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Identifying and Managing Invasive Plants

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What Makes a Plant Invasive?

DCNR's definition: Invasive plants are those that are not native to an area, spread aggressively, and cause economic or environmental harm, or harm to human health. They can be trees, shrubs, vines, grasses, herbaceous plants (annual or perennial)

How have they become invasive? In their natural range, these plants are limited by factors that keep them in balance, including environmental conditions, pests, herbivores, and disease. When introduced into an area where these limitations are absent, some species can become invasive.

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Garden Escapees

Gardeners have been responsible for introducing some of these plants.

Plants sold and promoted for their colorful flowers or foliage, ease of growth, attractiveness to birds or butterflies:

Ailanthus – Imported from China to Philadelphia, 1784

Burning bush – Introduced circa 1860 due to its hardiness and showy foliage

Callery (Bradford) pear – Promoted by USDA in 1960s as an attractive landscape tree

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Listing Invasive Plants

Yellow flag iris (*Iris pseudacorus*)

Over 100 nonnative trees, shrubs, vines, herbaceous plants, and aquatics are listed as invasive by the Pennsylvania Department of Conservation & Natural Resources.

These plants are established in many areas of Pennsylvania's fields, forests, roadsides, and streams.

DCNR has no authority to regulate the sale or propagation of these invasive plants.

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Listing Invasive Plants in PA

Since 1862, Pennsylvania has regulated a few noxious weeds that affect agriculture. In 2017, PA enacted the Controlled Plant and Noxious Weed Act and established the Controlled Plant and Noxious Weed Committee with the ability to add plants to the list. The Noxious Weed List includes Canada thistle, johnsongrass, multiflora rose, and kudzu.

Listing gives the Department of Agriculture the ability to enforce a prohibition on the sale or propagation of listed plants.

In October 2021, Pennsylvania added its first invasive ornamental, Japanese barberry, to the state's list of noxious weeds. Its sale and propagation will be banned in Pennsylvania after October 2023 (except for several "seedless" cultivars that have already been excepted from the ban). Delaware banned the sale and propagation of Japanese barberry as of July 2022.

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Impact of Invasive Plants

Norway maple (*Acer platanoides*)

Introduced from England by John Bartram in 1756.

Norway maple leafs out earlier, retains its leaves longer, and grows faster than native maples and other native trees. The dense, shallow root system and heavy canopy discourage many native tree seedlings from germinating and growing underneath it.

Norway maple is tolerant of poor soils and air pollution, making it the dominant tree in many urban settings.

It is a prolific seed producer, invading forests and forest edges. Due to its dense canopy, forest diversity is declining.

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Impact of Invasive Plants

Japanese barberry (*Berberis thunbergii*)

This ornamental shrub was first imported into the United States in 1875.

Historically used in living fences for livestock, it is now primarily an ornamental plant. It escapes easily from gardens, invading fields, woodlands, and natural areas, crowding and choking out native vegetation.

Dense stands of Japanese barberry provide favorable habitat for all life stages of blacklegged ticks, hosts for lyme disease.

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Impact of Invasive Plants

Japanese honeysuckle (*Lonicera japonica)*

All the green foliage in this photo (left) is Japanese honeysuckle, climbing through shrubs and into redbud trees.

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Impact of Invasive Plants

Orange daylily (*Hemerocallis fulva*)

Orange daylily has been a popular ornamental for decades due to its showy flowers, hardiness, and versatility.

Daylilies have migrated from home sites to cover roadsides, fields, and forest edges.

Once established, orange daylily spreads vegetatively via tuberous roots to form dense patches that displace native plants.

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Methods of Controlling Invasives on Residential Properties

Hand pulling can work for smaller plants with small root systems (garlic mustard, stiltgrass), or with new invasions (Japanese honeysuckle, bush honeysuckle). Pull when soil is moist so the entire root is removed.

- **Disadvantage –** soil disturbance can expose new seeds and lead to more weeds!
- **Disposal** – leave plants on the ground unless they are in flower (some can set seed even after being pulled) or unless the leaves contain allelopathic compounds

Digging out larger plants (bush honeysuckle, oriental bittersweet) can work if the entire root system is removed. If the roots are too extensive, dig out what you can, and plan to follow up during the season with a shovel, weed whacker, pruners, etc. to finish the job.

- **Disadvantage –** same issues with soil disturbance as for hand pulling. Alternative; uncover root down to crown; cut just below crown. Persistence is needed with plants that re-sprout from root fragments.

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Methods of Controlling Invasives on Residential Properties

Mowing or weed whacking can be effective on certain plants before they flower; this is the standard recommendation for Japanese stiltgrass. For perennials, plan to follow up several times during the season (and possibly for several years) to insure the plant is killed.

Grazing is an option if you have goats; they eat everything!

Smothering can work on shorter weeds (crabgrass, rocket cress) or weed-whacked areas, and on concentrated infestations. Use heavy cardboard covered with a layer of your choice of mulch. Leave no gaps. Follow up with spot weeding as needed. Effective up to several thousand square feet in area.

Burning with a hand-held torch is time-consuming but can work for weeds whose roots are deep in the cracks between pavers. Follow up during the season to insure complete removal. Be aware that some invasives thrive on a regimen of periodic burning because they have adapted to fire. Research before burning!

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Methods of Controlling Invasives on Residential Properties

To spray or not to spray?

What, where, and how much you spray makes a difference

- Non-systemic products work by damaging the foliage to interrupt photosynthesis and nutrient transfer. The roots are not affected. Repeated applications can kill even perennial weeds.
  - Common active ingredients: d-limonene, citric acid, clove oil, vinegar
- Pre-emergents work only before a plant has developed roots, at the seedling leaf stage. Timing of application is critical.
  - Active ingredient: corn gluten

Option -- look for products approved for use in organic-certified operations

Systemic products are more toxic by definition

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Know Your Foe
Garlic Mustard

Alliaria petiolata

- Prefers moist soil in part shade – stream banks, woods
- Cool-season biennial – first-year rosettes develop in fall and stay green over the winter
- Rosette -- rough, rounded-heart-shaped leaves, dark stems, <u>purple stem at soil level</u>

- Leaves smell like garlic!
- Flower stalks shoot up 1 to 2 ft in May
- Mature leaves are arrow-shaped
- Seed heads hold viable seed all through summer

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Native Look-Alike

Golden ragwort (*Packera aurea*)

- Prefers moist soil in full sun to part shade – stream banks, edges of woods, under trees.
- Heart-shaped toothed medium-green leaves often have a purplish tinge underneath.
- Flower buds also tinged with purple.

***Packera* and garlic mustard side by side**

Freely self-seeds and is easily grown from seed. Naturalizes into large colonies in optimum growing conditions.

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Species-Specific Control for Garlic Mustard

Effectiveness – Takes care of existing plants, but new ones sprout each year unless reseeding is prevented and the area is sufficiently replanted.

- Pull or cut plants in winter while soil is unfrozen?
- Pull or cut rosettes in spring before they flower?
- Cut or mow plants when they start to flower?

→ REMOVE any plants with flowers, as seeds can still develop on cut stems

- To compost or not to compost? (allelopathic? seeds!)
- Be persistent!

→ *Garlic mustard is a ruderal species* (opportunistic; highly adapted to taking advantage of a temporary availability of resources, usually due to disturbance)

Can we use aggressive natives to suppress garlic mustard?

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Species-Specific Control for Garlic Mustard

Guerilla gardening: Insert natives into patches of invasives

Information and photo: humanegardener.com

Golden ragwort (*Packera aurea)*

- If you have *Packera*, transplant some into garlic mustard patches.
- If you don't have *Packera*, buy or trade with friends for plants, or sow seeds.
- *Packera* spreads easily in the right conditions – part shade, average to slightly moist soil – the same conditions favored by garlic mustard!
- The takeover might require several years.
- Continue to cut garlic mustard stalks when in flower, to reduce future seed load.

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Know Your Foe
Lesser Celandine

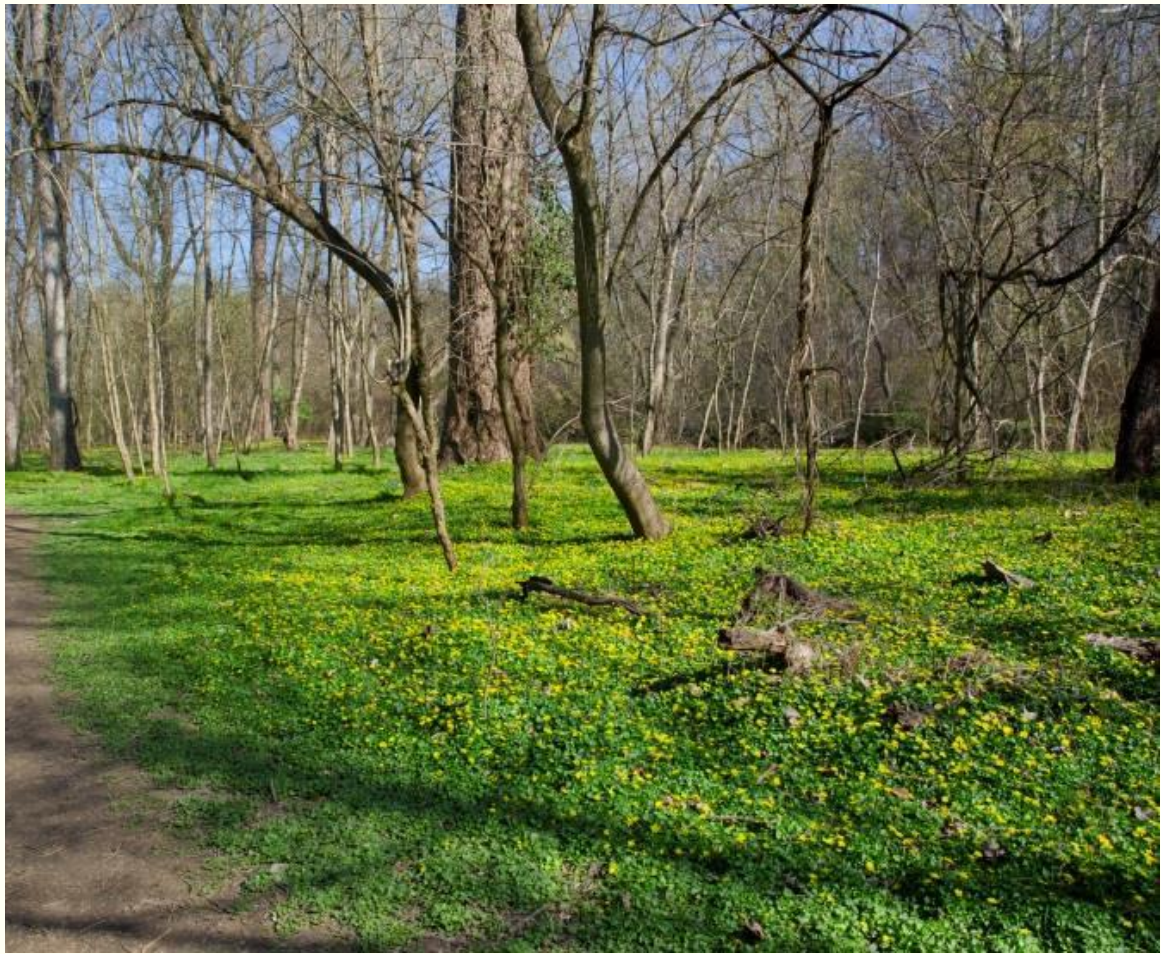
Ficaria verna

Buttercup family – shiny dark heart-shaped leaves, bright yellow flowers with 6 to 8 petals in March-April; fleshy white tubers; forms a low-growing mat

Colonizes lawns and edges of woods; prefers moist soil

Dense, rapid growth forms a **mat** of thick foliage, choking out existing natives and preventing germination of native seeds

Double whammy -- summer dormancy invites warm-season weeds



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Native Look-Alike

Marsh Marigold (*Caltha palustris*)

- Grows a bit taller than lesser celandine, and forms distinct clumps, <u>not</u> mats
- Flowers in late spring in our area – April to May

Lesser Celandine (*Ficaria verna*)

- Forms large, thick mats of leaves
- Flowers in early spring in our area, March to April
- Flowers have three light green sepals <u>underneath</u> the petals

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Species-Specific Control for Lesser Celandine

Effectiveness – Digging is only somewhat effective on existing plants and doesn't prevent reinfestation; smothering works locally but only in the short term

- Digging is problematic – it's difficult to dig up the entire root-tuber system, and digging disturbs the soil
- Smothering with thick cardboard can eliminate existing plants if no gaps are left, but new plants will emerge from seeds and bulbils that travel with stormwater
- Weed-whack the leaves completely to the ground for several years in a row? Be careful not to spread the bulbils if you do this.

→ *Lesser celandine is another ruderal plant that reproduces by seed as well as underground tubers – which native species might suppress it?*

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Know Your Foe
Bishop's Weed or Goutweed

Aegopodium podagraria

- Identified as an invasive ornamental in 1863.
- Leaves are twice-compound with long stalks. Roots are a distinctive bright white.
- Can form a dense mat in moist, partly shaded woodlands, preventing other plants from establishing.
- Spreads by seed and also by underground runners. If you don't get every last piece of root out of the ground, it will regrow.

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Native Look-Alike

Golden Alexander (*Zizia aptera*) is a good native alternative to bishop's weed. Zizia's flowers are yellow instead of white, but when the plants are not flowering, distinguishing them can be tricky.

- Both plants have compound leaves (more than one leaf on a stem), but the patterns are different.
- *Zizia* plants form defined clumps, whereas individual bishop's weed plants grow together to form a mass or mat.
- The roots of bishop's weed are WHITE; *Zizia* roots are brown.

← ***Zizia*** – three sets of compound leaves; short leaf stalks; usually three leaves at the tip of each stem.

Bishop's weed – longer leaf stalks, not all leaf sets have three leaves. →

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Species-Specific Control for Bishop's Weed

Effectiveness: Digging and smothering are effective when combined with replanting

- **Weed-whack or cut** the plants to the ground just after they have fully leafed out, then **cover** bare soil with wood chips and **replant** with aggressive natives. Follow up during the season to remove resprouts. This will deplete the plant's carbohydrate reserves and prevent it from photosynthesizing additional food.
- If you cannot cover the area because of other plants, **remove** new plants as they appear by digging them out as deep as possible with a narrow-bladed tool or **cutting** new plants below the base several times during the season to starve the roots.
- To compost, or not to compost? Roots can re-sprout in a compost pile; dry them out first.
- If an entire area is to be reworked, weed-whack it to the ground, cover with cardboard (leave NO gaps) and a layer of wood chips. Replant with natives.
- Persistence – monitor the locations where you removed bishop's weed and keep at them all season.
- Neighbors – install an impenetrable barrier at least 6" underground. Cut, mulch, and replant on your side of the barrier; monitor closely.

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Know Your Foe
Yellow Archangel

Lamiastrum/Lamium galeobdolon

- Yellow archangel is highly adaptable and grows in a wide range of conditions, from full shade to full sun, in sandy and heavy clay soils alike. Although it prefers moist soil and growth will be more dense under those conditions, it tolerates drought and dry sites.
- A member of the mint family, it spreads effectively by seed, stem fragments and from root nodes. It can climb and smother understory plants as well as brush.
- This garden escapee creates dense monocultures that allow little else to grow. It provides poor food and shelter for native wildlife and suppresses the diversity of native plant species typically found in forest understories.

Variegated coarsely toothed leaves, hooded yellow flowers, square stems, 1-2’ tall

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Species-Specific Control for Yellow Archangel

Effectiveness: Digging is effective combined with mulching and replanting

- Roots are not deep, so plants can be hand-pulled or dug. However, plants grow densely, so hand-pulling is labor-intensive and not very effective due the plant's ability to sprout from small fragments of root or stem, as well as its tendency to grow into and among desirable vegetation. Digging is easiest in fall through early spring. Sift through soil carefully to find all roots and stem fragments.
- Dense infestations can be controlled by smothering with cardboard followed by a layer of wood chips and replanting with natives. Control any escaping plants and check regularly for gaps in the covering material.
- Weed-whacking is not recommended because stems scattered by the machine can re-sprout where they land; if you use this method, rake up all the plant pieces and allow them to dry out before composting.
- Because yellow archangel spreads by stem and root cuttings, don’t dump the refuse in natural areas or dispose of it in the compost pile until it has been completely dried out.

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Know Your Foe
Oriental Bittersweet

Celastrus orbiculatus

- A deciduous, climbing, woody vine up to 60 feet in length. Vines can grow up to 4” thick. Light green alternate, elliptical leaves, finely toothed. Fruits are round and yellow, splitting to reveal bright red berries in fall.
- Commonly found on old home sites, abandoned fields, forest edges, and roadsides. Prefers open, sunny sites but can tolerate shade.
- Can girdle and kill trees, break branches, and shade out natives.
- Spreads by seeds (birds) and root suckers.

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Native Look-Alike #1

Oriental Bittersweet (*Celastrus orbiculatus*)

- Flowers and fruit occur in leaf axils all along the stems
- Fall fruit capsules are <u>yellow</u>

American Bittersweet (*Celastrus scandens*)

- Flowers and fruit occur only at the ends of branches, not in leaf axils
- Fall fruit capsules are <u>orange</u>

spicebush_2.webp

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Native Look-Alike #2

Spicebush (*Lindera benzoin*)

Oriental Bittersweet
(*Celastrus orbiculatus*)
Leaves glossy, rounded, serrated
Roots distinctly **orange**

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Species-Specific Control for Oriental Bittersweet

Effectiveness: Digging and vine removal are effective for larger plants; pulling is effective for new plants

1. Seedlings -- roots are not deep; pull by hand or cut below crown.
2. Larger plants – dig out with a shovel? Get as much root as possible. Roots can be branching on larger plants; follow and pull out or dig up as many root branches as possible.
3. Vines – cut off as high as possible; don't pull out of trees, as this may damage host tree's branches.
4. Vines – not necessary to untwine from host tree branches if vine has been cut off at soil level or root has been dug up.
5. Persistence – seedlings will continue to sprout as long as plants are in the area. Keep after them.

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Know Your Foe
Canada Thistle

Cirsium arvense

- Unlike most of our native thistles, Canada thistle is a perennial with a clonal root network that can grow deep into the ground.
- Lobed oblong leaves are waxy, green in color, and spine tipped.
- Flowers range from purple to pink or white, blooming June to August. Mature plants are 1 to 5 ft tall.
- A ruderal plant commonly found in agricultural and disturbed sites, or sites that are undergoing restoration. It is shade intolerant and therefore rarely found in wooded sites.
- Can spread rapidly through its horizontal roots and by seeding.

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Know Your Foe
Canada Thistle

Cirsium arvense

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Native Look-Alikes

The Mid-Atlantic is home to approximately 9 native thistle species that are important host plants for a wide range of insects. Field thistle and pasture thistle are biennials that spread by seed, not vegetatively.
Native Thistles: A Conservation Practitioner's Guide, Xerces Society
https://xerces.org/sites/default/files/2018-05/16-029_01_XercesSoc_Native-Thistles-Conservation-Guide_web.pdf

Field thistle (*Cirsium discolor*)

Grows 7 ft high with bright pink or occasionally white flowers.
White hairs on underside of deeply lobed leaves

Pasture thistle (*Cirsium pumilum*)

Grows 1 to 3 ft tall

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Species-Specific Control for Canada Thistle

Effectiveness: Digging is not consistently effective due to extensive root system. Cutting plants at the base + mulching and replanting can be effective.

- Light infestations (never just one plant; the root network sends up multiple stems at different times) -- repeated cutting just below soil surface, followed by replanting to shade out the area.
- Close mowing or cutting of plants twice per growing season just before flowering will usually prevent seed production. Cut at the early bud stage and again when resprouts reach the early bud stage. If plants are cut above the terminal bud before the stems elongate, they likely will regrow. Mowing before the flowers start showing color is important; plants that have developed flowers will produce some viable seed. DO NOT MOW after flowering. Bag or trash seed heads and roots.
- Sheet mulching of larger areas (cardboard + wood chips) should be followed by replanting with natives that create quick shade or ground cover.
- Highly vigorous plants such as wild bergamot (*Monarda fistulosa*), purple prairie clover (*Dalea purpurea*), golden alexander (*Zizia aurea*), Canada wild rye (*Elymus canadensis*), and slender wheatgrass (*Elymus trachycaulus*) can be used to outcompete and suppress Canada thistle.

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Know Your Foe
Japanese Honeysuckle

Lonicera japonica

- Introduced in 1806 for ornamental and wildlife uses. Fragrant white or yellow flowers.
- A fast-growing semi-evergreen vine that twines around the stems of shrubs and saplings.

- Forms large tangles that smother and kill vegetation. Dense thickets of honeysuckle prevent the germination and growth of many native species.
- Adapted to a wide variety of habitats from sun to shade.

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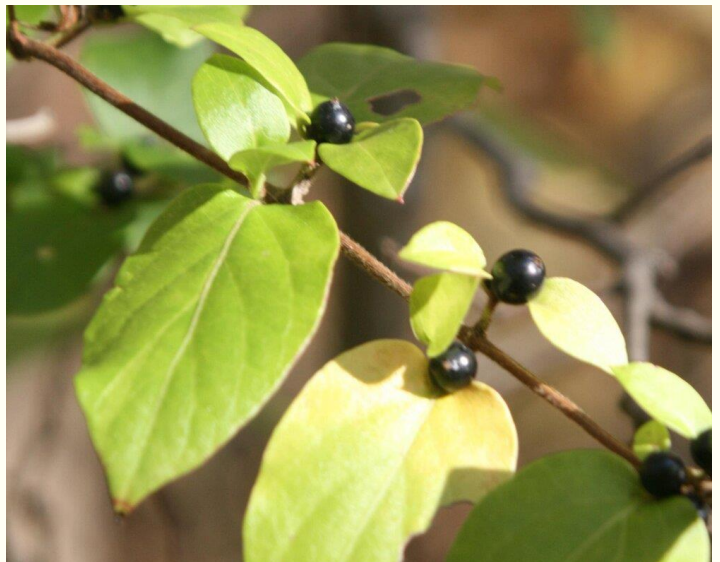
Know Your Foe
Japanese Honeysuckle

Lonicera japonica

- Opposite, oval leaves; secondary leaves can have additional margins.
- Can kill shrubs and saplings by girdling.
- Spreads by seeds (birds) and root runners from mature plants.



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Native Look-Alike

Japanese honeysuckle

Coralberry (*Symphoricarpos orbiculatus*)

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Native Look-Alike

Japanese honeysuckle

Coralberry

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Native Look-Alike

Japanese honeysuckle

Coralberry

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Species-Specific Control for Japanese Honeysuckle

Effectiveness: Removal of climbing vines is effective; removing re-sprouts and new plants is necessary

- Seedlings and surface runners: Pull out and toss in a pile on the ground to dry out before composting. Be careful around coralberry plants!
- Young vines choking saplings or shrubs: Unwrap each vine from the host plant, cutting the vine with pruners wherever necessary. These vines don't get very thick. When you get to the base of the shrub or tree, cut the vine below the crown. Allow vines and roots to dry out before composting.
- Mature vines climbing through trees: Cut vines as high as possible. Wait one season before pulling mature vines out of trees to minimize damage to host plant. Use pruners or a hand saw to cut vines as close as possible to ground level (beneath the soil level if possible). Allow vines and roots to dry out before composting.

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Know Your Foe
Sweet Autumn Clematis

Clematis terniflora, sometimes sold as *Clematis paniculata*

- Small fragrant white flowers emerge in August and September on new wood and by fall become a silvery mass of fluffy seed heads. It can aggressively self-seed and has escaped cultivation in many parts of the U.S.
- Small light green leaves when new growth emerges in spring. As temperatures rise, it rapidly puts out rampant growth, reaching 30 feet.
- This species is found invading forest edges, utility rights of way, and urban areas along streams and roads. It grows vigorously over other vegetation, forming dense blankets that block sunlight to the plants underneath.

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Native Look-Alike

Clematis terniflora

Long leaves have smooth edges.

Clematis virginiana

Also has fragrant white flowers in fall and fluffy, silvery seed heads, but leaves are <u>toothed</u>.

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Species-Specific Control for Sweet Autumn Clematis

- Sweet autumn clematis can be cut back in late August, when it is easily recognized by its showy flowers, and before the plants develop seeds. Repeated cuttings over the next year to starve out the root system will be necessary.
- Juvenile plants can be hand pulled or cut below soil level. Portions of the root system that are not removed may re-sprout. Monitor the site and cut back any new shoots to starve the roots.
- For climbing vines, first cut the vines near the ground at a comfortable height to kill upper portions and relieve the host tree. Vines can be cut using pruners or a pruning saw for smaller stems and a chain saw for larger stems. Try to minimize damage to the host tree's bark. Rooted portions will remain alive; sprouts must be repeatedly cut to the ground.
- Make sure roots are completely dried out before composting.

Photo courtesy Lynne Quarmby

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Know Your Foe
Ground Ivy/Creeping Charlie

Glechoma hederaceae

- Creeping groundcover in the mint family with small opposite round leaves with scalloped edges. Roots form along the stems at leaf nodes. Dark, minty odor when crushed or mowed. In May, short stems bear small tubular lavender flowers.
- Ground ivy prefers damp, wooded environments but can also thrive in full sun if soil is on the moist side or is heavily mulched to preserve moisture. In full sun with no competition, it can form a solid mat up to 8” thick.
- Dense mats of ground ivy can completely take over the groundcover layer if left unchecked.
- Once you pull it up, any pieces that are left behind will make new plants.

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Species-Specific Control for Ground Ivy

Effectiveness: Hand weeding is effective.
Follow-up is needed to control resprouting.

- Hand weeding can be effective when ground ivy is growing in among other plants. The roots are not deep. Weeding is easiest in spring when the ground is damp. All you need is a hand tool – a soil knife or Cape Cod weeder works well. Be certain to pull up all the runners, and be prepared to check back to find new plants that sprout from pieces you missed. New plants are smaller and easily removed. Persistence will keep this weed in check.
- Ground ivy forms stronger roots underneath thick mulch, especially in full sun. Rake the mulch back, remove all ground ivy runners, and replant the area with natives to shade out this weed.
- To get rid of a ground ivy monoculture, mow or weed whack the area as low as possible, followed by smothering with cardboard topped with wood chips, or solarization, to kill resprouts. Either way, watch for ground ivy to recolonize the area from the edges.
- The best way to prevent re-infestation is to plant the area heavily to cover the ground with other plants (e.g., *Phlox stolonifera*) or create enough shade (e.g., *Carex* spp) to slow down ground ivy's spread.

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Know Your Foe
English Ivy

Hedera helix

- Evergreen perennial vine, dark green triangular leaves, prominent light veins.
- Vines attach to tree bark by root-like structures.
- Small black fruits in fall are eaten by birds.

This vine is both a groundcover and a climber.

On the ground, it forms dense and extensive monocultures that displace native plants.

When it goes arboreal (adult phase), it weakens and kills trees by engulfing branches and blocking sunlight from the tree's leaves, threatening its viability. Eventually, trees can become completely smothered or die from progressive weakening. As ivy climbs higher in a tree, branch dieback advances from lower to higher branches. The added weight of the vines makes trees susceptible to blowing over during storms.

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Know Your Foe
English Ivy

- English ivy grows in a wide range of light conditions, from full shade to full sunlight. In general, the juvenile form of English ivy most often occurs in the shade, while the adult form occurs in full sun.
- Plants spread from adventitious roots that develop along the stem.
- Stems root easily when in contact with the soil.
- Stem fragments and cut stems can resprout.
- Fragments of roots left in the soil may sprout new stems.

Photo courtesy Invasive.org

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Species-Specific Control
English Ivy

Effectiveness: Pulling vines on the ground and cutting vines off trees are effective; ongoing attention to resprouting is necessary.

- Vines on the ground can be pulled by hand; the root system is shallow. To avoid soil disturbance, lift the vine and clip the roots as you pull. Wear gloves; ivy contains sap that can irritate skin.
- Vines on the ground can be smothered under several inches of biodegradable plant material, such as wood chips. The mulch should stay in place for at least two growing seasons.
- For vines climbing on trees, make two cuts in the vine, one close to the ground and one several inches to several feet higher. Repeat all the way around the tree. Cut just until you reach the tree bark; don't cut into the bark. Remove the vine between the cuts to prevent regrowth.
- The ivy above the cut will die; don't pull it out of the tree, as this could damage limbs. Allow ivy clippings to dry out completely before composting.
- Keep cutting or pulling off new growth that sprouts from the base of the cut vines, to starve the vines.

https://www.youtube.com/watch?v=sQKxiRe1XvI

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Know Your Foe
Chinese Silver Grass

Miscanthus sinensis

Miscanthus is a densely bunched grass, 5 to 10 feet tall, that invades roadsides, forest edges, old fields, and other disturbed areas throughout the U.S. It is considered a wildfire hazard because it produces large amounts of highly flammable dry plant material.

Individual grass blades are long (up to 18 in.), slender, and upright-to-arching with sharp tips and rough margins. The midribs are silvery in color.

Flowers in late summer with distinctive silver fans.

Spreads primarily by underground roots or rhizomes, but multiple varieties grown together have resulted in a “wild type” that can set a significant amount of viable seed.

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Native Look-Alikes

Miscanthus sinensis

Indiangrass
Sorghastrum nutans

Bottlebrush grass
Elymus hystrix

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Species-Specific Control for Chinese Silver Grass

Effectiveness: Digging isolated plants and mowing re-sprouts is effective.

- Repeated mowing or weed-whacking, as short as possible, throughout the growing season usually will kill *Miscanthus* in 2 seasons. Areas with a seed bank may require several years of mowing. Mowing management similar to that needed for lawn will provide the best control. *Miscanthus* cannot tolerate repeated mowing or cutting back DURING THE GROWING SEASON.
- Individual plants or small patches can be dug out as long as all of the roots are removed. After removal, monitor the site and cut down any re-sprouts.
- Cutting back in late fall or winter encourages more growth the next season.
- **Burning will increase** this plant's growth, vigor, and seed set.

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Know Your Foe
Winged Euonymus/Burning Bush

Euonymus alata/alatus

Burning bush is sold as an ornamental shrub that tolerates a wide range of exposures and soil conditions. It responds to being cut back by sprouting vigorous new stems. If cut back to the ground, it will resprout from the roots.

Corky edges on mature stems are an identifying feature.

- Bright red fall foliage
- Small red fruit in fall
- Seeds are spread by birds

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Native Look-Alikes

Strawberry bush (*Euonymus americanus)*

Green four-sided twigs; NO corky ridges; bright orange fruits seem to explode out of their covering

Eastern wahoo
Euonymus atropurpureus

Tiny <u>purple</u> flowers
Scarlet arils and dark purple fruits

Burning bush
Euonymus alata

Tiny <u>greenish</u> flowers

No other shrub in the East has thin, blade-like <u>corky ridges</u> on the sides of its twigs

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Species-Specific Control
Winged Euonymus

Effectiveness: Cutting large shrubs and continued removal of root sprouts, plus re-planting, is effective for localized infestations.

- Pull out any easy-to-pull plants.
- Cut larger plants just below soil level. If plants are too large, leave a short stump.
- Knock off or clip new sprouts around the stump.
- Check around the site for sprouts from roots. Roots of older plants are widespread – a 10-ft radius is not unusual.
- Mature plants send up root shoots that developed into new plants. All the plants in a colony must be cut or dug out.
- Every time you cut the plant, you force it to re-sprout, which depletes root reserves and weakens the plant.

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Know Your Foe
Japanese Stiltgrass

Microstegium vimineum

Japanese stiltgrass is an annual that typically grows 1 to 3 feet tall. It can also sprawl along the ground, sending out multiple thin stems that root at the nodes. It thrives in disturbed site. **Stiltgrass is considered one of the most damaging invasive plant species in the United States.**

- Forms a dense groundcover that smothers native plants and prevents regeneration of forests and fields.
- Releases chemicals that change soil chemistry and effectively stop other plants from growing, allowing it to spread even more quickly.

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Know Your Foe -- Japanese Stiltgrass

Microstegium vimineum

- Narrow, lance-shaped leaves; thin, weak root system; resembles a small, delicate bamboo
- Multiple stems branching near the base; longer stems sprawl and root at nodes
- Tan flower spikes in September AND self-pollinating flowers lower on the stem <u>any time in summer</u>

- Grows in sun or shade, in moist or dry soil, in lawns, in between and ON TOP OF other plants
- <u>One plant</u> produces 100 to 1,000 seeds
- Seeds are spread by surface water, animals, humans, and vehicles
- Seeds remain viable in the soil for 5 years or longer and germinate readily when soil is disturbed

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Species-Specific Control for Japanese Stiltgrass

Traditional Methods

Effectiveness: Hand pulling is effective for small localized infestations. Smothering and replanting are effective where possible.

- Hand pulling of Japanese stiltgrass can be effective for small populations. It is shallow rooted and generally easy to pull. Bag or dispose in the trash any time after mid-summer when seeds can be present.
- Pulling or mowing in mid-summer (June to July) allows existing stiltgrass seeds in the soil to germinate but does not leave enough growing season for them to set seed for next year.
- Mowing can be done while the plants are in flower but before seed set -- usually August. If stiltgrass is mowed in June, flowers low on the stems may still set seed, so repeat mowing will be needed.
- Weed-whacking can be done just before seeds mature in late August/early September. Cut stiltgrass as low as possible to remove all flowers. Hold the trimmer at a slight downward angle so the string digs into the ground to sever roots from stems.
- *Mowing and weed-whacking are problematic when stiltgrass grows in with other plants, or in woodlands that can't be mowed easily.*

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Species-Specific Control for Japanese Stiltgrass

Another Method: Smother and Re-plant

Cornell University Cooperative Extension

- Covering stiltgrass with 4-6 inches of wood chips or leaves will prevent stiltgrass from emerging for at least 1 year.
- Seeding directly into the decomposing layer will reduce future Japanese stiltgrass invasions. Seeding with annual rye can be a temporary restoration practice and is a recommended **first stage** of complete restoration. Annual rye competes with Japanese stiltgrass sufficiently to allow the natives in the seed bank to emerge.
- If applicable to the site, Virginia cutgrass (*Leersia virginica*) and jewelweed (*Impatiens capensis*) are competitive native plants to consider during restoration.
- Once Japanese stiltgrass has been suppressed for a number of years and natives have a chance to outcompete it, a formal native planting can occur.

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Species-Specific Control for Japanese Stiltgrass

Another Method: Native Competitors

Certain native plants may be able to out-compete and even control Japanese stiltgrass, either after removal or as interplantings:

- Golden ragwort, *Packera aurea*
- May apple, *Podophylum peltatum* (woodlands)
- Sedges, *Carex* spp.(woodlands and edge habitat)
- Northern sea oats, *Chasmanthium latifolium* (sun to part shade)
- Virginia wild rye, *Elymus virginicus* (sun to part shade)
- Bottlebrush grass, *Elymus hystrix* (drier soil, including clay)

Information from https://adamsgardennativeplants.blogspot.com

photo-2-april-15.webp

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Species-Specific Control for Japanese Stiltgrass

Alternate Method: Native Competitors

Encourage natives to populate areas overtaken by Japanese stiltgrass

Information and photos from humanegardener.com

White avens
(*Geum canadense*)

Enchanter's nightshade
(Circaea lutetiana)

Canadian black snakeroot
(*Sanicula canadensis*)

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Species-Specific Control for Japanese Stiltgrass

Time Your Control Methods

1. Spring: As soon as you notice seedlings (April-May), scuff or hoe them out. Cover disturbed ground with fast-growing natives or wood chips.
2. Mid-summer (June-July): Hand-pull clumps as you notice them among your plants. Don't add them to your "good" compost. Weed-whack larger areas to the ground. Cover bare ground with fast-growing natives or wood chips.
3. Late summer (August-September): Continue to hand-pull individual clumps from your plantings. Use a rake if necessary. Mow larger areas as low as possible. Don't leave the clippings on the ground as they will spread seeds.
4. Fall & winter – Cover infested areas with several inches of wood chips or leaves (collect bags from neighbors); seed or plant fast-growing natives.

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Follow Up After Removal

Whichever method you use to remove invasives, follow-up is critical:

* To prevent the same invasives from returning, especially if roots were left in the soil or a considerable seedbed remains
* To keep new invasives from colonizing the site due to soil disturbance and removal of canopy or groundcover plants

- **Vines** shade the canopy and in some cases the ground (ivy, honeysuckle).
- **Groundcovers** (lesser celandine, *Vinca minor*), **forbs** (garlic mustard, bishop's weed, yellow archangel, Canada thistle), and **grasses** (Japanese stiltgrass, Chinese silver grass) shade the ground.

Cleared areas need immediate cover. Plant lots of natives!

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Follow Up After Removal -- Plant More Natives!

- If you removed invasives that created **canopy** – climbing vines, trees, tall shrubs – plant more canopy trees and shrubs, and fill in the lower layers with forbs, grasses, and groundcover plants.
- If you removed invasives that **shaded the ground**, plant layers of native forbs and small shrubs.
- If you removed **groundcover** plants, including vines like honeysuckle, plant native groundcovers. Groundcovers can be planted under the native shrubs and forbs that you plant, as long as they get the light exposure they need.
- Plant natives that spread easily, because that's what invasives do.

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Natives for Quick Cover

Select plants that spread quickly to cover the ground, whether by seeds, rhizomes, or both. Check each plant's preference for sun and soil moisture. Watch that the super-competitors don't take over.

Groundcovers: *Carex*, creeping phlox (*P. stolonifera*), *Packera aurea*, *Antennaria plantaganifolia*, *Lysimachia lanceolata var. purpurea*, Virginia creeper (*Parthenocissus quinquefolia*), moss phlox (*P. subulata),* three-toothed cinquefoil *(Potentilla tridentata),* violet *(Viola sororia*), Robin's plantain (*Erigeron pulchella)*, *Chrysogonum virginianum*, *Salvia lyrata*

Forbs: ostrich fern (*Matteuccia struthiopteris*), celandine poppy (*Stylophorum diphyllum*), mountain mints (*Pycnanthemum*), white wood aster (*Eurybia divercata*), blue wood aster (*Symphotrichum cordifolium*), jewel weed (*Impatiens campensis*), *Monarda, Helenium autumnale,* blue mist flower (*Conoclinium coelestinum*), thimbleweed (*Anemone virginiana*), *Rudbeckia*, hay-scented fern *(Dennstaedtia punctilobula)*

Shrubs & small trees: Carolina allspice (*Calycanthus floridus*), coralberry (*Symphoricarpus orbiculatus*) grey dogwood (*Cornus racemosa*), elderberry (*Sambucus;* watch for deer), aromatic sumac (*Rhus aromatica*), Virginia sweetspire (*Itea virginica*)

Canopy trees: Sycamore (*Platanus occidentalis*), black cherry (*Prunus serotina*), black willow (*Salix nigra*), sassafrass (*Sassafrass albidum*), red maple (*Acer rubrum*)

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Plan(t) the Solution

Humans are the cause of the invasive plant problem, whether it was intentional, through planting nonnative ornamentals, or accidental. Our actions precipitated these invasions.

According to Professor Douglas Tallamy, 86% of land in the United States east of the Mississippi River is in private ownership.

"With great power comes great responsibility."

We need to take responsibility for the solution, for restoring balance to our ecosystem, "one yard at a time."

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Plan(t) the Solution

"In the past, we have asked one thing of our gardens: that they be pretty. Now they have to support life, sequester carbon, feed pollinators and manage water." — DOUG TALLAMY

HOMEGROWN NATIONAL PARK™ is a grassroots call to action to regenerate biodiversity and ecosystem function by planting native plants and creating new ecological networks. Our National Parks, no matter how grand in scale, are too small and separated from one another to preserve species to the levels needed. Thus was born the concept for Homegrown National Park, a bottom-up call to action to restore habitat where we live and work, by planting native plants and removing most invasive plants.

The initial goal is 20 million acres of native plantings in the U.S., representing approximately **one-half** of the green lawns of privately owned properties.

This is the largest cooperative conservation project ever conceived or attempted.

Learn more, and add your property to the map: **https://homegrownnationalpark.org/about**

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Native Alternatives to Common Invasive Ornamentals

Common invasive ornamentals	Plant these natives instead:
Lesser celandine	Marsh marigold (*Caltha palustris*), green and gold (*Chrysogonum virginianum*), golden ragwort (*Packera aurea)*
Bishop's weed	Golden alexander (*Zizia aurea* for wet soil, *Z. aptera* for drier soil), *Tiarella cordifolia var. cordifolia*; plantain-leaved pussytoes (*Antennaria plantaganifolia*), Robin's plantain (*Erigeron pulchella var. pulchella*)
Yellow archangel	Green and gold (*Chrysogonum virginianum*), *Lysimachia lanceolata var. purpurea*
Oriental bittersweet	American bittersweet (not deer resistant); cross vine (*Bignonia capreolata*), woodbine (*Clematis virginiana*)
Japanese honeysuckle	Coral honeysuckle (*Lonicera sempervirens)*, woodbine (*Clematis virginiana*), yellow jessamine (*Gelsemium sempervirens*; northern limit of its range), cross vine (*Bignonia capreolata*), Virginia creeper (*Parthenocissus quinquifolia*; groundcover)

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Native Alternatives to Common Invasive Ornamentals

Common invasive ornamentals	Plant these natives instead:
Sweet autumn clematis	Woodbine (*Clematis virginiana*)
Chinese silver grass	Big bluestem (*Andropogon gerardii*), Indiangrass (*Sorghastrum nutans*), sea oats (*Chasmanthium latifolium*; tolerates shade); bottlebrush grass (*Elymus hystrix*)
English ivy	Virginia creeper (*Parthenocissus quinquefolia*; climber & groundcover), wild ginger (*Asarum canadense;* groundcover)
Vinca minor	*Phlox stolonifera, Iris cristata,* blue-eyed grass *(Sisyrinchium angustifolia), Salvia lyrata*
Burning bush	Black chokeberry (*Aronia melanocarpa*), red chokeberry (*Aronia arbutifolia*), ninebark (*Physocarpus opulifolius*), Virginia sweetspire (*Itea virginica*)
Japanese barberry	Virginia sweetspire (*Itea virginica*), aromatic sumac (*Rhus aromatica*)

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Resources

Pennsylvania Department of Conservation and Natural Resources Invasive plant fact sheets

Blue Ridge PRISM Fact Sheets

iMapInvasives

- iMapInvasives is an on-line GIS-based data management system used to assist citizen scientists and natural resource professionals working to protect our natural resources from the threat of invasive species.
- Participating jurisdictions are Arizona, Maine, New York, Oregon, Pennsylvania, and Saskatchewan.
- Pennsylvania currently tracks 412 species of invasive plants (including aquatics), insects, and animals.
- If you find an invasive species in one of these areas, you can submit a report on line to iMap.

https://homegrownnationalpark.org/about