Foliar spray with 1.5-4.0% glyphosate solution July-October (post-flowering and pre-dormancy); or 3-5% solution of imazapyr in late spring. In sensitive areas, bundle stems with twine, cut and treat with a solution of 50-100% glyphosate.

Appendix D - Addendum

Aquatic Invasive Plants Regulated by NR 40

The invasive species rule (NR 40) lists aquatic as well as terrestrial and wetland invasive plants. Although this guide focuses on terrestrial and wetland invasive plants, here we provide a list of regulated aquatic invasives for reference. Additional information on these species can be found at <http://dnr.wi.gov>, search “Invasives Rule.”

Australian swamp crop (*Crassula helmsii*) - P

Brazilian waterweed (*Egeria densa*) - P

Brittle waterlily (*Najas minor*) - P

Curly-leaf pondweed (*Potamogeton crispus*) - R

Eurasian water milfoil (*Myriophyllum spicatum*) - R

European frog-bit (*Hydrocharis morsus-ranae*) - P

Fanwort (*Cabomba caroliniana*) - P

Hydrilla (*Hydrilla verticillata*) - P

Oxygen-weed, African elodea (*Lagarosiphon major*) - P

Parrot feather (*Myriophyllum aquaticum*) - P

Water chestnut (*Trapa natans*) - P

Yellow floating heart (*Nymphoides peltata*) - P

Pesticide Use Permits for Invasive Aquatic and Wetland Plants

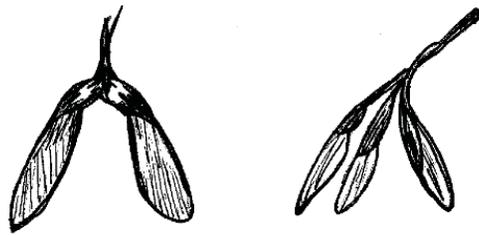
In many cases, permits are required for chemical control of aquatic or wetland plants. If you intend to apply herbicides to plants in a wet area including, but not limited to, marshes, creeks, streams, lakes or ponds, you should contact an Aquatic Plant Management (APM) coordinator. The goal of the APM permit program is to ensure that a balanced aquatic plant community is a component of healthy aquatic ecosystems. WDNR allows chemical management in a manner consistent with sound ecosystem management to minimize the loss of the ecological values in the waterbody. WDNR is also authorized by the US Environmental Protection Agency to issue a WPDES permit if chemicals applied in waters might spread beyond the proposed treatment area or remain in the water after the treatment period.

For more information about aquatic plant management, go to WDNR’s website and search “aquatic plants.” For information about pesticide permits for controlling aquatic invasive plants, search “aquatic pesticides.”

Addendum Photo Credits

Flowering rush: Emmett Judziewicz, UW-Stevens Point Herbarium (flowers); Antique Botanical Prints From Panteek, www.Panteek.com (illustration); Gary Fewless, UW-Green Bay Herbarium (leaf section); Ben Legler (roots); Peter Dziuk, MN Dept. of Agriculture (fruit); MN DNR (submerged leaves); **Forget-me-nots:** Ben

Legler, King County Noxious Weed Control Program, Seattle, WA (*M. scorpioides* flower); Merel R. Black, UW-SP Herbarium (*M. sylvatica* habit, flower); Leslie J. Mehrhoff, U. of Connecticut, Bugwood.org (*M. scorpioides* infestation); Tom Heutte, USDA Forest Service, Bugwood.org (*M. scorpioides*, flower); **Garden valerian:** Leslie J. Mehrhoff, University of Connecticut, Bugwood.org (plant, foliage); Emmet J. Judziewicz, UW-SP Herbarium (flower); Antique Botanical Prints from Panteek, www.Panteek.com (illustration); Steve C. Garske, Great Lakes Indian Fish & Wildlife Commission (infestation); **Giant reed:** James H. Miller, U.S. Forest Service, Bugwood.org (leaves); Steve Hurst, USDA-NRCS Plants Database (seeds); Larry Allain, USGS National Wetlands Research Center, Lafayette, LA (plant & seedhead); R.A.Howard Image Collection, courtesy of Smithsonian Institution (landscape); **Hairy willow herb:** Eleanor Saulys (flowers & leaves); J.K. Lindsey, 2008 (infestation); Jeff Delonge, Wikipedia Creative Commons, CC BY-SA 3.0 (shoreline); Antique Botanical Prints from Panteek, www.panteek.com (illustration); Leslie J. Mehrhoff, U. of Connecticut, Bugwood.org (fruit & seeds); **Japanese chaff flower:** Chris Evans, River to River Cooperative Weed Management Area (all); **Jewelweeds:** Michael Shephard, USDA Forest Service, Bugwood.org (*I. glandulifera* stem); Jan Samanek, State Phytosanitary Administration, Bugwood.org (*I. glandulifera* shoreline); Paul E. Barry, UW-SP (*I. balfourii* flower); Kelly Kearns, WDNR (*I. balfourii* plant); R.A. Howard Image Collection, Courtesy of Smithsonian Institution (*I. balfourii* stem & leaves); www.lauriecambell.com (*I. glandulifera* infestation, flower); **Lesser celandine:** Ramin Nakisa, Wikipedia Commons, en.wikipedia.org (flower & leaves); Phil Gates, Cabinetofcuriosities-greenfingers.blogspot.com (tubers); Leslie J. Mehrhoff, U. of Connecticut, Bugwood.org (patch); Rosser1954 Roger Griffith, Wikipedia Commons, en.wikipedia.org (infestation); Brock Woods, UW-Extension (bulbils); **Mile-a-minute:** Leslie J. Mehrhoff, U. of Connecticut, Bugwood.org (infestation, fruit & leaves); John Randall, TNC (vine); Todd I. Mervosh, Connecticut Agricultural Experiment Station (fruit & barbed stem); **Moneywort:** Leslie J. Mehrhoff, U. of Connecticut, Bugwood.org (flowers & leaves); David G. Smith, delawarewildflowers.org (plant); Panteek Antique Prints, www.panteek.com (illustration); Christopher Noll, UW-SP Herbarium (habit); **Seaside goldenrod:** Lawrence A. Leitner, Southeastern Wisconsin Regional Planning Commission (infestation, plant); Steve Hurst, USDA-NRCS Plants Database (seed); Bransford, W.D., Lady Bird Johnson Wildflower Center (flower & leaves); **Watercress:** Christopher Noll, UW-SP Herbarium (flowers & leaves); Kenneth Sytsma, UW-SP Herbarium (flowering); Leslie J. Mehrhoff, U. of Connecticut, Bugwood.org (infestation); 2009 Zoya Akulova, <http://Calphotos.berkeley.edu> (pods & seeds); **Yellow iris:** Joseph M. DiTomaso, University of California-Davis, Bugwood.org (shoreline, fruit capsules); Leslie J. Mehrhoff, U. of Connecticut, Bugwood.org (roots & rhizomes); Paul Drobott, UW-SP Herbarium (leaves & flowers); Steven C. Garske, GLIFWC (flower).



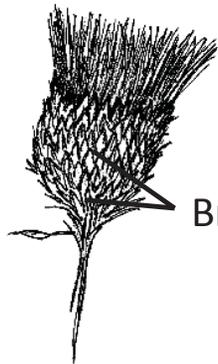
Samaras



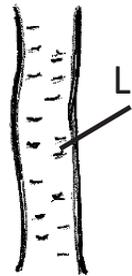
Ovate leaf shape

Leaf base clasp stem

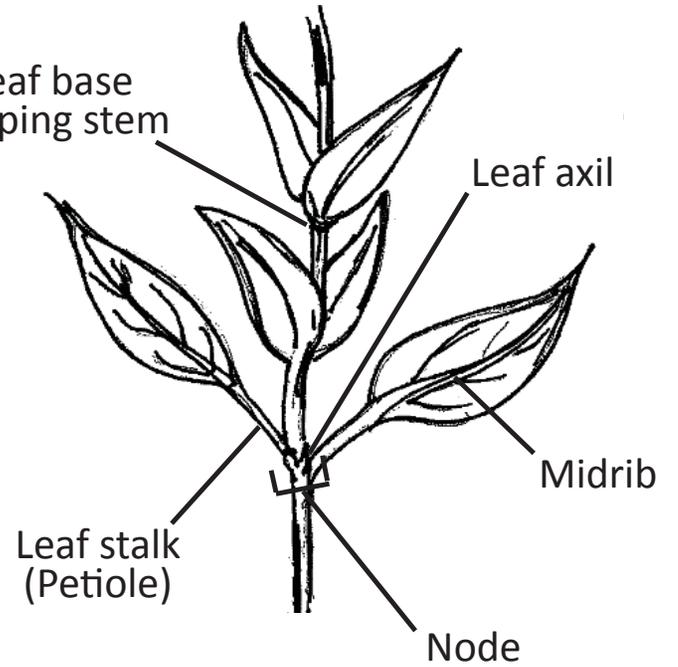
Leaf axil



Bracts



Lenticel

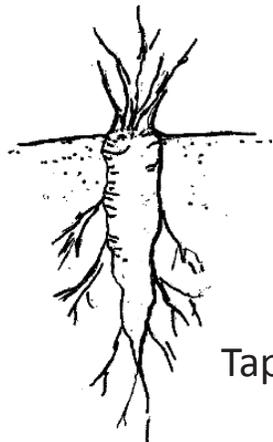


Leaf stalk (Petiole)

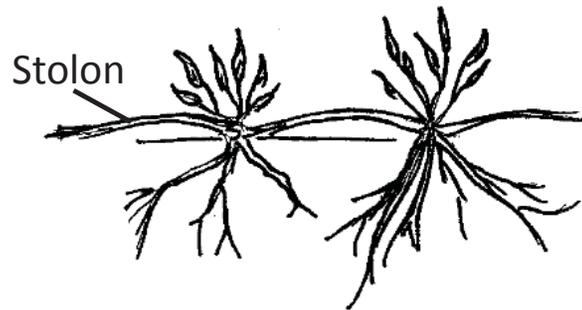
Midrib

Node

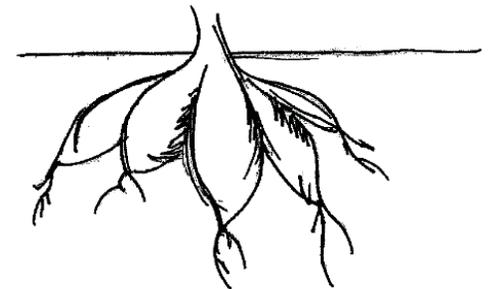
Root systems



Taproot



Fibrous root



Tuberous root

A Field Guide to Invasive Plants in Wisconsin, Wisconsin DNR, 2012



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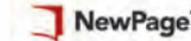
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Wisconsin Department of Natural Resources
Box 7921
Madison, WI 53707-7921

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