



SVT's Approach to Invasive Plant Management

Invasive species are the second greatest threat to biodiversity, second only to direct habitat destruction. Conservationists throughout the country have been dealing with the challenge of controlling invasive plants for many decades. Invasive species are also a significant economic and production issue for agriculture and forestry industries.

SVT has been a Steering Committee member of the Suasco CISMA (Sudbury, Assabet, Concord rivers watershed Cooperative Invasive Species Management Area) since its inception in 2009. More information about the CISMA can be found on their web site www.cisma-suasco.org. The CISMA was formed to address the huge challenge that invasive plants present to conserving and managing our natural lands and waters. In addition to SVT, members of the CISMA include the USFWS Eastern Region Wildlife Refuge Complex, National Park Service Wild & Scenic Rivers Program, OARS, MassAudubon, Native Plant Trust (formerly known as New England Wild Flower Society), Walden Woods Project, and many local land trusts and municipal conservation commissions in the watershed. Last year SVT assumed the role of Coordinator for the CISMA.

Members of the CISMA share information and best management practices (BMPS) with each other to ensure that we are using the most current and best science available. In addition to our collective experience, CISMA BMPS are based on national and regional guidelines from organizations such as The Nature Conservancy and the US Fish & Wildlife Service. The CISMA Steering Committee meets six times per year, including two educational meetings per year for the general membership. BMPs typically include a combination of mechanical, chemical, and, where possible biological control techniques. With certain species and under situations of extensive invasion, the CISMA has determined that the targeted and judicious use of a chemical herbicide to be essential for effective control. This targeted use of herbicides is in stark contrast to the typical broadcast spraying used in large scale agriculture or landscape operations.

The use of chemicals is understandably of concern and the CISMA has regularly re-evaluated these practices and refined techniques to minimize the use of chemicals. For example, with the continued publicity and concern over the use of glyphosate, we invited (for the second time in several years) a toxicology expert from UMass Amherst (Hotze Wijnja, PhD, MA Department of Agricultural Resources) to provide us with a presentation on the most recent studies on glyphosate. In his presentation this past March, some of the information that he provided included the following:

- International Agency for Research On Cancer (IARC) (under World Health Organization) 2015 – classified glyphosate as “probable human carcinogen” in the same category as “eating red meat” and “irregular work schedule”
- World Health Organization/Food & Agriculture Organization of the United Nations: 2016 – not carcinogenic through food or water; EPA and Health Canada came to same conclusions
- Agricultural Health study in 2018 assessed those exposed to glyphosate products over ~20 years of work and found no link to lymphoid cancers

Mr. Wijnja stated that there are many other more toxic chemicals in use than glyphosate that we should be worried about and he is not sure why glyphosate is the chemical that has received all of the publicity. He judges that glyphosate, if used according to the prescribed recommendations in invasive plant control are not a threat to environmental or human health.

Given the extremely pervasive and daunting problem of controlling invasive plants, SVT carefully chooses its battles. SVT focuses on those reservations that have higher ecological values and at which we believe we will be able to dedicate resources over the long-term to control invasive plants. We have employed a combination of mechanical, biological control and chemical methods. We are able to greatly minimize the use of chemicals by utilizing initial manual and mechanical treatments. Following mechanical controls, the first tactic is usually to cut larger stems and dab or paint the surface with an herbicide. This method is most preferred because it perfectly targets the invasive plant, minimizes application rates and avoids impacts to non-target species. The second method used for chemical control is to mow or cut plants, wait for low and dense foliage to regrow and then apply a foliar spray. This method can only be used in low wind conditions and with no precipitation. Use of backpack sprayers and newer surfactants further limit drift. Chemical applications are most intensive in the first year and are followed by much reduced applications in the following two years. Follow-up spot treatment may be needed in subsequent years. Continued monitoring and mechanical removal is always necessary.

SVT's Approach to Invasive Plant Control At the Smith Conservation Land in Littleton

In spite of the Smith Conservation Land's wonderful special habitats and beauty, half of the property is overrun with invasive plants. Oriental bittersweet is the invasive plant that is most abundant and pervasive throughout the 26 acres of disturbed habitat. Garlic mustard, narrow-leaved bittercress, and Dames rocket cover extensive areas of the property to the east of Whitcomb Avenue. Multiflora rose is quite common in the moister soil areas. Other invasive plants found on the property include common barberry, burning bush, glossy buckthorn, purple loosestrife, and wall lettuce.

Prior to SVT's ownership, Rick Findlay, current Vice President of the Littleton Conservation Trust and a Massachusetts certified applicator, had brought the issue of invasive plants to the attention of the Smith family. They permitted Rick to initiate mechanical and spot-herbicide treatments of the Oriental bittersweet. They had also permitted Rick to conduct some basic trail and property maintenance.

Prior to SVT's acquisition of the property, staff had begun to evaluate the land with Rick and other LCT members. SVT concluded early on that the greatest threat to the ecological health of the property is the abundance of invasive plants and the declining health of plantation trees, particularly the red pine stand. SVT invited representatives from MassWildlife and the USDA Natural Resources Conservation Service (NRCS) to visit the site in February, 2019, and provide additional technical and funding advice. Subsequently, the NRCS, through its Environmental Quality Incentives Program (EQIP) drafted a management plan and provided SVT with a contract to control invasive plants and remove the dying red pine stand. The NRCS provides partial funding for the project and SVT is in the process of conducting additional fundraising.

The NRCS contract prescribes the following:

“Treatment of woody, exotic/invasive or aggressive native plants using primarily chemical methods, in order to achieve the desired purpose identified on the Brush Management (314) Job Sheet. Herbicide method will be cut-stump treatments. The implementation of the practice shall comply with the 314 job sheet and 314 specification guide provided, as well as all Federal, State and local regulations. “

The recommended approach for management of large infestations of Oriental bittersweet is a combination of mechanical and chemical methods. Most practitioners consider triclopyr to be much more effective on Oriental bittersweet than glyphosate. In addition to the USDA NRCS recommendation, this approach is recommended by several organizations **not** limited to the following:

- the Suasco CISMA (<https://cisma-suasco.org/invasive/oriental-bittersweet/>)
“A combination of cutting followed by application of concentrated systemic herbicide to rooted, living cut surfaces is an effective approach for removing Oriental bittersweet. For large infestations spanning extensive areas of ground, a foliar herbicide is recommended over manual or mechanical methods, which would create soil disturbance. to minimize soil disturbance.”
- MassAudubon <https://www.massaudubon.org/learn/nature-wildlife/invasive-plants/oriental-bittersweet>
“For young vines, hand pulling can work, and repeated mowing may be effective in fields. When large vines have grown into trees, cut the vines when the leaves aren’t present, and apply a systemic herbicide to the freshly cut stems. The triclopyr-based herbicide Garlon usually works when applied as a foliar spray, whereas foliar applications of herbicides based on the active ingredient glyphosate are generally not effective.”
- Michigan Natural Features Inventory (Equivalent to the Mass. Natural Heritage and Endangered Species Program) <https://mnfi.anr.msu.edu/invasive-species/OrientalBittersweetBCP.pdf>
“Mechanical controls alone will not eradicate established Oriental bittersweet infestations but can effectively prevent further damage to the trees and shrubs that support its vines at least temporarily. In combination with herbicide treatment, they can provide effective control of established populations over time.”

Concerns About the Use of Triclopyr

A few neighbors and Littleton residents have raised serious concerns about the use of any chemicals for invasive plant control at the Smith Conservation Land. Neighbors are concerned that the chemical may get into drinking water as well as surface and ground water systems. They are concerned generally about environmental impacts on humans, wildlife and the environment.

In spite of the recommended methods described above, SVT is aware that a few conservation commissions in Massachusetts strongly discourage any use of chemicals, and that any use of chemicals is prohibited over and within a buffer zone to private or public water supplies in some municipalities. Understandably, this leaves room for continued concern over the use of chemicals.

Up to this date, SVT had not received any news or information that would have led us to believe that the limited and judicious use of triclopyr (or glyphosate) would endanger human health or cause significant environmental damage. However, **SVT proposes to indefinitely delay the use of any chemicals at the Smith property until we can further investigate the claims and concerns of neighbors and residents.**

We will be getting the data layers for the locations of drinking water supply wells and aquifers. We will research any additional scientific studies related to impacts of triclopyr on humans, land, water and wildlife as it relates to the use of this chemical for invasive plant control.

We had already begun researching the use of goats for initial manual control. The owner of the Central Mass Goat Rental visited the site last week. They recommend following up the goat treatment immediately with a spray of a soap/vinegar mix and then continued maintenance after that. Other practitioners, specifically the USDA NRCS and The Trustees, have not seen good long-term results with goats except in field maintenance. We will also be getting another project proposal and estimate from a company that uses only manual and mechanical methods of control. We have one estimate in-hand for a combination of mechanical and chemical application using triclopyr.

Response to Question About the Use of Triclopyr:

- Garlon 3A would likely be the triclopyr mix used, but this may change dependent upon the contractor
- 25 – 50% concentration of triclopyr for cut & dab applications
- 3-5% concentration for foliar spray
- The amount of the mix used is entirely dependent upon the site and the amount of invasive vegetation. Contractors provide reports of this information after each application.
- Other properties where SVT has used triclopyr: 14+ acres at Cedar Hill, Northborough; spot treatments at Wolbach Farm, Sudbury; spot treatments at Turenne in Southborough

Response to Question about Employing a Hydrologist

- SVT is not aware of any conservation organization or land management agency employing a hydrologist for invasive plant control projects. This inquiry has never been raised before. The techniques of herbicide application for invasive plant control avoid runoff and are not conducted when there is precipitation. If there is concern that a chemical would get into surface or groundwater, we rely on the regulating agencies and researchers to have tested those potential impacts.

Response to Question about SVT's use of Manual/Mechanical methods

- We use hand pulling to control garlic mustard, narrow-leaved bittercress and wall lettuce. LCT has used weed wacking technique to control garlic mustard at Smith, but the invasion is quite extensive and still out of control.
- At Gowings Swamp in Concord we experimented with the use of buckthorn baggies for glossy buckthorn and found it to only be 50% effective. We will still continue to try to use this method where we think it is feasible and has more chance for success.
- At the Desert Natural Area and SVT's Memorial Forest in Marlborough and Sudbury, we have been using teams of volunteers for the past 10 years to control small infestations of invasives and the large scale invasion of glossy buckthorn. This is an annual activity for the Lincoln-Sudbury high school community service day. SVT has additionally employed other school groups, corporate groups, scouts and general volunteers to assist in this effort annually. The more challenging and larger glossy buckthorn shrubs were located along two stream corridors; in those areas we utilized the cut and dab method with glyphosate.
- At the Turenne Wildlife Habitat in Southborough, volunteers had spent over 5 years pulling Oriental bittersweet. This method was effective in freeing strangled trees but exacerbated the Oriental bittersweet problem in the control area. Therefore, SVT implemented an initial heavy

cut and pull followed by a targeted herbicide treatment (for two years) in the intensely infested area and a cut & dab treatment in the sparser area with larger stems. Since then, SVT uses manual weeding to maintain the control.

- At SVT's Wolbach Farm, we have utilized volunteers over many years to conduct manual removal of invasive shrubs in areas that do not have a history of being mowed (where shrubs have been mowed, the root systems are too extensive to effectively remove with manual methods). Volunteers have cut Oriental bittersweet vines out of trees. We have a small area where we regular cut and mow the bittersweet – it is a very small, limited area that is contained enough to do that. Other areas of Oriental bittersweet have been treated with the cut & dab method.
- At SVT's Cedar Hill Reservation in Northborough, we used a team of scouts and then an Americorps team to manually remove Japanese barberry. The scout group was less effective at getting the roots up from around the roots; the Americorps group was able to achieve better results. The area was subsequently invaded with poison ivy and most volunteers are unable or unwilling to work in and around poison ivy. We subsequently hired a contractor to use a chemical herbicide.
- We have found manual removal to be effective for burning bush, glossy buckthorn and honeysuckle (where it has not previously been mowed and where the root systems are in discrete "balls.") We use this method at several properties where and when volunteer resources become available.
- To our knowledge, flame torches are not used by members of the CISMA or any of the practitioners that we have worked with. A quick google search indicates that burn certification may be required.
- Solarization and smothering is useful in small areas. SVT used it at our Wolbach Farm meadow with decent results but still had to cut and dab re-sprouting Oriental bittersweet. It has been tried on Japanese knotweed without great success.

To restate, in addition to our own experience, SVT relies on the experiences and expertise of other larger professional organizations, such as The Nature Conservancy and the CISMA, and on environmental and regulatory agencies to help guide our policies and practices.

Additional References:

- National Pesticide Information Center_ Triclopyr information fact sheet <http://npic.orst.edu/factsheets/triclopyr/gen.html>
- EPA Triclopyr Fact Sheet https://www3.epa.gov/pesticides/chem_search/reg_actions/reregistration/fs_G-82_1-Oct-98.pdf
- USDA NRCS Brush Management Job Sheet https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1081640.pdf
- Vermont Invasives <https://www.vtinvasives.org/>
- Center for Invasive Species and Ecosystem Health <https://www.invasive.org/gist/handbook.html>
- Beyond Pesticides <https://www.beyondpesticides.org/>
- Marin Municipal Water District, CA http://www.marinwater.org/DocumentCenter/View/254/HRA_Chap4_Triclopyr_1_1_2010?bidId=