

**Central Jersey Invasive Species Strike Team
2008 Annual Project Report**

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**Prepared by
Friends of Hopewell Valley Open Space
Upper Raritan Watershed Association**

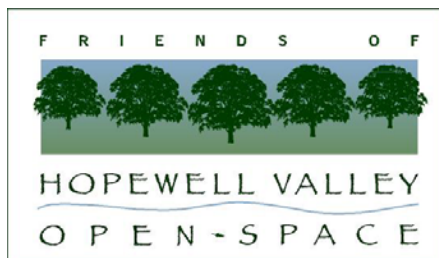


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Survey result maps for each detected species in the FoHVOS project area have been provided electronically (PDF format) with this report.

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- Appendix A. 2008 Species Searching Summary
- Appendix B. 2008 Site Searching Summary
- Appendix C. 2008 Eradication Summary & 2009 Eradication Strategies and Priorities
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Introduction

The primary purpose of this report is to provide 2008 project results and 2009 planned activities for the Central Jersey Invasive Species Strike Team (CJISST), which represents New Jersey's first cooperative effort to perform regional early detection & rapid response aimed at preventing future infestations. Detailed search and eradication results from the 2008 field season are presented as Appendices A through C. A separate project manual was prepared to provide instruction and references for current and future project partners.

Results

2008 Survey Results

Overall Summary - A total of 70 sites (7,551 acres) were surveyed for emerging populations of invasive plants. Searches included walking along trails and/or directed walks through various habitats. A total of 124 miles were traversed by staff, volunteers and partners. We approximate the total directly searched area as 408 acres by assuming accurate observations occur within 15 feet of either side of the searched path. Sites included FoHVOS preserves and private easements, URWA preserves and private easements, private unaffiliated landowners and lands managed by CJISST partners including D&R Greenway Land Trust, Hopewell Borough, Hopewell Township, Mercer County Park Commission, NJDEP - Division of Fish & Wildlife, NJDEP - Division of Parks & Forestry, Pennington Borough, Stony Brook-Millstone Watershed Association, and Tewksbury Land Trust.

A total of 792 emerging populations were recorded for 40 invasive species – an additional 10 species on the search list were not detected at any site (See Appendix A). A total of 381 of the 792 detected populations were emerging invasive species in New Jersey (the remaining 411 were new populations of already widespread invasive species).

For all mapped populations, the majority (554 or 70%) consisted of 10 or fewer individual plants. Fewer than 23% of the populations consisted of 11-100 individuals and 7% (60 populations) consisted of greater than 100 individuals. Considering only species that are emerging in New Jersey, 261 of 381 populations (68%) consisted of 10 or fewer individual plants, 24% (91 populations) consisted of 11-100 individual plants, and 8% (29 populations) consisted of greater than 100 individuals.

Species Summary - The two most frequently encountered species were winged burning bush (160 populations / 63% of sites) and linden viburnum (141 populations, 26% of sites). The remainder of the 'Top 10' most frequently encountered species included Asiatic bittersweet (67, 23%), Japanese barberry (49, 30%), Oriental photinia (46, 19%), autumn olive (31, 19%), Japanese angelica tree (26, 7%), mile-a-minute (21, 11%), Siebold's viburnum (20, 9%), and Japanese wisteria (19, 17%). Additional highly threatening emerging species that were detected included Callery pear (17, 10%), narrowleaf bittercress (14, 9%), Chinese bushclover (11, 10%), wintercreeper (11, 10%), butterfly bush (7, 9% -- Found only as planted specimens), jetbead (6, 7%), Chinese silvergrass (6, 6%), English ivy (6, 6%), white water cress (3, 4%), Japanese maple (3, 4% -- Found only as planted specimens), common buckthorn (3, 3%), water chestnut (2, 3%), yellow iris (2, 3%), Japanese hops (1, 1%), Japanese clematis (1, 1%), and fiveleaf akebia (1, 1%). A detailed summary of the quantity and sizes of all emerging populations for each species is provided as Appendix A.

The spatial distribution of emerging populations is critical to determine eradication priorities. GIS maps for each detected species found within the FoHVOS project area are included as an electronic attachment to this report. Figure 1 shows the entire FoHVOS project area and all detected emerging populations. Figure 2 serves as an individual species example depicting Siebold's viburnum. Figure 3 shows the entire URWA project area and all detected emerging populations. *Note:* Population Size codes include 1 = 1 plant, 2 = 2-10 plants, 3 = 11-100 plants, and 4 = > 100 plants.

Site Summary - Calculations were performed to estimate the relative density and hypothesized 'absolute' number of emerging populations of invasive species across all surveyed sites. The relative density of emerging populations was calculated by dividing the total number of emerging populations by the number of acres searched (reported as "Populations per Searched Acre" in Appendix B). An estimate of the 'absolute' number of emerging populations was calculated as the relative density calculated above multiplied by the total site acres (reported as "Corrected Total Populations"). Generally, larger sites can have a greater number of emerging populations but this is mediated by the calculated density per acre.

The combination of these two estimates allows for a comparison of relative site susceptibility to newly emerging populations of invasive species and allows for a gross estimate for the total potential scope of site-level eradication efforts. It is important to note that determining the suitability of any site-based invasive species control work is determined by factoring the level of infestation (both emerging and established populations) and the sites' relative ecological value.

The range of relative density ("Populations per Searched Acre) ranged from 0.0 to 10.7 across 70 sites. The 'Top 10' most relatively infested sites included Grossman (10.7), LippLewellen (8.3), Genovesi (7.1), Rosedale Woods (5.8), Kuser (5.7), Fairview Farm (5.3), Curlis Lake Woods (5.2), Hillman (5.2), Nayfield (5.0), and Hollowbrook (5.0). There were four FoHVOS preserves that did not contain a single emerging population (Arno, Krech, Lawrence, Vales). An additional 20 sites contained less than one detected emerging population per searched acre (Appendix B).

The range of estimated 'absolute' number of emerging populations ranged from 0.0 to 3,651. The 'Top Ten' most infested sites included Washington Crossing State Park - Main (3,651), Stony Brook Millstone Watershed Association (2,294), Baldpate Mountain (1,807), Mercer County Park NW (1,204), Fairview Farm (802), Kuser (736), Curlis Lake Woods (689), Rosedale Park (535), Hillman (363), and Fox Hill (275).

2008 Eradication Results

Although eradication was a secondary goal for the 2008 field season, a total of 51 emerging populations were eradicated through hand pulling upon detection or application of herbicide upon return visits (Appendix 3). This included 12 different invasive species across 22 sites. Only small populations were eradicated in 2008 (populations with less than 10 individuals). The majority of eradications were performed on winged burning bush (21), Asiatic bittersweet (7), and Japanese barberry (6). Small populations of emerging species were also targeted (i.e., Oriental photinia, Siebold's viburnum, linden viburnum, Japanese angelica tree, Chinese silvergrass, and water chestnut).

Outreach and Partnerships

FoHVOS and URWA have provided a number of outreach and training events through March 2009 (see below). The Kick Off event in September 2008 was attended by 45 individuals representing 22 organizations. In total, there have been 12 events and over 380 attendees plus numerous weekly training sessions with volunteers. The next scheduled event (May 20, 2009 at Duke Farms) will include a species identification training session followed by a partners meeting to formalize the CJISST Memorandum of Understanding (Appendix D). Currently, CJISST consists of 29 partners including state, county & municipal government, private conservation groups and other stakeholder groups (e.g., Native Plant Society of New Jersey, Mercer County Master Gardeners). A complete partner list is included with Appendix D.

- Strike Team Kick Off Event**, September 30, 2008, Duke Farms (venue offered as in-kind donation). Audience: land managers, project partners, volunteers (45 attendees)
- Curlis Lake Woods Volunteer Field Training Class**, September 20, 2008. Audience: volunteers and partner's volunteers (10 attendees)
- Central Jersey Invasive Species Strike Team Plant ID Workshop**, October 14, 2008, D&R Greenway. Audience: Land managers, project partners, volunteers (30 attendees)
- Presented at **2008 Landowner's Forum**, November 20, 2008, D&R Greenway. Audience: general public, landowners with easements, volunteers (35 attendees)
- Presented at **6th Annual Volunteer Monitoring and Education Summit**, November 17, 2008, Frelinghuysen Arboretum. Audience: land managers, educators, volunteers (25 attendees).
- Weekly field surveys/training sessions**, August-October 2008, across project area (URWA and FoHVOS). Audience: partners and volunteers.
- Partner and Volunteer Training Session**, January 14, 2009, Fairview Farm (URWA). Audience: partners, volunteers, land managers (20 attendees)
- **Wake Up Call Breakfast, Central Jersey Invasive Species Strike Team**, March 4, 2009, URWA. Audience: general public (25 attendees)
- **New Jersey's 13th Annual Land Conservation Rally**, March 7, 2009, New Brunswick. Audience: land managers, municipal representatives (30 attendees)
- Presentation for the **Hunterdon Hiking Club**, March 12, 2009, Hunterdon County Arboretum. Audience: club members, general public (25 attendees)
- Display booth for the **Native Plant Society of New Jersey Annual Meeting**, March 21, 2009, Trailside Nature Center. Audience: NPSNJ members, general public (70 attendees)
- Presented at **NJ Conservation Foundation program "Meadows on the Menu"**, April 1, 2009, The Willow School. Audience: landowners and managers, general public (70 attendees).

Level of Effort

FoHVOS and URWA have provided substantial effort toward CJISST. Through March 2009, FoHVOS and URWA staff have contributed 1,348 hours to the project. This includes 312 hours contributed by FoHVOS' Stewardship Director (Michael Van Clef), 750 hours contributed by FoHVOS' Land Steward (Rachel Mackow), and 286 hours contributed by URWA's Invasive Species Coordinator (Melissa Almendinger). An additional 501 hours have been contributed by FoHVOS volunteers (345 hours), URWA volunteers (84 hours), partner staff (64 hours), and partner volunteers (8 hours). The grand total of hours contributed to the project through March 2009 was 1,849 hours.

Planned Activities for 2009

The 2008 survey data (spatial and tabular) were analyzed to prioritize 2009 eradication efforts. In general, prioritization follows two broad approaches: species-based or site-based. The species-based approach is the primary function of CJISST (i.e., eradicating populations of newly emerging invasive species). Initially, preventing new infestations of already widespread invasive species was a CJISST goal. However, through the mapping process it has become apparent that this goal was too ambitious and will be eliminated from the project (See discussion in CJISST Project Manual). The goal of the site-based approach is to protect particular sites (especially those with the highest ecological values) from new infestations of any invasive species. In some cases, these two general approaches are combined (e.g., preventing a particular invasive species from infesting a particular site with high ecological value).

The overarching theme of eradication efforts is to have the greatest protective impact per unit effort, which requires careful prioritization. Unfortunately, it must be recognized that some species can no longer be practically eradicated from New Jersey. Similarly, some sites cannot be practically protected from all emerging populations of invasive species. Although all data collected from searches cannot be acted upon through complete eradication, the entirety of the data collected informs all eradication priorities. See Figures 1 and 3 for a complete distribution of all emerging populations in FoHVOS and URWA project areas.

Species-Based Eradication Priorities

Species-based priorities are based upon examination of the quantity and spatial distribution of mapped populations of both emerging invasive species and new populations of already widespread invasive species. The extent of all detected populations combined with the anticipated level of available resources precludes broad-based targeting of new populations of already widespread invasive species. However, it is hoped that project resources will increase in future years to address this severe problem. A total of 209 populations of emerging invasive species will be targeted for eradication in 2009. See Appendix C for detailed species-level eradication strategies and priorities.

Shade-Tolerant Species - The most threatening newly emerging invasive species encountered during the 2008 survey involved a suite of tall, shade tolerant shrubs that include Oriental photinia, common buckthorn, Siebold's viburnum (see Figure 2), and linden viburnum. These species are the highest eradication priorities because they cannot be easily reduced through ecological control exerted by native forest understory species (*Note*: Ecological control is defined as reductions in invasive species cover through competitive interactions with native species, which is usually accomplished through shading of shorter invasive species by taller native species - e.g., spicebush overtopping Japanese barberry). This type of control is ultimately the most desirable form of invasive species control, but cannot be expected to occur wherever deer are overabundant). All small populations (i.e., < 100 individuals) of these species will be targeted for eradication in 2009. However, some populations of these species are large (i.e., > 100 individuals and in some cases > 1,000 individuals) and will require longer term efforts over the next 3-5 years. In coming years, it will be determined whether containment, rather than complete eradication, is a more tenable goal for species such as linden viburnum that have large populations in portions of Hopewell Township.

Japanese angelica tree, although most productive in sunny areas, was also determined to be surprisingly shade tolerant and all populations will be targeted in 2009. A shorter, shade-tolerant shrub, jetbead, will

be targeted because the extent and severity of infestation is still relatively small. Narrowleaf bittercress, a forest herb just beginning to enter the Hopewell Valley, will be targeted at Baldpate Mountain.

Vines - Vine species are highly threatening because they have the ability to slow succession and/or kill mature trees and shrubs. Five vine species will be targeted for eradication in 2009. They include Japanese wisteria, English ivy, Japanese hops, Japanese clematis, and fiveleaf akebia. One large population of Japanese wisteria located at Baldpate Mountain will be targeted for longer term eradication efforts. Other vine species are considered already widespread (e.g., Asiatic bittersweet) or present relatively lower risk to natural systems (e.g., lesser periwinkle) – emerging populations of species in these categories will not be targeted for eradication in 2009.

Shade-Intolerant Species - There are a number of newly emerging invasive species that threaten open habitats (e.g., meadows, shrublands). The most threatening species targeted for eradication in 2009 include Chinese silvergrass and Callery pear. As with other emerging species, all smaller populations will be targeted for eradication in 2009, but larger populations of Callery pear will be targeted for eradication over a 3-5 year time period. Additionally, small populations of the already widespread purple loosestrife will be targeted in 2009. This programmatic decision by FoHVOS (i.e., outside of the revised CJISST project goals) to target new populations of this already widespread species has been carefully based upon the ecological values threatened at particular sites.

Aquatic Species - There are three emerging aquatic species that will be targeted for eradication in 2009. These species include yellow iris, white watercress, and water chestnut. All populations of each species are targeted for eradication. A large population of water chestnut found at the Baldwin Lake Wildlife Management Area will be removed by hand over multiple days with assistance of the NJDEP - Division of Fish & Wildlife.

Site-Based Eradication Priorities

The 2009 priorities will not include whole site-based eradication efforts. Although there are multiple sites with high ecological value, complete elimination of all mapped populations at particular sites is not feasible under current CJISST resource levels. FoHVOS is now formally evaluating ecological values across Hopewell Township, which includes consideration of habitat patch sizes and occurrences of rare animals, plants, and ecological communities. This evaluation procedure will be utilized to prioritize future conservation efforts including land acquisition, restoration, deer management, and invasive species management.

Additional Searching, Training, Outreach and Partner Building

CJISST will continue to search for emerging populations of invasive species in both FoHVOS and URWA project areas (2009 search goal is an additional 1,000 acres). It is hoped that project partners within existing project areas as well as the broader CJISST project area (see Appendix E), will supplement existing search efforts and provide a more complete picture of the status of emerging invasive species in central New Jersey. Toward that goal, FoHVOS and URWA plan continued training, outreach and partner building efforts in 2009. Goals for these activities include six additional outreach/training events (including annual CJISST partner meeting), recruitment of 15 additional project partners (includes public & private entities and private landowners), recruitment of 30 additional volunteers, shared data management / analyses, shared eradication efforts, production of the 2009 CJISST annual report, and supplementing website content to spur larger statewide efforts.