

# Strategic Plan for the Management of Slender False Brome (*Brachypodium sylvaticum*)



Great Lakes Slender False Brome Working Group

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## Great Lakes Slender False Brome Working Group

The Great Lakes Slender False Brome Working Group (Working Group) represents a collaborative effort to improve the understanding and management of slender false brome (*Brachypodium sylvaticum*) within New York State and the Great Lakes Basin. The Working Group consists of federal and state agencies, businesses, universities and private organizations that strive to address the ecological threat posed by slender false brome.



The Working Group developed core functions that provide the framework for efforts. Core functions include Survey and Monitoring, Partner/Network Coordination and Communication, Education and Outreach, Spread Prevention and Management. Western New York Partnership for Regional Invasive Species Management (WNY PRISM) took the lead on this collaboration and was awarded funding, through the Great Lakes Restoration Initiative in September 2017, to fulfill the Working Group's mission. Using the knowledge obtained from these various facets of the project, the Working Group has summarized its efforts to put forth this Strategic Plan for Management of Slender False Brome (Strategic Plan).

### Working Group Member Organizations

Adirondack Park Invasive Plant Program (APIPP) · Bergen Swamp Preservation Society · Byron-Bergen Central School District · Capital/Mohawk PRISM · The College at Brockport · Finger Lakes PRISM · Friends of Letchworth State Park · Genesee County Park and Forest · Lower Hudson PRISM · Massachusetts Institute of Technology · New York Invasive Species Research Institute · New York Natural Heritage Program · New York-New Jersey Trail Conference · Northwest Michigan Invasive Species Network · NYS Department of Environmental Conservation · NYS Office of Parks, Recreation and Historic Preservation · Onondaga Environmental Institute · Ontario Invasive Plant Council · St. Lawrence-Eastern Lake Ontario (SLELO) PRISM · SUNY Albany · SUNY Buffalo State · SUNY College of Environmental Science and Forestry

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Department of  
Environmental  
Conservation



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## Slender False Brome Background

### A) Threat

Slender false brome (*Brachypodium sylvaticum*) is a perennial, wind-pollinated bunch grass that is native to Europe, Asia and Northern Africa. This species is invasive in North America and has demonstrated its ability to negatively impact ecosystems. Slender false brome forms dense clumps and each plant can produce hundreds to thousands of seeds each year. These factors allow the species to rapidly spread and form dense monocultures that reduce native biodiversity. This species has low palatability to livestock or wildlife, so grazing does not typically keep the population size in check.

Slender false brome can grow in open grasslands and forest understories, and in habitats ranging from full sun to full shade. This species does not show a preference for specific soil types or moisture levels with an exception of avoiding of extremely wet or extremely dry areas. Slender false brome's ability to survive in a wide range of habitats allows it to dominate disturbed areas, hiking trails and rare, otherwise high quality, natural areas.



### B) Pathways of Invasion

There are various pathways in which slender false brome enters into and moves about an area. This species is highly associated with logging and transportation corridors (Roy, 2009). Equipment used for logging and mowing has been shown to spread this species to new areas within its native and invasive ranges. Slender false brome seeds also latch onto the fur of wildlife and are easily transported to new areas (Roy, 2009). Surveys carried out by the Working Group have shown this species is heavily associated with deer and game trails. Heinken and Raudnitschka (2002) studied hooves and fur of animals shot by hunters and saw that wild boar and roe deer frequently carried slender false brome seeds. The seeds are also transported by humans on hiking gear, footwear and in the wheels of recreational equipment such as ATVs, which allow them to travel longer distances and establish new populations. Slender false brome is typically found within 30 meters of human use corridors (i.e. hiking trails, roads, utility rights of way), further confirming the role that humans have played in the spread of this species (Holmes, Roy, Reed & Johnson, 2010).

### C) Likelihood of Invasion

Slender false brome is readily spread by many different pathways, allowing it to easily enter new ecosystems. This species can survive in a wide variety of habitats and compete well in shade. Livestock have only been shown to graze on this species if they are exposed to the plant from birth and trained to feed on it (Scholz, 2007). Since there is a potentially toxic endophyte associated with slender false brome, grazing can pose a risk to animals and more research is needed on the subject. Also, it takes a great deal of effort to train animals and would not be effective for slender false brome populations that have not been detected. Therefore, when seeds are spread to a new area it is highly likely they will be able to survive and reproduce in that habitat, without being foraged upon.

Individual plants can live up to 20 years in their native range, providing a large time frame for the plants to grow and reproduce (Hæggström & Skytén 1996). Over a 20-year period, this species increased from .5% to 50% cover in a 4m<sup>2</sup> plot in its native range, and the number of plants grew from 4 to 88. In an experimental plot in the invaded range, 15 plants increased from densely covering a 9m<sup>2</sup> area to a 14m<sup>2</sup> area in just one year. Also, seedlings were present within a 46m<sup>2</sup> area, demonstrating the high dispersal potential of the seeds (Brusati, 2005). Slender false brome plants produce tillers from seed that flower one year after germination and asexual tillers that can flower the first year they are produced. Higher rates of seed production from sexual and asexual tillers along with higher seed germination have been seen in the invaded range compared to the native range (Roy, 2009). These studies show the increased potential of slender false brome to form dense populations outside of its native range. Since this species is not well-known, plants go undetected and unreported in areas allowing them to establish dense populations. These factors make the spread of seeds and establishment in new areas highly likely, even those a great distance from known slender false brome occurrences.

### D) Identification

Slender false brome is a perennial grass that forms dense clumps. This species has a bright green color that is retained into the fall which allows it to be distinguished from other grasses throughout the growing season and makes it easily identifiable late in the season. Slender false brome has lax, flat leaves that arch out from the center of the plant. These leaves are 5-12 mm wide with hairy leaf margins. The leaf sheath is also hairy and open at the top. Slender false brome stems and nodes are covered in tiny hairs as well.



Slender false brome has a drooping inflorescence. The spikelets are arranged in a true spike because they have no stalk at the base. The flowers have long awns that are 7-15 mm and easily latch on to humans and animals. Slender false brome plants flower 1-2 years after germinating and flowering begins in late June. Mature spikelets can be seen into the fall, another characteristic that can be used to easily identify this plant later in the season (Roy et al., 2011).



Slender false brome flowers and hairy leaves. Photo credit: WNY PRISM

### Similar species:

#### Bearded shorthusk (*Brachelytrum erectum*)

Bearded shorthusk is native to North America. The leaves of bearded shorthusk are wider than those of slender false brome, at 11-17 mm wide, and hairs are only present on the lower surface of the leaf. The spikelets are short stalked with one floret per spikelet, and the awns are longer than those of slender false brome, at 13-20 mm long.



Bearded shorthusk flowers, leaves and awns. Photo credit: Peter M. Dzuik. [www.minnesotawildflowers.info](http://www.minnesotawildflowers.info)

### Hairy woodland brome (*Bromus pubescens*)

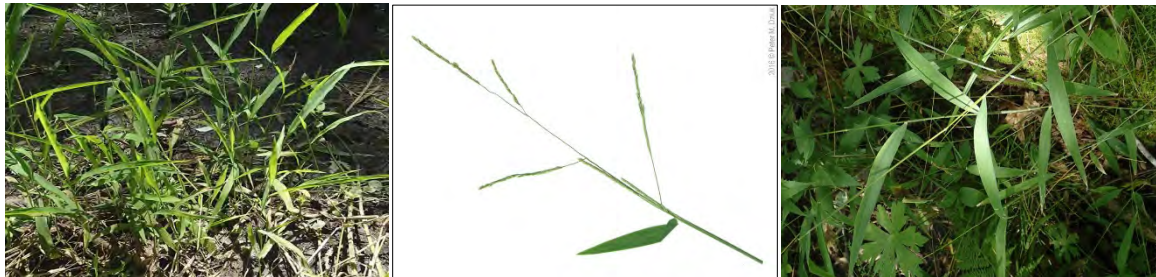
Hairy woodland brome is a native grass species. The leaves of hairy woodland brome are 6-15 mm wide, similar to slender false brome leaves. They can be hairy or hairless and slightly rolled. The leaf sheath margin is overlapping at the top, so the leaf does not pull away from the stem easily. The spikelets are long stalked, and the awns are shorter than those of slender false brome, at 3-8 mm long.



Hairy woodland brome flowers, leaves and awns. Photo credit: [www.illinoiswildflowers.info](http://www.illinoiswildflowers.info);  
G. D. Bebeau [www.friendsofthewildflowergarden.org](http://www.friendsofthewildflowergarden.org)

### White grass (*Leersia virginica*)

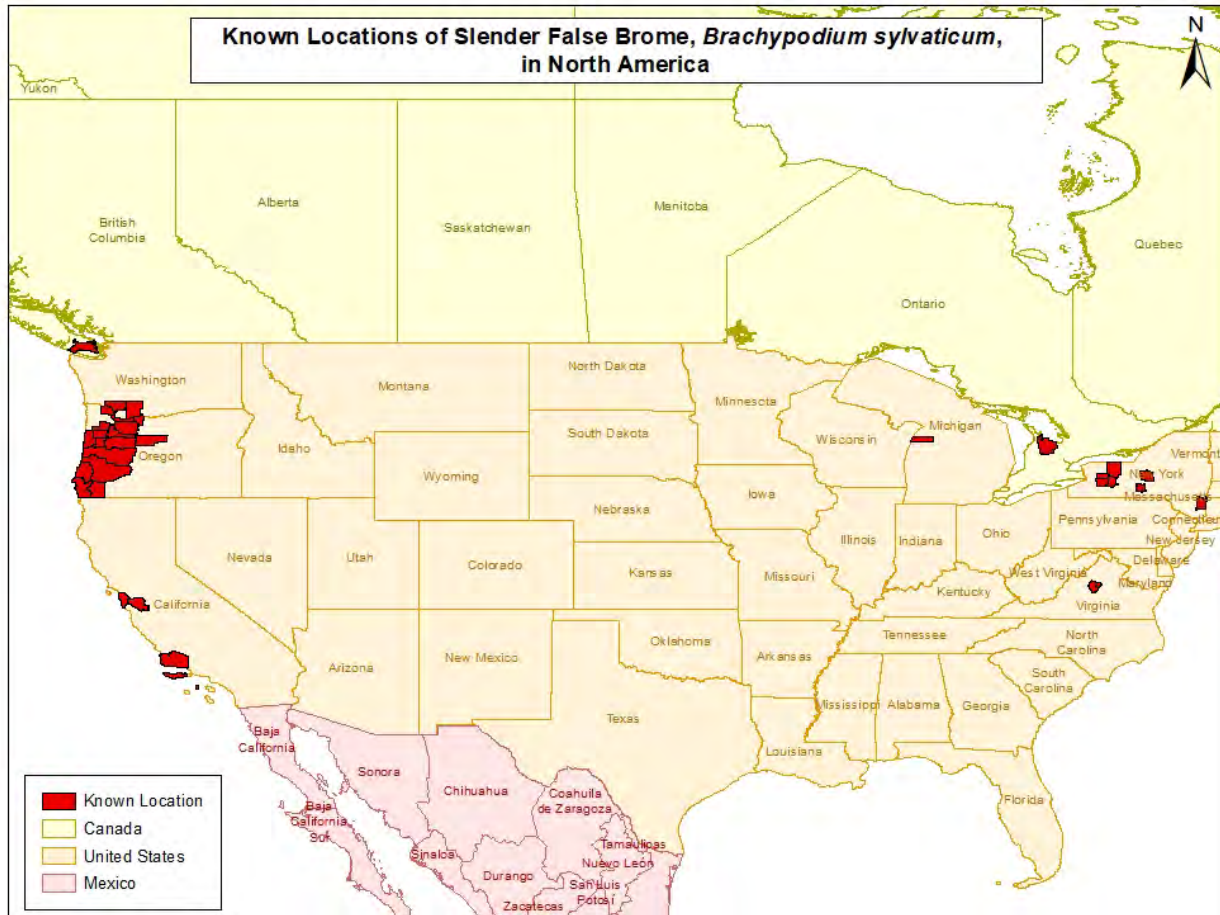
White grass is a native species of grass in the Great Lakes Basin. White grass does not form bunches and has a more structured form than slender false brome. White grass has a similar green color as slender false brome and forms dense clonal colonies from rhizomes, giving a bunch-like appearance. The leaves of white grass are mostly hairless and are 6-15 mm wide, similar in size to slender false brome. Spikelets are short stalked and lack awns.



White grass colonies, flowers and leaves. Photo credit: Peter M. Dzuik. [www.minnesotawildflowers.info](http://www.minnesotawildflowers.info)

### E) Distribution in North America

Slender false brome was first discovered in North America in Oregon in 1939, where the species rapidly spread and negatively impacted native species, such as Kincaid’s lupine, which is the host plant for Fender’s blue butterfly (Clark et al., 2004). Slender false brome was later reported in California in 2003, Washington in 2007 and in British Columbia. This species is now found in the eastern portion of North America as well, in Michigan, New York, Ontario and Virginia. In New York, slender false brome was first reported in Bergen Swamp and Tompkins County in 2009 (Daniel & Werier, 2010). Additional areas in New York where this species has been found include Genesee County Park and Forest, Letchworth State Park, Syracuse, Wappinger’s Falls, Taughannock Falls State Park and Danby State Forest along the Finger Lakes Trail. A map of slender false brome occurrences in New York State can be seen in Appendix A.



## Purpose and Use of the Strategic Plan

### A) Role of the Working Group

The Great Lakes Slender False Brome Working Group was created in response to the first reports of slender false brome in New York State. This group represents a collaborative effort to improve the understanding and management of slender false brome, and consists of federal and state agencies, businesses, universities and private organizations that strive to address the ecological threat posed by this species. The Working Group serves as a resource for organizations as they implement slender false brome education and outreach, early detection and management. Working Group members have experience and expertise to share with additional organizations working to carry out slender false brome management efforts. The Working Group Website (Website) is comprised of webpages housed within the WNY PRISM website that include education and outreach materials, meeting summaries and presentations, distribution maps and other information about the project. Working Group information can be easily accessed at [www.wnyprism.org/projects/slenderfalsebrome](http://www.wnyprism.org/projects/slenderfalsebrome).

### B) Purpose and Use of the Strategic Plan

The purpose of the Strategic Plan is to offer a summary of the approach used by the Working Group to combat slender false brome, which can be applied and adjusted for use by other organizations to address this and similar issues. The Strategic Plan is not a to-do list for the management of slender false brome, but rather demonstrates steps used for implementing removal efforts, spread prevention, and education and outreach. Organizations are encouraged to use this Strategic Plan to begin the difficult task of raising awareness of this unfamiliar invasive species and preventing the negative impacts of this species on the ecosystem. Many aspects of the Strategic Plan can be adapted and applied to other early detection invasive species.

## Education and Outreach

### A) When to begin

Education and outreach efforts for slender false brome should begin well before the species arrives in a region. Since the species spreads easily through many pathways of invasion, it has a high likelihood of quickly reaching and infesting nearby and distant regions. The earlier that professionals and citizen scientists recognize slender false brome as an invasive species and species of concern to keep a lookout for, the more successful early detection efforts will be. It is never too early to begin education and outreach on an invasive species with such great potential to negatively impact an area. Also, as grasses are less distinctive as showier invasive species, and less well-known overall, training on species recognition for professionals must begin early to ensure slender false brome is easily identifiable before it is introduced to the region.

Slender false brome education and outreach efforts should first focus on professionals in the field. Professionals can be given detailed identification guides along with specimens to further enforce recognition of slender false brome. Once professionals understand identification characteristics and the threat that this species can impose on their region, they can reach out to local groups and continue to hold trainings, thus increasing regional knowledge of the species. As with any early detection invasive species, many people including professionals and citizen scientists need to be aware of the species and incorporate it into their survey efforts and trainings.

A professional point of contact should be identified in the region and specific instructions for reporting slender false brome should be distributed. The point of contact must ensure the species is available in mapping software (iMapInvasives, EDDMapS, MISIN, etc.). If slender false brome, or other early detection species, are not listed on the reporting website for the region, the point of contact will need to ensure the species is added to the site. In many cases, slender false brome populations were rapidly increasing in areas for some time before the species was reported, simply because professionals and citizen scientists were unaware of this invasive species and did not have a clear means for reporting.

### B) Educational resources

Effective educational resources and materials accommodate a wide range of audiences and are easily distributed and/or accessible to organizations. The first step in the development of educational resources involves the identification and assessment of regional needs and information gaps. Once needs are identified, online searches and literature reviews can provide an understanding of what information is available and in what formats. The Working Group has worked through this process and has collected or otherwise developed prioritized resources, placing them on the website, in the resources section ([www.wnyprism.org/projects/slenderfalsebrome/resources/](http://www.wnyprism.org/projects/slenderfalsebrome/resources/)).

Included among the available resources is a 2-page identification fact sheet, created by the Working Group, that can be displayed on a website, distributed at outreach events and used during trainings to educate the public on characteristics of slender false brome. The identification fact sheet can be found on the Website, [www.wnyprism.org/wp-content/uploads/2018/08/SFB-ID-Fact-Sheet\\_Final.pdf](http://www.wnyprism.org/wp-content/uploads/2018/08/SFB-ID-Fact-Sheet_Final.pdf), and is also provided in Appendix B. After reviewing available slender false brome resources, organizations must evaluate if education and outreach needs are met, or not, and then move towards the creation of new materials if necessary.

Once information on slender false brome has been summarized and resources developed, they need to be distributed to organizations and individuals. Regional organizations with programs focused on invasive species identification, mapping or management should be contacted and made aware of slender false brome and other early detection invasive species, and the resources that exist. Resources may include printed or downloadable materials that have been created or a list of websites with species information. Partnering with multiple organizations is the quickest way to get the word out to the region about a new invasive species.

Potential groups to contact and partner with include local Cooperative Weed Management Areas (CWMAs), PRISMs, Soil and Water Conservation Districts, land trusts, researchers and state agencies. Broader partnerships allow educational resources to reach more people within the region. This distribution of materials increases the number of people who are aware of slender false brome and are also on the lookout for this species while hiking, gardening and enjoying other outdoor activities. In areas where large slender false brome infestations are found, letters or postcards can be mailed to residents to encourage public participation to determine the extent of this species in the area. The letter developed by the Working Group is provided as a template in Appendix C.

### **C) Hosting educational programs**

Educational programs such as workshops or guided hikes in areas where slender false brome populations are found can be used to further increase awareness of this species. The educational resources such as websites and fact sheets provide a nice way to summarize information, and a hands-on activity in the field can be used to further solidify the ability to recognize this species. Since slender false brome is a grass, non-botanists will need additional field training to feel confident with identification. Again, partnering with organizations that can host these activities allows a greater audience to be targeted. Educational programs should be tailored to many different audiences including land managers, landowners, citizen scientists, highway departments, recreational groups and volunteer organizations. The regional slender false brome point of contact can provide materials and assistance to partners as they prepare to implement programs.

### **D) Creation of a local working group**

Slender false brome educational trainings for professionals and citizen scientists will increase the number of people with the ability to identify and report this species. When slender false brome is first reported in the region, a local or regional expert should visit the site and confirm identification. Members of the Working Group can serve as experts to confirm the identity of slender false brome when it is detected in the field. Once a confirmed slender false brome report has been made in the area, all identified stakeholders should be notified immediately. Those previously identified during education and outreach efforts should make a good list to start from.

The point of contact should host a meeting to bring partners together and establish a local working group. The goal of the initial meeting should be to establish communication structure and delegate responsibilities involved in detection, monitoring and management of slender false brome. The local working group will continue to meet and fulfill necessary tasks leading to control and hopefully eradication of slender false brome, if the species is found early enough.

## Early Detection

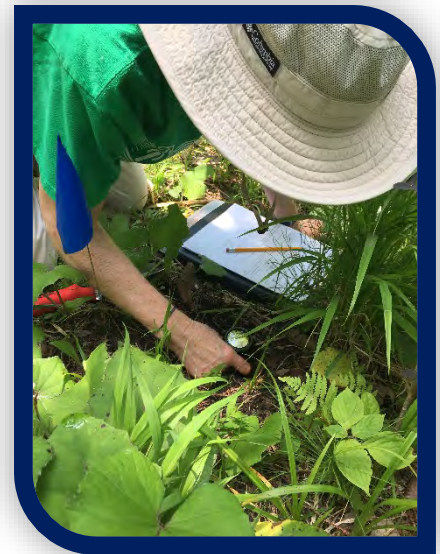
Early Detection is the process of surveying for, reporting and verifying the presence of invasive species, before the founding population is established and so widespread that eradication is not possible (The U.S. Department of the Interior, 2016). Early detection efforts are essential to prevent new, threatening invasive species from establishing in an area, protecting terrestrial and aquatic resources from their harmful impacts. An early detection framework encourages resources to be devoted to determining the presence and distribution of the species early on to drive removal efforts and achieve eradication. If the species is caught early, this process can lessen the duration of ongoing management, which decreases cost over long periods of time. WNY PRISM defines early detection priority species as ones that pose the greatest risk to the region based on negative impacts, pathways of invasion and other factors, and only occur in a few locations in the region. Slender false brome has many characteristics that allow it to become a problematic species as soon as it enters an area, so it should fall into the high priority early detection species category in most regions.

### A) Surveys

Early detection involves the combined efforts of private entities, public organizations and citizen scientists. One major component of early detection is the implementation of surveys for the particular species of concern. In this case, the Working Group has developed a survey protocol for slender false brome that can be used and adapted for survey efforts for other early detection invasive species.

Conducting surveys for slender false brome allows the presence and distribution of the species to be determined in an area, which will be used to guide management efforts. Many organizations conduct invasive species surveys and assessments, or at least take note of new invasives that appear in their region. The goal is for these organizations to make slender false brome a priority, so it can be included in invasive species surveys, or listed as a species to lookout for when working in new areas.

If organizations wish to incorporate slender false brome surveys into their work plan, they can use resources that have already been created. The Working Group published a Survey Summary Sheet ([www.wnyprism.org/wp-content/uploads/2018/09/Slender-False-Brome-Survey-Sheet.pdf](http://www.wnyprism.org/wp-content/uploads/2018/09/Slender-False-Brome-Survey-Sheet.pdf)) and a data sheet along with instructions ([www.wnyprism.org/wp-content/uploads/2019/02/Field-Observation-Data-Sheet.pdf](http://www.wnyprism.org/wp-content/uploads/2019/02/Field-Observation-Data-Sheet.pdf)). These documents are included in Appendices D and E. The Working Group's Field Observation Protocol is available on the Website as well ([www.wnyprism.org/wp-content/uploads/2019/02/Field-Observation-Protocol.pdf](http://www.wnyprism.org/wp-content/uploads/2019/02/Field-Observation-Protocol.pdf)) which includes detailed information on multiple data fields that can be collected during survey efforts. The general procedure is to walk along human corridors (i.e. hiking trails, roads, utility rights of way) and look for slender false brome along the edge, in approximately a 3 meter stretch off the road. Once found, surveys continue 30 meters off trail to see how far the species has spread, since it has been determined that slender false brome populations tend to be concentrated within 30 meters of human use corridors (Holmes, Roy, Reed & Johnson, 2010). The Field Observation Protocol contains many different aspects that may not pertain to the survey needs of every group. This protocol can easily



be adapted based on regional need or expertise of those surveying. Some data from the protocol may not be necessary, while additional data can easily be added to the protocol.

If slender false brome is found during surveys, follow the aforementioned procedure for creating a local working group to ensure a communication structure is established and responsibilities are assigned for rapid response of slender false brome. Use the procedure set forth in the reporting protocol section to ensure the information is disseminated to the proper organizations. This section describes the minimum information needed for each infestation, but any additional data that is collected should be reported as well.



## B) Reporting Protocol

On the ground early detection reports drive the ability to respond to, control and eventually eradicate an invasive species. In order to ensure slender false brome is found and reported, professionals who have been educated on this species must continue to distribute identification materials along with an established reporting protocol. This allows others working in the field, or engaging in outdoor recreation (hiking, gardening, etc.), to be armed with the resources to recognize and report slender false brome in a timely manner. The early detection reporting protocol, combined with an established contact person, allows the information to reach the correct individual rather than get passed around among organizations and potentially lost in the process. Also, an established reporting protocol allows the information to reach experts on plant identification to quickly verify the presence of this species, further facilitating quicker removal efforts.

When reporting slender false brome, the WNY PRISM Early Detection Reporting Protocol can be used. This protocol is detailed below, and is also available on the WNY PRISM website, [www.wnyprism.org/get-involved/early-detection/](http://www.wnyprism.org/get-involved/early-detection/).

- 1) Early detection invasive species infestation discovered:
  - The observer should use field guides or other identification materials to positively identify the species.
  
- 2) Document infestation:
  - Collect the following information on the infestation:
    - Size: number of individuals, percent cover, acreage, linear feet or square meters.
    - Location: GPS point or polygon, property address, description of the infestation within the property.
    - Photos: take clear photos showing close-up identifying characteristics of the species and the infestation within the landscape.
    - Contact information for the observer.
  
- 3) Log the infestation into the preferred invasive species reporting website for the region (iMapInvasives, EDDMapS, MISIN, etc.). See the Reporting Platforms chart in Appendix F for details:
  - Visit the specified website to request a log-in and then enter and upload all infestation information.
  - Observations will alert experts who can confirm identification.
  - If you are unable to access a reporting website, proceed to step 4.
  
- 4) Submit all documentation to your local invasive species management organization:
  - All information and pictures of the species and infestations can be sent here.
  - Photo documentation will be used to confirm identification. On-site visits will be conducted to further confirm the identification if necessary.

## Rapid Assessment

When an early detection invasive species has been reported and verified in an area, rapid assessment is used to determine a course of action. Rapid assessment determines the distribution and abundance of the species, environmental risks, pathways of invasion and economic feasibility of treatment in the area. These factors are reviewed to create a set of coordinated actions to remove the invasive species population before it establishes and spreads further (The U.S. Department of the Interior, 2016). Assessments should be carried out by the landowners or managers, but partnerships formed within the region during education and early detection efforts can be used to complete this process. For any site where slender false brome management will be implemented, a rapid assessment must be conducted to collect information necessary for successful planning.



Collect the following information during rapid assessment, before any removal takes place, and be as thorough as possible:

- 1) Extent of the infestation:
  - Take a GPS polygon of the infestation to determine area.
  - Provide a map with the location and extent of the infestation.
- 2) Plant density and percent cover:
  - Density of plants. Use a quadrat to count all plants in a small section and estimate density of the infestation.
  - Percent cover in the area. Again, use a quadrat to estimate percent cover of the species.
- 3) Invasion history:
  - Note if previous plant growth (thatch) is present.
  - Look at seedlings present in the infestation. For slender false brome, seedlings are plants which do not have previous thatch/growth present, are non-reproductive, less than 7-10 cm tall with 3 or fewer leaves (Poulos & Roy, 2015). Seedling density can be determined using a quadrat as well.
- 4) Conservation targets:
  - Determine if there are any rare, threatened or endangered species in the area. This will affect the removal methods that can be implemented.
- 5) Nearby properties:
  - Determine if the early detection invasive species is present on adjacent properties. Large infestations nearby will likely cause reintroduction of the species, even after successful management is implemented.
- 6) Pathways of invasion:
  - Determine pathways of potential spread or reintroduction after the species has been removed. This will help demonstrate the need for spread prevention efforts to be combined with removal.
- 7) Determine capacity:
  - Investigate available resources for management.
  - Estimate cost of management and look into grants and available funding sources.
- 8) Delegate responsibilities:
  - Spell out responsible parties for all components of management, including rapid response and long-term monitoring. This involves determining property ownership, easements, restrictions, permissions, etc. All components of management must be listed and assigned to an individual or organization before moving forward with removal efforts.

## Rapid Response

Rapid response is the process that is employed to eradicate populations of a new invasive species from a specific location, using information from the early detection report and rapid assessment to guide the correct practices (The U.S. Department of the Interior, 2016).

### A) Removal Methods

While many sections of this Strategic Plan apply to early detection species other than slender false brome, the timing and management methods listed for rapid response efforts are specific to slender false brome based on species biology and phenology. When applying this plan to other early detection species, methods must be adjusted to ensure removal efforts incorporate appropriate methods and timing.

- **Manual:** Dig up all plants in an area using a shovel, ensuring that the entire plant and root system are removed. This should be done in May or June, before the plants begin to produce flowers. Avoid digging up plants when seeds are present, as this will likely help spread the species. All plant material should be contained in landfill bound trash bags. This technique is best suited for small areas, sensitive areas where chemical and mechanical treatments cannot be implemented, or areas where plants are difficult to access with large equipment.
- **Mechanical:** Cut all plants in the area using a mower, weedwhacker or string trimmer. This should be done twice within each growing season to prevent flowers from forming. Ideally, plants should be cut late-June and late-July. Plants should be cut as low to the ground as possible to limit regrowth. If plants start to produce flowers earlier in the season, cutting times can be adjusted to prevent the flowers from producing seed. Plant material can be left on site, and equipment should be cleaned, by brushing or washing off debris, before being used in another area.
- **Chemical:** Herbicides, such as glyphosate, have proven to be very effective for slender false brome control and can be applied using foliar application methods. In Oregon, glyphosate reduced slender false brome cover by over 90%, while grass specific herbicides were much less efficient (Clark et al., 2004). Preliminary results from the Working Group's management research further supports the findings from Oregon, showing a greater than 90% reduction in slender false brome cover after one year of treatment. Herbicide can be applied in June before the plants produce flowers and seed. For dense infestations, a second round of herbicide application may be necessary in the same growing season to target plants that were missed during the first application.
- **Combination of mechanical and chemical:** Implement the mechanical removal technique which involves cutting all plants in the area twice within each growing season. Ideally, plants should be cut late-June and late-July. If plants start to produce flowers earlier in the season, cutting times can be adjusted to prevent the flowers from producing seed. Herbicide should be applied approximately three weeks after the area is cut for the second time, towards late August. The Working Group's research demonstrated that mowing ahead of herbicide treatment did not significantly improve treatment success. Preliminary results do suggest, however, that mowing may allow for greater manipulation of herbicide treatment timing.

USE PESTICIDES WISELY: Always read the entire pesticide label carefully and follow all instructions. Pesticide regulations can vary widely between regions; please contact local authorities for additional pesticide use requirements, restrictions or recommendations. Mention of pesticide products by WNY PRISM does not constitute endorsement of any material.



### B) Method selection

		Size of <i>B. sylvaticum</i> infestation in acres		
		1/4 or less	1/4 – 1/2	Greater than 1/2
Percent cover of <i>B. sylvaticum</i>	1 – 25 %	Manual	Manual	Manual*, Chemical or Mechanical/Chemical
	25 – 50 %	Manual	Manual, Chemical or Mechanical/Chemical	Chemical or Mechanical/Chemical
	Greater than 50 %	Manual*, Chemical or Mechanical/Chemical	Chemical or Mechanical/Chemical	Chemical or Mechanical/Chemical

NOTE: Mechanical control can be used for any infestation to suppress seed production while additional control efforts are planned, but this method alone will not eliminate *B. sylvaticum* infestations.  
\*Manual removal may be effective in this situation due to low percent cover or small infestation area.

Implementing the correct removal method for an infestation is key to completing effective, cost-efficient removal of an invasive species. This will involve meetings with landowners and other stakeholders to determine what can feasibly be accomplished in the area. Certain areas such as designated wetlands may require a permit for removal work, which must be obtained before any management is put into place. These factors, including the rapid assessment information, must be considered to determine the correct control method for this species. The Working Group conducted management research to create a Best Management Practices guide for slender false brome, which can be accessed at on the Website, [www.wnyprism.org/wp-content/uploads/2019/08/BMP-Slender-False-Brome.pdf](http://www.wnyprism.org/wp-content/uploads/2019/08/BMP-Slender-False-Brome.pdf), and in Appendix G.

### C) Spread Prevention

While removal of plants is the overarching goal of rapid response, continued education and outreach and spread prevention measures are also important to ensure people are aware of the species and the actions that can help reduce the spread of seeds.

During the rapid response stage, distribution of identification and informational materials about early detection invasive species should be carried out by invasive species management organizations and their partners. These materials should be present at events that target a wide range of audiences. At this time, small workshops that target particular interest groups can be carried out as well. Potential targets may include groups that work along trails and roads such as Friends Groups, highway crews or Master Gardeners. Slender false brome identification should also be included in general invasive species awareness workshops.



During the rapid assessment, pathways of invasion were identified for each site. In order to carry out successful slender false brome management, spread prevention measures should be implemented to hinder the dispersal and reestablishment of this species. The following may be used to prevent the unintentional spread of invasive species:

- **Boot Brush Stations:** These are an easy way to enact both spread prevention and education and outreach in an area. These podium-like structures include a brush at the base for cleaning off shoes and a sign on top describing invasive species in the area. Pictures and identification information for slender false brome on the sign spread awareness.
- **Educational Signage:** If boot brush stations are not feasible, signage near infestations can provide information on slender false brome threat and spread prevention measures individuals can use. Signs can stress the importance of cleaning off clothing and shoes after hiking, cleaning off pets after walks and washing the tires of cars or recreational vehicles.

## Long-term Management

Long-term management is the process employed to ensure continued removal of new invasive species is carried out in a timely manner to prevent reestablishment. This process involves monitoring areas treated during the rapid response phase, continued early detection efforts to catch new populations, and continued education on identification and spread prevention.

### A) Monitoring

Removal methods for slender false brome should be implemented in an area for at least 5 years. Unpublished data has shown slender false brome seeds are viable in the soil for 2-3 years, so ongoing removal is necessary to deplete the existing seed bank (T. Kaye, personal communication, February 6, 2018).

When mechanical methods are used the plants are unable to produce seed but will still grow back from year to year. In this case, it is necessary to implement additional removal methods to eliminate the infestation.

For each removal method, monitoring over time is necessary to prevent reestablishment of slender false brome. After 5 years of removal efforts, the area should continue to be monitored. This involves surveying the area once or twice a growing season to identify and remove any slender false brome seedlings that have emerged in the area. It is recommended that an area be revisited until there are 3 consecutive years without any slender false brome seedlings present. This also involves continued survey efforts for slender false brome, especially along highly visited trails and roads. As surveys are implemented for other invasive species, slender false brome should continue to be a species of concern to look out for and report.

### B) Education and Outreach

After management has been implemented, educational programs and distribution of resources should continue so citizen scientists can continue to assist with identifying new populations of slender false brome. In depth workshops can be carried out to educate other professionals on the Best Management Practices for slender false brome and demonstrate the success of management in the region.

Educational programs that focus on specific recreational users in the area should be carried out as well. These programs can involve reaching out to hunters, ATV users, hikers, etc. Programs should demonstrate the negative impacts slender false brome can have on the area they use recreationally, and the topics discussed should be specific to the target audience. The programs can show simple spread prevention measures such as cleaning off tires, boots and clothing when leaving an area, and stress the importance of taking spread prevention steps to help keep the area intact for continued recreational use.

### C) Spread Prevention

Boot brush stations should be revisited periodically to remove seedlings of invasive species that will grow around the structure. The success of these stations can also be assessed by collecting seeds that are removed from footwear and then growing them to determine the species that are being deterred by this spread prevention measure.

Programs should be implemented for logging projects and highway maintenance. These programs ensure that logging and mowing equipment that has been used in infested areas is cleaned and dirt is removed from tires to prevent the spread of seeds.

#### **D) Restoration**

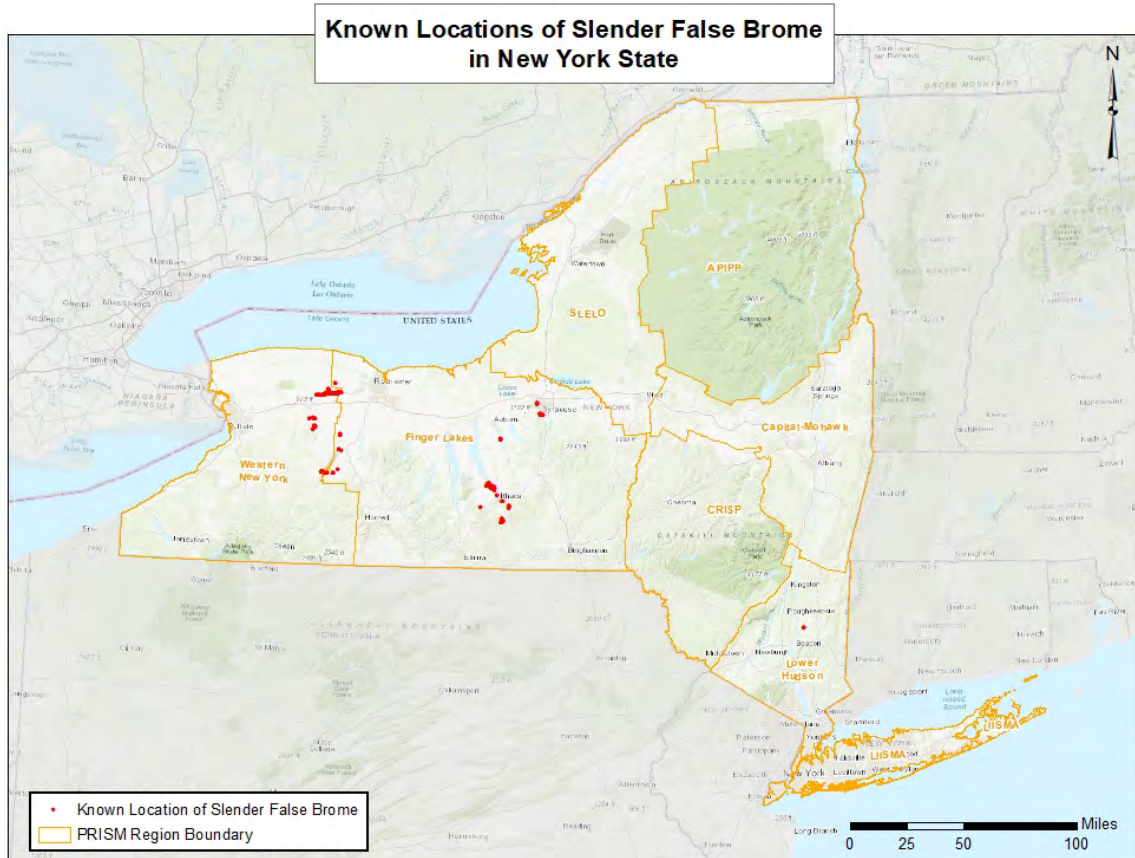
Slender false brome is likely to reestablish in areas once infested, especially if there are nearby source populations. To prevent reestablishment, or the introduction of new invasive species to the recently disturbed habitat, restoration should be a goal of long-term management. After removal methods have been implemented for 3 years, and the seed bank is relatively depleted, the population should be at a size small enough for manual removal. At this time, restoration efforts that involve planting native species in the area should be considered. To do this, first consult native plant guides or experts in the area to determine a good mix of species to plant. If possible, track the reestablishment of native species and decrease of slender false brome in the area as a restoration metric to determine success of long-term management.

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# Appendices

## Appendix A: Maps



# Slender False Brome

*(Brachypodium sylvaticum)*

## Overview:

Slender false brome is a highly invasive bunch grass native to Eurasia and North Africa. It grows up to 2.5 ft. tall, has a graceful, nodding form and bright green color that it retains into the fall. It rapidly reproduces from seed to form dense monocultures, and is not rhizomatous.



Photo credit WNY PRISM.



## Habitat:

Slender false brome is found in open grasslands and forest understories. It grows in habitats ranging from full sun to full shade, disturbed or undisturbed and is common along hiking and deer trails. This species seems to prefer soils that are not extremely wet or extremely dry.

## Identification:

**Stems:** The lower stem and nodes are covered in tiny hairs.

**Leaves:** Floppy, flat leaves arch out from the plant. Leaves are 5-12 mm wide with hairy leaf margins. The leaf sheath is open at the top and hairy.

**Flowers:** This plant has a drooping inflorescence. The spikelets are arranged in a true spike because they have no stalk at the base. The flowers have long awns that are 7-15 mm. Slender false brome begins flowering in late June and mature spikelets can be seen into the fall.



Hairy lower stems and nodes.



Hairy leaf sheath and hairy leaf margin.



Spikelets with long awned flowers.

# Comparison to similar species:



## Slender False Brome (*Brachypodium sylvaticum*)

Flat leaves 5-12 mm wide. Leaves are sparsely hairy on both sides. Leaf sheath margin is not overlapping at the top, and is hairy.



Photo credit WNY PRISM.



Photo credit Keir Morse. calphotos.berkeley.edu

Spikelets have no stalk with 6-16 florets per spike. Awns 7-15 mm. Flowers late June to August.



Photo credit WNY PRISM.



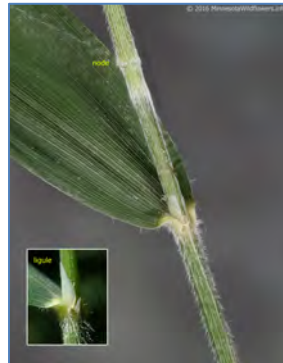
Photo credit Keir Morse. calphotos.berkeley.edu

## Bearded Shorthusk (*Brachyelytrum erectum*)

Flat leaves 11-17 mm wide. Hairs present on lower surface of leaf. Leaf sheath margin is not overlapping at the top, and is hairy.



Photo credit Peter M. Dzuik. www.minnesotawildflowers.info



Spikelets are short-stalked with one floret per spikelet. Awns 13-20 mm. Flowers June to August.



Photo credit Peter M. Dzuik. www.minnesotawildflowers.info



## Hairy Woodland Brome (*Bromus pubescens*)

Flat or slightly rolled leaves 6-15 mm wide. Leaves can be hairy or hairless. Leaf sheath margin is overlapping at the top, and is hairy.



Photo credit www.illinoiswildflowers.info



Photo credit G. D. Bebeau. www.friendsofthewildflowergarden.org

Spikelets are long-stalked with 5-10 florets per spikelet. Awns 3-8 mm. Flowers May to July.



Photo credit G. D. Bebeau. www.friendsofthewildflowergarden.org



Photo credit www.illinoiswildflowers.info



Dear Resident,

June 14, 2019

Invasive species are non-native species that cause harm to our environment. WNY PRISM works alongside our partners and citizens like you to address invasive species issues and protect our natural resources. One of our priorities is to manage early detection species – those invasive species that are new to the region and due to their low numbers, may be eradicated before they cause irreparable harm. Slender false brome (*Brachypodium sylvaticum*) is one such species. It has been found along the West Shore Trail in Elba, Byron, Bergen and Churchville, NY and we need your help!

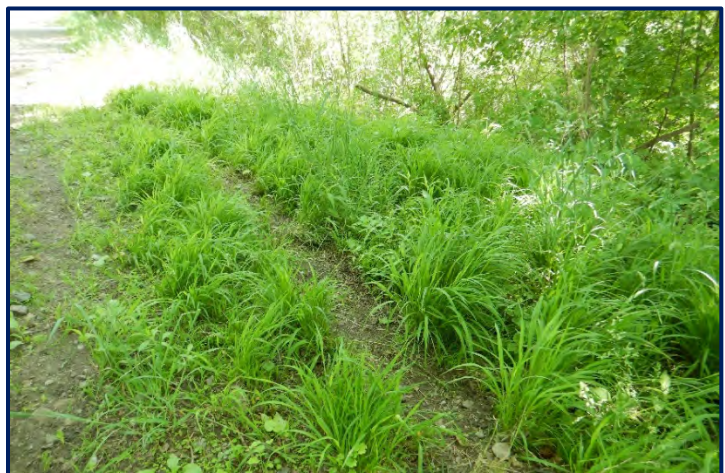
Slender false brome is a highly invasive grass that quickly establishes and spreads, crowding out all native vegetation. It grows in a wide range of places including forests, grasslands, streams and roadsides. Since it has been found along the West Shore Trail, it is likely that you may have this grass on your property. If you recognize this grass from your property, or suspect you may have it, we are asking that you document (take photos) and **report it**. Enclosed with this letter you will find a factsheet to help you identify the species. Please contact Brittany Hernon, Project Manager at 716-878-5422 or [hernonba@buffalostate.edu](mailto:hernonba@buffalostate.edu) to report this species. WNY PRISM can also survey your property for slender false brome, free of charge.

WNY PRISM also invites you to join us for an **Education and Removal Day**. We will be working at Drew's Nature Center in Bergen, NY, located on W. Sweden Road, on **Monday July 8, 2019**. Stop by anytime between **noon – 6:00 pm** to learn more about this species and help dig it up along the trails. We will provide shovels and gloves, just come ready to learn and get your hands dirty! If you can't make it out to Drew's, consider visiting the WNY PRISM table at the **Genesee County Fair** on July 18-20, 2019 or at the **Orleans County Fair** on July 25-27, 2019.

Thank you for your help with invasive species management – we hope to see you soon!

Brittany Hernon

Great Lakes Slender False Brome Working Group Project Manager, WNY PRISM



*The Great Lakes Slender False Brome Working Group is part of WNY PRISM, a sponsored program of the Research Foundation for SUNY Buffalo State and the Great Lakes Center. Funding for the Working Group is provided by the U.S. Environmental Protection Agency through the Great Lakes Restoration Initiative.*



# Slender False Brome Surveys

## General Survey Protocol:

Walk along all trails or roads in the target area and observe both sides, approximately 30 meters off-trail. If the area is too wide, survey one side and then the other. Collect all Field Observation data for each population of slender false brome observed. A population includes all plants found within 12 meters of one another, while any plant further than 12 meters apart would be considered separate populations. When the species is found along the trail, survey 30 meters off-trail at those locations as well.

Take a GPS polygon for all populations greater than 5m<sup>2</sup>.



Collect Field Observation data for each population.

30 meters off-trail

30 meters off-trail

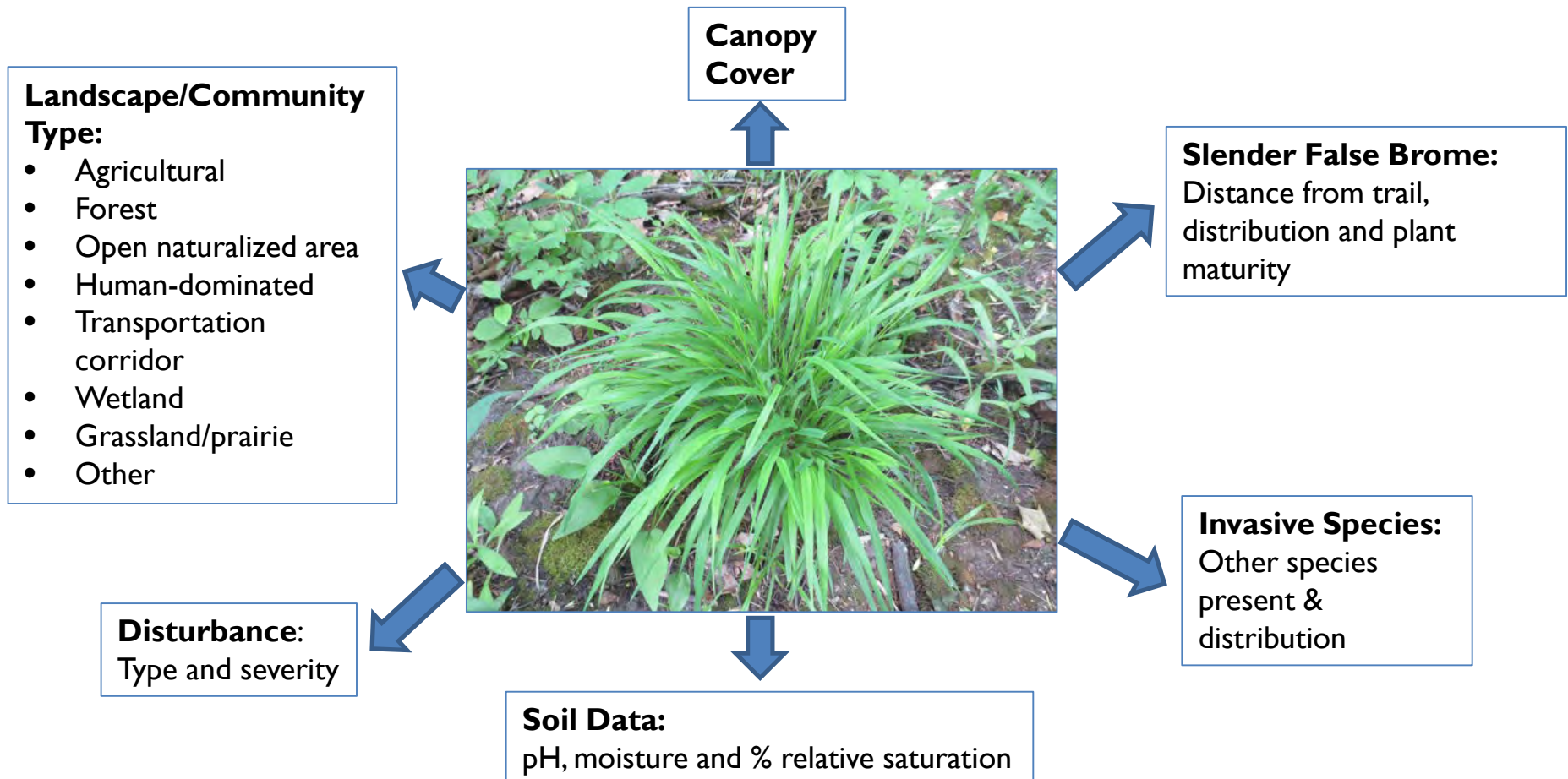
# Slender False Brome Surveys



## Field Observation Data:

**Basic Data Collection:** Record date, time, GPS coordinates, a GPS polygon if the infestation is greater than 5m<sup>2</sup> and take photos of the infestation and key characteristics of the species. Report information as an observation using iMapInvasives ([www.nyimainvasives.org](http://www.nyimainvasives.org)).

**Advanced Data Collection:** If the necessary equipment is available, collect the Basic Data along with the additional information displayed below. These data are consistent with the Great Lakes Slender False Brome Working Group Field Observation survey protocol.





*Brachypodium sylvaticum*

Field Observation Form

Observer(s):	A. Locke
Site/Location:	Bergen Swamp - Genesee County 6663 Hessenthaler Rd., Byron NY 14416
Site Code:	BESW
Date:	5/15/2017

Page 1 of 3

Unique ID: BESW 1

Photos	Time	Latitude	Longitude	Distribution	Plant Maturity	Canopy Cover	Distance
3	9:45 AM	43.200313	-79.04301	single plant	vegetative	85%	30m

Invasive Species Presence & Distribution: garlic mustard, japanese barberry - scattered plants

Soil pH: 6.4      Soil Percent Relative Saturation: 30%      Soil Moisture: Dry

Landscape Type: Wetland

Disturbance Type: Human      Disturbance Severity: Light

Additional Notes: Disturbance is the trail/trail traffic, plant starting to bolt, but not flowering yet

**Disturbance Type    Disturbance Severity**

- natural      none (intact habitat, no human disturbance, low/moderate natural disturbance)
- human      light (mostly intact habitat, minimal human disturbance, ex: unpaved hiking trails)
- both      moderate (apparent degradation of habitat, noticeable human disturbance, ex: fire pit scars)
- none      heavy (highly degraded habitat, significant human disturbance, ex: hard surface infrastructure)

**Plant Maturity    Landscape Type**

- Vegetative      agricultural system (ex: cattle pasture, row crop)
- Flowers      forest (indicate dominant species, up to 3)
- Seed      open naturalized area (ex: old field-fallow, regeneration)
- Other      human dominated area (ex: residential, industrial)
- along transportation corridor (ex: road, railroad)
- wetland
- grassland/prairie opening (indicate dominant species up to 5)
- other

**Soil Moisture**

- very dry
- dry
- moist
- wet/water

**Distribution**

- single plant
- scattered plants
- dense plants
- dense throughout
- linearly scattered
- monoculture

**Soil Percent**

- Relative Saturation**
- moisture value
- from meter: 0-100%

**Photo Types**

- Primary photo
- Infestation photo
- Close-up photo
- Additional photo

**Soil pH**

- acidity value
- from meter: 3.5-8.0

**Photos**

- Record # of photos associated with individual Observation
- Photos are used for ID confirmation

Appendix F: Reporting Platforms for the Great Lakes States

State	Invasive Species Reporting Platform	Website
Illinois	EDDMapS Midwest	<a href="http://www.eddmaps.org/midwest">www.eddmaps.org/midwest</a>
Indiana	EDDMapS Indiana- Report IN	<a href="http://www.eddmaps.org/indiana">www.eddmaps.org/indiana</a>
Michigan	MISIN (Midwest Invasive Species Information Network)	<a href="http://www.misin.msu.edu">www.misin.msu.edu</a>
Minnesota	EDDMapS Midwest	<a href="http://www.eddmaps.org/midwest">www.eddmaps.org/midwest</a>
New York	New York iMapInvasives	<a href="http://www.nyimainvasives.org">www.nyimainvasives.org</a>
Ohio	EDDMapS Midwest; MISIN (primarily in NW Ohio)	<a href="http://www.eddmaps.org/midwest">www.eddmaps.org/midwest</a> <a href="http://www.misin.msu.edu">www.misin.msu.edu</a>
Pennsylvania	Pennsylvania iMapInvasives	<a href="http://www.paimainvasives.org">www.paimainvasives.org</a>
Wisconsin	EDDMapS Midwest	<a href="http://www.eddmaps.org/midwest">www.eddmaps.org/midwest</a>



# WNY PRISM

*Partnering to Protect Western New York from Invasive Species*

## Best Management Practices: Slender False Brome

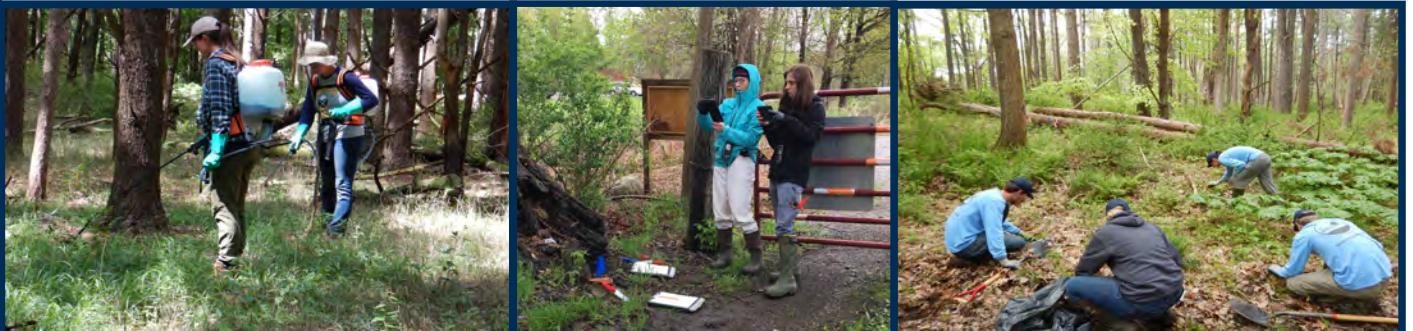
Slender false brome (*Brachypodium sylvaticum*) is a perennial grass found in open grasslands and forest understories. It is commonly found along hiking trails, deer trails and rights of way. Slender false brome forms bright green clumps and has tiny hairs present on leaves, lower stems and nodes.

Slender false brome spreads primarily by seed, which is transported by deer and people (boots, ATVs, mowers). Each plant can produce hundreds of seeds, and long awns allow it to be easily transported. It produces flowers in late June/early July and forms mature seed shortly after. Mature spikelets can be seen into the fall.

Research has shown seeds maintain viability in the soil for 2-3 years, but it is currently unknown how long individual plants live in the invaded range. Slender false brome is not typically eaten by wildlife or livestock and can tolerate a wide range of environmental conditions. This plant quickly forms large, dense monocultures that outcompete native species.

**Integrated Pest Management (IPM)** is an adaptive approach to invasive species management that involves the selection of multiple control methods and appropriate timing to meet the needs of each specific site and species. The goal is to maximize effective control and to minimize any potential negative impacts.

Management efforts should begin with an invasive species survey and site assessment. This allows for the development of a management plan and selection of appropriate removal methods. Management for most well-established species and/or infestations will require dedication over a number of years, often 3-5. Once initial control is achieved, restoration and continued monitoring will be required to maintain success.



## Best Management Practices:

### Slender False Brome

#### Management

##### Manual

Individual plants and small infestations may be removed manually, but care must be taken to dig up the entire root mass. Excessive manual removal can cause significant damage to the soil and native plant communities.

##### Mechanical

Mechanical methods such as cutting or mowing can reduce seed production, but will not eliminate the infestation. Mechanical methods are best used in tandem with other methods, such as chemical removal, or as a means to suppress seed production and slow spread while additional control efforts are planned.

##### Chemical

Herbicides, such as glyphosate, are very effective for slender false brome control and may be applied using foliar application methods. Apply herbicide in mid to late June, before plants form mature flowers and seed. Foliar spraying may be combined with mowing. Mow when flowers start to emerge, to prevent seed set, and apply herbicide 3-4 weeks after mowing. Management should be planned for 2-4 years.

##### Spread Prevention

Clean mowers before and after use. Mow non-infested areas before those infested with slender false brome and mow as low to the ground as possible.

##### Disposal

Plant material may be bagged in black plastic and placed in the sun to solarize for no less than 3 weeks to ensure seed is less likely to remain viable.

##### Restoration

Restoration efforts should take place after the slender false brome infestation has been effectively managed (populations down to levels appropriate for manual removal, seed bank depleted) and may include the planting of native species including grasses, flowers, shrubs and trees.

USE PESTICIDES WISELY: Always read the entire pesticide label carefully and follow all instructions. Pesticide regulations can vary widely between regions; please contact local authorities for additional pesticide use requirements, restrictions or recommendations. Mention of pesticide products by WNY PRISM does not constitute endorsement of any material.



Photos Front: Top - Slender false brome infestation; Middle - flower close-up; Bottom (left to right) - foliar spraying, survey and site assessment, and manual removal; Photos Back: Genesee County Park and Forest restoration; Top - Slender false brome infestation pre-treatment; Bottom - post-treatment, mechanical on left, herbicide on right.

#### Additional Resources:

[www.wnyprism.org/projects/slenderfalsebrome](http://www.wnyprism.org/projects/slenderfalsebrome)



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