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This document is the final report by the Ecological Research Institute on its activity in performance of the project "***Designing, testing and analyzing invasive plant surveys to serve PRISM needs: making the Block Buster work for us*****".** The aim of this project was to improve the Blockbuster survey site-selection, field-sampling and data-recording and reporting protocols and associated forms in order to upgrade the surveyor experience, broaden participation, and enable collection of more consistent, extensive, reliable, and scientifically rigorous invasive plant survey data. In designing the revised protocols and associated materials, we embraced the following principles:

First, the Blockbuster survey can and should yield five distinct benefits: (a) determining PRISM-wide distributions of focal species; (b) identifying High Probability Areas (HPAs) as sources and corridors for proliferation and spread of these species; (c) assessing focal species presence and abundance in natural areas, where their impact would be greatest; (d) documenting the absence of these species in potential invasive species prevention zones (ISPZs); and (e) serving as a recruitment, outreach, and educational tool that would increase participation in the LHPRISM. Second, the field-surveying protocol must have a sound scientific basis. Third, the protocols, while scientifically rigorous, need to be such that they can readily be learned and performed by citizen scientists and not be overly burdensome on them. Finally, rather than starting from scratch, we would use the pre-existing Blockbuster framework to the extent that it would be useful.

Our efforts to identify needed areas of improvement in the forms and protocols, actually began prior to the commencement of the contracted work, as one of us (Jonathan Rosenthal) had been involved in efforts to broaden Blockbuster participation in its 2015 inaugural field season, and one of us (Dr. Radka Wildova) had participated in a December 2015 Blockbuster feedback-sharing conference call. Moreover, Wildova and Rosenthal followed this up with phone calls to LHPRISM Coordinator Dr. Linda Rohleder, Nava Tabak of Scenic Hudson, Tom Lewis of Trillium Invasive Species Management, and Anne Christian-Reuter of Cornell Cooperative Extension of Rockland County, to address particular concerns in designing our approach prior to submission of the contract proposal. Then, throughout the duration of the contracted project itself, we engaged in intensive, ongoing consultations with Dr. Rohleder and Ms. Christian-Reuter and to a lesser extent with Jennifer Stengle of Cornell Cooperative Extension of Putnam County in order to ensure that the protocols and forms that we created would be best suited to the volunteers who would be using them. We also consulted repeatedly with Dr. Jennifer Dean and Brent Kinal of the DEC to discuss ways in which the Blockbuster protocols and/or iMapInvasives data management could be designed and/or modified such that they would be most seamlessly compatible with each other.

Redesigning the Blockbuster protocol would in fact consist of redesigning both the site selection protocol and the field sampling protocol. In setting out to do this, we began not only by identifying particular shortcomings of the existing protocols, but also searching the scientific literature and available Internet sources for examples of effective survey methods that would be sufficient to provide the desired information, as described above, and suitable for the scale and

volunteer base that would characterize the Blockbuster. We especially investigated the methods of IPANE (Invasive Plant Atlas of New England), iMapInvasives, and region-wide invasive plant surveys conducted by other PRISMs. This background research convinced us that the Blockbuster is truly unprecedented in its ambition, in that despite relying largely on volunteers, it is meant to be a highly rigorous and consistent survey project that attempts to obtain both presence and *absence* data for a diverse species list over a fairly large region. This uniqueness meant that we would need to be innovative in redesigning its protocols (and associated data forms).

For the site selection protocol, we realized that the existing Blockbuster gridlines would be helpful in enabling surveying effort to be spread across the LHPRISM region, by aiming to have a certain amount of effort allocated to as many blocks as possible rather than allowing effort to be locally concentrated by having multiple surveyors (or multiple survey teams) working within a small, popular area of the PRISM. Additionally, we realized that it would be best for surveyors to survey three basic types of sites (a minimum of one each) within their block, as the data from each type would yield different, important information, and the comparison among them would yield additional, important information (additionally, the data from these three types of sites could be supplemented by opportunistic data, as described below). The three basic types of sites were (1) HPAs; (2) natural areas (NAs); and (3) natural area parking lots/trailheads.

HPAs were defined as sites where (presumably) focal species would be most likely to occur, often although not always because they have been highly disturbed by human activity. Thus, they comprised sites such as roadsides, utility right-of-ways, lot edges, abandoned fields, Hudson River frontage, and unmaintained weedy areas adjacent to commercial or residential properties. Surveying these sites, we reasoned would be important because since they would be areas where the focal species would first occur in a block, both the presence and absence of the species there would be especially reflective of gross regional distributions. Additionally, these sites would likely serve as sources and corridors for emerging species, and if so, could be subjected to appropriate management responses. Because volunteer surveyors would likely know the locations of HPAs within their blocks, our protocol calls for the surveyors to choose these sites themselves, based on their own local knowledge.

In choosing the natural Natural Areas, surveyors were instructed to choose the “most natural” (i.e., least disturbed) area within their block, which, depending upon the degree of development and urbanization within the block, is not necessarily pristine wilderness. Nevertheless, this approach should reveal the extent to which focal species have invaded the areas of greatest conservation concern within each block, providing information needed for on-site management responses and also indicating the ability of the focal species to penetrate natural areas.

The natural area parking lot/trailhead type of site represented the third type of site, but was always tightly associated with the natural area site within the block as it would consist of the parking lot/trail area for the surveyed natural area (or at least the parking lot/trailhead of the portion of the natural area surveyed, if there were multiple parking lots/trailheads for the NA). The reasons for surveying the parking lot/trailhead were: (1) to reveal threats “on the doorstep” of the NA that had not yet penetrated the natural area itself; and (2) to enable comparison of the parking lot/trailhead to the interior of the NA, which might help reveal biotic resistance of the NA to invasion by particular focal species.

For the actual field surveying, we decided that it would be most efficient for sampling to consist not of collecting data at random or regular points (as species occurrences could be located between them), but instead to use a transect approach, and also to encourage volunteers to familiarize themselves with the sites and where invasive species are located on them (this focused approach mirrored that of IPANE). Because we wanted the sampling to be sufficient to capture the representation of focal species at each type of site, we did transect sampling at multiple sites of each type, constructing species accumulation curves that would indicate how long the transect would need to be to detect all the focal species present there. However, because many of the 27 species on the focal species list are emergent, and thus not widely occurring throughout the PRISM (and therefore unlikely to be at many of the sites), we chose to make these tests more sensitive and robust by also including 14 additional NY listed invasive plant species (see Appendix 1 in attached file).

We ended up doing test surveys at 17 sites (5 HPAs; 6 NAs; and 6 natural area parking lots/trailheads)
in 10 blocks (see Figs. 2-5 in attached file). These showed that a transect length of 300 meters was sufficient to capture the invasive plant species representation (see Fig. 6 in attached file). Nevertheless, just because potentially some sites (especially if of greater habitat diversity or if having invasion corridors intersecting with the transect at some point along it) might not plateau in invasive species diversity until a greater distance is reached, we added 100 m to the transect length for the actual volunteer survey protocol so that the transect length would typically be a total length of 400 m, and also specified that if new species were encountered in the final 100 m segment, then another 100 m should be surveyed, and so forth. In addition to enabling us to refine the field-survey techniques, the data we collected in our field tests were also largely in accord with patterns that we had anticipated – namely that HPAs would have the highest invasive plant diversity, with natural-area trailheads/parking lots having fewer species that represented a subset of the HPA species (Fig. 8) , and natural area invasive species diversity in turn being smaller than natural-area trailheads/parking lot invasive species diversity and consisting of a subset of this group (Fig. 7); moreover, that natural species accumulation curves would asymptote over a rather short distance from the trailhead/parking lot. Together, the admittedly small data set suggests that HPAs are the best places to find the focal species, that they to some extent spread to the trailheads/parking lots, and then due to biotic resistance and/or time lags, the focal species are less well-represented within the natural areas themselves, and attenuate over the distance from these entry points (trailheads/parking lots). If, when the much larger dataset from the Blockbuster itself is analyzed, these patterns are borne out, they will have implications for allocation of future surveying and management allocation for the focal species.

In order to simplify data collection, we designed the protocol such that species occurrence would be recorded in terms of each 100-meter segment of the transect, with abundance of each focal species being recorded for each segment using categorical variables. However, for the emergent focal species (i.e., in Species Group 2 on the forms), more particular location data would need to be recorded, as specified on the data forms' instructions. The different treatment for the emergent vs. the other (Species Group 1 on the forms) focal species was decided upon because the former would likely trigger management responses that would require validating and locating the individual plants at the site whereas the latter are already typically widely abundant, with recording detailed information on each occurrence not only unnecessary but also unduly burdensome upon the surveyors. In order to be able to validate the surveyors'

identification abilities regarding the emerging species, surveyors were directed to supply a labeled photograph of their first encounter with each Group 2 species during the 2016 Blockbuster.

In addition to the focal species, space was provided on each form for recording other invasive plant species found. However, because volunteers were not to receive formalized training in identifying non-focal species, presence/abundance data, but not absence data regarding these species would be used.

Because it is possible that some species of invasive plants could be overlooked in a block if they do not occur within the HPA, NA or natural area trailhead/parking lot, we also created Opportunistic Data forms, to be used to record presence/abundance of species not found at these formal survey sites within a block, but observed elsewhere within it. Thus, we created a total of four data forms (see Forms and Instructions file, attached): HPA Data form, Natural Area Trail Data form, Natural Area Parking Lot/Trailhead Data form, and Opportunistic Observation Data form. All had brief instructions included on them.

In order to support eventual analysis (not part of the contracted project) that would reveal ecological correlates of invasion, the relevant forms also call for description, in terms of categorical variables, of the sites and/or transect segments regarding their habitat, other features, and the transects themselves (e.g., road, path, etc.) as shown on the attached forms/instructions.

An important aspect of the field-surveying protocol design was determining how location data (i.e., transect routes, and plant locations) would be recorded. After searching for and then field-testing various different field surveying and hiking/exercise apps, we chose Avenza Maps (formerly known as PDF maps), which can be used with both Android and iPhones for recording transect routes, plant locations and waypoints, as well as associating photos with locations.

As mentioned above, a crucial aspect of our work on this project was our ongoing, frequent collaboration and communication with Coordinator Rohleder and with Cornell Cooperative Extension. This included a field-test of the forms and protocol at Schunemunk Mountain State Park , at which Wildova and Rosenthal of ERI were accompanied by Anne Christian-Reuter and two of her interns from Cornell Cooperative Extension of Rockland County. On this occasion, we were able to assess how easily the forms and protocols could be learned and used by people who were not directly involved in their development. Based upon this experience, the forms and protocols were revised. They underwent several further iterations of revision to address issues noticed by us and/or raised by Coordinator Rohleder and/or Ms. Christian-Reuter or Ms. Stengle of CCE during our frequent consultations. This process yielded the final versions of the forms as well as an overview instructional sheet that we produced; all of these were made available to Coordinator Rohleder and to CCE before the beginning of the 2016 Blockbuster training sessions, for use in them. Additionally, above and beyond our contractual obligations, Rosenthal of ERI wrote answers to FAQs posed by volunteer surveyors after the Blockbuster had commenced; these were posted on the relevant HPRISM web page (http://www.lhprism.org/content/bbs2016-faq). For a flowchart of the overall process that we employed in generating the protocols and forms, please see Fig. 1 in the attached file.

The next steps that we believe need to be taken consist of continuing the Blockbuster and necessary support (in terms of outreach, training, and coordination) to cover additional blocks (to eventually cover the entire LHPRISM region), doing some data validation and also examination of volunteer and trainer feedback to tweak the training, protocol, and forms as needed, and most importantly analyzing the already available data (now from ca. 70 blocks) both to detect important patterns that can help not only in targeting management and further EDRR effort, but also in revealing any additional ways in which the site selection and/or field surveying protocols should be modified to address any informational or inferential gaps.

We have attached the following supplementary materials:
1) A file comprising figures that include a schematic diagram of the process used to generate the protocols and forms, a map showing the Blockbuster grid and the particular blocks within it in which we did field testing, aerial images of the different types of sites in which we did field-testing in both urban and rural settings, graphic presentations of the results of field tests (including species-accumulation curves) and an appendix listing all the invasive plant species for which we searched when conducting our field testing; and
2) A file comprising all four data forms as well as the overview instructional sheet.

Figure 1. Flowchart of protocol development process

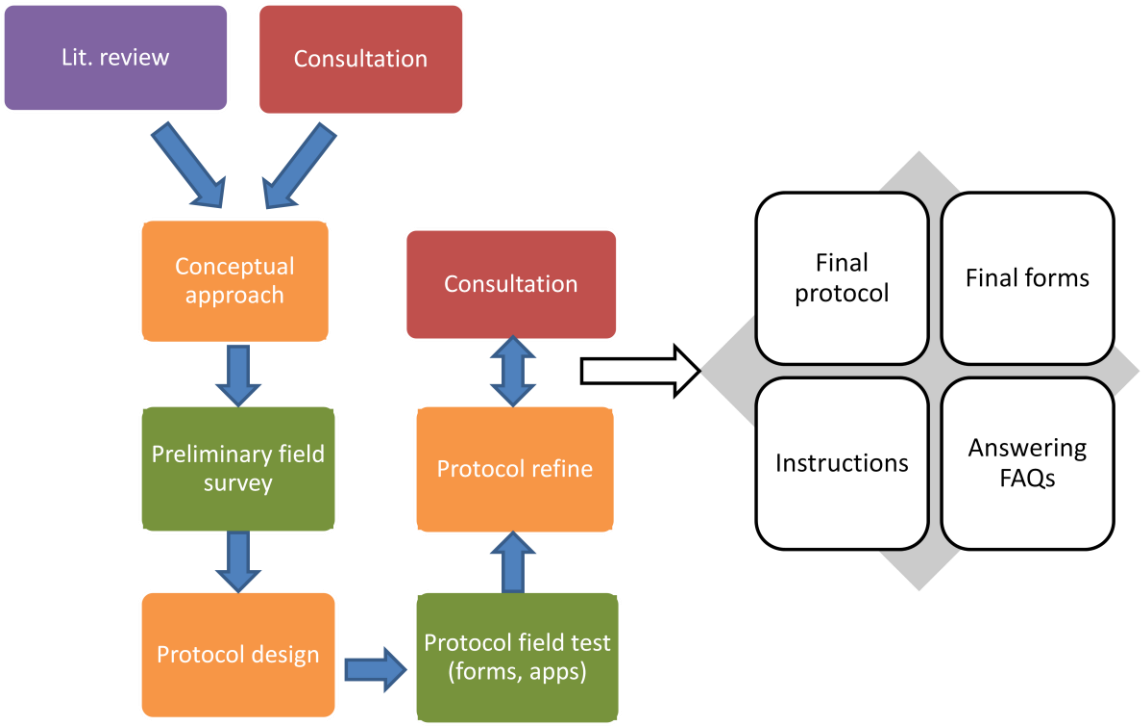


Figure 2. Black grid represents LH PRISM blocks. Ten blocks marked in yellow were used to develop and test the survey protocol. Aerial images show examples of blocks in A) urban landscape and B) undeveloped landscape.

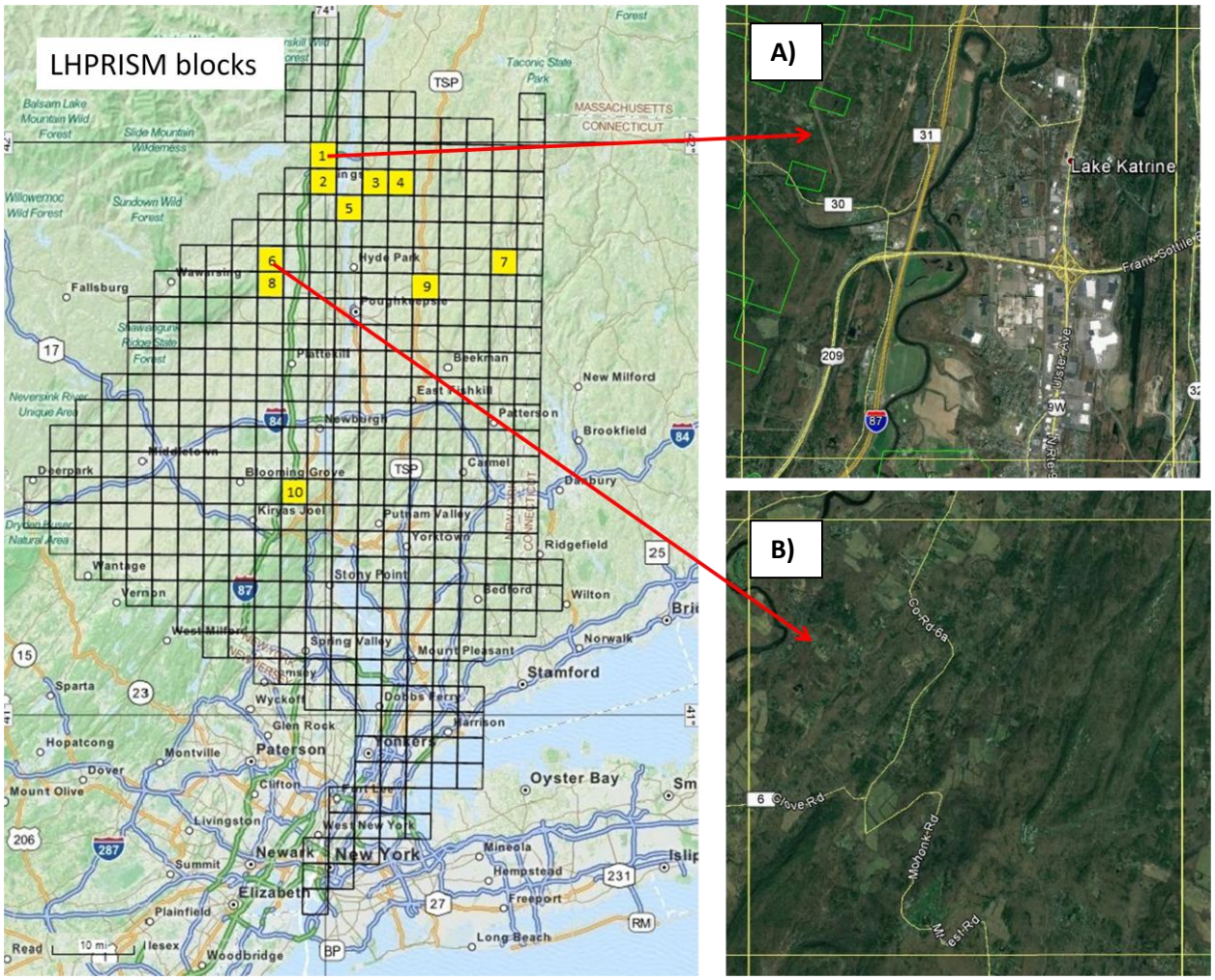


Figure 3. Aerial view of a block in A) an urban landscape, and B) an undeveloped landscape. Red arrows point at a natural area and high probability area selected in each of the blocks.

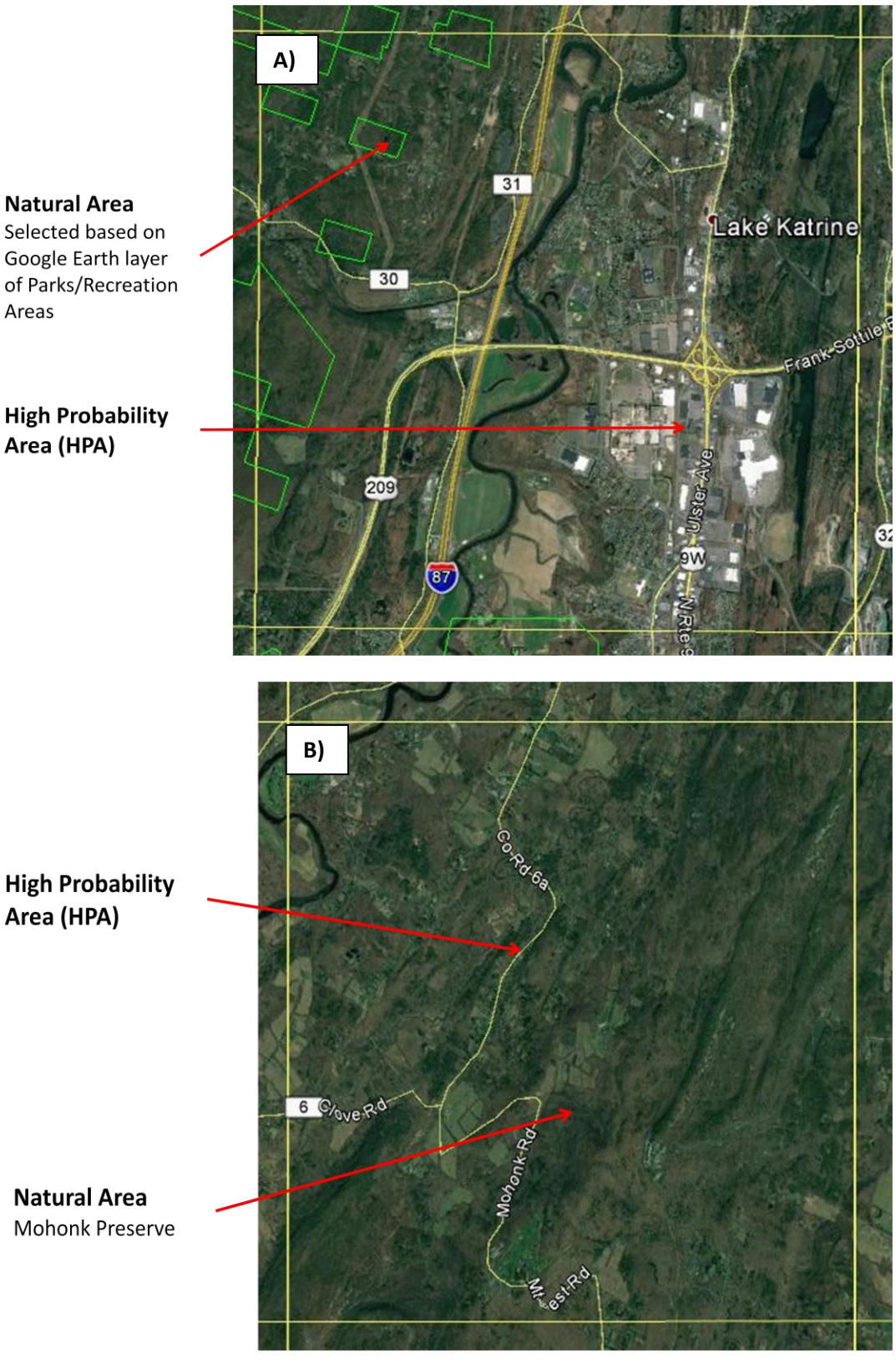


Figure 4. Arial view of a high probability area in an urban landscape. This site comprises shopping malls and a freight railway line. Red line shows route of transect we took to develop species accumulation curves. First, we walked on the periphery of a small green lot and then walked along a strip of vegetation between a road and rail road. The yellow marks delineate the first 100 m, 200 m and 300 m of the route taken.

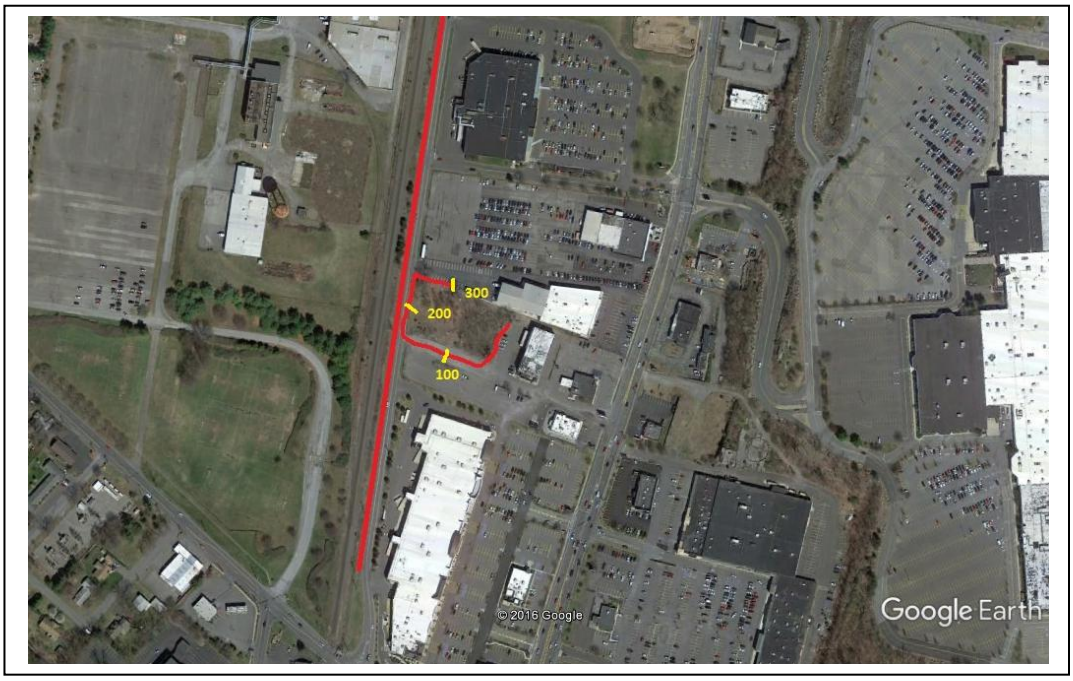


Figure 5. Arial view of a natural area in an urban landscape. Blue line shows the path that delineated the natural area parking lot and the red line shows the natural area trail we took. Yellow marks delineate 100 m segments.

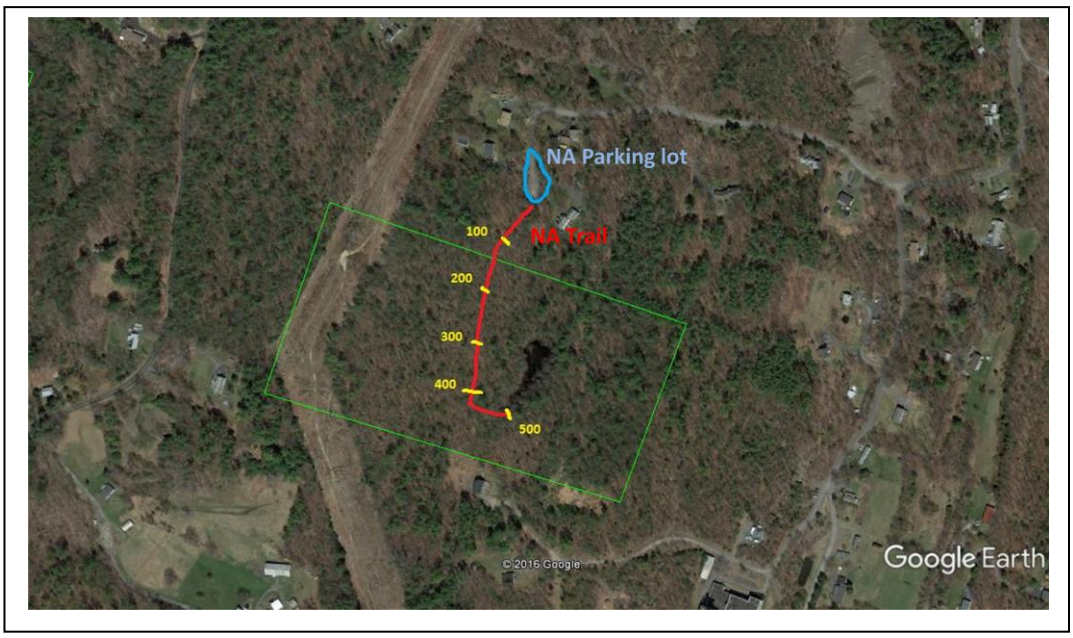
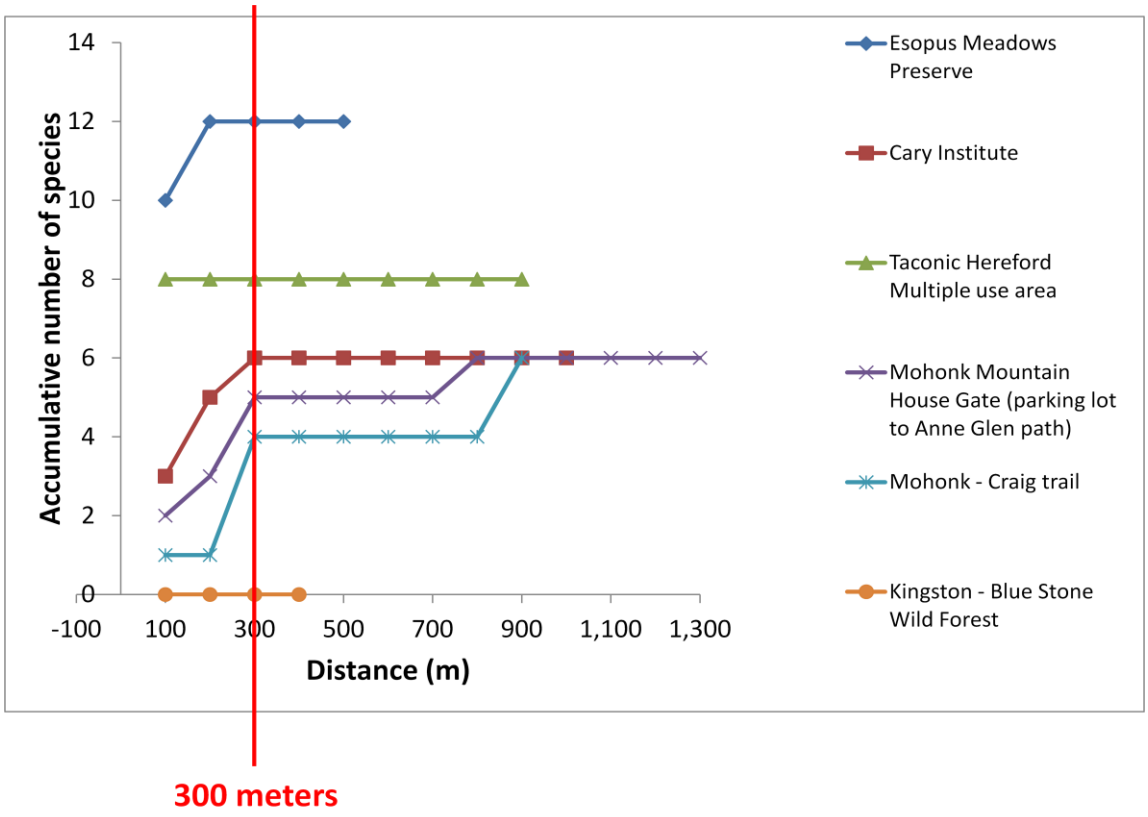


Figure 6. Species accumulation curves along routes in A) Natural Areas and B) High Probability Areas. Red line shows distance in meters at which most species accumulation curves leveled off.

A)



B)

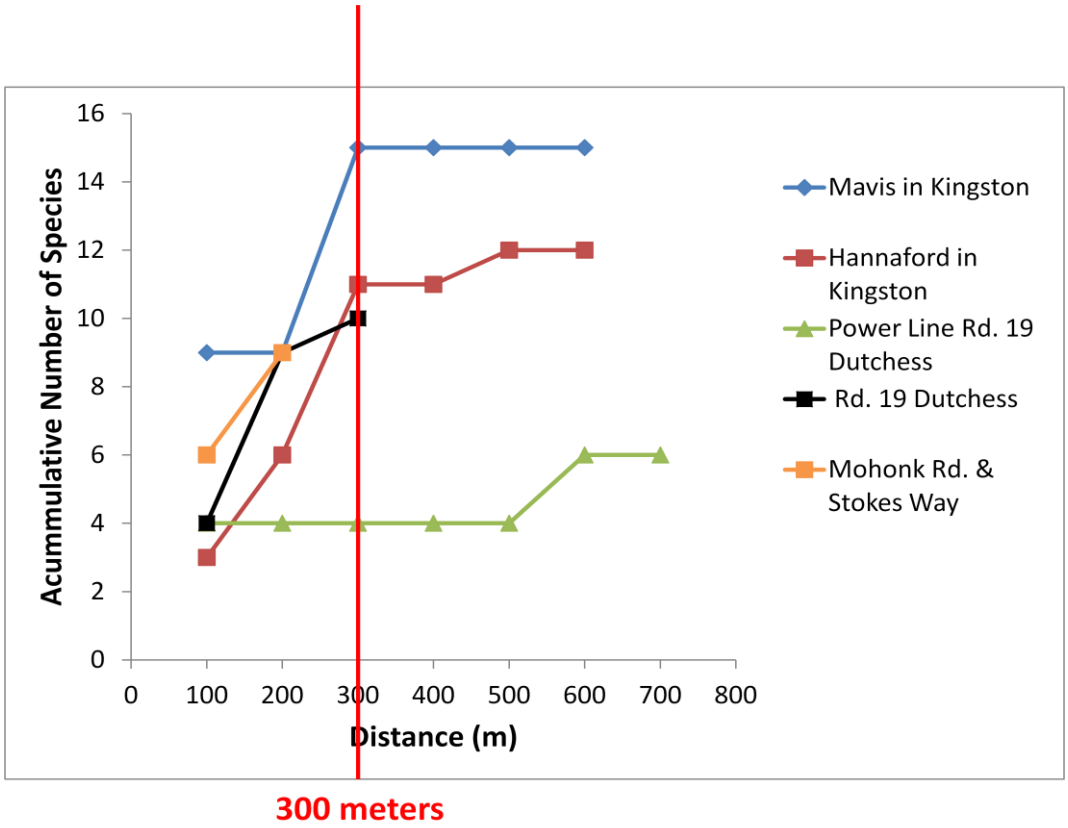


Figure 7. Comparison of numbers of invasive species detected at the Natural Area Trails vs. Natural Area Parking Lots/Trailheads.

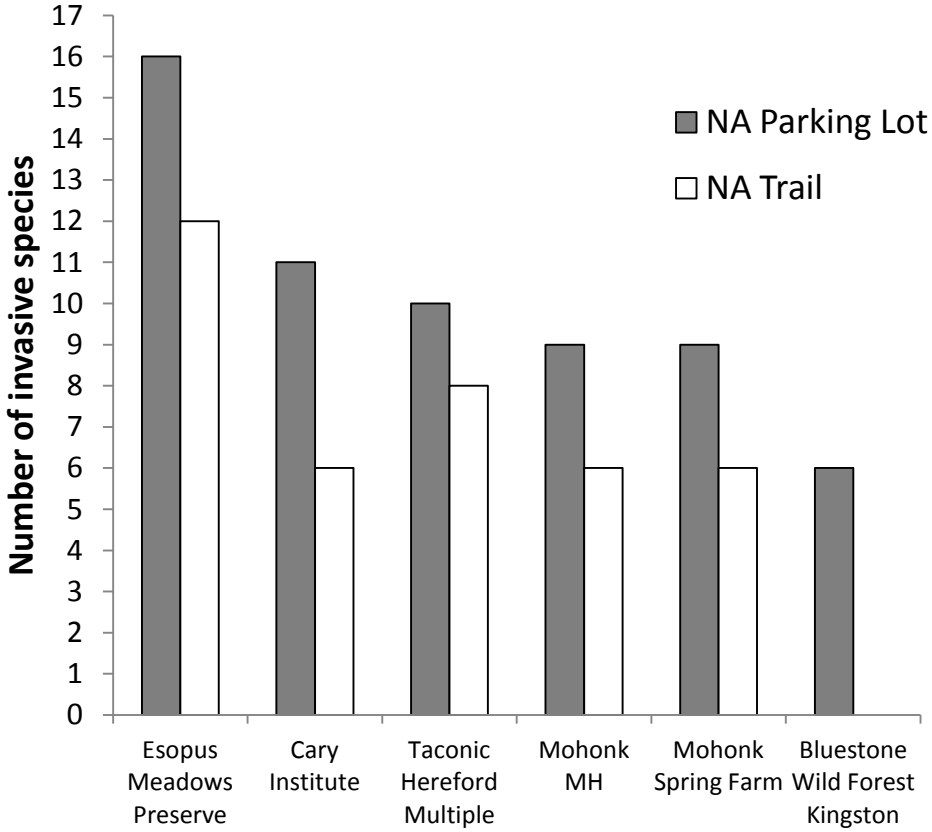


Figure 8. Number of invasive species detected in three blocks showing comparison among High Probability area, Natural Area trail and Natural Area Trailhead/Parking Lot in each block.

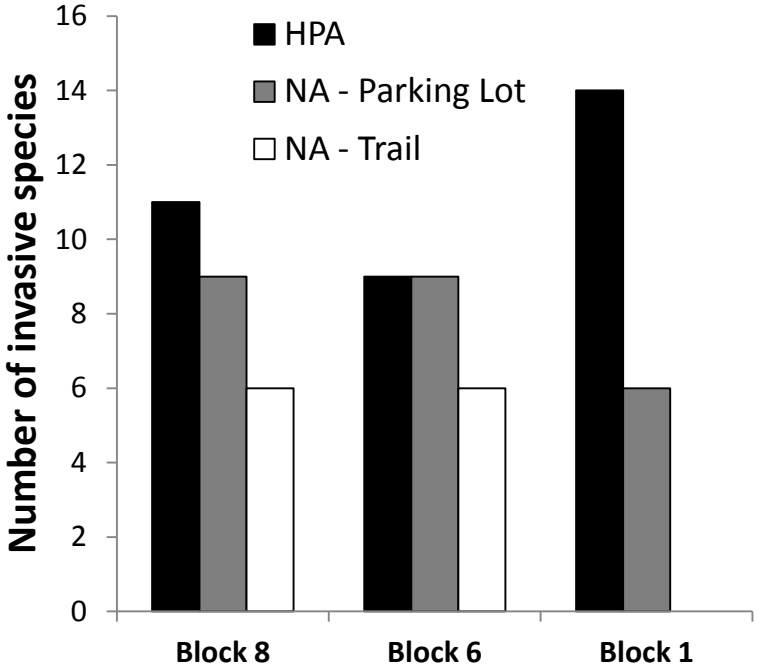
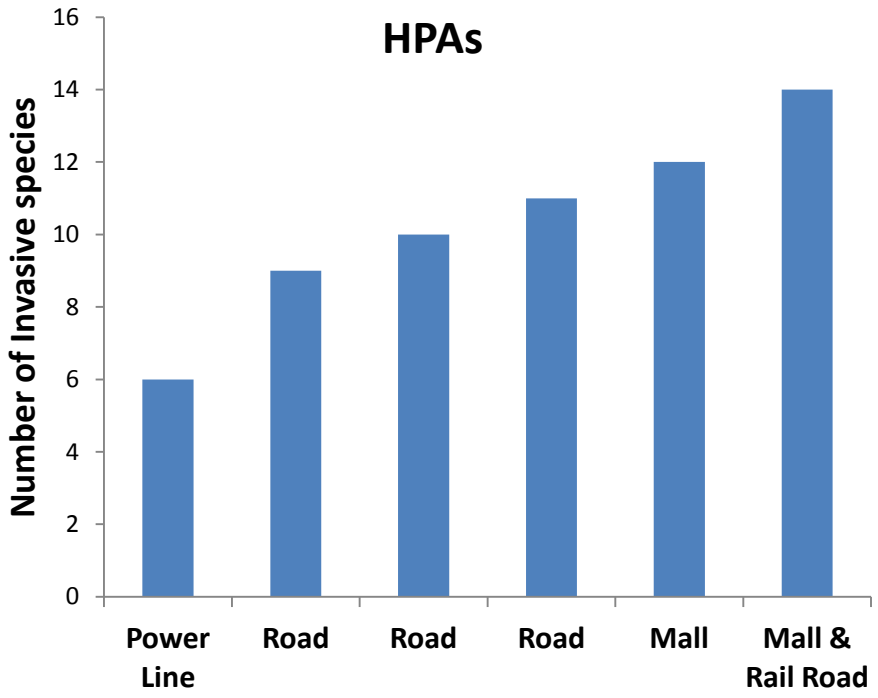


Figure 9. Number of invasive species detected in different types of High Probability Areas. Note: high probability areas showed in this figure were in different blocks.



Appendix 1. List of 41 NY listed invasive species that we used in our survey to identify species accumulation curves. 27 terrestrial focal species of LH PRISM Blockbuster survey are marked.

	Scientific Name	Common Name	LH Category
	Acer platanoides	Norway Maple	Widespread
*	*Actinidia arguta*	hardy kiwi	Threat
*	*Aegopodium podagraria*	Bishop's Goutweed	Emerging
*	*Ailanthus altissima*	Tree-of-heaven	Widespread
	Alliaria petiolata	Garlic Mustard	Widespread
*	*Alnus glutinosa*	European Alder	Emerging
	Ampelopsis brevipedunculata	Porcelain Berry	Established
*	*Aralia elata*	Japanese Angelica Tree	Established
	Artemisia vulgaris	Mugwort	Widespread, Underreported
*	*Arthraxon hispidus*	Small Carpgrass	Emerging
*	*Berberis thunbergii*	Japanese Barberry	Widespread
	Berberis vulgaris	Common Barberry	Emerging
*	*Celastrus orbiculatus*	Oriental Bittersweet	Widespread
	Centaurea stoebe	Spotted Knapweed	Established, Underreported
	Cirsium arvense	Canada Thistle	Emerging, Underreported
*	*Cynanchum louiseae*	Black Swallow-wort	Established
*	*Cytisus scoparius*	Scotch broom	Emerging
	Elaeagnus umbellata	Autumn Olive	Widespread
*	*Euonymus alatus*	Burning Bush	Widespread
*	*Humulus japonicus*	Japanese Hops	Emerging
	introduced Lonicera sp.		Widespread
*	*Iris pseudacorus*	Yellow Iris	Emerging
*	*Lespedeza cuneata*	Chinese Lespedeza	Threat
	Ligustrium obtusifolium	Border Privet	Emerging, Underreported
	Lythrum salicaria	Purple Loosestrife	Widespread
*	*Microstegium vimineum*	Japanese Stilt Grass	Widespread
*	*Miscanthus sinensis*	Chinese Silver Grass	Emerging, Underreported
*	*Pastinaca sativa*	wild parsnip	Widespread
*	*Persicaria perfoliata*	Mile-a-minute Weed	Established
*	*Phellodendron amurense*	Amur Cork Tree	Emerging
*	*Photinia villosa*	Oriental Photinia	Threat
	Phragmites australis	Common Reed Grass	Widespread, Underreported
	Pyrus calleryana	Bradford Pear	Emerging, Under-reported
*	*Pueraria montana*	Kudzu	Emerging
	Reynoutria sp.		
*	*Rhamnus cathartica*	Common Buckthorn	Widespread, Underreported
*	*Rhodotypos scandens*	black jetbead	Emerging
*	*Rosa multiflora*	Multiflora Rose	Widespread
*	*Rubus phoenicolasius*	Wineberry	Widespread
*	*Viburnum dilatatum*	linden viburnum	Emerging
*	*Viburnum sieboldii*	Siebold's viburnum	Emerging

2016 LOWER HUDSON PRISM BLOCKBUSTER SURVEY OVERVIEW

Welcome to the 2016 Lower Hudson PRISM Blockbuster Survey –thank you for your participation in it! This year, the Blockbuster is focusing on two kinds of sites within our PRISM region: **natural areas** and **High Probability Areas (HPAs)**. Whereas natural areas represent what their name implies (sites that largely comprise natural, relatively undisturbed habitat), HPAs represent areas that are particularly likely to host invasives, often although not always because they have been disturbed by human activity.

It is crucial to survey HPAs for invasive plants because they are places where such species are especially likely to appear first within a survey block, and will thus give us a great deal of information about how widely spread the focal species are within our PRISM region. Surveying natural areas is also important, because these are the places that are of higher conservation priority and where incursions of invasive plants would have the greatest impacts on native biodiversity. By comparing results of surveys of natural areas and HPAs from the same blocks, we can assess the degree to which invasive species found in the HPAs have reached and penetrated the natural areas. Also, because the HPA and natural area surveys will not necessarily reveal every focal invasive species occurring with each block, we are supplementing the formal survey with a procedure for collecting opportunistic data recording (see below), which will enable reporting sightings of focal species that would otherwise go overlooked and unreported.

Survey site selection and data collection:
Natural areas. – Please make sure to select a natural area that you have permission to enter. Your formal survey will consist of two parts: 1) a survey of the parking lot/trailhead area; and 2) a survey along a trail within the natural area itself. We are employing this two-part approach because it is likely that some invasive species will have established themselves in the disturbed area comprising the parking lot and trailhead, but these species may have penetrated the interior of the natural area only to a limited extent.

For the parking lot/trailhead survey, you will go along the perimeter of the lot and trailhead area, using your GPS unit or cell phone (with the appropriate app) to record your route, measure your distance as you proceed, and record locations of certain species (those listed as Group 2 Species on the forms), while manually recording other data on the appropriate form. If the perimeter of this area is 400 meters or less, please make sure to survey all of it in 100-meter segments. If it is more than 400 meters, you will need to survey the first 400 meters, and if in the last 100-meter segment you encounter new focal species, you should survey an additional 100 meters. After you are done with the parking lot/trailhead area, you should proceed along the trail itself, surveying for 400 meters in 100 meter segments (using the Natural Area Trail Form to record data). If you find species in the last 100 meters that you had not found along the previous 300 meters of trail, you should survey an additional 100 meters along the trail.

Please note that you do not need to attempt to survey the entirety of a large natural area or even the full extent of its trails. Rather, because your GPS unit or cell phone will be tracking your route, your data will be used just to characterize the area that you actually surveyed. However, if you know of habitat types (especially clearings or wetlands) that occur within the natural area, but that would not be sampled along the trail portion you are formally surveying, we encourage you to go to such sites and use the Opportunistic Observation Data Form to document any occurrences of any focal species found there that were not found during your formal survey of the natural area.

HPAs.- Typically, these are areas that have been disturbed by human activity and that are also not being managed. Weedy edges of shopping center parking lots and roadsides are two types of HPAs that are especially heavily invaded in our area, and tend to have high diversities of invasive species. In urban areas, abandoned lots can be quite productive. In rural areas, abandoned farmland can be heavily invaded. Utility right of ways can, in some settings, also serve as invasion corridors. Other sites that can be HPAs include river frontage and wetland edges, as they are open areas that can be easily colonized by invasive plants. This list is not meant to be exhaustive, but only to provide examples of some types of sites that can be HPAs. Sites that border a range of habitats (such as a roadside bordering residential areas and unmanaged fields or a weedy parking lot edge alongside field and forest remnants) can be especially promising, as can disturbed areas that are connected to multiple possible invasion corridors (e.g., roads, railroad tracks and utility right of ways).

In any case, make sure to survey safely; e.g., do not survey on or immediately adjacent to an active railroad track or on a roadside where you will not be safe from vehicular traffic. As in the case with natural areas, make sure to choose a site for which you would have sufficient access to survey it (this can include, for example, looking at the vegetation in an abandoned lot through a surrounding fence).

As will be described to you in your training session, you should survey the HPA for 400 meters in 100-meter segments (using the HPA Data Form and your GPS unit or cellphone). If you detect species in the last 100 meters that you had not detected along the previous 300 meters, you should survey an additional 100 meters of the HPA.

Species lists:
You will note that each of the data recording forms lists two groups of species. Group 1 consists of species that are known to be widely established throughout our PRISM region. Group 2 comprises species that have only begun to establish themselves in our region or are threatening to invade from adjacent areas. Based on this distinction between the two groups of species, the data-collection and documentation procedures differ between them, with greater requirements for Group 2, as will be described in your training session.

Opportunistic observations :
As noted above, the Opportunistic Observation Forms are to be used to record information on focal species that would otherwise go unreported in your block. You can use these forms not only for such sightings from natural area locations that you are not formally surveying, but also to record those from anywhere in your block where otherwise unreported species appear. For example, if you have completed the HPA and natural area surveys for your block without recording wild parsnip in either of them, and then find this species established along a roadside in your block, you should use the this form to record the relevant information for this occurrence (and a GPS unit or cellphone to obtain the geospatial location data).

Thanks again:
By participating in the 2016 LHPRISM Blockbuster Survey, you'll be making an important contribution to the knowledge and understanding of invasive plants in our region, which is greatly appreciated. We hope that you find this an enjoyable and rewarding experience.

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.

HPA (High Probability Area) Data Form

Segment 1 (should end at 100 m, if not, indicate ended at _____m)

HPA code(s)	Adjacent habitat code(s)	Lat/Long (start point)	P(W) #
		Lat/Long (end point)	**P(W) #**

Species group 1	Abundance
burning bush	
common buckthorn	
Japanese barberry	
Japanese stilt grass	
multiflora rose	
oriental bittersweet	
tree-of-heaven	
wild parsnip	
wineberry	
yellow iris	

P(W) # – *Enter placemark number from PDFMaps phone app or waypoint number from GPS unit*

Ph – *Make a check mark if you take a picture*

Ph	Species group 2	Abundance	Lat/Long	P(W) #
	Amur cork tree			
	bishop's goutweed			
	black jetbead			
	black swallowwort			
	Chinese Lespedeza			
	Chinese silver grass			
	European alder			
	hardy kiwi			
	Japanese angelica tree			
	Japanese hops			
	kudzu			
	linden viburnum			
	mile-a-minute weed			
	oriental Photinia			
	Scotch broom			
	Siebold's viburnum			
	small carpetgrass			

Other invasives	Abundance	Other invasives	Abundance

Segment 2 (should end at 200 m, if not, indicate ended at ____ m)

HPA code(s)	Adjacent habitat code(s)		
		Lat/Long (end point)	**P(W) #**

Species group 1	Abundance
burning bush	
common buckthorn	
Japanese barberry	
Japanese stilt grass	
multiflora rose	
oriental bittersweet	
tree-of-heaven	
wild parsnip	
wineberry	
yellow iris	

P(W) # – *Enter placemark number from PDFMaps phone app or waypoint number from GPS unit*

Ph – *Make a check mark if you take a picture*

Ph	Species group 2	Abundance	Lat/Long	P(W) #
	Amur cork tree			
	bishop's goutweed			
	black jetbead			
	black swallowwort			
	Chinese Lespedeza			
	Chinese silver grass			
	European alder			
	hardy kiwi			
	Japanese angelica tree			
	Japanese hops			
	kudzu			
	linden viburnum			
	mile-a-minute weed			
	oriental Photinia			
	Scotch broom			
	Siebold's viburnum			
	small carpetgrass			

Other invasives	Abundance	Other invasives	Abundance

Segment 3 (should end at 300 m, if not, indicate ended at ____ m)

HPA code(s)	Adjacent habitat code(s)		
		Lat/Long (end point)	**P(W) #**

Species group 1	Abundance
burning bush	
common buckthorn	
Japanese barberry	
Japanese stilt grass	
multiflora rose	
oriental bittersweet	
tree-of-heaven	
wild parsnip	
wineberry	
yellow iris	

P(W) # – *Enter placemark number from PDFMaps phone app or waypoint number from GPS unit*

Ph – *Make a check mark if you take a picture*

Ph	Species group 2	Abundance	Lat/Long	P(W) #
	Amur cork tree			
	bishop's goutweed			
	black jetbead			
	black swallowwort			
	Chinese Lespedeza			
	Chinese silver grass			
	European alder			
	hardy kiwi			
	Japanese angelica tree			
	Japanese hops			
	kudzu			
	linden viburnum			
	mile-a-minute weed			
	oriental Photinia			
	Scotch broom			
	Siebold's viburnum			
	small carpetgrass			

Other invasives	Abundance	Other invasives	Abundance

Segment 4 (should end at 400 m, if not, indicate ended at ____ m)			
HPA code(s)	**Adjacent habitat code(s)**		
		Lat/Long (end point)	**P(W) #**

Species group 1	**Abundance**
burning bush	
common buckthorn	
Japanese barberry	
Japanese stilt grass	
multiflora rose	
oriental bittersweet	
tree-of-heaven	
wild parsnip	
wineberry	
yellow iris	

P(W) # – *Enter placemark number from PDFMaps phone app or waypoint number from GPS unit*

Ph – *Make a check mark if you take a picture*

ph	**Species group 2**	**Abundance**	**Lat/Long**	**P(W) #**
	Amur cork tree			
	bishop's goutweed			
	black jetbead			
	black swallowwort			
	Chinese Lespedeza			
	Chinese silver grass			
	European alder			
	hardy kiwi			
	Japanese angelica tree			
	Japanese hops			
	kudzu			
	linden viburnum			
	mile-a-minute weed			
	oriental Photinia			
	Scotch broom			
	Siebold's viburnum			
	small carpetgrass			

Other invasives	**Abundance**	**Other invasives**	**Abundance**

Comments:

Reminders:

1. Each Species Group 2 species found needs to be photographed only once by each surveyor during the 2016 Blockbuster. Species Group 1 species do not need to be photographed. However, you should submit a photo for any potential focal plant for which you're unsure of the ID.
2. When taking a photo include the cover page of this form in your plant photo
3. The minimum number of segments to be surveyed is 4 (total of 400 meters), which can be done, for example along the edge of a mall parking lot. However, if you find new species in segment 4, continue to survey for an additional 100 meter segment. In this case, include any additional segment(s) on a second data form, marking it as "Part 2" of the HPA survey.
4. Latitude and longitude need to be entered on the form only for the **first individual of each Group 2 species that you find within each segment**.

Helpful hints:

- You can put tick marks next to species names to help you assign abundance codes.
- 100 meters equals 0.1 km and is about 300 ft.

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.

LHPRISM 2016 Blockbuster Survey

HPA Data Form

Block Code: _____

Site Name: _____

Date: _____

Surveyor(s): _____

Key to HPA Codes (**use as many as apply**):
Roadside (RS)
Parking lot (PL)
Abandoned lot (AL)
Abandoned agricultural land (AA)
Area adjacent to railroad tracks (RR)
Utility right of way (UT)
Other: [*Describe*]

Key to Adjacent Habitat Codes (**use as many as apply**):
Field/meadow (FM)
Woodland (WD)
Shrubland (SH)
Wetland (WT)
Infrastructure/bldgs. (IF)

Key to Abundance Codes:
1 – One to three plants
2 – Scattered plants or one large patch
3 – Scattered dense patches
4 – Predominant cover in area

Please email all track/point files and photos to **invasives@nynjtc.org.**

"pink form"

Natural Area Parking Lot/Trailhead Data Form

Segment 1 (should end at 100 m, if not, indicate ended at _____m)

Adjacent habitat code(s)	**Lat/Long** (start point)	**P(W) #**
	Lat/Long (end point)	**P(W) #**

Species group 1	**Abundance**
burning bush	
common buckthorn	
Japanese barberry	
Japanese stilt grass	
multiflora rose	
oriental bittersweet	
tree-of-heaven	
wild parsnip	
wineberry	
yellow iris	

P(W) # – *Enter placemark number from PDFMaps phone app or waypoint number from GPS unit*

Ph – *Make a check mark if you take a picture*

Ph	**Species group 2**	**Abundance**	**Lat/Long**	**P(W) #**
	Amur cork tree			
	bishop's goutweed			
	black jetbead			
	black swallowwort			
	Chinese Lespedeza			
	Chinese silver grass			
	European alder			
	hardy kiwi			
	Japanese angelica tree			
	Japanese hops			
	kudzu			
	linden viburnum			
	mile-a-minute weed			
	oriental Photinia			
	Scotch broom			
	Siebold's viburnum			
	small carpetgrass			

Other invasives	**Abundance**	**Other invasives**	**Abundance**

Segment 2 (should end at 200 m, if not, indicate ended at ____ m)

Adjacent habitat code(s)		
	Lat/Long (end point)	**P(W) #**

Species group 1	**Abundance**
burning bush	
common buckthorn	
Japanese barberry	
Japanese stilt grass	
multiflora rose	
oriental bittersweet	
tree-of-heaven	
wild parsnip	
wineberry	
yellow iris	

P(W) # – *Enter placemark number from PDFMaps phone app or waypoint number from GPS unit*

Ph – *Make a check mark if you take a picture*

Ph	**Species group 2**	**Abundance**	**Lat/Long**	**P(W) #**
	Amur cork tree			
	bishop's goutweed			
	black jetbead			
	black swallowwort			
	Chinese Lespedeza			
	Chinese silver grass			
	European alder			
	hardy kiwi			
	Japanese angelica tree			
	Japanese hops			
	kudzu			
	linden viburnum			
	mile-a-minute weed			
	oriental Photinia			
	Scotch broom			
	Siebold's viburnum			
	small carpetgrass			

Other invasives	**Abundance**	**Other invasives**	**Abundance**

Segment 3 (should end at 300 m, if not, indicate ended at ____ m)

Adjacent habitat code(s)		
	Lat/Long (end point)	**P(W) #**

Species group 1	**Abundance**
burning bush	
common buckthorn	
Japanese barberry	
Japanese stilt grass	
multiflora rose	
oriental bittersweet	
tree-of-heaven	
wild parsnip	
wineberry	
yellow iris	

P(W) # – *Enter placemark number from PDFMaps phone app or waypoint number from GPS unit*

Ph – *Make a check mark if you take a picture*

Ph	**Species group 2**	**Abundance**	**Lat/Long**	**P(W) #**
	Amur cork tree			
	bishop's goutweed			
	black jetbead			
	black swallowwort			
	Chinese Lespedeza			
	Chinese silver grass			
	European alder			
	hardy kiwi			
	Japanese angelica tree			
	Japanese hops			
	kudzu			
	linden viburnum			
	mile-a-minute weed			
	oriental Photinia			
	Scotch broom			
	Siebold's viburnum			
	small carpetgrass			

Other invasives	**Abundance**	**Other invasives**	**Abundance**

Segment 4 (should end at 400 m, if not, indicate ended at ____ m)		
Adjacent habitat code(s)		
	Lat/Long (end point)	**P(W) #**

Species group 1	**Abundance**
burning bush	
common buckthorn	
Japanese barberry	
Japanese stilt grass	
multiflora rose	
oriental bittersweet	
tree-of-heaven	
wild parsnip	
wineberry	
yellow iris	

P(W) # – *Enter placemark number from PDFMaps phone app or waypoint number from GPS unit*

Ph – *Make a check mark if you take a picture*

ph	**Species group 2**	**Abundance**	**Lat/Long**	**P(W) #**
	Amur cork tree			
	bishop's goutweed			
	black jetbead			
	black swallowwort			
	Chinese Lespedeza			
	Chinese silver grass			
	European alder			
	hardy kiwi			
	Japanese angelica tree			
	Japanese hops			
	kudzu			
	linden viburnum			
	mile-a-minute weed			
	oriental Photinia			
	Scotch broom			
	Siebold's viburnum			
	small carpetgrass			

Other invasives	**Abundance**	**Other invasives**	**Abundance**

Comments:

Reminders:

1. The trailhead/parking lot includes not only the lot itself, but any disturbed area (e.g., roadside) immediately adjacent to the trail entrance.
2. Each Group 2 species found needs to be photographed only once by each surveyor during the 2016 Blockbuster. However, you should also submit a photo for any potential focal plant for which you're unsure of the ID.
3. When taking a photo include the cover page of this form in your plant photo.
4. If the parking lot/trailhead perimeter is longer than 400 meters (4 segments) and you're still finding new species in segment 4, continue to survey for an additional 100 meter segment. In this case, include any additional segment(s) on a second data form, marking it as "Part 2" of the parking lot/trailhead survey.
5. Latitude and longitude need to be entered on the form only for the **first individual of each Group 2 species that you find within each segment**.

Helpful hints:

- You can put tick marks next to species names to help you assign abundance codes.

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.

LHPRISM 2016 Blockbuster Survey

Natural Area Parking Lot/Trailhead Data Form

Block Code: _____

Site Name: _____

Date: _____

Surveyor(s): _____

Key to Adjacent Habitat Codes (use as many as apply):
Field/meadow (FM)
Woodland (WD)
Shrubland (SH)
Wetland (WT)
Infrastructure/bldgs. (IF)

Key to Abundance Codes:
1 – One to three plants
2 – Scattered plants or one large patch
3 – Scattered dense patches
4 – Predominant cover in area

Please email all track/point files and photos to **invasives@nynjtc.org.**

"yellow form"

Natural Area Trail Data Form

Segment 1 (should end at 100 m, if not, indicate ended at _____m)

Trail code(s)	**Habitat code(s)**	**Lat/Long** (start point)	**P(W) #**
		Lat/Long (end point)	**P(W) #**

Species group 1	**Abundance**
burning bush	
common buckthorn	
Japanese barberry	
Japanese stilt grass	
multiflora rose	
oriental bittersweet	
tree-of-heaven	
wild parsnip	
wineberry	
yellow iris	

P(W) # – *Enter placemark number from PDFMaps phone app or waypoint number from GPS unit*

Ph – *Make a check mark if you take a picture*

Ph	**Species group 2**	**Abundance**	**Lat/Long**	**P(W) #**
	Amur cork tree			
	bishop's goutweed			
	black jetbead			
	black swallowwort			
	Chinese Lespedeza			
	Chinese silver grass			
	European alder			
	hardy kiwi			
	Japanese angelica tree			
	Japanese hops			
	kudzu			
	linden viburnum			
	mile-a-minute weed			
	oriental Photinia			
	Scotch broom			
	Siebold's viburnum			
	small carpetgrass			

Other invasives	**Abundance**	**Other invasives**	**Abundance**

Segment 2 (should end at 200 m, if not, indicate ended at ____ m)

Trail code(s)	**Habitat code(s)**		
		Lat/Long (end point)	**P(W) #**

Species group 1	**Abundance**
burning bush	
common buckthorn	
Japanese barberry	
Japanese stilt grass	
multiflora rose	
oriental bittersweet	
tree-of-heaven	
wild parsnip	
wineberry	
yellow iris	

P(W) # – *Enter placemark number from PDFMaps phone app or waypoint number from GPS unit*

Ph – *Make a check mark if you take a picture*

Ph	**Species group 2**	**Abundance**	**Lat/Long**	**P(W) #**
	Amur cork tree			
	bishop's goutweed			
	black jetbead			
	black swallowwort			
	Chinese Lespedeza			
	Chinese silver grass			
	European alder			
	hardy kiwi			
	Japanese angelica tree			
	Japanese hops			
	kudzu			
	linden viburnum			
	mile-a-minute weed			
	oriental Photinia			
	Scotch broom			
	Siebold's viburnum			
	small carpetgrass			

Other invasives	**Abundance**	**Other invasives**	**Abundance**

Segment 3 (should end at 300 m, if not, indicate ended at ____ m)

Trail code(s)	**Habitat code(s)**		
		Lat/Long (end point)	**P(W) #**

Species group 1	**Abundance**
burning bush	
common buckthorn	
Japanese barberry	
Japanese stilt grass	
multiflora rose	
oriental bittersweet	
tree-of-heaven	
wild parsnip	
wineberry	
yellow iris	

P(W) # – *Enter placemark number from PDFMaps phone app or waypoint number from GPS unit*

Ph – *Make a check mark if you take a picture*

Ph	**Species group 2**	**Abundance**	**Lat/Long**	**P(W) #**
	Amur cork tree			
	bishop's goutweed			
	black jetbead			
	black swallowwort			
	Chinese Lespedeza			
	Chinese silver grass			
	European alder			
	hardy kiwi			
	Japanese angelica tree			
	Japanese hops			
	kudzu			
	linden viburnum			
	mile-a-minute weed			
	oriental Photinia			
	Scotch broom			
	Siebold's viburnum			
	small carpetgrass			

Other invasives	**Abundance**	**Other invasives**	**Abundance**

Segment 4 (should end at 400 m, if not, indicate ended at ____ m)			
Trail code(s)	**Habitat code(s)**		
		Lat/Long (end point)	**P(W) #**

Species group 1	**Abundance**
burning bush	
common buckthorn	
Japanese barberry	
Japanese stilt grass	
multiflora rose	
oriental bittersweet	
tree-of-heaven	
wild parsnip	
wineberry	
yellow iris	

P(W) # – *Enter placemark number from PDFMaps phone app or waypoint number from GPS unit*

Ph – *Make a check mark if you take a picture*

ph	**Species group 2**	**Abundance**	**Lat/Long**	**P(W) #**
	Amur cork tree			
	bishop's goutweed			
	black jetbead			
	black swallowwort			
	Chinese Lespedeza			
	Chinese silver grass			
	European alder			
	hardy kiwi			
	Japanese angelica tree			
	Japanese hops			
	kudzu			
	linden viburnum			
	mile-a-minute weed			
	oriental Photinia			
	Scotch broom			
	Siebold's viburnum			
	small carpetgrass			

Other invasives	**Abundance**	**Other invasives**	**Abundance**

Comments:

Reminders:

1. Each Species Group 2 species found needs to be photographed only once by each surveyor during the 2016 Blockbuster. Species Group 1 species do not need to be photographed. However, you should submit a photo for any potential focal plant for which you're unsure of the ID.
2. When taking a photo include the cover page of this form in your plant photo.
3. The minimum number of segments to be surveyed along a trail is 4 (total of 400 meters). However, if you find new species in segment 4, continue to survey for an additional 100 meter segment. In this case, include any additional segment(s) on a second data form, marking it as "Part 2" of the trail survey.
4. Latitude and longitude need to be entered on the form only for the **first individual of each Group 2 species that you find within each segment**.

Helpful hints:

- You can put tick marks next to species names to help you assign abundance codes.
- 100 meters equals 0.1 km and is about 300 ft.

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.

LHPRISM 2016 Blockbuster Survey

Natural Area Trail Data Form

Block Code: _____

Site Name: _____

Date: _____

Surveyor(s): _____

Key to Trail Codes:
Foot and bike path (FP)
Trail shared w/ vehicles (TV)
Road (RD)
No Trail (NT)

Key to Habitat Codes (use as many as apply):
Field/meadow (FM)
Woodland (WD)
Shrubland (SH)
Wetland (WT)
Infrastructure/bldgs. (IF)

Key to Abundance Codes:
1 – One to three plants
2 – Scattered plants or one large patch
3 – Scattered dense patches
4 – Predominant cover in area

Please email all track/point files and photos to **invasives@nynjtc.org.**

"blue form"

Site Name:

Lat/Long	P(W) #

To describe the site, check all boxes that apply:

	Parking lot
	Roadside
	Abandoned lot
	Abandoned agricultural land
	Area adjacent to railroad tracks
	Utility right of way
	Foot and bike path
	Trail shared w/ vehicles
	Infrastructure/bldgs.
	Woodland
	Shrubland
	Wetland

P(W) # – *Enter placemark number from PDFMaps phone app or waypoint number from GPS unit*

Ph – *Make a check mark if you take a picture*

Site description:

Ph	Species name	Infestation size (e.g. 100 x 20 feet)	Abundance

Site Name:

Lat/Long	P(W) #

To describe the site, check all boxes that apply:

	Parking lot
	Roadside
	Abandoned lot
	Abandoned agricultural land
	Area adjacent to railroad tracks
	Utility right of way
	Foot and bike path
	Trail shared w/ vehicles
	Infrastructure/bldgs.
	Woodland
	Shrubland
	Wetland

P(W) # – *Enter placemark number from PDFMaps phone app or waypoint number from GPS unit*

Ph – *Make a check mark if you take a picture*

Site description:

Ph	Species name	Infestation size (e.g. 100 x 20 feet)	Abundance

Site Name:

Lat/Long	P(W) #

To describe the site, check all boxes that apply:

	Parking lot
	Roadside
	Abandoned lot
	Abandoned agricultural land
	Area adjacent to railroad tracks
	Utility right of way
	Foot and bike path
	Trail shared w/ vehicles
	Infrastructure/bldgs.
	Woodland
	Shrubland
	Wetland

P(W) # – *Enter placemark number from PDFMaps phone app or waypoint number from GPS unit*

Ph – *Make a check mark if you take a picture*

Site description:

Ph	Species name	Infestation size (e.g. 100 x 20 feet)	Abundance
`			

Site Name:		
Lat/Long		**P(W) #**

To describe the site, check all boxes that apply:

	Parking lot	**P(W) #** – *Enter placemark number from PDFMaps phone app or waypoint number from GPS unit* **Ph** – *Make a check mark if you take a picture*
	Roadside	
	Abandoned lot	
	Abandoned agricultural land	
	Area adjacent to railroad tracks	
	Utility right of way	
	Foot and bike path	
	Trail shared w/ vehicles	
	Infrastructure/bldgs.	
	Woodland	
	Shrubland	
	Wetland	

Site description:

ph	**Species name**	**Infestation size** (e.g. 100 x 20 feet)	**Abundance**

Focal Species:

Species Group 1	**Species Group 2**
burning bush	Amur cork tree
common buckthorn	bishop's goutweed
Japanese barberry	black jetbead
Japanese stilt grass	black swallowwort
multiflora rose	Chinese Lespedeza
oriental bittersweet	Chinese silver grass
tree-of-heaven	European alder
wild parsnip	hardy kiwi
wineberry	Japanese angelica tree
yellow iris	Japanese hops
	kudzu
	linden viburnum
	mile-a-minute weed
	oriental Photinia
	Scotch broom
	Siebold's viburnum
	small carpetgrass

Reminders:

1. Please provide opportunistic observation records only for those focal list species that you have not found in any of the formal surveys (HPA, Natural Area Trail, and Natural Area Trailhead/Parking Lot) within your block. You can enter data from up to four sites on one form.
2. Each Species Group 2 species needs to be photographed only once by each surveyor during the 2016 Blockbuster. Species Group 1 species do not need to be photographed. However, you should submit a photo for any potential focal plant species for which you're unsure of the ID.
3. When taking a photo, include the cover page of this form in your plant photo
4. To describe the invasion itself, indicate its size in the appropriate space and also check the appropriate abundance

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.

LHPRISM 2016 Blockbuster Survey

Opportunistic Observation Data Form

Block Code: _____

Date: _____

Surveyor(s): _____

Key to Abundance Codes:
1 – One to three plants
2 – Scattered plants or one large patch
3 – Scattered dense patches
4 – Predominant cover in area

Please email all track/point files and photos to **invasives@nynjtc.org.**

"white form"