SLELO PRISM
St. Lawrence Eastern Lake Ontario Partnership for Regional Invasive Species Management
Teaming Up to Stop the Spread of Invasive Species

Can a Fly Save Eastern Hemlock Forests?

By: Mat Levine
Conservation Lands Manager for The Nature Conservancy -CWNY Chapter

Three years ago, hemlock woolly adelgid (HWA) was discovered on a single tree along a nine-mile-long trail system that traverses forests, meadows and rocky bluffs above the Chemung River in Elmira, NY. Suspecting a larger infestation, The Nature Conservancy (TNC) and the Tanglewood Nature Center – adjoining landowners who jointly manage the conservation area – partnered with Cornell University and the Finger Lakes PRISM to conduct a one-day citizen science assessment of the HWA infestation. The results were definitive – **75% of the hemlocks surveyed contained HWA.**

Land managers for The Frenchman's Bluff/ Tanglewood Nature Center Conservation Area began to investigate options for managing a forest with a high-density HWA infestation. Chemical treatments could save select specimen trees, but were not practical options for conserving an entire forest. A long-term and self-sustaining solution was needed**.**

Managers looked at the practice of using natural predators, or biocontrols, to combat HWA. If successful, the biocontrols - a variety of beetle and fly species - would feed exclusively on HWA. HWA would be forever present in the forest, but the biocontrols would keep them at densities low enough so that hemlock trees were not threatened. The beetles and flies would naturally reproduce, mimicking the naturally occurring healthy predator/prey relationship between insects and HWA found in western hemlocks in the Pacific Northwestern U.S.

Knowing of the HWA infestation, Cornell University – a world leader in biocontrol research – approached The Nature Conservancy and Tanglewood Nature Center in 2017 with an exciting proposal. Researchers were testing a new biocontrol – silver flies – and wanted to make the first operational wild release in the Frenchman's Bluff/Tanglewood Nature Center Conservation Area. *Learn more details about the efforts of Cornell University's Hemlock Initiative-Biocontrol Lab on page 4.*

In May 2017, 240 adult silver flies were released into mesh bags installed on low-lying branches of hemlocks infested with HWA.

Photo credit Bridget Sharry. Release of HWA biocontrol by Mark Whitmore's lab at Frenchman's Bluff preserve and Tanglewood Nature Center conservation easement.

The mesh bags were left in place for 10 days to ensure the silver flies mated and laid eggs. Analysis of samples collected from those releases demonstrated that they can successfully reproduce in the wild.

Building on this success, additional research is now underway to analyze if silver flies can become established across the landscape as a successful HWA predator. Citizen scientists are also contributing to the project by collecting data on the life cycle of HWA to help researchers prepare for and schedule releases of biocontrols.

So, can the silver fly save the eastern hemlocks in New York State? We're not certain yet, but early analysis looks promising. The HWA predators have been shown to successfully reproduce in our hemlock forests. And a coalition of researchers, land managers and citizen scientists are working together to create a long-term and self-sustaining hemlock conservation program focused on biocontrols at the Frenchman's Bluff/Tanglewood Nature Center Conservation Area in Elmira, NY. The future of our hemlock forests may ride on the wings of the little silver fly.

Learn more about hemlock woolly adelgid and various citizen science initiatives that you can get involved in within the SLELO PRISM and other parts of New York State by visiting www.sleloinvasives.org .

New Aquatic Invasive Plant Control Technology on the Horizon

By: Megan Pistolese, SLELO E/O Coordinator

Aquatic invasive plants have the ability to reduce the overall health of aquatic ecosystems, impede recreational activities, and lower waterfront property values. Eastern Lake Ontario and other waterbodies in New York have suffered the impacts of aquatic invasive plants, but new ultraviolet-C (UVC) light technology may serve as an effective control method.
A partnership between the Tahoe Resource Conservation District, Inventive Resources, Inc., The California Tahoe Conservancy, and the Tahoe Fund has resulted in a UVC Light Pilot Project to test and analyze the effects of deep-penetrating UVC light on invasive aquatic weeds. The pilot project began in the summer of 2017 and will continue through 2018 in South Lake Tahoe, CA.

With funding, project partners obtained a drop-down panel of UVC lights that were mounted to a specially designed boat. When this boat passes over the target aquatic invasive plant populations, the UVC-light damages the cellular structure of the plant, leading to mortality and rendering the plant unable to reproduce (California Water Daily News). This technology resulted in the eradication of half the weeds in the test location within the first week of its use!

Excitement for UVC-light technology is rising as there is great potential for it to be used as an effective, fast-acting and chemical-free control method for aquatic invasive plants throughout the country & around the world. Chemical-free control alternatives are of great value, as aquatic ecosystems are highly sensitive to chemicals.

Pilot UVC-light boat used to control aquatic invasive weeds in Lake Tahoe, CA. Photo credit: Tahoe Fund at http://www.tahoefund.org/tahoe-goes-high-tech-adapt-effects-climate-change/

Information for this article was obtained from the TahoeFund.Org and the California Water News Daily.

California Water News Daily, "Lake Tahoe Pilot Program Kills Invasive Aquatic Plants with Ultraviolet Light." *California Water News Daily News*, 12 July 2017, californiawaternewsdaily.com/uncategorized/lake-tahoe-pilot-program-kills-invasive-aquatic-plants-with-ultraviolet-light/

Tahoe Fund, "Tahoe Goes High Tech to Fight Aquatic Invasive Weeds." 11 July 2017, www.tahoefund.org/tahoe-goes-high-tech-adapt-effects-climate-change/.

Status of Biological Control Candidates for Invasive Swallow-worts

By: Audrey Bowe, NYISRI

Hypena opulenta, a defoliating moth, is currently the primary candidate for swallow-wort control. This species was released in Canada in 2013, and has successfully overwintered there for the past two years (2015-2016). Currently, due to low densities and high dispersal of these moths, effective control of swallow-wort by this agent has not been documented in the field. Another moth species, *Abrostola asclepiadis,* is a promising candidate, however no petitions are currently being put forward to develop this agent. Host range testing is in progress for a third candidate, a seed destroying fly, *Euphranta connexa,* which has a high impact on seed crop in swallow-wort's native European range.

Outlook: Recent experimental releases of *H. opulenta* in Canada have shown limited suppression, but further assessment is needed. Models have suggested control of swallow-wort may only occur under high shade or stressful field conditions.

Challenges: *H. opulenta* might be subject to high predation in the field. Further study is needed to determine whether the moths will reach densities high enough to impact swallow-wort growth, spread, and reproduction.

Timeline: *Hypena opulenta* was approved for release in the United States in 2017. The first U.S. experimental releases of *H. opulenta* were made in several northeastern states during summer 2017 by researchers at the University of Rhode Island. At this time no releases have been made in New York State. However, releases are being planned for Summer 2018, with Whele State Park & Great Gully being potential target locations. In preparation, the New York Invasive Species Research Institute (NYISRI) has been working with a group of researchers to develop standardized release protocols and an experimental release strategy in New York for 2018.

Introducing the NYS Hemlock Initiative Biocontrol Program

By: Charlotte Malmborg, NYS Hemlock Initiative-Cornell University

In 1985 the hemlock woolly adelgid (HWA), an invasive forest pest from Japan, reached the Lower Hudson region of New York and began to spread throughout the state. It is currently present in 43 NY counties, and in July of 2017 was found in the Adirondack Park for the first time. HWA represents a major threat to our forested lands because hemlocks are the state's third most common tree. Hemlocks throughout New York are becoming weak and dying as a result of this invasive pest, and New York's verdant mountains and glens are at risk of becoming unrecognizable in the coming decades. For our forests to remain healthy and able to continue providing vital ecosystem services, it is critical we develop strategies to slow the spread of HWA in the coming years as this pest moves across New York.

There are several challenges to slowing the spread of HWA. First, it reproduces asexually, so just one insect can spark an infestation. Second, HWA completes two generations per year. Third, it has no natural predators here in our East Coast forests, so there is little control of population growth or spread. While these three challenges combined are certainly formidable, there is hope with the development of biological controls being researched at Cornell University. Under the direction of forest entomologist Mark Whitmore, the New York State Hemlock Initiative is hoping to use natural predators of HWA that are native to the United States' Pacific Northwest region to slow the spread of HWA and prevent widespread mortality of hemlock trees.

The NYS Hemlock Initiative's biocontrol program is developing methods and capacity to control HWA through natural predators in a new biocontrol lab, which opened on Cornell University's Ithaca campus in November 2017. The lab is primarily funded by the New York Department of Environmental Conservation (DEC), with additional funds from the US Forest Service and the US EPA as part of their Great Lakes Restoration Initiative.

The biocontrol program aims to explore the life cycle, or phenology, of HWA and HWA predators, and rear lab colonies of discovered biocontrol agents for wild release. The program is currently focused on a beetle species *Laricobius nigrinus*, and two species of silverflies in the genus *Leucopis*.

The first *Laricobius* beetles were released in New York in 2008, and populations have been established at three sites. Silverflies are also found in the Pacific Northwest, where they feed on the eggs of both HWA generations. West Coast silverflies were released and established at ten New York sites in the spring of 2017.

Laricobius nigrinus under the microscope feeding on HWA in Cornell's Biocontrol Lab. Photo Credit: Megan Pistolese, SLELO-PRISM.

The Hemlock Initiative is planning to begin research to breed silverflies in the lab in enough abundance to reliably feed upon HWA along the entire East Coast.

Biocontrol strategies are a long-term solution for HWA control and hemlock conservation, yet it will be many years until hemlock mortality will be prevented by these strategies alone. In the meantime, we are fortunate to have effective insecticides, allowing us to preserve the genetic diversity of the state's hemlock resources and buy the time needed to develop a robust biocontrol program. Continued conservation efforts of government agencies and private forest owners are critical to the preservation of hemlocks in New York. Identifying existing hemlock stands, monitoring the spread of HWA, and treating ecologically important hemlock trees in the short term will ensure that there will be hemlocks left for the future. In the interim, the NYS Hemlock Initiative biocontrol lab team will be hard at work, researching the insects that could provide the key to long-term HWA management in New York.

The New York State Hemlock Initiative represents the efforts of scientists, researchers, lawmakers, landowners, and citizen-science volunteers throughout New York.

You can learn more about hemlock conservation, hemlock woolly adelgid, and how to get involved by visiting the NYS Hemlock Initiative website at ***www.nyshemlockinitiative.info*** *Or email* ***nyshemlockinitiative@cornell.edu****, or visiting the Hemlock Initiative Facebook page*

Another 'Fly' in the Ointment: *Invasive Species on the Move*

By: Sue Gwise, CCE Jefferson County

Another invasive insect has popped up on our radar. SLELO partners have been keeping an eye out for the spotted lanternfly since 2014 when it was found in Pennsylvania. This past November it was found in New York State in Delaware County. The insect was dead, but it is believed that it was introduced by a contaminated interstate shipment.

The spotted lanternfly could easily be mistaken for a butterfly or moth due to its large size (one-inch long) and colorful wings, But it is actually a plant hopper and classified as a 'true bug'. For all the entomologists' out there it is in the *Hemiptera* order of insects which also includes other plant pests like aphids, whiteflies and mealybugs.

On the left is an adult spotted lanternfly, note its size and various colors and patterns on the wings. Photo credit: PA Dept. of Agriculture. The bottom right photo is the immature nymph stage of SLF. Nymphs have white spots with red patches as they mature. Photo Credit: itchydogimages.

The adult spotted lanternfly is quite striking. The forewings are grey with black spots; the wing tips are speckled in black. The hindwings are scarlet red with black and white bands. The stout abdomen is yellow with black bands and the legs and head are black. As displayed in the bottom right photo above, the immature insects, or nymphs, are black with white spots—red patches develop as they mature.

Female adult spotted lanternfly laying eggs on a tree. *Note the grey cement-like appearance of the egg mass above.* Photo credit: Greg Hoover, Penn State Department of Entomology
http://news.psu.edu/photo/334848/2014/11/14/spotted-lanternfly-laying-eggs

Native to Indo-China, the spotted lanternfly sucks the sap from the leaves and stems of plants. As a result, sap will weep from the wounds attracting wasps and ants. This feeding activity stresses and weakens the plant host. The hosts are several commercially important plant species including grapes, apples, stone fruits, hops and pine.

Females will lay their eggs on any smooth surface including stone, siding, vehicles, lawn furniture and toys. The egg masses are about an inch long and look like a thin layer of cement. Initially grey and mud-like, the masses become dry and cracked. Although their favorite host is the tree of heaven or *Ailanthus altissima*, they are known to feed on 30 native woody plant species, notably the sugar maple, which is their favorite native host. Fortunately, they are apparently not able to complete their life cycle in the absence of *Ailanthus* trees, so most of Northern NY State does not seem to be at risk. However, spotted lanternfly can be spread by the movement of materials containing egg masses, such as trees, bricks and stone.

If you encounter an insect you suspect to be spotted lanternfly, take an up-close and clear photo. Better yet, catch it and place it in alcohol or in a container in the freezer for preservation. Contact your local Department of Environmental Conservation, or Cornell Cooperative Extension or reach out to the SLELO PRISM Coordinator Rob Williams at rwilliams@tnc.org.

Do Invasive Species Affect People?

By: Rob Williams, SLELO PRISM Coordinator

The ecological and economic impacts of non-native, invasive species generally receive a lot of attention, but much less is known about the effects invasive species have on people's well-being and livelihood. We may assume that invasive species primarily impact developing countries, especially indigenous peoples, and forget that invasives affect developed nations such as the United States. The question of how and to what extent invasive species affect human well-being and livilihoods on a local level is something the SLELO partnership wanted to better understand.

To explore this question, in the summer and fall of 2017, SLELO partners created a *Cultural Impact Survey*. The purpose of the survey was to determine how invasive species affect the well-being and livelihood of individuals in the St. Lawrence Eastern Lake Ontario (SLELO) Region, comprising Oneida, Oswego, Jefferson, St. Lawrence, and Lewis counties. For this survey, well-being was defined as *general happiness*, and livelihood as *food on the table, money in your pocket or financial means.*

The results revealed that roughly 92% of survey participants reported their well-being was being affected by invasive species in the SLELO region, and about 74% indicated their livelihood was impacted. These percentages increase when asked if a rise in invasive species introductions from global trade and travel would affect people's well-being and livelihoods, demonstrating genuine concern.

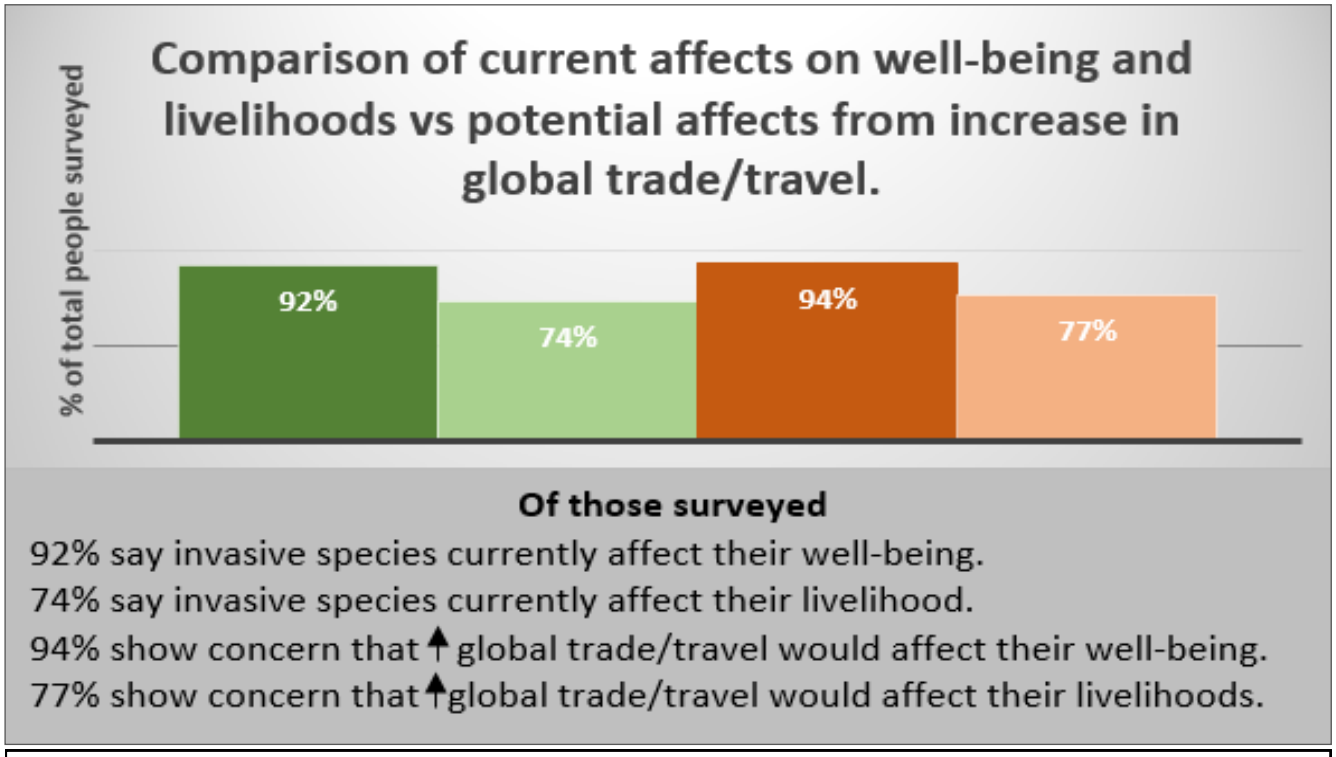
Interestingly are several comments that were received in the "additional comments" section of the survey. Of the eight pages of comments, two are presented here;

"We don't have a lot of money. Last weekend my husband and I both got a rash from some poisonous hog plant that we were removing from our yard. We don't have health insurance and we had to pay a fortune to the doctors and for medicine, now we don't have enough to buy food until next week".

"The milfoil and curly weed are wrecking by business. I have 5 or 6 slips that no one will rent because of the weeds and this business is my livelihood".

Prior to this survey, little was known about the cultural impacts of invasive species. We now know that, in addition to ecological and economic effects, invasive species cause real and measurable harm to the well-being and livelihoods of people on a local level in the SLELO PRISM region of New York State.

More details and statistics can be viewed in the SLELO PRISM Cultural Impacts White Paper.



This graph was taken from, page three, of the Cultural Impacts Survey White Paper.

SLELO by The Numbers: *2017 Accomplishments at a Glance*

1,726
People directly engaged

38
Education, outreach & citizen science events

65
Forest pest traps hung & monitored by volunteers

45,000
Tree seedlings readied for planting on Tug Hill

19
Giant Hogweed sites eradicated

17
Number of PCA's where Control work took place

12
Tons water chestnut plants harvested.

12
Priority Conservation Areas protected by early detection surveys.

1,333
Observations were recorded into iMapinvasives.org

485
Participants in our Cultural Impact Survey

Upcoming Invasive Species Events

We encourage our partners to highlight their upcoming invasive species related events in each newsletter. Please contact Megan Pistolese to submit an event at 315-387-3600 ex.7724; megan.pistolese@tnc.org.

Case Studies in Response to and Management of Invasive Mussel Infestations Webinar: January 19th 1:30pm-3pm. For more details and to register CLICK HERE

Hemlock Woolly Adelgid Workshop: Saturday, January 27th 1pm-4pm at the Delta Lake State Park located at 8797 NY-46, Rome, NY 13440. For more information and to register contact Megan Pistolese, 315-387-3600 x7724, megan.pistolese@tnc.org. Workshop Flyer.

Save the River's 29th Annual Winter Environmental Conference: Saturday, February 3rd, 9:30am-4pm at the 1000 Islands Harbor Hotel in Clayton, NY. For more information, contact Save the River at 315-686 2010, info@savetheriver.org. To Register Click Here

Tug Hill Commission's 29th Annual Local Government Conference: Thursday, March 29th 7:30am-4pm at JCC in Watertown. **Event schedule and registration.**

New York State Wetlands Forum Annual Conference: Tuesday, April 10th - Wednesday, April 11th. Registration info will be posted HERE in the near future. For more details view: NYS Wetlands Forum

Hemlock Woolly Adelgid Surveys: Hosted by the Roger Tory Peterson Institute of Natural History, Chautauqua Watershed Conservancy and Jamestown Community College. Survey sites are located along various state forests and preserves in Western New York. For more details CLICK HERE.

-2018 National Invasive Species Awareness Week-

February 26 - March 2

This year's theme:

Don't Move Firewood/Burn it Where you Buy it

-Partner Spotlight-

NYSG & NYSDEC Partner to Integrate Invasive Species Curriculum into the Classroom

By: Emily Sheridan, Great Lakes Watershed Coordinator-NYSDEC

Teachers and educators interested in teaching k-12 students about invasive species and other Great Lakes issues will find a wealth of information in the New York Great Lakes Ecosystem Education Exchange (GLEEE) program.

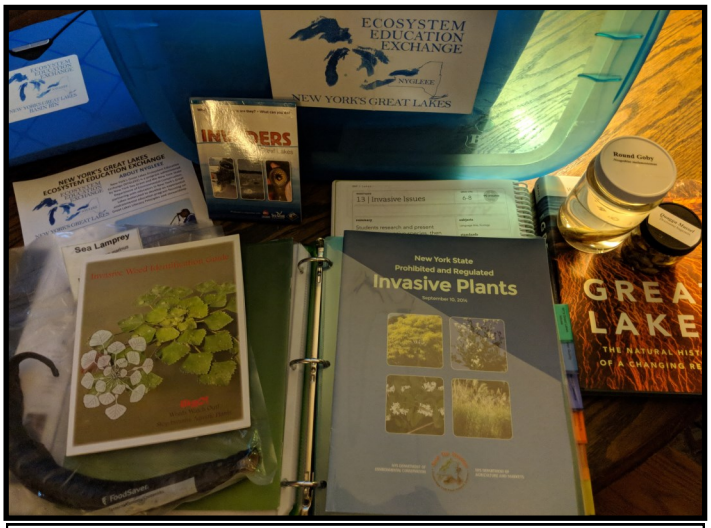
GLEEE is administered by New York Sea Grant and the New York State Department of Environmental Conservation. The program aims to develop an experiential environmental education program in partnership with environmental educators throughout the region, and to foster the next generation of environmentally literate, stewardship-minded citizens within the watershed. GLEEE offers curricula & other resources to help k-12 teachers provide hands-on methods for connecting local and regional environmental issues with classroom and field-based learning. A clearinghouse of resources, curricula, and tools are available for teachers and educators at this link.

GLEE offers resources on many issues that impact the Great Lakes Watershed, including aquatic invasive species. Teaching your students about aquatic invasive species helps them better understand how these species are spread, which can help students become responsible recreational users of our shared water resources, and may spur them to encourage their families to "clean, drain and dry" their boats to help stop the spread of invasives. For educators interested in teaching about invasive species in the St. Lawrence– Eastern Lake Ontario region, the resources and tools available through GLEEE are sure to bolster your classroom discussions and help engage students.

The GLEEE website has a section on aquatic invasive species that includes background information on aquatic invaders that threaten our Great Lakes, such as hydrilla, water chestnut and Eurasian watermilfoil. Downloadable versions of detailed curricula, classroom activities, fact sheets, and many other invasive species-related resources for teachers are available.

One hands-on activity is Rival for Survival, a game which presents real-life choices involving exotic species such as zebra mussels and purple loosestrife. Students analyze a situation related to ecology and make an environmentally sound decision. After playing, students organize what they learned into a concept map.

Another curricula example is Invader Species of the Great Lakes where groups of students select an exotic species, create a poster or fact sheet, and develop a charade-like game to demonstrate how to prevent exotic species from spreading. Both of these curricula can be aligned with the NYS learning standards for Interdependent Relationships with Ecosystems.



Pictured above are some samples of invasive species related resources available in the GLEEE basin bins. Photo credit: Emily Sheridan, NYSDEC.

In addition to online materials, teachers have access to program basin bins. These bins are equipped with hands-on activities, learning materials, identification booklets, and real preserved aquatic invasive species specimens such as sea lamprey, round goby, and quagga mussels. The bins are available at several locations in the SLELO PRISM region, including Clayton, Watertown, Oswego, as well as at the TNC Pulaski office. To learn more, or to borrow one of these basin bins, click here.

Furthermore, GLEEE offers a networking platform to connect educators who are teaching about invasive species and other Great Lakes issues. To learn more about this network, you can attend a Great Lakes Networking Model Educator Workshop. The next one will be offered this spring. NYSDEC and NY Sea Grant are also planning 2-day professional development workshops for this summer to help teachers integrate GLEEE resources into their classrooms.

If you would like to learn more about the NY Great Lakes Ecosystem Education Exchange or attend an upcoming workshop for educators in the Great Lakes basin, email Greatlakes@dec.ny.gov

NY's Great Lakes Ecosystem Education Exchange is supported by the Environmental Protection Fund to advance the Ocean and Great Lakes Ecosystem Conservation Act.

COORDINATOR'S COLUMN

2018 Workplan Breakdown

Unique habitats along with rare, threatened and endangered species in our region are under constant threat from invasive species. This threat also extends to peoples wellbeing and livelihoods, as suggested in our recent Cultural Impacts Survey. To address these threats, the SLELO PRISM prepares Annual Work Plans designed to complement the seven goals of our five-year Strategic Plan. These seven strategic goals are: prevention, early detection & rapid response, cooperation, information management, control, restoration and education/outreach.

Our work plans have always been developed in a way that links all activities to our Strategic Plan. This ensures our work serves the outcome of protecting our lands and waters for people and nature. In 2018 ,we will once again implement a robust work plan that includes 68 individual tasks, many of which are focused within ecologically important Priority Conservation Areas. Below these tasks are broken down into percentages for each goal category:

* 23% early detection/rapid response
* 22% invasive species control efforts
* 17% cooperative efforts
* 17% education & outreach
* 14% prevention efforts
* 05% information management
* 02% habitat restoration

To implement this year's work plan we intend to have help from eight seasonal employees and numerous volunteers and citizen scientists, in addition to many outreach efforts coordinated by our Educator, Megan Pistolese, as well as, administrative support from our host organization The Nature Conservancy. Most important, however, is the collaboration of our partners. Many of our achievements are made through commitment and robust cooperation between partners. It is through this partnership that we work together to protect our lands and waters from the threat of invasive species.

I have the utmost confidence in our partnership to successfully implement the 2018 work plan and to take a positive steps towards protecting our lands and waters. I look forward to another year working together.

~Rob Williams

SLELO PRISM Partners

- NYS Department of Environmental Conservation
- The Nature Conservancy
- Cornell Cooperative Extension Offices
- NYS Office of Parks, Recreation & Historic Preservation
- NYS Department of Transportation
- NY Sea Grant
- Ducks Unlimited
- Soil & Water Conservation Districts
- Fort Drum Military Installation
- Tug Hill Tomorrow Land Trust
- Tug Hill Commission
- Save The River
- Onondaga Audubon
- Thousand Islands Land Trust
- NY Power Authority
- CNY Regional Planning & Development Board
- US Coast Guard Auxiliary

Acknowledgements:
NYS Invasive Species Council
NYS Dept. Environmental Conservation
The NYS Environmental Protection Fund

Edits completed by: Paul Hetzler, St. Lawrence CCE;
Rob Williams SLELO PRISM Coordinator
Megan Pistolese SLELO PRISM E/O Coordinator

St. Lawrence - Eastern Lake Ontario SLELO PRISM Partnership For Regional Invasive Species Management

The Nature Conservancy
Protecting nature. Preserving life.

Our host organization
The Nature Conservancy, CWNY