



Invasive Species Manual

Environmental Resilience Department, City of Goshen



Japanese Knotweed Photo by By G10ck/shutterstock

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Current and upcoming invasive species

The following is a list of invasive species that have been found on the property of the City of Goshen or that have been deemed as a potential threat to property in the city. This list is not exhaustive but does encompass a majority of the invasive species that may be seen in forests, along roadsides, or in backyards in Goshen. The table denotes if the species is regulated in Indiana or in Goshen. For reference, the **Terrestrial Plant Rule**, which is Indiana Code 312 IAC 18-3-25, designates 44 species of plants as invasive pests and makes it illegal to sell, gift, barter, exchange, distribute, transport, or introduce these plants in the State of Indiana. Additionally, with the exception of butterfly bush, all of the species in this table have been designated as invasive by the **Indiana Invasive Species Council**, which was created by the legislature and is housed at Purdue Entomology.

Common Name	Scientific Name	Type	Regulation In Indiana ¹	Invasive Rank
Asiatic Bittersweet	<i>Celastrus orbiculatus</i>	Vine	Prohibited Invasive Terrestrial Plant (PITP) per [312 IAC 18-3-25]	High
Autumn Olive	<i>Elaeagnus umbellata</i>	Shrub	PITP per [312 IAC 18-3-25]	High
Black Jetbead	<i>Rhodotypos scandens</i>	Shrub	-----	Medium
Bush Honeysuckle	<i>Lonicera periclymenum</i>	Shrub	PITP per [312 IAC 18-3-25]	High
Butterfly Bush	<i>Buddleja davidii</i>	Shrub	-----	
Callery Pear	<i>Pyrus calleryana</i>	Tree	-----	High
Common Privet	<i>Ligustrum vulgare</i>	Shrub	-----	Caution
Dame's Rocket	<i>Hesperis matronalis</i>	Noxious Weed	PITP per [312 IAC 18-3-25]	High
Garlic Mustard	<i>Alliaria petiolata</i>	Noxious Weed	PITP per [312 IAC 18-3-25]	High
Japanese knotweed	<i>Reynoutria japonica</i>	Shrub	PITP per [312 IAC 18-3-25]	High
Norway Maple	<i>Acer platanoides</i>	Tree	-----	High
Mugwort	<i>Artemisia vulgaris</i>	Noxious Weed	PITP per [312 IAC 18-3-25]	High
Multiflora Rose	<i>Rosa multiflora</i>	Shrub	Prohibited per [312 IAC 18-3-13]	High

¹ Natural Resources Commission, Prohibited invasive terrestrial plants.

Common Name	Scientific Name	Type	Regulation In Indiana ¹	Invasive Rank
Phragmites/Common Reed	<i>Phragmites australis</i>	Noxious Weed	PITP per [312 IAC 18-3-25]	High
Poison Hemlock	<i>Conium maculatum</i>	Noxious Weed	PITP per [312 IAC 18-3-25]	High
Purple Loosestrife	<i>Lythrum salicaria</i>	Noxious Weed	Prohibited per [312 IAC 18-3-13]	High
Reed Canarygrass	<i>Phalaris arundinacea</i>	Noxious Weed	PITP per [312 IAC 18-3-25]	High
Siberian Elm	<i>Ulmus Pumila</i>	Tree	-----	Medium
Teasel	<i>Dipsacus</i>	Noxious Weed	PITP per [312 IAC 18-3-25]	High
Tree of Heaven	<i>Ailanthus altissima</i>	Tree	PITP per [312 IAC 18-3-25]	High
Winged Burning Bush	<i>Euonymus alatus</i>	Shrub	-----	Medium
Winter Creeper	<i>Euonymus fortunei</i>	Vine	PITP per [312 IAC 18-3-25]	High

Overview of Invasive Species and its Regulation

As defined by Clinton’s Executive Order 13112, which also established the National Invasive Species Council², an invasive species is “a non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic harm, environmental harm, or harm to human health.”³ Prior to Order 13112, Jimmy Carter signed Executive Order 11987, which require[d] Federal agencies to “restrict the introduction of exotic species”⁴ but didn’t have any regulatory authority and didn’t list specific species.

In 2009, the Indiana Invasive Species Council (IISC) was created by the state legislature in response to a proposal from a task force that investigated invasive threats in Indiana⁵. The task force needed a Council to communicate and coordinate between state agencies and stakeholders.⁶ The IISC has no regulatory function, a role generally held by the Indiana Department of National Resources (DNR); rather, it focuses on outreach, education, and advocacy. After its creation, the IISC appointed an Invasive Plant Advisory Council. Their first action was to compile an evidence-based list of the current and upcoming invasive plants in Indiana, which the IISC adopted as the official list of Indiana. The IISC’s invasive species list can only be used to educate or inform other regulatory agencies; it does not regulate species.

On April 28th, 2019, the Terrestrial Plant Rule was added to the Indiana code under 312 IAC 18-3-25. This Rule includes a list of invasive species to be regulated under Indiana law. On April 18, 2020, the rule became fully enforceable, banning the ability to “sell, gift, barter, exchange, distribute, transport, or introduce” any species listed under 312 IAC 18-3-25. Several other species, including aquatic ones, are also regulated or prohibited under a different Indiana Code.

Non-native and invasive species are prevalent in Indiana, with 25% of species in Indiana growing outside cultivation being nonnative, though only a portion of those are invasive.⁷ According to the EPA, the “Ten Percent Rule” states that only 10% of nonnative species survive being released into a foreign ecosystem, and of those 10%, only 10% become invasive. This means that of the hundreds of non-native plants released in the US, only about 0.01% have become invasive.

While non-native plants don’t always help native wildlife, they don’t harm the ecosystem they’re in. If they do cause harm, they become classified as an invasive species. Many invasive species in the US have come from Asia or Europe through the nursery trade⁸ because of their

² Clinton, Invasive Species.

³ Clinton.

⁴ Carter, Executive Order 11987: Exotic Organisms.

⁵ “Indiana Council Begins Fight against Invasive Plants.”

⁶ Indiana Invasive Species Task Force, “At the Crossroads – Invasive Species in Indiana.”

⁷ Indiana Native Plant Society, “What’s an Invasive Plant?”

⁸ USDA, “Invasive Plants in Indiana.”



beauty, and subsequently, many nurseries still sell invasive plants. These plants take over forest space, displacing native plants and making it harder for native wildlife to find food and natural habitat.⁹ Disregarding the ecological impacts of invasive plants, many invasives have economic and health impacts as well. Studies have estimated that invasive species cost the US around \$26¹⁰ billion per year in costs associated with control efforts and losses from effects on “property values, agricultural productivity, public utility operations, native fisheries, tourism, and outdoor recreation.”

In 2024, in partnership with the US Fish & Wildlife Service. The City of Goshen is removing invasives on two parcels at Millrace Park. These parcels have had invasive removal efforts for years, but they could not be eradicated with volunteer resources. A private contractor is being paid \$32,500 to focus on removing these species over a 2-year period.

The efforts in Goshen have also prioritized addressing stormwater basins that are overrun with phragmites. These invasive plants can dominate basins, accumulating sediment at the bottom, which reduces water storage capacity and displaces native vegetation essential for water infiltration. Consequently, treating stormwater basins is a critical priority in invasive species removal initiatives.

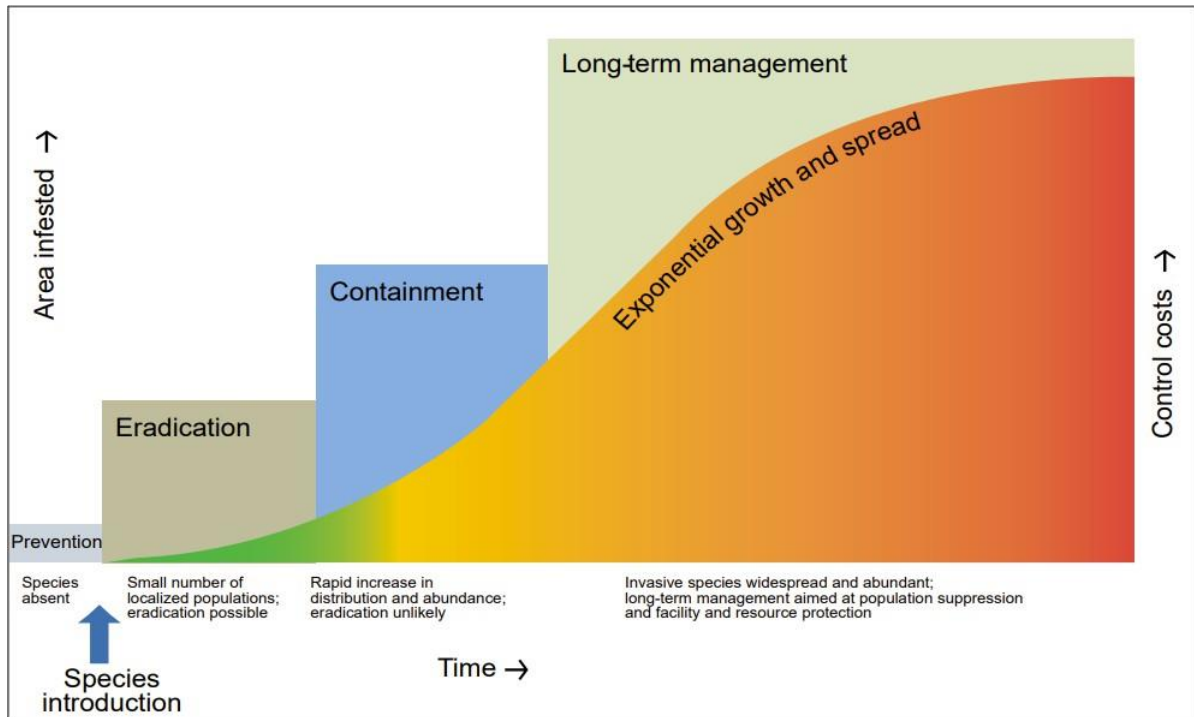
To address the challenges posed by invasive species, it is crucial to take a proactive approach to manage them so that we can protect native ecosystems, safeguard biodiversity, and reduce the economic and health impacts associated with invasive species. Continued vigilance and collaboration at local, state, and federal levels will be essential in mitigating invasive species' threat and ensuring our natural resources' sustainability.

⁹ Indiana Native Plant Society, “What’s an Invasive Plant?”

¹⁰ Crystal-Ornelas, Hudgins, and Cuthbert, “Economic Costs of Biological Invasions within North America.”



The following figure shows the different types of invasive management and their relative costs.



(United States Department of the Interior Invasive Species Strategic Plan)

InSPEC

The Invasive Species Partnership of Elkhart County is a grassroots invasive species management group that was established in 2024. InSPEC, along with other Cooperative Invasive Species Management Areas (CISMAs), are groups that organize invasive species removal events, raise awareness of invasive species, and promote conservation in their communities.

In the fall of 2023, an Americorps member serving with the City of Goshen learned of the concept of CISMAs at the Indiana Trails Gathering. Realizing there was no CISMA in Elkhart County, as a part of her AmeriCorps service, she contacted stakeholders to gauge interest in the county. The following January, 45 community members attended a call-out meeting, and since then, they have incorporated into InSPEC, an official CISMA. Currently, 49 counties in Indiana are represented by a CISMA with the recent addition of InSPEC, Elkhart County's CISMA.

To learn more about the organization, email cismaINSPEC@gmail.com or follow the Facebook Page at facebook.com/INSPEC.info.

Helpful Apps:

- EDDMapS
- PlantNet
- Seek



CONTACT

EMAIL:

cismaINSPEC@gmail.com

FACEBOOK:

Facebook.com/INSPEC.info

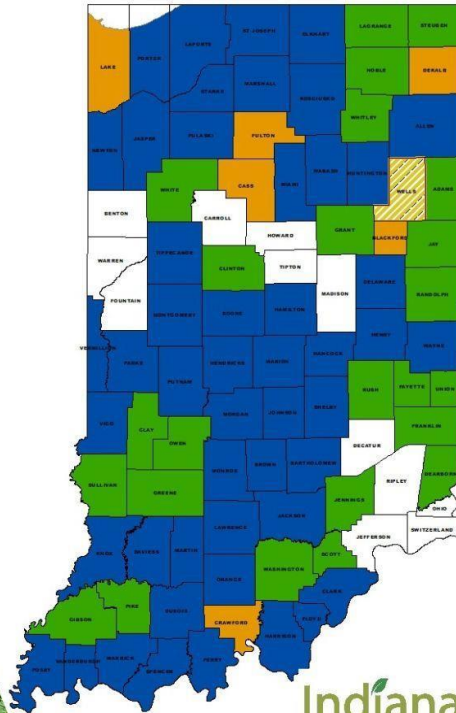


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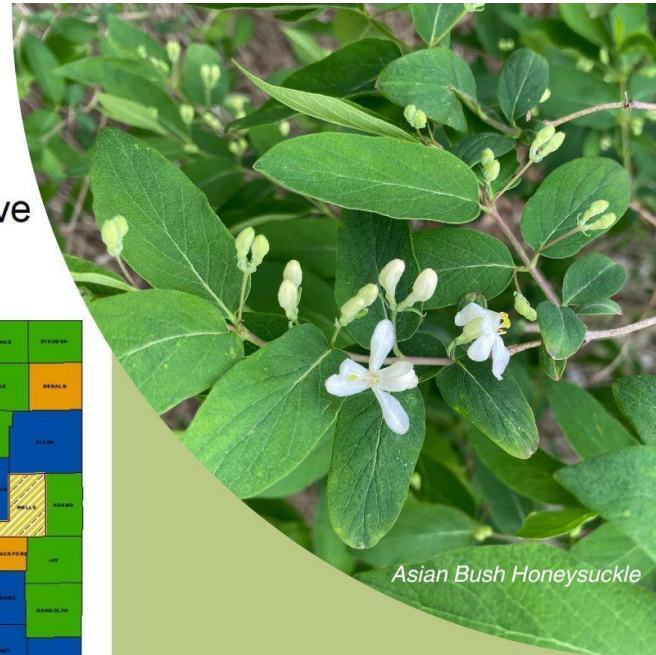


Poison Hemlock

Indiana Invasives Initiative CISMA Status Map



Indiana Invasives Initiative
 Legend
 Formed and Active
 Organizing
 Limited Territory CISMA
 Future
 N
 sncim



Asian Bush Honeysuckle

Invasive Species Partnership of Elkhart County (InSPEC)

"Removing invasives, restoring healthy habitats."



Bradford/Callery Pear

WHAT IS AN INVASIVE SPECIES?

An invasive species is an organism that is **not native** and whose introduction harms the **economy**, the **environment**, or **human health**.



ABOUT INSPEC

InSPEC's mission is to foster healthy habitats in Elkhart County by reducing non-native invasive species through education, removal, and native restoration.

🌱 InSPEC is a CISMA made up of members from four different parks departments, multiple non-profits, and many passionate private citizens.

We hope you'll consider joining!

WHAT IS A CISMA?

(Cooperative Invasive Species Management Area)

- 🌱 A CISMA is a grassroots invasive species management group.
- 🌱 These groups organize invasive removal and educational events to promote conservation and communication throughout their counties.



Control Methods¹¹

1. Cultural Methods

Cultural control methods are those associated with changing human behavior to “increase the mortality of invasives or reduce its rate of damage.” Selecting pest-resistant crops, changing planting times, prescribed burning, prescribed grazing, or introducing signage that tells people to brush their shoes off before they move from one ecosystem to the next.

2. Manual Methods

Manual methods reference the destruction of species by hand, including hand-pulling, digging, flooding, and mulching.

3. Mechanical Methods

Mechanical methods include mowing, hoeing, tilling, and chopping using tools/machines to remove/collect/transport species.

4. Biological Methods

Biological methods use natural enemies to control and prey on the problematic population. This can be done by releasing insects, mites, or pathogens that only affect the invasive species.

5. Chemical Methods

Chemical methods refer to the use of pesticides, herbicides, fungicides, and insecticides to spray and control invasive species. Per the Office of Indiana State Chemist, no licensure is required for “not for hire” companies using General Use Pesticides (GUP). A pesticide applicator license is required if using Restricted Use Pesticides (RUP) or working for hire. Attached is the [Indiana list of RUPs as of March 2023](#). An example of a GUP is glyphosate.

¹¹ National Invasive Species Information Center, “Control Mechanisms.”



Definitions

Native – A species that is living in its natural environment where it evolved through natural processes.

Non-native – A species that was introduced to and is growing outside of its natural range through human intervention.

Invasive – A non-native species that causes economic harm, environmental harm, or harm to human health.

Basal bark treatment – Spraying herbicide in a band around the bark of a tree smaller than 6 inches in diameter.

Stump-cut treatment – Cutting the above-ground woody material of the invasive plant and then treating the wound with herbicide.

Window cut – Cutting woody material (like a vine) at the ground and again at chest height to separate the two cut ends.

Girdle – Using a chainsaw or a handsaw, cut two parallel, horizontal grooves all the way around the trunk of a tree and remove the bark in between the two cuts.

Foliar spray – A chemical spray application that covers the leaves of a plant.

Surfactant – Surfactants are used in herbicide formulas to increase efficacy for waxy leaves. The surfactant reduces the surface tension of water, which decreases the chances of the herbicide beading and dripping off the leaf.

Alternate leaves – At each node (where the leaf meets the stem) there is only one leaf and the nodes and leaves alternate along the stem.

Opposite leaves – A pair of leaves that grow on the same node on opposite sides of the stem.

Simple leaves – Only one leaf structure comes from each bud.

Compound leaves – Each bud gives way to a leaf that is split into multiple leaflets.

Glyphosate -- A non-selective and general-use pesticide, which means that it will kill most things, and no license is required to apply it. It can be bought in concentrations from 1% to upwards of 50%. Lower concentrations are generally used for foliar sprays and high concentrations for stump treatments.

Triclopyr – An herbicide that affects woody plants, shrubs, and forbs but has little to no effect on grasses. It can stay in the soil for about a month.

Imazapyr – A non-selective herbicide that is only legally allowed to be applied by licensed applicators (restricted use pesticide). The chemical can kill trees from 30 feet away and stay in the soil for over a year. This should only be used for complete infestations.



Treatment Calendar

Below is a calendar to aid in the treatment of these species. For each species, the calendar shows the recommended control methods and recommended window of treatment, that is for Asiatic Bittersweet, it is recommended to window cut at some point from April to November. Refer to the individual species pages for more details on each treatment.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Asiatic Bittersweet				Window cut	Window cut	Window cut	Window cut	Window cut	Window cut	Window cut	Window cut	
							Foliar spray	Foliar spray	Foliar spray			
Autumn Olive							Cut stump treatment	Cut stump treatment	Cut stump treatment			
Black Jetbead						Foliar spray	Foliar spray	Foliar spray	Foliar spray			
						Cut stump treatment	Cut stump treatment	Cut stump treatment	Cut stump treatment	Cut stump treatment	Cut stump treatment	Cut stump treatment
Bush Honey-suckle	Cut stump treatment	Cut stump treatment				Foliar spray	Foliar spray	Foliar spray	Foliar spray			
						Cut stump treatment	Cut stump treatment	Cut stump treatment	Cut stump treatment	Cut stump treatment	Cut stump treatment	Cut stump treatment
Butterfly Bush				Hand pull	Hand pull	Hand pull	Hand pull	Hand pull	Hand pull	Hand pull	Hand pull	
						Cut stump treatment	Cut stump treatment	Cut stump treatment	Cut stump treatment	Cut stump treatment	Cut stump treatment	
Callery Pear							Cut stump treatment	Cut stump treatment	Cut stump treatment	Cut stump treatment	Cut stump treatment	
							Girdle tree	Girdle tree	Girdle tree	Girdle tree	Girdle tree	

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Common Privet	Cut stump treatment	Cut stump treatment				Foliar spray Cut stump treatment	Foliar spray Cut stump treatment	Foliar spray Cut stump treatment	Foliar spray Cut stump treatment	Cut stump treatment	Cut stump treatment	Cut stump treatment
Dame's Rocket			Hand pull Foliar spray	Hand pull Foliar spray	Hand pull Foliar spray	Hand pull Foliar spray				Foliar spray	Foliar spray	
Garlic Mustard			Foliar spray Hand pull	Foliar spray Hand pull	Foliar spray Hand pull				Foliar spray	Foliar spray	Foliar spray	
Japanese Knotweed					Cut stems	Cut stems Foliar spray regrowth	Foliar spray regrowth	Foliar spray regrowth	Foliar spray regrowth	Foliar spray regrowth		
Mugwort			Hand pull Foliar spray	Hand pull Foliar spray	Hand pull Foliar spray	Mow Foliar spray	Mow			Foliar spray	Foliar spray	
Multi-Flora Rose	Cut stump treatment	Cut stump treatment		Cut back	Cut back		Foliar spray	Foliar spray			Cut stump treatment	Cut stump treatment
Norway Maple					Girdle tree	Girdle tree	Girdle tree	Girdle tree	Stump cut	Stump cut	Stump cut	

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Phragmites/ Common Reed						Cut back Herbicide	Cut back Herbicide	Cut back Herbicide	Cut back Herbicide	Cut back Herbicide		
Poison Hemlock			Foliar spray Mowing	Foliar spray Mowing	Foliar spray	Foliar spray			Foliar spray	Foliar spray	Foliar spray	
Purple Loosestrife							Hand pulling Foliar spray	Hand pulling Foliar spray	Hand pulling Foliar spray			
Reed Canary grass				Foliar spray	Foliar spray	Mow			Mow	Foliar spray Mow		
Siberian Elm			Girdle	Girdle	Girdle	Hack and squirt	Hack and squirt	Hack and squirt	Hack and squirt	Hack and squirt	Hack and squirt	
Teasel			Foliar spray rosettes	Foliar spray rosettes Cut down flowering plants	Foliar spray rosettes Cut down flowering plants	Cut down flowering plants						

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Tree of Heaven	Cutting post-treatment	Cutting post-treatment	Cutting post-treatment	Cutting post-treatment			Foliar spray Stem treatment	Foliar spray Stem treatment	Foliar spray Stem treatment	Foliar spray Stem treatment	Cutting post-treatment	Cutting post-treatment
Winged Burning Bush					Foliar spray Cut stump treatment	Foliar spray Cut stump treatment	Foliar spray Cut stump treatment	Foliar spray Cut stump treatment	Cut stump treatment	Cut stump treatment		
Winter Creeper		Foliar spray Cut vines	Foliar spray Cut vines					Foliar spray	Foliar spray	Foliar spray	Foliar spray	

Asiatic Bittersweet

Characteristic Features

- Thick, woody vine
- Winds up trees
- Can grow up to 60ft
- Bright red fruit

Habitat

- Woodland edges
- Fence rows
- Forests

Distribution

- 21 states

Native Alternatives

- Virgin's bower
- Trumpet honeysuckle¹²

Description

Asiatic bittersweet is a deciduous, vining plant that is native to Japan, Korea, and China. In the U.S., the vine climbs and twists up native shrubs and trees, injuring and even killing them.¹³ The stems can climb up to 60 ft high in the tree.

Identification

The thick vine has glossy leaves with toothed edges that alternate on the branch. At the base of the leaves, there are clusters of green flowers. The skin of the fruit that results is yellow, but once mature, they split open to red flesh covered seeds. The berries are spread out along the entirety of the branch.¹⁴ Asiatic bittersweet can be confused with the native American bittersweet. Unlike the invasive counterpart, the fruits of American bittersweet are only at the end of the branch. Additionally, the roots of the bittersweet are orange.

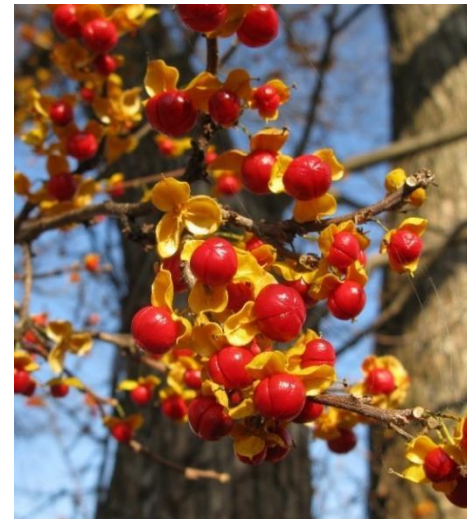
Treatment

For large vines, cut the stem as close to ground level as possible and again at eye level, this is called a window cut. Do this before the vine flowers. Cutting the plant forces new growth at the base of the vine, which can then be foliar sprayed with glyphosate or triclopyr. The plant is easy to identify in the fall because the leaves turn yellow and stay on until mid-November.

Continue cutting the vines throughout the growing season.



Photograph by MN Department of Agriculture



Photograph from Skidmore College

¹² IPSAWG, "Invasive Plant Species Fact Sheet: Oriental Bittersweet," 10/06.

¹³ (IPSAWG 10/06)

¹⁴ Maine Department of Agriculture, Conservation, and Forestry, "Asiatic Bittersweet," Maine Natural Areas Program, n.d.

Autumn Olive

Characteristic Features

- Shrubby tree
- Oval leaves
- Silver underside of leaves

Habitat

- Edges of forest
- Disturbed habitats
- Sunny areas

Distribution

- Eastern US
- Every county in Indiana¹⁵

Native Alternatives¹⁶

- Dogwood
- Chokeberry
- Winterberry

Description

Autumn olive is a shrubby tree from Japan, which was often used for revegetation of disturbed areas when it was first introduced. The tree is problematic because it grows quickly and fruits abundantly, and birds spread the seeds easily. The roots fix nitrogen into the soil, which changes the nitrogen cycle for native plants making it harder for them to compete with autumn olive. It is also hard to control because it resprouts after cutting and burning and it shades out native plants.¹⁷

Identification

The large shrubby tree has oval leaves that grow to 1-3 inches that alternate on the branch. It has small yellow flowers and small, red, round berries with scales on them. The tell-tale sign of an autumn olive is that the underside of each leaf is a brilliant silver color.¹⁸



Treatment

The best way to treat autumn olive is either through hand pulling or through a combination of cutting and treating with chemicals. If the tree is just cut, it will resprout.¹⁹ Get down to the base of the shrub, as close to the ground as possible, and use a hand saw or clippers to clip the trunk. Then, follow up by directly spraying the stump with round-up or another glyphosate solution that is anywhere from 10-50%. Be careful not to spray elsewhere other than directly on the stump. If hand pulling, only pull small seedlings and try to get as much of the root system as possible, or it will resprout.

¹⁵ IPSAWG, "Invasive Plant Species Fact Sheet: Autumn Olive."

¹⁶ USDA, "Invasive Plants in Indiana."

¹⁷ IPSAWG, "Invasive Plant Species Fact Sheet: Autumn Olive."

¹⁸ IPSAWG.

¹⁹ IPSAWG.



Black Jetbead

Characteristic Features

- White, four petaled flowers
- Rough leaf texture with toothed edges
- Black berries

Habitat

- Forests
- Well-drained sites
- Sun/shade tolerant

Distribution

- East of the Mississippi
- Larry Beachy Classified Forest

Native Alternatives

- Silky dogwood
- Black chokeberry
- Spicebush

Description

Black jetbead is an invasive shrub native to China, Korea, and Japan.²⁰ It is in the rose family and was introduced to the U.S. as an ornamental plant. The plant prefers full sun, but can tolerate a variety of conditions from shade to urban environments.²¹

Identification

Black jetbead is a shrub with open, arching branches that grows 3 to 6 feet tall and a foot or two wider than that. Each branch has opposite leaves and four petaled white flowers bloom at the tips of the branches in April and May.²² The leaves have a rough texture, and it gets its name from the black, oval, and hard fruit that is clustered at the ends of the branches.

Treatment

In order to treat invasive shrub, pull the small plants by hand. For larger shrubs, cut the shrubs as close to the ground as possible and treat with 20% glyphosate solution in the spring. Additionally, the presence of jetbead is not very well documented in Indiana, so track any occurrences at EDDMapS.org.²³



²⁰ LIISMA, "Black Jetbead," Invasive Species Management Long Island, n.d.

²¹ NC Extension, "Rhodotypos Scandens," NC Extension Gardener Plant Toolbox, n.d.

²² NC Extension, "Rhodotypos Scandens."

²³ MISIN, "Black Jetbead (Rhodotypos Scandens)."



Bush Honeysuckle

Characteristic Features

- Grows up to 20 feet
- Oval, opposite leaves
- Red berries
- Grooved bark

Habitat

- Edges of forest
- Sun/shade tolerant

Distribution

- Everywhere
- Eastern US
- Every county in Indiana
- Spans from the great plains to the east coast.²⁴

Native Alternatives²⁵

- Dogwood
- Chokeberry

Description

Bush honeysuckle were introduced originally for erosion control and as food for wildlife.²⁶ They became problematic because they grow densely and shade out all other plants. This inhibits tree regeneration, effectively halting forest succession, which is the process of the species that make up a community changing over time. Honeysuckle also releases a chemical into the soil that stops most other plants trying to grow, a mechanism known as allelopathy.

Identification

These are tree-like shrubs that can grow up to 20 feet tall. They can outcompete native species because they are the first to leaf in the spring and last to lose their leaves in the fall.²⁷ The leaves are green and oval shaped and are arranged opposite each other on the stems. In the summer, they have white flowers; in the fall, they have berries that sit at the base of the leaves in pairs of 2-4. The bark of the honeysuckle is striped, with large grooves in the older, more mature bushes.



large grooves in the older, more mature bushes.

Treatment

Hand removal by pulling the shrubs out can be an effective method because the roots are quite shallow, but be careful not to disturb the soil too much, as this can facilitate sprouting. The other option is cutting and treating the stump. This can be done from mid-summer through the dormant season. For the less experienced, this is best done in November because the honeysuckle is still green, but virtually everything else is dormant. Use loppers or a small saw to cut each bush off as close to the ground as possible, and then follow it by spraying a 20% glyphosate solution directly on the fresh cut.²⁸



²⁴ IPSAWG, "Invasive Plant Species Fact Sheet: Bush Honeysuckle."

²⁵ USDA, "Invasive Plants in Indiana."

²⁶ IPSAWG, "Invasive Plant Species Fact Sheet: Bush Honeysuckle."

²⁷ Missouri Department of Conservation, "Bush Honeysuckle."

²⁸ IPSAWG, "Invasive Plant Species Fact Sheet: Bush Honeysuckle."

Butterfly Bush

Characteristic Features

- Purple flower spikes
- Long leaves

Habitat

- Sunny areas
- Roadsides
- Forest edges

Distribution

- East coast to the west coast

Native Alternatives

- Buttonbush
- Gayfeather²⁹
- Butterfly milkweed

Description

Butterfly bush is an invasive ornamental shrub originally from China. The plant is invasive because it outcompetes native plants primarily through seed production. Each flower spike contains 40,000 seed, which are lightweight and winged³⁰. The seeds can travel far in the air and in water and are then able to germinate at an 80% rate. The butterfly bush produces a lot of pollen, so pollinators often choose to feed on it, forgoing native plants. Unfortunately, then the native plants don't get the pollination they need to survive and reproduce. Additionally, there are no North American caterpillars that are able to eat butterfly bush leaves, so when butterflies eggs hatch, they are not sustained.³¹

Identification

The shrub can grow up to 15 feet tall and 5 feet wide. The 5-10 inch leaves grow oppositely and have jagged, toothed edges. The

trademark of the bush is the long flower spikes that bloom from mid summer to the early fall.³² The flowers come in a variety of colors, but the most common cultivated variety is purple.

Treatment

Pulling the plan out is an effective control measure for small butterfly bushes. For larger bushes, it may be necessary to cut the bush off at the base and spray the wound with a 20% glyphosate solution.



Photograph from Gardenia



Photograph from WikiSpecies

²⁹ Alyssa Ford Morel, "Plant This, Not That: Replacing Butterfly Bush," Northern Virginia Bird Alliance, March 30, 2023.

³⁰ Morel, "Plant This, Not That: Replacing Butterfly Bush."

³¹ Lillia Schmidt and Susan Charkes, "Invasive Species Spotlight: The Truth About Butterfly Bush," Brandywine Conservancy, June 7, 2020.

³² Schmidt and Charkes, "Invasive Species Spotlight: The Truth About Butterfly Bush."

Callery Pear

Characteristic Features

- Showy, white flowers
- Unpleasant aroma

Habitat

- Disturbed areas, along roadways and old fields
- Landscaping tree³³

Distribution

- South and Midwest of the US³⁴
- A street tree in Goshen

Native Alternatives

- Juneberry
- Eastern redbud

Description

Callery pear also known as Bradford, Cleveland, or Autumn Blaze pear is an ornamental tree that was introduced to North America from Asia in the early 1900s.³⁵ The tree is often planted for its white flowers in springtime. The pear has weak wood and branch structure that results in it being very susceptible to storm damage. Additionally, the tree is invasive, spreading onto interstate roadsides and nearby wooded areas, crowding out native species. Unfortunately, the distribution of Callery pear trees is not yet illegal in Indiana, so many homeowners, businesses, and municipalities have these ornamental trees in their landscapes.

Identification

The leaves are thick, waxy, and arranged alternatively. Each teardrop shaped leaf is rippled with fine teeth along the edges. Callery pears have five-petaled white flowers that grow together in clusters.³⁶ The

flowers have a strong rotten smell. In the summer, the tree gets small pears that are hard until the first frost. They then soften enough for birds to eat them and spread the seeds. The bark of the tree is smooth on smaller trees but gets scaly when the tree matures.

Treatment

Small trees can be pulled by hand. Larger trees should be cut down with a chainsaw, but that must be followed by herbicide application of 25% triclopyr so that they don't resprout. Alternatively, the tree can be girdled by cutting through the bark around the circumference of the tree, and then 25% triclopyr can be sprayed into the wound.³⁷ These methods are most effective in the fall.



Photograph from News 5 Cleveland



³³ ODNR, "Callery Pear," Ohio Department of Natural Resources, n.d.

³⁴ David R Jackson et al., "Callery Pear," PennState Extension, July 16, 2020.

³⁵ ODNR, "Callery Pear."

³⁶ Jackson et al., "Callery Pear."

³⁷ Jackson et al., "Callery Pear."



Common Privet

Characteristic Features

- Small leaves
- Multi-stemmed shrub
- Up to 12 ft tall

Habitat

- Riparian and closed-canopy forests
- Adaptable to most light and nutrient conditions

Distribution

- Eastern to Midwestern US

Native Alternatives

- Red chokeberry
- Silky dogwood

Description

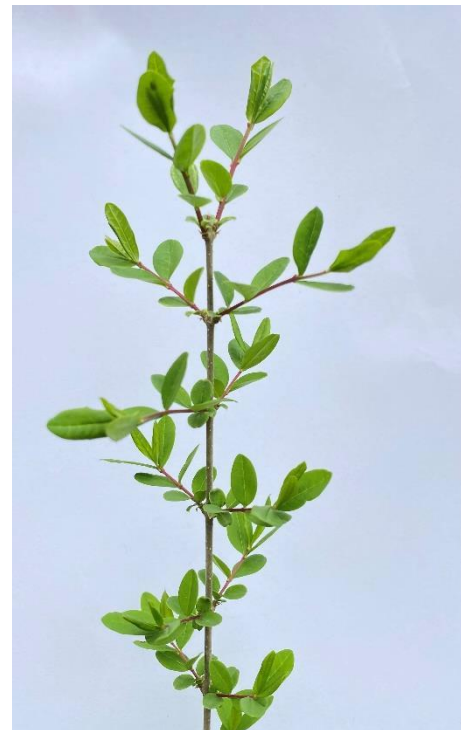
Privet is a shrub that is native to Europe and northern Africa and is used as ornamentals or hedges there. It was introduced to the US in the late 1800s for the same purposes. They form thick stands and grow aggressively in forests, fields, and riverbanks. It is invasive because it shades out native understory species and reproduces aggressively through thousands of seeds and root suckers.

Identification

Privet usually has multiple smaller stems clustered in a central area rather than a trunk and can grow from 4 to 15 feet tall. The long, leafy branches have 2-inch, oblong leaves that are opposite each other. The branches are opposite as well, which is useful in identifying it in the winter. Each stem has clusters of small, white flowers that bloom in June and July. The flowers then make way for blackish berries that mature in the fall and last into the winter.

Treatment

Common privet can be controlled using manual or chemical methods. Manual methods, such as digging up the plant or cutting the stem as close to the ground as possible, can be effective if repeated at least once every growing season. After cutting the stems, apply a solution of glyphosate to increase the efficacy and drastically reduce the need for large-scale control year after year. Use a glyphosate solution with 50% active ingredient and mix it with water to make a 30% glyphosate - 70% water solution. Privet can be treated from summer through the early winter, with the highest efficacy in late fall to early winter.



Dame's Rocket

Characteristic Features

- Purple, pink, and white flowers
- Four petals
- Long, pointy leaves

Habitat

- Roadside ditches
- Woodlands

Distribution

- Northern states

Native Alternatives

- Summer phlox
- Bee balm

Description

Dame's rocket is a biennial ornamental that was brought to the US in the 1600s and subsequently escaped cultivation.³⁸ It is mostly found in woodlands and roadside ditches in most states, except in the far south. The flower is so prolific that many think it's a native wildflower and intentionally spread the seeds, but its distribution is prohibited by Indiana law.

Identification

The plants are tall, growing up to 3 or 4 feet. They have four petaled flowers that can be purple, pink, or white that are grouped at the end of the stem. Covering the stem are long, pointy leaves that alternate up the stem and have fuzz covering the surface.³⁹

Treatment

It is recommended to pull out the stalk before it flowers, being careful to get all of the roots out. Additionally, in large infestations, it is best to spray a foliar herbicide like roundup on the rosettes in early spring or late fall.



Photograph by Scott Vogt, Dyck Arboretum



Photograph from Bleeding Heartland

³⁸ Uriel Menalled, "Dames's Rocket (Hesperis Matronalis)," MSU Extension, July 2016.

³⁹ Weld County Public Works Dept, "Dames Rocket Identification and Management," Weld County, n.d.

Garlic Mustard

Characteristic Features

- Deep veins in the leaves
- Small, white clustered flowers
- Hairy stems

Habitat

- Fields
- Forest understories

Distribution

- Northeast and Midwest United States

Native Alternatives

- Cut-leaf toothwort
- Virginia saxifrage

Description

Garlic mustard was brought to the US from Europe in the 1800s for erosion control. Like many invasives, garlic mustard emerges and leaves out early in the spring before natives can sprout. Garlic mustard can quickly become the only thing in the understory after crowding out native species and tree saplings.⁴⁰ The mustard roots also release chemicals that change the below-ground fungal network and make it difficult for native species to grow.

Identification

First year plants grow very low to the ground. A tell-tail sign of garlic mustard is the garlic smell that emanates from the crushed leaves.⁴¹ The leaves look wrinkled because of the deep veins. Second year plants have white flowers in early may and can grow up to 3 feet. The plants have hairy stems and small seed pods.

Treatment

Pull up the plants before they go to seed. Foliar spray with 1-2% glyphosate solution over the area for large infestations. Make sure to do this at least two weeks before they're set to go to seed and don't compost the remnants unless done so to a high temperature, as that will spread the seeds.



⁴⁰ "Garlic Mustard (*Alliaria Petiolata*)," Invasive Species Center, n.d.

⁴¹ "Garlic Mustard (*Alliaria Petiolata*)."

Japanese Knotweed

Characteristic Features

- 3-9 feet tall
- Red stems
- Cluster of white flowers

Habitat

- Riverbanks
- Open to partially shaded areas⁴²

Distribution

- Northeastern US to western US
- Most counties in Indiana
- Millrace trail and Linway pond

Native Alternatives

- Nannyberry
- Red osier dogwood⁴³
- Goatsbeard

Description

Japanese knotweed is a shrubby invasive plant that was introduced to North America in the late 1800s from Japan and China.⁴⁴ It is primarily used for ornamental purpose due to its flowers and height. It is highly invasive, emerging early in the growing season, and forming dense stands that spread through seed and rhizomes.

It is often found in moist soils, but is tolerant of many different pHs, temperatures, salinities, and moisture levels. Because of its rhizomic reproduction, it is very difficult to eradicate.

Identification

Knotweed is a dense shrub that forms stands up to 9 feet tall. The thick red stems are sectioned with ridges and are hollow. Small greenish white flowers bloom in clusters that branch off from the stem. The top side of the leaf feels like very fine sandpaper. In the winter, the red stems are left.



Treatment

Japanese knotweed is resilient against many different treatment methods. Do not mow, as the pieces that are spread will be able to root and grow. Manual controls like digging and cutting will not work well unless paired with a chemical control. The recommended control is twofold. First, cut the stems as close to the ground as possible in early June. Wait until it resprouts, then after it flowers, apply a 2% glyphosate solution (0.5% nonionic surfactant is recommended as well) to the leaves so they are coated, but not running off the leaf.⁴⁵



Photograph from Britannica

⁴² IPSAWG, "Invasive Plant Species Fact Sheet: Japanese Knotweed,"

⁴³ "Top Garden Invasives / Native Alternatives," Indiana Native Plant Society, n.d.

⁴⁴ IPSAWG, "Invasive Plant Species Fact Sheet: Japanese Knotweed."

⁴⁵ Douglas Cygan, "Control Methods for Japanese Knotweed," New Hampshire Department of Agriculture, n.d.



Mugwort

Characteristic Features

- Large lobed leaves
- Hairy leaf undersides
- Brown stems⁴⁶

Habitat

- Roadsides
- Disturbed areas

Distribution

- Eastern and northeastern US

Native Alternatives

- Dogbane
- Wild bergamot

Description

Mugwort is a member of the Aster family that was brought to the US from Eurasia in the 1500s. It is planted and spread because of its medicinal properties. The perennial grows up to 5 feet tall and spreads primarily via seeds and underground stems called rhizomes into roadsides and other disturbed areas. Mugwort generally does not do well in wet areas.⁴⁷ Additionally, the pollen is a common allergen that contributes to hay fever.

Identification

The plant has a brown, hairy stem supporting green leaves with large lobes that alternate down the stem. The underside of the leaves are covered with white hairs that make the color look grey. Mugwort has disc flowers that don't have any petals, though they bloom in late summer or early fall. Another identifier of the plant

is the pungent, herbal aroma that arises from crushing the leaves.

Treatment

Mugwort can be hand pulled in the spring and early summer, through leftover roots and rhizome fragments can resprout.⁴⁸ Mowing throughout the summer before the seed heads have matured is also important for weakening the plant. In order to eliminate Mugwort, an herbicide will likely need to be applied. A foliar spray of triclopyr is recommended to be sprayed in the early summer or late fall.



Photograph from *Edible Wild Food*



Photograph by Alyssa Siegel-Miles

⁴⁶ "Mugwort (*Artemisia Vulgaris*)," State of Indiana Cooperative Invasives Management, May 19, 2022.

⁴⁷ "Mugwort (*Artemisia Vulgaris*)."

⁴⁸ Victoria Wallace, Alyssa Siegel-Miles, and Klaudia Sowizral, "*Artemisia Vulgaris*," UConn Extension, 2021.

Multi Flora Rose

Characteristic Features

- Serrated edge leaflets
- Small, white flowers
- Thorny branches

Habitat

- Hedgerows
- Forest understories⁴⁹
- Pastures

Distribution

- Eastern US

Native Alternatives

- Witch hazel
- Carolina rose
- Climbing wild rose

Description

Multiflora rose came to the US in the late 1800s from east Asia because it can act as erosion control, wildlife enhancement, and an ornamental garden plant. The plant has also been planted as a natural crash barrier for cars because of the dense thickets it creates.⁵⁰

Identification

The rose is a climbing shrub which can grow to 10 or 15 feet. The branches are covered in the characteristic rose thorns.⁵¹ What looks like the leaves of the rose are actually leaflets. Each leaf has five to ten opposite leaflets. Each leaflet measures up to 2 inches long and has a serrated texture.

The plant has clusters of white five-petaled

flowers with yellow pollen centers.⁵² In late summer, the flowers give way to small red rose hips.

Treatment

Pull out small plants by hand, but make sure to wear gloves because of the thorny stems. Multi flora rose have a large seed bank in the soil, so mowing the rose does not help because it allows the seed bank to grow. “Domestic goats and sheep are used to control multiflora rose in agricultural situations.”⁵³ In late summer, when the plant is transporting nutrients from the leaves to store in the roots, is the best time to use chemical control. During July, August, or September, cut the plant as close to the ground as possible and dab herbicide on the cut stem. Alternatively, you can do an initial cut of the plant in the spring, before the plant flowers to force it to sprout again and expend energy. Then a 2% solution of glyphosate can be sprayed foliarly onto the leaves.⁵⁴



Photograph from UNH Extension

⁴⁹ Alyssa Siegel-Miles, Victoria Wallace, and Klaudia Sowizral, “Rosa Multiflora,” UConn Extension, 2021.

⁵⁰ Bruce Wenning, “Multiflora Rose: An Exotic Invasive Plant Fact Sheet,” Eco Landscaping Alliance, July 2012.

⁵¹ Siegel-Miles, Wallace, and Sowizral, “Rosa Multiflora.”

⁵² Siegel-Miles, Wallace, and Sowizral, “Rosa Multiflora.”

⁵³ Wenning, “Multiflora Rose: An Exotic Invasive Plant Fact Sheet.”

⁵⁴ Wenning, “Multiflora Rose: An Exotic Invasive Plant Fact Sheet.”

Norway Maple

Characteristic Features

- Greyish bark
- 5 to 7 lobed leaves
- Sharp leaf points

Habitat

- Forests and forest edges
- Urban areas and yards

Distribution

- Northeast and Midwest states
- Northwest states

Native Alternatives

- Sugar maple
- Red maple
- Red oak

Description

The Norway maple's hardiness has made it a popular street and landscaping tree, but its shallow roots and overstory shade out smaller plants and grasses from growing. Insect and fungal damage is significantly lower in Norway maples than in sugar maples.⁵⁵

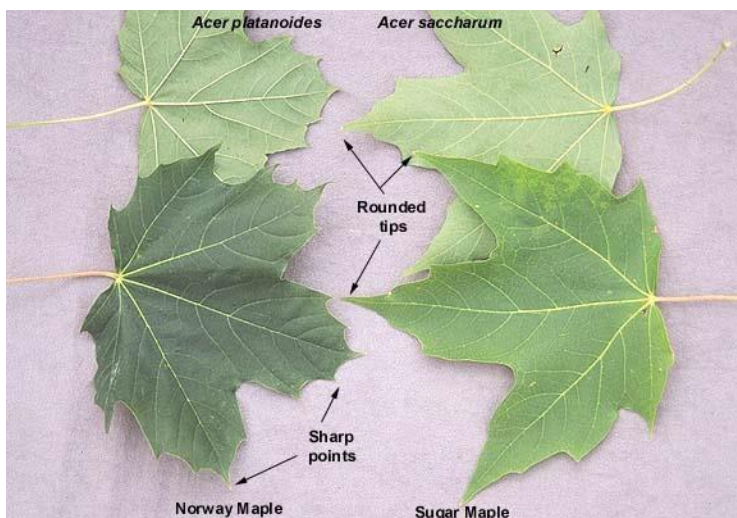
Identification

The leaves have five lobes and are dark green to red during the summer. In the fall, they turn yellowish. The bark is greyish-black and has large furrow lines. It can often be confused with sugar maple, but sugar maple has shaggy bark rather than furrowed bark.

Treatment

Seedlings can be pulled by hand. Smaller trees can be cut down and the stump sprayed with at least 20% glyphosate. Large trees can be girdled by removing the bark layer in a circle around the tree.⁵⁶ Because of the shade they provide as street trees in urban

areas, it is recommended that there is a gradual phase-out of Norway maples rather than an immediate one.



⁵⁵ "Norway Maple," New York Invasive Species Information, July 2019.

⁵⁶ "Norway Maple."

Phragmites/Common Reed

Characteristic Features

- 15 feet tall
- Thick stands
- Red flower heads

Habitat

- Wetlands
- Ditches

Distribution

- Lower 48 states

Native Alternatives

- Switchgrass
- Prairie cord grass



Description

Phragmites is an invasive reed grass. It has a native and nonnative strain in the US, but the most common is the nonnative, invasive subspecies. The invasive phragmites are common in wetland areas or ditches and can thrive in a variety of pHs. They create dense clonal stands and reproduce through rhizomes and stolon. Stolon are stems that run laterally along the ground, and rhizomes are horizontal roots underground that both produce clonal plants.

Identification

Phragmites can grow up to 15 feet tall. In midsummer, they form purplish feather-like flower heads that can be about a foot long. At maturity, the flower heads develop into brown seed heads. The reeds have rough, hollow stems that are tan or green in color. Unlike the invasive reed's tan-green, rough stalk, the native reed has a smooth, reddish-purple stem.

Treatment

Treat with imazapyr (up to 5% solution) or glyphosate (1-2% solution) depending on the severity of the infestation.

Imazapyr is best for thick stands that don't have native vegetation growing. This herbicide is foliar and soil-active; this means that not only does the plant take up the herbicide through the leaves, but the herbicide in the soil remains active and provides some residual control.⁵⁷ Do not use imazapyr when treating near a waterway. The herbicide treatments are most successful when the plant is actively growing, in late July through October. Be advised that the extensive root system holds nutrients, adds organic matter to the soil, and prevents erosion. When the phragmites are removed, something must be planted in its place to minimize the impacts of losing erosion control.



⁵⁷ Dugdale et al., "Residues and Dissipation of the Herbicide Imazapyr after Operational Use in Irrigation Water," April 2, 2020.

Poison Hemlock

Characteristic Features

- 4-8ft tall
- Purple spotted stem
- Small, white, umbrella-shaped flowers

Habitat

- Wet, sunny, recently disturbed areas
- Along roadsides

Distribution

- Eastern US
- Every county in Indiana
- Abshire park
- Shanklin park

Native Alternatives⁵⁸

- Sunflowers
- Wild lupine
- Native asters

Description

Poison hemlock is a biennial, invasive plant. Not only is it a threat to native species but a threat to public health because it is one of the most toxic plants in North America. The toxins, present in all parts of the plant (leaves, stems, roots), enters the body through openings like the eyes, mouth, or cuts on the skin.⁵⁹

Identification

In the first year of the life cycle, the plant is short, growing only up to a foot in height. The plant then grows to 4-8 feet tall in its second year. The bright green leaves look like carrot tops and are easily confused with wild carrot, or Queen Anne's Lace. It has many small, white flowers that grow in umbrella-like clusters, and the long, hollow stem is spotted with deep purple.

Look- a-likes to poison hemlock will not have the purple splotches on their stems.

Treatment

When working with poison hemlock, always wear protective eyewear, dust mask, gloves, and long clothes to prevent poisoning. There are slightly different methods for poison hemlock because of its biennial life cycle. During the first year, when the plant is a seedling to a rosette, apply a foliar herbicide over the leaves during the growing season, like glyphosate.

During the second year, a foliar spray should be applied in early spring, before there are flowers. In Indiana, that is usually in



Year 1 rosettes



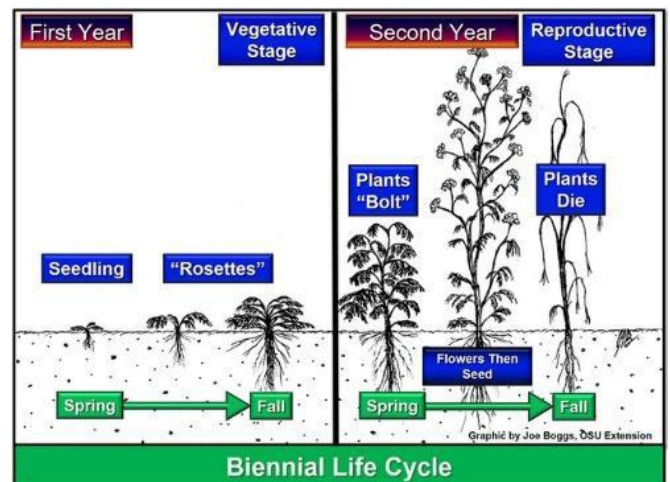
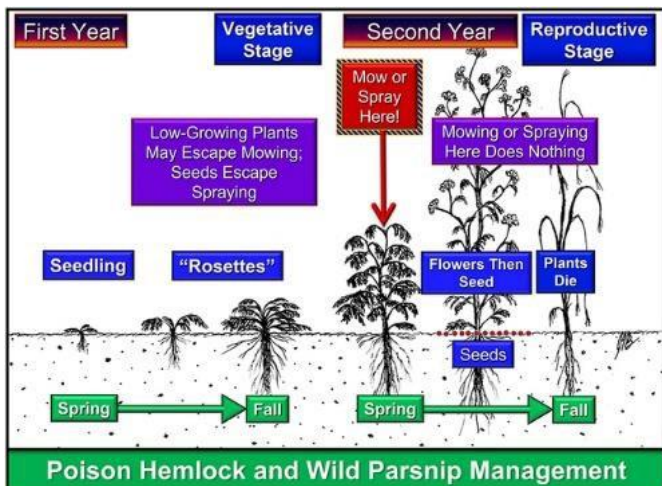
Year two purple stalks

⁵⁸ "Poison Hemlock: Native Alternatives."

⁵⁹ Anderson, Branstom, and Hill, "Poison Hemlock Identification and Control."



April. Never mow the plants after they have flowered and seeded because that will spread the seeds rather than control them. Herbicides that are shown to be effective for poison hemlock control are clopyralid, triclopyr, 2,4-D, triclopyr, and glyphosate, if the glyphosate is of at least 40% concentration.⁶⁰ Generally, poison hemlock will have to be controlled for multiple years because of the seeds stored in the seed bank.



Both figures from Joe Boggs at OSU Extension

⁶⁰ Joe Boggs, "Get a Head Start on Controlling Poison Hemlock and Wild Parsnip," OSU Extension, March 2022.



Purple Loosestrife

Characteristic Features

- 3-6 feet tall
- Tall purple flower spikes

Habitat

- Wetlands
- Ditches
- Disturbed areas

Distribution

- Northern U.S.
- Every county in Indiana⁶¹
- Mullet Park
- Fiddler Pond

Native Alternatives

- Fireweed
- Dense blazing star⁶²

Description

Purple loosestrife is an invasive plant that has spread to almost every state in the US. The perennial plant, native to Europe and Asia, grows primarily in wetlands, ditches, and other disturbed moist areas.⁶³ It reproduces through rhizomes, which spread rapidly to create thick layers underground, but the plant can also produce 2 million seeds in a season.

Identification

Purple loosestrife has long, skinny leaves with smooth edges that are organized in oppositely positioned pairs along the stem. The stem is generally 4 or 6-sided with square edges and grows up to 3 to 6 feet tall.⁶⁴ The plants have purple spikes of flowers, each made up of many small 5 or 6-petaled flowers, that can reach a foot tall.



Treatment

Hand-pulling the plant can be effective for smaller stands of loosestrife, but bag the resulting plant material and remove it from the area. If the plant is not in standing water, 1-2% glyphosate can be applied to the leaves until they're just wet. If there is water, use a water-based herbicide. This species also has an effective bio-control measure, which is a species of beetle, *Galerucella*, that feeds on the stems and leaves of only purple loosestrife.⁶⁵ This and two other beetle species have successfully controlled the population of loosestrife in many states.

⁶¹ IPSAWG, "Invasive Plant Species Fact Sheet: Purple Loosestrife."

⁶² USDA, "Invasive Plants in Indiana," July 2003.

⁶³ Kelly Reeves, "Exotic Species: Purple Loosestrife," National Parks Service, June 2016.

⁶⁴ Reeves, "Exotic Species: Purple Loosestrife."

⁶⁵ IPSAWG, "Invasive Plant Species Fact Sheet: Purple Loosestrife."



Reed Canarygrass

Characteristic Features

- 2-6 ft tall

Habitat

- Wetlands
- Open areas
- Forests

Distribution

- North half of the US and into Canada
- Every county in Indiana
- Abshire Park

Native Alternatives

- Switchgrass
- Big bluestem

Description

Reed canarygrass is a grass that forms large stands. It was initially planted throughout the US for erosion control and revegetation. It grows mostly in wet areas, ditches, wetlands, moist fields, and other disturbed areas. The grass has

dense growth that eliminates all other plants.⁶⁶ It spreads aggressively through rhizomes and runners, which make removal exceedingly difficult. Runners are stems that grow horizontally above the ground and rhizomes are root-like stems that grow horizontally below the ground. Seeds ripen in late June.

Identification

Reed canarygrass is one of the first grasses to sprout in the spring. It grows from 2-6 feet tall, with blades that are 1 to 4 feet long and less than an inch wide. The flat blades grow at a 45-degree angle from the hairless stems. Reddish coloring near the top. There are native species of reed grasses, but they are much shorter than the invasive species.⁶⁷ Reed canarygrass also has a larger center vein on its leaves than the native species.

Treatment

Reed canarygrass is incredibly difficult to remove. It is recommended to mow the grass in mid-June and then again in October, as they will have had a second growth spurt after the first mowing.⁶⁸ The mowing works to reduce seed production. After the second mowing, a fall application of 2% glyphosate solution is recommended. Control methods must be diligently applied multiple years in a row because canarygrass is aggressive and resilient.



Photograph from Iowa State Extension



Photograph from Friends of the Forest Preserves

⁶⁶ Iowa State University Extension and Outreach, "Reed Canarygrass Invasive Species Profile."

⁶⁷ "Reed Canarygrass (Phalaris Arundinacea)," Minnesota Department of Natural Resources, n.d.

⁶⁸ "Reed Canarygrass (Phalaris Arundinacea)."

Siberian Elm

Characteristic Features

- Toothed leaves
- Furrowed bark

Habitat

- Roadsides
- Grasslands

Distribution

- Midwest US

Native Alternatives

- Northern red oak
- Hackberry

Description

Siberian elm is an invasive deciduous tree that can grow up to 70 feet tall. The tree is not ideal for the Midwest because of its weak wood and branch structure, and susceptibility to ice storms⁶⁹. The tree has a high seed germination rate that helps it spread aggressively. Additionally, Siberian elms can cross pollinate with native elms, which can make it difficult to identify the invasive variety.

Identification

The tree has a large, rounded crown that is full of tear drop shaped leaves that alternate on the branches. The leaves are heavily toothed and have large vein creases on the face of the leaf⁷⁰. Once mature, the trunk has grey, lightly furrowed or grooved bark. The tree blooms from March to May, with little red flowers that clump together and look like a pompom. The seeds pods, otherwise known as samaras, are round and papery and are dispersed primarily by the wind⁷¹.

Treatment

When the elms are small seedlings, they can be pulled by hand, making sure to get all the roots. Once the trees are mature, they can either be girdled or hacked in late spring⁷². Girdling involves cutting a ring of bark around the tree and letting the tree die over a few years. Hacking is making cuts with an axe at a downwards angle all around the trunk and spraying herbicide into the cuts.



⁶⁹ Spencer Campbell and Sharon Yiesla, "Siberian Elm," Morton Arboretum, n.d.

⁷⁰ "Siberian Elm (Ulmus Pumila)," Minnesota DNR, n.d.

⁷¹ Angela Gupta, Amy Rager, and Megan M Weber, "Siberian Elm," UMN Extension, 2019.

⁷² "Siberian Elm (Ulmus Pumila)."

Teasel

Characteristic Features

- 8 feet tall
- Large purple flowers/seed heads

Habitat

- Prairies
- Roadsides
- Savannas

Distribution

- Almost every state in the U.S.

Native Alternatives

- Pasture thistle
- Purple coneflower

Description

Teasle is a flower native to European that was brought to North America in the 1700 and 1800s. Teasle became popular because of the dye that can be derived from the plant and because the spiky flower heads were used in wool processing.⁷³ It is a biennial that flowers once before dying. It has been found that dried bouquets of teasle left at gravesites has facilitated the spread of teasle.

Identification

Teasle are particularly identifiable after the seed head has dried in the late summer. The plant grows up to 8 feet tall.⁷⁴ The flower is lavender or white and they leave a bristly cone seed head. Stem is hollow and has spines on it. Leaves form a cup around the stem. The flowers have thin leaves (bracts) that grow up from the base of the flower head. It blooms in June through October.

Treatment

The most effective treatment is to treat the rosettes when they come up in the spring with a foliar spray of 2% triclopyr with a surfactant added. In the spring and early summer, cut down or remove the seed heads just at flowering, but before the flowers have gone to seed. Additionally, a foliar herbicide like triclopyr can be used on the mature flowering plants.⁷⁵ It will likely be necessary to follow up the next year when the seed bank sprouts. If the area is completely covered with teasle, mowing can be an option after the heads are flowering but before the seeds are mature.⁷⁶ Do not mow after the flowers have gone to seed.



Photograph from Katy Chayka, 2021



⁷³ Angela Gupta, Amy Rager, and Megan M Weber, "Common and Cutleaf Teasel," UM Extension, 2019.

⁷⁴ Douglas B Gucker, "Beware of the Invasive Teasel Plant," Illinois Extension, 2017.

⁷⁵ Gupta, Rager, and Weber, "Common and Cutleaf Teasel."

⁷⁶ Gucker, "Beware of the Invasive Teasel Plant."

Tree of Heaven

Characteristic Features

- Large leaves, each with 10-40 leaflets
- Two notches at the base of each leaflet

Habitat

- Forests
- Open areas

Distribution

- 42 states from Eastern US to California

Native Alternatives

- Sumac
- Black walnut

Description

Tree of heaven was brought to the US from China in the late 18th century. It was used for landscaping in urban areas because of its prolific nature and resistance to disease.⁷⁷ These once desirable characteristics are unfortunately, the same reasons it is invasive.

The tree abundantly produces seeds and crowds out native plants wherever it spreads. Not only that, but it is allelopathic, meaning that it secretes a toxin into the soil that kills surrounding plants.⁷⁸ Tree of heaven can create structural problems as well, with the root system damaging sidewalks,



building foundations, and sewers. Lastly, another invasive species that is invading the US, the spotted lantern fly, lays their eggs on the Tree of heaven.⁷⁹

Identification

Tree of heaven can reach up to 60 to 75ft. When it matures, the bark has rough ridges resembling cantaloupe rind. One leaf is between one to four feet long, each with 10 to 40 leaflets that are positioned oppositely. The leaflets are often mistaken for individual leaves because they are so large. Each leaflet is smooth, save for two or three notches close to the base of the leaflet. In the winter, the tree can be identified by its seed pods that persist on the branches. New sprouts can be identified because of their distinctive bud scars that pair with each bud on the stem. Tree of heaven and black walnuts are often confused because they both have similar leaflets. The distinguishing factor is that black walnut leaflets are finely toothed all the way down the leaflet. The bark of the black walnut is furrowed, in contrast to the relatively smooth surface of the tree of heaven.



⁷⁷ "Stories in Indiana: Tree of Heaven," The Nature Conservancy, July 2020.

⁷⁸ "Stories in Indiana: Tree of Heaven."

⁷⁹ "Stories in Indiana: Tree of Heaven."

Treatment

Tree of heaven saplings and root suckers (shoots that the tree can shoot up over 50 feet away) grow prolifically.⁸⁰ Those can be controlled by foliar spraying the seedlings. When the trees are no longer saplings but are smaller than 6 inches in diameter, they can be basal bark treated using triclopyr. The best way to control trees once they get larger than 6 inches is to create evenly spaced downward cuts into the trunk and spray triclopyr into the wounds in the mid-summer. This method is coined “hack and squirt.” Be careful to watch for the vigorous resprouts that the tree shoots up. All of these methods are best done in late summer through the early fall.



Photograph from Captial Press

⁸⁰ Steven K Rettke, “Tree-of-Heaven: Best Herbicide Treatment and Removal Timing,” Rutgers Cooperative Extension, n.d.



Winged Burning Bush

Characteristic Features

- Red leaves in the fall
- “Winged” ridges on the stems

Habitat

- Forest shrub layer, roadsides, pastures

Distribution

- Eastern and Midwest US

Native Alternatives

- Red chokeberry
- Black chokeberry
- Highbush blueberry

Description

Winged burning bush is a shrubby tree that is tolerant to various levels of light and soil conditions. It is often planted in yards or along streets for its brilliant red fall color, but it then invades nearby forests. Unfortunately, it is not yet illegal to distribute burning bush in the state of Indiana, even though it is aggressively invasive to the Northeast and Midwest. White-tailed deer don't even like to eat it, forgoing the shrub to eat native plants.

Identification

The name winged burning bush was coined because of two unique features. The first is the fiery red color that the bush turns in the fall. The second is the ridges or “wings” that form along the stem. These are the two main ways to identify the bush. In the spring and summer, the football-shaped, oppositely arranged leaves are dark green in color. The bush

can reach up to 15 feet in height, but usually are closer to 5-6 feet in both height and width.⁸¹ Burning bush looks similar to eastern Wahoo (*Euonymus atropurpureus*), though eastern Wahoo does not have the “wings” present on the branches of the burning bush.

Treatment

The best treatment for burning bush's aggressive growth combines mechanical and chemical methods. First, cut the plant at the base of the stem as close to the ground as possible. Then, follow that up by painting, dabbing, or carefully spraying the fresh cut with 20-50% glyphosate solution. If the shrub is too large to be cut, a foliar (leaf) spray can be applied in early summer, though this method has a higher chance of regrowth.⁸² It's recommended to use 3-4% glyphosate concentrate in water with a surfactant for foliar treatment. Herbicide treatment can be done from May through late fall.



⁸¹ “Burning Bush or Winged Euonymus,” Wisconsin DNR, n.d.

⁸² “Burning Bush or Winged Euonymus.”

Winter Creeper

Characteristic Features

- Glossy, dark green leaves
- Vine

Habitat

- Forests
- Open areas
- Tolerates most conditions except wet soil

Distribution

- Eastern U.S.
- Larry Beachy Classified Forest

Native Alternatives

- Wild ginger⁸³
- Allegheny spurge

Description

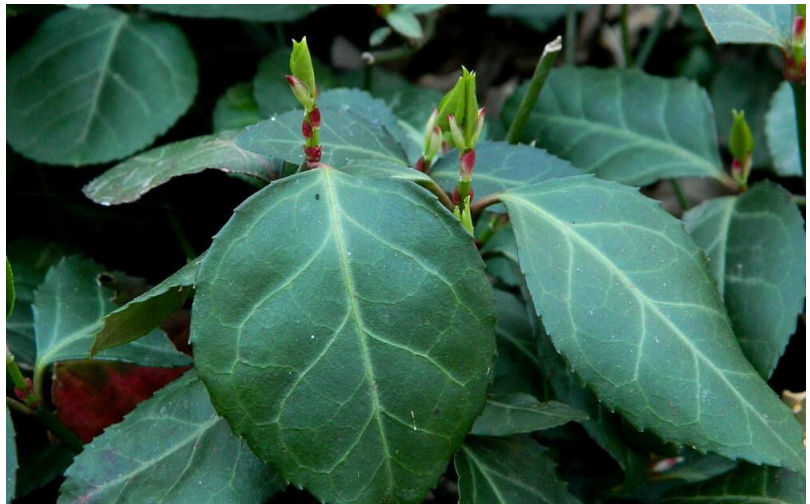
Winter creeper is an evergreen climbing vine that originated in China. The plant was sold in the U.S. as landscaping ground cover. It escaped cultivation and now grows densely on the forest floor and up trees. Winter creeper is able to outcompete native plants because it blocks light, depletes moisture and nutrients, and blocks native seedlings from growing.⁸⁴

Identification

Winter creeper has dark green, glossy leaves that are oval in shape. The leaves are teathed and oppositely arranged on the stems. In June and July, small green flowers bloom on long flower stalks. The flowers give way to reddish orange berries. A common misidentification is for winter creeper is common periwinkle. They look quite similar, though the leaf edges of periwinkle are smooth compared to winter creeper's toothed edges. Unfortunately, periwinkle is also invasive.

Treatment

A foliar spray will almost always be the best method to treat wintercreeper. Leaves can be sprayed with a 3% triclopyr solution with 0.5% non-ionic surfactant until they are covered but not dripping wet. Surfactants help herbicide penetrate the leaf cuticle on waxy leaves like winter creeper. If the winter creeper is large, the main stem can also be cut and then treated with an herbicide.⁸⁵ Pulling the winter creeper can give some short-term benefits, but it's not a solution because of the runners and roots that the plant shoots out. Additionally, do not compost the plants; dispose of them in the trash.



Photograph by WJ Haydon

⁸³ "Top Garden Invasives / Native Alternatives."

⁸⁴ Ellen Jacquart, "Invasive Plants in Indiana," Indiana Native Plant Society, n.d.

⁸⁵ Jacquart, "Invasive Plants in Indiana."

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Identification of the most significant problem areas

Municipal Property	Invasive Species Confirmed	Timeline – In Progress
Millrace Park	Black jetbead, bittersweet, multiflora rose, winter creeper, honeysuckle	Current \$32,500 contract for 2 parcels of Millrace Park over 2 years.
Abshire Park	Poison hemlock, tree of heaven, reed canarygrass, phragmites, honeysuckle	Current \$2,350 contract for removal of 0.9 acres of phragmites in Abshire Park.
Shanklin Park	Poison hemlock, multiflora rose, honeysuckle, privet, thistle, phragmites	Current \$1,050 contract for 0.358 acres of phragmites at Shanklin Park.
Shoup Parsons Woods	Honeysuckle, dames rocket	
Mullet Park	Purple Loosestrife, phragmites, reed canarygrass	
Pumpkinvine Bike Path	Honeysuckle, multiflora rose	
Fidler Pond	Phragmites, reed canarygrass, thistle, mugwort	Current \$2,500 contract for removal of 1 acre of phragmites at Fidler Pond.
823 E Lincoln Ave	Phragmites	Current \$375 contract for removal of 0.06025 acres of phragmites in stormwater basin.
2427 Kercher Rd	Phragmites	Current \$3,425 contract for removal of 0.417 acres of phragmites in stowamter basin.
Mill Street Park		

