Controlling Invasive Plant Species: A Primer

by Sharon Boddy

This primer was created specifically for those new to dealing with invasive plant species. Whether you're part of a community group that's helping protect natural spaces, or an individual who wants to control invasives on their own property, this primer provides an overview of three manual control methods, advice and tips, and examples of successful projects.

There are many excellent guides that provide detailed information about each species, including the most up-to-date best practices for their removal and control. See the **Resources** section at the end for links.

Background photo: Non-native periwinkle got into this urban forest through dumped garden waste.

Since 2016, I have been the director of two stewardship groups, the Friends of Hampton Park and the Friends of Carlington Woods. Many of the earliest conservation projects I worked on were invasive species control. I've used those experiences to inform this free primer, which is part of my *Naturally Yours* stewardship consultancy business.

https://sharonboddy.wordpress.com/naturally-yours/

Over the last five years, I've helped remove invasive species from public, forested land, and in many cases, planted native species in their place. I've also trained dozens of volunteers on how to identify and remove many invasive species.

I've been a professional freelance researcher and writer for 30 years, with a focus on environmental issues.

At a Glance:

BA, English, Carleton University 1995

Winner, 2022 Member Conservation Award, Ottawa Field-Naturalists' Club

2023 Ontario Master Naturalists' Program, Lakehead University

Presented "Bye bye Buckthorn" removal and replacement project at the 2023 Ontario Invasive Plant Council conference

What is an invasive plant? An invasive plant is any species not native to a particular area. Ecosystems evolved over time as a balancing act between many different species. Invasive species interrupt those connections, causing immense environmental and economic harm. The Intergovernmental Platform on Biodiversity and Ecosystems Services concluded that invasive species have played a role in 60% of global plant and animal extinctions, and costs global health and the economy more than $400 billion every year.

Source: IPBES Invasive Alien Species Assessment https://www.ipbes.net/IASmediarelease

Not all non-native plants are as harmful as others. Some, like dandelions, have been in North America for hundreds of years and some native species have evolved to live with them.

Ways to reduce your impact

1. Do not plant invasive species in your garden. Many invasive species were brought in long ago as ornamental plants and some are still being imported and/or grown here for sale. If you already have invasive species in your yard, dig out the roots or cut off the flowering parts before they seed and infect other areas.

2. Choose native plants and support local, native growers. Do not support growers that sell invasive plants. The soil they use for other plants may be contaminated. If you feel comfortable, speak to the owner or manager of the store or nursery about your concerns.

3. Learn what parts of invasive plants can be safely composted or left to rot in your own yard, and which should be bagged for solarization (= baking it in sun until all plant parts are dead) or for garbage pick up.

Some of the more common invasive species in the Ottawa, Ontario region

Japanese knotweed (*Reynoutria japonica*)

Garlic mustard (*Alliaria petiolata*)

Periwinkle *(Vinca minor*)

European [pictured] and common buckthorns (*Rhamnus cathartica* and *Frangula alnus)*

Dog strangling vine (*Vincetoxicum nigrum*)

Before you begin

- When controlling invasive plants, it's very tempting to start ripping everything out. With some species, however, that method can make the problem worse. Learn as much as you can about the area the invasive plant is in, such as the soil type, other species growing there (native and non-native), how much sun/shade it receives, etc.

Get to the know the species

- Where is the species' native range? How and where does it grow? Is it bi-annual, perennial? Noxious or toxic? How does it reproduce? Learn as much as you can about the species and always use scientific names in your research to ensure you make a 100% positive identification.

Prioritize

- If you're dealing with multiple invasive species, which is often the case, you will need to prioritize based on the resources you have.

Starter Areas

- If you have limited resources – people, money, time – start small. An area of less than ~10 m^2 (~108 ft^2) can be managed by one person. Getting a few small but quick wins will give you confidence, and can encourage others to help with larger infestations.
- If you are well resourced, take on the species that is having the greatest impact. For example, once Japanese knotweed moves in, it can take only a few years to completely take over an area, making it that much more difficult to remove.

Basic Manual Control Methods

This guide will provide information on three manual methods for controlling invasive species:

1. Remove & Replace
2. Cut & Cover
3. Off with their Heads (or the Queen of Hearts method)

You can also mix & match controls.

Remove & Replace involves removing as much invasive plant material as possible and immediately replacing it with native species. This is considered to be a best practice for many invasive plant species.*

Before taking on a Remove & Replace project, ensure that you:

1. Have adequate labour and plant resources to replant the entire area you've cleared.

2. Remove as much invasive material before you replant and a plan to deal with the vegetation.

3. Choose native species that can compete against invasive regrowth and make weeding easier. For example, New England asters and goldenrods can grow 2 m or more and reseed well on their own.

4. Have a *minimum* 2-year maintenance plan to make sure the native species survive and to check and weed out any regrowth of the invasive species.

**Japanese knotweed is not always a good candidate for remove & replace, unless it's in a very small area where you are certain that all of the roots and rhizomes have been removed.*

Remove & Replace: Dog strangling vine

Dog strangling vine (DSV) spreads horizontally and vertically, smothering any plants and trees in its path. It emits a chemical that fools Monarch butterflies into laying eggs on it, so once the caterpillars hatch they have no food to eat. The chemical also prevents the growth of some native plant species.

This area was already dominated by invasive, but wrongly named, Canada thistle when DSV arrived. It was caught early and native wildflower species were planted immediately after it was removed. DSV must be cut, not pulled as pulling can stimulate the plant to keep growing. Volunteers have continued to plant more native species and weed out DSV and other invasive regrowth for two years.

Circled: DSV infestation in a portion of a meadow. **Top**: The area after it was cleared. **Middle**: Black-eyed Susans and New England asters, among a few other native species, were planted in the first year. **Bottom**: More plants were added in the second year and many of the first plants are naturally reseeding the area.

Remove & Replace: Buckthorn

European buckthorn has an extensive root system and produces dark blue almost black berries that are eaten by many overwintering birds. It's not a very good source of nutrition for them but may be the most plentiful source of food during certain times of the year, so buckthorn seed is easily spread through their waste.

A chemical in buckthorn also discourages other plants from growing nearby, and new research shows that this chemical may also be harming amphibians and reptiles.

The area pictured above was dominated by buckthorn and non-native honeysuckle. Some native species were present, but it was only a matter of time before they too would be gone. The pollinator garden, planted in 2021 in front of the fence, was also at risk.

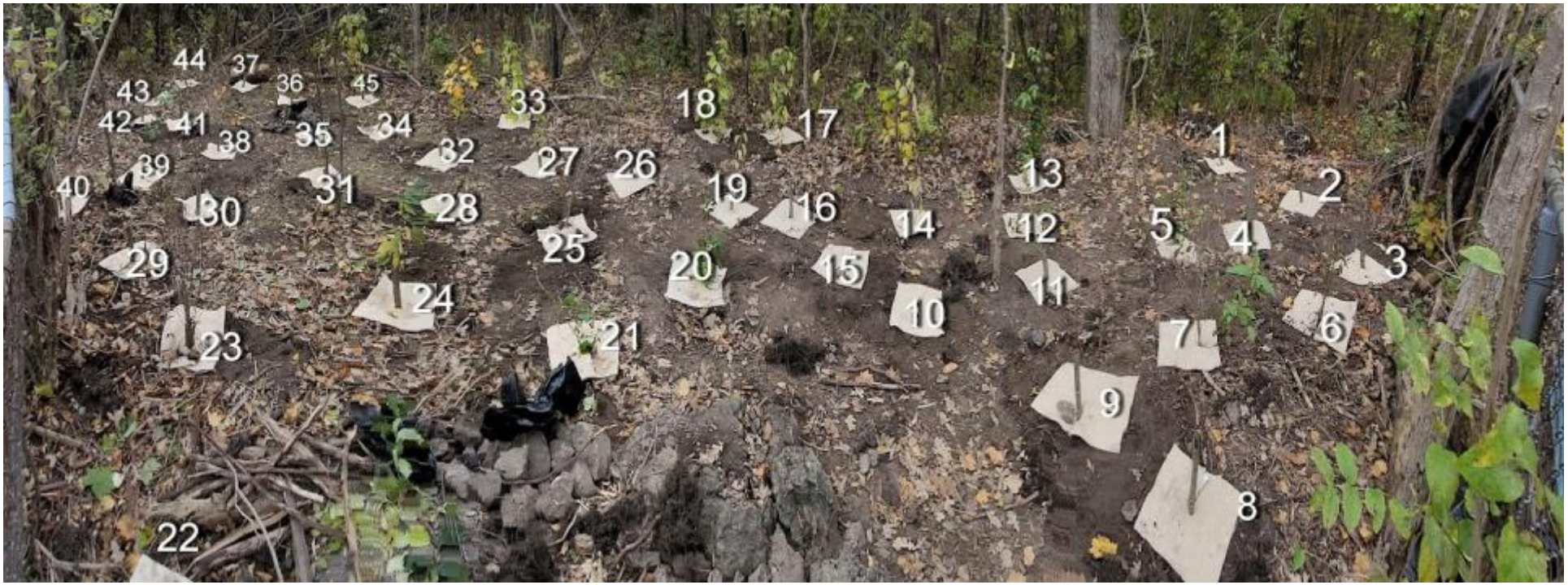
Bottom: The smaller buckthorn growth was removed by hand with trowels and spades.

Left: Medium-sized buckthorn were taken out by the roots using root extractors.

Right: Larger buckthorn was cut down using saws, and some of the stumps left were covered with thick black plastic to starve them of sunlight.

Top: All berries and small plants were bagged, and larger limbs twined for City pick up.

Bottom: The area cleared and native shrubs and trees planted. All new plants were numbered to track their progress over the years.



Cut & Cover involves cutting down plants and covering the soil so that the plants cannot grow back. Covers* are weighed down to ensure that no light gets through. This method weakens the root system over time, and regular checks for regrowth are required.

Cut & Cover is ideal for areas where

- Invasives dominate and little to no native species grow, or
- For those who don't have enough resources to immediately replant native species.

Ensure that you:

1. Have adequate labour and resources to remove all the invasive material from an area and cover it.

2. Ensure that the cover is pegged and/or weighed down sufficiently, ideally with 10 cm (4") of wood chips across the entire surface. Bricks, paving stones, or other vegetation such as tree limbs, can also be used.

3. Check the area regularly for regrowth. Depending on the species, covers may need to stay down and checks for regrowth done for up to 5 years or longer.

**Landscape/geotextile fabric, black plastic, tarps, burlap, or thick cardboard can be used as covers.*

Cut & Cover: The Bee Spot

The Bee Spot is a holding bed for native pollinating species. Plants are grown in a nearby greenhouse, planted in spring, then transplanted to other areas that fall or the following spring, and the bed replenished.

This area was filled with native, but noxious poison ivy, and non-native plants like garlic mustard, creeping bellflower, and burdock. The larger plants were cut down and the area covered with clean cardboard and burlap.

Lesson Learned! The burlap method did not work as well as black tarps would have, but still did a decent job with free and readily-available materials.

Pictured L-R: The Bee Spot covered and marked out, September 2022. Native species planted in June 2023. Yarrow and butterfly milkweed were among the native species flowering by August 2023.




Cut & Cover: The Staircase Garden

The Staircase Garden mimics a meadow with native grasses and flowering plants. Located at the top of a steep slope on the edge of an urban forest, the garden is surrounded by invasive species like burdock, black medic, and dog strangling vine, as well as the native but aggressive staghorn sumac shrub.

In June 2022, the area was covered with black landscape fabric, pegged, and weighed down with wood chips. Four months later, the coverings were lifted, native grasses and flowering species planted, and the mulch reused. The method worked very well as shown by the bare clay soil pictured below. Regular weeding is still necessary and will be for some time to come.

Pictured L-R: Staircase Garden before, 2021. Area covered June 2022. Inset: Lifting the tarps in September 2022. Canada rye grass and New England asters are two of the "heavy lifters" at the garden, helping to shade out smaller, non-native species, September 2023.

Cut & Cover: Japanese Knotweed

Since 2020, the National Capital Commission and volunteers have been controlling six knotweed colonies in Hampton Park, an Ottawa urban forest, using the cut & cover method. Volunteers had been controlling some colonies since 2018.

Japanese knotweed can grow 5+ m tall, spread 1+ m/year, shades out all other plants, and can bust through concrete.

Vegetation was cut down and the roots dug out. Geotextile was pegged down with woodchips on top. Volunteers check for regrowth each spring and fall. In one colony, the tarps have been lifted and native species of trees and shrubs replanted. The rest remain under cover to weaken the root systems.

Left: One colony cleared; some native Ostrich fern colonies were retained. **Middle**: Tarp laid. **Right**: Wood chips on top of another colony that was also covered. Mulch couldn't be used on the sloped area as it would clog a nearby creek bed, which acts as stormwater overflow.

Off with their heads, or the Queen of Hearts method involves cutting off the flowering or seeding parts of invasive species. If done regularly, the plant will never reproduce and the root system will eventually weaken and die.

This is a good method to use when you don't have the resources to do a full removal job or the area to be controlled is simply too large. It can also be part of regular maintenance.

Ensure that you:

1. Have a plan to dispose of all the cut vegetation. If the plant has started seeding, all material cut should be removed from the environment. If the plant is flowering but not yet seeding, you may wish to leave it for a few days or weeks to allow insects to benefit, then cut it just before it turns to seed. In some cases, it can be safe to leave cut flowers as they won't develop any further. **Never leave seed pods behind**.

2. Have a plan to eventually replace at least a portion of the infected area with native species.

Off with their Heads: Canada thistle

Canada thistle has been the dominant flowering plant in this Ottawa meadow for years. In recent years, more damaging invasive species, like dog strangling vine, have taken priority over its removal. Volunteers however, have slowed its spread by clearing new areas for native species each year, and using the Queen of Hearts method in between.

The seeds are surrounded by fluff that is easily carried by wind, and can hitch rides on any animal, including humans. The heads are cut just before they turn to seed, to limit the spread and to allow insects to benefit for the longest time.

Native Black walnut trees emit a chemical that discourages plants like Canada thistle growing beneath it. It can also discourage native species from growing, so volunteers never plant native species beneath their canopy.

Tools

Some projects may require different tools but, in general, the equipment needed to control invasive species includes:

- Gloves
- Pruners, loppers, saws and hacksaws; scissors can also be ideal for cutting plants that are low to the ground
- Spades and/or a root extractor
- Garbage bags or other containers
- Covers. These can be as simple as black garbage bags, or as sophisticated as geotextile. The key is to ensure that no light gets in and that it is weighed down so that regrowth cannot break through.

Costs

There are few, if any, dollars that need to be spent to remove invasive plants. It is much more on the labour-intensive side. Many people already have many of the gardening tools needed, and covers can be made from a wide range of free or easy-to-find materials. Most costs involved come when replanting native species since, in most cases, those plants must be purchased.

Disposal

Invasive species must be disposed of carefully to avoid infecting new areas.

Bag all roots, seeds and flowering plant parts.

Never compost any roots, seeds or flowering parts, including in municipal organics systems. Some plant parts may be compostable but check each species to make sure. Japanese knotweed, for example, can regrow from 1 mm of live material.

Best practice
Before putting any invasive plant into the trash or compost, bake it under the sun. Collect all the invasive plant material into black plastic bags or other sealed containers, and let it sit in the sun for up to a week or more to kill all live portions. Only when you are sure that all of the material is dead should you compost or use it as mulch.

Tip! If the invasive removal project is to be ongoing for several years, consider having an on-site container where invasive material can be put to rot. This can substantially reduce the volume of material you need to dispose of and, once it's inert it can sometimes be safely used as mulch or compost.

Pictured: Container used to collect Japanese knotweed regrowth includes a sign that explains the project.

Timing

Spring & fall are usually the best times to remove invasive species, but there are opportunities to remove invasive plants all year round.

Cutting DSV too early in the spring, for example, still gives the plant plenty of time to produce new flowers and seeds, so you may wish to wait until early summer when the flowers appear before cutting. Mature stands of knotweed are obvious in winter and can be cut down to save time in the spring. Plant roots are always easier to dig out after a rainstorm.

You need to be sensitive to the needs of wildlife, their feeding, breeding, nesting, and/or migration habits and patterns to make sure that they are not impacted by any of your control methods.

Tip! Know your area before you clear it of invasive species. If there are native species present, do all that you can to protect them or, if need be, to safely transplant them. Spring ephemerals, such as trilliums, are only visible for a few weeks every year and then die back into the soil. Knowing where these plants grow will help you protect them while removing the invasive species.

Maintenance Plans

All the hard work you do to remove invasive species may have to be completely redone if maintenance is not considered. Luckily, bi-weekly or monthly inspections over the growing season to weed or water are all that's needed.

However, sometimes more involved maintenance plans are needed if regrowth is very persistent or if water availability is scarce. If the area is on public land, you may also need to protect it from city maintenance crews, foot traffic, or vandalism.

Monitoring

Consider setting up a monitoring plan to check the progress of the native species you plant in place of the invasive species, and/or the rate at which invasive species regrow.

Many data points can be easily collected in a simple spreadsheet, including the planting dates, flowering and seeding times, insect/bird interactions with the species, if the native species naturally reseeded, and other relevant observations. This data can be compared year over year and help fine tune future projects for greater success.

Tip! If you can't handle a full monitoring plan, always take before, during and after photos/videos of your removal projects and take them in the same spots for easier year over year comparison.

Questions to consider

1. Do we have enough human resources to maintain the area for at least two years? If not, are there other groups we can partner with?

2. Do we have the equipment we need to maintain the area? E.g., a rain barrel, pruners, etc.

3. Will we need to water new plants, if using the remove and replace method? If so, how often?

4. What will we do if our control methods don't work?

5. Do we need signage or other communications to explain the project, raise awareness of the issues, and protect the area?

Resources

The **Ontario Invasive Plant Council** has information on invasive species, and a Best Management Practices Series that includes step-by-step information on removing 26 invasive plant species. Free Fact Sheets and Postcards. https://www.ontarioinvasiveplants.ca/

The **Invasive Species Centre** has information on invasive insects, fish, mammals, and pathogens, as well as plants. It offers grant opportunities to help pay for removal projects, and its searchable best management practices database is regularly updated as new information and research arises. https://www.invasivespeciescentre.ca/

The **Canadensis** database can be used to confirm native or non-native species. Operated by the Université de Montréal Biodiversity Centre, it publishes specimen data compatible with internationally-accepted biodiversity information standards. The NCC uses this database when planning its own projects and when screening community planting projects on federal lands. https://data.canadensys.net/vascan/search?lang=en

Case Studies

Learn more about some of the examples shown here.

The Bee Spot https://sharonboddy.wordpress.com/2023/08/04/the-bee-spot/

Bye Bye Buckthorn https://sharonboddy.wordpress.com/2022/11/02/bye-bye-buckthorn/

I hope that this guide gives you the best start in your fight against invasive species. If you found it useful, please consider making a contribution to my fundraiser:
https://gofund.me/48b1f953

If you'd like more in-depth advice or a consultation, please use the Contact form on this website.

Cheers,
Sharon

Standing with some relatively short knotweed, only 7 feet tall, a month before it was cut down.