SLELO PRISM

St. Lawrence Eastern Lake Ontario Partnership for Regional Invasive Species Management

Teaming Up to Stop the Spread of Invasive Species

The Hidden Costs of Novel Ecosystems

By: Dr. Doug Tallamy, University of Delaware

Nature is a series of specialized relationships, from the resplendent quetzal's uncompromising need for wild avocado fruits in Central America, to the total dependence of bolas spiders on a single species of moth prey, to the 11 species of native bees that only forage for pollen on gold-enrod in New England, to the reliance of mayapples on box turtles for seed dispersal in your local woodlot, to the millions of species of insects that can develop only on particular plant lineages. Specialization that took eons to evolve is the rule in nature rather than the exception, and in most cases it starts with plants. Today, specialized relationships are threatened by the loss of the indigenous plants upon which they were built. Throughout the globe we humans are rapidly dis-placing native plant communities with plants that evolved on other continents.

Bee harvesting goldenrod. Photo credit: http://mplsgreen.com/our-bees/

When we import an ornamental plant from China or South America to decorate our yards, or plant Eucalyptus from Australia to shade coffee trees in Costa Rica, or replace native grasses in the southwestern U.S. with African grasses that better endure cattle grazing, we create "novel ecosystems." Ecologists define novel ecosystems as those in which resident species are just meeting each other for the first time in evolutionary history. By definition, this means that members of novel ecosystems have not had the immense periods of time required to develop specialized relationships with each other. Unfortunately, this also means that the specialized co-evolved relations that once characterized local ecosystems are degraded or lost entirely when novel plants replace native plants.

Nowhere is this more evident than in ecosystems flooded with invasive plants. Picture, if you can, a kudzu invasion in Mississippi, a *Phragmites* invasion in New Jersey, a spotted knapweed invasion in California, a burning bush invasion in Connecticut, a cheat grass invasion in Washington, a privet invasion in Georgia, a buckthorn invasion in Michigan, a *Melaleuca* invasion in the Everglades, or a bush honeysuckle invasion in Tennessee. In these and many other examples, native plant communities are largely or entirely replaced by the invasive species. And when that happens, the animals that depended on the native plants lost during the invasion disappear from the invaded site as well. With 3,300 species of invasive plants now in the U.S., it is hard to imagine the staggering loss of biodiversity that has been caused by invasive plants in this country alone.

It is not the aggressive nature *per se* of invasive plants that is destroying specialized biological interactions; some of our native plant species are as aggressive as invasives. It is the evolutionary origins of invasive plants that cause the problem. A barberry species that evolved in Asia, for example, has not had the opportunity to develop a specialized relationship with a monarch caterpillar in Virginia, and it is unlikely that it will ever be able to do so. Monarchs are locked into a specialized relationship with milkweeds and will disappear before they could develop a taste for barberry. Similarly, the Asian crepe myrtles that adorn so much of South Carolina are not invasive plants that will displace native plants in local woodlots. But because of their origins in Asia, crepe myrtles cannot provide food for the insects in South Carolina that in turn provide food for the birds, frogs, toads, salamanders, rodents, foxes, black bears, lizards, bats, foxes, raccoons, skunks, and possums of South Carolina. Insects are the backbone of most terrestrial food webs, and without them those food webs collapse.

Continued on Page 6

Strengthening Early Detection Efforts in SLELO PRISM

By: Megan Pistolese

Preventing the introduction of invasive plant and animal species from entering the five counties encompassed by SLELO (Oneida, Oswego, Jefferson, Lewis, St. Lawrence) is the number one priority of our PRISM. The main strategy used to accomplish this goal is to search for invasive species that have not yet been found, known as "Prevention/Watch-List" species.

Early detection of invasive species gives a strategic advantage to prevention and treatment initiatives, as it often results in the detection of invasive populations before they become too dense to manage. Currently, SLELO PRISM hires two seasonal employees to scout twenty-four Priority Conservation Areas (PCAs) on a two-year rotation.

To strengthen prevention efforts, SLELO PRISM is promoting an invasive species Volunteer Surveillance Network (VSN). Currently we are focusing on surveillance of emerald ash borer (*Agrilus planipennis*) in areas along the St. Lawrence River and Eastern Lake Ontario; hemlock woolly adelgid (Adelges tsugae) in areas within the southern portion of Tug Hill; and fanwort (*Cabomba caroliniana*) in Fish Creek which connects Kasoag and Oneida Lakes. So far we have gained over thirty volunteers and hope to acquire more!

Participants of the VSN learned how to identify priority invasive species, infestation symptoms, surveillance techniques and observation reporting methods at various workshops sponsored by SLELO PRISM.

Establishing a volunteer surveillance network is a cost effective way to increase the surveillance capacity of our PRISM while also promoting a better understanding of invasive species by engaging people in science. To get involved please contact the SLELO PRISM Education and Outreach Coordinator Megan Pistolese at 315-387-3600 extension-7724; megan.pistolese@tnc.org

Photo taken by Linda Brosch, Executive Director Oswego County CCE, at the Hemlock Woolly Adelgid Workshop held on Saturday, November 12th, 2016 at the 4-H Education Center in Williamstown, NY. Names of those pictured: John Cooper, Steve Litwhiler, Doug Leuenburger, Patricia Carney, Bob Thompson, Sundas Rehman, Don Fenske, Josh Curroll, Josh Payette, Maria MoskaLee, Tony Perry, Matt Hoctor, Dudley Bailey, Caroline Hoctor, James Hoctor, Nathan Keller, Megan Pistolese, Meg Wilkinson, and Cary Fassler.

Species Profile: Southern Pine Beetle (*Dendroctonus frontalis*)

By: Megan Pistolese

The Southern Pine Beetle (*Dendroctonus frontalis*), is a bark beetle native to Latin America and Southeastern portions of the US. It predominantly attacks pitch, white and red pine trees, but hemlocks and spruce are also susceptible when population densities of *D. fontalis* are high. Although, *D.frontalis* is not currently on the SLELO PRISM priority species list, its recent spread in NYS is worthy of discussion. Most likely due to warming winter temperatures, *D.frontalis* spread to Suffolk County on Long Island in 2014, and has since moved to counties north and west of New York City.

About the size of a grain of rice, this small 2-4 mm brown colored beetle disrupts nutrient flows and weakens host trees by digging out "S"-shaped tunnels in the cambium tissue causing tree mortality typically within 2-4 months. Pine tree mortality results in habitat loss, and an overall reduction in the health of forest ecosystems. Furthermore, infestations of *D. frontalis* also cause large revenue losses for the timber industry as infestations introduce a blue-stain fungus that quickly reduces the marketability of infected trees (Profiles of Selected For-est Pests, 68).

Pictured above, enlarged *Dendroctonus frontalis*. Photo Credit: Pest and Disease Image Library, Bugwood.org.

Most of the destruction caused by *D.frontalis* in New York has occurred in Suffolk County on Long Island, with the largest infestation at the Wertheim National Wildlife Refuge. Since, 2014, *D.frontalis* has spread to Rockland, Ulster, and Orange counties. Since *D.frontalis* appears to be on the move it is important to be on the lookout for signs of infestation which include, popcorn-shaped clumps of reddish colored resin (pitch tubes), and shotgun patterned holes on the bark exterior, S-shaped tunnels under the bark and reddish-brown needles. The NYS Department of Environmental Conservation (NYS DEC) suggests that the removal and disposal of infested trees will help to keep *D.frontalis* from spreading.

Top photo, *D.frontalis* pitch tube; bottom photo, yellowing on pitch pine caused by *D.frontalis* . photo credit's: Maria MoskaLee, DEC Forest Health Specialist. Photo location, Long Island, NY.

Furthermore, thinning infested forests increases the amount of sunlight and nutrients available for remaining tree populations which strengthens their resiliency.

D.frontalis is mainly spread through the transport of untreated sawn wood and wooden packaging materials that contain bark. Therefore, the suggested time to remove infested trees is in the winter months when the invasive beetle lies dormant within the tree thus reducing its ability to spread to uninfested areas. It is also important to destroy the remains of removed trees, especially when *D.frontalis* is active in summer months, to prevent its spread.

If you suspect a *D.frontalis* infestation, please contact the NYS DEC Forest Health Division at 1-866-640-0652; foresthealth@dec.ny.gov.

References:

"Profiles of Selected Forest Pests" FAO Forestry Paper 156: Global Review of Forest Pests & Diseases. Food and Agriculture Organization of the United Nations (FAO), 68. 2009.Web.

Tools of Collaboration

By: Emily Sheridan,
Eastern Great Lakes Watershed Coordinator; DEC Great Lakes Program/ Natural Heritage Trust

"Synergy is what happens when one plus one equals ten or a hundred or even a thousand! It's the profound result when two or more respectful human beings determine to go beyond their preconceived ideas to meet a great challenge." ~ Stephen Covey

A New York Great Lakes Action Agenda Northeast Lake Ontario sub-basin work group meeting was recently held. Stakeholders were brought together from environmental groups, federal and state agencies, local and regional planners, and other community organizations to meet the challenges of New York's Great Lakes watershed. Topics such as, water quality, natural resources, invasive species management, sustainability, resiliency, recreation and energy were discussed. In the Northeast sub basin, which encompasses the Black and St. Lawrence river watersheds, 15 attendees participated in the meeting at the beautiful Keewaydin State Park and collective ideas were shared for collaborating to address these regional challenges.

The work group recognized that combating invasive species is an especially urgent concern, as invasive aquatic plants like Eurasian watermilfoil, European frogbit and water chestnut clog our waterways, out-compete native species and degrade important habitat, recreational and water resources. Furthermore, terrestrial invasive species like pale swallow wort, Japanese knotweed, and giant hogweed can reduce plant diversity along riparian areas, contribute to shoreline erosion, and potentially threaten human health. Through an ecosystem based management approach, collective ideas are being shared and organized to better understand how to manage invasive species and meet other challenges our region faces.

By bringing in multiple stakeholders and perspectives, invasive species management can be scaled up as a larger strategy to protect water quality and restore native fish, pollinator and other wildlife habitat. With funding from the New York State Environmental Protection Fund, new tools for resource managers are being developed to help guide strategies to meet challenges. For example, a NY Great Lakes Riparian Restoration Opportunity Assessment was recently completed that can help local schools, clubs or other organizations target stream bank restoration projects. This tool uses indicators such as water quality, species of greatest conservation need, trout waters, land use, and topography to identify priority areas where the DEC Trees for Tribs program can provide trees to achieve the greatest benefits for riparian habitat restoration. Invasive species control and management is an important component of restoring native habitat. In disturbed areas where invasive species have been treated, the planting of native trees and shrubs can aid in restoration.

The assessment tool and other information about the Great Lakes Action Agenda is available online at: http://www.dec.ny.gov/lands/91881.html. For more information or to learn how you can get involved in the Great Lakes Action Agenda workgroups, email: greatlakes@dec.ny.gov

Attendees collaborate at the North East Laker Ontario Sub-Basin Workgroup at Keewaydin State Park on October 25th, 2016. Photo Credit: Emily Sheridan, Eastern Great Lakes Watershed Coordinator; DEC Great Lakes Program/ Natural Heritage Trust.

Partner Spotlight

By: Chris Sherwood , New York Power Authority (NYPA)

Fundamentally, all the projects and daily activities of the New York Power Authority (NYPA) are geared to provide safe, reliable energy to the residents of New York State in a sustainable and environmentally sound manner. The NYPA provides 25% of New York State's electricity from sixteen facilities, predominately through hydropower. Our transmission lines cross 1,400 miles within the state and include 16,000 acres of managed right-of-way corridors, of which approximately a quarter are serviced each year.

Integrating new technology into the electric grid is at the forefront at NYPA. Two local projects within the SLELO region will increase efficiency in transmission without building new lines or creating new generation. These are the Substation Automation Modernization and Controls project, and the Marcy South Series Compensation Project. The Substation Modernization being done at the St. Lawrence Power Project in Massena, NY allows real-time monitoring of system conditions to detect problems and improve the Northern New York transmission grid. This will help optimize the constantly changing energy flows from the many wind farms and hydro facilities in this region. Also new is the Marcy South Series Compensation Project. It was put into service in June and increases clean energy flows from upstate facilities without the need for new transmission lines. This project has increased energy flow by 440 megawatts which is enough to compensate the closing of the coal-fired Huntley Power Plant in western NY.

To better manage NYPA corridors, Integrated Vegetation Management (IVM) is employed to prevent tall growing trees and shrubs from interfering with critical infrastructures. IVM controls undesirable tall plant species while encouraging the growth of desirable low growing plants. We also encourage compatible land use by property owners, and selectively use herbicide treatment to create the diverse plant communities that work well for us.

Furthermore, as part of the planning process, a year before work is scheduled to be completed the NYPA performs an inventory of vegetation growing along our corridors. This inventory is used to estimate cost, determine treatment options if needed, and track past work progress. We have also begun tracking/monitoring the invasive plant species found in each corridor or "work polygon". With help from the University of New York's College of Environmental Science and Forestry (SUNY ESF) we have recently started inventorying beneficial native vegetation such as, milkweed species, in order to monitor and promote their survival. Studies conducted by SUNY-ESF on NYPA corridors located in Oneida and Oswego counties identified more than 300 plant species, 50 grasses, 30 tree species, 40 shrubs, 15 ferns and 160 other native plants that provide critical habitat for wildlife.

Chris Sherwood (left) and James Buckingham (right) docu-menting native vegetation found within a NYPA right-of-way corridor. Photo credit: Chris Sherwood.

NYPA has renewed its agreement with SUNY ESF to conduct other studies in our corridors, on various topics important to the electric utility industry and NYPAs commitment to being an active partner in our communities. One project included a study of the spread potential of invasive species along these areas. Other studies included tree growth rate, pre and post-treatment riparian zone conditions, as well as a pollinator study to monitor pollinator species within our corridors and to learn how our practices affects them. In addition to these studies, NYPA has created photo field identification guides for native saplings, shrubs and willow species commonly found in our corridors. These guides will be very useful for other industries and conservation groups. A large part of the work done on these guides took place in the SLELO region.

In conclusion it has been an exciting year here at the NYPA and we look forward to our continued leadership role in the electric utility industry but more importantly with our partnerships in local communities.

Upcoming Partner Events

We encourage our partners to showcase their upcoming events in each newsletter. Please contact Megan Pistolese to submit and event at: 315-387-3600 extension 7724; megan.pistolese@tnc.org

Onondaga Audubon is hosting a series of bird watching field trips in January. For more information visit: https://onondagaaudubon.com/

Save the River's 28th Annual Winter Environmental Conference: Saturday, February 4th, 2017 at the 1,000 Islands Harbor Hotel 200 Riverside Drive Clayton NY . For more details call 315-686-2010.

2017 Tug Hill Commission Local Government Conference: Thursday, March 30, 2017 at Jefferson Community College. Follow link for more details and to register: http://www.tughill.org/LGC2017/

2017 Eastern Lake Ontario Invasive Species Symposium: Wednesday, June 7th, 2017 at Selkirk Shores State Park. More information to be announced.

The Hidden Costs of Novel Ecosystems

Continued from page 1

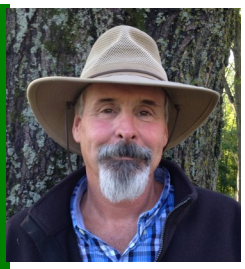
Every time we landscape with an introduced plant, or permit an ornamental plant from our garden to escape into natural areas, we reduce the number and diversity of the insects in our local ecosystem, which, in turn, creates a chain reaction of species loss that degrades the ability of ecosys-tems to produce the services on which we and all other living things depend. The chickadee that wants to raise young in your yard needs to be able to find 6000-9000 caterpillars within 50m of its nest, or its chicks will starve. Let it hunt in the local park, you say? This may not work either, because surveys have shown that nearly a third of the plants in your local park - as in natural areas all over the country - are now invasive species, 85% of which are escapees from our gardens. Besides, we have not left nearly enough parks or natural areas to meet the needs of local animals. We now must do so at home.

As E.O. Wilson wrote decades ago, it is insects that run the world, and humans would last only a few months on this earth without them. Unfortunately, it is insects that disappear first when we create novel ecosystems with invasive plants.

A Carolina chickadee with a caterpillar, a particularly important food source. Photo Credit: Dr. Doug Tallamy

SLELO PRISM Prevention/Watch Species List

Mile-A-Minute Vine	(*Polygonum perfoliatum*)
Didymo	(*Didymosphenia geminate*)
Hydrilla	(*Hydrilla verticillata*)
Asian Longhorned Beetle	(*Anoplophora glabripennis)*
Hemlock Wooly Adelgid	(*Adelges tsugae*)
Silver, Big Head and Grass Carp	(*Ctenopharyngodon spp.*)
New Zealand Mud Snail	(*Potamopyrgus antipodarum*)
Fanwort	(*Cabomba caroliniana*)
Hemimysis	(*Hemimysis anomala*)
Asian Clam	(*Corbicula fluminea*)
Kudzu	(*Pueraria lobata*)
Feral swine	(*Sus scrofa* Linnaeus)
Porcelainberry	(*Ampelopsis brevipedunculata*)
Water Soldier	(*Stratiotes aloides*)
Water Hyacinth	(*Eichornia crassipes)*
Rusty Crayfish	(*Orconectes rusticus*)



COORDINATOR'S COLUMN

The Connection Between People, Their Way of Life and Invasive Species in New York

In a recent discussion, a compelling question came up about whether invasive species affect people and their way of life here in New York. To that I have but one answer: "You bet they do." And here's how.

According to Early et al., 2016, New York is ground zero for the import of harmful invasive species into the United States and North America. As part of the 21st Century Global Invasion Risk, 17% of global land surface is highly threatened by new invasive species and the ports of New York place the Empire State at a very high threat level. This, combined with our freshwater connectivity via the Erie Canal and our world-class fisheries creates a tremendous opportunity for the import and spread of harmful invasive species throughout North America.

The Lake Ontario fishery provides food and income to individuals, families and water-dependent businesses. This lake-centered way of life occurs throughout the Great Lakes and locally along Eastern Lake Ontario. Charter captains support their families through the lake fishery, as do river boat guides along our inland waters. Restaurants depend on locally caught perch, trout and bullheads. Many people derive sustenance from our Lake Ontario fishery, as well as from New York's Atlantic coastal and shell fisheries. These cultural factors combined with the economic benefits from water-based recreation and tourism mandate that providing healthy, sustainable freshwater resources is a local, regional and global priority, and should be treated as such.

The evidence is compelling that aquatic invasive species have posed, and continue to pose a genuine threat to food webs, fisheries populations and ways of life. An example is the predatory sea lamprey eel, which has played a substantial role in the decline of game fish species, such as lake trout and salmon.

Furthermore, terrestrial invasive plants are of great concern to trail managers, natural history guides, and farmers who depend on healthy lands for their livelihood and to supplement their family income. Many invasive species can reduce crop yields, and some are un-palatable or even toxic to livestock (K.A. Rawlins. 2013). Asian soybean rust, for example, was introduced into the United States in 2004 and has now spread to seven states. The problem is worsened by our changing climate, as many southern-oriented invasive species are now threatening northern states as well. The effects of invasive species on farmers and others who depend on the land is more than a simple frustration; it affects their quality of life.

Invasive species are a global problem, with the annual cost of impacts and control efforts equaling five percent of the world's economy (The Nature Conservancy 2016). To top things off, invasive species can now adversely affect global food security (Paini et al 2016). The need to prevent and manage invasive species, especially in New York, is paramount.

~ Rob Williams

SLELO PRISM Partners

- Cornell Cooperative Extension Offices
- The Nature Conservancy
- NYS Department of Environmental Conservation
- 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

Acknowledgments:
NYS Invasive Species Council
NYS Environmental Protection Fund
NYS DEC Invasive Species Coordination Unit

C/O
The Nature Conservancy, CWNY