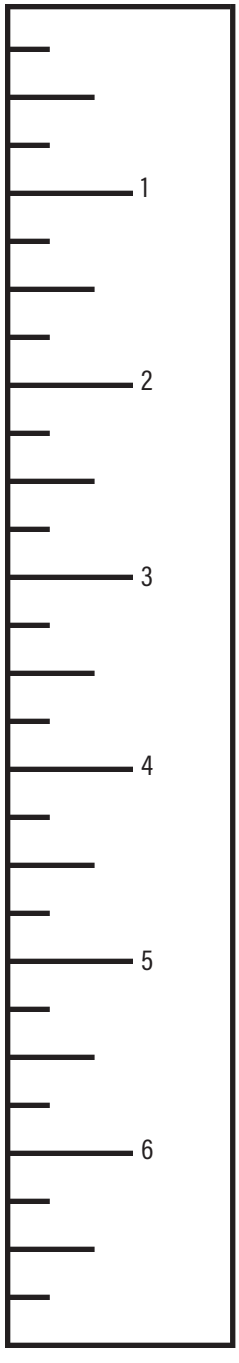
Roadside Vegetation Guidebook:

INDIANA PLANT IDENTIFICATION AND MANAGEMENT

PURDUE UNIVERSITY | Local Technical Assistance Program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INDIANA LTAP

This guidebook is brought to you by Indiana Local Technical Assistance Program (INLTAP). We provide help to street departments, highway departments, and local elected officials to better meet the needs of the public. We act as a resource for training, technical assistance, and technology transfer.

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PURDUE UNIVERSITY | Local Technical Assistance Program

OTHER CONTACTS

If you have other questions, please contact your regional specialist in the 2021 Indiana CISMA Directory at http://www.sicim.info/cisma-project

If you have plant-specific questions, contact Will Drews, Natural Resources Specialist and Chair of the Knox County Indiana Cooperative Invasives Management, at the following:

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Introduction

DISCLAIMER

This guidebook is meant to be used for informational purposes. INLTAP neither accepts responsibility for injury nor guarantees vegetation control results. Please contact the plant expert on page 1 with any questions or concerns.

When using herbicide control, be sure to read, understand, and follow all label directions when mixing and applying herbicides. Be sure to follow county and state regulations. Please contact the plant expert on page 1 with any questions or concerns.

ACKNOWLEDGEMENTS

Thank you to the following for providing plant information. This guidebook would not be possible without them.

Michigan Natural Features Inventory

Minnesota Wildflowers
a field guide to the flora of Minnesota

SICIM Southern Indiana Cooperative Invasives Management

The University of Georgia Center for Invasive Species and Ecosystem Health

Indiana Invasive Species Council

Vegetation control is a problem in Rights of Way (ROW). Before maintenance, it is beneficial to understand the plants in the ROW. Without proper identification, mowing and maintenance equipment could spread seeds. Also, spraying indiscriminately could have no effect on the target species and may harm desirable species.

Uncontrolled roadside vegetation can:

- overtake maintenance rotations
- outpace time and resources
- block signs and create sightline issues
- block the shoulder and drainage facilities
- buckle walkways, roads, parking areas, foundations, and masonry

This guidebook is a beneficial tool for ROW workers in identifying and managing roadside vegetation. Two types of plants will be discussed: native and invasive. For each plant, the following information is provided: identification characteristics, how and when to manage the species, and potential hazards. *Native plants* can be controlled when detrimental to workers' safety but should be allowed to grow where traffic control devices and sightlines are not blocked. *Invasive plants* should be controlled wherever possible and feasible. If invasive plants are not well controlled, they could take over and become harder to remove, potentially choking out native and beneficial plants. Invasive plants grow rapidly, form dense stands, and negatively impact the environmental, economic, and human health.

Personal Protective Equipment (PPE)

Example of road maintenence worker dressed in adequate PPE for manual removal: long-sleeved shirt, ripstop work pants, leather boots, leather gloves, and a face covering that protects the eyes.

Example of leather gardening gloves used for manually removing plants.

Personal Protective Equipment (PPE) is essential to protect yourself from injurious plants and safely perform chemical control of plant species. Side effects of coming in contact with certain plants could include mild to severe rash, skin irritations, skin abrasion, cuts, skin punctures, tire punctures, and poisoning if ingested. Plant specific side effects will be described later on.

What to wear during plant management and herbicide application:

- Long-sleeved shirts
- Ripstop work pants
- Leather boots with thick soles
- Leather gloves if manually removing plants
- Nitrile-coated gloves if using herbicides
- Goggles

Check herbicide label for specific mixing or application PPE requirements.

Herbaceous: "herb-like," recognizable by the absence of woody tissue.

FORB

Any herbaceous plant that is not a grass or grass-like.

Beefsteak Plant
Bull Thistle
Canada Thistle
Common Teasel
Cow Parsnip
Cutleaf Teasel
Dame's Rocket
Giant Hogweed
Japanese Hedge Parsley
Japanese Knotweed
Mugwort
Musk Thistle
Narrowleaf Bittercress
Poison Hemlock
Queen Anne's Lace
Sericea Lespedeza
Spotted Knapweed
White Sweet Clover
Wild Parsnip
Yellow Sweet Clover

Beefsteak Plant

Perilla frutescens • **Invasive** • **Grows 3 feet tall** • **Annual**

LEAVES

The Beefsteak Plant has a paired leaf arrangement with long leafstalks called petioles. The leaves can be green, purple, or a combination of green tinged with purple. Wide at the base, the leaf is 3" to 7" long and narrows to a tip. The leaf margins are saw-like with a sharp, serrated appearance.

STEMS

The stems can range from 3' to 5' in height. The hairy and square stems can have a green or dark purple color.

FRUIT

The fruit are imperfectly spherical, called sub-globose. They are **reticulate** small nuts called nutlets that are grayish-brown and about 1/16" in diameter.

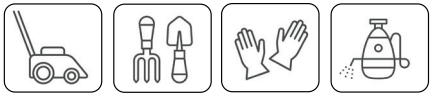
FLOWERS

The Beefsteak Plant has small flowers that range from white to purple. They are arranged in tight spikes.

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:



- Mowing
- Digging
- Hand-pulling
- Spraying with: 2,4-D and glyphosate

Reticulate: a surface level web-like network. A common fruit example is a cantaloupe.

Bull Thistle

Cirsium vulgare • **Invasive** • **Grows 5 feet tall** • **Biennial**

WARNINGS & ADVISORIES:

Prickles and spines along stems and leaves can cause skin irritations and abrasions.

Tomentose: covered in dense, matted, woolly hairs.

METHODS OF CONTROL:

- Continuous mowing
- Digging
- Hand-pulling
- Spraying with: 2,4-D, triclopyr, clopyralid, or aminopyralid. Spray before flowering.

SEASON SPECIFIC:

- Blooming season is spring through fall.
- Recommended chemical control season is fall through spring.

LEAVES

The leaves of the Bull Thistle are lobed, meaning they have protrusions instead of a simple, smooth shape. They are very hairy with spine-tipped teeth and grow up to 12" long. Young leaves or leaves at the base of the plant are often **tomentose** with gray and hairy undersides.

STEMS

The stems have protruding flaps covered in spines called spiny wings. Additionally, the stems are branched.

FRUIT

The fruit of the Bull Thistle are small and light brown. They have 1/16" long pappus-like hairs for wind dispersal, similar to dandelions.

FLOWERS

The Bull Thistle has a composite flowerhead, meaning it is made up of many smaller flowers. The tip has pink to purple disk flowers. Rarely, the flowers can also be white. The bracts which come below the tip have long upcurved spines that are 1½" to 2" in diameter and 1" to 2" long.

Canada Thistle

Cirsium arvense • **Invasive** • **Grows 5 feet tall** • **Perennial**

LEAVES

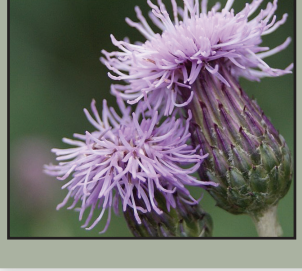
The leaves of the Canada Thistle are sessile, meaning they come right out of the stem without a connective leafstalk. They are irregularly lobed, meaning they have protrusions instead of a simple, smooth shape. They have spine-tipped teeth and their hairiness can vary.

STEMS

The stems are grooved and branch near the top. They have no spines.

FRUIT

The fruit are small and light brown. They have pappus-like hairs for wind dispersal, similar to dandelions.



FLOWERS

The Canada Thistle has a composite flowerhead, meaning it is made up of many smaller flowers. The tip has pink to purple disk flowers. Rarely, the flowers can also be white. The bracts which come below the tip are purpleish-green and **appressed** with tiny spines up to 1/16" long.

WARNINGS & ADVISORIES:

Prickles and spines along stems and leaves can cause skin irritations and abrasions.

METHODS OF CONTROL:

- Spraying with: foliar spray like 2,4-D, triclopyr, clopyralid, or aminopyralid. These are most effective with two applications per season: in fall, on new growth just after mowing; and in spring, just before flowering. Some require 5 to 10 years of ongoing efforts as this species is extremely difficult to eradicate.

SEASON SPECIFIC:

- Blooming season is spring through fall.
- Recommended chemical control season is fall through spring.

Appressed: laying flat or pressed down

Common Teasel

Dipsacus fullonum • **Invasive** • **Grows 6 feet tall** • **Biennial**

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

Unlobed: having a simple, smooth leaf shape without "lobes" or protrusions.

METHODS OF CONTROL:

- Digging
- Prescribed burning
- Spraying with: triclopyr application to foliage and stems.
- Cutting

Achene: dry, one-seeded fruit that doesn't release the seed. A common example is a sunflower seed.

SEASON SPECIFIC:

- Blooming season is summer.

LEAVES

The leaves of the Common Teasel are oblong, **unlobed** and prickly. On flowering plants, the leaves clasp around the stem, forming a cup.

STEMS

The stems are branched, robust, angled, prickly, and can reach up to 6' tall.

FRUIT

The fruit are hairy **achenes** that measure up to ¼" long. Each plant can produce as many as 2,000 seeds which can remain viable for 2 years.

FLOWERS

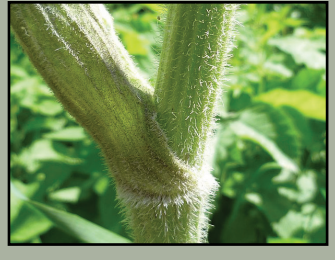
The flowers are purple and pink. One egg-shaped head can have 200 to 1,000 small flowers clustered densely. There are bracts, or stiff, spiny protrusions, under the flowers.

Cow Parsnip

Heracleum maximum • **Native** • **Grows 4–10 feet tall** • **Perennial**

LEAVES

The leaves are lobed and softly hairy with fine, sharp teeth around the edges. They are palmately compound in 3's, which means three leaves emerge like fingers on a hand from one center. The leaves at the bottom of the plant can be up to 18" long and wide, but they get smaller higher up on the stalk.



STEMS

The stalk is long and sheathed where it clasps the stem, seen in the photo to the left. The stems are upright, stout, and hollow. The stems, stalks, and sheaths are all covered in short fine hairs.

FRUIT

The fruit are flat and vary from oval to heart-shaped. They are ¼" to ½" in size. They sprout green but mature to brown and split into 2 seeds. The mature seeds are ribbed along the edges, have 3 or 4 vertical lines, and are often finely hairy.

FLOWERS

Each flower has five heart-shaped petals that come in clusters, called umbels, made of up to 30 flowers. Individual flowers are about ¼" across, having 5 white-tipped stamens around a creamy button center. Flowers bloom May through June.

WARNINGS & ADVISORIES:

Burns and blisters can form from exposure to the clear, watery sap in the leaves and stems. It contains a phototoxin that causes the skin to be hypersensitive to sunlight.

METHODS OF CONTROL:

- As a native species, this plant only needs control when detrimental to a worker's safety or when interfering with the visibility of traffic or traffic control devices.
- Mowing: mow dense carpets of seedlings after the mature plants have been removed.
- Spraying with: translocated herbicides. Application is most effective in warm, dry weather. Treated areas should not be mowed or cut for 2 to 3 weeks afterwards.
- Mulching or covering can be used after plants have been mowed or weed-whacked to prevent reinfestation.
- Cutting: cut when plants are about to flower.

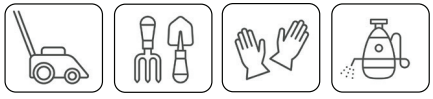
Cutleaf Teasel

Dipsacus laciniatus • **Invasive** • **Grows 6–7 feet tall** • **Biennial**

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:



- Mowing: frequent mowing throughout growing season.
- Digging: for small infestations.
- Hand-pulling: for small infestations.
- Spraying with: any of the several readily available general-use herbicides.

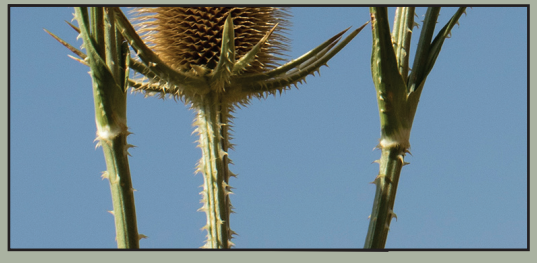
SEASON SPECIFIC:

- Blooming season is summer.

Achene: dry, one-seeded fruit that doesn't release the seed. A common example is a sunflower seed.

LEAVES

Leaves of the Cutleaf Teasel are oblong, prickly, and very deeply lobed. The leaves of flowering plants clasp around the stem to form a cup.



STEMS

The stalks of the Cutleaf Teasel branch near the top of the plant. They are strong, prickly, and can reach up to 6' tall.

FRUIT

The fruit are hairy **achenes** that measure up to ¼" long. Each plant can produce as many as 2,000 seeds that can remain viable for 2 years.

FLOWERS

200 to 1,000 small white flowers are clustered into a dense egg-shaped head.

Dame's Rocket

Hesperis matronalis • **Invasive** • **4 feet tall** • **Perennial & Biennial**

LEAVES

The Dame's Rocket has simple leaves, meaning one leaf is not comprised of a set of smaller leaflets. The leaves are alternate, meaning they climb the stalks independently and not in pairs. They have short hairs and little "teeth" along the edge of the leaf.

STEMS

The stems of the Dame's Rocket are branched both at the base and top of the plant. They are erect, or standing straight, and hairy.

FRUIT

The fruit are elongated, slender pods that can be as long as ½". They contain many seeds. The seeds are rounded and dark reddish-brown, ripening from June through August.

FLOWERS

The flowers of Dame's Rocket come in large, loose, rounded **inflorescences** of white, pink, or purple four-petaled flowers. They have a sweet and spicy aroma, much like clove.

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:

- Hand-pulling: pull plants while the soil is moist. The pulled flower and seed heads must be burned or placed in a landfill to prevent seed development.
- Spraying with: foliar herbicide treatment, most effective in early spring or late fall while native species are dormant.
- Control efforts should continue for several years until the seed bank is exhausted.

SEASON SPECIFIC:

- Blooming season is spring through summer.
- Recommended chemical control season is fall through spring.

Inflorescence: a group of small flowers comprising one head. A common example is a hydrangea.

Giant Hogweed

Heracleum mantegazzianum • **Invasive** • **Grows 8–10 feet tall** • **Perennial & Biennial**

WARNINGS & ADVISORIES:

Burns and blisters can form from exposure to the clear, watery sap in the leaves and stems. It contains a phototoxin that causes the skin to be hypersensitive to sunlight.

Ribs: raised ridges that run the entire length of a stalk or leaf.

METHODS OF CONTROL:

- Digging: for small infestations.
- Spraying with: glyphosate in spots if there is no desirable vegetation. If in a grassy area, use a selective broadleaf herbicide.

LEAVES

The leaves of the Giant Hogweed are very large, flat, and jagged. They are typically wider than they are long, are hairless, and grow in groups of three.

STEMS

The stems are very large with purple spots. They are hollow and covered in hairs. They have vertical **ribs** and develop branches as they prepare to flower.

FRUIT

The fruit are flattened, round, green disks that are covered in hairs. As they mature, they turn brown.

FLOWERS

The flower heads are found as an upright, flat-topped, or rounded formation of clustered smaller flowers known as an umbel.

Japanese Hedge Parsley

Torilis japonica • **Invasive** • **Grows 2–4 feet tall** • **Annual**

LEAVES

The compound leaves climb the stalk alternately, meaning they do not come in pairs. However, within the compound leaf, the smaller leaves are pinnately divided, meaning they have a mirrored leaf segment across the midline. They are found 2" to 5" long.

STEMS

The stems are ridged and branched. When pulled, they expose a thick **taproot**.

FRUIT

The fruit are small, cylindrical, and covered with upward-hooking hairs.

FLOWERS

The flowers are 5-petaled, tiny, and white. They are found in small, flat-topped clusters called umbels.

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:

- Mowing: mow plants before blooming season.
- Hand-pulling: pull plants before blooming season.
- Spraying with: glyphosate or triclopyr in early spring and when resprouting after mowing.

Taproot: a singular, thick root system. A common edible taproot is a carrot.

SEASON SPECIFIC:

- Blooming season is June through September.
- Recommended chemical control season is late spring through midsummer.

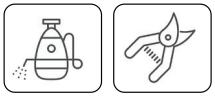
Japanese Knotweed

Fallopia japonica • **Invasive** • **Grows 8–10 feet tall** • **Perennial**

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:



- Spraying with: foliar herbicide. Spray after cutting early in the season, then spray again while plants are still short enough to spray efficiently.
- Cutting: cut early in the season.
- Multiple control strategies may be needed for a single population, as Japanese Knotweed resprouts vigorously after cutting, mowing, tilling, and digging.
- Be sure to remove all cut plant materials and incinerate or place in landfill.

SEASON SPECIFIC:

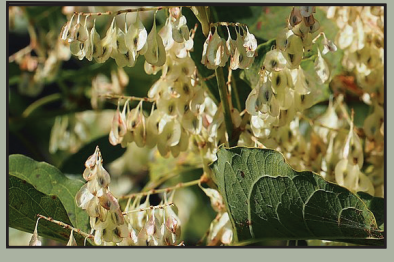
- Blooming season is the summer.

LEAVES

The leaves of the Japanese Knotweed climb at intervals without a paired leaf, which is called an alternate arrangement. These hairless leaves can be up to 6" long, sticking somewhat perpendicular from their branches with a small sheath at the base called an ocreae.

STEMS

The stems profusely branch in clusters, meaning a lot of branches stem from the stalk in a localized area. The stems themselves are stiff, hairless, and hollow. They are also glaucous, meaning they have a fine waxy coating.



FRUIT

The fruit are smooth, brown achenes. Achenes are dry one-seeded fruit that don't release their seed; a common example is a sunflower seed. The Japanese Knotweed fruit have "wings" that can be flat or wavy for wind dispersal.

FLOWERS

Japanese Knotweed flowers range from cream to green, clustered in elongated groupings called panicles, found both at the tips and along the branches of the plant.

Mugwort

Artemisia vulgaris • **Invasive** • **Grows 5 feet tall** • **Perennial**

LEAVES

The leaves of Mugwort climb its branches in an alternate pattern, which means it appears in intervals without a second leaf emerging from the stem with it as a pair. The upper surface of the leaves are green and hairless, whereas the bottom surface may be bicolored and hairy. They grow from 2" to 4" long, and crushed leaves can produce an unpleasant odor.

STEMS

The stems are reddish-brown with hairy, grooved, and **parallel** twigs. As the plant matures, the stem can become woody. Instead of standing erect, the stems are angled.

FRUIT

The fruit of the Mugwort are small achenes, which are dry, one-seeded fruit that don't release their seed; a common example is a sunflower seed.

FLOWERS

The flowers are small and can be hard to spot. They are an indistinct yellowish-brown, clustering at the top of the plants. The flower heads grow up to ⅛" wide and are on short stalks.

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:

- Spraying with: non-selective systemic herbicide. Spray in the spring and repeat in the fall. Mugwort is relatively tolerant of most herbicides.
- Pulling weeds is unsuccessful. Mulching beds can be used to reduce growth.

Parallel: a growth pattern where each twig or leaf is paired along the stalk with a second twig or leaf at the same point, growing in the opposite direction.

SEASON SPECIFIC:

- Blooming season is late summer.
- Recommended chemical control season is late spring through fall.

Musk Thistle

Carduus nutans • **Invasive** • **Grows 1–7 feet tall** • **Biennial**

WARNINGS & ADVISORIES:

Prickles and spines along stems and leaves can cause skin irritations and abrasions.

METHODS OF CONTROL:

- Mowing: patches continously for contol.
- Hand-pulling: is most effective on small populations. It can be done throughout the year, but is most effective prior to seed development.
- Spraying with: foliar spray of 2,4-D, triclopyr, clopyralid, or aminopyralid. Try to spray before flowering. Target in fall or early spring.

SEASON SPECIFIC:

- Blooming season is spring to summer.
- Recommended chemical control season is fall through spring.

LEAVES

Musk Thistle leaves have coarse lobes, or rough protrusions in the overall shape of the leaf. They have sharp edges with spine-tipped teeth. The dark green leaves have a smooth, waxy surface with a light green midrib, and can grow up to 10" to 12" long.

STEMS

The Musk Thistle has branched stems, covered in spine-tipped leafy wings, or flaps, that are often covered with bristly hairs.

FRUIT

The fruit are small and light brown, found at the base of a fluffy, hair-like pappus for wind dispersal. A common example of pappus is found on a white, mature dandelion.

FLOWERS

Musk Thistle has a composite flowerhead, formed from a bundle of many pink to purple disk flowers. At maturity, the flowerheads can nod, or droop, up to 90 degrees. Musk Thistle blooms in the plant's second year, accompanied by 1½" to 3½" long bracts, or leafy protrusions under the flowerhead.

Narrowleaf Bittercress

Cardamine impatiens • **Invasive** • **2 feet tall** • **Annual & Biennial**

LEAVES

The leaves are **pinnately compound** with 6 to 20 sharply toothed leaflets, or smaller leaves that make up a bigger leaf. In the first year, Narrowleaf Bittercress forms a **rosette** with different shaped leaves than the upcoming years. Compare the image to the left and the image above for first year versus the growth of later years.

Pinnately compound: leaflets are mirrored over the midline of the leaf. A common example is a fern.

Rosette: a circular arrangement of growth, mimicking the arrangement of petals on a rose.

STEMS

The stems of Narrowleaf Bittercress are erect and glabrous, meaning they stand straight and are free from any hair.

FRUIT

The fruit are slender seedpods that range from ½" to ¾" long with 10 to 24 seeds. These fruit form on connective stalks called pedicels that are either erect, meaning upright; or ascending, meaning upturned.

FLOWERS

Narrowleaf Bittercress has small, white flowers that grow up to ⅛" long. The petals can be shorter than the sepals, or protective cup around the base of the flowers.

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:

- Hand-pulling: remove all plants before seed dispersal.

SEASON SPECIFIC:

- Blooming season is May through September.

Poison Hemlock

Conium maculatum • **Invasive** • **Grows 3–9 feet tall** • **Biennial**

WARNINGS & ADVISORIES:

Can cause severe rashes when oils of plant come in contact with exposed skin and can cause chemical burns in combination with sunlight. All parts of the plant are extremely poisonous if ingested.

METHODS OF CONTROL:

- Mowing: mow once it first flowers around June, then again when the resprouts flower. The mowing regimen should be maintained for 3 consecutive years.
- Spraying with: 2, 4-D foliar spray or other broadlead specific herbicide in fall to get the overwintering rosettes, and in spring to get the seedlings.

SEASON SPECIFIC:

- Blooming season is spring to summer.
- Recommended chemical control season is fall through May.

LEAVES

The leaves of Poison Hemlock are comprised of two or three leaflets. These hairless, compound leaves can be up to 18" long and 12" across. The edges of the leaves are dentate, having a serrated look like the edge of a saw.

STEMS

The stems of Poison Hemlock are light green with purple spots, hairless, and hollow. They are also glaucous, meaning they have a powdery, waxy finish like that on a grape.

FRUIT

The fruit are broadly ovate, meaning they are the shape of a very stout egg. The fruit is a schizocarp, or a dry fruit that splits into single-seeded parts. Also, the fruit have wavy, longitudinal "ribs," or ridges that run up and down the fruit.

FLOWERS

Poison Hemlock has flowers made from smaller clusters called umbellets, making up the larger unit of the compound flower, the umbel. Each umbel consists of 8 to 16 umbellet clusters, consisting of 12 to 25 small, white flowers.

F
0
R
B

Poison Hemlock may look unalarming, but contact with skin causes severe burns and ingesting small amounts can be fatal.

F
0
R
B

Poison Hemlock can be distinguished from other look-a-like white flowering Carrot Family plants by its earlier flowering time and tall growth habit.

Queen Anne's Lace

Daucus carota • **Invasive** • **Grows 2–4 feet tall** • **Biennial**

LEAVES

The leaves of Queen Anne's Lace have a distinct, carrot-like odor. They are pinnately compound, meaning there are small, mirrored leaflets comprising one large leaf. The leaflets are finely divided with a fern-like appearance.

STEMS

The stems of Queen Anne's Lace are hairy, hollow, grooved, and branch near the top. They are erect, or very stiffly upright, and may be reddish at the base.

FRUIT

The small, brown fruits are dry and ribbed, or ridged, with bristly hairs. The fruits have hooked spines that can attach to clothing or animal fur which aids in dispersal. One plant can produce up to 40,000 seeds in a season.

FLOWERS

Queen Anne's Lace has small, white, 5-petaled, flowers in clusters called umbels that occur at the end of the stems. It produces a succession of flowering stalks until it dies with the first frost.

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:

- Mowing: mow close to the ground before seeds form in mid to late summer.
- Hand-pulling: pull before seeds form in mid to late summer.
- Spraying with: any of the several readily available general use herbicides such as 2,4-D and triclopyr.

SEASON SPECIFIC:

- Blooming season is midsummer.
- Recommended chemical control season is summer.

Sericea Lespedeza

Lespedeza cuneata • **Invasive** • **Grows 3–6 feet tall** • **Perennial**

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:

- Mowing: mow in flowerbud stage for 2 to 3 consecutive years.
- Burning is not recommended as it can result in even more plants.
- Spraying with: any of several readily available general use herbicides such as triclopyr, glyphosate, clopyralid, and metsulfuron methyl in early to mid summer.
- Cutting: cut plants low to the ground.

SEASON SPECIFIC:

- Blooming season is summer to fall.
- Recommended chemical control season is summer.

LEAVES

The leaves have three wedge-shaped, bristle-tipped leaflets that are densely hairy on the underside. The upper surface can be sparsely hairy. The ½" to 1" long leaves have a grayish-green or silver appearance.

STEMS

The stems are hairy, standing upright or stiffly angled. Sericea Lespedeza stems can have a woody appearance near the base.

FRUIT

The fruit are subglobose, or nearly spherical. They are appressed, or pressed closely to the stalk. A single hairy seed forms per flower that is small, shiny, and slightly flattened. Their color ranges from tan or olive to purple.

FLOWERS

The ¼" flowers are white to pale yellow with pink to purple colored veins. They are found alone, or in small clusters of 2 to 4 flowers. Some flowers remain closed and self-pollinate.

Spotted Knapweed

Centaurea stoebe • **Invasive** • **4 feet tall** • **Biennial & Perennial**

LEAVES

The leaves of Spotted Knapweed are gray-green and covered in rough hairs. They are deeply divided, or almost split into separate leaflets. **Rosette** leaves, or leaves growing in the arrangement like petals on a rose, grow up to 6" long. The leaves branching from stems climb the stalk alternately, or without a paired leaf.

STEMS

Spotted Knapweed has 1 to 7 upright, hairy, rough stems that branch on the upper half of the plant.

FRUIT

Spotted Knapweed can produce hundreds to thousands of small seeds per plant. They are wind-dispersed for short distances, but can be carried long distances by humans and animals. The seeds remain viable in soil for up to 7 years.

FLOWERS

The flowerheads range from pink to purple, and can rarely be found in white. Below the flowerhead, stiff bracts, or the leafy part of the flower, have black, fringed hairs.

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:

- Hand-pulling: pull or dig plants in small infestations and remove entire root. Remove flowers and seed heads from site to prevent further growth.
- Spraying with: foliar herbicide application of **rosettes**, most effective before the stem elongates.
- Continue control efforts until the seed bank is exhausted.

Rosette: a circular arrangement of growth, mimicking the arrangement of petals on a rose.

SEASON SPECIFIC:

- Blooming season is summer through fall.

White Sweet Clover

Melilotus alba • **Invasive** • **5 feet tall** • **Biennial & Annual**

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:

- Hand-pulling: pull first year plants in fall. After the root-crown buds have developed, pull second year plants before flowering. Flowering plants should be removed and disposed of so seeds do not develop.
- Poorly planned prescribed fire will increase infestations. Multiple hot burns needed with critical timing. The burns are also dependent on population age structure.
- Spraying: a single burn may also be combined with herbicide application.

SEASON SPECIFIC:

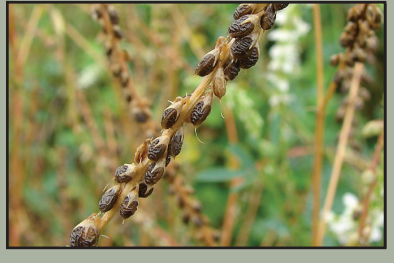
- Blooming season is May through September.

LEAVES

The leaves of White Sweet Clover are comprised of three leaflets, making up the classic clover leaf shape. Each leaflet has fine teeth, or ridges along their edges.

STEMS

There are many smooth, upright branches that are often found hollow. These stems can be leafy and spread near the base, giving the plant a busy appearance.



FRUIT

White Sweet Clover has seed pods containing 1 to 2 tiny, wrinkled, tough seeds. These seeds can remain viable for up to 30 years.

FLOWERS

Numerous white fragrant flowers are crowded onto elongated stems.

Wild Parsnip

Pastinaca sativa • **Invasive** • **Grows 5–7 feet tall** • **Biennial**

LEAVES

The leaves of Wild Parsnip are large and compound, with 2 to 5 mitten-shaped leaflets in young plants and 5 to 15 **pinnately compound** leaflets in mature specimens. Each leaflet is rimmed with fine teeth.

STEMS

The stems of Wild Parsnip stand upright and are unbranched, thick, hairless, and grooved. Like the root vegetable you find in the grocery store, Wild Parsnip has a thick, singular root called a taproot.

FRUIT

Wild Parsnip fruit are large, flat, round, and yellowish. These seeds can remain viable for up to four years.

FLOWERS

Small, yellow, 5-petaled flowers are found in flat clusters called umbels. These umbels can be up to 6" wide, and lateral flowers, or flowers farther from the center, usually extend further up than central flowers.

WARNINGS & ADVISORIES:

Can cause severe rashes, burns, and blisters when oils found in leaves, stem, and flowers come in contact with exposed skin.

Pinnately compound: leaflets are mirrored over the midline of the leaf. A common is example is a fern.

METHODS OF CONTROL:

- Mowing: mow once the plant first flowers in June and again for resprouts. This regimen should be maintained for at least 3 consecutive years.
- Spraying with: foliar spray of 2,4-D or other broadleaf specific herbicide. Spray in fall to target the overwintering rosettes and in April and May to target the seedlings.

SEASON SPECIFIC:

- Blooming season is June through July.
- Recommended chemical control season is fall through June.

Yellow Sweet Clover

Melilotus officinalis • **Invasive** • **3 feet tall** • **Biennial & Annual**

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:

- Hand-pulling: pull first year plants in fall. After the root-crown buds have developed, pull second year plants before flowering. Flowering plants should be removed and disposed of so seeds do not develop.
- Poorly planned prescribed fire will increase infestations. Multiple hot burns needed with critical timing. The burns are also dependent on population age structure.
- Spraying: a single burn may also be combined with herbicide application.

SEASON SPECIFIC:

- Blooming season is May to September.
- Control season is fall through spring.

LEAVES

The leaves of Yellow Sweet Clover are comprised of three leaflets, making up the classic clover leaf shape. Each leaflet has fine teeth, or ridges along their edges.

STEMS

There are many smooth, upright branches that are often found hollow. These stems can be leafy and spread near the base, giving the plant a busy appearance.

FRUIT

Yellow Sweet Clover has seed pods containing 1 to 2 tiny, wrinkled, tough seeds. These seeds can remain viable for up to 30 years.

FLOWERS

Numerous yellow fragrant flowers are crowded onto elongated stems.

GRASS

Any plant of the family Gramineae having jointed stems, sheathing leaves, and seed-like grains.

Chinese Maiden Grass
Common Reed
Japanese Stiltgrass
Johnsongrass
Ravenna Grass
Reed Canary Grass
Tall Fescue

Chinese Maiden Grass

Miscanthus sinensis • **Invasive** • **5–10 feet tall** • **Perennial**

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:

- Spraying with: any of several readily available general use herbicides such as glyphosate or imazapyr.
- Digging out plants will probably result in resprouts, thus requiring follow-up treatments. Similarly, discing and cutting methods may spread **rhizome** pieces into clean areas.

Rhizomes: horizontally growing roots.

SEASON SPECIFIC:

- Blooming season is fall.

LEAVES

The leaves of Chinese Maiden Grass are elongated with a silver-white midrib, or ridge down the center of the leaf. The tips of the leaves are sharp and recurving. Leaves can grow up to 3' in length and 1" across. The colored appearance of leaves can vary, carrying the characteristics of a parent plant.

STEMS

The stems are erect, standing vertically, although they are very flexible and can spread or droop. The stems bunch densely where they sprout at the base of the plant.

FRUIT

The seeds of Chinese Maiden Grass are dispersed mechanically, bursting open upon ripening. They can also be dispersed by the wind.

FLOWERS

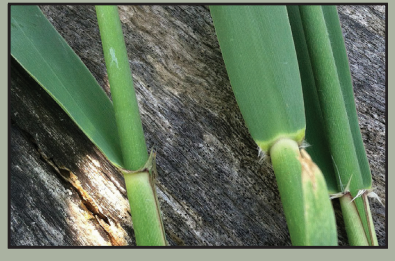
The flowers are fan-shaped, forming at the ends of stalks. They range from silvery to pale pink and grow 6" to 24" long.

Common Reed

Phragmites australis • **Invasive** • **Grows 3–16 feet tall** • **Perennial**

LEAVES

The blades of the Common Reed are long and tapering. They are 1" to 1½" wide at the base and extend 10" to 20" long. The blade surface is smooth but the edge of the blade can be rough.



STEMS

The stems of the Common Reed are hollow and bamboo-like. They turn yellow to tan in the fall.

FRUIT

The fruit are seeds with white hairs that form almost as long as the seed. Although thousands of seeds can be produced every year, these fruit typically have very low viability.

FLOWERS

The flowers of the Common Reed are large and feathery panicles, ranging from 5" to 16" long. They sprout purple-brown, but turn golden-brown to yellow with age.

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:

- Mowing: mow when ground is frozen to remove skeletons so new growth can be sprayed more easily in summer.
- Spraying with: glyphosate or imazapyr in late summer after flowering but before seed heads form.
- Burning, mowing, discing, and digging may stimulate populations. Cutting earlier in the season may facilitate spraying.
- Flooding cut stems with at least three feet of water for four months during the growing season may also provide control.

SEASON SPECIFIC:

- Blooming season is summer.
- Recommended chemical control season is summer through fall.

Japanese Stiltgrass

Microstegium vimineum • **Invasive** • **Grows 1–3 feet tall** • **Annual**

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:

- Hand-pulling: effective for small patches.
- Spraying with: any of the several readily available general use herbicides such as glyphosate and grass-specific herbicides like clethodim.

SEASON SPECIFIC:

- Blooming season is late summer and early fall.
- Recommended chemical control season is summer before fruit appears.

Achene: dry, one-seeded fruit that doesn't release the seed. A common example is a sunflower seed.

LEAVES

The narrow, lance-shaped leaves of Japanese Stiltgrass grow up to 3" long and are lightly hairy. There is a silvery stripe of reflective hairs along the centerline of the upper leaf surface.

STEMS

The stems are branched, root at nodes, and are thin and weak. This leads to a prostrate appearance where the leaves lay relatively flat.

FRUIT

Each plant produces 100 to 1,000 seeds which can remain viable in the soil for 5 or more years. Each seed is about ⅛" long. They are elliptic achenes, meaning they are elongated and ovular.

FLOWERS

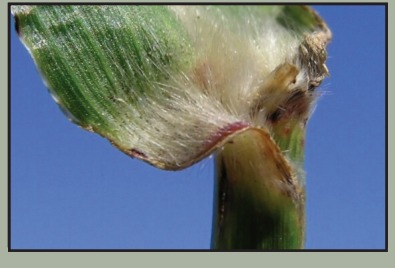
Japanese Stiltgrass has tiny flowers arranged on slender stalks that are 1" to 3" long.

Johnsongrass

Sorghum halepense • **Invasive** • **Grows 12 feet tall** • **Perennial**

LEAVES

The 2' long leaves climb the stalk in an alternate, not paired pattern. Each hairless leaf has a visible midrib, or line down the center of the leaf. The **ligule** is a small tuft of hair.



STEMS

The stalks of Johnsongrass are hairless. They are often purplish at the base of the plant.

FRUIT

The slender grain of Johnsongrass develops straight from the plant's spikelet, or cluster of seeds. The seeds are reddish-brown.

FLOWERS

Clusters called spikelets are arranged in a large, spreading, loose, elongated shape called a panicle.

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

Ligule: a small membrane at the junction of a blade of grass and its stalk.

METHODS OF CONTROL:

- Mowing: large infestations can be supressed by mowing or tilling.
- Spraying with: any of several readily available general use herbicides such as glyphosate. Multiple applications may be necessary.

SEASON SPECIFIC:

- Blooming season is summer through fall.

Ravenna Grass

Saccharum ravennae • **Invasive** • **13 feet tall** • **Perennial**

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:

- Mowing
- Spraying with: spot treatments of glyphosate before flowering, usually during the early summer months.

SEASON SPECIFIC:

- Blooming season is late summer and early fall.
- Recommended chemical control season is early summer.

Inflorescence: the entire flowering part of the plant, which can include flowers and accessory plant parts.

LEAVES

Each blade is about 3′ to 4′ long by ½″ to 1″ wide, producing a very long and narrow appearance. Clumps at the base of the plant can be 4′ to 5′ across. The blades appear gray-green with a white midvein down the center. The ligule is covered by long, fuzzy hairs.

STEMS

The stiff stalks of Ravenna Grass grow 5′ to 13′ tall and have a diameter of under ½″. Lower nodes, or joints of grass to stalk, have yellowish hairs. However, upper nodes are hairless below the **inflorescence**. Large stems can turn red when the plant is in flower. Old flowering stems can remain for one year or longer.

FRUIT

The fruit of Ravenna Grass are tiny seeds found within the flowering part of the plant.

FLOWERS

Inflorescences occur at the tips of the stem growing up to 2′ long by 4″ to 6″ wide. Primary panicles, or long, finger-shaped clusters, are 2½″ to 8″ long. Spikelets, or small seed clusters, are ⅛″ to ¼″ long and purplish. These spikelets have silky hairs and occur in unequal pairs, where the lower spikelet sprouts straight from the panicle and the upper spikelet is stalked.

Reed Canary Grass

Phalaris arundinacea • **Invasive** • **6 feet tall** • **Perennial**

LEAVES

The blades of Reed Canary Grass climb the stem alternately, or without a paired blade. The blades are flat, hairless, and gradually tapering. With coarse texture, they grow ¼" to ¾" wide and 3½" to 10" long.

STEMS

The stems are hairless bluish-green in color. They stand erect, stiff and upright.

FRUIT

Reed Canary Grass produces shiny, brown, smooth seeds that can germinate immediately after they become fully mature.

FLOWERS

The flowerheads are 3" to 6" long. They sprout green to purple and turn beige with age. The branches of the inflorescence, or complete flowerhead, spread when in bloom but are held close to stem at maturity.

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:

- Spraying
- Reseeding with desired plant species is beneficial. Burning, mowing, discing, and plowing must be ongoing as root fragments resprout, as one-time efforts may increase population. Monitoring and follow-up are required for 5 to 10 years until the seed bank is exhausted.
- This species is extremely difficult to eradicate. Research control options thoroughly.

SEASON SPECIFIC:

- Blooming season is spring.
- Recommended chemical control season is summer through fall.

Tall Fescue

Schedonorus arundinaceus • **Invasive** • **3–5 feet tall** • **Perennial**

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:

- Spraying with: a non-selective herbicide such as glyphosate in late winter while Bermuda grass is dormant. Two applications may be needed for complete control. Additionally, chlorsulfuron is a selective herbicide registered for the control of Tall Fescue. When spot applied, the Tall Fescue will slowly thin and die.
- The controlled area should be reseeded 7 to 14 days after the final application of herbicide. Thoroughly rake the area to remove dead plant material and ensure good soil-seed contact.

LEAVES

Tall Fescue has dark green blades that are 4″ to 24″ long and ⅛″ to ½″ wide. They are ridged on the upper surface and shiny on the lower surface. They have rough margins and a yellowish base. At the junction of blade to stem, the sheath is round and smooth and small, rounded flaps are found at the top of the sheath and fringed with hairs.

STEMS

The stems are smooth, round, and stand stiffly upright.

FRUIT

Tall Fescue has long, narrow seeds that grow up to ¼″ long. They are dark with a purplish tint upon maturity.

FLOWERS

Tall Fescue blooms in spike-like clusters in a flowerhead that reaches 2″ to 12″ long at the top of the stem.

SHRUB

A woody plant smaller than a tree, usually having multiple permanent stems branching from or near the ground.

Amur Honeysuckle
Autumn Olive
Bicolor Lespedeza
Black Raspberry
Border Privet
Burning Bush
Common Blackberry
Common Buckthorn
Glossy Buckthorn
Multiflora Rose
Russian Olive

Amur Honeysuckle

Lonicera maackii • **Invasive** • **Grows 12–16 feet tall** • **Perennial**

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:

- Digging: when digging, remove all roots and target large, fruit-bearing plants.
- Spraying with: foliar spray of glyphosate in large populations where few native species are present. Treat cut stumps with herbicide. Additionally, basal bark treatment is effective.
- Prescribed fire may provide effective contol of seedlings in fire-adapted communities.

SEASON SPECIFIC:

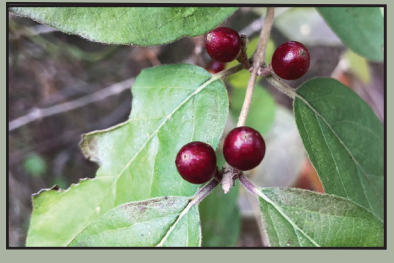
- Blooming season is May through June.

LEAVES

The leaves of the Amur Honeysuckle sprout opposite to each other on a stalk. The simple, elliptical shape starts growing early in the season. On the lower leaf surfaces of these 1½" to 3½" leaves you can find the veins to be hairy.

STEMS

Multiple hollow stems branch from the ground with many arching branches. The thick gray or tan bark has noticeable ridges.



FRUIT

The fruit of the Amur Honeysuckle are paired, orange-red to purple-red berries.

FLOWERS

On flowering Amur Honeysuckle, the flowers are small and tubular, or long and hollow like a tube. They range from white to pink and are found in pairs.

Autumn Olive

Elaeagnus umbellata • **Invasive** • **20 feet tall & 30 feet wide** • **Perennial**

LEAVES

Autumn Olive's 2" to 4" long simple leaves climb their branches alternately, or without a paired leaf. They typically have waxy edges and the upper surface can be bright or dull green. The underside of the leaves is silvery with brown scales. These leaves persist into winter.

STEMS

The bark can be ridged and deeply furrowed. While the outer bark is dark gray, the inner bark is yellow. The twigs of the Autumn Olive usually have u-shaped scars where leaves bud.

FRUIT

The ¼" fruit are bright red and fleshy. Although they are fleshy, they are achenes, meaning they are one-seeded and do not release their seed. Before maturity, they are found silvery with brown scales.

FLOWERS

The fragrant flowers of Autumn Olive are white to yellow. They have no petals and are tubular, or hollow and tube-shaped. Their scent is strong and similar to jasmine.

WARNINGS & ADVISORIES:

Large spurs along trunk and branches can puncture skin and tires.

METHODS OF CONTROL:

- Hand-pulling: hand pull seedlings.
- Cutting, girdling, and burning are ineffective without herbicide as they stimulate sprouting.
- Spraying with: triclopyr for basal bark and stem sprays. Foliar spray with 2,4-D, triclopyr, glyphosate or a combination of these. Apply glyphosate to cut stumps and fecon grind. Spray resprouts.
- Injection of herbicide into basal stem on dormant plants can provide excellent control.

SEASON SPECIFIC:

- Blooming season is spring.
- Recommended chemical control season is spring through fall.

Bicolor Lespedeza

Lespedeza bicolor • **Invasive** • **Grows 8–10 feet tall** • **Perennial**

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:

- Mowing: mow 1 to 3 months before herbicide application to assist control.
- Spraying with: Garlon 4 as a 2% solution, Escort at ¾ of an ounce per acre, Transline as a 0.2% solution, a glyphosate herbicide as a 2% solution, or Velpar L as a 2% solution. Thoroughly wet all leaves with a surfactant July to September.
- When using Escort, nontarget plants may be killed or injured by root uptake.
- Transline controls a narrow spectrum of plant species.

SEASON SPECIFIC:

- Blooming season is June to September.
- Recommended chemical control season is spring through summer.

LEAVES

Bicolor Lespedeza is a trifoliate, meaning it is a compound leaf made up of three leaflets. Each leaflet is usually 1½" long and 1" wide and can taper to a point or be rounded.

STEMS

The stems of Bicolor Lespedeza have a ½" diameter. Young stems are green and get darker with lenticels, or visible pores on their surface, as they age.

FRUIT

The small, black, bean-like seeds are produced in pods which open when they mature in late September to early October. They are considered legumes and contain one seed per pod.

FLOWERS

The flowers are pink to purple in color. They appear in late June to early July and bloom for 4 to 6 weeks.

Black Raspberry

Rubus occidentalis • **Native** • **Grows 6 feet tall** • **Perennial**

LEAVES

Black Raspberry comes in groups of 3 to 5 leaflets up to 3" long and 2" across. Along the edges, they are doubly serrate, meaning within the jagged edge, there are smaller teeth as well. The lower side of the leaf is white and **tomentose**.

STEMS

The stems are initially green and hairless but later turn brown and woody during the winter. Prickles are scattered along the length of each stem. With age, the stems arch toward the ground. They have a visible waxy coating and are therefore considered glaucous.

FRUIT

Each flower is replaced by a **compound drupe** that is initially white but becomes red, then blackish-purple when mature. These ⅓" long fruit are sweet and slightly tart in flavor.

FLOWERS

Each flower is about ½" across with 5 white petals. They grow in tight clusters, blooming for 2 to 3 weeks.

WARNINGS & ADVISORIES:

- Prickles and thorns along stem can puncture skin.

Tomentose: covered in dense, matted, woolly hairs.

METHODS OF CONTROL:

- As a native species, this plant only needs control when detrimental to a worker's safety or when interfering with the visibility of traffic or traffic control devices.
- When controlling nearby species, be aware of prickles and thorns.

Compound drupe: a fruit made up of smaller, fleshy, one-seeded parts.

SEASON SPECIFIC:

- Blooming season is spring through summer.

Border Privet

Ligustrum obtusifolium • **Invasive** • **Grows 15 feet tall** • **Perennial**

WARNINGS & ADVISORIES:

Large spurs along trunk and branches can puncture skin and tires.

METHODS OF CONTROL:

- Hand-pulling: small individuals can be pulled effectively.
- Spraying with: herbicide on foliage, bark, cut stems, and stumps.

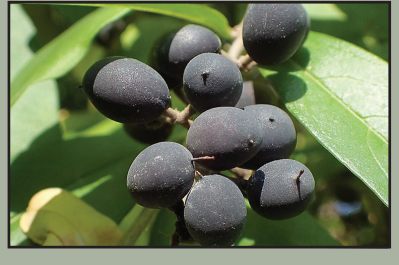
Lenticel: a visible pore on the surface of a woody plant that allows the passage of air.

LEAVES

The leaves of Border Privet climb twigs in a pair. The leaves are a tapering oval with smooth edges. They can grow up to 2" long. Along the midrib, or central ridge, on the bottom of the leaves, there can be fine hair. The leaves sprout almost directly from the twig.

STEMS

Border Privet has somewhat smooth gray bark with short, raised **lenticels**. Young twigs are light brown or dull reddish-purple and hairy. Spurs occur occasionally along the stems.



FRUIT

Border Privet has small black spherical drupes, or fleshy 1-seeded fruit. These fruit mature in late summer to fall.

FLOWERS

1" to 2" long white flowers form on panicles, or elongated clusters. The hairy stalks for the flowers range from light green or light brown to reddish-purple.

Burning Bush

Euonymus alatus • **Invasive** • **Grows 15–20 feet tall** • **Perennial**

LEAVES

Burning Bush has 1" to 3" long **elliptic**, simple leaves that have small teeth along the edges. They grow in an opposite, or paired pattern. They turn bright red in the fall before dropping.

Elliptic: the shape of an ellipse, or an elongated oval.

STEMS

The stems are green to brown in color and grow at an angle. They have two to four corky ridges or "wings" that often form along the length of young stems.

FRUIT

The fruit of Burning Bush are smooth red to purple capsules that appear in pairs. They turn purple in the fall and split open to reveal orange fleshy seeds, appearing from September to October.

FLOWERS

Burning Bush has small, greenish-yellow, hard-to-spot flowers that lay flat against nearby leaves.

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:

- Cutting or digging: cut or dig larger plants. Root systems can be removed with a spading fork or pulled with a weed wrench. Be sure to ground out stump and spray with glyphosate immediately.
- Spraying with: any of several readily available general-use herbicides such as glyphosate, imazapyr, or triclopyr.

SEASON SPECIFIC:

- Blooming season is May through June.

Common Blackberry

Rubus allegheniensis • **Native** • **Grows 3–6 feet tall** • **Perennial**

WARNINGS & ADVISORIES:

Prickles and thorns along stem can puncture skin.

Doubly serrate: having rough, jagged edges that have smaller teeth within.

METHODS OF CONTROL:

- As a native species, this plant only needs control when detrimental to a worker's safety or when interfering with the visibility of traffic or traffic control devices.
- When controlling nearby species, be aware of prickles and thorns.

SEASON SPECIFIC:

- Blooming season is spring through summer.

Stamen: male reproductive plant part comprised of an anther with pollen and a filament, or connective stalk.

LEAVES

Common Blackberry leaves grow along the stem in an alternate, or unpaired, arrangement. The compound leaves are made up of three to five leaflets stemming from the same point. The leaves grow up to 4" long and 3" across with **doubly serrate** edges. The lower surface of the leaves are light green and pubescent, or having hair.

STEMS

The ribbed stems of Common Blackberry are green where there is new growth at the tips, but are otherwise brown or reddish-brown. They also have stout prickles that are straight or somewhat curved.

FRUIT

The fruit are ¾" long and ⅓" across, but size varies with moisture levels. They are initially white or green, but eventually turn red, finally becoming almost black. They are seedy and have a sweet flavor when fully ripened.

FLOWERS

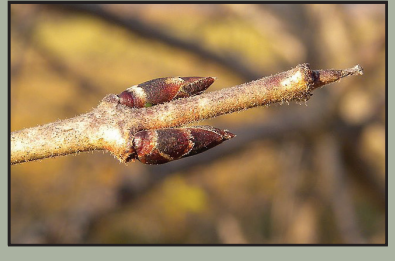
Flower clusters form with about 12 5-petaled white flowers. These clusters are longer than they are wide. The unscented flowers are about ¾" to 1" across, are rather rounded and often wrinkly, and in the center of each flower there are numerous **stamens**.

Common Buckthorn

Rhamnus cathartica • **Invasive** • **Grows 25 feet tall** • **Perennial**

LEAVES

The leaves of Common Buckthorn grow in pairs opposite to one another, or almost opposite. The upper surface of the leaves are dull green and hairless. The leaf shape is rounded and edged with teeth with 3 to 4 pairs of veins arching across the leaf. These leaves persist into winter.



STEMS

The stems are thin. When young, they are grayish-brown, shiny, and smooth. With age, they become dark brown, cracked, and roughened. The tips of the stems are often found with spines.

FRUIT

The fruit of Common Buckthorn are round, shiny, black **drupes**.

FLOWERS

Common Buckthorn's tiny, fragrant, yellow flowers are found in clusters among the leaves.

WARNINGS & ADVISORIES:

Spurs along stem can puncture skin and cause abrasions.

METHODS OF CONTROL:

- Hand-pulling and digging: hand-pull and dig seedlings and small plants.
- Spraying with: triclopyr as foliar spray which can be effective for large populations. Treat cut stumps with herbicide as they sprout. Also, basal bark treatments can be effective.
- Target large or fruit-bearing plants for control and removal.
- Where fuel is present, prescribed fire may provide effective control of seedlings in fire-adapted communities.

Drupe: fleshy fruit containing a single stony seed.

SEASON SPECIFIC:

- Blooming season is spring.

Glossy Buckthorn

Frangula alnus • **Invasive** • **Grows 20 feet tall** • **Perennial**

WARNINGS & ADVISORIES:

Spurs along stem can puncture skin and cause abrasions.

METHODS OF CONTROL:

- Hand-pulling: hand-pull seedlings.
- Burn with propane torch where densities are high.
- Target large or fruit-bearing plants for control and removal.
- Spraying with: triclopyr as basal bark herbicide. Also, treat cut stumps.
- Where fuel is present, prescribed fire may provide control for seedlings in fire-adapted communities.
- This species is difficult to control. Research control options thoroughly.

SEASON SPECIFIC:

- Blooming season is spring through summer.

LEAVES

Glossy Buckthorn grows 1" to 2½" long with smooth edges, often slightly wavy and glossy. They are shiny green and hairless with 8 to 9 prominent veins. The lower surface of the leaves can have some hair.

STEMS

The stems are thin. When young, they are reddish-brown and hairy. With age, they become smooth and gray or brown with lenticels. Lenticels are visible pores on the surface of a woody plant that allows the passage and exchange of air.

FRUIT

The fruits are drupes, or fleshy fruit with stony seeds. They are yellowish-red when immature, becoming dark purple with age. They have 3 to 4 seeds and are found July through September.

FLOWERS

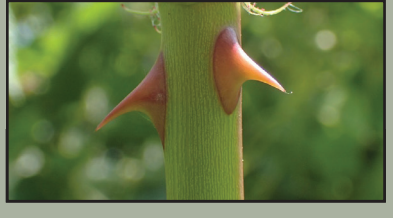
The flowers are 5-petaled, tiny, and yellow. They are found nestled within the leaves.

Multiflora Rose

Rosa multiflora • **Invasive** • **Grows 10 feet tall** • **Perennial**

LEAVES

The leaves of Multiflora Rose are comprised of 1" **pinnately compound** leaflets found in groups of 5 to 9. They have hairy stipules, or leaf-like growths at the base of the compound leaf. They are egg-shaped with sharp teeth along the edge. The tops of the leaves are hairless whereas the bottoms have some hair.



STEMS

The stems are reddish-green, becoming gray with age. They are stout, hairless, and their prickles are recurved, or curved downwards.

FRUIT

The fruit of Multiflora Rose are achenes, or dry one-seeded fruit that don't release their seed. A common example is a sunflower seed. This seed is surrounded by a glossy, red hip, which is a word for the fruit of rose plants.

FLOWERS

The flowers are 5-petaled and white, often with a pink blush. They are bisexual, meaning they contain both male and female reproductive parts. Each inflorescence, or cluster, has many flowers that are 1½" wide.

WARNINGS & ADVISORIES:

Prickles along stem can puncture skin and cause abrasions.

Pinnately compound: leaflets are mirrored over the midline of the leaf. A common example is a fern.

METHODS OF CONTROL:

- Mowing: mow several times throughout the growing season for several years.
- Digging: dig out small plants and remove all roots.
- Spraying with: herbicide on cut stems and basal bark on the bottom 18" of all stems. Foliar herbicide treatment with glyphosate is effective where few natives are present.

SEASON SPECIFIC:

- Blooming season is spring.

Russian Olive

Elaeagnus angustifolia • **Invasive** • **Grows 25 feet tall** • **Perennial**

WARNINGS & ADVISORIES:

Spurs along stem can puncture skin and cause abrasions.

METHODS OF CONTROL:

- Hand-pulling: manually remove seedlings and saplings before they mature.
- Ring barking can be used to kill older trees. Girdling and cutting can suppress growth but not control when used alone.
- Burning alone does not adequately control larger individuals. However, stump burning has been shown to be effective.
- Spraying with: 2,4-D, picloram, triclopyr, glyphosate, imazapyr, or tebuthiuron.

LEAVES

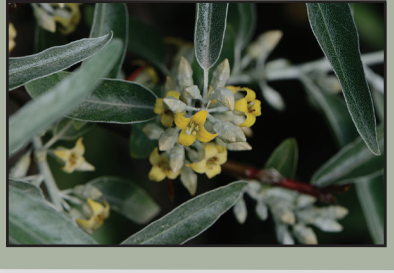
The leaves climb their twigs in an alternate pattern, or without a paired leaf. They are simple in shape, without lobes. They can be long and narrow, from 2" to 4" long. They appear silvery or gray-green with silvery star-shaped hairs and scales.

STEMS

Russian Olive's twigs and branches are sometimes thorny. Their twigs are gray and densely covered with silvery, shield-shaped scales.

FRUIT

The fruit are like drupes with a stony seed in the interior surrounded by a fleshy exterior. They grow about ½" to 1" long and are covered with silvery scales. Most fruits remain on trees until disturbed.



FLOWERS

The flowers of Russian Olive are highly fragrant and tiny, around ⅓" long. They have smooth edges and a narrow, bell-shaped body with four petal-like lobes.

TREE

A plant having a permanently woody main stem or trunk, ordinarily growing to a considerable height and developing branches at some distance from the ground.

Black Locust
Callery Pear
Honey Locust
Mimosa
Siberian Elm
Tree of Heaven
White Mulberry

Black Locust

Robinia pseudoacacia • **Native** • **40–82 feet tall & 12–25 feet wide** • **Perennial**

WARNINGS & ADVISORIES:

Paired spines under the leaves can cause cuts and abrasions.

METHODS OF CONTROL:

- As a native species, this plant only needs control when detrimental to a worker's safety.
- Spraying with: clopyralid and triclopyr for foliar applications. Basal bark treatment is also effective.
- Cutting: cutting and girdling will stimulate sprouting unless cut stumps are treated with herbicide.
- Fire stimulates resprouting.
- Mowing stimulates germination of the seed bank.
- The species is difficult to control.

SEASON SPECIFIC:

- Blooming season is May through June.

LEAVES

Black Locust has pinnately compound leaves up to 8" to 14" long made up of 7 to 21 smaller leaflets. Each of the leaflets is 1" to 2" long with smooth edges. They are hairless and bluish-green on the upper side but paler beneath.

BRANCHES & BARK

The twigs are covered with fine soft hairs, becoming smooth with age. They are green to reddish brown with a zigzag shape and two spines at each node. The bark is thick, deeply furrowed, and tan to gray-brown. However, the inner bark is orange.

FRUIT

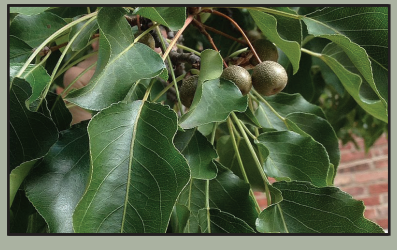
Black Locust has smooth, flat, dark brown seed pods that contain 4 to 8 seeds. They form in the fall but persist over winter.

FLOWERS

The 5-petaled flowers are white and very fragrant. A cluster called a raceme of 10 to 25 flowers hangs on a thin dangling pedicel, or flower stalk.

Callery Pear

Pyrus calleryana **• Invasive • 30–50 feet tall & 20–30 feet wide • Perennial**



LEAVES

The leaves of Callery Pear climb their twigs alternately, or without a paired leaf. They are a simple oval without lobes. They are shiny, slightly wavy, and have very fine teeth along the edges.

BRANCHES

The branches are reddish-brown to gray in color. They are stout, relatively large, fuzzy, and have light-tan buds on branch tips and along the branches. They grow in a deep V-shaped branching pattern.

FRUIT

Callery Pear has small greenish-brown round fruits that are ½" in diameter. They appear in late spring and summer and can form dense thickets of seedlings.

FLOWERS

The flowers of Callery Pear give off an unpleasant odor in the spring. They are 5-petaled and white, occurring early in the spring before leaves appear. They can be the first tree to flower.

WARNINGS & ADVISORIES:

Large, sharp spurs and thorns along trunk and branches can puncture skin and tires.

METHODS OF CONTROL:

- Spraying with: 2, 4-D, triclopyr, glyphosate, or a combination for foliar spray. Basal bark application with triclopyr. Cut stump application with glyphosate. Fecon grind and spray resprouts.
- Trees can be girdled during the spring and summer.

SEASON SPECIFIC:

- Blooming season is spring.
- Recommended chemical control season is spring through summer.

Honey Locust

Gleditsia triacanthos • **Native** • **30–50 feet tall & 25–35 feet wide** • **Perennial**

WARNINGS & ADVISORIES:

Thorns can cause abrasions and puncture tires.

METHODS OF CONTROL:

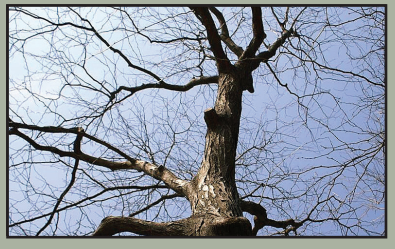
- As a native species, this plant only needs control when detrimental to a worker's safety or when interfering with the visibility of traffic or traffic control devices.
- Prescribed burning: successive spring and fall burns can reduce seedlings and sapling coverage.
- Spraying with: triclopyr as foliar or basal bark spray. Apply an herbicide like glyphosate on cut surfaces.
- Combination of cutting, girdling, and herbicide application will provide the most immediate and effective control.

SEASON SPECIFIC:

- Recommended chemical control season is spring through fall.

LEAVES

The compound leaves contain a varying number of small leaflets. They are dark green with a smooth edge, and sprout alternately on the stem, without a paired leaf. However, the leaflets sprout opposite, or with a paired leaflet.



BRANCHES & BARK

The twigs of Honey Locust are red-brown, shiny, and form a zigzag pattern. Bark on young trees is thin and light in color. With age, it turns almost black and breaks into peeling strips. They can have long thorns that can be found in groups.

FRUIT

Honey Locust has reddish-brown, shiny, twisted pods that are 10" to 18" in length and contain numerous seeds.

FLOWERS

Male and female flowers can be found on the same tree or on separate trees. They aren't readily visible and hang in dangling clusters.

Mimosa

Albizia julibrissin • **Invasive** • **Grows 20 feet tall** • **Perennial**

LEAVES

The leaves of Mimosa climb their twigs alternately, or without a paired compound leaf. They are bipinnately compound, having 20 to 60 small leaflets per branch. Many of these branches combined in pairs make a single leaf that is 6" to 20" long.

STEMS

The stems are smooth and light brown with lenticels, or visible pores for the exchange of air. Young stems are lime green in color.

FRUIT

The fruit of the Mimosa are flat, straw-colored pods that are 6" long. Inside, there are 5 to 10 light brown seeds about ½" long. These pods can persist on the tree throughout the winter.

FLOWERS

The flowers of Mimosa look like pom poms that are found in clusters at the end of twigs. They are fragrant, pink, and about 1½" long.

WARNINGS & ADVISORIES:

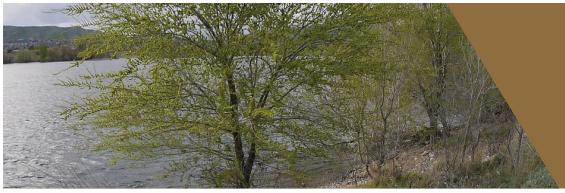
No additional precautionary measures needed.

METHODS OF CONTROL:

- Hand-pulling: hand-pull seedlings, removing seed pods.
- Spraying with: glyphosate or triclopyr on seedlings, small trees, cut stumps, and basal bark treatments.
- Cutting: if possible, power or manual saws can be used to cut trees at ground level. Cutting is an initial control measure and will require either an herbicidal control or repeated cutting for resprouts.
- Control is best achieved at flowering before seed production.

SEASON SPECIFIC:

- Blooming season is May through June.



Siberian Elm

Ulmus pumila • **Invasive** • **Grows 50–70 feet tall** • **Perennial**

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:

- Hand-pulling: hand-pull seedlings.
- Girdling: seedlings and large trees can be girdled. Girdling trees in late spring to midsummer is preferred.
- Spraying with: any of several readily available general use herbicides such as glyphosate or triclopyr.
- Cutting: cut large trees.

SEASON SPECIFIC:

- Recommended chemical control season is spring through summer.

LEAVES

The leaves of the Siberian Elm are small, smooth, and dark green with teeth along the edges. They are about 1" to 2½" long and pointed at the tip.

BRANCHES & BARK

The bark is rough, gray or brown, and shallowly furrowed at maturity. The twigs are nearly hairless with small buds.

FRUIT

After flowering, a single seed forms in the center of each flower. The seeds are smooth, flattened, circular, and ½" wide. They are covered in circular samara, or a winged sheath that doesn't release the seed.

FLOWERS

Small green flowers occur in drooping clusters of 2 to 5.

Tree of Heaven

Ailanthus altissima **• Invasive • 85 feet tall & 24–40 feet wide • Perennial**

LEAVES

The leaves of Tree of Heaven are pinnately compound, having 11 to 41 paired leaflets climbing a twig to make a 1' to 4' long single leaf. The leaflets are dark green above and pale green below and turn yellow in fall. When crushed, the leaves smell like rancid peanut butter.

BRANCHES & BARK

The bark is smooth and pale gray and can develop fissures with age. The twigs are light chestnut-brown. Leaf scars that are found where leaves used to sprout are large and heart or shield shaped.

FRUIT

Yellow to pinkish **two-winged** fruit are twisted and arranged in large clusters. The seeds are located near the middle of the fruit.

FLOWERS

The flowers of Tree of Heaven are small and yellowish-green with 5 to 6 petals. They are arranged on a branching panicle, or elongated cluster. They bloom in late spring. Male flowers emit a foul odor.

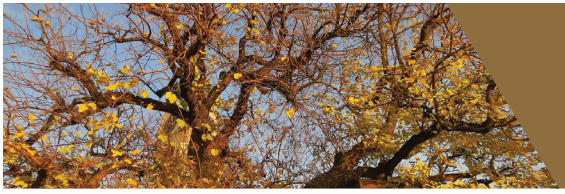
WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:

- Spraying with: foliar herbicide on small trees. Use an oil-based product containing triclopyr for: basal bark applications during fall, cut stump treatment, or treatment for stems under 6 inches. All stems in a clone must be treated.
- Vigorously cutting, girdling, mowing, and burning are not recommended.
- Girdling followed by herbicide or basal bark applications is the most effective.

Wing: flap surrounding the seed.



White Mulberry

Morus alba • **Invasive** • **Grows 30–50 feet tall** • **Perennial**

WARNINGS & ADVISORIES:

All parts of the plant are toxic if ingested except for fully ripened berries. Unripe berries are toxic.

METHODS OF CONTROL:

- Hand-pulling: hand-pull seedlings.
- Spraying with: foliar applications of triclopyr or glyphosate.
- Cutting: for trees, cut and grind the stump. Paint the cut surface with a systemic herbicide like glyphosate or girdle the tree.

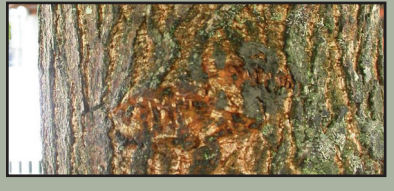
SEASON SPECIFIC:

- Blooming season is spring.

Catkin: a flower cluster in the shape of a spike that typically holds only one sex.

LEAVES

The 4" long leaves of the White Mulberry climb their twigs alternately, or without a paired leaf. They vary from lobed to unlobed, with or without protrusions along the edge changing their shape. They have blunt teeth along their edges and a shiny upper surface with a dull lower surface, occasionally with hairs on the veins. When the leaf stalk is broken, they exude milky sap.

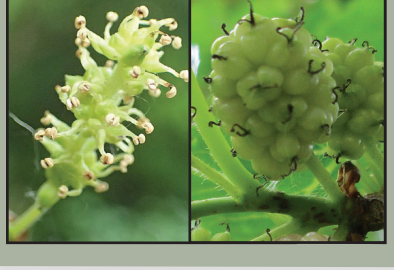


BRANCHES & BARK

The branches and bark are gray when young, but mature into a brown. Furrows in older bark can expose orange inner bark.

FRUIT

The White Mulberry produces a multiple fruit that varies from white to red to black. A multiple fruit is formed from many small flowers.



FLOWERS

Male and female flowers are usually found on separate plants. While male flowers are arranged in a thinner **catkin**, the stouter female flowers are arranged in a shorter cluster. They range from green to yellow.

VINE

Any plant having a long, slender stem that trails or creeps on the ground or climbs by winding itself about a support or holding fast with tendrils or claspers.

Bristly Greenbrier
Chinese Wisteria
Common Greenbrier
Crown Vetch
Field Bindweed
Japanese Honeysuckle
Japanese Hops
Poison Ivy
Sweet Autumn Clematis
Wintercreeper

Bristly Greenbrier

Smilax hispida • **Native** • **Grows 10–20 feet long** • **Perennial**

WARNINGS & ADVISORIES:

Sharp, black spines on stems can puncture skin and tires.

METHODS OF CONTROL:

- As a native species, this plant only needs control when detrimental to a worker's safety or when interfering with the visibility of traffic or traffic control devices.
- Hand-pulling: for single plants, hand removal is best.
- Spraying with: glyphosate for larger infestations.

SEASON SPECIFIC:

- Blooming season is late spring to early summer.

Tepal: a part of some flowers that is neither a petal or a sepal that encloses the petals.

LEAVES

The leaves of the Bristly Greenbrier grow up to 5" long and 4" across. They usually have smooth edges and are hairless. On the leaves, 3 to 7 arching veins can be seen.

STEMS

Young stems are green, becoming woody with age. The lower stems have stout, straight spines and stiff bristles whereas the upper stems are less heavily guarded. These spines and bristles become dark brown or black with age.

FRUIT

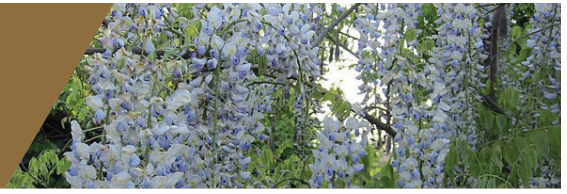
The fruit develops from a pistillate flower, from the female pistil of the plant. They become fleshy berries about ¼" across that range from dark blue to black and contain 1 to 3 seeds.

FLOWERS

Each umbel, or flower cluster, has 8–30 flowers and spans from 2" to 3" across. These clusters are either all male or all female. Each flower is about ¼" across, consisting of 6 yellowish-green **tepals** and either pistils on the females or stamens on the males.

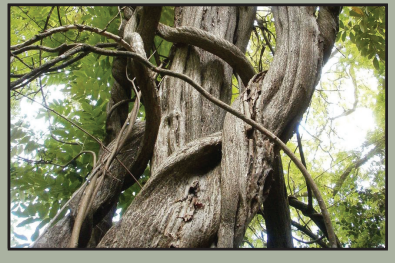
Chinese Wisteria

Wisteria sinensis • **Invasive** • **Grows 60 feet long** • **Perennial**



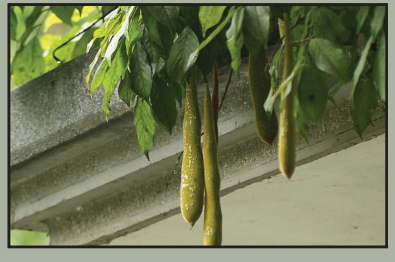
LEAVES

Chinese Wisteria has leaves that climb the stalk alternately, or without a paired leaf. Each compound leaf has 9 to 11 slightly wavy leaflets that can range from oval to pointed.



STEMS

The stems are stout, gray-brown, and covered with fine white hairs. Older plants can grow up to 15" or more in diameter. The stems vine in a counter-clockwise pattern.



FRUIT

The fruit are irregularly-shaped legume pods that look similar to edamame, or soy bean pods. They are 2½" to 6" long and ¾" to 1¼" wide with velvety hair. They range from greenish-brown to golden, splitting to release up to 8 flat round brown seeds that are ½" to 1" in diameter.

FLOWERS

The flowers of Chinese Wisteria appear when leaves emerge, blooming all at once. They are lavender to violet, fragrant, angling, and found in stalked clusters 4" to 20" long and 3" to 3½" wide.

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:

- Manual, mechanical, and chemical control methods are all effective in removing and killing Chinese Wisteria.
- Spraying with: systemic herbicides like triclopyr and glyphosate which can kill the plant within a week. Cut stump applications on larger vines can also be effective.

Common Greenbrier

Smilax rotundifolia • **Native** • **Grows 20 feet long** • **Perennial**

WARNINGS & ADVISORIES:

Thorns can cause punctures and abrasions. Tripping hazard.

METHODS OF CONTROL:

- As a native species, this plant only needs control when detrimental to a worker's safety or when interfering with the visibility of traffic or traffic control devices.
- Digging: for a few small, individual plants, it is possible to dig up the **rhizomes**. Manual control of greenbriers is difficult because of the extensive root system.
- Spraying with: glyphosate or triclopyr on larger infestations. Cut the vines, apply herbicide to cut surfaces, and spray after they resprout.

Rhizomes: horizontally growing roots.

LEAVES

The leaves are 2" to 6" long and 2" to 5½" across with smooth edges, occasionally with very small prickles. They are broadly ovate, or the shape of a stout oval, with a dark green, hairless upper leaf surface. There are 3 to 5 primary, arching veins per leaf.

STEMS

The stems of Common Greenbrier are hairless, typically with stout thorns up to ⅓" long that have black tips. They have a general 4-sided shape without deep furrows or ridges.

FRUIT

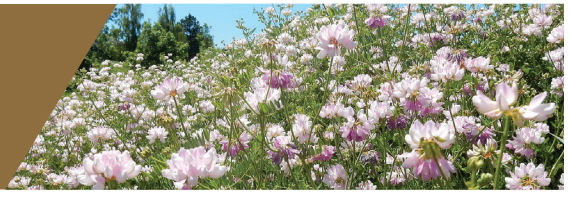
The fruit of Common Greenbrier are about ¼" across. They are globose, or globe-shaped, and contain 1 to 3 seeds. When ripe, the fruit becomes bluish.

FLOWERS

On the Common Greenbrier, clusters of 3 to 20 flowers that are ¼" long are yellow to green. After the 2-week blooming period in late spring to early summer, pollinated female flowers are replaced by fruit.

Crown Vetch

Coronilla varia • **Invasive** • **Grows 10 feet long** • **Perennial**



LEAVES

The leaves of Crown Vetch are compound, meaning a single leaf is made up of many leaflets. The Crown Vetch has 11 to 25 leaflets that are sessile, or sprout directly from the center without a connective stalk. These leaflets are oblong, hairless, and are usually ¾" long.

STEMS

The stems are ascending, or are known to climb upward. They are hairless and sometimes branching.

FRUIT

The fruit of the Crown Vetch is a legume, or bean pod, that is slender. It is constricted into several single-seeded joints, containing seeds that are reported to be poisonous.

FLOWERS

The inflorescence, or cumulative parts that make up the flowerhead, is a cluster with 10 to 25 pink to white flowers. They are pea-like in shape, resembling a large clover flower.

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:

- Mowing
- Hand-pulling
- Prescribed fire may be effective against seedlings and in slowing spread.
- Spraying with: general use herbicides such as glyphosate, triclopyr, or clopyralid.

SEASON SPECIFIC:

- Blooming season is spring through summer.

Field Bindweed

Convolvulus arvensis • **Invasive** • **Grows 5 feet long** • **Perennial**

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:

- Mowing: continuous mowing suppresses bindweed.
- Spraying with: foliar applications of glyphosate or 2,4-D. Repeated applications may be necessary in a single growing season.

SEASON SPECIFIC:

- Blooming season is summer.

LEAVES

The leaves climb the vine alternately, or without a paired leaf. Their shapes vary from round to arrow-shaped. At the base of the leaf, there are usually two slightly angled basal lobes, or parts of the leaf that clasp the stem.

STEMS

Field Bindweed has branched stems that lay flat on the ground, or climb by twining themselves around other nearby features. They are usually hairless and exude milky sap when cut.

FRUIT

The fruit of Field Bindweed are small, hairless, light brown seed capsules. They are between ¼" and ½" long with 1 to 4 seeds that are very small, or about ⅛" long.

FLOWERS

The funnel-shaped flowers are white to pale pink, approximately 1" in diameter. They grow individually, usually by themselves or in small clusters. They sprout among the leaves, instead of being found at the end of the vine.

Japanese Honeysuckle

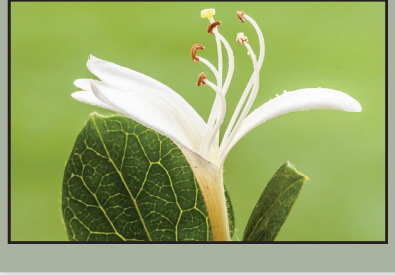
Lonicera japonica • **Invasive** • **Grows 23 feet long** • **Perennial**

LEAVES

Japanese Honeysuckle has 1½" to 3" long, simple, oblong to oval leaves. Younger leaves may have a more irregular shape and be covered in soft hairs. These leaves stay on the vine until midwinter.

STEMS

Young stems are brown or red and usually a bit hairy. As they age, stems become woody and hollow with bark that peels in long strips.



FRUIT

The fruit of Japanese Honeysuckle are purple to black berries that are produced in the fall. They are glossy, found in pairs, and produce 4 to 10 brownish-black seeds.

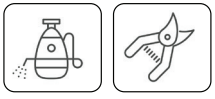
FLOWERS

Japanese Honeysuckle has fragrant, white to pink flowers that yellow with age. They are found in pairs at leaf junctions.

WARNINGS & ADVISORIES:

Tripping hazard.

METHODS OF CONTROL:



- Spraying with: foliar application of glyphosate after a prescribed burn. Application of glyphosate to cut stumps and vines after cutting back.
- Prescribed burns provide effective control when followed by foliar herbicide application about a month after resprouts emerge.
- Cutting: cut stumps and vines that climb trees and spray resprouts.

SEASON SPECIFIC:

- Blooming season is April through June.
- Recommended chemical control season is fall through winter.

Japanese Hops

Humulus japonicus • **Invasive** • **Grows 20 feet long** • **Annual**

WARNINGS & ADVISORIES:

Prickles can cause skin irritations. Tripping hazard.

METHODS OF CONTROL:

- Mow and spray resprouts.
- Spraying with: foliar application of 2,4-D, glyphosate, or metfulfuron. Requires treatment before seeds mature.
- Cutting: cut back climbing vines.

SEASON SPECIFIC:

- Blooming season is summer.

Achene: dry, one-seeded fruit that doesn't release the seed. A common example is a sunflower seed.

LEAVES

The 2" to 4" long leaves grow opposite to each other, or with a paired leaf along the stem. They usually have 5 to 7 lobed leaflets with a toothed edge. The leaf stalks, or connective stalk between the leaf and the stem, are very long or longer than the leaf itself. There are usually whitish glands present on the underside of the leaflets.

STEMS

The stems of Japanese Hops are often twining, meaning they climb by wrapping around nearby items. They also have hooked, downward-pointing hairs.

FRUIT

Japanese Hops has a yellowish-brown **achene** as a fruit. They are in pistillate spikes, or spikes forming from the female pistil of the plant. They appear as small cone structures.

FLOWERS

The flowers have a cream to green color with 5 sepals, or the part of the plant that encloses the petal. Japanese Hops, however, has flowers without petals. Japanese Hops is also dioecious, meaning the male and female flowers are found on separate plants. The male flowers are found in spreading clusters while the female flowers are found in tight spikes.

VINE

Poison Ivy can be difficult to identify as it can grow as groundcover, a single-stemmed shrub, or a vine growing up a tree.

VINE

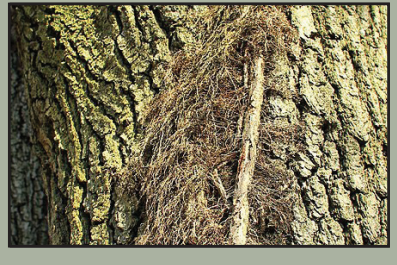
To identify Poison Ivy, look for three-part leaves with occasional shallow teeth. The bottom two leaflets also mirror each other.

Poison Ivy

Toxicodendron radicans • **Native** • **Grows 60 feet long** • **Perennial**

LEAVES

"Leaves of three, let it be." In Poison Ivy, three leaflets make up a compound leaf. Each of the leaflets have shallow teeth along the edge, and can range from an oval shape to a mitten shape. Leaves can grow up to 7" to 10" long, with a shiny green surface and a paler underside.



STEMS

Mature Poison Ivy has a densely hairy vine that is slender and gray to reddish in color. This species can grow as a vine, groundcover, or a shrub. While old growth is very hairy, new growth lacks hair or the hair is very sparse.

FRUIT

The fruit of Poison Ivy has green-tinted, round berries about ¼" wide. They form in hanging clusters in late summer to early fall.

FLOWERS

Posion Ivy is a **dioecious** plant with small, clustered flowers ranging from light yellow to light green.

Dioecious: the male and female reproductive systems are present on separate plants.

WARNINGS & ADVISORIES:

Mild to severe rash when skin is exposed to oils. All parts of Poison Ivy are highly toxic.

METHODS OF CONTROL:

- As a native species, this plant only needs control when detrimental to a worker's safety or when interfering with the visibility of traffic or traffic control devices.
- Spraying with: foliar application of 2,4-D, glyphosate, or triclopyr.
- Cutting: cut vines at the stump of those which are climbing trees.

SEASON SPECIFIC:

- Recommended chemical control season is May through August.

Sweet Autumn Clematis

Clematis terniflora • **Invasive** • **Grows 20 feet long** • **Perennial**

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:

- Hand-pulling: hand-pull small plants, being sure to remove the root system.
- Fairly easy to remove depending on the size of the bush.
- Spraying with: foliar application of glyphosate is effective.
- For larger plants, cut down and treat with herbicide.

SEASON SPECIFIC:

- Blooming season is summer to fall.

LEAVES

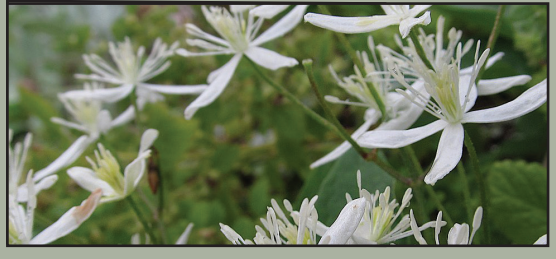
The compound leaves climb the stalk opposite to each other or with a paired leaf. Each leaf has 3 to 5 leaflets that are 2" to 3" long and 1½" wide. The leaflets are ovate in shape, or egg-shaped, and glabrous, or free from hair.

STEMS

The stems of the Sweet Autumn Clematis are green in color and glabrous, or free from hair. Older stems can develop a brown tinge.

FRUIT

The fruit are very visible with long, silvery, feather-like hairs.



FLOWERS

Sweet Autumn Clematis flowers are four-petaled and white in color, producing a pleasant fragrance in bloom.

Wintercreeper

Euonymus fortunei • **Invasive** • **Grows 20–70 feet long** • **Perennial**

LEAVES

The egg-shaped leaves of Wintercreeper are found in pairs opposite to each other. They are a glossy, medium-dark green. They are 1¼" to 2½" long, leathery, and are rimmed with teeth. The appearance of leaf shape and color can vary widely due to inheritance of parental characteristics.

STEMS

The stems are woody, rough, narrow, and warty. With age, they become densely covered with gray hairs.

FRUIT

The fruit are smooth cream to pink capsules that open to expose fleshy reddish-orange **arils** that surround the seeds.

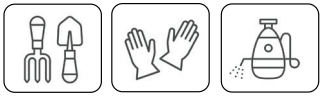
FLOWERS

The flowers of Wintercreeper are 4-parted and vary from green to white.

WARNINGS & ADVISORIES:

No additional precautionary measures needed.

METHODS OF CONTROL:



- Digging: grubbing is effective for small populations or environmentally sensitive areas.
- Hand-pulling: juvenile plants can be hand-pulled when soil is moist.
- Spraying with: triclopyr ester or a glyphosate herbicide as a 4% solution in water with a surfactant for sucessive years. Cut stump applications on larger vines are effective.

Aril: an extra layer of a fruit. A common example of a capsule with arils is a pomegranate.

SEASON SPECIFIC:

- Blooming season is summer.
- Recommended chemical control season is July through October.

ADDITIONAL RESOURCES

Definitions, a list of sources, and an index to navigate the book.

Glossary
Sources
Index

Glossary of Terms

A

Achene: referring to fruit
Dry, one-seeded fruit that doesn't release its seed. A common example is a sunflower seed.

Alternate: referring to a pattern of growth
Leaves or twigs emerge independently without a pair.

Appressed: referring to a pattern of growth
Laying flat or pressed down.

Ascending: referring to a pattern of growth
Climbing upward.

Arils: referring to fruit
An extra layer of a fruit, often brightly colored. A common example of a capsule with arils is a pomegranate.

B

Basal lobes: referring to leaves
Parts of the leaf that clasp the stem.

Bisexual: referring to flowers
Containing both male and female reproductive parts.

Bract: referring to flowers
Leaf-like structures underneath a flowerhead.

Bristles: referring to stems
Spiny structures along a stem.

Broadly ovate: referring to leaves
The shape of a stout egg.

C

Catkin: referring to flowers
A flower cluster in the shape of a spike that typically holds only one sex.

Composite flowerhead: referring to flowers
A flower made up of many smaller flowers.

Compound drupe: referring to fruit
A fruit made up of smaller, fleshy, one-seeded parts. A common example is a raspberry.

Compound leaf: referring to leaves
A leaf made up of multiple leaflets.

D

Dentate: referring to leaves
Having a serrated look like the edge of a saw.

Deeply divided: referring to leaves
Lobed very severely, almost dividing the leaf into smaller parts.

Dioecious: referring to flowers
The male and female flowers are found on separate plants.

Doubly serrate: referring to leaves
Within a jagged edge of a leaf, there are smaller teeth, or ridges, as well.

Drupe: referring to fruit
A fleshy, one-seeded fruit containing a stony seed.

E

Elliptic: referring to leaves
Elongated and oval-shaped.

Erect: referring to stems
Standing straight, stiff, and upright.

Exude: referring to leaves and stems
Excrete.

F

Fissures: referring to bark
Shallow depressions.

Forb: referring to a type of plant
Any herbaceous plant that is not a grass or grass-like.

Fragrant: referring to leaves and flowers
Having a smell.

Furrowed: referring to bark
Deeper indentations, often diamond-shaped.

G

Germinate: referring to seeds
A seed beginning to sprout to form a new plant.

Glaucous: referring to fruit or stems
Having a fine, powdery, light, waxy coating. A common example is found on a grape.

Glabrous: referring to leaves or stems
Free from any hair.

Glossary of Terms

Globose: referring to fruit
Spherical, or globe-shaped.

H

Herbaceous: referring to a type of plant
"Herb-like," recognizable by the absence of woody tissue.

Hip: referring to fruit
The fruit of rose plants.

I

Inflorescence: referring to flowers
1) A group of small flowers comprising one head. A common example is a hydrangea.
2) The entire flowering part of the plant which can include accessory plant parts like bracts.

Invasive Plants: referring to a type of plant
Plants that grow rapidly, form dense stands, and negatively impact health of the local environment, economy, and human population.

L

Lateral flowers: referring to flowers
Flowers farther from the center of a compound flower.

Lance: referring to leaves
A shape characterized by a lance or sword-like appearance.

Leaf margins: referring to leaves
The edge of a leaf, commonly found smooth or with teeth.

Leaf scars: referring to stems
Marks where leaves once were on a woody stem.

Leaflets: referring to leaves
Smaller leaf units that make up a compound leaf.

Legume: referring to fruit
A type of dry fruit that splits open at maturity.

Lenticels: referring to bark
Visible pores on the surface of bark used for gas exchange.

Ligule: referring to leaves and stems
A small membrane at the junction of a blade of grass and its stalk.

Lobed: referring to leaves
Having protrusions instead of a simple, smooth shape.

Longitudinal ribs: referring to fruit or stems
Ridges that run up and down.

M

Midrib: referring to leaves
The central line of a leaf. It is usually very visible on grasses.

Multiple fruit: referring to fruit
A fruit formed from many small flowers.

N

Native plants: referring to a type of plant
Plant that were present in an area prior to foreign settlement. These species have adapted to the climate of an area and are part of the local ecosystem.

Nodes: referring to stems
Joints found along a plant's stem.

Nutlets: referring to fruit
Small nuts.

O

Ovate: referring to leaves
Egg-shaped.

P

Palmately compound: referring to leaves
Leaflets emerge from a single point like fingers from the palm of a hand. A common example is a leaf from a Buckeye Tree.

Panicles: referring to flowers
Elongated flower clusters.

Pappus: referring to fruit
Fluffy, hairy parts of a fruit that help in dispersal. A common example of pappus is found on a mature dandelion.

Parallel: referring to a pattern of growth
Each twig or leaf is paired along the stalk with a second twig or leaf at the same point, growing in the opposite direction.

Glossary of Terms

Pedicels: referring to flowers and fruit
Connective stalks on which flowers and fruit can form.

Persist: referring to leaves
Clinging to a tree. Used to describe leaves that remain in winter.

Petioles: referring to leaves
The connective stalk from a twig or stem to a leaf.

Pinnately compound: referring to leaves
Leaflets are mirrored over the midrib of a leaf. A common example is a Tree of Heaven leaf.

Pinnately divided: referring to leaves
Having a mirrored leaf segment across the middle of a compound leaf.

Pistillate: referring to flowers and fruit
The female part of the plant.

PPE: referring to protective measures
Personal Protective Equipment. See page 3.

Prickle: referring to stems
A thorny protrusion from the stem. A common example is found on a rose stem.

Prostrate: referring to a pattern of growth
Laying relatively flat.

Pubescent: referring to leaves and stems
Having hair.

R

Raceme: referring to flowers
A dangling flower cluster.

Recurved: referring to a pattern of growth
Curved downwards.

Reticulate: referring to fruit
A surface-level web-like network. A common example is found on a cantaloupe.

Rhizomes: referring to roots
Horizontally growing roots that can send up new plant shoots.

Ribs: referring to leaves, stems, and fruit
Raised ridges that run the entire length of the plant part.

Rosette: referring to a pattern of growth
A circular arrangement of growth, mimicking the arrangement of petals on a rose.

S

Samara: referring to fruit
A winged fruit sheath that doesn't release its seed.

Scales: referring to leaves, stems, and fruit
Small protrusions that are often light-colored or brown.

Serrated: referring to leaves
Saw-like.

Sessile: referring to leaves
Emerging straight from the stem or twig without a leafstalk.

Sepals: referring to flowers
A protective cup that can be found around the base of flowers, enclosing the petals.

Schizocarp: referring to fruit
A dry fruit that splits into single-seeded parts.

Sheathed: referring to stems
Having a thin covering, or sheath.

Simple: referring to leaves
1) One leaf is not comprised of a set of smaller leaflets.
2) Unlobed, having no protrusions.

Spikelet: referring to fruit
A spiky cluster of seeds.

Spines: referring to leaves and stems
Sharp protrusions from the stem or leaves of a plant.

Spurs: referring to stems
Modified short branches, often with sharp ends.

Stamen: referring to flowers
Male reproductive part comprised of an anther with pollen and a filament (connective stalk).

Glossary of Terms

Stipules: referring to leaves
Leaf-like growths at the base of a compound leaf.
Sub-globose: referring to fruit
Imperfectly spherical.

T

Taproot: referring to roots
A singular, thick root system. A common edible taproot is a carrot.
Teeth: referring to leaves
Having ridges instead of a smooth edge.
Tepals: referring to flowers
A part of some flowers that is neither a petal or sepal, but acts as both.
Thicket: referring to a pattern of growth
A dense patch of shrubby vegetation.
Thorns: referring to stems
Sharp protrusions from the stem.
Tomentose: referring to leaves
Covered in dense, woolly hairs.
Toothed: referring to leaves
Having an edge with teeth.
Trifoliate: referring to leaves
A compound leaf made up of three leaflets. A common example is Poison Ivy.
Tubular: referring to flowers
Long and hollow like a tube.
Twining: referring to a pattern of growth
Climbs by wrapping around nearby items.

U

Umbel: referring to flowers
A flower cluster chracterized by a wide spreading shape, much like an umbrella.
Umbellets: referring to flowers
Smaller umbels that join together to make a larger compound umbel flower.
Unlobed: referring to leaves
Having a simple, smooth shape without lobes (protrusions).

V

Viable: referring to fruit
Fertile. Able to produce a new plant.
Veins: referring to leaves
The lines found throughout a leaf that are used for moisture and nutrient dispersal.

W

Warty: referring to bark
Rough, uneven texture.
Wings: referring to fruit
Protruding flaps that aid in wind dispersal.

Sources

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COMMON TEASEL

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COW PARSNIP

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CUTLEAF TEASEL

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GIANT HOGWEED

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POISON HEMLOCK

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POISON HEMLOCK SPOTLIGHTS

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SPOTTED KNAPWEED

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YELLOW SWEET CLOVER

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JAPANESE STILTGRASS

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REED CANARY GRASS

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TALL FESCUE

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AMUR HONEYSUCKLE

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AUTUMN OLIVE

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BICOLOR LEPEDEZA

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BLACK RASPBERRY

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BORDER PRIVET

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BURNING BUSH

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COMMON BLACKBERRY

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COMMON BUCKTHORN

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GLOSSY BUCKTHORN

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MULTIFLORA ROSE

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RUSSIAN OLIVE

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BLACK LOCUST

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CALLERY PEAR

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HONEY LOCUST

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SIBERIAN ELM

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TREE OF HEAVEN

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WHITE MULBERRY

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BRISTLY GREENBRIER

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COMMMON GREENBRIER

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JAPANESE HOPS

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POISON IVY SPOTLIGHTS

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