



New York Invasive Species Research Institute

2017 Annual Report



Carrie Brown-Lima, Director // Audrey Bowe, Research Assistant



PROGRAM MISSION

The mission of the New York Invasive Species Research Institute (hereafter NYISRI) is to communicate and coordinate research to help prevent and manage the impact of invasive species in New York State and beyond.

NYISRI serves as the link between the scientific resources of the state and the invasive species management network, including the eight Partnerships for Regional Invasive Species Management (PRISMs), the New York Department of Environmental Conservation (DEC), and the New York Natural Heritage Program (NYNHP).

NYISRI promotes collaboration and information-sharing between researchers and managers through organizing conferences, workshops and webinars, coordinating meetings, and circulating new findings. In addition to developing and coordinating our own initiatives, NYISRI uses research needs solicited from partners to seek out funding and support projects that will produce the most impactful and useful products for invasive species managers. NYISRI also promotes and supports the research initiatives of partners by connecting relevant organizations, providing letters of support, and offering a platform to disseminate findings. NYISRI makes it a priority to actively network within the scientific community, in order to understand and bring back to New York the latest research that can be applied in invasive species management.

NYISRI tailors its work to meet the needs of managers in New York, while also engaging in and working synergistically with regional and national initiatives to bring the benefits of a larger network back to the state.

All of NYISRI's activities serve the ultimate goal of improving the scientific-basis of invasive species prevention and management in New York State.

Funding for NYISRI is provided by the Environmental Protection Fund as administered by the New York State Department of Environmental Conservation.



**Department of
Environmental
Conservation**

Cornell CALS
College of Agriculture and Life Sciences



EXECUTIVE SUMMARY

2017 was a landmark year for the New York Invasive Species Research Institute. Working with collaborators, NYISRI coordinated or co-coordinated the First Annual Northeast Regional Invasive Species and Climate Change Management Symposium, the Environmental DNA Workshop: Research Frontiers & Management Perspectives in New York State and the 2017 Invasive Species Track of the Cornell Cooperative Extension In-service, in addition to contributing to the planning of two more. NYISRI attended eight conferences across the U.S., presenting on the work of the institute and networking with scientists working at the forefront of invasive species issues. Taking part in state meetings, calls, and working groups, NYISRI interacted with partners, gained insight into the current information needs of organizations across the state, and took actions to address them.

NYISRI continued to move forward priority research projects that it supports, including water chestnut and swallow-wort biocontrol, prioritization and understanding invasive species and climate change interactions. NYISRI regularly responded to information requests from partners and the general public, as well as hosted webinars during monthly PRISM calls. Additionally, NYISRI expanded its website (nyisri.org) to improve and provide further resources for managers and researchers.

Highlights from 2017, below, provide a snapshot of NYISRI's accomplishments this year.



2017 HIGHLIGHTS

- Coordinating the Northeast Regional Invasive Species and Climate Change Workshop at the University of Massachusetts Amherst in collaboration with the USGS Northeast Climate Science Center and Dr. Bethany Bradley
- Organizing and hosting the Environmental DNA Workshop: Research Frontiers & Management Perspectives in New York State in collaboration with Dr. David Lodge and the Atkinson Center for a Sustainable Future
- Organizing and hosting the Invasive Species Track of the 2017 Cornell Cooperative Extension Agriculture, Food & Environmental Systems In-service
- Delivering the keynote speech at the 2017 New York Integrated Pest Management Conference, and participated in other capital region events during Invasive Species Awareness Week
- Coordinating swallow-wort working group to promote biocontrol research and establish a monitoring system once *Hypena opulenta* is released in New York
- Working with Dr. Linda Rayer of the Cornell Naturalist Outreach Program and Carol Jennings of Park Media Productions to produce an educational video on *Hydrilla verticillata*
- Developing a Lecturer Database for the New York Invasive Species Research Institute website to allow university-level educators to connect with one another and share resources and ideas
- Kicking off the development of a prioritization tool for invasive species in New York through the hiring of a post-doctoral associate
- Supporting established and developing research initiatives throughout the state and beyond to meet the needs of partners

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We would like to extend our special thanks to:

The New York State Department of Environmental Conservation, Invasive Species Coordination Unit for their support, guidance, and partnership.

Our PRISM and other partners for providing ideas for and feedback on our initiatives.

Dr. Bernd Blossey of Cornell University and his lab group for their support and valuable suggestions.

The administrative staff of the Department of Natural Resources at Cornell University for their technical, administrative, and fiscal expertise.



CONNECTIONS & COLLABORATIONS

The New York Invasive Species Research Institute Network

A. Statewide Participation

NYISRI serves as the research hub for the New York Invasive Species Network, and in 2017 actively attended statewide meetings with partners:

- All NY Invasive Species Council Meetings
- All NY Invasive Species Advisory Committee Meetings
- Quarterly PRISM Leaders Meetings
- Monthly PRISM Webinar Meetings
- New York State Hemlock Initiative Meetings

NYISRI also participated in meetings of the following specialized work groups & events:

- APPIP Communications Strategy Work Group
- Brachypodium Working Group
- Biocontrol Review Team
- Cornell Cooperative Extension Invasive Species Work Team
- Cultivar Assessment Team
- Forest Ecological Monitoring Cooperative
- HWA Biological Control Lab Ribbon Cutting Ceremony
- iMapInvasives User Feedback Group
- iMapInvasives Invasive Species Categories Chart Working Group
- Invasive Species Awareness Week 2017 Planning Committee
- Invasive Species Awareness Week 2018 Planning Committee
- Northeast Climate Science Center Focus Group
- Northeast Aquatic Nuisance Species Panel Midterm Call
- NYS IPM Biocontrol Specialist Search Committee
- NY Hemlock Initiative Meetings



Figure 1. April PRISM Leader's Meeting. Photo Credit: Finger Lakes PRISM

B. Scientific Conferences and Training Participation

As a link between the research and management worlds, NYISRI makes it a priority to connect with researchers and stay up-to-date with new invasive species research. Attending conferences is vital to making professional connections in the research sphere. NYISRI participated in the following conferences and trainings in 2017:

- 29th USDA Interagency Forum on Invasive Species, Annapolis, MD (January 2017)
- Climate Change Seminar Series, Cornell University (Spring 2017)
- Communicating Research to a Public Audience Workshop, Cornell University (March 2017)
- Difficult Problems in Conservation Class, Cornell University, Ithaca, NY (Spring 2017)
- North American Invasive Species Forum, Savannah, Georgia (May 2017)
- Saint Lawrence- Eastern Lake Ontario PRISM's Research Symposium, Selkirk Shores State Park, NY (June 2017)
- North American Invasive Species Management Association Conference, Reno, Nevada (October 2017)
- Cornell Cooperative Extension In-service Invasive Species Track, Cornell University, Ithaca, NY (November 2017)
- Forest Ecosystem Monitoring Cooperative Annual Conference Burlington, Vermont (December 2017)

C. Presentations

NYISRI shares its work and establishes new connections by presenting across a range of venues, from academic conferences to local outreach programs. In 2017, NYISRI reached hundreds of people through the following presentations:

- Keynote Speaker: NYS Integrated Pest Management Conference at Siena College in Albany, NY on Invasive Species
- Invited Speaker: Cary Institute of Ecosystem Studies Lunch Seminar Series
- Invited Speaker: NYS Parks FORCES Leaders Summit
- Invited Speaker: Cornell Forest Resources Extension Sharing conference
- Invited Speaker: 2017 Ithaca Native Landscape Symposium
- Invited Speaker: Empire State Forest Products Association Board
- Invited Speaker: North American Invasive Species Management Conference
- Invited Speaker: Forest Ecological Monitoring Cooperative (FEMC) Conference
- Invited Speaker: Wells College Science Colloquium
- Invited Lecturer: Cornell University Natural Resources Field Biology Class
- Speaker: RISCC Management Symposium- Workshop leader on Communicating Climate/Invasion Science
- Speaker: Cornell Cooperative Extension In-service, Promoting Innovative Projects & Interdisciplinary Solutions in Invasive Species Management
- Facilitator: Regional Invasive Species and Climate Change Management Symposium, Lessons Learned from Management Panel
- Facilitator: Environmental DNA Workshop: Research Frontiers & Management Perspectives in New York State, Manager and Researcher Discussion Panels
- Panel Member: Alternative careers discussion with graduate student fellows of the Atkinson Center for a Sustainable Future
- Lab Section Leader: Intro to Field Biology Course, Department of Natural Resources, Cornell University



Figure 2. NYISRI Director Carrie Brown-Lima talking at the North American Invasive Species Management Association. Photo Credit: Dr. David Coyle

D. Advisory Board

In 2017, NYISRI formalized its Advisory Board. Moving forward, this board will provide yearly guidance on NYISRI activities, and respond to information requests as solicited throughout the year.

The first Advisory Board meeting is scheduled for April 2018. The Board includes experts from a wide range of fields, from economic analysis to integrated pest management:



Dr. Jennifer Grant
Director, New York
State Integrated
Pest Management
Program, Cornell
University



**Dr. Rebecca
Epanchin-Niell**
Fellow, Resources
for the Future



Dr. David Lodge
The Francis J. DiSalvo
Director, David R.
Atkinson Center for a
Sustainable Future,
Cornell University



Dr. Gary Lovett
Senior Scientist and
Forest Ecologist,
Cary Institute of
Ecosystem Studies



Karen Feldman
Commissioner,
Adirondack Park
Agency



Dr. Stuart Findlay
Aquatic Ecologist,
Cary Institute of
Ecosystem Studies



Brendan Quirion
Adirondack Park
Invasive Plant
Program Manager,
The Nature
Conservancy -
Adirondacks



Dr. Dylan Parry
Associate Professor,
SUNY College of
Environmental
Science and Forestry



Dr. Angela Fuller
Leader, USGS New
York Cooperative Fish
and Wildlife Research
Unit
Associate Professor,
Cornell University



Dr. Bernd Blossey
Associate Professor,
Department of
Natural Resources,
Cornell University



Dr. Bethany Bradley
Associate Professor
of Spatial Ecology &
Biogeography,
University of
Massachusetts
Amherst



Hilary Smith
Senior Advisor for
Invasive Species
U.S. Department of
Interior



Laura Eaton
Assistant Regional
Biologist, U.S. Fish and
Wildlife Service
Invasives Coordinator,
Northeast National
Wildlife Refuges



Gregory Parra
Staff Scientist, PPQ
Center for Plant
Health and
Technology, USDA
APHIS

E. Meeting with Scientists & Other Organizations

In order to maintain and continually expand the network of researchers and institutes to address invasive species research needs in NYS, NYISRI Director Carrie Brown-Lima met with invasive species researchers throughout the year.

Meetings are listed in Appendix 2, and served to hear about research, plan conference presentations, discuss potential research projects, and connect interested managers and researchers.

Partnerships

A major role of NYISRI is to facilitate partnerships which further the mission of improving the scientific basis of invasive species management. The following projects or programs are the results of NYISRI's valuable collaborations.

F. Northeast Regional Invasive Species & Climate Change Management (RISCC) Network

The Northeast Regional Invasive Species and Climate Change (RISCC) Management Network initiated by NYISRI and collaborators from the University of Massachusetts and the Northeast Climate Science Center in 2016 continued to grow in 2017.

In July, NYISRI worked with RISCC partners to coordinate a two-day symposium held at UMass Amherst. A detailed account of this event and collaboration are provided in Research Initiatives Section N.



G. Invasive Species Awareness Week 2017

Throughout 2017, NYISRI participated in New York Invasive Species Awareness Week (NYISAW) planning calls led by Meg Phillips, Education and Outreach Coordinator for the NY DEC for Invasive Species Awareness Week (ISAW). During the week of ISAW, July 9th – 15th, 2017, NYISRI travelled to Albany to take part in the Capitol's events.



Figure 3. NYISRI Tabling at the Empire State Plaza in Albany, NY during 2017 Invasive Species Awareness Week.

pictured in Figure 3. NYISRI staff interacted with and provided outreach materials to passers-by.

Thursday, July 13th was the date of the New York State Integrated Pest Management Conference, held at Sienna College. NYISRI Director Carrie Brown-Lima kicked off the conference as the keynote speaker with the presentation “Invasive Species Reality Check: Where we are & where we need to go”.

NYISRI also set up a table at the IPM conference, handing out biocontrol field guides and other information sheets and event flyers during the lunch break.

NYISRI worked closely with Meg Phillips to coordinate Dr. Stuart Findlay of the Cary Institute to give a noontime presentation for the DEC Main Offices titled “Invasive Species: How to Choose Your Battles”. The seminar, which took place on Tuesday, July 11th, had approximately 40 people in attendance. The presentation was also live-streamed and drew over 70 remote attendees.

That evening, Dr. Findlay gave a second presentation at a local brewery as part of a special ISAW edition of Science on Tap, a local program to bring science to the public in a casual environment.

On Wednesday, July 12th, NYISRI joined the line-up of organizations at the Empire State Plaza tabling event,



Figure 4. Carrie Brown-Lima during a questions session at the NYS IPM Conference held at Sienna College

H. iMapInvasives Partnership

NYISRI has continued to have a productive working relationship with Jennifer Dean and the iMapInvasives team at the New York Natural Heritage Program. Jennifer Dean has worked closely with NYISRI in the prioritization initiative, spearheading the work developing spatial prioritization maps using risk of spread, ecological significance, and conservation status layers.

Jennifer Dean also co-advises NYISRI post-doctoral associate Jennifer Prick-Tack who is developing an invasive species prioritization tool for New York. Details on this project can be found in the “Prioritization” section under the Promoting Research heading.

I. NYS Parks FORCES Program Partnership

Assessing management outcomes is a difficult task, especially given the limited resources that most managers work with. As part of a pilot program to establish a monitoring system within managed areas, NYISRI partnered with Dr. Andrea Davalos of SUNY Cortland and Tom Hughes and Rebecca Sibner of New York State Parks, to assess the success of pale swallow-wort management in Taughannock State Park.

NYISRI plays a coordinating role in this partnership, and facilitated a meeting with Dr. Andrea Davalos, NYISRI, and NYS Parks FORCES program (Tom Hughes and Becky Sibner) to plan for 2017 field season to monitor the effectiveness of swallow wort control efforts including the future incorporation of biocontrol in this effort.

NYISRI Director Carrie Brown-Lima presented on this project and ways to monitor and measure success of control projects at the FORCES Summit held in Spring 2017.



PROMOTING RESEARCH

Surveying Research Needs

An integral part of the New York Invasive Species Research Institute's role is to coordinate and connect PRISMs and partners with the science needed to improve invasive species management.

To understand partners' needs, NYISRI solicits annual input on research needs in the form of a survey, from each of the PRISMs, the New York Natural Heritage Program, NYS Parks, and NY DEC's Invasive Species Coordination Unit.

In 2017, NYISRI modified its approach to better identify projects which will bring the greatest benefit to the invasive species management community. Research suggestions from the past three years were compiled and organized by topic. This list was then sent out to representatives from each partner organization, who then scored projects using a 0 (not a priority) – 3 (highest priority) scale to represent the needs of their respective regions.

NYISRI compiled, averaged, and ranked the resulting scores to create a prioritized list for state research priorities, the highest-ranking of which will be presented to the Invasive Species Council in early 2018.

Promoting and Supporting Research

Beyond promoting its own projects, NYISRI also supports the development of research and management projects of researchers and partner organizations. In 2017, NYISRI:

- Wrote a letter of support for the Finger Lakes PRISM's grant proposal for a GLRI Starry Stonewort Collaboration.
- Wrote letters of support for Notre Dame and Cornell University on Great Lakes Restoration Initiative proposals for DNA Barcode Reference Library research
- Reviewed a research proposal from SUNY Cortland on measuring swallow wort control effectiveness
- Reviewed and met with Cornell graduate student Jaime Ortiz to discuss an invasive species research proposal for the Galapagos Islands.
- Coordinated a meeting with Dr. Todd Walters (NY Water Resources Institute), Mark Whitmore, and John Thompson to discuss a research project on the impact of hemlock loss on water quality in the Catskills
- Provided a letter of support to Dr. Richard Casagrande from University of Rhode Island for a swallow-wort biological control grant proposal

- Collaborated with an international group of researchers on two proposals:
 - A SNAPP Proposal for funding to conduct research on Climate Change and Invasive Species
 - i-Link Grant Proposal from the Spanish Government to address the question: How will global environmental change alter the risk of establishment and impacts of invasive species?
- Connected post-doc Paul Simonin with the NYS DEC to establish a target species list for a NYS Sea Grant Proposal on environmental DNA, and provided a letter in support for the project
- Participated in the development of two climate change and invasive species proposals for the Northeast IPM Center grants. In addition to writing letters of support, NYISRI connected the PI's with letters of support from PRISMs and other NYS partners.

NYISRI Research Initiatives

In response to recognized research needs in the state and partner requests, NYISRI has developed and/or supported the funding of a number of multi-year research projects within the state. Overarching themes for these projects fall under 5 headings:

1. Promoting biological control
2. Prioritization
3. Utilizing New Technologies
4. Implications of climate change for invasive species
5. Assessing outcomes of invasive species management

Promoting biological control

Successful biological control programs are arguably one of the most cost-effective strategies for controlling an invasive species. Many high impact invasive species in New York biological control programs in various stages of development. NYISRI aims to promote these existing programs in order to ultimately bring a new management tool to managers, while also sharing information about pertinent biological control programs with its partners. In 2017, NYISRI:

- Provided an update on biocontrol programs for key species for the SLELO PRISM
- Created and distributed a fact sheet on biological control for the NY Invasive Species Advisory Committee
- Coordinated a tour of the Sarkaria Arthropod Research Laboratory (SARL) for the NY DEC Invasive Species Coordination Unit
- Invited knotweed biocontrol researcher Dr. Richard Shaw of CABI to give a PRISM Call presentation on the biocontrol program for knotweed in the United Kingdom.

J. Water Chestnut Biocontrol

Update from Wade Simmons, Graduate Student, Department of Natural Resources, Cornell University:

The colony of *Galerucella birmanica*, the leaf feeding beetle being investigated as a biological control agent for water chestnut, is currently overwintering in quarantine after a successful second year of testing. In the

upcoming season, we plan to complete the required host specificity screening process where native plants are initially tested in no-choice experiments using both adults and larvae. We are propagating plants in our greenhouse and they will be ready for experiments in late spring, soon after beetles emerge from diapause.

In addition to no-choice testing, more ecologically relevant tests will be conducted with those plants that require closer study because we found some initial feeding under no-choice conditions. Beetles will be introduced into large cages with 5-6 different test plants to determine preferences in feeding and oviposition. Additionally, we will use a combination of new approaches and standard techniques for assessing the presence, magnitude, and impacts of non-target feedings on water shield (*Brasenia schreberi*) using plant demography. While more testing is needed to better understand the biology and ecology of *G. birmanica*, our initial results are promising and suggest that herbivory by the beetle will lead to reductions in the size of water chestnut populations.

K. Hemlock Woolly Adelgid Monitoring and Control

Update from Caroline Marschner, New York State Hemlock Initiative

2017 was a landmark year for the New York State Hemlock Initiative (NYSHI). Thanks to support from New York State's Department of Environment and Conservation (NY DEC), the US Forest Service, and the US Department of Agriculture, the Initiative established New York's first biocontrol research facility for hemlock woolly adelgid (HWA), an invasive species that threatens to functionally remove hemlocks from New York. Our substantial growth included laboratory construction, increased personnel, and growing research, biocontrol rearing, and outreach programs. We continued to help coordinate the state and regional response to HWA, collaborated with NY DEC for HWA mapping and management, worked with New York's Partnerships for Regional Invasive Species Management (PRISMs), supported new programs in Michigan and Nova Scotia, conducted outreach to landowners and potential volunteers, and added new and expanded outreach tools and resources.



Figure 5. Left, a hemlock branch with hemlock woolly adelgid; Right, Mark Whitmore of Cornell University speaking at the grand opening of the Hemlock Woolly Adelgid Biocontrol Lab

NYSHI's new HWA biocontrol research facility is housed in Morrison Hall on Cornell campus in Ithaca, NY, which was renovated to meet the needs the facility's needs. Growth chambers, microscopes, jars, cages, insect handling equipment and more were installed, and NYSHI's director Mark Whitmore hired two post-docs, a second field technician, two full-time laboratory technicians and a handful of student workers to provide expertise and staffing for the research laboratory. The HWA biocontrol laboratory staff reared the two *Leucopis* species to adulthood from April – June, and conducted experimental releases of these insects. In October and November our *Laricobius* beetles were established in the new laboratory, and the grand opening of the lab was held on November 17th.

A full report of the New York State Hemlock Initiative's 2017 activities can be found at:

<https://blogs.cornell.edu/nyshemlockinitiative/>

L. Swallow-wort Biological Control Initiative

Along with water chestnut and hemlock woolly adelgid, promoting the biological control program for pale and black swallow-wort has emerged as a top priority for research in New York State.

In the past year, NYISRI organized over a dozen meetings with key researchers that have been studying and rearing *Hypena opulenta*, a defoliating moth of swallow-wort, to understand the status of approval for release and develop a strategy for additional research and biocontrol releases in New York State once permits are available. NYISRI has shared this strategy with the NY Invasive Species Council and has been working with the NYS Department of Transportation, the NYS Department of Environmental Conservation and researchers on ways to implement this strategy.



Figure 6. Left, A mesocosm experiment with *Hypena opulenta* in a quarantine greenhouse. Right, Dr. Lindsey Milbrath explaining his research program during a tour of the quarantine facility for DEC Invasive Species Coordination Unit staff.

NYISRI also coordinated with numerous potential collaborators including iMap invasives, Cornell Cooperative Extension Educators Sharon Bachman and Emily Staychock, and researchers working with swallow wort including Drs. Dick Casagrande and Lisa Tewksbury (University of Rhode Island), Dylan Parry (SUNY ESF), and NYS Integrated Pest Management Biocontrol Specialist Amara Dunn to write a proposal for Federal Capacity Funds for swallow wort biocontrol outreach and monitoring.

Thanks to this funding, an RFP for swallow-wort biocontrol research will be released in New York in 2018.



Figure 7. From left, Drs. Dylan Parry (SUNY ESF), Andrea Davalos (SUNY Cortland), Lindsay Milbrath (USDA), and Jaclyn Schnurr (Wells College) discussing swallow-wort biocontrol & monitoring. Credit: Carrie Brown-Lima

Prioritization

Update from Dr. Jennifer Price-Tack, Postdoctoral Associate, Department of Natural Resources, Cornell University

The need for a consistent and comprehensive priority setting scheme for making decisions about managing invasive species in the state of New York was one of the earliest needs identified by NYISRI. One of the main recommendations that came out of a 2015 NYISRI-coordinated Structured Decision Making Workshop and the subsequent report was to hire a post-doctoral associate to aid New York in the development of a model for priority setting.

In 2017, working together with Dr. Angela Fuller of Cornell University and Dr. Jennifer Dean of the New York Natural Heritage Program, NYISRI conducted a candidate search for this position.

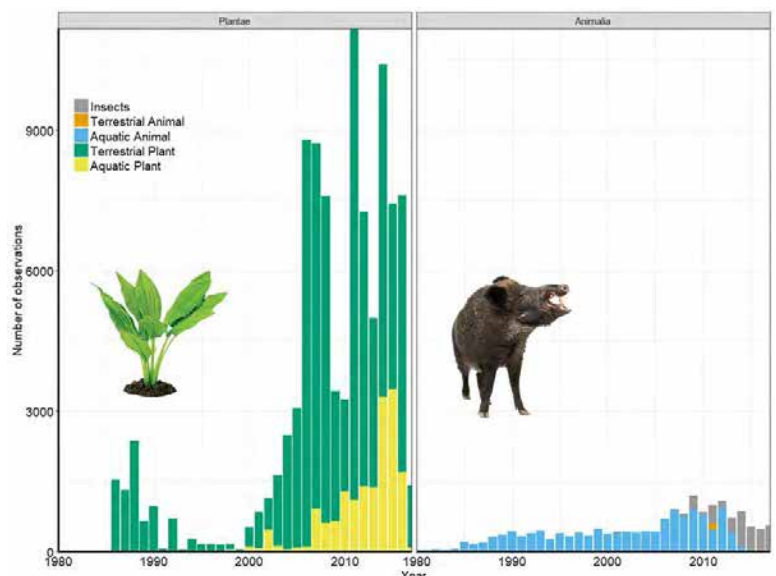


Figure 8. Reports to iMapInvasives over time. Credit: Dr. Jennifer Price-Tack

In September 2017, the post-doctoral position was filled by Dr. Jennifer Price-Tack. Dr. Price-Tack brings extensive quantitative expertise and experience working with managers on natural resources issues in Alabama. During her first few months, she reviewed relevant literature and tools related to prioritizing and optimizing invasive species management decisions. Dr. Price-Tack attended several meetings with NY invasive



Figure 9. Dr. Jen Price-Tack

species managers and stakeholders, including meetings with the NYS Invasive Species Committee, Invasive Species Advisory Council, NYS Heritage Program, and PRISM leaders. She has also worked with Jennifer Dean and others from NYS Heritage Program to utilize iMapInvasives observations of invasive species for prioritizing spatial distribution of management funds.

Dr. Price-Tack is also writing up on two manuscripts related to the project: 1) a review of methods for prioritizing and optimizing the management of multiple invasive species, and 2) an analysis of factors influencing the spatial distribution of citizen science data using iMapInvasives data in New York. The former manuscript will be written in conjunction with colleagues from Computer Science (Carla Gomes and her lab), and the second is a collaborative effort with Jennifer Dean (NYSHP) and graduate student, Brittney Rogers (SUNY-ESF).

Utilizing New Technologies

Exciting new advances are being made in the fields of computer science, genetics, robotics, and others at a rapid pace. Many of these new technologies have only recently been adopted to support conservation practices. From drones to computer science, NYISRI aims to understand and communicate the potential applications and provide information on limitations and regulations surrounding these powerful new tools. This year, NYISRI shared information on new technologies via the following:

- Coordinating the New York State **Environmental DNA** Workshop (See Section O for more details)
- Inviting Scott McDonnell (New York DEC) to talk about the state's **drone program**, and Zachary Simek (Adirondack Park Invasive Plant Program) to discuss **drone applications** at the Cornell Cooperative Extension In-service
- Inviting Dr. Tony Shelton (Cornell University), Dr. John Godwin (University of North Carolina) and Dr. Tim Harvey-Samuel (Pirbright Institute) to talk about **Genetic Engineering** for Invasive Species Management at the Cornell Cooperative Extension In-service

Understanding Climate Change and Invasive Species

In 2015, a call for research priorities yielded requests for more and better information on how to manage natural areas and invasive species in light of climate change. Shortly thereafter, an amendment to the executive order on invasive species was released, ordering that agencies should “consider the impacts of climate change when working on issues relevant to the prevention, eradication, and control of invasive species, including in research and monitoring efforts...”.

Unable to identify synthesized research that addressed this specific challenge presented by a changing climate, NYISRI reached out to scientists from the Northeast Climate Science Center and the University of Massachusetts Amherst to begin to address these questions.

Encouraged by widespread interest from the scientific and management communities, these initial talks formed the basis of what became the NE RISCC Management Network.

The Northeast Regional Invasive Species & Climate Change (RISCC) Management Network is collaboratively led by the Department of Interior Northeast Climate Science Center, the University of Massachusetts Amherst, and the New York Invasive Species Research Institute to address the question: “How can we manage for upcoming biological invasions in the light of climate change?”

The network combines climate and invasive species scientists with invasive species managers and policy makers from the Northeast to promote a two-way dialogue to:

- 1) share regional knowledge about current management strategies and scientific insights; and
- 2) identify and address planning and information needs of managers related to invasive species and climate change

This year marked the hosting of the First Annual Northeast Regional Invasive Species & Climate Change Symposium, which took place at the University of Massachusetts Amherst in July. See Section N for more details on the event.



Figure 10. Left, RISCC Leaders: Toni Lyn-Morelli, Northeast Climate Science Center (left), Bethany Bradley, UMass Amherst (center), Carrie Brown-Lima, New York Invasive Species Research Institute. Right, break-out sessions during the RISCC Symposium

The NE_RISCC list-serv serves as the primary means of communication for the group, and members can circulate new research, articles and information on conferences. Established in 2016, the list consists of over 150 members and continues to grow as the initiative becomes more widely known. RISCC also plans to begin hosting webinars featuring research that marries invasive species and climate change issues starting in Spring 2018, announcements for which will be circulated via the RISCC list-serv.

Moving forward, NYISRI is working with partners to organize a one-day symposium for July 2018 during New York Invasive Species Awareness Week. Further details on the symposium will be posted on the NYISRI website in Spring 2018.

Assessing Management Outcomes

Update from Audrey Bowe, Graduate Student, Department of Natural Resources, Cornell University

Assessing outcomes is a critical, and sometimes overlooked, aspect of invasive species management. This project will to utilize a “sentinel species” approach to assess management success of *Phragmites australis* in the wetlands of the Adirondacks. This multi-year project will follow the growth and survival of native plants planted into in previously, or currently managed areas. We are working closely with the Adirondack Park Invasive Plant Program to identify candidate sites, and growing wetland plants to be planted out in early summer of 2018.



COMMUNICATING INFORMATION

Conference Organization

M.Cornell Cooperative Extension In-service

For the past three years, NYISRI has coordinated the Invasive Species Track of the Annual Cornell Cooperative Extension Agriculture, Food, and Environmental Systems In-service.

In 2017, over 110 invasive species professionals attended the 3-day conference, which featured a whole day of presentations from New York's invasive species network, sessions on genetic engineering, and using drones to detect and monitor invasive species. Based on feedback received from the 2016 In-service, NYISRI set aside an entire day for PRISMs, and state partners to present on their programs, new tools and techniques for management, and current projects.

This year, the In-service had nine different sessions, with a total of 27 speakers. Sessions included:

- Pesticide Management Education Program: Updates on Important Pesticide Issues
- Genetic Engineering for Invasive Species Management
- Invasive Species Detection and Monitoring using Drone Technologies
- Aquatic Invasive Species: Monitoring and Predicting Invasions
- Promoting Innovative Projects and Interdisciplinary Solutions in Invasive Species Management: NISC & NYISRI
- Trans-media Communications Workshop
- Presentations by the NYS Partnerships for Regional Invasive Species Management
- Presentations by the NYS Invasive Species Partner Organizations

A post-attendance survey found 92% of participants agreed or strongly agreed that the conference was beneficial to their professional development, and 97% agreed or strongly agreed that the in-service was valuable as a venue for spending quality time with colleagues.

Eighty-three percent of attendees indicated that there was a good selection of workshops relevant to their interests, with 77% indicating that they will implement something they learned at the conference upon returning to work.



Figure 11. Break-out groups during the trans-media communications workshop.

N. First Annual Northeast Regional Invasive Species and Climate Change Management Symposium

The first annual RISCC Symposium was held on July 27-28th, 2017, with the objective of bringing together natural resource managers and scientists to discuss how climate change might affect invasion risk in the northeastern region and to identify ways to translate research into management action.

Speakers addressed a wide range of topics, including:

- How is climate changing and how do we know it? (Radley Horton, Columbia University)
- Why does “climate skepticism” exist? (Ezra Markowitz, UMass Amherst)
- Overview: Implications of climate change for invasive species (Bethany Bradley, UMass Amherst)
- Climate driven range shifts in invasive plants (Jenica Allen, University of New Hampshire)
- Climate change and southern pine beetles (Radley Horton, Columbia University)
- Range shifts in marine invasions – what to expect (Judy Pederson, MIT)
- Invasive plant dispersal and climate change (Britta Teller, Utah State)
- Forest pests and climate change (Joe Elkinton, UMass Amherst)
- Invasives and CO₂: the rest of the story (Lew Ziska, USDA APHIS)
- Citizen science and data collection (Chuck Barger, University of Georgia)
- Predicting Invasive Species Phenology: Tools and Insights from the National Phenology Network (Alyssa Rosemartin, National Phenology Network)
- Mapping and monitoring forest pest disturbances using satellite remote sensing (Valerie Pasquarella, UMass Amherst)
- Asian Longhorned Beetle Landscape Risk Assessment (Ryan Vazquez, USDA APHIS)



Figure 12. Left, NYISRI Director Carrie Brown-Lima co-presenting the Communicating Climate Change & Invasion Science Workshop at the 2017 RISCC Symposium; right, break-out groups during the Emerging Threats- How should we manage climate migrants? workshop.

The symposium also featured the following panel discussions and break-out workshops:

- National & Regional Policies, Funding, and Approaches to Support Invasive Species Management in the Face of Climate Change
- Lessons Learned from Management
- Developing Watch Lists for Invasive Species
- Communicating Climate and Invasion Science
- Outsmart Invasive Species App
- Brainstorming Multi-scale, Multi-species Interactions
- Emerging Threats- How Should We Manage Climate Migrants?
- Brainstorming A Review Paper Of Invasives & Climate Change In The Northeast

The symposium, which was also live-streamed via Zoom, drew over 90 in-person participants from states throughout the Northeast. Recordings of select presentations were made available on the RISCC website, and have since accumulated over 200 views.

Responses from a post-conference survey were positive, and are being used to plan the second annual RISCC Symposium, to be held July 12-13th, 2018 at the University of Massachusetts Amherst.

The symposium drew participants from across the Northeast, with attendees from Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, Vermont, Maryland, New Jersey, and Pennsylvania.

One hundred percent of respondents indicated this event was moderately to extremely useful, with 86.5% indicating they found the symposium extremely or very useful. Ninety-five percent of respondents said they would participate again or recommend attending to a colleague. Feedback from participants included:

“Thank you so much for pulling this together. It was excellent and very helpful in thinking about climate change and invasive species. It was perhaps all the more interesting because it was not focused only on terrestrial plants but included other communities as well.”

“My sincere thanks for the symposium. While a lot of attention has been paid separately to climate change and invasive species, it is exceedingly important to put both subjects together to understand the threats and consequences.”

“Thank you!! Really appreciate the great agenda, great connections made.”

O. New York Environmental DNA Workshop: Research Frontiers & Management Perspectives

With the advent of new molecular tools and techniques, the idea of using DNA found in the natural environment (lakes, streams, soils), or environmental DNA (also known as eDNA) to inform conservation efforts has rapidly gained attention. Many organizations and researchers within New York State are already exploring the application of this novel method to detect species of interest, whether invasive or threatened. In recognition of this, NYISRI partnered with Dr. David Lodge of the Atkinson Center for a Sustainable Future at Cornell University to bring together those working on, or interested in environmental DNA projects in the state.

The one-day workshop featured research presentations ranging from detecting declining and extinct frogs, to using eDNA to inform management decisions, and developing partnerships for environmental DNA projects. A full archive of presentation slide decks can be found on NYISRI’s [Environmental DNA Research Page](#). The day’s presentations included:

- **An overview of environmental DNA: Science & Application**
Dr. David Lodge, Director, Atkinson Center for a Sustainable Future
Professor, Department of Ecology and Evolutionary Biology, Cornell University
- **Detecting declining and extinct frogs with eDNA**
Dr. Kelly Zamudio, Goldwin Smith Professor, Department of Ecology and Evolutionary Biology, Cornell University
- **Use of environmental DNA to detect and quantify brook trout populations in Adirondack Mountain streams**
Dr. Barry Baldigo, Research Biologist, U.S. Geological Survey
- **Novel methods for early detection of the bloody red shrimp (*Hemimysis anomala*)**
Dr. Meghan Brown, Associate Professor, Hobart & William Smith Colleges
- **Monitoring the expansion of invasive round goby in the Mohawk River/Barge Canal**
Scott George, Biologist, U.S. Geological Survey
- **The next eDNA target: Microparasites**
Dr. Rod Getchell, Assistant Research Professor, Cornell University
- **Detecting oak wilt using molecular techniques**
Karen Snover-Clift, Director, Plant Disease Diagnostic Clinic, Cornell University
- **Using eDNA to inform invasive species management responses**
Dr. Tammy Newcomb, Senior Water Policy Advisor, Michigan Department of Natural Resources

- **Developing partnerships for early detection of aquatic invasive species using eDNA: A case study**
Rob Williams, Invasive Species Program Coordinator, St. Lawrence Eastern Lake Ontario Partnership for Regional Invasive Species Management, The Nature Conservancy
- **Fish Trackers: Students, Scientists, and eDNA**
Dr. Donna Cassidy-Hanley, Senior Research Associate, Cornell University
- **Responding to positive eDNA results: A fisheries management perspective**
Steve LaPan, Section Head, Great Lakes Fisheries, NYS Department of Environmental Conservation



Figure 13. Researcher & Manager Panels at the Environmental DNA Workshop

Central to the workshop was an afternoon discussion panel with both researchers and managers, which generated conversation around controversial findings, issues with detection, and future research and project directions.

One hundred percent of respondents to a post-workshop survey indicated that the workshop was useful as a networking opportunity, as well as for improving their understanding of environmental DNA concepts and applications. Participants also gave uniformly positive reviews of the day in their survey comments, with praise including:

“Excellent workshop, perfectly demonstrated both the power and gaps in the world of eDNA technology.”

“I could only stay for the first half of the talks, unfortunately. I was very impressed by the talks I saw, and also impressed that most of the researchers were sticking around and happy to talk with practitioners. Too many conferences the researchers can only stay for their talk, so you never get a chance to interact. I hope the afternoon sessions went just as well!”

“This was a great workshop, very beneficial with a superb exchange of information. I would recommend that you sponsor a similar workshop on evolving technologies ever/other year.”

“... the selection of speakers was overall excellent and particularly liked the effort to not only present background and variety of uses of the technique but also perspective of how it could be used by on the ground managers and the balance (Or lack of) between the two.”

P. Contributed Planning

In addition to planning its own conferences and events, NYISRI often plays a role in the identification and coordination of speakers for events held by other organizations. In 2016, NYISRI provided suggestions, contacted potential speakers, or assisted in logistical planning for the following:

- New York State IPM Conference on Invasive Species, Albany NY (July 2017)
- New York State Society for American Forests, (January 2017)

Hosting Monthly PRISM Calls

Since 2016, NYISRI has hosted the monthly state-wide calls for the PRISM network. The calls, which take place on the last Wednesday of every month (with the exception of July, August, and December), draw 30-60 participants and feature a guest speaker on an invasive species topic. Based on input from partners, NYISRI selects and invites the speakers for each call. NYISRI also coordinates with speakers about call logistics, and runs a test call in advance of each monthly meeting to ensure everything runs smoothly.

In 2017, NYISRI brought new and updated information to the state in the form of invited speakers, who spoke on topics ranging from invasive *Brachypodium sylvaticum* in the Pacific Northwest, to releasing a biological control agent for Japanese knotweed in the UK. A full list of presentation topics are listed in Appendix 3.

NYISRI posted presentation recordings from each call to the [NY Invasives YouTube Channel](#) (with permission from speakers). Videos on the YouTube channel posted in 2017 have accumulated over 350 views, in addition to being viewed by dozens of call participants each month.

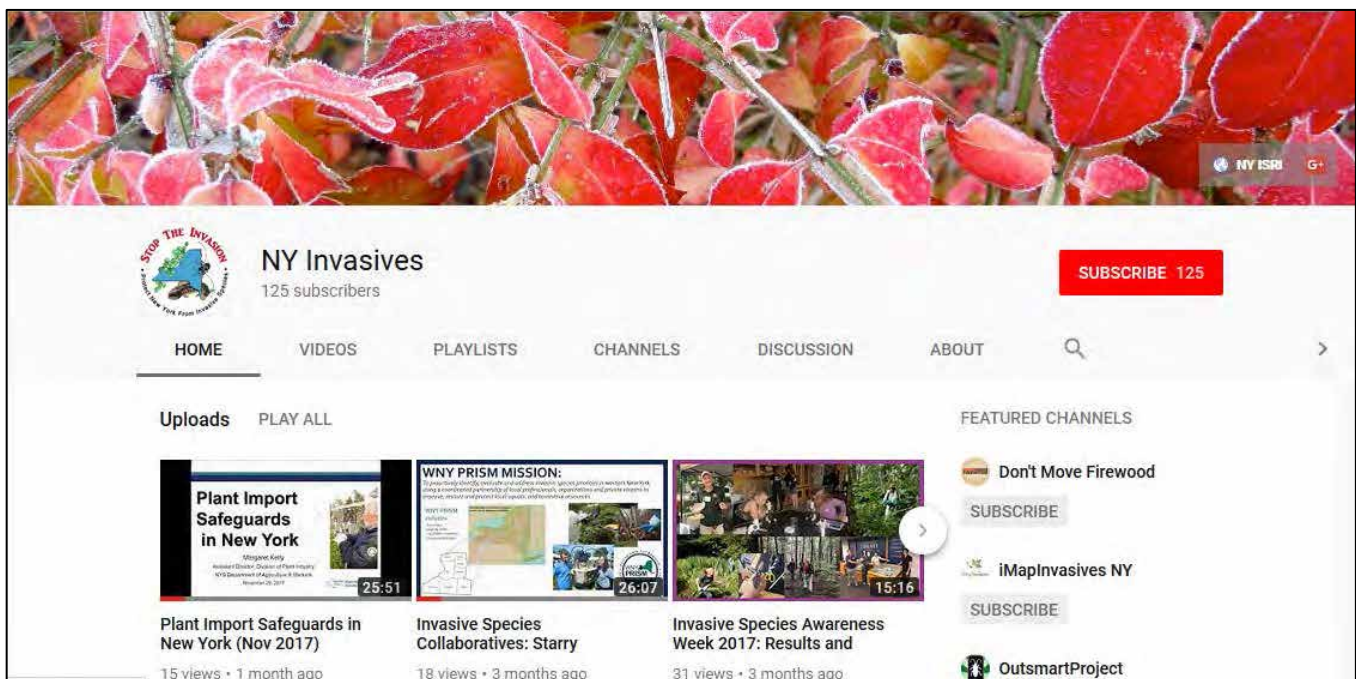


Figure 14. NY Invasives YouTube Channel

Addressing Invasive Species Denialism

With the advent of the “novel ecosystems” concept in the field of invasion biology, “invasive species denialism”, or questioning the negative impact that invasive species exert on ecosystems, the economy, or human health has been on the rise in public perception.

An ongoing conversation in the management community revolves around how to effectively combat this idea, and emphasize the importance of invasive species management work. NYISRI worked with Meg Phillips of the NY DEC Invasive Species Coordination Unit to identify and support two opportunities to address this issue.

Q. Invasive Species Documentary

Discussions with Dr. Doug Tallamy, author of the popular science book “Bringing Nature Home”, and the keynote speaker from the 2016 CCE In-service, brought about the idea for a documentary exploring the negative ecological impact of invasive and non-native species and address growing “invasive species denialism” among the public. NYISRI supported Meg Phillips with the development and posting of an RFP for this project. This film will be geared towards a public audience, and prominently feature Dr. Tallamy’s research, as well as that of other scientists and is slated to commence in Spring 2018.

R. Conservationist Article

As a shorter-term project, NYISRI also coordinated with Dr. Tallamy to publish an article in *The Conservationist*, the widely circulated magazine of New York Department of Environmental Conservation. This feature, showcasing his work documenting changes in insect and bird communities alongside exquisite photography is slated for publishing in February 2018 issue; Vol. 72; Number 4.



Figure 15. Dr. Tallamy's article in *The Conservationist*

Tree-Smart Trade Initiative

In 2017, NYISRI continued to work with Dr. Gary Lovett of the Cary Institute for Ecosystem Studies to communicate the findings from his paper on the impacts of forest pests and pathogens on Northeastern forests and policy recommendations to prevent further introductions ([Lovett et al. 2016](#)).

In collaboration with Dr. Lovett, Dr. Becky Epanchin-Niell, and Faith Campbell, NYISRI presented and facilitated a discussion about this topic at the Spring 2017 New York Invasive Species Advisory Committee Meeting. NYISRI and Dr. Lovett subsequently presented this research and policy recommendations to the NYS Invasive Species Council and led a discussion about how this could be addressed in NYS. Following this discussion, Brown-Lima and Lovett were invited to present this same material at the Empire State Forest Products Association board meeting in September 2017.

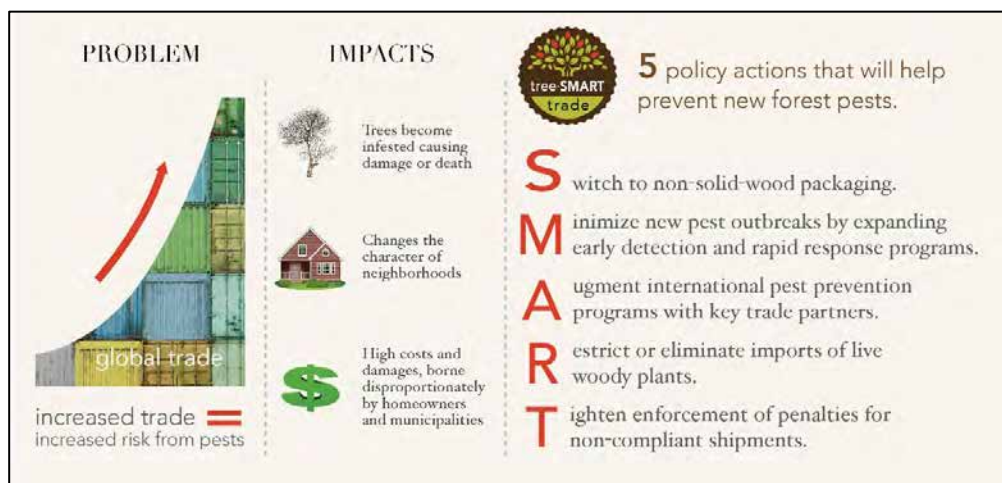


Figure 16. Tree-Smart Trade Recommendations. Credit: G.Lovett/The Cary Institute of Ecosystem Studies.

Producing & Distributing Outreach Material

The Research Institute produces fact sheets, and educational material in response to requests for information, or needs that become apparent in the state. In 2017, NYISRI:

- Coordinated with Dr. Linda Rayer of the Cornell Naturalist Outreach Program and Carol Jennings of the Park Media Lab to finalize a short video on *Hydrilla verticillata*, an aquatic invasive plant
- Coordinated with authors and publishers of the Field Guide for the Biological Control of Weeds in Eastern North America to obtain and distribute copies to the NYS invasive species network
- Reviewed an invasive species book proposal for Elsevier publishing
- Produced & circulated summer and fall newsletters on NYISRI events and activities
- Created an information sheet on the Priority Setting Project for the ISC
- Created a two-page fact-sheet on updates from key biological control programs
- Created a fact sheet on biological control for distribution at the December 2018 ISAC meeting



Figure 17. Hydrilla Hazard outreach video- the product of a collaboration with Cornell Naturalist Outreach and Ithaca College Park Media Lab.

New York Invasive Species Research Institute Webpage

The website of the New York Invasive Species Research Institute (nyisri.org) serves as the primary interface with partners and the public on a day-to-day basis, and as a repository for recordings and resources from past events. The site features news on Research Institute initiatives, upcoming events and conferences, recent invasive species findings, funding opportunities, and many other resources.

Over the past year, nyisri.org has received over 24,500 page views from over 3,500 independent visitors, consisting of over 5,500 sessions. Site views came from all 50 states, with sixty-three percent of sessions based in New York, and over 80% of sessions from Northeastern states.

Globally, nyisri.org has been accessed from 75 countries, with 87% of sessions originating in the United States.

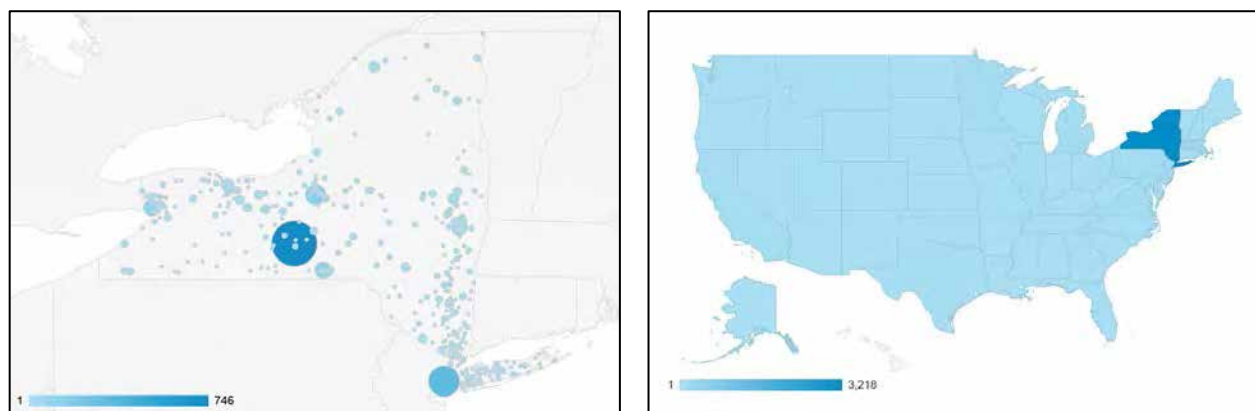


Figure 18. Website sessions within New York by city; Right, site visitors by state (January 2017 – January 2018)

Over the years, NYISRI has continually sought to increase the number and diversity of resources the site offers. Most recently, NYISRI has added a database and discussion forum which allows those who teach invasive species coursework to connect with other lecturers and share resources, detailed in Section S.

S. Lecturer Database

NYISRI worked closely with Meg Phillips (Invasive Species Education and Outreach Coordinator, NYS DEC) to expand the Expert Database once again to incorporate invasive species lecturers and educators at the university level. Lecturers can create profiles including a description of teaching, their institution, and invasive species concepts included in teaching.

The NYISRI website also features a complementary discussion forum where managers and lecturers can share resources, post questions, or otherwise communicate.

These resources will help the NYS DEC meet an objective of the recently published NYS Invasive Species Education and Outreach 5 Year Plan.

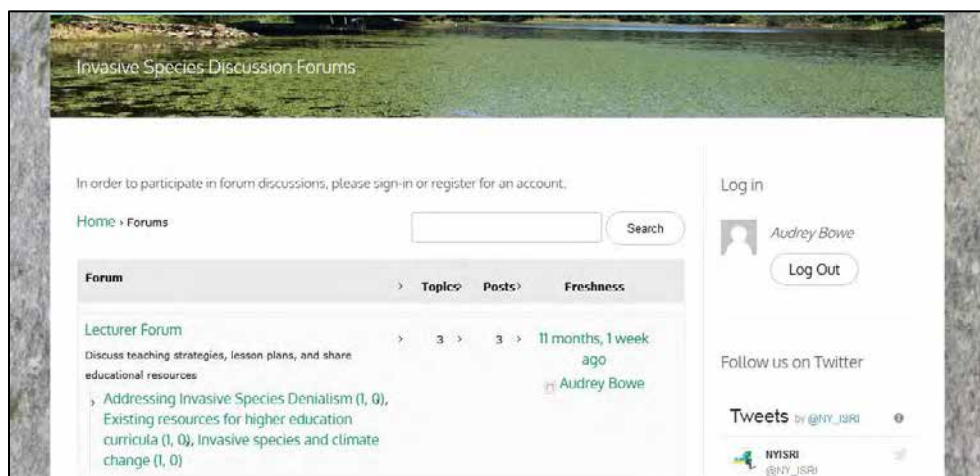


Figure 19. Lecturer database interface on NYISRI's website

T. Monthly Research Digest

Since 2015, NYISRI has scanned over three dozen ecology journals on a monthly basis to compile a list of newly published research papers that would interest to those working with invasive species in New York. Papers are included in the digest if they include one or more of the following criteria:

- Applied research on invasive species present in New York State or the Northeast,
- Theoretical concepts or models that have implications for invasive species in New York
- Economic, social, or ecological impacts of invasive species on a regional or global scale
- Topics of citizen science or social science approaches to invasive species awareness or management
- Restoration practices specific to ecosystems or species found in New York

Studies of the “knowing-doing gap” in invasive species management have found that practitioners typically do not read or consult primary literature, and limited time and access to scientific journals is a contributing factor. By providing this easily-skimmed monthly list of recent invasive species publications, NYISRI hopes managers and partners across the state of New York can more easily access and keep up to date on current relevant research.

NYISRI makes a point of connecting those who may not have access to particular journals to the resources they need to be successful.

Monthly Research Digest posts are distributed to over 30 blog subscribers and also shared via NYISRI’s Twitter.



Figure 20. Posts from the Monthly Research Digest Page

U. Blog

Modelled after the [blog of The Journal of Applied Ecology](#), which serves a similar purpose (“Bridging the gap between researchers, and practitioners, and policymakers”), the NYISRI blog is a venue where invited researchers can summarize and clearly communicate their recent research findings on invasive species, and implications for management.

This year we had two guest contributors to our blog.

- 1) The Geography of Invasion Risk, Dr. Jenica Allen, University of New Hampshire
- 2) Predicting Aquatic Invasion Risk in Adirondack Lakes, Dr. Richard Shaker & Stephanie Nick, Ryerson University

Links to these posts were circulated via PRISM list-servs and on Twitter, and the pages remain some of the most trafficked posts on the NYISRI site.

In 2018, NYISRI intends to continue soliciting blog posts from researchers, as well as debut a “Researcher Spotlight” style blog post, featuring Principle Investigators, and the work that they do in their lab.

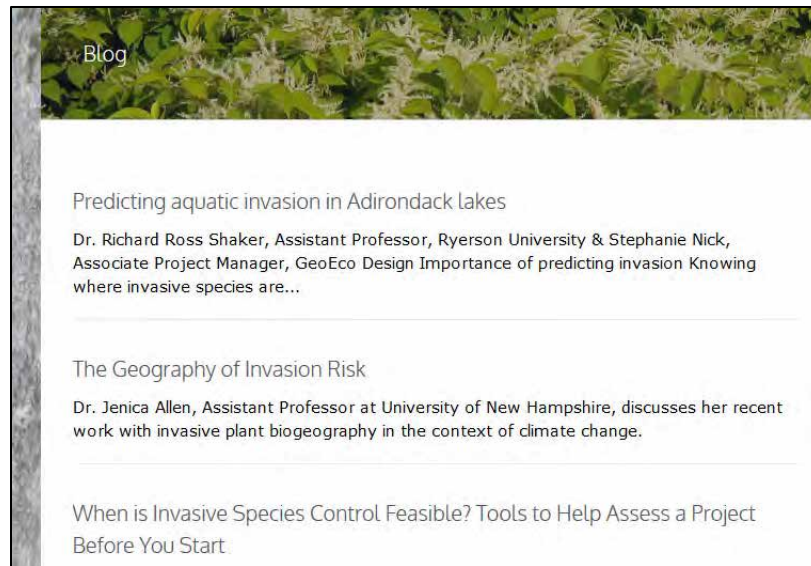


Figure 20. The blog.

V. Other Website Resources

The NY Invasive Species Research Institute Webpage also maintains and updates several other resources on a regular basis.

- The Events page provides a list of upcoming regional and national invasive species talks, events and conferences.
- The Expert Database provides a searchable interface of regional managers and researchers working with invasive species.
- The News page includes recent news articles featuring invasive species research, as well as updates from the New York Invasive Species Research Institute about initiatives or current activities.
- The Funding page provides a list of links to the grant pages of organizations that fund invasive species-related work, as well as to specific grant opportunities that are open for applications.
- The Webinars and Recorded Talks page archives presentations from the annual in-service as well as the presentations from the monthly state-wide invasive species calls, and other recordings of NYISRI presentations.

- The Web Resources page provides links to online resources for those interested in invasive species, including the NY DEC's prohibited and regulated species lists and the Nature Conservancy's Invasive Plant Management Decision Analysis Tool (IPMDAT).

Twitter



NYISRI's Twitter profile

NYISRI follows over 80 different ecology journals, scientists, and news outlets. News and blogs posted on the NYISRI website is also shared on Twitter, and NYISRI also retweets interesting scientific articles, papers, and blogs to followers. In 2017, NYISRI's tweets made over 6,000 impressions. The research institute's twitter handle, @NY_ISRI, has 60 followers, ranging from scientific journals, to researchers and practitioners working in the world of invasive species.

APPENDICES

Appendix 1. Organizations and Institutions

NYISRI met with professionals from the following organizations and institutions in 2017:

Quarter 1 Meetings:

Organization	Individual
Cornell University	Dr. David Lodge
	Mark Whitmore
	Julie Suarez
	Dr. Angela Fuller
	Dr. Carla Gomes
	Dr. Bernd Blossey
	Dr. Lindsay Milbrath
NYS Water Resource Institute	Dr. Todd Walters
NY Natural Heritage Program	Dr. Jennifer Dean
SUNY ESF	Dr. Dylan Parry
	Dr. Melissa Fierke
	Dr. Donald Leopold
	Dr. Martin Dovciak
	Dr. Danilo Fernando
Washington University at St. Louis	Dr. Solny Adalsteinson
Delaware University	Dr. Doug Tallamy
NY DEC ISCU	Dave Adams
	Megan Phillips
University of Rhode Island	Dr. Dick Casagrande
	Dr. Lisa Tewksbury
Resources for the Future	Dr. Becky Epanchin Niell
Center for Invasive Species Prevention	Dr. Faith Campbell
Cary Institute	Dr. Gary Lovett

Quarter 2 Meetings:

Organization	Individual
British Columbia Invasive Species Council	Danielle Toperczer
CABI Invasives	Dr. Richard Shaw
California Invasive Plant Council	Doug Johnson
Cary Institute for Ecosystem Studies	Dr. Gary Lovett

	Dr. Rick Ostfeld
	Dr. Chris Solomon
Cornell University	Dr. David Lodge
	Mark Whitmore
	Lauren Chambliss
	Dr. Jon McKenzie
	Dr. Todd Walter
Cornell Lab of Ornithology	Dr. David Bonter
	Dr. Amanda Rodewald
	Becca Rodomsky-Bish
Great Lakes Commission	Elaine Ferrier
iMap Invasives	Dr. Jennifer Dean
Invasive Species Center	Tracey Cooke
National Invasive Species Council	Dr. Jamie Reaser
	Hilary Smith
North American Invasive Species Management Association	Belle Bergner
NE Climate Science Center	Dr. Toni Lyn Morelli
	Dr. Alexander Bryan
Oregon State University	Dr. Fritz Grevstad
RRISC	Richard Otis
Ryerson University	Dr. Richard Shaker
SUNY Cortland	Dr. Andrea Davalos
University of British Columbia	Dr. Peter Arcese
University of Delaware	Dr. Doug Tallamy
University of Georgia	Chuck Barger
	Joe LaForest
University of Massachusetts Amherst	Dr. Bethany Bradley
	Dr. Valerie Pasquerella
University of Pittsburg	Dr. Walter Carson
University of Rhode Island	Dr. Dick Casagrande
	Dr. Lisa Tewksbury
USDA	Dr. Lindsey Milbrath
US Department of Homeland Security	Keving Harriger
Wells College	Dr. Jaqueline Schnurr

Quarter 3 Meetings:

Organization	Individual
Ausable River Association and Adirondack Watershed Institute	Dr. Brendan Wiltse

Cary Institute for Ecosystem Studies	Dr. Gary Lovett
Center for Invasive Species Solutions (Australia)	Greg Mifsud
Cornell University	Dr. David Lodge
	Dr. Rod Getchell
	Dr. Donna Cassidy-Hanley
	Melissa Osgood
	Dr. Kelly Zamudio
	Jose Andres
	Karen Snover-Clift
Hobart William & Smith Colleges	Dr. Meghan Brown
iMap Invasives	Dr. Jennifer Dean
Michigan Department of Natural Resources	Dr. Tammy Newcomb
National Invasive Species Council	Jeff Morisette
NY Department of Environmental Conservation	Scott McDonnell
NE Climate Science Center	Dr. Toni Lyn Morelli
	Alex Bryan
Other	Dr. Faith Cambell
Paul Smith's College	Dr. Lee Anne Sporn
SLELO PRISM	Rob Williams
USGS	Dr. Barry Baldigo
	Scott George
University of Massachusetts	Dr. Bethany Bradley
	Dr. Valerie Pasquarella

Quarter 4 Meetings:

Organization	Individual
Becker County Soil and Water Conservation District	Marsha Watland
Beyond Attitude Consulting	Ken Donnelly
British Columbia Invasive Species Council	Danielle Topezer
Cary Institute for Ecosystem Studies	Dr. Gary Lovett
Cornell University	Dr. David Lodge
	Dr. Suresh Sethi
	Dr. Katie Fiorella
	Jon McKenzie
	Julie Suarez
	Dr. Jon McKenzie
	Josephine Martell
	Dr. Todd Walter
iMapInvasives	Dr. Jennifer Dean
NAISMA	Belle Bergner
National Invasive Species Council	Dr. Jeff Morisette
NYS IPM Program	Dr. Amara Dunn
NE Climate Science Center	Dr. Toni Lyn Morelli
	Dr. Alexander Bryan

North Carolina State University	Dr. John Godwin
	Krishna Pacifici
OBG	Tony Eallonardo
Oregon State University	Dr. Fritzi Grevstad
Ryerson University	Dr. Richard Shaker
SUNY Cortland	Dr. Andrea Davalos
The Nature Conservancy	Matt Miller
University of Georgia	Chuck Barger
University of Massachusetts	Dr. Bethany Bradley
	Dr. Valerie Pasquarella
University of Minnesota Aquatic Invasive Species Research Center	Dr. Nick Phelps
University of Vermont	Dr. Ellen Marsden
University of Wyoming	Dr. Dan Tekiela
USDA Forest Service	Dr. Carol Randall
Western IPM Program	Dr. Amanda Crump
Working Dogs for Conservation	Aimee Hurt

Appendix 2. NYS PRISM Call Presenters & Topics

Speaker topics for 2017 monthly PRISM calls:

[Oak Wilt in New York State \(January 2017\)](#)

Jennifer Kotary, Oak Wilt Operations Manager, NY DEC

[False-brome \(*Brachypodium sylvaticum*\) in the western US: Invasion, ecology, identification and control methods \(February 2017\)](#)

Dr. Tom Kaye, Executive Director and Senior Ecologist, Institute for Applied Ecology

[The Phragmites Adaptive Management Framework \(March 2017\)](#)

Karen Alexander, Senior Program Specialist, Coastal Conservation and Habitat Restoration, Great Lakes Commission

[Multiflora rose, lymes disease, and ticks \(April 2017\)](#)

Dr. Solny Adelsteinsson, Post-doctoral Research Associate, Washington University in St. Louis

[Weed Biocontrol from Across the Pond – Japanese Knotweed and Himalayan Balsam \(May 2017\)](#)

Dr. Richard Shaw, Regional Coordinator of Invasive Species for Europe and the Americas and CABI's Country Director for the UK

[North American Invasive Species Management Association: Unifying Invasive Species Management Approaches \(June 2017\)](#)

Belle Bergner, Executive Director, North American Invasive Species Management Association

[Invasive Species Awareness Week 2017: Results and Recommendations \(September 2017\)](#)

Emma Antolos, Outreach and Education Specialist, Department of Environmental Conservation

[Invasive Species Collaboratives: Starry Stonewort & Slender False Brome \(October 2017\)](#)

Hilary Mosher, Finger Lakes PRISM Coordinator & Andrea Locke, Western NY PRISM Coordinator

[Plant Import Safeguards in New York State \(November 2017\)](#)

Margaret Kelly, Assistant Director, Division of Plant Industry, NYS Department of Agriculture & Markets