

Mechanical Control of Terrestrial Invasives Plants

Mechanical control strategies for managing terrestrial invasive plants.

The best tools and techniques for controlling invasive plants will be determined by a site's characteristics, the type of plants present, the size of the infestation, and the resources available to implement a control plan. Since each invasive plant species responds to a given control method differently, it is important to determine which methods are best suited to a situation. Often a combination of control techniques is needed, including mechanical, chemical or biological techniques.

Here we focus on prevention and mechanical methods, which are common techniques used at the start of a project, and techniques that can work on a range of projects from small to large.

Prevention

Preventing invasive plants from getting a foothold is always the best strategy of control. It is fairly easy to snuff out a small population of invasive plants, but once the infestation spreads, the cost and effort needed to control the plants escalates and they become harder to remove. This is the idea behind "early detection and rapid response."

A major avenue for invasive plants spreading is via materials moved around by humans. A seed or fragment of an invasive plant can stow away in a potted plant or in haybales, in mulch, soil, gravel or other material, or on boots or clothing. Invasive plants can be inadvertently moved along roadsides by mowers, graders, or plows.

Here are some strategies to prevent invasive plants from hitching a ride to new areas:

- Know the source of purchased plants to ensure the soil is free of invasive plant material
- Compost food waste, leaves, and grass clippings and make your own wood chips to reduce the need to buy mulch, which may contain invasive seeds
- When buying or selling haybales, ask the farmer about invasive plants in their fields
- When building trails, use on-site rocks, soil, sand, and gravel whenever possible
- Consult with your town's Department of Public Works to ensure they use local materials when possible, have roadside mowing protocols for invasive plants, and employ other best practices to prevent invasive plant spread
- Consult with your town planner to ensure zoning ordinances require developers to pay attention to invasive plants
- When working around invasive plants, clean off tools and shoes before moving to another location, and avoid wearing clothing (such as fleece) that enables seeds to stick to you and catch a ride



It's important to begin a project with a goal in mind, in this case clearing a treeline to allow native shrubs and seedlings to thrive.



Mechanical Control

Mechanical removal can be very labor intensive and may create significant site disturbance. Before embarking on the physical removal or treatment of invasive plants, recognize that it will require a long-term plan and a multi-year effort. Otherwise, efforts may not succeed and may even get worse. “Picking Our Battles: A Guide to Planning Successful Invasive Plant Projects” published by the New Hampshire Fish and Game Department is helpful in crafting a plan. Mechanical methods for controlling invasive plants usually do not require special permits or licensing. However, there are a few situations, such as around historical foundations or in wetland areas, where mechanical control requires special care and in some cases a permit if disturbing soil in sensitive areas.

Your on-site project goal when conducting mechanical control will usually be to halt seed production of the invasive plants, which can remain viable for years. The seed bank in the soil already dictates a multi-year project. Without halting seed production, the project timeframe will continue to stretch into the future. There is a lot to consider even before pulling or digging any plants. Have a vision for the future and find incremental successes along the way.

Plants that are pulled, dug, or cut should be piled on site. Depending on the size of the project, you can pile the material on a tarp or pallet or directly on the ground if there is little chance that the plants will take root. Create “weed drying stations” where non-viable, seed-free plants are piled to desiccate in the sun. Pile plants that contain seeds or other viable plant parts in separate “hot spots,” where any resprouts can be easily contained. See “Methods for Disposing Non-Native Invasive Plants,” by UNH Cooperative Extension for more information.

Recognize that repeat visits are almost always needed whether you use mechanical techniques, herbicides, or a combination of methods. The number of repeat treatments may depend on site conditions as well as the species of plant.

Safety is an important consideration when working with invasive plants. Woodchuck holes, barbed wire, wasp nests, poison ivy, dehydration, thorns, ticks, and skin rashes are all potential hazards. Additional care is needed when pulling plants, such as wild parsnip or giant hogweed, that can cause a severe rash if skin comes in contact with the plant sap; consider getting guidance from a professional before trying to handle these plants. Be prepared for field work: wear eye protection, long-sleeved shirt and pants, gloves, sturdy shoes, and a sun hat; carry water and a first aid kit; consider using a white 5-gallon bucket to carry your gear.

Before embarking on the physical removal or treatment of invasive plants, recognize that it will require a long-term plan and a multi-year effort. Once an invasive plant infestation spreads, the cost and effort escalate.





Sturdy hoes and similar tools are useful for digging out roots.

Methods

Hand Pulling & Digging

Gloved hands work amazingly well on soft or small stems. Rubber kitchen gloves offer protection when pulling plants that exude sap that can cause a rash, such as wild parsnip. Soft, well-fitting garden gloves work well for pulling soft-stemmed plants such as garlic mustard or small seedlings of woody plants. Thicker work gloves are a must for larger shrubs, especially when pulling plants with thorns, such as barberry and multiflora rose.

The best approach to hand pulling is slow and steady. Reach down to the base of the plant and pull with both hands. This will help ensure that you pull up all or most of the roots. Hand-pulling is most effective if the ground is somewhat moist. Dry, hard-packed ground will often result in plants snapping off before the entire root system is extracted. Plants should be pulled when viable fruits or seeds are not present on the plant, to avoid spreading the fruits to a new spot.

Plants that are less than 2-3 inches in diameter, but too large to hand pull, can be removed by digging. Dig using traditional gardening tools, such as a mattock, hoe, or soil knife, or try specialized invasive plant tools available on the market today. Some tools use body weight to lever the root system out of the ground. When selecting a tool, consider the weight and size, as some may be cumbersome to carry around a large project area.

Areas of disturbed soil provide ideal conditions for invasive plant and weed germination. After a plant is pulled or dug up, tamp down the soil and replace any leaf litter or other native plant material. Repeat visits are essential to check for resprouts or sprouts from the soil seed bank.

Smothering

The smothering or suffocating of small seedlings or herbaceous plants may be effective with some infestations. This technique is also used with some stands of Japanese knotweed, but it requires vigilance and patience to maintain a heavy plastic layer for five continuous years. This technique will kill all vegetation in the affected area such that replanting will be required when plastic is removed.

Another smothering technique involves cutting a woody stem at six inches above ground and covering with a heavy plastic bag, tying it closed with a zip-tie. The covering should be left in place for at least one year before removing.



Make sure to remove the entire root system when hand pulling, which is easiest in moist soil.



When smothering a woody stem, the covering should be left in place for at least one year.

Cutting*

Repeated cutting of invasive shrubs and vines can help stop seed production of large plants. This may be accomplished with loppers or hand saws. With some training or supervision, weed trimmers, brush saws and chain saws may also be used.

Woody invasive shrubs will need to be cut multiple times over several years. The number of repeat treatments may depend on the site conditions as well as the species of plant. The goal is to initially stop seed production and then with each subsequent cut to reduce the plant's energy reserves. Time the first cut for late spring or early summer (before July 4th), followed by a second cut in late summer or fall (as late as November), and do the third cut the following spring.

Cut the stems at ground level or at waist height. The latter technique allows you to find the plants for the repeat treatments and it is easier on your body. Large bittersweet vines should be cut as close to the ground as possible and then cut off another 4 to 5 feet along the stem to create a gap between the ground and the treetop vines. Again, monitoring is important, so check back every year for a while.

Girdling*

Girdling can be used on large invasive shrubs if other techniques are not viable. At waist height, cut into the bark approximately $\frac{1}{4}$ - $\frac{1}{2}$ " and all the way around the tree. Repeat 6 inches above that cut, then strip off all the bark

in between. This severs the phloem, which is the living tissue just under the bark, and cuts off the flow of sugars from the leaves to the roots. While the portion of the plant above the cut will die back it may sprout below the cut, so you will need to check back to see if there are any new sprouts. If so, just strip them off with gloved hands or use clippers and continue removing any new sprouts until the entire plant is dead. Girdling can be done with hand tools including an ax, hand saw or specialized tool. Similar to cutting, spring and early summer are the best time to girdle a plant after it has used energy from its reserves for leaf production. The bark is also more easily removed at this time of year.

Mowing/Shredding*

Some large invasive plant infestations may require large equipment, such as tractors with brush or rotary mowers or excavators with special attachments (such as a "brontosaurus"). It is best to use this equipment before seed production (usually before July 4th) to avoid disturbing the soil when the plants have viable seeds. Some contractors have the ability to uproot and shred large shrubs. Others can grind shrubs down to the ground. As long as some of the root system remains in the ground, repeat visits with hand tools or other methods will be needed. When plants are top-killed, the size of the root system increases, resulting in more vigorous re-sprouting after the initial mowing. In order to deplete the energy reserves, repeat

*Cutting, girdling and mowing are sometimes used in combination with herbicide treatments. Cutting and mowing can be used to reduce the above-ground biomass and foliage, thus reducing the amount of herbicide needed as well as improving access to the site.



Cut woody invasives at ground level or waist height, best done late spring to early summer.



Girdling is best done in spring and early summer after a plant has used energy to produce leaves.



Use mowing equipment before seeds are produced, and avoid disturbing soil after plants have viable seeds.



Mechanical equipment has the potential to spread invasives. Inspection and cleaning is essential.



A “weed drying station”

mowing is necessary. This can mean re-mowing 3-4 times a year for multiple years following the initial mow.

Mowing or shredding have the benefit of halting seed production over a large area. Make sure to ask the contractor details about their equipment, technique, and expected outcomes before embarking on a project. While it can increase the complexity of a project, depending on the plant composition on the site, you can flag and retain mature native plants during mowing projects. Skilled operators will be able to maneuver around retained plants. All mechanical equipment used in treating invasive plant infestation has the potential to transport seeds, roots, rhizomes, and spores to other sites. Equipment inspection and cleaning is essential to stop subsequent invasive plant spread.

Monitoring

Persistence and monitoring are key for all invasive plant projects to be successful. A monitoring schedule should be built into your project plan. It may be necessary to adapt your plan based on the results of your monitoring.



It’s important to wear appropriate protective equipment when managing invasive plants, including work gloves.



Always map and monitor your invasive plant control efforts.

References

Invasive Species Outreach Group. *Methods for Disposing Non-Native Invasive Plants*. UNH Extension, 2010.

Invasive Plant Working Group. *Picking Our Battles: A Guide to Planning Successful Invasive Plant Management Projects*. NH Fish and Game, 2015.

Learn More

For more information on invasive plants and management options, see UNH Extension's webpage nhinvasives.org.

Photo Credits

Many of the photos are courtesy of Ellen Snyder.

About the Author

Ellen Snyder is a certified wildlife biologist and sole owner of Ibis Wildlife Consulting.

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