

# NYBG

NEW YORK BOTANICAL GARDEN

## Incised Fumewort in Westchester County: Early Detection and Rapid Response

### Final Report to the Lower Hudson Partnership for Regional Invasive Species Management





**Incised Fumewort in Westchester County: Early Detection and Rapid Response**

**Final Report to the Lower Hudson Partnership for Regional Invasive Species Management**

**Report Date: December 15, 2016**

**Prepared by:**

**Daniel Atha  
Jessica Schuler  
Suzanne Nolan**

This project was contracted by the Lower Hudson Partnership for Regional Invasive Species Management using funds from the Environmental Protection Fund as administered by the New York State Department of Environmental Conservation.

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## Introduction

Incised Fumewort (*Corydalis incisa*) is an annual or biennial herb native to forests, clearings, and irrigation channels in Japan, Korea, and China (Flora of China). The species was first documented growing wild in North America in 2005 (Atha et al., 2014) from a small population on the Bronx River in Bronx County, New York. Since then, the Bronx population has expanded locally and additional populations have been found in Tennessee, West Virginia, Virginia, Maryland, Pennsylvania, and Westchester County, New York. The species forms dense colonies, often dominating the herbaceous layer and displacing more desirable native species. Abundant seed set and multiple dispersal mechanisms enable rapid and persistent recolonization, challenging management and eradication efforts.

By 2015, there were three known populations of *Corydalis incisa* in New York, all on the floodplain of the Bronx River. To address the threat posed by the species and potentially to stop its spread in the state, The New York Botanical Garden (NYBG) proposed a strategy to survey the length of the River for additional populations and identify the northernmost occurrence. The project was designed to map the distribution of the species and inform relevant stakeholders for management action. It is believed that the species is dispersed downstream by water currents, and identifying the northernmost population would help focus management efforts efficiently.

In spring of 2016, the Center for Conservation Strategy at NYBG was awarded a grant from the Lower Hudson Partnership for Regional Invasive Species Management (LH PRISM) to document the extent of *Corydalis incisa* infestation in New York. The proposal was approved by the Executive Committee of the PRISM and funding was awarded in March 2016. The program was led by the Director for Conservation Outreach, Daniel Atha, and the Director of the Thain Family Forest, Jessica Schuler, in collaboration with the President of the Bronx River Parkway Reservation Conservancy, Suzanne Nolan. Individuals from the community and local institutions were recruited and participated in the surveys as volunteers (see Acknowledgements).

Very little is written about the species in English. There are brief descriptions and a few photographs on websites that have offered or are offering the plant or seeds for sale and there is the short technical description (in English) from the Flora of China (Zhang et al., 2008). One of the goals of current research is to accumulate additional information about the life cycle, morphology, pollination, and dispersal of the plants. In addition, we hypothesize that long distance dispersal is downstream by water and only very locally by seed.

The length of the Bronx River in Westchester County was surveyed from its source in Valhalla to the Bronx County border in Yonkers from May 26, 2016 to July 11, 2016. Twenty sites spaced one kilometer apart were surveyed intensively. The species was found and mapped at four locations (but in only three actual survey sites), representing three previously unknown

populations. The northern-most population was found at the Leewood North site in the town of Eastchester, New York. An information flier illustrating the species and describing the threat was prepared and distributed within the community as well as more broadly in New England and the Mid-Atlantic regions. Relevant agencies (New York City Department of Parks and Recreation, Westchester County Parks, and the Bronx River Parkway Reservation Conservancy) participated in the surveys and will receive copies of this report.

## Site Description

The Bronx River, located in southeastern New York, flows 39 kilometers (24 miles) south from its current source below the Kensico Dam in Westchester County to its terminus in the East River at the western end of Long Island Sound. The watershed drains an area of approximately 130 km<sup>2</sup> (50 mi<sup>2</sup>) (Smith et al., 2015; Westchester County Department of Planning, 2007) of urbanized landscape and passes through the municipalities (from north to south) of White Plains, Greenburgh, Scarsdale, Yonkers, Eastchester, Tuckahoe, Bronxville, Fleetwood, and Mt. Vernon in Westchester County and the borough of the Bronx in Bronx County, New York City.

The headwaters of the River were originally located at New Castle in Westchester County (Westchester County Department of Planning, 2007), but the construction of the Kensico Dam in the 1880s blocked the natural flow of the River and created a large reservoir to supply fresh water to Westchester and New York City. The Bronx River now begins just south of the Kensico Dam from water that either passes over the spillway into Davis Brook or as runoff from the fountains at the Kensico Dam Plaza (Westchester County Department of Planning, 2007). Below the Dam, the river flows nearly due south through the Bronx River Valley, a natural depression etched through a vein of soft marble and flanked by outcrops of igneous rock. The largest tributary to the Bronx River is the Sprain Brook and the Grassy Sprain River.

The Bronx River has always been an important transportation corridor. Critical arteries that closely parallel the River or cross the River's watershed include the Cross Westchester Expressway (I-287), New York State Thruway (I-87), Bronx River Parkway, Sprain Brook Parkway, and Cross County Parkway. In addition, the Harlem line of the Metro North Railroad closely follows the River with stations at Mt. Vernon, Tuckahoe, Crestwood, Scarsdale, Hartsdale, White Plains, and North White Plains.

As the region industrialized during the 18th and 19th centuries, the Bronx River became a source of power for mills and as a site to discharge waste, including sewage and toxic industrial byproducts. In the early 20th century, the Bronx River Parkway was constructed as the first-limited access roadway in America. During construction, sections of the River were re-



engineered and several bridges were constructed. A portion of the Bronx River Parkway is on the National Register of Historic Places. Additional road work has had significant impact on the River, including the construction of the Crane Road Bridge at the Greenburgh Scarsdale Municipal border, completed in 2015. The vegetation of the Bronx River in Westchester was surveyed from 1973 to 1999 by Dr. Edward Frankel (Frankel, 1999).

## Materials and Methods

Permission was requested and granted by the Westchester County Parks Department to conduct the research (see appendix A).

A large-scale Hagstrom Westchester County Street map and a tape measure were used to designate 20 sites spaced as close to one kilometer apart as possible. The sites were marked on the physical map and then used to locate the sites on Google Earth and Google Maps. A snapshot of each Google Earth and Google Map section encompassing that site was then extracted. Using Adobe Illustrator, a star was placed at the approximate site where each transect should be placed and the image was saved as a jpeg file. In determining placement, some consideration was given to terrain at that site as well as obstructions such as bridges, roads, and buildings (see Discussion), such that a 100-meter straight line could be accommodated as fully as possible and as close to one kilometer distance from either adjacent site as possible.

Once the sites were identified, a workshop was designed to recruit and train volunteers to conduct the surveys as well as enter survey results in iMapInvasives, the invasives database maintained by the New York Natural Heritage Program. The workshop was advertised through the PRISM network, the NYBG network, and the iMapInvasives website. The workshop was held on May 18, 2016 at NYBG. Daniel Atha gave a presentation introducing *Corydalis incisa*, its introduction and discovery in North America and its identifying features. Jennifer Dean, Ph.D., Invasive Species Biologist, New York Natural Heritage Program, introduced iMapInvasives and gave an overview on data entry.

Twenty teams were assembled with a minimum of two surveyors for each site. The exact survey date was chosen by the participants. Each team was given a survey kit consisting of the following equipment (see Figure 1): safety vests; two orange plastic stakes; four snow marking pins; a 100-meter mason line on spool, marked every ten meters; a 10-meter heavy rope marked every meter; a 1-meter PVC square; a measuring tape; plant press; clipboard; pencils; a copy of the work-plan with maps of each site and datasheets (see Figure 2 and 3). Each team was required to have a GPS enabled device for obtaining latitude and longitude.

All personnel were required to wear safety vests while conducting the surveys. Upon arrival at each site, the team established the two end points of the 100-meter transect as indicated

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by the star on the map provided. One of the orange plastic stakes was sunk at each end of the transect and the line was extended in a straight line the full 100-meter length and attached to the stakes at both ends. The location of each stake was recorded using GPS. The accuracy as indicated by the device was recorded. The canopy cover was estimated for the transect and recorded. Dominant species were recorded for each layer of the vegetation (canopy, shrub and herb layers). The landscape type was recorded based on broad categories such as riparian forest, lawn, floodplain forest, etc. Notes regarding special problems or unusual occurrences at each site were recorded.

The 100-meter transect was divided into 10 plots, each plot 10 meters by 10 meters (see Figure 4). The 10-meter heavy rope was extended perpendicular to the 100-meter mason line and the ends marked with the snow marking stakes. These formed two of the four corners of the plot. The process was repeated 10 meters further down the mason line to establish the remaining two corners. In this way, the survey crew could efficiently survey the site without having to re-measure the distance from the center line. The 10 meter square plots were then surveyed for the presence of *Corydalis incisa*. If none was found, the team moved on to the next plot along the transect and repeated the process for establishing the 10 x 10 meter plot.

If any *Corydalis incisa* plants were found, the team estimated the number of patches and the size of each patch within the plot and recorded the information on the data sheets. A random number between 1 and 100 was generated using an electronic random number generator. The one-meter PVC square was placed in the subplot corresponding to that number as depicted in the diagram (see Figure 4). Each subplot was surveyed for the presence of *Corydalis incisa* plants. Juveniles and adults were counted separately and recorded on the data sheets (see Figure 3). After the plants were counted within the plots and subplots all individuals of *Corydalis incisa* were pulled and bagged. The plants were later discarded with municipal trash. If *Corydalis incisa* was found, a herbarium specimen was prepared for permanent deposition in the William and Lynda Steere Herbarium at NYBG. In addition, a tissue sample of the plants was placed in silica gel for DNA analysis.

At sites where *Corydalis incisa* was removed, locally sourced seed of *Persicaria virginiana*, *Juncus tenuis* and *Symphyotrichum cordifolium* was or will be broadcast. Management suggestions for the site were recorded by the teams. Suggestions included removal of trash and dangerous obstacles and management of invasive species, etc.

Data sheets were returned to Project staff at NYBG for photocopying, data entry, and archiving.

All data was entered into iMapInvasives where it is publicly available. The transect polygons were entered as a survey record and, if *Corydalis incisa* was found at a site, the specimen was entered as an occurrence record.



Figure 1. Equipment used by teams.

Insected Fumewort in Westchester County: Early Detection and Rapid Response  
Transect

Site:

Team:	Date:
-------	-------

Transect Center (S) N: \_\_\_\_\_ W: \_\_\_\_\_ ±

Transect Center (N) N: \_\_\_\_\_ W: \_\_\_\_\_ ±

Coordinates: WGS84 datum; decimal format: xx.xxxxxx"; xxx meters

Canopy Cover:    100%–75%    75%–50%    50%–25%    25%–5%    <5%

Dominant Species:

Landscape Type:

Transect Notes:

Figure 2. Transect Data Sheet.



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Insected Fumewort in Westchester County, Early Detection and Rapid Response  
Plot Data

Site:

Team: \_\_\_\_\_ Date: \_\_\_\_\_

Plot #	Number of Corydalis Patches/Plot	Total Patch Area (m <sup>2</sup> )	Subplot Number of Plants (Juvenile)	Subplot Number of Plants (Mature)	Subplot #	Plot Notes
Plot 1:						
Plot 2:						
Plot 3:						
Plot 4:						
Plot 5:						
Plot 6:						
Plot 7:						
Plot 8:						
Plot 9:						
Plot 10:						

Herbarium Specimen Collected: \_\_\_\_\_ DNA Sample Collected: \_\_\_\_\_ Plants Removed: \_\_\_\_\_ Disposal Method: \_\_\_\_\_

Management Suggestions:

Other Observations:

Figure 3. Plot Data Sheet.

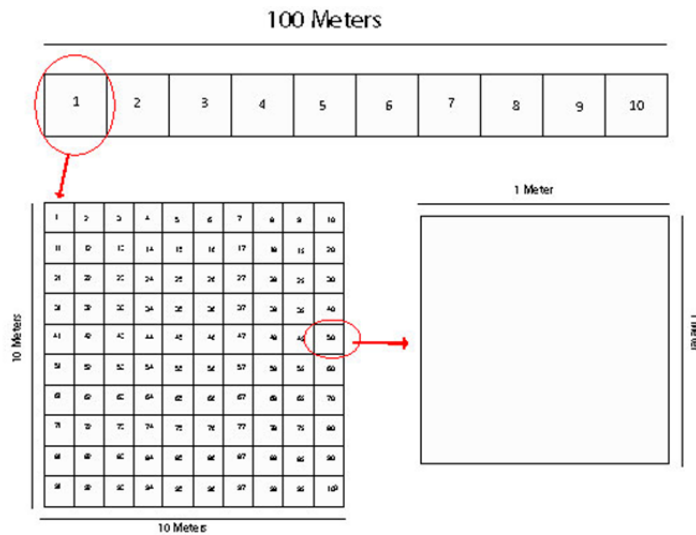


Figure 4. Transect layout. Top figure is 100 meter transect divided into ten plots. The lower left figure is a plot divided into 100 subplots. The lower right figure is one subplot.

## Results

Following the protocols outlined above, the teams systematically surveyed the length of the Bronx River in Westchester County from Valhalla in the north to the Bronx County border in Wakefield. Twenty transect sites were surveyed intensively for the presence of *Corydalis incisa*. The results of the project are summarized below.

- **Bronx River in Westchester County sampled at 1 km intervals (20 sites)**
- **20,000 m<sup>2</sup> surveyed (4.9 acres)**
- ***Corydalis incisa* found in three transects and at four sites**
- **11 plots with *Corydalis incisa***
- **~ 1 percent of Bronx River infested with *Corydalis***
- **1,100 m<sup>2</sup> cleared of *Corydalis***
- **Northern-most population found**
- **32 people participated directly in surveys**
- **> 2000 fliers distributed from Connecticut to Tennessee**
- **2 additional states and 7 counties newly documented**
- **2 research projects begun**

*Corydalis incisa* was found in transects at three sites on the Bronx River in Westchester County: Site 2, Oak Street; Site 8, Leewood South; and, Site 9, Leewood North. In transects at 17 sites, no *Corydalis incisa* was found, although at Crestwood (Site 7), adjacent to Leewood South (Site 8), no *Corydalis incisa* was found in the transect, but individuals were found just outside the transect on the north and south ends. No *Corydalis* was found between Site 10 (Garth Woods) and Site 20 (Kensico).

The northern-most transect with occurrence of *Corydalis incisa* was at Site 9, Leewood North. Practically, although not strictly shown by the transects, *Corydalis incisa* was found to form a continuous population between Site 9 and Site 7.

At Site 9 (Leewood North), *Corydalis incisa* was found in 8 out of 10 plots (each 10 x 10 meters). The two plots at Site 9 without *Corydalis* were plots 1 and 2, at the northern end of the transect. Within the eight plots with *Corydalis*, individuals (juveniles or adults) were found in three randomly placed subplots (1 x 1 meter). Subplots randomly placed within the other five

plots with *Corydalis* did not contain any plants, although the plant was present in the plot. The subplot with the highest number of plants was in plot 9, near the south end of the transect.

Site 9 also had the highest average density of plants (42 plants per square meter). One square meter in plot 9 had 112 plants.

Experimental (but unpublished) observation show that the seeds float in water. Observation also show that the seeds are explosively dehiscent up to three meters (Atha et al., 2014).

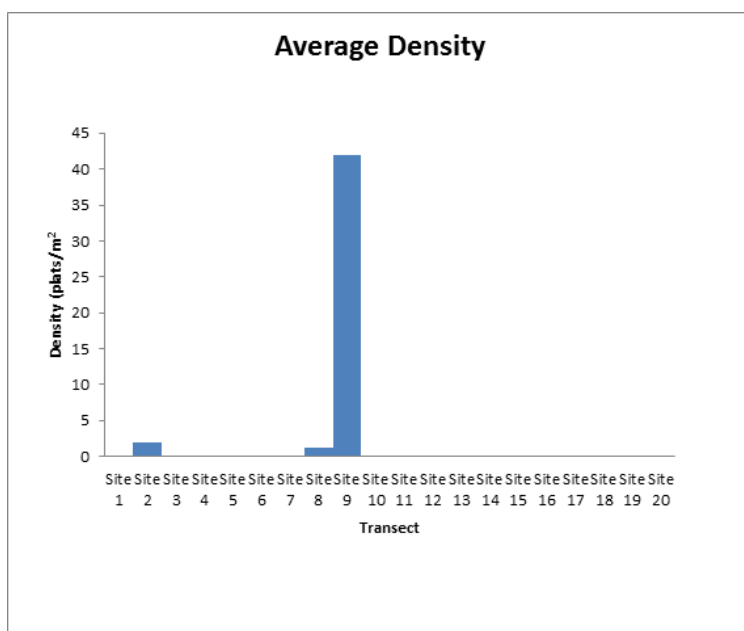


Figure 5. Average density of *Corydalis incisa* at each site.

Over 2,000 informational fliers were distributed in the Bronx River Watershed and beyond (see Appendix F, Presentations and Tabling Events). NYBG created a sign displayed on the grounds of the Garden warning of the threat of *Corydalis incisa* (see Appendix D, Figure 8). Outreach materials will continue to be distributed during next year's New York Invasive Species Awareness Week, NYBG events, and other opportunities.

In April 2017, Suzanne Nolan will contact News 12 Westchester for outreach to discuss the threat from *Corydalis incisa*. The discussion will be made in context of Earth Day.

Nurseries and Garden Centers that have sold or are selling *Corydalis incisa* will be contacted throughout North America and beyond. Retail and wholesale nurseries in area will be sent fliers.

On May 14, 2016, the Invasive Strike Force crew of the New York-New Jersey Trail Conference, led by Linda Rohleder, removed *Corydalis incisa* at the Crestwood section of the Bronx River. The crew even donned waders to reach some plants on the banks. The crew also conducted removals at Muskrat Cove in the Bronx. Almost 2,000 plants over both locations were removed.

## Discussion

Long distance dispersal of *Corydalis incisa* is effected by humans through cultivation. It has been recommended for its attractive flowers, low habit, self-seeding, and wide habitat tolerance. We know it was sold at a nursery in Greenbrier County, West Virginia. A botanical garden in Norfolk Virginia reportedly had the plant for sale until informed that it was an invasive. As of November 2016, it was available as seed from online sources. Individuals from New York to Tennessee report that the species was cultivated in a garden and became problematic as it escaped outside the garden setting. It is possible it was sold by other plant distributors, perhaps in and around New York City as well.

The plants are very fecund. On all mature plants observed, all flowers produced fruit and all fruit produced the maximum number of seeds (by ovules). We have observed that the seeds float in water. Although we have no experimental evidence to prove it, we hypothesize that the first-season tubers carried downstream by water currents may be an additional means of dispersal.

The northern-most plants on the Bronx River is now known to be just north of Site 9, Leewood North (at 40.9761412972, -73.8145763851,  $\pm 5$  m). Of the 20 sites surveyed along the River, *Corydalis incisa* was found in three—all downstream from Site 9. *Corydalis incisa* was not found in any of the ten sites upstream of Site 9. In addition, the highest density of infestation was at Site 9. Since the plant is not known from any other location in New York State except along the Bronx River, the results obtained support the hypothesis that the plant was first introduced horticulturally in Westchester in the vicinity of Leewood and that the species dispersed downstream as far as NYBG in Bronx County.

We know from Ed Frankel's careful surveys of the Bronx River (Frankel, 1999), that *Corydalis incisa* was not present up to 1999. And we know that it was first found in New York State in 2005 (Atha et al, 2014).

Taken together, the evidence suggests that *Corydalis incisa* was introduced in the vicinity of Leewood North sometime between 1999 and 2005. Perhaps not coincidentally, there is a former gas station at this site that is only a few meters from the River. It has been used as an information center. In the immediate vicinity of the building around the year 2000 there were

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numerous plantings installed. We hypothesize that *Corydalis incisa* was inadvertently introduced here sometime around the year 2000. The species could have come in with nursery stock. The seeds can be forcibly ejected up to three meters (Atha et al., 2014) away and it would not take long for the seeds to reach the river bank. The seeds have a fleshy aril and they could have been transported by ants to reach the River more quickly. They could also have been transported to the River bank on the feet of people or animals.

In the transect at Site 9 (Leewood North), *Corydalis incisa* was found in eight of the 10 plots. This was the highest density of any site. The two plots without *Corydalis* were plot 1 and 2 at the northern end of the transect. This is notable because we observed *Corydalis* plants in abundance just north of these two plots, but outside of the transect area. The vegetation of these two plots is very dense with a 100 percent canopy cover of mature trees, a nearly continuous cover of shrubs including *Viburnum sieboldii*, and a 100 percent covering of herbaceous species including *C Reynoutria japonica* and *Laportea canadensis*. There was no trail through this area. By contrast, in plots 3-10, the trail nearly bisected the plots and the shrub layer was very sparse and the herbaceous layer was more low, open and sometimes non-existent. The observations suggest that *Corydalis incisa* aggressively colonizes areas with some shade and disturbed soil. Japanese knotweed (*Reynoutria* species), while forming shade, leaves the surface of the ground relatively free of competing plant material. At Leewood North, we observed *Corydalis incisa* growing directly among the stalks of *Reynoutria*. At this site, in a location outside the transect area, Knotweed was cut and stems removed in June 2016 as part of an invasive control pilot project. Applications of Glyphosate followed in July and September. By October, the *Corydalis incisa* population had exploded.

It is interesting to note that no *Corydalis* was found at the four sites between Crestwood (Site 7) and Oak Street (Site 2). With such high density of plants at Sites 7, 8, and 9, it is surprising that none were found at Site 6, Tuckahoe.

Suzanne Nolan and Christina Andruk (Iona College) began management at the Leewood North area, just north of Transect 9. On October 21, 2016, they established a 30-meter transect and counted seedlings prior to hand pulling.

*Corydalis solida* is invasive in Dutchess County, New York. It is filling a vacant lot in the town of Poughkeepsie. It may have been cultivated in the lot, but it is now nearly dominating the entire property, under Japanese Knotweed. The infestation was found and photographed by Ann Meader in April 2015.



## Management Recommendations

This survey shows that *Corydalis incisa* is restricted to a limited number of sites on the Bronx River between Leewood and Oak Street, with the northern-most and densest population at Leewood North. Our observations of the distribution of *Corydalis incisa* in various levels of disturbance and competition suggest that it does best in moist, disturbed soil with some shade and that it is dispersed downstream by seed and possibly also by tubers.

Based on these observations, we recommend that *Corydalis incisa* be aggressively managed at Leewood North with the goal of exhausting the soil seed bank there. At the same time, we recommend that the banks of the River be re-vegetated with native species typical of floodplain forest in the area, such as the trees, *Acer saccharinum* and *Acer negundo*, understory shrubs, such as *Lindera benzoin*, and herbaceous species, such as *Laportea canadensis* and *Persicaria virginiana*, *Geum canadense*, *Cryptotaenia canadensis*, *Juncus tenuis*, and others. Based on our results, we hypothesize that *Corydalis incisa* colonizes disturbed ground and does especially well under the canopy of the exotic Japanese Knotweed (*Reynoutria japonica*). Resource managers should focus efforts progressively downstream, removing the species before the plants set seed in spring.

The species is readily hand-pulled from the soil, especially as second-season mature plants. These are fairly large plants with a weak root system and they are easily spotted amongst other species, especially if in flower. They should be removed before they set seed (usually in mid-May). First-season plants are more problematic. They may have enlarged tubers that can break off and remain in the soil. And they are also sometimes difficult to distinguish from other species, particularly *Artemisia vulgaris* and *Daucus carota*—both non-natives. Eradication teams should take care to minimize disturbance to native understory vegetation.

It is our hope and our belief that if no new introductions occur and persistent eradication efforts proceed from upstream to downstream on known populations, the species can eventually be eradicated from New York State.

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- **Brenda Bates**, Westchester County Parks
- **Danielle Bissett**, NYC Parks
- **Brian Boom**, NYBG
- **Laura Booth**, NYBG intern
- **Ken Chaya**, Volunteer
- **Roni Cohen**, Volunteer
- **Steve Cohen**, Volunteer
- **Sean Curran**, Volunteer
- **Mark Daniels**, Levy Nature Preserve, Bahamas
- **Bob DelTorto**, BRPRC
- **Debra Dreger**, Medical writer
- **Thatcher Drew**, Volunteer
- **Suzanne Evans**, Volunteer
- **Mary Farrah**, MAIPC
- **Allison Granberry**, Hostos-Lincoln Academy of Science
- **Amanda Kingsley**, Volunteer
- **Nadya Hall**, Pace University
- **Larry Haller**, USDA
- **Carly Hutchinson**, Volunteer
- **Ted Hvraneck**, Volunteer
- **Ilsa Jule**, Volunteer
- **Damon Little**, NYBG
- **Michelle Luebke**, NYC Parks
- **Sarah Lumban Tobing**, NYC Parks
- **Chris Mangels**, Volunteer
- **Chuck Mullin**, Volunteer
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- **Christina Thomas**, Pace University
- **Zihao Wang**, NYBG intern and NYC Department of Sanitation

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## Appendix A. Westchester County Parks Letter of Agreement



Robert P. Asterio  
County Executive

Department of Parks,  
Recreation & Conservation  
Kathleen M. O'Connor  
Commissioner

February 26, 2016

Linda Rohleder  
Director of Land Stewardship  
New York-New Jersey Trail Conference  
156 Ramapo Valley Road  
Mahwah, NJ 07430

**Re: Letter of Support for Invasive Funewort in Westchester County: Early Detection and Rapid Response by the New York Botanical Garden**

Dear Ms. Rohleder:

On behalf of Westchester County Department of Parks, Recreation and Conservation, I am writing to support the application of the New York Botanical Garden to the Lower Hudson Partnership for Regional Invasive Species Management. Through the proposed project, we will collaborate with NYBG to assist with identifying and monitoring plots on County properties and provide required permitting and logistics.

Westchester County Department of Parks, Recreation and Conservation has a committed conservation staff that has provided the department with extensive field work in the County parks, including invasive species identification and removal. It's important to the department to manage invasive species and the proposed project falls within our mission.

Thank you for your consideration of the proposed project. We are looking forward to the possibilities of working together with the New York Botanical Garden. Identifying *Corydalis incisa* infested areas in Westchester County is vital to prevent further spread of this non-native invasive plant.

Sincerely,

Kathleen M. O'Connor  
Commissioner

400 Saw Mill River Road  
Ardley, New York 10503 Telephone: (914)231-4500 Fax: (914)864-1068/1139 Website: westchestergov.com/parks





## Appendix B. Transect Sites

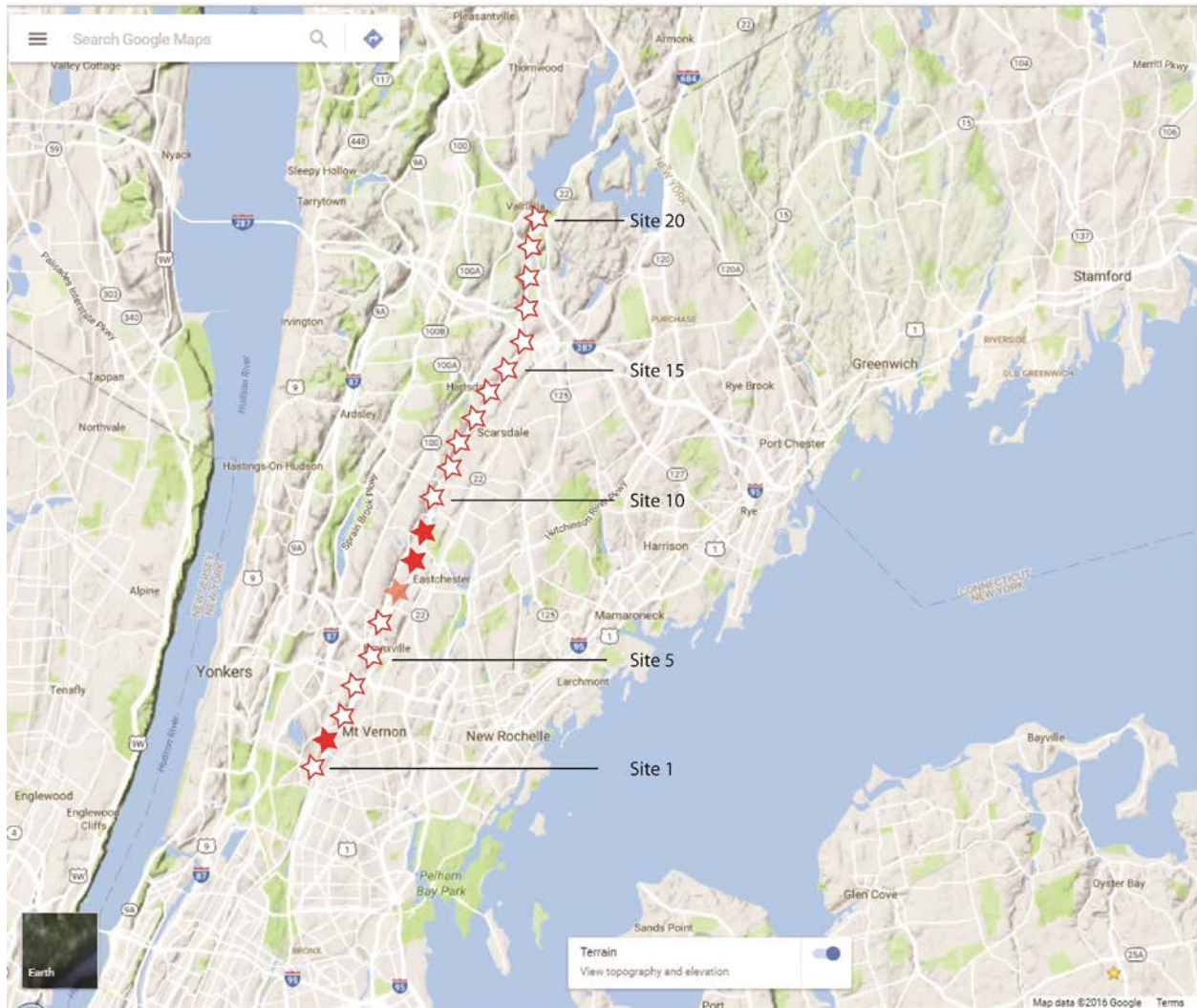


Figure 6. Survey sites on the Bronx River in Westchester County. Red stars indicate where *Corydalis incisa* was found. Open stars indicate no *Corydalis incisa* found. The pink star at Site 7 indicates that *Corydalis incisa* was found very near the transect, but not actually in it.

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Site 1 Wakefield

Team: Jessica Schuler, Elsie Spencer, Laura Booth

Date: June 17, 2016

Transect coordinates: ( $\pm 5$ m) 40.907245N,  
73.8557057W - 40.9078125N, 73.8549961W

Landscape type: Riparian forest that has become a  
vineland and highway median.

Canopy cover: 100-75%

Dominant tree layer: *Acer saccharinum*, *Pinus strobus*,  
*Robinia pseudoacacia*, *Morus alba*, *Fraxinus americana*, *Acer saccharum*, *Fraxinus  
pennsylvanica*, *Acer negundo*.

Dominant shrub layer: *Reynoutria x bohemica*, *Reynoutria japonica*, *Celastrus orbiculatus*,  
*Toxicodendron radicans*, *Parthenocissus quinquefolia*, *Rosa multiflora*.

Dominant herb layer: *Alliaria petiolata*.

Transect notes: The area is a dense vineland. There is lots of trash.

Management recommendations: Vine and *Reynoutria* management followed by restoration  
planting.

*Corydalis incisa* found?: No



# NYBG

NEW YORK BOTANICAL GARDEN

Site 2 Oak Street

Team: Jessica Schuler, Zihao Wang, Laura Booth

Date: June 10, 2016

Transect coordinates: (5m) 40.9160216N,  
73.8481751W - 40.9167633N, 73.8477121W

Landscape type: Riparian forest, steep river bank.

Canopy cover: 100-75%

Dominant tree layer: *Celtis occidentalis*,  
*Quercus palustris*, *Quercus alba*, *Morus alba*.

Dominant shrub layer: *Ampelopsis brevipedunculata*, *Celastrus orbiculatus*, *Toxicodendron radicans*, *Rosa multiflora*, *Rubus pensylvanicus*, *Sambucus canadensis*, *Parthenocissus quinquefolia*, *Artemisia vulgaris*, *Persicaria virginiana*, *Apocynum cannabinum*.

Dominant herb layer: *Alliaria petiolata*.

Transect notes: There is lots of *Sambucus*. "This site has hope. It just needs a little management and restoration planting with follow up."

Management recommendations: Trash pickup, Mugwort and *Corydalis* management and restoration.

*Corydalis incisa* found?: Yes. *Corydalis incisa* was found in two plots. In Plot 8, three juveniles were found. In Plot 9, one juvenile was found.



# NYBG

NEW YORK BOTANICAL GARDEN

Site 3 Fleetwood

Team: Jessica Schuler, Zihao Wang, Laura Booth

Date: May 26, 2016

Transect coordinates: ( $\pm 5$ m) 40.9223637N, 73.8440870W - 40.9231244N, 73.8434439W

Landscape type: Riparian forest and armored river bank outflow and steep river bank.

Dominant tree layer: *Populus deltoides*, *Acer saccharinum*, *Acer rubrum*, *Platanus occidentalis*, *Alnus glutinosa*.

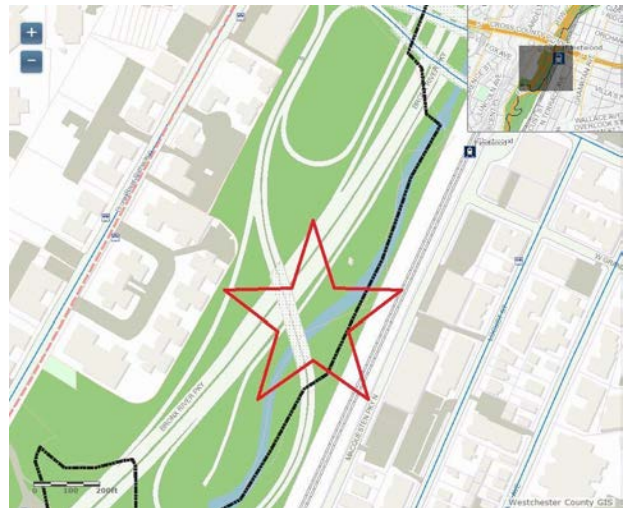
Dominant shrub layer: *Ampelopsis brevipedunculata*, *Celastrus orbiculatus*, *Reynoutria japonica*, *Rosa multiflora*, *Hedera helix*, *Toxicodendron radicans*.

Dominant herb layer: *Alliaria petiolata*.

Transect notes: some of the river bank is armored with rip-rap stone and transect ends at an outflow ditch.

Management recommendations: Manage invasive species, especially *Alnus glutinosa*, *Ampelopsis brevipedunculata* and *Celastrus orbiculatus*.

*Corydalis incisa* found? No.





# NYBG

NEW YORK BOTANICAL GARDEN

Site 4 Midland Ave

Team: Suzanne Nolan, Bob DeiTorto, Suzanne Evans, Tom O'Moore, Steve Pucillo, Chuck Mullin, Sean Curran

Date: June 7, 2016

Transect coordinates: ( $\pm 5$ m) 40.9315549N, 73.8365673W - ( $\pm 5$ m) 40.9319646, 73.8356364W

Landscape type: Riparian forest.

Canopy Cover: 75-50%

Dominant tree cover: *Liriodendron tulipifera*, *Quercus*, *Acer negundo*, *Sassafras albidum* (saplings)

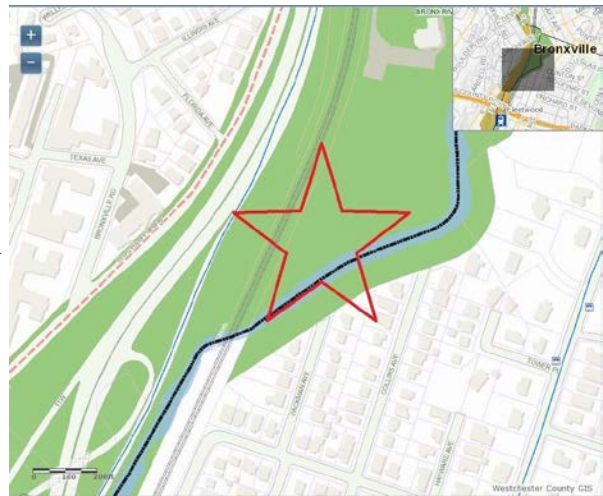
Dominant shrub layer: *Rubus* (wineberry,) *Rosa multiflora*, *Viburnum sieboldii*, *Parthenocissus quinquefolia*, *Toxicodendron radicans*.

Dominant herb layer: *Japanese knotweed*, *Urtica dioica*, *Pachysandra terminalis*, *Viola sororia*, *Viola striata*, *Artemisia vulgaris*, *Burdock*, *Goldenrod*, *Ageratina sessilifolia*, *Impatiens capensis*, *Bidens frondosa*.

Transect notes: Transect on west bank of river, following a beaten, wide path. Riverbanks are steep from scour, with 2 m drop to water level. Plots 2-5 are located in a clearing at the confluence of 3 paths. *Heracleum maximum* (cow parsnip) found immediately west of transect.

Maintenance recommendations: Stabilize eroded banks with native plants; requires Japanese knotweed control. Continue monitoring for *Corydalis*.

*Corydalis incisa* found?: No.





# NYBG

NEW YORK BOTANICAL GARDEN

Site 5 Bronxville

Team: Suzanne Nolan, Bob DeTorto, Ted Hvraneck

Date: June 6, 2016

Transect coordinates: ( $\pm 5$ m) 40.9417147N,  
73.8387413W - ( $\pm 10$ m) 40.9424424, 73.8380472W

Landscape type: Edge of managed lawn area

Canopy Cover: 100-75%

Dominant tree cover: *Acer* (sugar or red,) *Prunus serotina*, *Quercus*, *Fraxinus*, *Ulmus americana*, *Carya*, *Morus alba*, *Platanus occidentalis*.

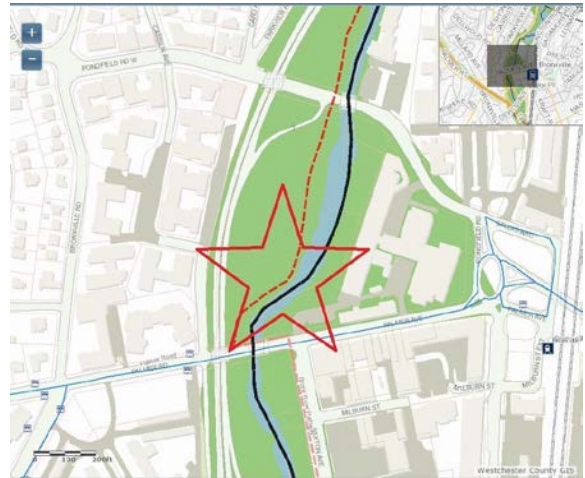
Dominant shrub layer: *Euonymus alatus*, *Toxicodendron radicans*.

Dominant herb layer: *Ageratina altissima*, *Eurybia divaricata*, *Viola sororia*, *Viola striata*, *Persicaria virginiana*, *Asarum canadense*, *Carex*, *Urtica dioica*, *Solidago sp.*, *Alliaria petiolata*, *Persicaria longiseta* (lady's thumb,) lawn grasses.

Transect notes: Transect on east bank of river, on the west side of the asphalt path, through a managed lawn area. Lush growth at river's edge where mowing ends. Slope to the river's edge is steep but gradual. Shallower slope areas are thick with leaf litter. Groundlayer is sparse with some patches of thick growth of *Asarum canadense*. Lady's thumb and common violet are found in the grass.

Management recommendations: Carefully adit out invasives, particularly *Euonymus alatus*. Increase buffer zone to river's edge. Continue to monitor for *Corydalis*.

*Corydalis incisa* found?: No.



# NYBG

NEW YORK BOTANICAL GARDEN

Site 6: Tuckahoe

Team: Suzanne Nolan, Bob DeTorto, Roni Cohen,  
Steve Cohen, Steve Pucillo, Thatcher Drew

Date: June 2, 2016

Transect coordinates: ( $\pm 10\text{m}$ ) 40.9498574N,  
73.8333285W - ( $\pm 5\text{m}$ ) 40.9506997, 73.8329494W

Landscape type: Edge of managed lawn area

Canopy Cover: 25-5%

Dominant tree cover: *Acer platanoides*, *Salix sp.*,  
*Robinia pseudoacacia*, *acer negundo*, *Alnus*  
*glutinosa*, *Carya sp.*, *Morus alba*.

Dominant shrub layer: *Rosa multiflora*, *Rubus sp.*, *Celastrus orbiculatus*, *Toxicodendron*  
*radicans*, *Parthenocissus quinquefolia*.

Dominant herb layer: *Artemisia vulgaris*, *Viola sororia*, *Solidago sp.*, lawn grasses.

Transect notes: Transect at managed lawn area adjacent to the east bank of the river, to the west of the asphalt path. Lush tree (sapling) growth along the river bank where the mowing ends. River bank is steep with a 6' drop to the river. A few trees in the lawn (outside the transect) as individuals: American elm and linden.

Management recommendations: Allow native saplings along river's edge to grow while editing out invasive saplings. Establish a native buffer at river's edge. Continue to monitor for *Corydalis*.

*Corydalis incisa* found?: No.



# NYBG

NEW YORK BOTANICAL GARDEN

Site 7 Crestwood

Team: Daniel Atha, Ilsa Jule

Date: May 27, 2016

Transect coordinates: ( $\pm 10$ m) 40.957407N,  
73.823183W - 40.958108N, 73.822548W

Landscape type: Lawn and wetland

Canopy cover: 50-25%

Dominant tree layer: *Alnus glutinosa*, *Acer saccharum*, *Acer negundo*, *Liriodendron tulipifera*.

Dominant shrub layer: *Reynoutria japonica*, *Rosa multiflora*, *Impatiens sp.*

Dominant herb layer: *Acorus calamus*, *Asarum*, *Cardamine flexuosa*, *Iris pseudacorus*, *Luzula sp.*

Transect notes: There is no Phragmites here now. That is good.

Management recommendations: *Rosa multiflora* and *Alnus glutinosa* should be managed.

*Corydalis incisa* found? No. *Corydalis incisa* was found just south of the transect at the foot bridge crossing the Bronx River and also north of the transect on the west bank, just south of the traffic bridge across the River.



# NYBG

NEW YORK BOTANICAL GARDEN

Site 8 Leewood South

Team: Ilsa Jule, Carly Hutchinson

Date: June 4, 2016

Transect coordinates:

Landscape type: Floodplain

Dominant tree layer: Oak, Maple, Tulip, mostly hardwoods.

Dominant shrub layer: Japanese Knotweed

Dominant herb layer:

Transect Notes:

Management recommendations: Evidence of encampment.

*Corydalis incisa* found? Yes. *Corydalis* not plotted. Five mature plants found in transect and 117 juveniles.



# NYBG

NEW YORK BOTANICAL GARDEN

Site 9 Leewood North

Team: Daniel Atha, Brian Boom, Mark Daniels, Suzanne Nolan

Date: June 9, 2016

Transect coordinates: ( $\pm 10\text{m}$ ) 40.9713650N,  
73.8156148W - ( $\pm 5\text{m}$ ) 40.9722622,  
73.8155139W

Landscape type: Riparian forest

Canopy Cover: 100-75%

Dominant tree cover: *Fraxinus americana*,  
*Acer saccharum*, *Quercus rubra*, *Fraxinus pennsylvanica*, *Acer platanoides*, *Platanus occidentalis*, *Tilia americana*, *Acer negundo*.

Dominant shrub layer: *Lindera benzoin*, *viburnum sieboldii*, *Celastrus orbiculatus*, *Ligustrum sp.*, *Ampelopsis glandulosa*. Occurrence: *Hibiscus syriacus*

Dominant herb layer: *Polygonatum pubescens*, *Asarum canadense*, *Viola sororia*, *Cryptotaenia canadensis*, *Symplocarpus foetidus*, *Matteuccia struthiopteris*, *Urtica dioica*, *Impatiens capensis*, *Hydrophyllum virginianum*, *Artemisia vulgaris*, Big-leaf goldenrod, *Ficaria verna*, *Epipactis helleborine*, *Geum sp.*, *Aegopodium podagraria* (stand,) *Veratrum viride*.

Transect notes: Transect on east side of river, on the west side of the railroad tracks. West portion of the transect is partially in the river. *Ficaria verna* throughout transect. Transect follows a beaten footpath. *Corydalis incisa* found in depressions in the floodplain, and along the footpath.

Management recommendations: Concentrated *Corydalis* removal effort in Spring of 2017. Rich diversity of natives, so removal efforts must limit disturbance.

2003, first use of gas station as Visitor's Center by Westchester Tourism Office (John Baker to Suzanne Nolan, Nov 2016). There is *Corydalis incisa* ringing a planted *Ilex verticillata* shrub on path between the gas station and the path.

*Corydalis incisa* found?: Yes.





# NYBG

NEW YORK BOTANICAL GARDEN

Site 10 Garth Woods

Team: Jessica Schuler, Suzanne Nolan, Bob DelTorto, Zihao Wang, Laura Booth

Date: May 27, 2016

Transect coordinates: ( $\pm 5m$ ) 40.9825833N, 73.8146945W - 40.9835051, 73.8148W

Landscape type: Riparian forest

Canopy Cover: 100-75%

Dominant tree cover: *Liriodendron tulipifera*, *Fagus grandifolia*, *Acer saccharum*, *Tilia americana*.

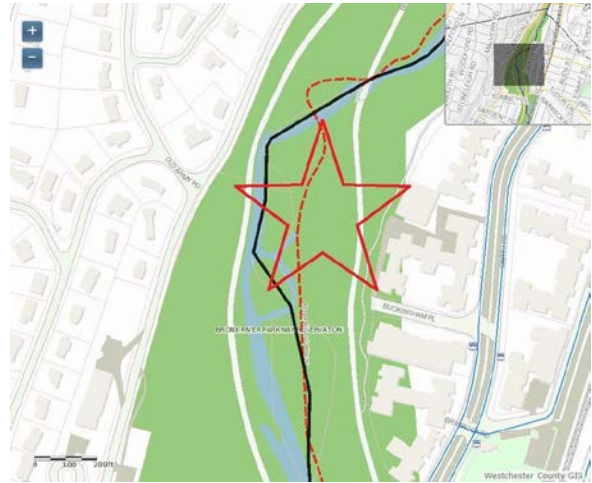
Dominant shrub layer: *Hamamelis virginiana*, *Lindera benzoin*, *Euonymus alatus*, *Hedera helix*, *Toxicodendron radicans*,

Dominant herb layer: *Sanguinaria canadensis*, *Maianthemum racemosum*, *Asarum canadense*, *Trillium erectum*, *Japanese knotweed*, *Cardamine concatenata* (toothwort,) *Viola sororia*. 1 incidence: *Veratrum viride*.

Transect notes: Every plant layer present. Ground covered with thick layer of vines, mostly *hedera helix* and *toxicodendron radicans*, interspersed with natives in significant numbers. No evidence of animal (deer) browse. Transect partially in the river on west side of transect (@40%) from plot 3 through 10.

Management recommendations: Remove invasive shrubs, particularly *Euonymus alatus*, *Berberis thunbergii* also found, although not in the transect. Removal operations must limit disturbance as there is a rich diversity of natives.

*Corydalis incisa* found?: No.





# NYBG

NEW YORK BOTANICAL GARDEN

Site 11 Scarsdale

Team: Daniel Atha, Michelle Luebke, Saidan Qi

Date: June 6, 2016

Transect coordinates: ( $\pm 10m$ ) 40.990156N,  
73.808927W - 40.991056N, 73.808559W

Landscape type: Floodplain.

Canopy cover: 75-50%

Dominant tree layer: Sycamore, Norway Maple,  
Sweetgum, Cottonwood (*Populus deltoides*).

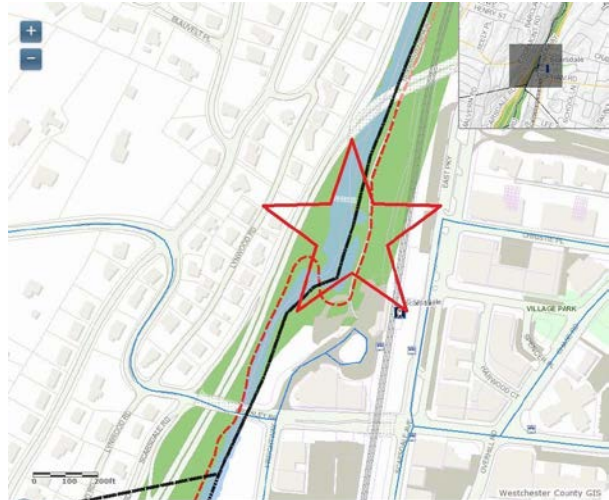
Dominant shrub layer: Spicebush, Poison Ivy,  
Porcelainberry, Japanese Knotweed.

Dominant herb layer: *Persicaria virginiana*, *Bidens*, *Vicia*, *Persicaria longisetata*, *Persicaria lapathifolia*.

Transect notes: Kudzu found just east of plot 8 at north end of transect. Most of transect is in recently restored river bank, planted with *Cornus* and *Lindera*. A paved walking path runs nearly the whole length of the transect.

Management recommendations: On-going monitoring of river bank restoration planting required to prevent invasive incursions. Remove kudzu and monitor area.

*Corydalis incisa* found? No.



# NYBG

NEW YORK BOTANICAL GARDEN

Site 12 Ogden Road

Team: Daniel Atha, Suzanne Nolan

Date: July 10, 2016

Transect coordinates: ( $\pm 10$ m) 40.996747N,  
73.805141W - 40.997717, 73.804702W

Landscape type: Riparian forest

Canopy Cover: 100-75%

Dominant tree cover: *Acer platanoides*, *Fraxinus* sp., *Acer saccharinum*, *Quercus alba*, *Staphylea trifolia*, *Cornus* sp., *Betula* sp., *Ailanthus altissima*, *Acer negundo*, *Liriodendron tulipifera*, *Malus* sp.

Dominant shrub layer: *Lindera benzoin*, Japanese knotweed, *Euonymus alatus*, *Lonicera japonica*, *Lonicera maackii*, *Viburnum plicatum*, *Viburnum sieboldii*, *Berberis thunbergii*, *Toxicodendron radicans*, *Parthenocissus quinquefolia*, *Ampelopsis glandulosa*, *Rubus* (wineberry,) *Hedera helix*, *Ligustrum* sp.

Dominant herb layer: *Thalictrum* sp., *Ageratina altissima*, *Bidens* sp., *Persicaria longiseta*, *Impatiens capensis*, *Symplocarpus foetidus*, *Artemisia vulgaris*, *Alliaria petiolata*, *geum* sp., *Viola sororia*, *Convolvulus arvensis*, *Symphyotrichum* sp., *Asarum canadense*, Moss-2 types w/ small liverwort.

Transect notes: Transect hugs west bank of river. East 5m of transect in the river. Generally sparse understory. Moss at river's edge. West portion of transect is approximately 3m above level of river along the top of the west bank of the river at edge of Metro North property where heavy invasives occur. Sycamore maple stump sprouting present. South end of transect located 10m north of culvert outfall from under the railroad tracks.

Management recommendations: Area difficult to access. Consider repeated cutting of invasives.

*Corydalis incisa* found?: No.



# NYBG

NEW YORK BOTANICAL GARDEN

Site 13 Greenburgh

Team: Daniel Atha, Chris Mangels

Date: June 13, 2016

Transect coordinates: ( $\pm 10$ m) 41.007975N,  
73.798129W - 41.00822N, 73.79721W

Canopy cover: 100-75%

Dominant tree layer: *Acer platanoides*, *Fagus grandifolia*, *Picea abies*, *Acer negundo*, *Fraxinus pensylvanica*, *Morus alba*, *Tilia americana*, *Acer rubrum*, *Quercus rubra*.

Dominant shrub layer: *Reynoutria japonica*, *Euonymus alata*, *Toxicodendron radicans*, *Lonicera cf. morrowii*, *Celastrus orbiculatus*, *Ligustrum sp.*, *Hamamelis*, *Euonymus fortunei*, *Lindera benzoin*, *Hedera helix*, *Symplocos* (?).

Dominant herb layer: *Sanguinaria canadensis*, *Persicaria spp.*, *Lepidium didymum*, *Epipactis helleborine*, *Bidens sp.*, *Oxalis spp.*, *Alliaria petiolata*, *Cryptotaenia canadensis*, *Dryopteris spp.*, *Polystichum acrostichoides*, *Laportea canadensis*, *Eurybia divaricata*.

Transect notes: Little or no sign of recent human disturbance. Several large diameter *Vitis* stems.

Management Recommendations: This site is difficult to access. *Rosa multiflora*, *Celastrus orbiculatus* and *Hedera helix* are major problems.

*Corydalis incisa* found? No.



# NYBG

NEW YORK BOTANICAL GARDEN

Site 14 Hartsdale

Team: Daniel Atha, Suzanne Nolan, Ken Chaya,  
Saiden Qi, Amanda Kingsley

Date: July 11, 2016

Transect coordinates: ( $\pm 10$ m) 41.013321N,  
73.792519W - 41.013864N, 73.791846W

Landscape type: Riparian forest

Canopy Cover: 100-75%

Dominant tree cover: *Acer platanoides*, *Carya ovata*, *Prunus serotina*, *Acer rubrum*, *Tilia americana*, *Fraxinus pennsylvanica*, *Fraxinus americana*, *Sassafras albidum*, *Ulmus americana* (saplings,) *Betula lenta*.

1 Incident: *Ostrya virginiana*, *Cornus florida*

Dominant shrub layer: *Euonymus alatus*, *Hamamelis virginiana*, *Rosa multiflora*, *Viburnum sp.*, *Viburnum sieboldii*, *Viburnum acerifolium*, *Prunus serotina* saplings, *Carya cordiformis* saplings, *Parthenocissus quinquefolia*, *Euonymus fortunei*, *Toxicodendron radicans*, *Clematis terniflora*.

Dominant herb layer: *Cryptotaenia canadensis*, *Persicaria virginiana*, *Geum sp.*, *Polygonatum pubescens*, *Eurybia divaricata*, *Alliaria petiolata*.

Transect notes: For plots 1-5, the eastern half of the transect is on the pathway. For plots 6-10, the transect is bounded on both sides by water; on the west is the Bronx River and on the east is the mill spillway.

Management recommendations: Control invasive shrubs; consider successive cuttings. Will require limiting disturbance to protect saplings.

*Corydalis incisa* found?: No.



# NYBG

NEW YORK BOTANICAL GARDEN

Site 15 White Plains South

Team: Daniel Atha, Suzanne Nolan, Ken Chaya, Saiden Qi, Amanda Kingsley  
Date: July 11, 2016

Transect coordinates: ( $\pm 10$ m) 41.016390N,  
73.789353W - 41.017281N, 73.788835W

Landscape type: Riparian forest

Canopy Cover: 100-75%

Dominant tree cover: *Acer platanoides*,  
*Fraxinus americana*, *Liriodendron tulipifera*,  
*Acer saccharinum*, *Quercus rubra*, *Fagus grandifolia*, *Acer negundo*.

Dominant shrub layer: *Japanese knotweed*, *Sassafras albidum*, *Hamamelis virginiana*, *Euonymus alatus*, *Berberis thunbergii*, *Lindera benzoin*, *Hibiscus syriacus*, *Rosa multiflora*, *Rubus sp.*, *Ampelopsis glandulosa*, *Acer japonica sp. saplings*.

Dominant herb layer: *Aegopodium podagraria*, *Athyrium filix-femina*, *Symphyotrichum sp.*, *Toxicodendron radicans*, *Parthenocissus quinquefolia*, *Carex sp.*, *Impatiens campensis*, *Cryptotaenia canadensis*, *Bidens sp.*, *Polygonatum pubescens*, *Microstegium vimineum*, *Cardamine impatiens*, *Polygonum sp.*, *Circaea lutetiana*, *Viola sororia*, *Viola striata*, *Allaria petiolata*, *Geranium maculatum*, *Laportea canadensis*, *Persicaria virginiana*, *Artemisia vulgaris*, *Oxalis sp.*, *Leersia virginica*, *Ageratina altissima*, *Juncus tenuis*, *Hosta sp.*

Transect Notes: Transect is located roughly on the east edge of the pathway along the Bronx River.

Management Recommendations: *Japanese knotweed* is very established in this area, as are *bittersweet*, *Euonymus alatus*, and *Berberis thunbergii*. Control of these plants must allow for protection of native herbaceous layer.

*Corydalis incisa* found?: No.





# NYBG

NEW YORK BOTANICAL GARDEN

Site 16 White Plains Central

Team: Daniel Atha, Suzanne Nolan

Date: July 1, 2016

Transect coordinates (WGS84, ±10m) --  
41.029571N, 73.776593W – 41.029066N,  
73.777558W.

Landscape type: Riparian forest

Canopy Cover: 100–75%

Dominant tree cover: *Fraxinus americana*,  
*Catalpa bignonioides*, *Acer platanoides*, *Acer*  
*negundo*, *Ulmus*, *Morus alba*, *Gleditsia triacanthos*.

Dominant shrub layer: *Lindera benzoin*, *Viburnum sieboldiana*, *Ligustrum* sp., *Hibiscus*  
*syriacus*, *Lonicera maackii*, *Lindera benzoin*, *Euonymus alatus*, *Toxicodendron radicans*,  
*Parthenocissus quinquefolia*, *Ampelopsis glandulosa*, *Rosa multiflora*, *Celastrus orbiculatus*,  
*Albizia julibrissin*.

Dominant herb layer: *Aegopodium podagraria*, *Leersia virginica*, *Artemisia vulgaris*, *Viola*  
*sororia*, *Viola striata*, *Ficaria verna*, *Cryptotaenia canadensis*, *Erigeron annua*, *Stinging nettle*,  
*Hedera helix*, *Ageratina altissima*, *Geum canadense*, *Juncus tenuis*, *Alliaria petiolata*.

Submerged aquatic: *Potamogeton foliosus*.

Notes and Management Recommendations: The vegetation here was dominated by non-native and invasive species such as Norway Maple, Ligustrum, Honey Locust and even Mimosa. Some evidence of animal browse (probably deer). There are several thickets of *Rosa multiflora* present. This is a very aggressive species and forms mono-specific stands. These dense stands diminish plant diversity and impede recreation.

*Corydalis incisa* found?: No.





# NYBG

NEW YORK BOTANICAL GARDEN

Site 17 White Plains North

Team: Daniel Atha, Suzanne Nolan

Date: July 5, 2016

Transect coordinates ( $\pm 10\text{m}$ ) 41.037693N,  
73.777102W - 41.038593N, 73.777193W

Landscape type: Flooded forest

Canopy cover: 100-75%

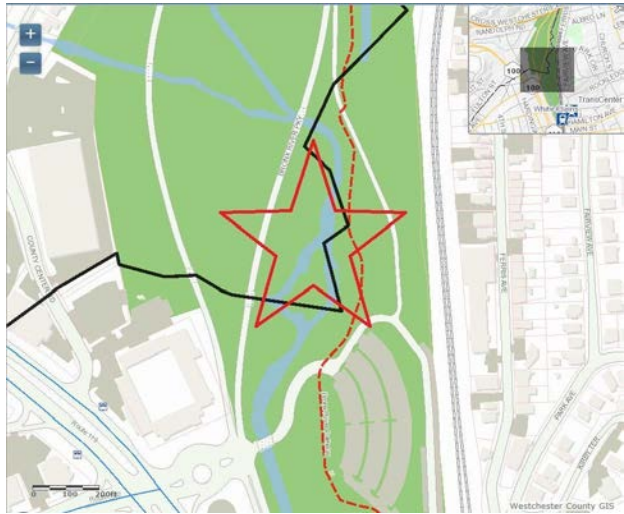
Dominant tree cover: *Platanus occidentalis*,  
*Fraxinus pennsylvanica*, *Acer saccharinum*,  
*Acer negundo*, *Ulmus*.

Dominant shrub layer: *Polygonum cuspidatum*, *Celastrus orbiculatus*, *Cornus amomum*, *Rosa multiflora*, *Viburnum sieboldiana*, *Toxicodendron radicans*, *Lindera benzoin*, *Euonymus fortuneii*.

Dominant herb layer: *Ficaria verna*, *Impatiens capensis*, *Conium maculatum*, *Peltandra virginica*, *Persicaria sagittata*, *Boehmeria cylindrica*, *Persicaria longiseta*, *Alliaria petiolata*, *Calystegia sepium*, *Persicaria hydropiper*, *Artemisia annua*, *Lythrum salicaria*, *Sonchus sp.*, *Perilla frutescens*, *Veronica sp.*, *Portulaca oleracea*, *Amaranthus blitum*, *Viola sororia*, *Galinsoga quadriradiata*, *Persicaria lapathifolia*, *Ranunculus sp.*, *Bidens sp.*, *Circaea lutetiana*, *Epipactis helleborine*, *Cryptotaenia canadensis*.

Transect Notes: The north end of the transect is located between the parkway drive, to the west, and the Bronx River, to the east. Transect continues south onto an island in the river.

Management Recommendations: This site have a very healthy intact native overstory of Silver Maple (*Acer saccharinum*), Green Ash (*Fraxinus pennsylvanica*), American Elm (*Ulmus americana*), Box Elder (*Acer negundo*) and Sycamore (*Platanus occidentalis*). For the most part the herbaceous layer also mostly consists of a mosaic of native species, including Jewelweed (*Impatiens capensis*), Smartweed (*Impatiens hydropiper*), Enchanter's nightshade (*Circaea canadensis*), Poison Ivy (*Rhus radicans*), and others. However, the major problem is the shrub layer which is dominated by Siebold's Viburnum (*Viburnum sieboldii*). There were very few herbaceous species around the *Viburnum* suggesting that it is allelopathic. *Corydalis incisa* found?: No.



# NYBG

NEW YORK BOTANICAL GARDEN

Site 18 White Plains Cemetery

Team: Ilsa Jule, Carly Hutchinson

Date: July 1, 2016

Transect coordinates: 41.04654076N,  
73.77463178W - 41.04538883N, 73.7749074W

Landscape type: Floodplain forest with mowed  
grass.

Canopy cover 75-50%

Dominant tree cover: Plane, Tulip, Cherry, Oak,  
Maple, Ash, Beech, Sumac, Honey Locust.

Dominant shrub layer: Dogwood, Poison Ivy, Grapes, Barberry, Knotweed, Roses.

Dominant herb layer: Soapwort, Fern, Violets, Nettles, Meadow Rue, Water Hemlock, Common  
Plantain, Lesser Duckweed, Aster, Water Hyacinth, Pickeralweed.

Transect notes:

Management recommendations: Control Knotweed, Barberry and Multiflora rose.

*Corydalis incisa* found?: No.



# NYBG

NEW YORK BOTANICAL GARDEN

Site 19 Holmes Road

Team: Matt Aiello-Lammens, Christina Thomas, Nadya Hall

Date: June 22, 2016

Transect coordinates: ( $\pm 4$ m) 41.05772N, 73.77248W - 41.05857N, 73.77264W

Landscape type: Floodplain

Canopy cover: 25-5%

Dominant tree layer: Ash (black?), Oak, Basswood

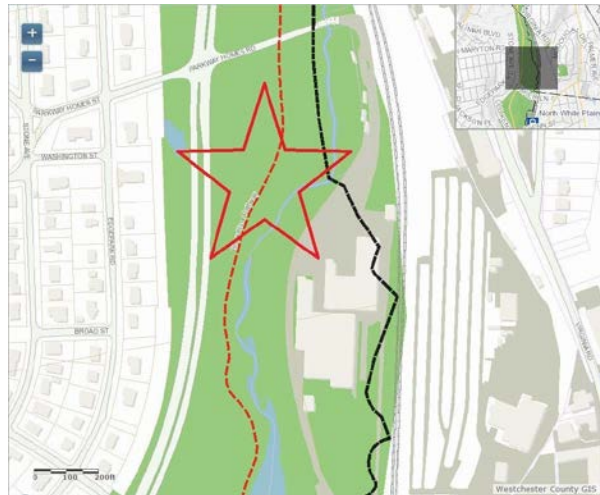
Dominant shrub layer: Grape vine, Multiflora Rose, Swamp Dogwood, Jewelweed, Ironweed.

Dominant herb layer:

Transect notes: Exceedingly dense vegetation; floodplain of the river was very narrow (< 10 m wide). Plots 1-5 are likely flooded on a regular basis.

Management recommendations: Control Multiflora rose.

*Corydalis incisa* found? No.



# NYBG

NEW YORK BOTANICAL GARDEN

Site 20 Kensico

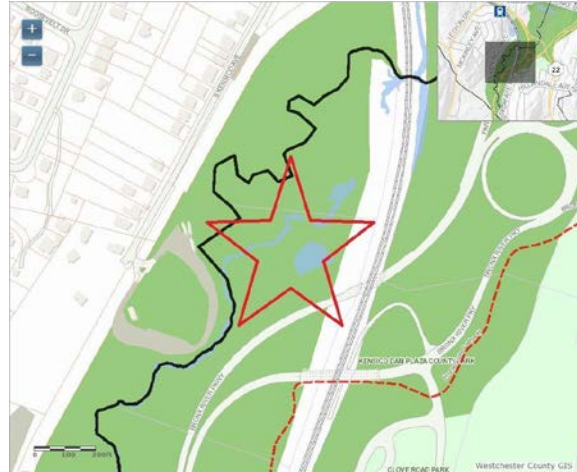
Team: Team: Matt Aiello-Lammens, Christina Thomas, Nadya Hall

Date: June 21, 2016

Transect coordinates; ( $\pm 4m$ ) 41.0672N, 73.77280W - 41.06818N, 73.77325W

Landscape type; Riparian/wetland/marsh

Canopy cover: plots 1-4 0% cover; plots 5-10 about 10% cover.



Dominant tree layer: *Acer negundo*, *Acer saccharinum*, *Acer saccharum*.

Dominant shrub layer: *Rosa multiflora*, buttonweed?

Dominant herb layer: Jewel Weed, Phragmites, Wild grape Vine, Skunk Cabbage

Transect notes; *Rosa multiflora* dominant in plot five.

Management recommendations: Control multiflora rose and Phragmites.

*Corydalis incisa* found? No.

# NYBG

NEW YORK BOTANICAL GARDEN

## Appendix C. Completed Data Sheets

Incised Furmwort in Westchester County: Early Detection and Rapid Response

Site #1, Wakefield

Team: Jessica Schuler, Elise Spencer, Laura Both		Date: 6/17/16
Transect Center (S) N 73.8557057	W: 40.9072452	= 5m
Transect Center (N) N 73.8549961	W: 40.9078125	= 5m

Coordinates: WGS84 datum; decimal format: xxxxxxxx, .xxx meters

Canopy Cover: 100%-75%    75%-50%    50%-25%    25%-5%    <5%

Dominant Species:		
Acer saccharinum Pinus strobus Rhamnus pallidocarpa Morus alba	Elymus x borealis Elymus x japonica Celastrus orbiculus Fragaria virginiana Alliaria petiolata Toxicaria canadensis	Parthenocissus quinquefolia Rosa multiflora Acer saccharum Fragaria pennsylvanica Acer platanoides Acer rubrum

Landscape Type:  
Vineyard; riparian forest, highway median

Transect Notes:  
dense vineyard, lots of trash, needs attention

Incised Furmwort in Westchester County: Early Detection and Rapid Response

Site #1, Wakefield

Team: Jessica Schuler, Elise Spencer, Laura Both		Date: 6/17/16
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# Crystals Patches/Plot	Total Patch Area (m <sup>2</sup> )	Subplot Number of Plants (Juvenile)	Subplot Number of Plants (Mature)	Subplot #	Plot Notes
0					15% of plot in water
0					15% of plot in water
0					
0					
0					
0					
0					
0					(false alarm since 0%)
1	1	1	1	1	No plants in subplot 1 - 1x + 1x + 1x - 5m x 5m

Herbarium Specimen Collected:    DNA Sample Collected:    Plants Removed:    Disposal Method:

Management Suggestions:  
vine + Elymus borealis mgt followed by restoration planting.

Other Observations:

### Site 1 Wakefield

# NYBG

NEW YORK BOTANICAL GARDEN

Invasive Fumewort in Westchester County: Early Detection and Rapid Response

Site 2, Oak St

Team: Zihao Wang, Jessica Schuler, Laura Booth Date: 6/10/16

Transect Center (S) N 73.8481757 W 40.9160216 ± 5m  
 Transect Center (N) N 73.8477121 W 40.9167633 ± 5m

Coordinate: WGS84 datum; decimal format; xxxxxxxx, xxx meters

Canopy Cover: 100%-75% 75%-50% 50%-25% 25%-5% <5%

Dominant Species:

<i>Celtis occidentalis</i>	<i>Celastrus orbiculatus</i>	<i>Rubus pensilvanicus</i>
<i>Quercus pedunculata</i>	<i>Morus alba</i>	<i>Urtica dioica</i>
<i>Quercus alba</i>	<i>Toxicodendron radicans</i>	<i>Sambucus racemosa</i>
<i>Amelanchier canadensis</i>	<i>Rosa multiflora</i>	<i>Polygonum virginicum</i>
<i>Prunella pennsylvanica</i>	<i>Ailanthus petiolaris</i>	<i>Parthenocissus vitacea</i>
		<i>Artisania vulgaris</i>

Landscape Type: Riparian Forest, steep near bank

Transect Notes: narrow patch between train tracks + Bronx River  
*Carydalis* present in 2 plots in sun.

Invasive Fumewort in Westchester County: Early Detection and Rapid Response

Site 2 Oak St.

Team: Zihao Wang, Jessica Schuler, Laura Booth Date: 6/10/16

#	Carydalis Patch/Plot	Total Patch Area (m <sup>2</sup> )	Subplot Number of Plants (Columbs)	Subplot Number of Plants (Mature)	Subplot #	Plot Notes
Plot 1:	0	/	/	/	/	no <i>Carydalis</i> ; full shade; forest edge
Plot 2:	0	/	/	/	/	"
Plot 3:	0	/	/	/	/	no <i>Carydalis</i> ; full shade; compacted "hang out"
Plot 4:	0	/	/	/	/	"
Plot 5:	0	/	/	/	/	"
Plot 6:	0	/	/	/	/	1/2 half in canopy opening / half full shade.
Plot 7:	0	/	/	/	/	sun / vine land.
Plot 8:	2	2.1 x 1.1 = 2.31	3	0	1	sun; <i>Carydalis</i> not as dense as other areas.
Plot 9:	1	1.1 x 0.9 = 0.99	1	0	1	half sun / half shade // <i>Carydalis</i> not as dense as other areas
Plot 10:	0	/	/	/	/	no <i>Carydalis</i> ; shade

Herbarium Specimen Collected: YES DNA Sample Collected: YES Plants Removed: 10 Disposal Method: trash bag + track

Management Suggestions: Invasive vine management, trash pick ups, mugwort + *Carydalis* removal + restoration.

Other Observations: There is lots of *Sorambucus* this site has; here just needs a little mow + restoration planting with follow up.

## Site 2 Oak Street



# NYBG

NEW YORK BOTANICAL GARDEN

Incised Fumewort in Westchester County: Early Detection and Rapid Response

Site: #3 Fleetwood

Team: Laura Booth Jessica Schuler Date: 5/26/16  
Zihao Wang

Transect Center (S) N: -73.8440870 W: 40.9223637 ± 5m  
Transect Center (N) N: -73.843489 W: 40.9231244 ± 5m

Coordinates: WGS84 datum; decimal format: xx.xxxxxx; x: x meters

Canopy Cover: 100%-75% 75%-50% 50%-25% 25%-5% <5%

Dominant Species:  
*Populus deltoides* *Ailurus glutinosus* *Rhynchospora japonica*  
*Acer saccharinum* *Asplenium platyneuron* *Rosa multiflora*  
*Acer rubrum* *Celastrus orbicollatus* *Alliaria petiolata*  
*Platanus occidentalis* *Hedera helix*  
*Taxodium radicans*

Landscape Type:  
 Riparian forest, stream river bank & outflow  
 very steep river bank.

Transect Notes:  
 some of river bank is covered with riparian stone & hanging dunes  
 at an outflow ditch.

Incised Fumewort in Westchester County: Early Detection and Rapid Response

Site: #3 Fleetwood

Team: Laura Booth Jessica Schuler Date: 5/26/16  
Zihao Wang

Plot #	Number of Corydalis Patches/Plot	Total Patch Area (m <sup>2</sup> )	Subplot Number of Plants (Juvenile)	Subplot Number of Plants (Mature)	Subplot #	Plot Notes
Plot 1:	○	/	/	/	/	no corydalis
Plot 2:	○	/	/	/	/	"
Plot 3:	○	/	/	/	/	"
Plot 4:	○	/	/	/	/	"
Plot 5:	○	/	/	/	/	"
Plot 6:	○	/	/	/	/	"
Plot 7:	○	/	/	/	/	"
Plot 8:	○	/	/	/	/	"
Plot 9:	○	/	/	/	/	"
Plot 10:	○	/	/	/	/	"

Herbarium Specimen Collected: DNA Sample Collected: Plants Removed: Disposal Method:

Management Suggestions:

Other Observations:

## Site 3 Fleetwood

# NYBG

NEW YORK BOTANICAL GARDEN

Insected Fumewort in Westchester County: Early Detection and Rapid Response

Site: 4 Midland

Team: Suzanne Nolan, Bobo Del Toro, Suzanne Evans, Tom O'Moore, Steve Pucillo, Chuck Mullin, Sean Curran Date: 6/7/16

Transect Center (S) N: -73.8365673 W: 40.9315549 ±0005 m  
Transect Center (N) N: -73.8356364 W: 40.9319646 ±.0005 m

Coordinates: WGS84 datum; decimal format: xx.xxxxxx°, xxx meters

Canopy Cover: 100%-75% **75%-50%** 50%-25% 25%-5% <5%

Dominant Species: Canopy: Tulip, oak - red? Box elder  
shrub: redstart, viburnum, multiflora rose, viburnum sieboldii, sassafras, <sup>ginkgo</sup> ~~liquidambar~~  
ground: stinging nettle, violets, purple sandbar, white violet, virginia creeper  
moss: ivy, burdock, golden rod, eupatorium, jewelweed.

Landscape Type: Riparian forest,

Transect Notes: some hole still visible  
river banks steep from scar. Drop 6' from transect level to river.  
Plots 3, 4, 5 in clearing at the entrance of 3 paths.

Insected Fumewort in Westchester County: Early Detection and Rapid Response

Site: 4 Midland

Team: Date:

Plot #	Number of Corydalis Patches/Plot	Total Patch Area (m <sup>2</sup> )	Subplot		Subplot #	Plot Notes
			Number of Plants (Juvenile)	Number of Plants (Mature)		
Plot 1:	0	0	0	0	15	Pensacola <sup>shaded</sup>
Plot 2:	5	5	4	0	13	Semi sunny <sup>(Pensacola) dense shade, 1 patch</sup>
Plot 3:	2	2	1	0	61	Sunny <sup>open 1 sunny edge of path</sup>
Plot 4:	1	1	0	0	83	Shaded <sup>patch 1 sunny edge of path</sup>
Plot 5:	0	0	0	0	64	edge of path <sup>shaded</sup>
Plot 6:	0	0	0	0	2	edge of path <sup>shaded under tree</sup>
Plot 7:	0	0	0	0	16	edge of path <sup>shaded under tree</sup>
Plot 8:	0	0	0	0	53	shady edge of path
Plot 9:	0	0	0	0	74	shady path
Plot 10:	0	0	0	0	13	shady inside of path

Herbarium Specimen Collected: DNA Sample Collected: Plants Removed: Disposal Method:

Management Suggestions:

Other Observations:

## Site 4 Midland

# NYBG

NEW YORK BOTANICAL GARDEN

Incised Furmewort in Westchester County: Early Detection and Rapid Response

Site: 5 Bronxville

Team: Suzanne Nolan, Bob Deltorto, Ted Hovanek Date: 6/6/16

Transect Center (S) N: -73.8357413 W: 40.9417177 ± .0005m

Transect Center (N) N: -73.8380472 W: 40.9424424 ± .00010m

Coordinates: WGS84 datum; decimal format; xxx,xxxxx; xxx meters

Canopy Cover: 100%-75% 75%-50% 50%-25% 25%-5% <5%

Dominant Species: Sugar Maple, Chokecherry (Leucus Seroxotina), Oak, Ash, Hickory, Malbary, American Sycamore  
 Sirolo: *variegata*, *euonymus*, lots in saplings  
 ground: *prisonensis*, *cupatarianus*, *Woodland* etc.; in duffe *virginiana*, *juniperus*, *anglicus*, *river* edge  
*canine* *mustard*, *strawberry* *potentilla* *gracilis* *capex*

Landscape Type: managed lawn, lush, growing @ river's edge where mowing ends; ground layer sparse, w/ patches of thick growth of grasses  
 Ingrass - smooth, vetch, grass  
 From Slope in 12'

Transect Notes: Shady; sloped edge of river; steep but gradual; asphalt path through in Aris B; Sl  
 @ 8' from in 12' m. Steeper slope and thick organic layer of leaves  
 e/m

Incised Furmewort in Westchester County: Early Detection and Rapid Response

Site: 5 Bronxville

Team: Suzanne Nolan, Bob Deltorto, Ted Hovanek Date: 6/6/16

Plot #	Number of Cordgrass Patches/Plot	Total Patch Area (m2)	Subplot		Subplot #	Plot Notes
			Number of Plants (Juvenile)	Number of Plants (Mature)		
Plot 1:	0					
Plot 2:	0					
Plot 3:	0					
Plot 4:	0					
Plot 5:	0					
Plot 6:	0					
Plot 7:	0					
Plot 8:	0					
Plot 9:	0					
Plot 10:	0					

Herbarium Specimen Collected: DNA Sample Collected: Plants Removed: Disposal Method:

Management Suggestions:

Other Observations:

## Site 5 Bronxville

# NYBG

NEW YORK BOTANICAL GARDEN

Insect Humewort in Westchester County: Early Detection and Rapid Response

Site: 6 Tuckahoe

Team: Suzanne Nolan, Bob DeLotto, ~~Roni~~ Roni Cohen, Steve Cohen, Steve Picillo, Date: 6/2/16  
Traci Dren

Transect Center (S) N: -73.8332285 W: 40.9498574 ± 0.010m  
Transect Center (N) N: -73.8329444 W: 40.9506997 ± 0.005m

Coordinates: WGS84 datum; decimal format: xxxxxxxx, xxx meters

Canopy Cover: 100%-75% 75%-50% 50%-25% 25%-5% <5%

Dominant Species: Canopy: Norway Maple, Willow, black locust, Norway maple, box elder, European alder, Shadbush, multiflora rose, winged, ornamental, sweet ground layer: poison ivy, Virginia creeper, mugwort, violets, goldenrod, mulberry

Landscape Type: managed lawn area. Lush tree, shrub growth along river bank where mowing ends. A few trees in the lawn as individuals: (1) elm, (3) linden

Transect Notes: adjacent to walking path, steep banks and river; steep banks with <sup>river</sup> to river

Insect Humewort in Westchester County: Early Detection and Rapid Response

Site: 6 Tuckahoe

Team: Suzanne Nolan, Bob DeLotto, Roni Cohen, Steve Cohen, Steve Picillo Date: 6/2/16

Plot #	Number of Corydalis Patches/Plot	Total Patch Area (m <sup>2</sup> )	Subplot Number of Plants (Juvenile)	Subplot Number of Plants (Mature)	Subplot #	Plot Notes
Plot 1:	0					
Plot 2:	0					
Plot 3:	0					
Plot 4:	0					
Plot 5:	0					
Plot 6:	0					
Plot 7:	0					
Plot 8:	0					
Plot 9:	0					
Plot 10:	0					

Herbarium Specimen Collected: DNA Sample Collected: Plants Removed: Disposal Method:

Management Suggestions:

Other Observations:

## Site 6 Tuckahoe

# NYBG

NEW YORK BOTANICAL GARDEN

Site 7

Incised Furrow in Westchester County: Early Detection and Rapid Response  
Transect

Site: Crestwood

Team: Daniel Atha, Isaac Jule Date: 27 May 2016

Transect Center (S) N: 40.957407 W: 73.623183 ± 10 m  
Transect Center (N) N: 40.956108 W: 73.622548 ± 10 m

Coordinates: WGS84 datum; decimal format: xx.xxxxxx; axx meters

Canopy Cover: 100%-75% 75%-50% 50%-25% 25%-5% <5%

Dominant Species: *Xinus angulatus*, *Acer saccharum*, *Acer negundo*  
*Polygonum japonicum*, *Impatiens*, *Rosa multiflora*  
*Lonicera*, *Iris versicolor*, *Acer rubrum*, *Asarum canadense*  
*Cardamine flexuosa*, *Alnus incana*

Landscape Type: lawn and wetland

Transect Notes: *Rosa multiflora* should be controlled  
no phragmites!

Site 7

Incised Furrow in Westchester County: Early Detection and Rapid Response  
Plot Data

Site: Crestwood

Team: Daniel Atha, Isaac Jule Date: 27 May 2016

Plot #	Number of Corydalis Patches/Plot	Total Patch Area (m <sup>2</sup> )	Subplot Number of Plants (Juvenile)	Subplot Number of Plants (Mature)	Subplot #	Plot Notes
Plot 1:						
Plot 2:						
Plot 3:						
Plot 4:						
Plot 5:						
Plot 6:						
Plot 7:						
Plot 8:						
Plot 9:						
Plot 10:						

Herbarium Specimen Collected: DNA Sample Collected: Plants Removed: Disposal Method:

Management Suggestions:

Other Observations:

## Site 7 Crestwood

# NYBG

NEW YORK BOTANICAL GARDEN

Insected Forest in Westchester County: Early Detection and Rapid Response  
Transect

Site: #8 Leewood South

Team: *ILSA JULE* Date: *06/04/16*

Transect Center (S) N: W: ±  
Transect Center (N) N: W: ±

Coordinates: WGS84 datum; decimal format: xx.xxxxxx°, xxx meters

Canopy Cover: 100%-75% 75%-50% 50%-25% 25%-5% <5%

Dominant Species: *typical for the region: oak, maple, tulip etc mostly hardwoods*  
*invasives: Japanese knotweed*

Landscape Type: *flood plain*

Transect Notes:  
*There is an area low down someone has possibly camped out - a transient - human feces + a very creepy vibe.*

Insected Forest in Westchester County: Early Detection and Rapid Response  
Plot Data

Site: #8 Leewood South

Team: *ILSA Jule / Cathy Hutcheon* Date: *6/14/16*

Plot #	Number of Cordials/ Patches/Plot	Total Patch Area (m <sup>2</sup> )	Subplot Number of Plants (Juvenile)	Subplot Number of Plants (Mature)	Subplot #	Plot Notes
Plot 1:	<i>112</i>	<i>1000</i>	<i>117</i>	<i>5</i>		<i>100% oak, maple, tulip etc mostly hardwoods</i>
Plot 2:	<i>0</i>	<i>1000</i>	<i>0</i>	<i>0</i>		<i>11</i>
Plot 3:	<i>0</i>					<i>11</i>
Plot 4:	<i>0</i>					<i>11</i>
Plot 5:	<i>0</i>					
Plot 6:	<i>0</i>					
Plot 7:	<i>0</i>					
Plot 8:	<i>0</i>					
Plot 9:	<i>0</i>					
Plot 10:	<i>0</i>					

Herbarium Specimen Collected: DNA Sample Collected: Plants Removed: *yes* Disposal Method: *hand pulled*

Management Suggestions:

Other Observations:

## Site 8 Leewood South



# NYBG

NEW YORK BOTANICAL GARDEN

Incised Furnewort in Westchester County: Early Detection and Rapid Response

Site: 9 Leewood North

Team: Daniel Atria, Brian Boom, Mark Daniels, Suzanne Nolan Date: 6/9/16

Transect Center (S) N: 40.9713250 W: -73.8150148 ± 0.002M

Transect Center (N) N: 40.9722672 W: -73.8155134 ± 0.005M

Coordinates: WGS84 datum; decimal format: xx.xxxxx°, xxx meters

Canopy Cover: 100%-75% 75%-50% 50%-25% 25%-5% <5%

Dominant Species: white oak ostrya fraxinus americana, sycamore, red oak, greenash, norway spruce, american sycamore, black gum, liriodendron, box elder, spicebush, knottweed, Occumnia virginiana, basil, virginian sidekick, hibiscus, Sclerocarya aspera, viola, canadian horsetail, skunk cabbage, ostrich fern, strawberry, nettle, triple reed, Hydrophyllum, Sium, canadian lotus, A. ovata, bragg, C. acuminata, lily, asclepias, epipactis helleborifolia, g. deers

Landscape Type: Riparian forest

Claret  
begonias, stork, plant  
porcelainberry, helleborus  
ventum viridae

Transect Notes: Found in depression in fieldplain, along foot path. Transect on east side river + west of railroad tracks

Ficaria verna throughout transect

Portion of transect in river  
Footpath location follows transect

Incised Furnewort in Westchester County: Early Detection and Rapid Response

Site: 9 Leewood North

Team: Daniel Atria, Brian Boom, Mark Daniels, Suzanne Nolan Date: 6/9/16

Plot	Number of <i>Corydalis</i> Patches/Plot	Total Patch Area (m <sup>2</sup> )	Subplot Number of Plants (Juvenile)	Subplot Number of Plants (Mature)	Subplot #	Plot Notes
Plot 1:	0	0	0	0	32	Patch positive
Plot 2:	0	0	0	0	N/A	
Plot 3:	1	1cm <sup>2</sup>	0	2	25	total patches: 1 to this date 1cm <sup>2</sup>
Plot 4:	2, 3	12cm <sup>2</sup> + 12cm <sup>2</sup> = 24cm <sup>2</sup>	0	0	45	total patches to this date 45cm <sup>2</sup>
Plot 5:	0	0	0	0	92	
Plot 6:	0	0	0	0	97	edges in water @ west end, (edges in water) <u>total patches to this date 97cm<sup>2</sup></u>
Plot 7:	0	0	12	0	107	1cm <sup>2</sup> patch in the river; subplot directly in footpath <u>total patches to this date 107cm<sup>2</sup></u>
Plot 8:	0	0	0	0	100	2 meters from river; subplot directly in footpath <u>total patches to this date 100cm<sup>2</sup></u>
Plot 9:	0	0	0	0	44	sloped river bank @ 1m <sup>2</sup> (150' from)
Plot 10:	0	0	0	0	42	subplot within path; mature plants @ 1m <sup>2</sup> (150' from)

Herbarium Specimen Collected: \_\_\_\_\_ DNA Sample Collected: \_\_\_\_\_ Plants Removed: \_\_\_\_\_ Disposal Method: Preservation

Management Suggestions:

Other Observations:

## Site 9 Leewood North

# NYBG

NEW YORK BOTANICAL GARDEN

Incised Fumewort in Westchester County: Early Detection and Rapid Response

Site: #10 Garth Woods

Team: Schuler, Booth, Wang, Nolan, DeToers Date: 5-27-16

Plot #	Number of Cystidia Patches/Plot	Total Patch Area (m <sup>2</sup> )	Subplot Number of Plants (Juvenile)	Subplot Number of Plants (Mature)	Subplot #	Plot Notes
Plot 1:	0					
Plot 2:	0					
Plot 3:	0					patchily in woods - 1/4
Plot 4:	0					11 11 11 40%
Plot 5:	0					11 11 11 40%
Plot 6:	0					11 11 11 35%
Plot 7:	0					11 11 11 40%
Plot 8:	0					11 11 11 40%
Plot 9:	0					11 11 11 40%
Plot 10:	0					11 11 11 30%

Herbarium Specimen Collected: DNA Sample Collected: Plants Removed: Disposal Method:

Management Suggestions:

Other Observations:

Incised Fumewort in Westchester County: Early Detection and Rapid Response

Site: #10 Garth Woods

Team: Schuler, Booth, Wang, Nolan, DeToers Date: 5-27-16

Transect Center (S) N: -73.8146945 W: 40.9825833 ± 5 meters  
 Transect Center (N) N: -73.8148 W: 40.9835051 ± 5 meters

Coordinates: WGS84 datum; decimal format; xx.xxxxxx°, xxx meters

Canopy Cover: 100%-75% 75%-50% 50%-25% 25%-5% <5%

Dominant Species: Tulip, Amaryllidaceae, Beech, Sugar Maple, Sycamore, Amaryllidaceae (Tilia),  
 understory with hazel, ~~...~~, Sugar Maple, Eriophorum, Eriophorum  
 ground cover: Eriophorum, Blackberry, Poison Ivy, False Solomon Seal, Sandbar Grass, Teillium  
 Knotweed, Toothwort, (false hellebore - not dominant) Crummock

Landscape Type: Riparian Forest

Transect Notes: Eriophorum present - grass understory (lack of deer)

## Site 10 Garth Woods

# NYBG

NEW YORK BOTANICAL GARDEN

Site 11 Incised Furrow in Westchester County: Early Detection and Rapid Response  
Transect

Site: Scarsdale

Team: Daniel Aiko, Michelle Luebbe, Saida O. Date: 6 June 2016

Transect Center (S) N: 40.99056 W: 73.808927 ±  
Transect Center (N) N: 40.991056 W: 73.808559 ± 10m  
Coordinates: WGS84 datum, decimal format, xx.xxxxxx°, xxx meters  
Canopy Cover: 100%-75% 75%-50% 50%-25% 25%-5% <5%

Dominant Species:  
Sycamore Cottonwood (*Populus deltoides*) Sweet gum  
Spice bush Persimmon (*Diospyros virginiana*)  
Norway maple *Parrotia persiana* Persimmon (*Diospyros virginiana*)  
*Parrotia persiana*

Landscape Type:  
Narrow, recently-restored floodplain w/ walking path (paved) most of plots in restored bank  
Next to impoundment on left (SW) bank planted with various conifers  
Lep. drum didgum sycamore  
Kudzu east of plot B on the  
in woods

Transect Notes:  
slightly elevated area of soil at bridge in nice native woods.  
Transect between path and river

Site 11 Incised Furrow in Westchester County: Early Detection and Rapid Response  
Plot Data

Site: Scarsdale

Team: Daniel Aiko, Michelle Luebbe, Saida O. Date: 6 June 2016

Plot #	Number of Corydalis Patches/Plot	Subplot Total Patch Area (m2)	Subplot Number of Plants (Juvenile)	Subplot Number of Plants (Mature)	Subplot #	Plot Notes
Plot 1:						E in 3-5 in path (1) w 4-5 in river
Plot 2:						E in 4-5 in path w 4 in 9 in river
Plot 3:						E in 4-5 in path, w in 5 in river
Plot 4:						E in 5-4 in path
Plot 5:						E in 5-4 in path
Plot 6:						E in 5-2 path, w in 3-5 in water
Plot 7:						4 5-3 center of path w 2-5 in river
Plot 8:						w in path
Plot 9:						2-4 in path in center and east side of river at SW
Plot 10:						1 3-1 in on path

Herbarium Specimen Collected: DNA Sample Collected: Plants Removed: Disposal Method:

Management Suggestions: 1-101 Amp 1-7 5-5, low 4 w 2-2

Other Observations:

## Site 11 Scarsdale

# NYBG

NEW YORK BOTANICAL GARDEN

Original site 12 Incised Furrow in Westchester County: Early Detection and Rapid Response  
 Site: Ogden Transect

Team: Daniel Atha, Suzanne Nolan Date: 7/10/16

Transect Center (S) N: 40.996747 W: 73.805741 1:30 pm start  
 Transect Center (N) N: 40.997717 W: 73.804702 2 stumps ± 10m

Coordinates: WGS84 datum, decimal format: xx.xxxxxx°, xxx meters

Canopy Cover: 100%~75% 75%~50% 50%~25% 25%~5% <5%

Dominant Species: Norway maple, Ash, Sugar maple, white Oak, ~~red maple~~ black locust, black locust, black locust, black locust, black locust, black locust  
 Shrub: spruce, knotweed, burning bush, japanese honeysuckle, lonicera maackii, viburnum  
 Herbaceous: poison ivy, Virginia creeper, meadow rue, porcupine quill, artemisia alba, mimulus, purple top, yellow, skullcap, common violet, bindweed

Landscape Type: Riparian forest, English ivy, aster, ~~black locust~~, myrica, moss, white thorn

Transect Notes: Transect runs west bank of river. East side in river: sparse understory. West side: 10m wide strip of top of bank at edge of meadow property where heavy meadow occurs; mosses in meadow; ~~myrica~~ more maple stump sprout. South end of transect ~~still~~ begins 10 m north of culvert cut-off from under RR tracks

Site 12 Incised Furrow in Westchester County: Early Detection and Rapid Response  
 Site: Ogden

Team: Daniel Atha, Suzanne Nolan Date: 7/10/16

Plot #	Number of Cordials	Total Patch Area (m <sup>2</sup> )	Subplot	Subplot	Subplot #	Plot Notes
			Number of Plants (Juvenile)	Number of Plants (Mature)		
Plot 1:	<u>0</u>					
Plot 2:	<u>0</u>					
Plot 3:	<u>0</u>					
Plot 4:	<u>0</u>					
Plot 5:	<u>0</u>					
Plot 6:	<u>0</u>					
Plot 7:	<u>0</u>					
Plot 8:	<u>0</u>					
Plot 9:	<u>0</u>					
Plot 10:	<u>0</u>					

Herbarium Specimens Collected: \_\_\_\_\_ DNA Sample Collected: \_\_\_\_\_ Plants Removed: \_\_\_\_\_ Disposal Method: \_\_\_\_\_

Management Suggestions: could investigate esp on west side 2m

Other Observations:

### Site 12 Ogden Road

# NYBG

NEW YORK BOTANICAL GARDEN

Site 13

Incised Furmwort in Westchester County: Early Detection and Rapid Response  
Transect

Site: Greenburgh / Herkstadler

Team: D. Atwa, O. Mangels Date: 6/13/2016

Transect Center (S) N: 41.007970 W: 73.798127 ±  
Transect Center (N) N: 41.00822 W: 73.79721 ±

Coordinates: WGS84 datum; decimal format; xx.xxxxxx°; six meters

Canopy Cover:  100%-75%  75%-50%  50%-25%  25%-5%  <5%

Dominant Species: *Picea canadensis*, *Fagus grandifolia*, *Rumex crispus*, *Hedera helix*, *Eucalyptus*  
*nitida*, *Taxus canadensis*, *Lonicera sp.*, *Asplenium platyneuron*, *Sanguinaria canadensis*, *Celastrus scollarii*,  
*Picea abies*, *Acer spicatum*, *Artemisia vulgaris*, *Panicum sp.*, *Lepidium didymum*, *Epipactis*  
*trichomanes*, *Bidens sp.*, *Oxalis sp.*, *Allium sp.*, *Cypripedium acaule*, *Ligustrum sp.*

*Pteris aquilina*, *Fraxinus americana*, *Parthenocissis*, *Vitis sp.*, *Malva sp.*, *L. moenchii*, *E. phoenicifolius*, *Citrus*  
Landscape Type: *Hemerocallis*, *Eucalyptus fortunei*, *Polygonum orientale*, *Aster sp.*, *Diracium sp.*,  
*Tilia americana*, *Lindera benzoin*, *Polygonum*, *Lupinus*, *Quercus rubra*, *Symplocos*, *Hieracium*,  
*Acer sp.*, *Erythronium*

Transect Notes: Transect W side at 4m to water's edge. Little/no sign of <sup>recent</sup> human disturbance.  
Numerous large Vitis (5cm diameter).

Site 13

Incised Furmwort in Westchester County: Early Detection and Rapid Response  
Plot Data

Site: Greenburgh

Team: D. Atwa / O. Mangels Date: 6/13/16

Plot #	Number of Corymbia Patches/Plot	Total Patch Area (m <sup>2</sup> )	Subplot Number of Plants (Juvenile)	Subplot Number of Plants (Mature)	Subplot #	Plot Notes
Plot 1:	0					
Plot 2:	0					
Plot 3:	0					
Plot 4:	0					
Plot 5:	0					
Plot 6:	0					
Plot 7:	0					
Plot 8:	0					
Plot 9:	0					
Plot 10:	0					

Herbarium Specimen Collected: DNA Sample Collected: Plants Removed: Disposal Method:

Management Suggestions:

Other Observations:

## Site 13 Greenburgh

# NYBG

NEW YORK BOTANICAL GARDEN

Invasive Fumewort in Westchester County: Early Detection and Rapid Response

Site: 14 Hartsdale

Team: Daniel Atha, Suzanne Nolan, Ken Chaya, Saidan Qui, Amanda Kingsley Date: 7/11/14  
3 pm start  
4:10 finish

Transect Center (S) N: 41.013321 W: 73.792519 ± 10m  
Transect Center (N) N: 41.013304 W: 73.791846 ± 10m

Coordinates: WGS84 datum; decimal format; xxxxxxxx, xxx meters

Canopy Cover: 100%-75% 75%-50% 50%-25% 25%-5% <5%

Dominant Species:  
Canopy: Norway maple, shadbark hickory, pinus serotina, red oak, tilia, green ash,  
white oak, sassafras, elmscaping, birch (sweet) white oak  
shrub layer: burning bush, witch hazel, viburnum, multiflora rose, viburnum (unleaved acutobata)  
herbaceous: virginia creeper, euonymus alatus, poison ivy, sassafras, horsetail; virginia jesspe  
ground: dandelion, Solomon's seal, ~~blackberry~~, ~~strawberry~~, ~~blackberry~~, ~~strawberry~~  
formation (very low) white oak

Landscape Type:  
Riparian forest.

Transect Notes: 1-5  
all plots east 5 meters on the path. 6 → 10  
plots behind on both sides by water; west side  
brownier, east side mill spillway

Invasive Fumewort in Westchester County: Early Detection and Rapid Response

Site: 14 Hartsdale

Team: Daniel Atha, Suzanne Nolan, Ken Chaya, Saidan Qui, Amanda Kingsley Date: 7/11/14

plots start @ south

Plot #	Number of Corydalis Patches/Plot	Total Patch Area (m <sup>2</sup> )	Subplot Number of Plants (Juvenile)	Subplot Number of Plants (Mature)	Subplot #	Plot Notes
Plot 1:	0					green ash, Norway maple
Plot 2:	0					garlic mustard; sassafras sapling
Plot 3:	0					dogwood, white oak
Plot 4:	0					euonymus alatus <del>capit</del>
Plot 5:	0					ground ivy, viburnum; dead vine sassafras <del>along</del>
Plot 6:	0					dogwood
Plot 7:						all east side plots all mature: cork oak, sycamore, white oak
Plot 8:						white oak, sassafras, blackberry
Plot 9:						maple leaf miner, white oak
Plot 10:						poplar, blackberry

Herbarium Specimen Collected: DNA Sample Collected: Plants Removed: Disposal Method:

Management Suggestions:

Other Observations:

## Site 14 Hartsdale



# NYBG

NEW YORK BOTANICAL GARDEN

Incised Furrow in Westchester County: Early Detection and Rapid Response  
Transect

Site: 15 White Plains South.

Team: Daniel Atron, Suzanne Nolan, Ken Chaya, Suidan Qi, Amanda Kinsey  
Date: 7/11/14 2:00 start 2 pm end

Transect Center (S) N: 41.016890 W: 73.789353 ± 10m  
Transect Center (N) N: 41.017281 W: 73.788835 ± 10m

Coordinates: WGS84 datum, decimal format: xx.xxxxxx, xxx meters

Canopy Cover: 100%-75% 75%-50% 50%-25% 25%-5% <5%

Dominant Species: canopy: Norway maple; white ash, tulip, sugar maple, red oak, american beech, birch, linden  
Shrub layer: knotweed, *A. canadensis*, *S. angustifolia*, *A. verticillata*, burning bush, berberis, spicebush, rose, viburnum, *A. roseum* (blackberry), sapling  
Herbaceous: *B. filix*, *Aster*, *Prunella*, *Viola*, *Asperula*, *Galium*, *Quercus*, *Conium maculatum*, *Podium*, *Solidago*, *Senecio*, *Thalictrum*, *Cardamine*, *Impatiens*

Landscape Type: *penicillata*, *guttata*, *endlicheri*'s *hirsutum*; common nettle, white nettle, *epipactis*, *gymnomma*, *lucida* (wood nettle), *virginica*, *juncea*  
Riparian forest *juncea* (pan mix) - *Leersia virginica*, *agrostis* *actisimum*

Transect Notes:  
East side 2.5 meters of transect in path  
almost all of east 5 meters in path.

Incised Furrow in Westchester County: Early Detection and Rapid Response

Site: 15 White Plains South.

Team: Daniel Atron, Suzanne Nolan, Ken Chaya, Suidan Qi, Amanda Kinsey  
Date: 7/11/14

Plot #	Plots from South to North		Subplot #	Subplot #	Subplot #	Plot Notes
	Number of Corydalis Patches/Plot	Total Patch Area (m2)				
Plot 1:	0					in 2.5 meters on path
Plot 2:	0					<i>Aster</i> <i>virginica</i> - 2
Plot 3:	0					<i>Viola</i> <i>virginica</i> - 4 <i>Sparganium</i> <i>virginicum</i> <i>Leersia</i> <i>virginica</i> <i>Cardamine</i> <i>virginica</i>
Plot 4:	0					1.5 meters of path on east side of plot, remains
Plot 5:	0					along east side of path in path
Plot 6:	0					east side of transect in path
Plot 7:	0					"
Plot 8:	0					<i>endlicheri</i> 's <i>hirsutum</i> . east side of transect in path
Plot 9:	0					"
Plot 10:	0					"

Herbarium Specimen Collected: DNA Sample Collected: Plants Removed: Disposal Method:

Management Suggestions:

Other Observations:

## Site 15 White Plains South

# NYBG

NEW YORK BOTANICAL GARDEN

16  
Site: White Plains Central  
Inocised Fumewort in Westchester County: Early Detection and Rapid Response  
Transect

Team: Daniel Atria, Suzanne Nolan Date: 7/1/16

Transect Center (S) N: 41.024066 W: 73.777658 ± 10M.  
Transect Center (N) N: 41.029571 W: 73.776593 ± 10 meters

Coordinates: WGS84 datum: decimal format: xxxxxxxx, xxx meters

Canopy Cover: 100%-75% 75%-50% 50%-25% 25%-5% <5%

Dominant Species: Canopy: white oak, catalpa, Norway maple, box elder, a few poison ivy  
understory: Myrica, multiflora rose, Pteridium, Ligustrum, mulberry, Riburnum, sialbaldung  
ground: violet, poison ivy, Canadian horsetail, Glehnia, Virginia creeper, Stone nettle  
deep pedunc, viola serena, white violet - violastris, I. pectinatus, I. frigidum, I. pectinatus

Landscape Type: Riparian Forest  
English holly, yellow birch, sweet gum, tulare poplar, ash

Transect Notes: Some evidence of animal browse - deer? (ignominia) fruits present but no the multiflora rose trunks  
\* leafy pond weed in river next plot 3

16  
Site: White Plains Central  
Inocised Fumewort in Westchester County: Early Detection and Rapid Response  
Plot Data

Team: Daniel Atria, Suzanne Nolan Date: 7/1/16

Plot #	Number of Corydalis Patches/Plot	Total Patch Area (m2)	Subplot Number of Plants (Juvenile)	Subplot Number of Plants (Mature)	Subplot #	Plot Notes
Plot 1:	0					<u>Myrica leaning over the river</u>
Plot 2:	0					
Plot 3:	0					<u>leafy pond weed in river adjacent to grassy bank. 2 meters in water on west side. large multiflora rose trunks</u>
Plot 4:	0					<u>Multiflora rose trunks</u>
Plot 5:	0					<u>Canadian horsetail 2 feet, medium size poison ivy</u>
Plot 6:	0					<u>2 meters in river. 1.5m + yellow wood, elm.</u>
Plot 7:	0					
Plot 8:	0					<u>2.5m by 2m grasses in center of plot. (both crows) catch ash seed line</u>
Plot 9:	0					<u>2 meters in river, Knotweed</u>
Plot 10:						<u>Knotweed, winged fumewort planted</u>

Herbarium Specimen Collected: \_\_\_\_\_ DNA Sample Collected: \_\_\_\_\_ Plants Removed: \_\_\_\_\_ Disposal Method: \_\_\_\_\_

Management Suggestions: \_\_\_\_\_

Other Observations: \_\_\_\_\_

## Site 16 White Plains Central



# NYBG

NEW YORK BOTANICAL GARDEN

Site: #18 Long - 23.22403177  
 Transect end Lat 41.04538883 Long - 23.22492704  
 Incised Furmwort in Westchester County: Early Detection and Rapid Response


Team: Ilsa Jule, Caroly Hutchinson  
 White Plains Cemetery  
 Date: 07/01/16

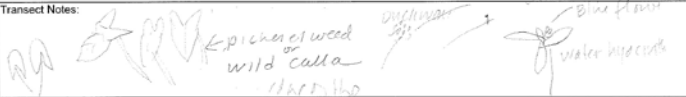
Transect Center (S) N: W: ±  
 Transect Center (N) N: W: ±

Coordinates: WGS84 datum; decimal format: xx.xxxxxx°, xxx meters

Canopy Cover: 100%-75% 75%-50% 50%-25% 25%-5% <5%

Dominant Species: *Concord pine, tulip, butternut trees, poison ivy, Sanguinaria, cherry, wild sweet, roses, fern, poison hemlock, violets, nettles, grasses, oak, water hyacinth, blackberry, aster, maple, ash, beech, oak, picea, cedar*  
*Top 5 plants in our area were:* *knit weed, common, water hyacinth, knotweed, plain-will, water*

Landscape Type: *Flood plain + mowed grass next to dense upland woods along river.*  
*some of area crossing river in hares*  
  
*skunk cabbage?*

Transect Notes:  
  
*Pichostemum, wild calla, knotweed, water hyacinth*

Site: #18 White Plains Cemetery  
 Incised Furmwort in Westchester County: Early Detection and Rapid Response  
 Plot Data

Team: Ilsa Jule, Caroly Hutchinson  
 Date: 07/01/16

Plot #	Number of Corydalis Patches/Plot	Total Patch Area (m <sup>2</sup> )	Subplot		Subplot #	Plot Notes
			Number of Plants (Juvenile)	Number of Plants (Mature)		
Plot 1:	0					
Plot 2:	1	4x4m	4	0		not sure - <i>Cicuta maculata</i> or <i>water hyacinth</i>
Plot 3:	0					
Plot 4:	0					
Plot 5:	0					
Plot 6:	0					
Plot 7:	0					
Plot 8:	0					
Plot 9:	0					
Plot 10:	0					

Herbarium Specimen Collected: DNA Sample Collected: Plants Removed: Disposal Method:

Management Suggestions:

Other Observations:  
*water level low in plot - river bed exposed. Visual detection on both sides seem to indicate absence of corydalis now.*

## Site 18 White Plains Cemetery

# NYBG

NEW YORK BOTANICAL GARDEN

Incised Furrow in Westchester County: Early Detection and Rapid Response  
Transect

Site: 19

Team: Matt Aiello-Lammens, Christine Thomas, Madya Hall Date: 6/22/2016

Transect Center (S) N: 41.05722 W: 73.77248 ± 4  
Transect Center (N) N: 41.05857 W: 73.77264 ± 4

Coordinates: WGS84 datum; decimal format: xx.xxxxxx°; six meters

Canopy Cover: 100%-75% 75%-50% 50%-25% 25%-5% <5%

Dominant Species:

Ash, black?	Grape vine	iron wood
Oak	Multi-flora rose	
box wood	smooth sumac	dog wood
	jewel weed	

Landscape Type: Highly impacted, between river and meadow edge <sup>edge</sup> ~~meadow~~ of bike path

Transect Notes: Exceedingly dense vegetation; Flood plain of the river was very narrow (can walk). Plots 1-5 are likely not flooded on a regular basis.

Incised Furrow in Westchester County: Early Detection and Rapid Response  
Plot Data

Site: 19

Team: Matt Aiello-Lammens, Christine Thomas, Madya Hall Date: 6/22/2016

Plot #	Number of Cordials Patches/Plot	Total Patch Area (m <sup>2</sup> )	Subplot Number of Plants (Juvenile)	Subplot Number of Plants (Mature)	Subplot #	Plot Notes
Plot 1:	0					Densely covered by grape vine
Plot 2:	0					Same as 1
Plot 3:	0					same as 1
Plot 4:	0					Very densely covered in multi-flora rose; sample taken
Plot 5:	0					Similar to plot 4; 100% rose → more thorough sampling
Plot 6:	0					quite thick; box wood; jewel weed
Plot 7:	0					Same as 6
Plot 8:	0					Similar to 6 w/ oak and oak (leafy, immature) <sup>SPIDER</sup> <del>SPIDER</del>
Plot 9:	0					Same as 8
Plot 10:	0					Same as 8

Herbarium Specimen Collected: DNA Sample Collected: Plants Removed: Disposal Method:

Management Suggestions:

Other Observations:

## Site 19 Holmes Road

# NYBG

NEW YORK BOTANICAL GARDEN

Incised Fumewort in Westchester County: Early Detection and Rapid Response  
Transect

Site: 20

Team: Matt Aiello-Lammens, Christina Thomas, Nadya Hall Date: 6/21/2016

Transect Center (S) N: 41.06726 W: 73.77220 ± 4' 3"  
Transect Center (N) N: 41.06818 W: 73.77325 ± 4' 3"

Coordinates: WGS84 datum, decimal format: xx.xxxxxx°, xxx meters

Canopy Cover: 100%-75% **75%-50%** 50%-25% 25%-5% <5%

Dominant Species:

Box Elder ( <i>Acer negundo</i> )	Shrub	Herb
Silver Maple	multi-flora rose	jewel weed
Sugar maple	bottom weed?	Prunella
		wild grape vine
		skunk cabbage

Landscape Type:  
Riparian / wetland / marsh

Transect Notes:  
Down hill behind ball field; plots 1-4 0% cover, plots 5-10 ~100% cover

Incised Fumewort in Westchester County: Early Detection and Rapid Response  
Plot Data

Site: 20

Team: Matt Aiello-Lammens, Christina Thomas, Nadya Hall Date: 6/21/2016

Plot #	Number of Corydalis Patches/Plot	Total Patch Area (m <sup>2</sup> )	Subplot Number of Plants (Juvenile)	Subplot Number of Plants (Mature)	Subplot #	Plot Notes
Plot 1:	0					Same as plot 4
Plot 2:	0					Same as plot 4
Plot 3:	0					Same as plot 4
Plot 4:	0					fully open canopy; <i>Sanguinaria</i> , <i>Skunk cabbage</i> , jewel weed,
Plot 5:	0					largely dominated by multi-flora rose; not seen
Plot 6:	0					Dense skunk cabbage & jewel weed; <i>Aralia</i>
Plot 7:	0					Dense understory
Plot 8:	0					Dense understory
Plot 9:	0					Dense understory
Plot 10:	0					Dense understory

Herbarium Specimen Collected: DNA Sample Collected: Plants Removed: Disposal Method:

Management Suggestions:

Other Observations:

## Site 20 Kensico



# NYBG

NEW YORK BOTANICAL GARDEN

## Appendix D. Informational Flier and Signage at NYBG

### NYBG/125

WANTED: EMERGING INVASIVE  
INCISED FUMEWORT



The latest threat to our gardens, forests and wetlands comes from the invasive plant called Incised Fumewort or Purple Keman (*Corydalis incisa*).

Currently known from a few populations ranging from Washington, DC. to White Plains, New York, Incised Fumewort escapes cultivation, spreading by seed explosively ejected up to nine feet away. The plants form dense stands, carpeting an area within a few years and crowding out other species. Incised Fumewort is highly invasive and has the potential to become another garlic mustard, diminishing biodiversity and altering ecosystem functions. Plants should be pulled immediately, bagged and discarded.

**Identifying features:**

Plants 4 to 20 inches tall, with watery sap. Seedlings germinating late summer and fall, growing through the winter from pale, swollen roots about 1/2 inch long. Plants mature in spring with several stems and fibrous roots. Leaves highly divided, 2-6 inches long and wide, sharply incised. Inflorescences erect, 2-6 inches long. Flowers 10-16 per stalk, 1/2-3/4 inches long, tubular, purple with darker tips (rarely white). Fruits hanging, 1/2 inch long, green, explosively dehiscent. Seeds very small, black. Flowering and fruiting April to June.

This project was contracted by the Lower Hudson Partnership for Regional Invasive Species Management using funds from the Environmental Protection Fund as administered by the New York State Department of Environmental Conservation.

If found, please send photos and location to:  
[datha@nybg.org](mailto:datha@nybg.org)



NEW YORK BOTANICAL GARDEN

Learn more about NYBG anniversary at [nybg.org/125](http://nybg.org/125)

Figure 7. Informational Flier



**Figure 8. Sign on the grounds of The New York Botanical Garden**



## Appendix E. Identification Guide



**Figure 9. First-season plants.**



**Figure 10.** Tuber from first-season plants collected on October 22, 2016 (scale in mm).





**Figure 11. Second-season plants, photographed May 30, 2015.**



**Figure 12.** *Corydalis incisa* flowers, photographed May 30, 2015.





**Figure 13.** *Corydalis incisa* fruit, photographed May 30, 2015.



# NYBG

NEW YORK BOTANICAL GARDEN



**Figure 14. Infestation in Bronx Park, photographed May 15, 2014.**

# NYBG

NEW YORK BOTANICAL GARDEN

## Appendix F. Presentations and Tabling Events

<b>Date</b>	<b># of fliers distributed</b>	<b>Location</b>
April 8, 2016	25	Bronx River Alliance Ecology Team meeting at NYBG
April 10, 2016	75	Grow it Green, Larchmont Community Symposium
April 11, 2016	25	LuEsther T. Mertz Library
April 12, 2016	50	Invasive Species lecture, Orange County Community College
April 14, 2016	25	Hill and Dale Garden Club in Tarrytown, New York
April 27, 2016	100	Gowanus Canal Conservancy Panel Discussion on urban biodiversity and outreach
April 30, 2016	250	The Native Plant Center, Westchester Community College
May 3, 2016	40	Long Island, especially to the Long Island Botanical Society at their meetings
May 10, 2016	50	NYC Parks, Data-Driven Tools for Forest Management, Natural Areas Conservancy, Arsenal North
May 18, 2016	9	iMapInvasives training, NYBG
May 20, 2016		NYNJ Trail Conference Invasives Strike Team
May 21-22, 2016	25	Science Open House, NYBG

# NYBG

NEW YORK BOTANICAL GARDEN

<b>Date</b>	<b># of fliers distributed</b>	<b>Location</b>
June 6, 2016	50	Michelle Luebke, New York City Parks Department
June 7, 2016	pdf	Barry Glick, Sunshine Farms and Garden (probable source)
June 8, 2016	25	Long Island Native Plant Sale, Riverhead Long Island
June 10, 2016	25	Mike Ruggiero, NYBG instructor
June 10, 2016	25	Sally Rynd, Syossett Garden Club and Bailey Arboretum
June 11, 2016	25	Jamaica Bay BioBlitz
June 24, 2016	25	LuEsther T. Mertz Library
June 27, 2016	50	Amanda Kingsley, Stone Barns
July 7, 2016	25	New York New Jersey Harbor and Estuary Program Symposium on the Bronx River, Pace University
July 7, 2016	25	Eric Sanderson, Wildlife Conservation Society
July 8, 2016	50	NYBG Tour Guides for New York State Invasive Species Week 2016
July 11, 2016	25	Damien Ossi, Mid-Atlantic Invasive Plant Council/Mid-Atlantic Early Detection Network
July 2016	25	Larchmont Farmers Market
July 29, 2016	pdf	Steve Young, plantwhacker.com

# NYBG

NEW YORK BOTANICAL GARDEN

<b>Date</b>	<b># of fliers distributed</b>	<b>Location</b>
July 21–24, 2016		Kathryn Peterson-Lambert attended the International Pollinator conference at Penn State University. She picked up a copy of the flier there.
August 18, 2016	50	Kathryn Peterson-Lambert, to botanical community in the Virginia Beach area, including Norfolk Botanic Garden
September 30, 2016	30	Back to School with Go Native U, The Native Plant Center at Westchester Community College, Valhalla, NY
October 14, 2016	30	SER-NE Regional Conference, University of New Hampshire, Durham, NH
October 19, 2016	50	MetroHort October meeting, Central Park Arsenal
November 1-3, 2016	150 and pdf	Jennifer Dean, at the Cornell 2016 Agriculture, Food & Environmental Systems In-Service
November 10, 2016	50	Plants on the Move Symposium, Morton Arboretum, Lisle, IL
November 5,6,12,13, 2016	150	NYBG Fall Forest Weekends, Tabling
November 14, 2016	pdf	Alyssa Siegel-Miles, Mt. Laurel Chapter, wildones.org (affiliated with Connecticut College, New London, UCONN, and the Connecticut Invasive Plant Working Group)
November 14, 2016	50	PRISM and CCE Native Alternatives and Invasive Species Management Training for Gardeners, Teatown Lake Reservation

# NYBG

NEW YORK BOTANICAL GARDEN

<b>Date</b>	<b># of fliers distributed</b>	<b>Location</b>
November 16, 2016	50	PRISM partner meeting, Teatown Lake Reservation
December 1, 2016	50	Bronx River Watershed Summit, Westchester County Center