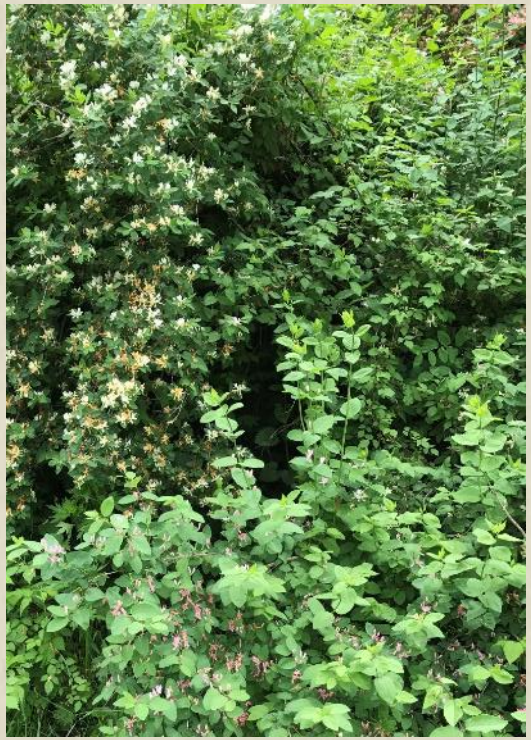
DEVELOPING PLANS TO MANAGE INVASIVE PLANTS ON YOUR LAND



THE UNIVERSITY of WISCONSIN MADISON

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APPROACH TO MANAGING INVASIVE PLANTS

Step 1: Plant identification

Step 2:Distribution of population

Step 3: Select appropriate control tactic(s)

Step 4: Apply control method(s)

Step 5: Monitor and adapt management

STEP 1: PLANT IDENTIFICATION

- Management techniques are usually **species specific**

Black locust

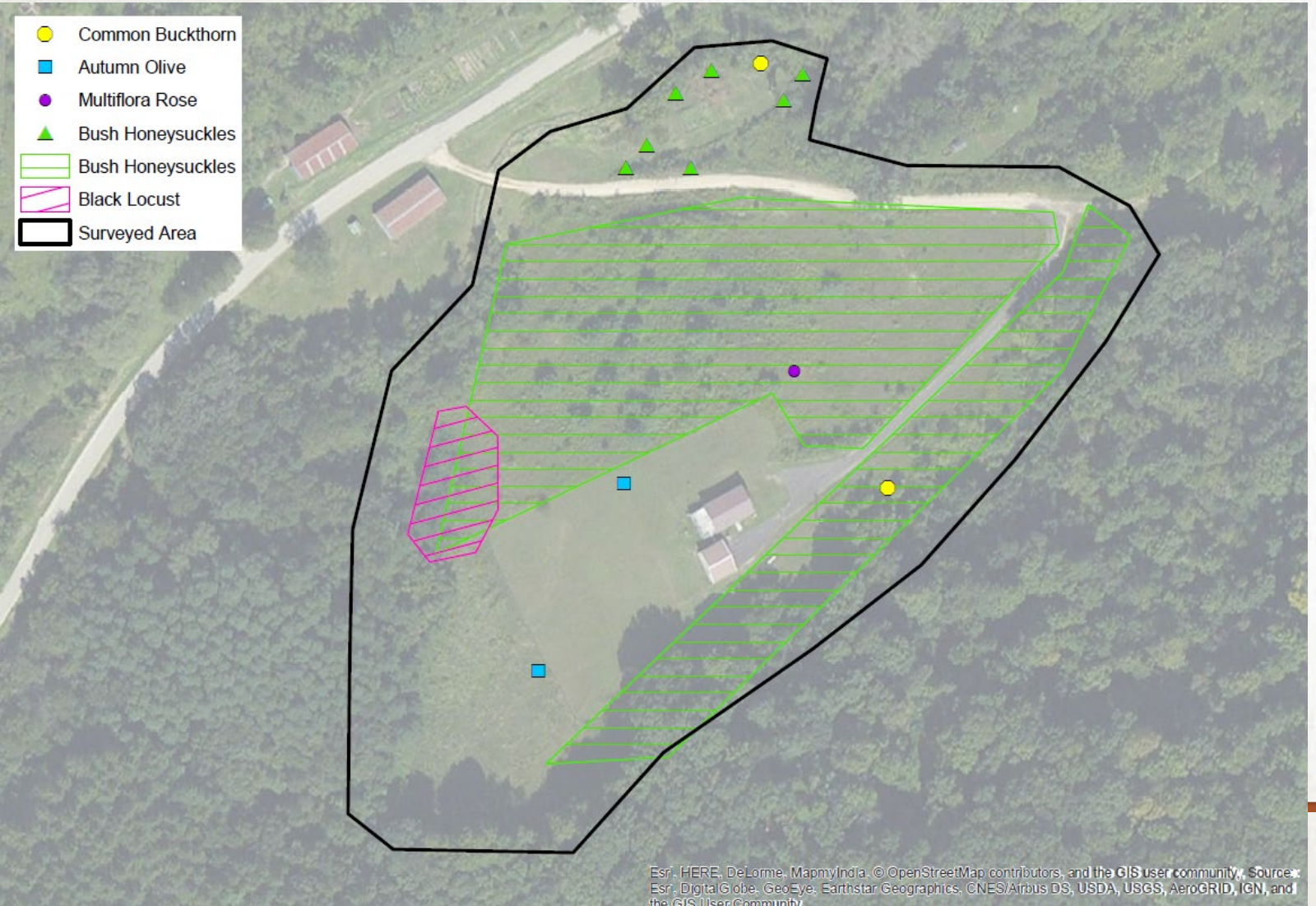
Callery pear

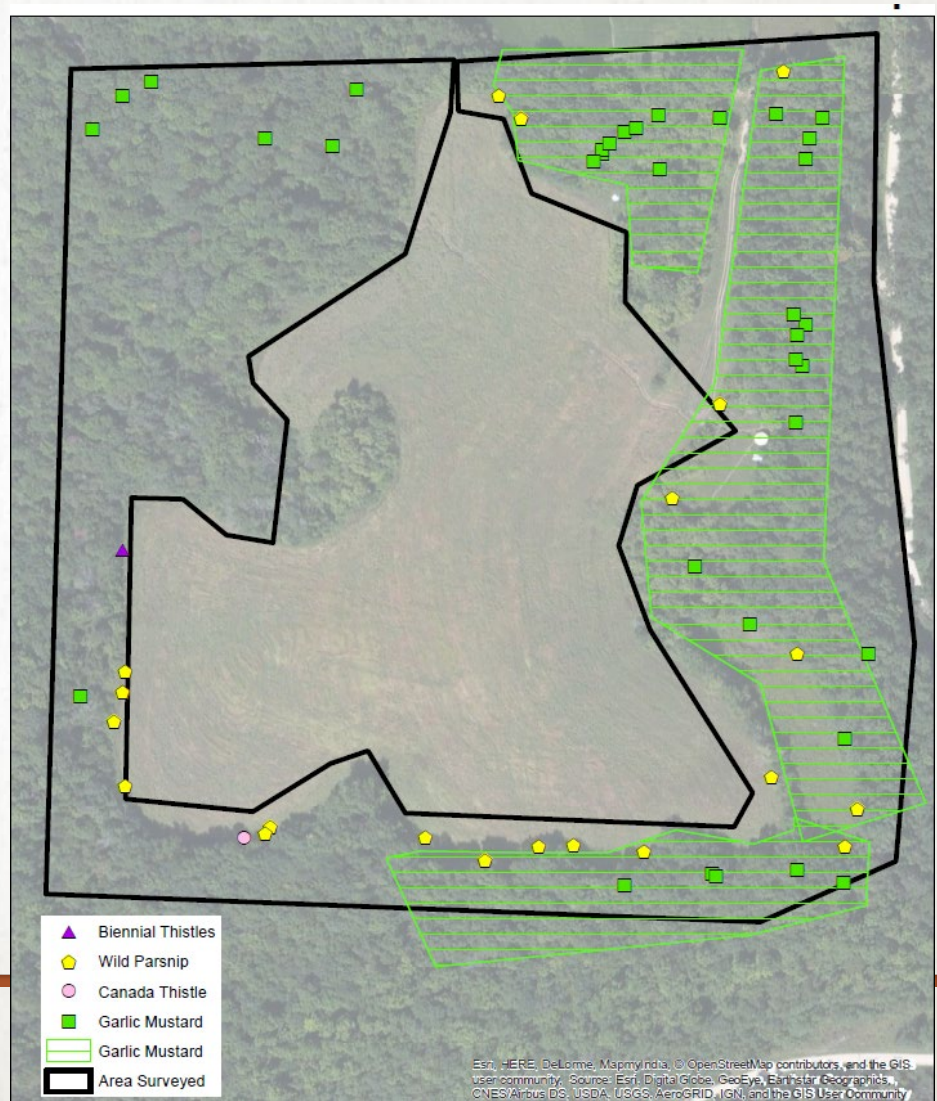
STEP 2: DISTRIBUTION OF POPULATION

Critical for selection of management techniques

- Where is it on your property
- Where did it come from?

IF YOU ARE INVOLVED IN THIS PROJECT WE HAVE MAPPED YOUR LAND





STEP 3: SELECT APPROPRIATE CONTROL TACTIC

- Evaluate options based on info from Step 1 and 2

- Search **trusted sources** for control recommendations
  - Look for this information:
    - Detailed instructions on how to implement
    - Estimate of how effective it is and for how long
    - Cost to do yourself or hire someone to do
    - Does using this method impact desired plant species

MANY CONTROL TACTICS

- Manipulation of the environment
- Physical/mechanical management
- Prescribed fire
- Biological control
- Herbicide

PARTICIPANTS GET A REPORT THAT PRIORITIZES PLANTS AND SUMMARIZES CONTROL METHODS

Invasive plants observed on property

The table below lists invasive plant species observed on the property. The species are listed in order of suggested management priority:

- **High:** few plants present (possible to eradicate before infestation grows) and/or species is a high priority species (prohibited in state or high consequence species)
- **Medium:** Larger infestations that will take more effort to control on property; also includes species that have high impact
- **Lower:** Largest infestations on property (will take significant effort to control on property) and/or species with lower impact
- **Monitor:** species that were not observed on the property but which are known to be nearby and could infest property. Keep an eye out for new infestations of these species.

The area impacted refers to the general area infested by the species, including area not occupied by the species of interest.

Mgmt. priority	Species	Number of points	Number of polygons	Approx. area impacted (acres)	Abundance
High	Autumn olive (*Elaeagnus umbellata*)	1	0	-	Few individual plants
High	Biennial thistle (*Cirsium sp./ Carduus sp.*)	3	0	0.2	Scattered plants
High	Canada thistle (*Cirsium arvense*)	3	0	-	Scattered plants
Medium	Reed canary grass (*Phalaris arundinacea*)	4	0	1.5	Scattered dense patches
Medium	Purple crown vetch (*Securigera varia*)	5	1	0.5	Scattered dense patches
Lower	Bush honeysuckles (*Lonicera sp.*)	20	0	2.8	Scattered plants
Lower	Japanese barberry (*Berberis thunbergii*)	1	12	3.5	Scattered plants
Monitor	Multiflora rose (*Rosa multiflora*)	-	-	-	Absent, but present nearby
Monitor	European buckthorn (*Rhamnus cathartica*)	-	-	-	Absent, but present nearby

Management options

Managing invasive species is a long-term commitment, so it is necessary to prioritize management activities based on the density of plants (highest density/largest population of plants generally has lower priority) and your land management objectives. If populations are too large to control the entire population in one year, develop a coordinated approach that starts at the edge of the population and works inward as time permits.

Below are general recommendations for managing invasive plants on your land. Click the fact sheet links (where available) to access more detailed recommendations.

ORIENTAL BITTERSWEET (fact sheet) is a woody, perennial, climbing vine. Stems may reach 6" in diameter and vine may grow up to 60' long, depending on tree canopy. It invades a variety of sunny and shaded habitats and can strangle or topple the vegetation (shrubs, trees) on which it grows. Easily spread to new areas by birds.

Control strategies for small populations: If left uncontrolled, individual plants can severely damage shrubs and trees and fruits can be easily spread to new locations. Control individual plants before fruiting to prevent spread to new areas. Individual plants can be effectively controlled by pulling/digging plants and via herbicide application. When manually removing plants, remove roots to prevent resprouting. If fruit is present, avoid movement of material off site unless material can be transported without spreading seed to other locations. Cut stump herbicide treatment is an effective control technique. Foliar herbicide application when species is fully leafed out and actively growing is also effective but difficult to apply without contacting nearby plants.

JAPANESE BARBERRY (fact sheet) is a round, dense, spiny shrub, typically 2 – 3' tall, though it may grow up to 6' tall and 6' wide. Branches are reddish-brown and deeply grooved, with a single sharp spine at each node. The wood beneath the bark is bright yellow. Barberry forms dense thickets as its branches root freely when they touch the ground. The thickets shade out other plants and uncontrolled thickets are associated with increased populations of blacklegged (deer) ticks and Lyme disease.

If left uncontrolled, individual plants can spread quickly to form dense thickets, and fruits are easily spread by birds to new locations. Individual plants should be controlled when small and before fruiting, to prevent spread by birds to new locations. Hand pulling/digging is effective as long as root crown is removed. If fruit is present, avoid movement of material off site unless material can be transported without spreading seed to other locations. Hand removal can be difficult due to the spiny nature of barberry; basal bark, cut stump and foliar herbicide treatments are also effective for controlling barberry. Foliar herbicide applications are most effective when the plant is fully leafed out and actively growing, while other treatments can be applied year-round.

FACTSHEETS ON

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Brandon Panke and Mark Renz

A3924-11

Japanese knotweed

(Polygonum cuspidatum)

Invasive plants can thrive and aggressively spread beyond their natural range, disrupting ecosystems. The *Management of Invasive Plants in Wisconsin* series explains how to identify invasive plants and provides common management options. Management methods recommend specific timings for treatment, as well as expected effectiveness. For more information, go to: fyi.uwex.edu/weedsci/category/invasive-plants-of-wisconsin.

Japanese knotweed is an herbaceous perennial, growing up to 10' tall. Hollow, reddish, arching, bamboo-like stems are smooth and stout, and they can persist after plant dies back each year. The base of the stem above each joint is swollen and surrounded by a membranous sheath (ocrea).

Legal classification in Wisconsin: Restricted

Leaves: Alternate, egg-shaped to almost triangular, 4–6" long, 3–4" wide. Dark green on upper surface and pale green on lower surface.

Flowers: Bloom in late summer. Flowers are numerous, highly branched, tiny, creamy white or greenish, and found where the leaf attaches to the stem (axils), near the tips of stems.

Fruits and seeds: Small, winged, triangular fruits carry very small, shiny seeds.

Roots: Plants arising from seed have a taproot up to 6' deep. Stout rhizomes can reach 45' or more from parent plants and give rise to new stalks. Plants arising from seed and rhizome also have fibrous roots.

Similar species: Giant knotweed (*P. sachalinense*) is also invasive, but grows up to 13' tall with larger leaves. The two species are known to hybridize.

Ecological threat:

- Invades upland and lowland sites that are disturbed and undisturbed.
- Poses a significant threat to riparian areas, where it can rapidly spread.
- It tolerates shade, high temperatures, high salinity, and drought.
- It can be transported to new sites as a contaminant in fill dirt or on equipment. During floods, it spreads downstream by shoot fragments, rhizomes, or occasionally by seeds. Escapes from neglected gardens and discarded cuttings are common routes of dispersal from urban areas.
- Although reported to not produce viable seed, several studies have shown that populations of knotweed in the United States can produce viable seed that readily germinate and survive in field conditions.

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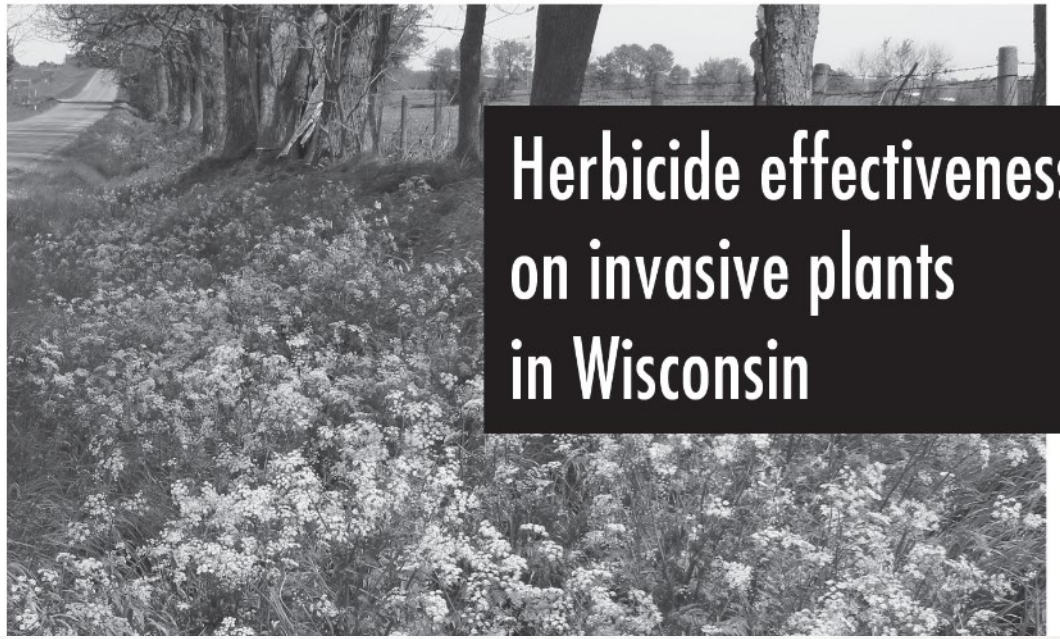
NPM



Herbicide effectiveness on invasive plants in Wisconsin

Herbicide effectiveness on invasive plants in Wisconsin (A3893)

Commercial name	Common name (active ingredient)	Burdock	Canada goldenrod	Chinese lespedeza	Common tansy	Crown vetch	Curly dock	Dames rocket	Field bindweed	Garlic mustard	Giant hogweed	Giant ragweed	Hawkweeds	Hill mustard	Japanese hedge parsley	Japanese knotweed	Knapweed spp.
Banvel	dicamba	G	F/G	P	G	G	F/G	G	F/G	F	P/F	F/G	F/G	—	—	F/G	F/G
Butyrac	2,4-DB	—	F/G	—	—	—	F	N	N	—	—	—	—	—	—	—	—
Chaparral	aminopyralid + metsulfuron	G/E	G/E	F/G	G/E	G/E	G/E	G	—	G/E	G	G	G/E	G	G	G/E	E
Cimarron Max	metsulfuron + 2,4-D + dicamba	G/E	G/E	G	G	G	G/E	—	F/G	—	—	F	—	G/E	—	—	F/G
Cimarron Plus	metsulfuron + chlorsulfuron	G/E	G/E	—	E	G	—	—	—	—	—	—	—	—	—	—	—
Crossbow	2,4-D + triclopyr	G/E	F/G	G	F/G	G	G/E	—	F/G	—	—	G/E	—	G	—	—	F/G
Curtail	2,4-D + clopyralid	G	F	—	G	G	F	—	—	—	—	G	F/G	—	—	—	G
Escort	metsulfuron	G/E	G/E	F/G	G	G	G/E	G	P/F	G/E	G	P	—	E	E	—	F
Forefront	2,4-D + aminopyralid	G/E	F/G	P	F/G	E	G/E	—	—	—	—	E	E	—	—	—	E
Fusilade	fluazifop	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Garlon	triclopyr	G/E	F/G	G/E	P	G/E	F/G	G	F	G	G	G/E	—	G	G	F/G	P/F

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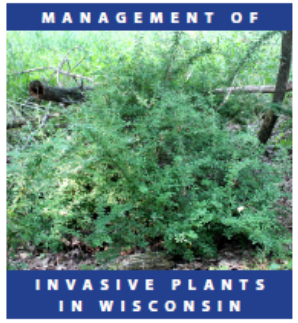
DETAILED CONTROL INFORMATION



A3924-34

Japanese barberry
(Berberis thunbergii)

Brendon Panke and Mark Renz

Invasive plants can thrive and aggressively spread beyond their natural range, disrupting ecosystems. The *Management of Invasive Plants in Wisconsin* series explains how to identify invasive plants and provides common management options. Management methods recommend specific timings for treatment, as well as expected effectiveness.

Japanese barberry is a round, dense, spiny shrub, typically 2–3' tall, though it may grow up to 6' tall and 6' wide. The branches are reddish brown and deeply grooved with a single, sharp spine at each node. The wood beneath the bark is yellow. It spreads vegetatively through branches that root freely when they touch the ground.

Legal classification in Wisconsin: All wild plants are restricted. Select varieties/hybrids are also restricted. Consult Wisconsin's invasive species rule (NR 40) for details.

Leaves: Alternate, 0.5–1.5" long, entire, and shaped liked a spatula with a narrow base and wide end (spatulate). Color varies depending on the cultivar, but includes green, bluish-green, or dark reddish-purple. Leaves are arranged in clusters above a spine.

Flowers: Mid-spring. Yellow, umbrella-shaped, 0.25" across with 6 petals. Flowers are found along the stem individually or in clusters of 2–4.

Fruits and seeds: Bright-red, oblong berries, 0.3" long. Fruit are found on narrow stalks along the stem individually or in clusters of 2–4. Fruit mature in mid-summer and can persist on shrub into winter.

Roots: Shallow root system. When scratched, the inner layer of the root is yellow.

Similar species: European barberry (*Berberis vulgaris*) is another introduced species that is sometimes invasive. European barberry spines occur in sets of 3, while Japanese barberry spines occur singly.

Ecological threat:

- Invades open and closed canopy forests, woodlands, oak savannas, wetlands, pasture, and meadows. Grows more vigorously on well-drained soils.
- Seeds are readily dispersed by birds.
- Sites infested with Japanese barberry have significantly more deer ticks (*Ixodes scapularis*) than sites where Japanese barberry control efforts have taken place or where barberry is not present.

Non-chemical control

Removal

Effectiveness in season: 90–100%
Season after treatment: 70–90%

Pulling or digging up small- to medium-sized barberry any time of the year is an effective individual plant control strategy if soil conditions are amenable. Remove the root crown, as Japanese barberry resprouts from that area. Small bushes can be pulled by hand and larger bushes can be pulled using a leverage tool. Digging up soil surrounding larger bushes can facilitate plant removal. If fruiting, avoid movement unless material can be transported without spreading fruit to other locations.

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NPM

Detailed info on

1. Identification
2. Methods
3. Effectiveness
4. Warnings

Mowing

Effectiveness in season: 50–70%
Season after treatment: < 50%

Mow or cut when flowering but prior to fruit production. Mow or cut plants as close to the ground as possible. Mowing or cutting will need to be repeated for a number of years to reduce established populations. Mowing resprouting barberry after initial removal of a plant can prevent reestablishment of the resprouting plant.

Prescribed burning

Effectiveness in season: 50–70%
Season after treatment: < 50%

Spring burns can kill germinating seedlings and suppress aboveground growth of established plants, depending on fire intensity. After fire, established plants will quickly resprout and reinvade areas. Cutting barberry in spring, followed by a summer burn is the most effective burning regime. Burns must be repeated annually for 2–5 years to suppress established populations. A hand-held propane torch can be effective for treating seedlings or barberry plants that are less than 4" in diameter.

Chemical control

Foliar

Apply directly to individual plants or broadcast across an infested area. Broadcasted foliar applications are typically the most cost-effective treatment in dense infestations. Use lower rates on smaller plants and less dense populations and higher rates on larger plants and denser populations. Absorption of herbicide can be limited with this species, resulting in reduced effectiveness. Including a surfactant at 0.25–0.5% can alleviate any potential reduction. If infestations are mixed with desirable vegetation, applications of herbicide without soil activity in the early spring or late fall can reduce injury to desirable plants, as barberry leafs out earlier and drops leaves later than most desirable vegetation.

dicamba + 2,4-D*

Effectiveness in season: 70–90%
Season after treatment: 70–90%

Common name: Outlaw

Rate:
broadcast: 28–44 fl oz/A (dicamba: 0.2–0.4 lb a.e./A + 2,4-D: 0.3–0.5 lb a.e./A)
spot: 0.8% (dicamba: 0.01 lb a.e./gal + 2,4-D: 0.01 lb a.e./gal)

Timing: Apply when target species is actively growing and fully leafed out. While plant is fruiting is the most effective treatment time.

Caution: Do not apply directly to water or to areas where surface water is present. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Overspray or drift to desirable plants should be avoided, as even minute quantities of the spray may cause severe injury to plants. Rates > 16 oz/A (0.5 lb a.e./A) may cause stunting and discoloration of sensitive grasses, such as smooth brome.

glyphosate*

Effectiveness in season: 70–90%
Season after treatment: 50–70%

Common name: Roundup

Rate:
broadcast: 1.5–3 lb a.e./A
spot: For a 3 lb a.e./gal product. 1–2% (0.03–0.06 lb a.e./gal)

Timing: Apply when target species is actively growing and fully leafed out. While plant is fruiting is the most effective treatment time.

Caution: Use product labeled for aquatic use if potential exists for solution to contact surface waters. Applications can result in bare ground as glyphosate is not selective. Overspray or drift to desirable plants should be avoided, as even minute quantities of the spray may cause severe injury to plants.

metsulfuron*

Effectiveness in season: 70–90%
Season after treatment: 70–90%

Common name: Escort

Rate:
broadcast: 1.0–2.0 oz/A (0.6–1.2 oz a.i./A)
spot: 0.04 oz/gal (0.02 oz a.i./gal)

Timing: Apply when target species is actively growing and fully leafed out.

Caution: Do not apply directly to water or to areas where surface water is present. Remains in the soil for months depending on application rate. Overspray or drift to desirable plants should be avoided as even minute quantities of the spray may cause severe injury to plants.

tridopyr*

Effectiveness in season: 70–90%
Season after treatment: 70–90%

Common name: Element 4

Rate:
broadcast: 16–32 fl oz/A (0.5–1.0 lb a.e./A)
spot: 1–2% (0.04–0.08 lb a.e./gal)

Timing: Apply when target species is actively growing and fully leafed out. While plant is fruiting is the most effective treatment time.

Caution: Use product labeled for aquatic use if potential exists for solution to contact surface waters. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Overspray or drift to desirable plants should be avoided as even minute quantities of the spray may cause severe injury to plants.

IS NON CHEMICAL CONTROL EFFECTIVE?

Removal

Effectiveness in season: 90–100%
Season after treatment: 70–90%

Pulling or digging up small- to medium-sized barberry any time of the year is an effective individual plant control strategy if soil conditions are amenable. Remove the root crown, as Japanese barberry resprouts from that area. Small bushes can be pulled by hand and larger bushes can be pulled using a leverage tool. Digging up soil surrounding larger bushes can facilitate plant removal. If fruiting, avoid movement unless material can be transported without spreading fruit to other locations.

Mowing

Effectiveness in season: 50–70%
Season after treatment: < 50%

Mow or cut when flowering but prior to fruit production. Mow or cut plants as close to the ground as possible. Mowing or cutting will need to be repeated for a number of years to reduce established populations. Mowing resprouting barberry after initial removal of a plant can prevent reestablishment of the resprouting plant.

Prescribed burning

Effectiveness in season: 50–70%
Season after treatment: < 50%

Spring burns can kill germinating seedlings and suppress aboveground growth of established plants, depending on fire intensity. After fire, established plants will quickly resprout and reinvade areas. Cutting barberry in spring, followed by a summer burn is the most effective burning regime. Burns must be repeated annually for 2–5 years to suppress established populations. A hand-held propane torch can be effective for treating seedlings or barberry plants that are less than 4" in diameter.

WHAT HERBICIDES SHOULD I USE AND HOW?

FOLIAR

glyphosate*

Effectiveness in season: 70–90%
Season after treatment: 50–70%

Common name: Roundup

Rate:
broadcast: 1.5–3 lb a.e./A
spot: For a 3 lb a.e./gal product. 1–2% (0.03–0.06 lb a.e./gal)

Timing: Apply when target species is actively growing and fully leafed out. While plant is fruiting is the most effective treatment time.

Caution: Use product labeled for aquatic use if potential exists for solution to contact surface waters. Applications can result in bare ground as glyphosate is not selective. Overspray or drift to desirable plants should be avoided, as even minute quantities of the spray may cause severe injury to plants.

CUT SURFACE

triclopyr*

Effectiveness in season: 90–100%
Season after treatment: 70–90%

Common name: Element 4

Rate: 20–25% in oil (0.8–1.0 lb a.e./gal)

Timing: Apply any time of year.

Remarks: Products containing this active ingredient can have different instructions for mixing. Labels will recommend mixing the product in a water- or oil-based carrier (e.g., basal bark oil). Consult the label to determine the appropriate carrier.

BASAL BARK

triclopyr*

Effectiveness in season: 70–90%
Season after treatment: 90–100%

Common name: Element 4

Rate: 20–30% in oil (0.8–1.2 lb a.e./ gal)

Timing: Apply any time of year.

Remarks: Products containing this active ingredient can have different instructions for mixing. Labels will recommend mixing the product in a water- or oil-based carrier (e.g., basal bark oil). Consult the label to determine the appropriate carrier.

Caution: Use product labeled for aquatic use if potential exists for solution to contact surface waters. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Overspray or drift to desirable plants should be avoided since even minute quantities of the spray may cause severe injury to plants.

SPECIES WITH FACTSHEETS

- Amur honeysuckle
- Asian bittersweet
- Bell's honeysuckle
- bird's-foot trefoil
- black locust
- black swallowwort
- border privet
- bull thistle
- Canada thistle
- common buckthorn
- common privet
- common tansy
- common teasel
- creeping bellflower
- crown vetch
- cut-leaved teasel
- dame's rocket
- European marsh thistle
- field bindweed
- garlic mustard
- glossy buckthorn
- hill mustard
- hybrid cattail
- Japanese barberry
- Japanese hedge parsley
- Japanese honeysuckle
- Japanese hop
- Japanese knotweed
- Japanese stiltgrass
- leafy spurge
- Morrow's honeysuckle
- multiflora rose
- musk thistle
- narrow-leaved cattail
- plumeless thistle
- poison hemlock
- purple loosestrife
- quackgrass
- sericea lespedeza
- spotted knapweed
- spreading hedge parsley
- Tatarian honeysuckle
- tree-of-heaven
- white sweetclover
- wild chervil
- wild parsnip
- yellow sweetclover

MIPN.org
Midwest Invasive Plant Network

LIMITATIONS/CAVEATS OF FACTSHEETS

- Methods that take multiple years to reach full effectiveness are rated as providing poor control.
  - **Biological control**
  - **Revegetation and other cultural methods**
- Combining multiple control methods may be most effective strategy.
- Does not determine if tactic is suitable for your specific site.

WE CAN CONTROL MULTIFLORA ROSE WITH ROUNDUP, BUT……

STEP 3: SELECT APPROPRIATE CONTROL TACTIC

Fire is a popular tool, but does it fit every situation?

STEP 3: SELECT APPROPRIATE CONTROL TACTIC

YOU WILL NEED TO DECIDE WHICH PRACTICES ARE APPROPRIATE FOR YOUR LAND

- Use land management goals as a guide to assist in making this decision

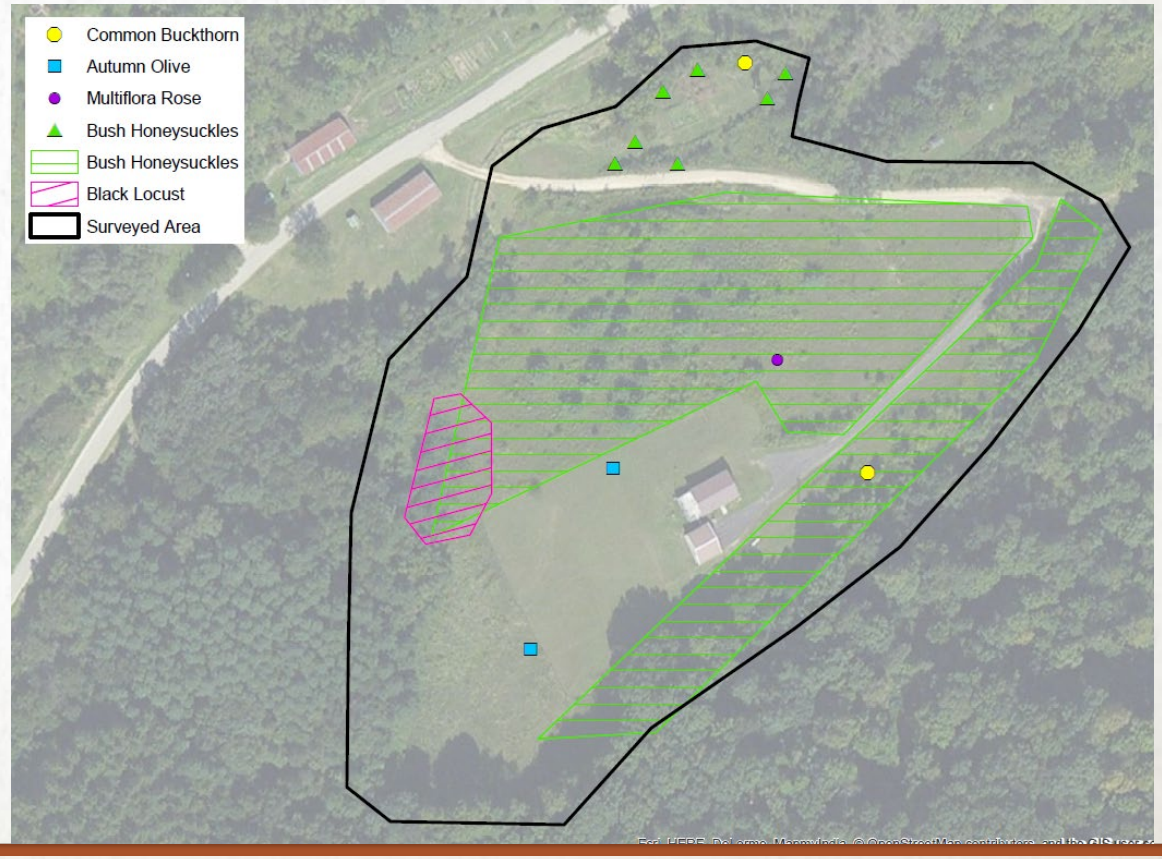
- Ask experts to help if you have questions!!!!

STEP 4: APPLY CONTROL METHOD(S)

- Follow the directions provided
  - Pay close attention to details
    - **What timing** is needed to conduct to maximize control?
    - Can I minimize non-target impacts if I apply at a different timing?
    - What restrictions are associated with the method(s)?

STEP 4: APPLY CONTROL METHOD(S)

- What if I have too much to treat in a year?
  - Be strategic
  - Year 1
    - Treat leading new infestations
  - Year 2
    - treat escapes
    - treat further into population



STEP 5: MONITOR AND ADAPT MANAGEMENT

- Periodically assess success
- What to assess
  - Level of control
  - Injury to non-target plants
- Alter management to current conditions to optimize effort/success

STEP 5: MONITOR AND ADAPT MANAGEMENT

- When should you retreat?
  - Dependent on goals of land
    - suppression vs eradication

  - Often it is expensive in first year
    - Get a grant
    - Wait until have money, or meets land objectives
      - For example wait to control widespread woody species until just prior/just after timber harvest

SUMMARY

- Develop a plan to manage
  - Identification, mapping, selecting and applying control methods, monitoring success and adapting as needed
    - Lots of resources and people available to help

- Don’t be afraid to ask questions or consult experts!

MANAGEMENT OPTIONS FOR WOODY SPECIES

MANAGE BEFORE DENSITIES GET HIGH!

	Hook Lake (Southern)	Buena Vista (Central)	Johnson (NW)
Low Brush Density **(5-20% cover)**	3 gallons used 1.1 hrs to treat	1.25 gallons used 0.8 hrs to treat	0.75 gallons used
High Brush Density **(20-50% cover)**	5 gallons used 1.9 hrs to treat	2.5 gallons used 2.2 hrs to trt	3 gallons used

USED MORE HERBICIDE (50-300% more)

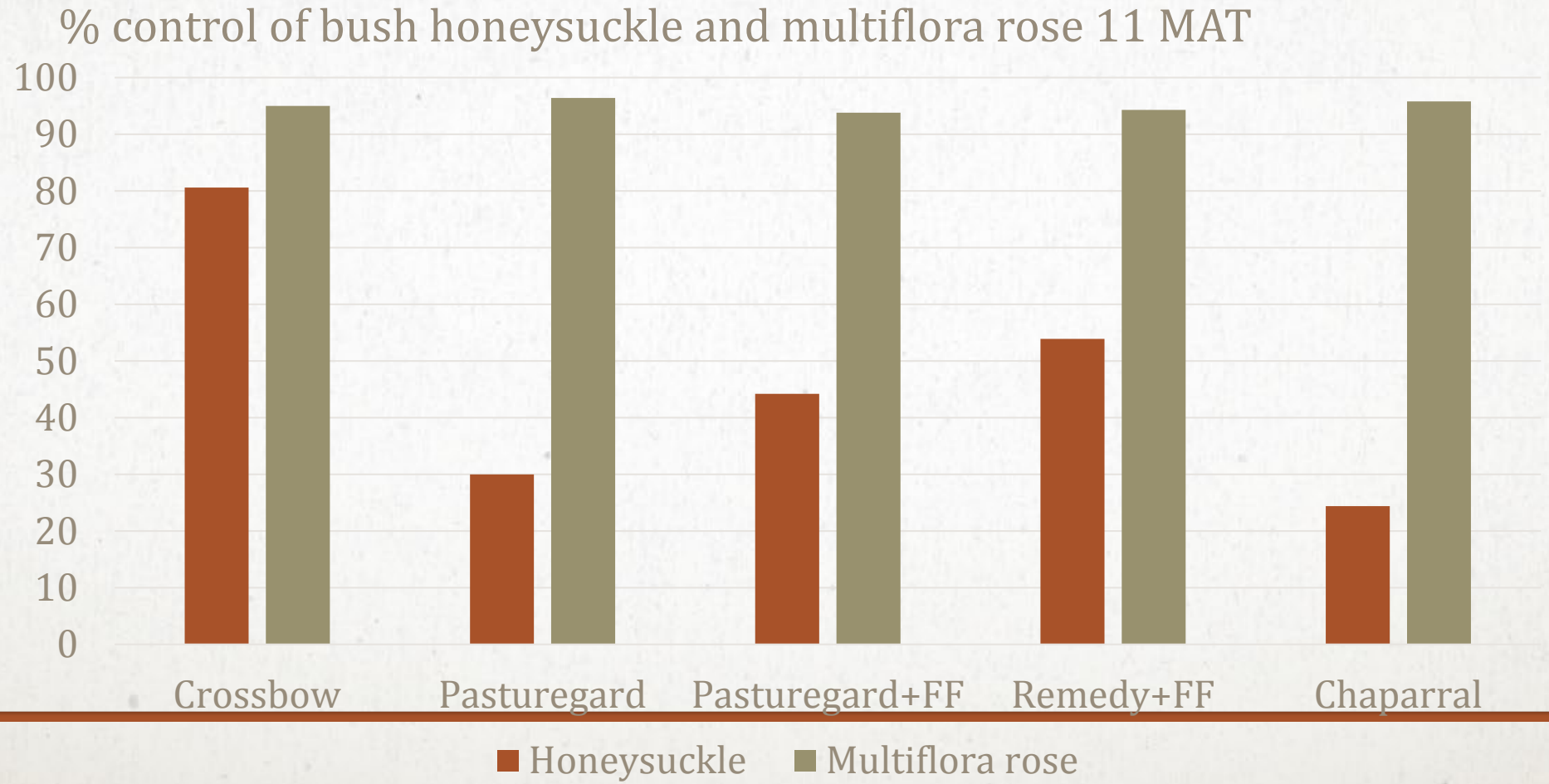
SPENT MORE TIME (75 to 175% more time)

WHAT TECHNIQUES SHOULD I BE FAMILIAR WITH TO CONTROL WOODY SPECIES

- Something to cut down woody species
  - Chainsaw
- Something to pull them out of the ground
  - Weed wrench/pulling implement
- Something to spray with a herbicide
  - Foliar, Basal bark, Cut stump/surface

A RANGE OF HERBICIDES ARE EFFECTIVE

- Inexpensive IF treated early in an invasion!
- Species specific response



FOLIAR APPLICATIONS

- Can spot treat or broadcast
- Tends to be most cost effective for large populations
- Systemic herbicides work best

- IMPORTANT APPLICATION INFO
  - Apply to green tissue (leaves) to the point of runoff
  - Effectiveness reduced when plants are stressed
  - If temps are low (<50F) expect reduced control
  - Rainfall day of application may reduce control
  - USE LABEL RATES (higher rates can reduce control)

BASAL BARK APPLICATIONS

- Use on woody species *5" or less in diameter*
- Treat lower 12 to 18 inches
  - Around entire stem
- High rates of herbicide targeting individual stems
- **Must mix with oil-compatible products for penetration**
  - diesel fuel, basal bark oil, RTU
- Do not apply when
  - excessive snow present
  - Bark is wet

CUT SURFACE/STUMP

- Effective on small and large sized plants
- Cut stem then apply herbicide to cut surface
  - Entire surface for small plants
  - Outer surface for large plants
    - cambium and root collar area
  - Several herbicide options
    - Glyphosate: treat immediately after cut (**mix in water**)
    - Oil based solutions: apply within 4 hours of cut (Garlon)
  - Do not apply when excessive snow present or heavy sap flow

SOME TO HERBICIDES TO CONSIDER

Herbicide	Active ing.	Cost	Selectivity	Best uses
Roundup (liquid)	glyphosate	$	Not-selective, no residual	Spot treatment, broadcast in winter, cut stump
Garlon 4 (liquid)	Triclopyr	$$$	Safe to grasses, short residual	Cut stump, basal bark, selective foliar treatment
2,4-D (liquid)	2,4-D	$	Safe to grasses, short residual	Cut stump, basal bark, selective foliar treatment
Crossbow (liquid)	2,4-D + triclopyr	$$	Safe to grasses, short residual	Cut stump, basal bark, selective foliar treatment
Escort (dry)	metsulfuron	$$	Safe to grasses, residual can be long	Selective foliar treatment

COMPARISON OF COMMON METHODS

- Basal bark
  - good IPT treatment with small diameter trees
  - bad if lots of trees, and if you want to cut them down after treatment
- Cut stump
  - Good, effective on larger diameter trees
  - Bad, takes more time to cut down trees, remove stems
- Girdling
  - Very time consuming, likely more cost/time efficient techniques
  - Other have had success with creeping perennial trees
- Mowing
  - Good site prep for future treatment, but few species killed without follow-up trt

SUMMARY

- Woody invasive plants can be effectively controlled

- Things you need to do to maximize success
  - Identify species on the property and the goal of the site
  - Map the area so you know the good and bad species present
  - Develop a plan that includes
    - Management for multiple years
    - Accounts for desirable plants present
    - Incorporates restoration/revegetation
    - Limits recruitment/reinfestation

ANY OTHER QUESTIONS?