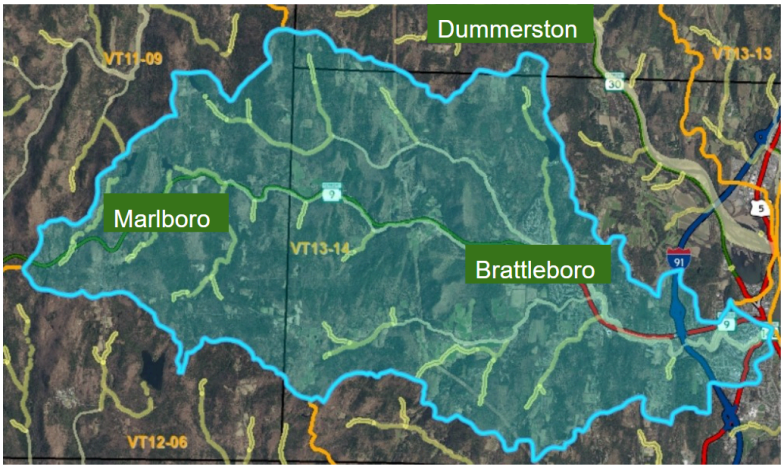
Proposed Whetstone Watershed Invasive Management Plan

Protecting Whetstone Brook Riparian Zones; Mapping, Planning, and Outreach



Southeast Vermont Cooperative Invasive Species Management Association (CISMA)

sevtcisma.org

This project was funded in part by a Vermont Watershed Grant.

Management recommendations:

The CISMA recommends a multi-year mechanical and chemical invasive management strategy, focused along Route 9 and in downtown Brattleboro to target oriental bittersweet, buckthorn, and knotweed invasive plants. This management strategy should also include Early Detection and Rapid Response for invasives that are new to our area including Japanese stiltgrass.

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Project background

The Whetstone Brook watershed consists of 28 square miles and flows into the Connecticut River[1]. Located in southeastern Vermont, this watershed is found primarily in Brattleboro. The Whetstone brook starts in Marlboro and follows Vermont Route 9 to the Connecticut River. The northern-most sections of the watershed cross into Dummerston.

The Southeast Vermont Cooperative Invasive Species Management Association (CISMA) implemented an assessment, inventory, and monitoring project of terrestrial invasive plants growing in the Whetstone Brook watershed. Invasive plants serve as a significant threat to our natural ecosystems. Specifically, established invasive plants in riparian zones exacerbate erosion, decrease rainwater infiltration, and ultimately degrade streambanks[2]. Invasive plants outcompete our native plants. Our native plants serve as riparian buffers, they can reduce flood damage, form beneficial relationships in soil, and provide stability to streambanks[3]. Through outreach efforts on Front porch forum, social media, newsletters, postcards, and contacts with partner organizations, the CISMA involved the community in mapping invasive plants along the Whetstone watershed using iNaturalist (see appendix A).

iNaturalist is a crowd-sourced plant identification and mapping application. The CISMA provided an informational sheet (see appendix B) explaining how to create an observation in the app. Only observations with research grade (requiring two agreeing identifications of the photo) were used in the results.

Results

The monitoring efforts resulted in 61 observers with 33 invasive plant species observed on iNaturalist. The project had 632 total observations, shown in figure 1 and appendix C. The most common invasive observed was oriental bittersweet (*Celastrus orbiculatus*) with 108 observations, followed by glossy and common buckthorn (*Frangula alnus* and *Rhamnus cathartica,* respectively) with 95 observations. The third-most observed invasive was knotweed (*Reynoutria* species) with 76 observations. The top ten invasive plants observed using iNaturalist are shown in table 1 and figure 2 illustrates the distribution of invasive plants species found in the watershed.

Given the widespread distribution of invasive plants, coordinated invasive plant management is needed. Consistent management of these plants can keep them contained[4]. An Early Detection and Rapid Response (EDRR) plan can catch invasive plants early, before they become difficult to eradicate. This requires consistent monitoring along roadsides as they provide mechanisms for plants in neighboring states to come into Vermont.

Specific recommendations

Invasive plants were often found along roadsides. In Brattleboro, this includes along Route 9, Bonnyvale Road, South Street, Williams street, Gulf Road, Meadowbrook Road, and Orchard Street. Other hotspots include the area around Guilford Street, Maple Street, Austine Drive, Canal Street, and Elliot Street. In the Marlboro area, Ames Hill Road and Hamilton Road had numerous invasive plant observations. To manage these infestations, road crews should follow proper management protocols for removal and containment of these plants. A combination of methods can allow for low herbicide use while achieving a high success rate[5]. Table 2 provides a combination of mechanical and chemical management techniques of the most prevalent invasive plants in the watershed. This table was created based on information from VTinvasives.org[6] (*Refer to a licensed applicator if using chemical treatments*). This website is a great resource for identifying, treating, and removal of invasives. In general, they recommended leaving dead plant material on site to allow for solarization and desiccation. This must be done at the proper time in the growing season as invasive plants take advantage of newly cleared areas.

In addition to managing established invasive plant populations, road crews and landscape companies should clean equipment prior to and after working onsite. This will diminish the spread of invasive plants by mowers, weed whackers, and other tools. Equipment should be cleaned (ex: with air compressors or pressure washers) at the same location onsite to reduce seed spread[5]. Charging for time spent cleaning equipment can serve as an incentive for landscape companies to implement these cleaning practices. An example for managing roadside invasive plants from the Nature Conservancy can be found in appendix D.

The highest concentrations of invasive plants were found in Brattleboro. However, it is important to note that the survey data provided were collected using the iNaturalist platform. This platform collects crowdsourced observations and is therefore biased by densely populated areas. In addition, herbaceous plants such as garlic mustard and Dame's rocket can be underrepresented as they are less conspicuous. Management strategies should include further invasive plant mapping in areas with a lack of data. Continued outreach efforts should be made in the Whetstone Watershed on invasive plant identification and management strategies. Given the lack of data in forested areas, farmed areas, and around ponds and water bodies, additional outreach and surveys are needed. Specifically, forestland owners, farmers, foresters and landscape companies should be involved in identifying large invasive populations.

At the end of each subsequent year of management, the effectiveness of these practices should be reevaluated. Towns should include assessments of invasive species in the watershed in subsequent town plans and in other reports to the public. In addition, newly established invasive plants should be reported to the CISMA so that an EDRR plan can be created.

Figure 1: Map of invasive plants in the Whetstone watershed.

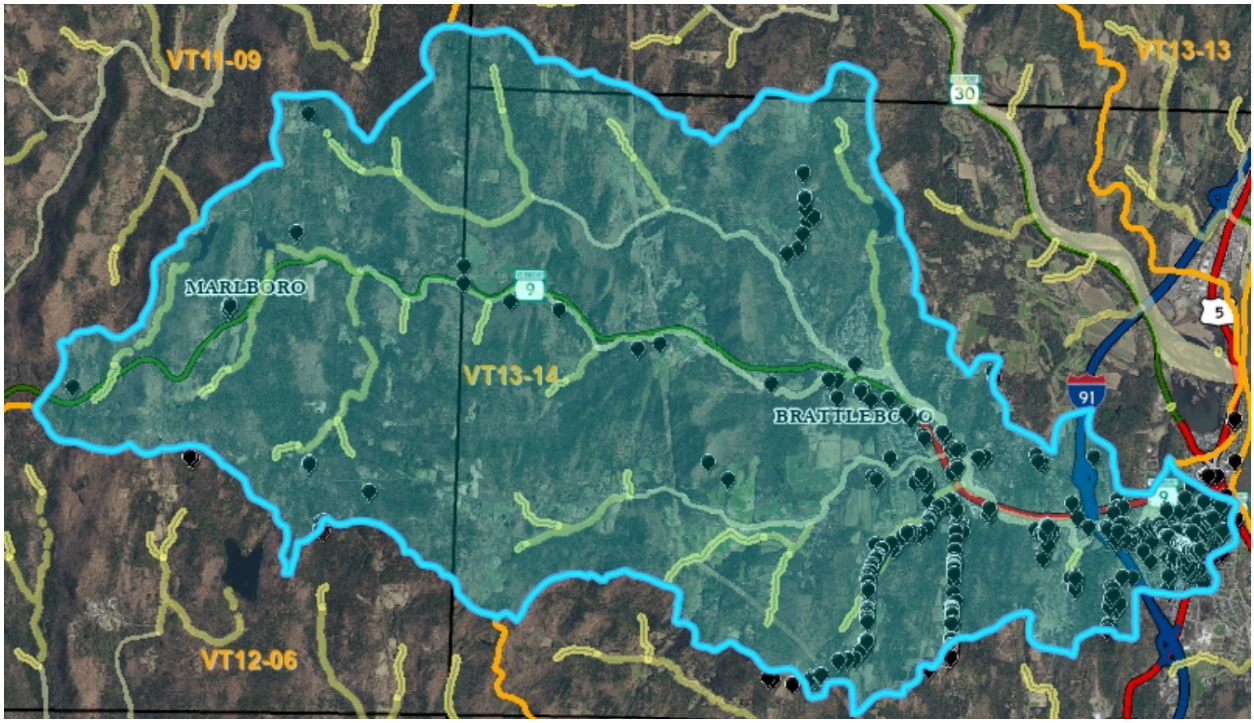


Table 1: Most common invasive plants in the Whetstone watershed

Name	Number of observations
Oriental bittersweet	108
Buckthorn species	95
Knotweed species	76
Multiflora rose	74
Japanese barberry	42
Winged euonymus	34
Garlic mustard	31
Black swallow-wort	24
Bittersweet nightshade	22
Black locust	20

Figure 2: Pie chart of the distribution of invasive plants in the Whetstone watershed

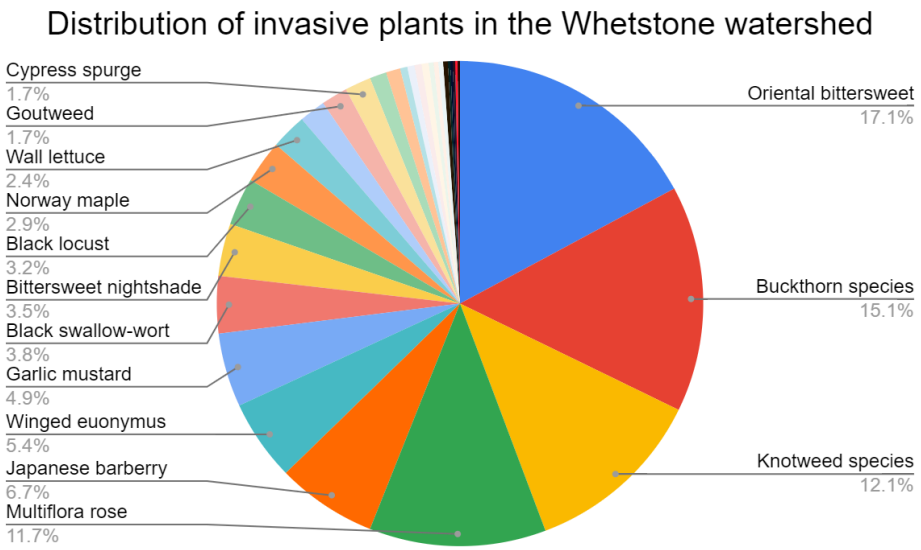


Table 2: Management recommendations for invasive plants

Plant name	Management recommendations:
Oriental bittersweet	• In early spring, cut vine at the root collar and repeat every two weeks • In fall, apply a foliar spray, in fall, apply a cut stump treatment
Buckthorn species	• In the spring, use a weed wrench to remove entire root system • In late summer through early fall, apply cut stump treatment
Knotweed species	• From June to September, cut back knotweed and smother with dark tarps • Throughout growing season, foliar spray
Multiflora rose	• Throughout the growing season, repeated mowing, foliar spray • In late summer through winter, cut stems and dig out the roots • In late summer through early fall, cut stump application
Japanese barberry	• Early in the season, hand pull or flame using a propane torch • Throughout growing season, mow • From May to October, apply foliar spray • Late summer to early winter, cut stump
Winged euonymus	• Any time of the year, hand pull • In fall and winter, cut stump, apply herbicide or wrap plastic over stump • In fall, apply foliar spray
Garlic mustard	• In early May, hand pull, smother with dark tarp • In early spring or late fall, foliar application
Black swallow-wort	• In June, mow down • From July to August, apply a foliar spray

Appendix A: Invasive plants of Windham County informational sheets

Invasive species: Early Detection

Detecting invasive species early is one of the best ways to minimize their impact on a landscape. This page provides information on potential early detetction invasives that the Windham County Natural Resources Conservation District is concerned about.

Stiltgrass

Photo: NY State IPM Program
Description: Plant with pale green leaves with stripe, prop roots, "collar hairs"
Management:
Hand pulling, Mowing/mulching/brush-hogging.
When: Before seeds drop, in September

Lesser Celandine

Photo: Clackamas Soil and Water Conservation District
Description: Dark green, kidney-shaped leaves, arranged in a rosette, yellow flowers on stalks
Management: Hand pulling, herbicides
When: Herbicide use should be applied early spring

Garlic mustard

Photo: NY invasive species
Description: First year: basal rosettes with heart-shaped leaves, Second year: white, 4 - petaled flowers, more triangular and toothed leaves
Management: Hand pull entire plant, smother patches, apply herbicides directly to leaves
When: Early May

Wild Parsnip

Photo: Burlington Free Press
Description: Alternate, compound leaves with jagged teeth, diamond-shaped, yellow flowers in an umbel pattern
Management: Dig up entire plant, smother, apply herbicides directly to leaves
When: Before seeds set, May-June

Wild Chervil

Photo: vtinvasives.org
Description: compound, fern-like leaves, white flowers with 5 notched petals
Management: Pull at base of stem, smother, herbicides
When: Before flowering, May - June

For more details, visit vtinvasives.org
www.windhamcountynrcd.org

DO YOU HAVE INVASIVE PLANTS GROWING ON YOUR PROPERTY?

DO YOU WANT TO LEARN MORE ABOUT INVASIVE PLANT IDENTIFICATION AND MANAGEMENT?

HELP THE SOUTHEAST VT COOPERATIVE INVASIVE SPECIES MANAGEMENT ASSOCIATION (SE VT CISMA) WITH THEIR WHETSTONE WATERSHED INVASIVE PLANT OUTREACH AND MAPPING PROJECT

The SE VT CISMA is mapping terrestrial invasive plants growing in Whetstone Brook watershed for their Whetstone Watershed Invasive Plant Outreach and Mapping Project.
Participants will have their property evaluated for invasive plants and will be provided with relevant management resources.
We will also be hosting two invasive plant identification and management workshop on July 13th or August 4th.
Visit sevtcisma.org or scan the QR code below for more information.

This project was funded in part by a Vermont Watershed Grant.

Appendix B: iNaturalist instructions

Protecting Whetstone Brook Riparian Zones; Invasive Plant Management Project How-To Guide

How to create an iNaturalist account

1. Go to **www.inaturalist.org**
2. Click the "Sign Up" button.
3. Choose one of the two options for joining.

   Option One: Create a username and password specific to iNaturalist. To choose this option, fill in the fields and click the "Sign Up" button.

   Option Two: Link an existing account to iNaturalist. If you have one, you can use one of the following accounts to sign into iNaturalist: Facebook, Twitter, Flickr, Google, Yahoo, or SoundCloud. To choose this option, click on the type of account you want to use for iNaturalist. Follow the prompts to sign into that account and/or give permission to iNaturalist to access it.
4. You've signed up! Once you've signed into your account, you'll be directed to your "Dashboard." This is the home base for your account. If you need more guidance, there's a "Getting Started Guide" on the right-hand side of your Dashboard.

If you've downloaded the iNaturalist app from the App Store or Google Play Store you will be greeted with a welcome screen and information about how to use the app when you open it on your phone.

At the login page select "New to iNaturalist? Sign up now!" at the bottom of the screen. Enter your email address, a password, and a username.

How to access and join the project

1. Go to www.inaturalist.org
2. At the top of the page, you should see a grey header. Hover your mouse over "Community" then click "Projects."
3. Once you are in the community section use the search bar and enter "Whetstone Brook Invasive Plants"
4. Once you've reached the project page you can click "Join Project" in the upper right corner of the page. Your observations will still be included in the project even if you haven't joined. Joining the project allows you to receive notifications about the project through iNaturalist.

How to make an observation

Your observation will automatically be included in the project if it is within the Whetstone watershed.
More detailed instructions can be found at **www.inaturalist.org/pages/getting+started**

How to make an observation with your phone

1. Tap observe.
2. Add one or more photos as evidence.
3. Choose what you saw.

4. When you saw it should be added automatically
5. Where you saw it should be added automatically. If it doesn't, check Privacy in the Settings app.
6. Save your observation.
7. Check back for activity on your observation from the community or be notified by email to the address in your account settings.

How to make an observation for the Web

1. Start by clicking the green **Upload** button from the header when you are logged in.
2. From the upload page, begin by dragging in one or more photos. Each photo will create an 'observation card' that you can edit before submitting. You can also use the 'Add' button in the upper left to create observation cards without photos or the 'More Import options' menu to upload a CSV or import from external sites.
3. Choose **what** you saw from the suggestions or by searching for a name. If you can't find what you're looking for, leave it blank or use some placeholder text. If you entered a scientific name that's not recognized, click 'Search external name providers' to first import the organism from elsewhere. Use the sidebar to record if the organism you observed was captive or cultivated.
4. Use the calendar to enter **when** you observed the organism.
5. Type in an address and select from the places offered in order to calculate coordinates and an accuracy circle describing **where** you were. You'll probably also need to zoom into the map and manually adjust the marker position and accuracy circle size.
6. **Submit** your observation.

How to access the SEVT CISMA website

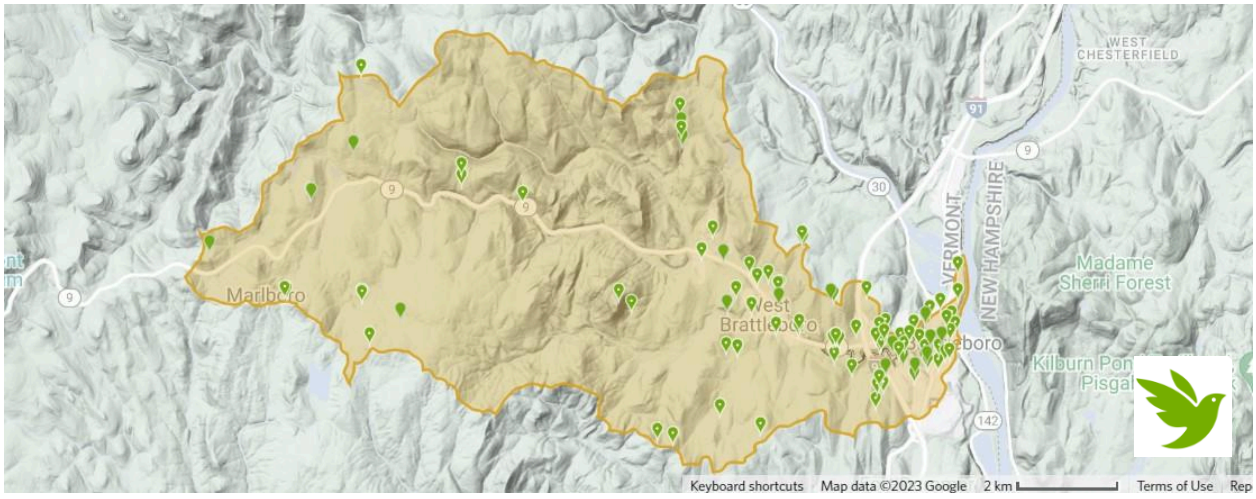
Visit our website at **sevtcisma.org** or scan the QR code below.

How to request a visit

Once you've accessed the website click on "Resources" then "Whetstone Brook Project." If you scanned the QR code, it should take you directly to the Whetstone Brook project page.

There is a link to a form you can fill out on this page.

Appendix C: iNaturalist invasive plant observations



Appendix D: Best Management Practices for Roadside Invasive Plants by the Nature Conservancy

Best Management Practices for Roadside Invasive Plants

SOIL DISTURBANCE & STABILIZATION	MOVEMENT & MAINTENANCE OF EQUIPMENT
1. **Minimize soil disturbance.** Monitor recent work sites for the emergence of invasive plants for a minimum of 2 years after project completion. 2. **Stabilize disturbed soil as soon as possible.** • Use clean mulch, hay, rip-rap, or gravel • Seed with native species where possible 3. **Avoid using fill from invaded sites.** When in doubt about the quality of fill, monitor work sites for the emergence of invasive plants for a minimum of 2 years.	1. **When equipment needs to be moved, plan work flow so that equipment is moved from unaffected sites to affected sites.** This is especially important during ditch cleaning and shoulder scraping. 2. **Staging areas should be free of invasive plants** 3. **All equipment and tools should be cleaned of visible dirt and plant material before leaving affected project sites.** Cleaning methods can include portable wash stations, high pressure air, brush, broom, or other hand tools. 4. **If equipment will be used in infested areas, remove above-ground invasive plant materials** such as purple loosestrife, phragmites, and Japanese knotweed prior to the start of work.
MOWING	**HANDLING EXCAVATED MATERIAL & INVASIVE PLANT MATERIAL**
1. **Avoid mowing areas infested with purple loosestrife, phragmites, and Japanese knotweed,** as these can sprout from stem and root fragments. Stake roadside populations with "Do Not Mow". 2. **If mowing is necessary, mow these areas BEFORE seed maturation** (approximately August 1st). 3. **Clean mowing equipment daily, and prior to transport.** This is particularly important if mowing is after seed maturation (August 1st)	1. **Destroy removed plant material.** Methods include: • Drying/Liquefying: *place on impervious surface and cover* • Brush piles: *not for plants with fruit or seed* • Burying: *minimum of 3 feet below grade* • Burning: *have a designated burn pile for invasive plants* • Herbicide: requires a *licensed applicator (VT Department of Agriculture)* 2. **Cover invasive plant material when transporting.** 3. **Excavated materials taken from infested areas should only be used onsite, unless all plant material has been destroyed.** Only use within exact limits of infestation. 4. **Stockpile unused excavated materials on impervious surface, or bury a minimum of 3 feet below grade** (5 feet for Japanese knotweed). 5. **Excavation should be avoided in areas containing purple loosestrife, phragmites, and Japanese knotweed.** 6. **Cover soil from infested areas when transporting.**

Adapted from New Hampshire Department of Transportation's Best Management Practices for Roadside Invasive Plants
http://www.nh.gov/dot/org/projectdevelopment/environment/units/technicalservices/documents/BMPsforRoadsideInvasivePlants.pdf

Vermont Chapter of The Nature Conservancy
Montpelier, Vermont
(802) 229-4425

The Nature Conservancy
Protecting nature. Preserving life.™

For more information, go to www.vtinvasives.org.

References

1. Vermont Department of Environmental Conservation, 2011. *Watershed Management Division's Watershed Descriptions.* Appendix 17, pg 1.
2. Vermont Department of Environmental Conservation, 2017. *Watershed Management Division's Stressor Plan; Aquatic Invasive Species.* Pg 1.
3. Vermont Agency of Natural Resources, 2022. *The Vermont Bioengineering Manual*. Pg 28.
4. Department of Primary Industries, 2010. *Invasive Plants and Animals Policy Framework/State of Victoria*. Pg 17.
5. Vermont Invasives, 2010. *Invasive Plant Treatment Methods: Companion Tool #4 for Best Management Practices for the Prevention and Treatment of Terrestrial Invasive Plants in Vermont Woodlands.* Pg 6 - 10. www.vtinvasives.org.
6. Vermont Invasives, 2023. *VTinvasives.org.*