Invasive Plant Symposium 2016

INVASIVE PLANTS IN OUR CHANGING WORLD

Learn from the Past, Prepare for the Future

Connecticut Invasive Plant Working Group
cipwg.uconn.edu

University of Connecticut, Storrs, CT
Tuesday, October 11, 2016

PROGRAM
Speakers, Posters, Exhibits, Co-Sponsors

INVASIVE PLANTS IN OUR CHANGING WORLD

Connecticut Invasive Plant Working Group
October 11, 2016

8:00 **Check-in and Refreshments:** Posters and exhibits will be on display throughout the day.

9:00 **Greetings and Orientation:** CIPWG committee Co-Chairs Donna Ellis, UConn Senior Extension Educator, and Peter Picone, DEEP Wildlife Biologist

9:15 **Opening Remarks**: Gregory Weidemann, Dean, UConn College of Agriculture, Health and Natural Resources

9:30 **Connecticut Invasive Plants Council Update:** William A. Hyatt, Bureau Chief, Connecticut Department of Energy and Environmental Protection, Bureau of Natural Resources

9:40 **Leslie J. Mehrhoff Award:** Presented by Olga Mehrhoff

9:50 **Invited Talk:** ***Connecticut's Future: Rooted in Choice***
Karl Wagener, Executive Director, Connecticut Council on Environmental Quality

10:10 **BREAK:** Posters and exhibits on display.

10:40 **Keynote Address:** ***We're Moving On Up: Invasive Plants Heading North.***
Jil Swearingen**,** Integrated Pest Management and Invasive Species Specialist, federal government

11:40 **Poster Session:** Posters and exhibits on display.

12:00 **LUNCH**

1:00 **<u>Concurrent Sessions 1 through 3</u>**

Session 1 (Theatre)	***Session 2 (Room 304)***	***Session 3 (Ballroom 330)***
PANEL: What Are Other States Doing?	Native Plants for Our Pollinators	Management of Key Invasives: Success Stories, Progress Reports

2:15 **BREAK:** Refreshments; move to next session

2:30 **<u>Concurrent Sessions 4 through 6</u>**

Session 4 (Ballroom 330)	***Session 5 (Room 304)***	***Session 6 (Theatre)***
Biological Control: No Animal Too Small	Aquatic Invasive Plants	Plants to Watch Out For: Future Threats

3:45 **Closing Remarks:** Charlotte Pyle, Ph.D., Landscape Ecologist, Storrs, Connecticut

4:15 **Door prizes**

4:30 **Adjournment**

INVASIVE PLANT SYMPOSIUM 2016

INVASIVE PLANTS IN OUR CHANGING WORLD:

Learn from the Past, Prepare for the Future

Connecticut Invasive Plant Working Group
October 11, 2016

8:00 **Check-in and Refreshments**: Posters and exhibits will be on display throughout the day. Poster list starts on page 15. Contact information starts on page 21.

9:00 **Greetings and Orientation:**

Donna Ellis, Senior Extension Educator, UConn Department of Plant Science and Landscape Architecture, CIPWG Co-chair and CIPWG Symposium Planning Committee Co-chair

Peter Picone, DEEP Wildlife Biologist, Habitat Management Program, Sessions Woods WMA, Burlington CT. CIPWG Symposium Planning Committee Co-chair

9:15 **Opening Remarks:**

Gregory Weidemann, Dean, UConn College of Agriculture, Health and Natural Resources

Biography: Greg Weidemann has served as Dean and Director of the College of Agriculture, Health and Natural Resources at the University of Connecticut since 2008. As Dean and Director, he has responsibility for all aspects of the academic, research and outreach missions for the college.

Prior to serving in his current role, he served as Dean and Associate Vice President for Academic Programs in the College of Agricultural, Food and Life Sciences at the University of Arkansas and as Dean and Associate Vice President for Research and Agricultural Experiment Station Director from 2002 until 2008.

He joined the Department of Plant Pathology at the University of Arkansas in 1983 where he served as an Assistant, Associate and Full Professor until being appointed as interim Associate Director and Associate Dean in 1995. As a faculty member, his research focused on the taxonomy and biology of plant-pathogenic fungi and biological control. As a teacher, he received several teaching awards, including the National Association of Colleges and Teachers of Agriculture 1990 Award of Merit, the John W. White Teaching Award and the Gamma Sigma Delta Teaching Award of Merit. In 1993, he was elected to the University of Arkansas Teaching Academy.

Dr. Weidemann has served in a number of leadership roles within the land grant university system including serving as chair of the Southern Association of Agricultural Experiment Station Directors and as chair of the Administrative Heads Section for the Northeast region. He serves as the Vice-Chair of the Administrative Heads Section for the Board on Agriculture Assembly of the Association of Public and Land Grant Universities.

Greg is a native of Wisconsin and holds a bachelor's degree in Zoology and a Ph.D. in Plant Pathology from the University of Wisconsin.

9:30 Connecticut Invasive Plants Council Update:

William A. Hyatt, Bureau Chief, Connecticut Department of Energy and Environmental Protection, Bureau of Natural Resources

Abstract: The Connecticut Invasive Plants Council was established and operates pursuant to Connecticut General Statutes §22a-381 through §22a-381d. The Council is authorized to develop and conduct initiatives to educate the public about the problems created by invasive plants in lakes, forests and other natural habitats; recommend ways of controlling their spread; make information about invasive plants available to the public; annually update and publish the invasive plant list; and support research on developing and improving methods for controlling invasive species and for developing new non-invasive plant varieties. The Council consists of nine members representing government, the nursery industry, academia, and environmental groups. The Council provides the well-structured, legislatively authorized forum needed to develop cohesive invasive plant management strategies. This assemblage of representation from the State's key plant-related agencies, educational institutions, businesses and non-profit organizations has been able to develop the consensus strategies and collaboration needed to balance the interests of protecting Connecticut's environment and maintaining healthy nursery and related industries. The actions of the Council also enhance regional coordination in addressing invasive species, which know no boundaries and continue to spread across political lines.

Biography: Bill is Chief of the Bureau of Natural Resources at the Department of Energy and Environmental Protection (DEEP), which includes the Inland Fisheries, Marine Fisheries, Wildlife and Forestry Divisions. He was chair of the CT Invasive Plants Council from 2011 - 2014, is current chair of the Association of Fish & Wildlife Agencies Invasive Species Committee, and a member of the Federal Invasive Species Advisory Council. His prior positions with DEEP include Director of Inland Fisheries, Supervisor of Fisheries Management and Senior Fisheries Biologist. Bill also served as a Research Associate at the Institute of Ecosystem Studies in Millbrook, NY, where he did graduate research leading to an MS from the University of Connecticut. Bill has served as President of the Southern New England Chapter and the Northeast Division of the American Fisheries Society, and is the current chair of the CT River Atlantic Salmon Commission.

9:40 Leslie J. Mehrhoff Award: Presented by Olga Mehrhoff

9:50 Invited Talk: *Connecticut's Future: Rooted in Choice*

Karl Wagener, Executive Director, Connecticut Council on Environmental Quality

Abstract: Human activities will interact with trends in the physical environment to greatly influence the look and health of the future landscape, according to many lines of research. Those activities and trends, including changes in climate, movement of people and goods and fragmentation of forests, will be powerful forces in many regions of the country. This presentation explores critical activities and trends specific to Connecticut's fate. Not being an accomplished futurist, I use current state environmental trend data and extrapolate to the future. Because human activity is involved, considerable speculation is inevitable.

Biography: Karl Wagener is executive director of the state Council on Environmental Quality (CEQ), which monitors the condition of Connecticut's air, water, land and life and recommends improvements to state laws and policies. Much of his work involves investigating and finding solutions to complaints from the public about environmental problems. He oversees publication of the CEQ's annual report to the governor, *Environmental Quality in Connecticut*. Previously he worked on environmental policy for the Connecticut Audubon Society and was its lobbyist at the State Capitol.

10:10 BREAK: Posters and exhibits on display.

10:40 Keynote Address: ***We're Moving On Up: Invasive Plants Heading North***

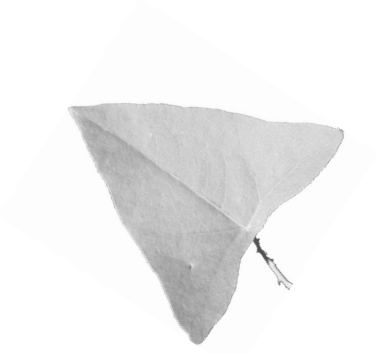
Jil Swearingen, Integrated Pest Management and Invasive Species Specialist, federal government

Abstract: Many factors play a role in the movement of invasive species to new locations including spread by humans, vehicles, wildlife, water, storms and other means. Becoming established is more challenging - conditions need to be suitable for an introduced species based on its adaptability to soil types, moisture, humidity, temperature extremes, pH, and other influences. Species with low cold tolerances might find it difficult to establish in cooler northern parts of the United States, helping to control their northerly and altitudinal spread to some extent. However, with impacts of climate change resulting in increasing temperatures and extended growing seasons further and further north over time, some invasive species previously considered to be southern residents can be expected to expand into higher latitudes and altitudes as long as other conditions are conducive. A search of the Early Detection Distribution and Mapping System (EDDMapS) database for invasive plant species that occur in the mid-Atlantic region but not in Connecticut resulted in just under 300 species. Fortunately, it's unlikely that all 300 species will move northward and make Connecticut their new forever home. But some especially worrisome species, including waterwheel (*Aldrovanda vesiculosa*), wavyleaf basketgrass (*Oplismenus undulatifolius* – aka *Oplismenus hirtellus* ssp. *undulatifolius*), English ivy (*Hedera helix*) and many others could. Putting these species on an early detection alert list will help ensure that they are found early and wiped out before they get a chance to set down roots.

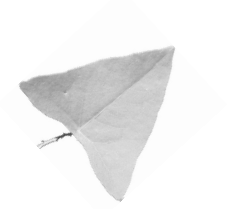
Biography: Jil is the lead author of the book "Plant Invaders of Mid-Atlantic Natural Areas" now in its 5th edition; initiator, co-founder and past-President of the Mid-Atlantic Invasive Plant Council; initiator and co-developer of the Mid-Atlantic Early Detection Network (MAEDN); co-creator of the Invasive Plant Atlas of the United States; Chair of the Plant Conservation Alliance's Alien Plant Working Group and creator of the Weeds Gone Wild website. Since 1995, she has served as Regional IPM Program Manager and Invasive Species Coordinator for the National Park Service at the Center for Urban Ecology in Washington DC.

11:40 Poster Session: Posters and exhibits on display.

12:00 LUNCH



1:00 Concurrent Sessions 1 through 3



1:00 – 2:15 Concurrent Sessions 1 through 3

Session 1 (Theatre) *PANEL - What Are Other States Doing?*

Moderator: Todd Mervosh, General Manager, TM Agricultural & Ecological Services

Panelists: William Hyatt *(CT Department of Energy and Environmental Protection),* Randy Prostak *(*University of Massachusetts*),* Doug Cygan *(*New Hampshire Department of Agriculture), Lisa Tewksbury (University of Rhode Island)

PANELIST INFORMATION:

William A. Hyatt, Bureau Chief, Connecticut Department of Energy and Environmental Protection Bureau of Natural Resources

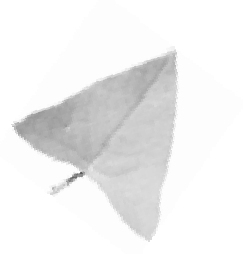
Abstract: The Connecticut Invasive Plant List originated as an educational, non-legal document developed by the Connecticut Invasive Plant Working Group (CIPWG) almost 20 years ago. The list has undergone numerous revisions by CIPWG members and the Connecticut Invasive Plants Council and was added to the General Statutes in 2003. There are currently 97 Invasive and Potentially Invasive plant species on the list. A subset of these species are prohibited from importation, movement, sale, purchase, transplanting, cultivation, and distribution. Extensive invasive plant educational outreach is conducted in the state to increase public awareness and provide training for municipalities, conservation organizations, state and federal agencies, and the public, with a goal of increasing knowledge regarding identification, management, and promoting the use of non-invasive alternatives. "Clean, Drain, Dry" messaging is the primary tool being used to increase awareness and to combat the spread of aquatic invasive species. Rapid response and control efforts have been successfully undertaken to address both terrestrial and aquatic invasions; however, state and municipal agencies currently lack the capacity to achieve long-term success.

Biography: See page 2

Randy Prostak, University of Massachusetts Extension Weed Specialist

Abstract: The Massachusetts nursery industry has been represented and involved in the Massachusetts Invasive Plant Advisory Group (MIPAG) from its inception. The nursery industry has actively participated in all aspect of MIPAG. Over the past several years the nursery industry has made many adjustments in their operation as a result of the invasive plant issue, notably the ban on some key nursery trade ornamentals.

Biography: Randy Prostak joined the University of Massachusetts in 1994 and has been a UMass Extension Specialist since 2000 where he specializes in weed management. He is a member of the UMass Extension Landscape, Nursery and Urban Forestry Team and is an active contributor to the Crops, Dairy, Livestock and Equine; Turf; Floriculture; and Pesticide Education Extension Programs. He currently serves on the Massachusetts Invasive Plant Advisory Group and is an active member of the Northeastern Weed Science Society and Weed Science Society of America.



Session 1 (Theatre) *PANEL - What Are Other States Doing? -continued*

Douglas Cygan, Invasive Species Coordinator, NH Department of Agriculture, Markets & Food

Abstract: Invasive Plant Programs in New Hampshire. Since the passing of the National Invasive Species Law (Executive Order 13112 in 1999), the state of New Hampshire has taken a proactive approach towards addressing this issue. In 2000, the New Hampshire Invasive Species Law giving regulatory authority to the NH Department of Agriculture, Markets & Food (DAMF) was approved. The Law created the NH Invasive Species Committee (ISC), which is composed of 11 members from various state agencies, NGO's, specialists, a public representative and nursery industry representative. With the guidance and recommendations of the ISC, the DAMF took regulatory action and created rules (Agr 3800), adopted in 2004, that prohibited 24 invasive plants. Included in the rules was a 3-year phaseout period for Norway maple, burning bush and Japanese barberry, which allowed the nursery industry the opportunity to recoup their losses. DAMF's Pesticide Control Division has also modified their Pes 500 series rules that provide exemptions for invasive species management. In addition, the NH Department of Environmental Services (DES) Wetlands Bureau includes conditions for invasive management when issuing certain wetlands permits. DES's Alteration of Terrain Bureau includes reference to Agr 3800 for large-scale land altering projects.

The DAMF is actively involved with outreach, education and hands-on invasive plant management. Since 1996, DAMF has maintained a biocontrol program for purple loosestrife. Doug Cygan has created the New Hampshire Guide to Upland Invasive Species and numerous fact sheets that are available on DAMF's website, and he typically conducts 30 to 50 presentations per year. In addition, Doug is a NH licensed herbicide applicator who has initiated a NH Statewide invasive species management initiative.

Biography: Douglas Cygan has been the Invasive Species Coordinator for the NH Department of Agriculture for the past 13-years as well as being a nursery inspector and an Authorized Certification Official for the USDA. Prior to this he was a Wetlands Permitting Officer for the NH Department of Environmental Services (DES) for 2 years, and before that he was a Senior Environmental Manager for the NH Department of Transportation's (DOT) Bureau of Environment for 7 years. In 1992 he graduated from the University of Maine, Orono, with a B.S and an A.S in Plant Science with a minor in Conservation Biology and Wetland Science.

Lisa Tewksbury, Research Associate, University of Rhode Island Dept. of Plant Science and Entomology

Abstract: Invasive Plant Management in Rhode Island: There are a number of organizations in Rhode Island that are concerned with invasive plant management, including the Rhode Island Natural History Survey, Rhode Island Department of Environmental Management (DEM), the University of Rhode Island Biological Control Lab, the University of RI CELS Outreach Center, the Rhode Island Nursery and Landscape Association, the Rhode Island Native Plant Society, and RI Coastal Resources Management Council (CRMC). There is also a RI Invasive Species Council which has recently been reinstated. Invasive Plant Legislation in Rhode Island primarily concerns aquatic invasive species. There is an "Aquatic Nuisance Species Plan" that was adopted in the state in 2007, and most actions against invasive aquatic plants require approval through RI DEM.

Biography: Lisa Tewksbury received her Bachelor's Degree in Plant Science from the University of Rhode Island, and her Master's Degree in Entomology from the University of Delaware. She has worked as a Research Associate at URI in the Plant Sciences Dept. for the past 31 years and as manager of the URI biological control lab for the past 22. The biological control lab conducts research on insect natural enemies of invasive insect and weed species; among the current projects are the lily leaf beetle, common reed (phragmites), and black swallow-wort.

Session 2 (Room 304) - *Native Plants for Our Pollinators*

Moderator: Lisa Turoczi, Co-owner and Principal Designer, Earth Tones Native Plant Nursery and Landscapes

A. *The Pollinator Victory Garden: Winning the War on Pollinator Decline*

Kimberly Stoner, Associate Scientist, The Connecticut Agricultural Experiment Station

Kim Eierman, Founder, EcoBeneficial

Abstract: Animal pollinators are responsible for the pollination of 80% of all flowering plants globally, and at least 30% of the food that we eat. Although many pollinator species are in decline, our landscapes rarely reflect the importance of these species - offering little in the way of appropriate habitat or forage sources. Casual, broad-spectrum pesticide use in the average landscape has also contributed to declines in many pollinator species. To win the war on pollinator decline, we need to understand pollinator requirements and sensitivities, and landscape accordingly. Not all pollinators are bees and not all pollinators utilize the same plants or habitat types, or are active at the same time of year. We can attract and support native bees, European honey bees and many other animal pollinators by making fundamental changes in our landscapes. Learn the best practices to turn any landscape into Pollinator Victory Garden to help win the war on pollinator decline.

Biography: Kimberly Stoner has a Ph.D. from Cornell University in Entomology, and a BS from Duke University in zoology. She has been at the Connecticut Agricultural Experiment Station since 1987. Her recent research includes routes of exposure of honey bees and bumble bees to neonicotinoid insecticides, pollination of pumpkin and winter squash, and biological diversity of bees in Connecticut. She is beginning projects on the attractiveness of ornamental horticulture plants to bees and methods of establishing pollinator habitat on farms.

Biography: Kim Eierman is an Environmental Horticulturist specializing in ecological landscapes and native plants. Based in New York, she teaches at the New York Botanical Garden, Brooklyn Botanic Garden, The Native Plant Center in NY, Rutgers Home Gardeners School and several other institutions. Kim is an active speaker nationwide on many ecological landscape topics, presenting for industry conferences, "green events," Master Gardener groups, garden clubs, nature centers, Audubon Society chapters, beekeeping groups, and other organizations interested in environmental improvements. Kim also provides horticultural consulting to homeowners and commercial clients.

In addition to being a Certified Horticulturist through the American Society for Horticultural Science, Kim is a Master Gardener, a Master Naturalist, an Accredited Organic Land Care Professional, a Steering Committee member of The Native Plant Center and a member of the Garden Writers Association.

Session 3 (Ballroom 330) - *Management of Key Invasives: Success Stories and Progress Reports*

Moderator: Jatinder S. Aulakh, Assistant Weed Scientist, The Connecticut Agricultural Experiment Station, Valley Laboratory, Windsor, CT 06095

A. *A Longitudinal Experiment in Volunteer-Powered Restoration of a* Berberis thunbergii-*Infested Floodplain Forest.*

William H. Moorhead III, Consulting Field Botanist

Abstract: Over the last nine years, we have assembled volunteer work parties 1-2 times/year to remove invasive plants, primarily *Berberis thunbergii* (Japanese Barberry), from a High Floodplain Forest community on the Farmington River in Avon, Connecticut. Our primary objective was to determine the minimum allocation of volunteer resources required per unit area to remove invasive species, restore and maintain a native herb layer and woody understory, without herbicides, without using plantings, and without harming rare plant populations. We experimented with various non-chemical methods of removing Japanese Barberry, and collected data on numbers of Barberry plants pulled, acreage cleared, numbers and demographics of the work parties, and development of ground layer and understory vegetation each year after treatment. We concluded that the most effective and efficient method of Barberry removal is hand pulling in teams of three to four members, with one member using a crowbar to pry on the root crown. This method results in a barberry removal rate of up to 19.7 Barberry pulled/person-hour, and up to 0.00138 ha/person-hour cleared in areas of dense Barberry. Of the two demographic groups of volunteers we have tested to-date, 1) mixed male and female adults aged 30-60 and 2) male secondary school juniors and seniors, Group 1 has been most productive. There has been no significant re-invasion by Barberry or other woody invasives in treatment areas. In the older treatment areas in which the ground layer was sparsely vegetated after Barberry removal, significant increase in native herbaceous cover had occurred by the third spring after Barberry removal, with cover increasing to high percentiles by the fifth year. A regionally rare native sedge has increased exponentially in the treatment areas. The herbaceous invasives *Alliaria petiolata* (Garlic Mustard) and *Microstegium vimineum* (Japanese Stiltgrass) have increased in all treatment areas, but dramatically so only in some areas. We hypothesize that this is due to differences between treatment areas in forest light levels and/or proximity to a well-used hiking/running trail. Experiments have been initiated to test these hypotheses, and to control Garlic Mustard, an allelopathic biennial, by removing entire flowering/fruiting plant populations during the year from certain of the treatment areas.

Biography: Bill Moorhead is an independent consulting field botanist based in western Connecticut. He has specialized for over 28 years in the search for populations of rare plants and their habitats, the study of plant communities and the factors determining their species composition and distribution, and classification and mapping of critical habitats and significant natural communities. He has worked in Connecticut, Massachusetts, Vermont, New York, Rhode Island, Maryland, and Virginia. Highlights of his work include the rediscovery of 27 plant species presumed extirpated in CT, and the discovery of over 700 new populations of rare plants. He also teaches plant identification workshops in difficult plant groups, such as sedges, grasses, willows, asters and goldenrods, and invasives.

Session 3 (Ballroom 330) - *Management of Key Invasives* - *continued*

B*. Volunteers vs. Invasive Plants: Practical Strategies, Successes, and Lessons Learned*

Dianne Saunders, Wallingford Conservation Commissioner

Abstract: The Stewards of Tyler Mill Preserve, a group of 16 volunteers, maintains about 750 acres and 11 miles of blazed trails in the town-owned 1,000-acre nature preserve. A primary element of the group's work is controlling invasive plants and fostering native species.

The workshop focuses on details of methods used for particular plants and habitats, with 'before and after' photos. As examples, the main entrance was rescued from a monoculture of Japanese knotweed, and a variety of native plants now flourish in the stream corridor and edge habitat at this migratory warbler hot-spot. The central trail 'hub', rescued from a potpourri of impenetrable invasives, is now an early successional forest opening supporting diverse species of birds, insects, reptiles and amphibians. Trail edges and roadsides that were dominated by invasives are now predominantly edged by native plants. Other areas are a 'W.I.P.', work in process, or better yet, 'When Invasives Persist' endeavors. The presentation combines specific techniques for particular plant species, including establishing native alternatives, with strategies for success with volunteers.

Biography: Dianne Saunders is a Conservation Commissioner in Wallingford, Connecticut, and co-leads the Stewards of Tyler Mill Preserve. As a former 4-H'er, and with a college background in outdoor education and special populations, she has had a lifelong commitment to volunteerism. In 2014, the Stewards received the Les Mehrhoff Plant Biodiversity Preservation Grant ($1,000) from the CT Association of Wetland Scientists, and in 2015, the QRWA (Quinnipiac River Watershed Association) Conservation Award, for the group's work in Tyler Mill Preserve.

C. *Knotweed: A Surefire Method*

Petie Reed, Owner, Perennial Harmony Garden & Landscape

Abby Stokes, Author and Public Speaker

Abstract: Japanese Knotweed (*Polygonum cuspidatum* aka *Fallopia japonica* aka Mexican Bamboo), is listed in the top 10 worst invasive plants in the world and is very prevalent and highly invasive in New England. Its point of entry into the United States was Boston as an ornamental, in 1825, and it has since spread into 42 states. In the summer of 2011 the Pine Grove Beautification Committee began a pilot program in a 100'x20' area to eradicate Japanese Knotweed and restore low-growing, native plants and grasses to prevent erosion, minimize maintenance, and negate the use of chemicals. Within three years that pilot area was virtually knotweed free and is a happy and healthy bank now. Since then we've honed in on the most effective and efficient method for knotweed eradication using Mechanical, not Chemical, Control. But wait, there's more...Japanese Knotweed is now considered a delicacy. Our discussion will include methods for cooking. If you can't beat it, eat it!

Biography: Petie Reed has owned Perennial Harmony for 14 years and has been a NOFA Organic Land Care Professional for 10 years. A lifelong environmentalist, Petie is active with *Save the River-Save the Hills,* a non-profit grassroots organization protecting the Niantic River.

Biography: Abby Stokes lives and works in the cement jungle of Manhattan. She got her hands dirty 12 years ago when she purchased a cottage in Pine Grove, a peninsula in the Niantic River. She founded the Pine Grove Beautification Committee in 2007. Abby is also the bestselling author *"Is This Thing On?" A Friendly Guide to Everything Digital for Newbies, Technophobes, and the Kicking & Screaming* as well as *Dinner Party Disasters: True Tales of Culinary Catastrophe*.

2:15 **BREAK:** Refreshments; move to Sessions 4, 5, 6.

2:30-3:45 Concurrent Sessions 4 through 6

Session 4 (Ballroom 330) - *Biological Control: No Animal Too Small*

Moderators: Lindsay Suhr, Land Conservation Director, Connecticut Forest & Park Association and Lisa Turoczi, Co-owner and Principal Designer, Earth Tones Native Plant Nursery and Landscapes

A. *Biological Control of Mile-a-minute in Connecticut*

Emmett Varricchio, Research Assistant, The Connecticut Agricultural Experiment Station

Abstract: Mile-a-minute (*Persicaria perfoliata*, aka *Polygonum perfoliatum*), is an invasive annual vine from Asia that has been present in the United States since the 1930's. Since its accidental introduction from a nursery in Pennsylvania it has invaded the Mid- Atlantic and Northeastern United States and continues to spread. In Connecticut the first report of the invasive weed was in Greenwich in 1997. Since then Mile-a-minute (MAM) has spread across 44 towns in Connecticut. This plant thrives in disturbed soils and can outcompete native plants making it a serious threat to our threatened ecosystems. The good news is a little weevil, *Rhinoncomimus latipes,* a highly specific biological control agent found in the plant's native range of China, was approved for release in the United States to combat MAM. This weevil is only able to survive and reproduce on MAM, making it a great biological control agent. The first releases of the weevil occurred in New Jersey in 2004. In 2009 The Connecticut Agricultural Experiment Station and the University of Connecticut teamed up to release the first weevils in Connecticut, supported by funding from USDA APHIS. Presently, close to 50,000 weevils have been released in the state. This presentation aims to show the present distribution of MAM in Connecticut, show the successes and trials of this biological control program in CT, and educate the public into this ongoing program aimed at stopping the spread of Mile-a-minute in its tracks.

Biography: Emmett Varricchio attended Central Connecticut State University, earning a B.A. in Biology. He has worked at The Connecticut Agricultural Experiment Station since 2014. His current research is focused on the biological control program for Mile-a-minute Weed in Connecticut.

B. *Beauty and the Beast: Purple Loosestrife Biological Control Update*

Donna Ellis, Senior Extension Educator, UConn Department of Plant Science and Landscape Architecture and Co-Chair, Connecticut Invasive Plant Working Group (CIPWG)

Abstract: Biological control involves the use of natural enemies to reduce an invasive plant's population below a biological or economic threshold, and it is a sustainable, low-input method to manage invasive plants. Integrated Pest Management (IPM) methods, which include biological control, can successfully reduce invasive plants in natural and managed landscapes. *Galerucella* leaf-feeding beetles are beneficial insects that have been introduced for biological control of purple loosestrife (*Lythrum salicaria*), a program that began at UConn twenty years ago in 1996. The beetles feed primarily on purple loosestrife and do not prefer other kinds of plants. Feeding injury by the beetles helps to reduce purple loosestrife populations that invade wetland habitats in Connecticut and throughout the United States. The Purple Loosestrife Beetle Farmer Program and website (www.purpleloosestrife.uconn.edu) were developed at the UConn Department of Plant Science and Landscape Architecture, with partial funding by USDA APHIS. The goals of the program are to enhance educational outreach for biological control and to increase the distribution of *Galerucella* beetles in the state. A diverse group of more than 770 Connecticut citizens received training and participated in the Beetle Farmer Program. To date, more than 2 million *Galerucella* beetles have been introduced into Connecticut wetlands where purple loosestrife control is needed. While it may take an average of seven years for the impacts of biological control to occur, the beetles have not only been successful reducing purple loosestrife in many state wetlands but

they are naturally dispersing to other areas where purple loosestrife threatens native wetland vegetation and reduces the quality of these critical habitats. The Beetle Farmer Program and purple loosestrife biological control are part of the IPM and Environmental Science curriculum for K-8 students developed by UConn scientists and area teachers (http://www.ipm.uconn.edu/pa_curriculum/).

Biography: Donna Ellis is a Senior Extension Educator in the Department of Plant Science and Landscape Architecture at the University of Connecticut, where she has worked for 26 years. She has a B.S. degree in Plant Science from the University of Rhode Island and an M.S. degree in Plant Science from the University of Connecticut. Donna is the UConn Integrated Pest Management (IPM) Program Coordinator and conducts IPM training programs for the green industry. She teaches a course at UConn on agricultural and horticultural plant pests and is involved with educational outreach and applied research programs for insects, weeds, and plant pathogens, with an emphasis on invasive plants and biological control. Donna initiated a Beetle Farmer Program to train volunteers to raise beneficial insects as biological control agents for the invasive plant purple loosestrife (*Lythrum salicaria*). Since 2009, Donna has collaborated with other scientists to release beneficial weevils for biological control of invasive mile-a-minute weed (*Persicaria perfoliata* aka *Polygonum perfoliatum*). Donna serves as Co-Chairperson of the Connecticut Invasive Plant Working Group (CIPWG), a statewide organization whose mission is to provide invasive plant education. The Working Group convenes biennial symposia on invasive plants.

C. *Biological Control of Swallow-worts*

Lisa Tewksbury, Research Associate, University of Rhode Island Dept. of Plant Science and Entomology

Abstract: There are two species of invasive swallow-worts in the Northeast, *Vincetoxicum nigrum* (black swallow-wort), and *Vincetoxicum rossicum* (pale swallow-wort). Black swallow-wort is prevalent in Rhode Island and Massachusetts and pale swallow-wort is a serious invasive weed in New York and Canada. The Connecticut invasive species list has both species of swallow-worts as prohibited in Connecticut. The scientific names in the CT list are synonyms of the ones used here: *Cynanchum louiseae (*black swallow-wort) and *Cynanchum rossicum* (pale swallow-wort). In 2006 URI began a biological control program for swallow-worts. It has culminated in the petition for release of a moth species, *Hypena opulenta*. The caterpillar of this species feeds on both species of swallow-worts. This species was approved for release by the Weed Biological Control Technical Advisory Group (TAG), which includes representatives from the USDA, Fish and Wildlife, and other agencies, as well as representatives from Canada and Mexico. We are now awaiting final issuance of the permit.

Biography: Lisa Tewksbury received her Bachelor's Degree in Plant Science from the University of Rhode Island, and her Master's Degree in Entomology from the University of Delaware. She has worked as a Research Associate at URI in the Plant Sciences Dept. for the past 31 years and as manager of the URI biological control lab for the past 22. The biological control lab conducts research on insect natural enemies of invasive insect and weed species; among the current projects are the lily leaf beetle, common reed (phragmites), and black swallow-wort.

Session 4 (Ballroom 330) - *Biological Control* - *continued*

D. ***Using Livestock as a Biological Control of Invasive Plants***

Bill Purcell, Soil Conservationist, USDA Natural Resources Conservation Service

Abstract: Livestock can be an effective tool to biologically control weeds and invasive plants such as Multiflora Rose, Autumn Olive, Honeysuckle, Kudzu, Privet, and Japanese Barberry when used as part of a Prescribed Grazing System. Prescribed grazing systems can be used to accomplish specific invasive plant control. Livestock are deployed for specified periods of time to help control the invasive plant species. Livestock stocking rates, paddock size, fencing, watering facilities, predator control, and length of time the animals are put on pasture will be discussed. Management of livestock is crucial to not cause other resource concerns such as soil erosion or water quality on the property. Examples of using goats, pigs, sheep, cattle, and Exmoor ponies to control invasive plants will be discussed.

Biography: Bill holds a BS in Natural Resource Management and Engineering from the University of Connecticut. He previously worked for the CT DEEP Wildlife Division controlling invasive plants and has been working for the USDA Natural Resources Conservation Service as a Soil Conservationist since 2008 where he continues to help landowners manage invasive plants on their property. He became NRCS CT's State Grazing Land Specialist in 2011 and has seen various types of livestock used to control invasive plants in pastures and the woods.

Session 5 (Room 304) - *Aquatic Invasive Plants*

Moderator: Rose Hiskes, Diagnostician, Information Office, The Connecticut Agricultural Experiment Station.

A. ***Managing Invasive Plants in a Complicated World***

Kenneth J. Wagner, Ph.D., CLM, Water Resource Manager, Water Resource Services, Inc.

Abstract: Invasive species management is subject to scientific uncertainty, economic limitations and a complicated regulatory process that makes it difficult to effectively manage in many cases. Conflicts with protected species laws, water quality regulations, property rights, and perceptions created by a lack of information or misinformation hamper progress, but successes have been achieved where proponents have been well prepared, adequately funded and persistent, with many important lessons learned. Management options include physical, chemical and biological methods, and a multi-pronged approach is often most suitable. Successful processes tend to treat invasions like medical problems, incorporating prevention, remedial activities and monitoring, and relying on sound research to develop appropriate "cures". More effort is needed to convince both the public and decision makers that managing invasive species is important enough to support within the institutional framework for environmental management.

Biography: Dr. Wagner holds degrees from Dartmouth College and Cornell University, with his Ph.D. earned in Natural Resource Management in 1985. He has over 40 years of experience working on a variety of water resources assessment and management projects, including lake, reservoir, river and watershed assessment, rehabilitation, and management, regulatory processes, and educational programs. In 2010 he started Water Resource Services, a small company with a focus on water supply protection and lake management consulting. He is a former President of the North American Lake Management Society and former Editor in Chief of Lake and Reservoir Management, a peer-reviewed journal.

Session 5 (Room 304) - *Aquatic Invasive Plants - continued*

B. ***If at First You Don't Succeed... How to Stop Invasive Aquatic Plants in New England***

Don Les, Professor, Department of Ecology & Evolutionary Biology, University of Connecticut, Storrs

Abstract: Invasive aquatic plants cause devastating environmental and socioeconomic problems throughout North America. Long-settled areas like New England are particularly vulnerable to introductions of invasive aquatic plants and historical studies have shown that the region acquires on average, one new invasive aquatic plant species every decade. These invasions have been met with many different attempts at management including early detection strategies, public information dissemination, as well as biological, chemical, and mechanical control. Yet, despite these efforts, every single nonindigenous aquatic plant species that has been introduced to New England over the past century continues to survive in the region. How can these invasions best be managed? Is there an "optimal" solution for stopping the incessant spread of aquatic plants in the region? This presentation will provide an overview of the problem of invasive aquatic plants in New England and present an evaluation of the efficacy of various management strategies used to combat these introductions. The bottom line is that there does seem to be only one effective solution to the problem, but we have been focusing all of our resources in numerous other directions.

Biography: Don Les has been a Professor with the department of Ecology & Evolutionary Biology at the University of Connecticut since 1992 and was an Associate Professor at the University of Wisconsin-Milwaukee from 1986-1992. He has a Ph.D. in botany from The Ohio State University, and B.S. and M.S. degrees in biology from Eastern Michigan University. He has studied aquatic flowering plants for more than 40 years, with an emphasis on their systematics, evolution, and invasive characteristics.

C. ***Becoming an Invasive Investigator Launch Monitor at Your Launch Just Got Easier***

Gwendolynn Flynn, Environmental Analyst**,** Connecticut Department of Energy & Environmental Protection

Abstract: Zebra mussels had been confined to the Twin Lakes in Salisbury, CT from 1998-2010. With the unfortunate news of zebra mussels being discovered in the Housatonic River impoundments in 2011, the Invasive Investigator Program was started. This program was designed to train volunteers in a classroom setting to educate boaters at boat launches and help empower them on how they can prevent the spread of Aquatic Invasive Species. For the past few years the training has been on a Saturday morning, but we are excited to launch the new online course. The new training is designed to make it more convenient for volunteers to get the education and hands-on training with a seasoned volunteer or DEEP employee.

Biography: Gwendolynn Flynn holds a B.S. in Coastal Studies from the University of Connecticut. She has worked for the Connecticut Department of Energy and Environmental Protection for 11 years. For the past few years, she has served as the Supervisor for the Boating Division Education and Outreach Unit. Gwendolynn is also responsible for education and outreach of the Clean Vessel Act program, as well as environmental education for boaters. In 2011, when zebra mussels were discovered in the Housatonic River impounds, she launched the Invasive Investigator program. This program provides training for volunteers who wish to interact with boaters to educate them about and teach them how they can prevent the spread of Aquatic Invasive Species (AIS). Gwendolynn has served on the States Organization for Boating Access AIS Task Force, whose primary goal is to gather and develop site level design, development and operational guidelines that will assist access administrators with providing AIS/ANS prevention areas.

Session 6 (Theatre) - *Plants to Watch Out For: Future Threats*

Moderator: Peter Picone, DEEP Wildlife Biologist, Habitat Management Program, Sessions Woods WMA, Burlington CT and CIPWG Symposium Planning Committee Co-chair

A. New Invasive Threats on the Horizon: What's Coming Next Connecticut?

Bryan A. Connolly, Ph.D., Assistant Professor, Dept. of Biology, Framingham State University

Abstract: Think Connecticut has enough invasive plant species? Guess what! More are on their way. This presentation will focus on plant species with potential to become invasive in Connecticut. Species that are newly arrived and are near the border of the state will be discussed. Identification features, habitat, ecology, and threats to natural resources will be covered.

Biography: Bryan holds a B.A. from the University of Vermont, and a M.S. and Ph.D. from the University of Connecticut. Previous to his appointment as an Assistant Professor at Framingham State University, he served as the Massachusetts State Botanist for the MA Division of Fisheries and Wildlife. Bryan also served as the volunteer coordinator for the Invasive Plant Atlas of New England (IPANE). He has consulted for the Guilford Land Trust and the CT DEEP. He has also taught botany, plant science, and environmental studies classes at Connecticut College and the University of Connecticut. He is currently serving as President of the New England Botanical Club.

B. Identification and Management of Running Bamboo

Jeffrey S. Ward, Chief Scientist, Department of Forestry and Horticulture, The Connecticut Agricultural Experiment Station

Abstract: Running bamboo (*Phyllostachys* spp.) is a non-native species in Connecticut that can cause major disputes between neighbors if it crosses property lines and can be a localized problem if planted adjacent to unmanaged areas with full sunlight. Therefore, it is illegal to plant running bamboo within 40 feet of a property line (CGS 22a-281e), and if the rhizomes cross a property line, the owner is responsible for "any damages caused to any neighboring property by such bamboo, including, but not limited to, the cost of removal of any running bamboo that grew beyond the boundaries of his or her property."

This talk will focus on identifying running bamboo, discuss its growth habits, and examine different methods of control.

Biography: Jeffrey S. Ward received his BS (forest biology) and MS (silviculture) at The Ohio State University and, after service in the Peace Corps (Guatemala), his Ph.D. (forest ecology) at Purdue University. He is Chief Scientist-Department of Forestry and Horticulture at The Connecticut Agricultural Experiment Station. His research has focused on the dynamics of long-term herbaceous and tree populations, invasive species control, and forest management. He is currently Chair-Elect of the New England Society of American Foresters.

Closing Remarks and Door Prizes: Theatre

3:45 Closing Remarks

Charlotte Pyle, Ph.D., Landscape Ecologist, Storrs, Connecticut

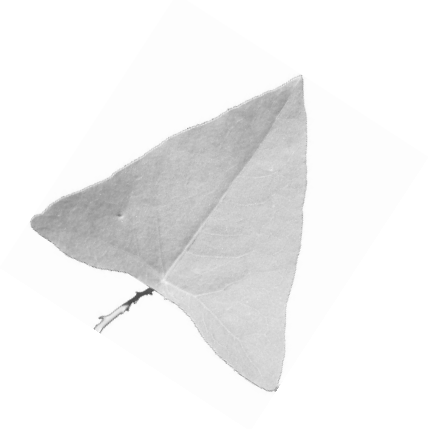
Abstract: As I think now, in August, 2016, about wrapping up the eighth biennial symposium of the Connecticut Invasive Plant Working Group, I look forward to many good things. I know that the day will have been a wonderful event with much new information, many opportunities for meeting new people and seeing old friends, and that ever-present wish that one could clone oneself in order to attend all of the concurrent sessions. With each symposium, we have gotten updates on hot invasive plant topics, new thinking, new invaders, and new reports on how invasives are being dealt with legislatively. The symposium is a reliable source of information on management techniques for Connecticut. And, we have always recognized value of native plants as alternatives to invasives.

BUT, just because the biennial symposia are wonderful does not mean CIPWG members and friends have no work left to do. At the symposium, I will summarize what I heard during the day and then leave you with some thoughts on how we might learn from the past to prepare for the future.

Biography: Dr. Charlotte Pyle is a member of the Connecticut Invasive Plant Working Group's Steering Committee and has been on the planning committees for all the CIPWG symposia. She co-chairs the CIPWG Native Plant Alternatives subcommittee. Though now retired from the USDA Natural Resources Conservation Service, she believes the work CIPWG does is very important for Connecticut so she remains involved in CIPWG. She received a Ph.D. in Forestry Ecosystem Analysis with a focus on Landscape Ecology from the University of Washington. Prior to working for the USDA Natural Resources Conservation Service, she worked for the University of Connecticut, Great Smoky Mountains National Park, and Tahoe National Forest. This past summer she was awarded one of the Artist-in-Residence weeks at Connecticut Audubon's Trail Wood (Edwin Way Teale Memorial Sanctuary) in Hampton to pursue her nature writing.

4:15 Door Prizes

4:30 Adjournment



Poster Presentations for the 2016 CIPWG Symposium

1. Christian Allyn, University of Connecticut

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Invasive Plant Solutions, Company Offering Invasive Plant Removal

A student with a double major in Horticulture and Resource Economics saw a way to apply his interests and education to the real world. Recognizing a business opportunity with landowners who have become increasingly aware of the damage caused by invasive plants, UConn Senior Christian Allyn started an invasive plant removal business. He obtained partial funding from the UConn IDEA Grant program. The business was also a 2016 finalist in the UConn Innovation Quest Program for start-up companies, graduating from the UConn Innovation Quest Summer IQbator Program.

2. John Campanelli[1], Julia Kuzovkina[1], Cristian Schulthess[1], Robert Ricard[2] and Glenn Dreyer[3]
[1]UConn Department of Plant Science and Landscape Architecture, [2]UConn Department of Extension, [3]Connecticut College

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Effective Establishment of Native Plant Communities and Pollinator Habitats along New England Roadsides

Plant species selection is a critical component of roadside vegetation management, providing safe clear zones and effective control of slope erosion. For decades, state Departments of Transportation have used introduced cool-season turf grasses for quick cover along roads. However, recent policy changes require the use of native plants as the first choice in roadside revegetation efforts. The New England Transportation Consortium (NETC) - a research cooperative funded by all six New England state DOTs - commissioned research to find the most affordable, reliable, and expeditious methods for establishing native plant communities of warm-season grasses and forbs along New England roadsides. Various establishment protocols were implemented during this study which included Truax drill seeding, use of sawdust, clayballs, Jacobsen verticutter/overseeder and hydroseeding. Our research has also found that sizeable populations of native plant communities already exist along New England roadsides and they can be enhanced by a management approach, called augmentation. The augmentation is more effective than establishing native communities from scratch: less intensive, costs less, and is ecologically more sound because it promotes the integrity of locally-adapted populations. A manual for all six New England DOTs that guides managers and workers as they transition from long-standing revegetation practices was developed as the result of this project.

Posters, *continued*

3. Carole Cheah[1] & Donna Ellis[2], assisted by Emmett Varricchio[1]
[1]The Connecticut Agricultural Experiment Station; [2]University of Connecticut

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Biological Control of Mile-a-minute Weed (MAM) in Connecticut

Mile-a-minute weed (MAM), *Persicaria perfoliata* aka *Polygonum perfoliatum*, originally from Asia, is considered a serious and problematic invasive weed because of its prolific ability to spread in disturbed environments. First verified in Greenwich in 2000, currently 44 towns in Connecticut have confirmed MAM reports. *Persicaria perfoliata*, though an annual, can quickly overwhelm native vegetation with its exponential growth and is a serious threat to forest regeneration. A tiny weevil, *Rhinoncomimus latipes*, native to China, with high host plant specificity and great damaging potential to MAM, was first released as a biological control agent in Delaware and New Jersey in 2004. In 2009, the first releases were implemented in Connecticut in a joint collaboration between The Connecticut Agricultural Experiment Station and the University of Connecticut, in cooperation with the University of Delaware and the Phillip Alampi Beneficial Insect Laboratory, New Jersey Department of Agriculture. Annual regional releases of this weevil to manage MAM, and monitoring assessments of weevil establishment and impact on the MAM are currently funded by USDA APHIS PPQ. From 2009-2016, >49,000 weevils have been released in 46 sites in 24 Connecticut towns, in cooperation with town, state, federal, NGOs and private partners. Updates on the Connecticut program are presented. Our annual monitoring has documented extensive, even offshore weevil dispersal, weevil survival of unpredictable Connecticut winters, drought, severe flooding, storms and site interference, and some localized reductions in MAM populations. Intensive scouting and GIS mapping in 2015-2016 has shown little or no spread of MAM from weevil release sites.

4. **Sigrun N. Gadwa**, MS, PWS. Ecologist, Registered Soil Scientist, Carya Ecological Services, Cheshire, CT 06410

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Why Get Alarmed about Mugwort?

Mugwort, *Artemisia vulgaris,* is a familiar, medicinal-smelling perennial weed. It forms large, fast-spreading patches along roadsides and in idle construction sites, and its impressive rhizome system is daunting should anyone attempt to pull it out. For decades it received little attention because the general assumption was that at least it only spread vegetatively, and rarely intruded into natural ecosystems - just disturbed areas. It was also boring looking, lacking colorful foliage or flowers because it was wind pollinated.

In the late 1990's one study found terpenoid allelopathic chemicals in mugwort foliage, and another showed that decomposing mugwort foliage inhibits growth of red clover growth. Concerns were raised that this species inhibited natural succession to an old field rich in nectar sources, nutritious seeds, and wild fruits. (Mugwort has no nectar and its seeds are extremely tiny.) Then a pilot germination study was carried out by Dr. Jeffrey Ward, at the Connecticut Agricultural Experiment Station, using seed collected from seven parts of Connecticut. Dr. Ward had repeatedly noticed isolated young mugwort plants and had been skeptical that they were entirely clonal, spreading mostly by rhizome fragments. His study showed unequivocally that mugwort seedlings sprouted readily, at least from mature seed collected in mid to late fall, and was presented to the Connecticut Invasive Plant Council. Questionnaires were distributed to CIPWG members, and responses made clear that this plant now occurs in many habitats and localities, not just in disturbed roadsides. *Artemisia vulgaris* was formally added to the Connecticut Invasive Plant list.

Unfortunately, the hoped for grant funding for a formal study of mugwort reproduction, germination, and seedling establishment did not materialize. Even without rigorous data, it is now clear that late summer mowing is an important control strategy, to minimize further spread. Early

summer mowing of mugwort, does not prevent flowering and seed set, but it does allow continued coexistence with low numbers of shorter nativer forbs like the goldenrods and asters, needed by pollinators, which are otherwise shaded out by two-meter tall mugwort. Mowing in early summer and early fall can be a temporary strategy, while resources are gathered for careful chemical control.

Per Connecticut weed scientist, Todd Mervosch, effective controls may finally available for mugwort, though additional data is still needed on the revegetation of soils that had been infested with this allelopathic species. These chemical control methods will be outlined in the poster. Note that chemical controls are not wise under all conditions. For example, where stream bank erosion is a high risk, it would be wise to leave mugwort rosettes in place, at least during the winter and early spring.

Important questions remain to be answered regarding this invasive. How long do rhizomes remain viable and how deep must they be buried, to prevent resprouting, if mechanical control is selected?

Do seedlings succumb to competition or mold in mesic, partially shaded, dense sites, giving the impression that plants are sterile? Would mugwort seedlings become established if idle bare soil were well covered with straw or hay? This is a practice recommended by CT DEEP, but rarely carried out.

Initial colonizers of any outcrossing invasive may be infertile until populations grew diverse enough, genetically, to prevent "inbreeding depression". This is likely the reason that many horticultural specimens do not naturalize. Was this the case with mugwort? Is mugwort self-fertile, so that a single individuals's seed can start a large new clone?

Is mugwort still used anywhere for sheep parasite control, commercially - an historic widespread use? Perhaps harvest and sale could offset the cost of revegetation?

5. S.M. Graves, Department of the Environment, Geography and Marine Sciences, Southern Connecticut State University.

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Viability and Utility of µUAS for Wetland Monitoring – Pond Lily Nature Preserve & Cove River

The work presented is part of ongoing research collaborations with the New Haven Land Trust, CT Fund for the Environment and Save the Sound, as well as the City of West Haven, CT. Two selected sites (2 posters presented here) were mapped using µUAS (micro Unmanned Aerial Systems – quadcopter drones), after considerable ecosystem and habitat remediation had been undertaken by these stakeholders over the last few years.

The Pond Lily site (poster 1), roughly 1 hectare, is a remediated old Mill Pond that was drained (dam removed), and stream channels re-engineered. Our µUAS mapping flights were conducted in March and August 2016 after the major earth works were completed and initial replanting of native species. The image/map mosaics produced will allow the stakeholders to track changes in the vegetative regrown over time (as we re-fly the area seasonally). The image/map mosaics produced are very high resolution and allow some individual species identification, which can be confirmed on the ground. Repeated mapping missions will allow for easy detection of regrowth and spotting of any invasive species emergence.

The Cove River site (poster 2) is a freshwater and estuarine wetland location that had become completely overgrown with invasive *Phragmites australis*. In 2012 the City of West Haven conducted an eradication program involving bulldozing and poisoning of the invasive grasses. The lower-most salt marsh is roughly 8.5 hectares and the middle wetland is a complex of freshwater and estuarine wetland, roughly 9.5 hectares combined. There was little funding available for follow-up work and replanting of native *Spartina sp.* Our µUAS mapping missions began in the fall of 2015 and we have flown/mapped the site repeatedly since then. Our goal here, as with at Pond Lily, is to document the regrowth of native wetland species over time. We had expectations that native marsh grasses

(*Spartina* and others) would recolonize the marsh top and channel margins rather quickly. Unfortunately, that has not happened to the extent and/or rate anticipated. It appears that the current marsh-top may be deflating in places and the channel margins are surely collapsing in others. Some of these aspects may well be documented and visualized using µUAS overflights and employing Image Mosaics and 3D Modeling (Pix4D Mapper software).

Future/follow-up research and data collection will continue and involve conducting precision ground surveys (Total Station) to establish ground control points for the µUAS mapping flights, as well as establish the elevation of the marsh top.

• On-ground marsh top, channel bank, and channel floor sediment sampling would help to resolve whether channel banks are collapsing.

• Measuring marsh top inundation depth can be achieved by anchoring a newly developed time-lapse *Marsh Inundation Camera System* into the marsh top and gathering timelapse image sets of changing water levels (spring and neap high tide). Salinity data collected at high tides also helps in resolving the conditions that may be preventing normal marsh top vegetation (*Spartina patens*) from returning.

6. Jessica Lubell, Department of Plant Science and Landscape Architecture, University of Connecticut, Storrs, Connecticut.

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Challenges to Developing the Market for Native Shrubs*.*

There is increased demand for native shrubs to use in developing sustainable landscapes. Native plant species provide support for pollinators and other ecological systems and are a suitable landscape alternative to invasive plants. Through my research and extension program at the University of Connecticut, I have worked to expand the availability of native shrubs in the nursery trade by studying their landscape suitability, propagation and production in containers. My poster will present the issues around developing the market for native shrubs including the need for education about landscape use, lack of plant availability, poor quality of nursery stock, lack of cultivars, and perceived drawbacks of cultivar use.

7. Alyssa Matz, Department of Molecular and Cellular Biology, University of Connecticut

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Investigating the Chemical Signals of **Galerucella** ***spp. for Effective Biological Control of*** **Lythrum salicaria**

The invasive plant *Lythrum salicaria* has been a main contributor to the decline of wetland ecosystems across the North American continent. *Galerucella* spp. beetles *G. calmariensis* and *G. pusilla* are proven safe and effective biological control agents of this invasive plant; however, they are often limited to the plant colonies they are first introduced to. In order to best control the *L. salicaria* population, the mechanism which these beetles use to find new host plants needs to be better understood. Part I of this study sought to test if *L. salicaria* emit a fragrance, presumably green leaf volatiles (GLVs) when damaged, that *Galerucella* spp. beetles are attracted to in comparison to intact plant scents. In part II, individual synthetic green leaf volatiles described in Bartelt 2008 were blended to determine if they are responsible for the behaviors observed in part I. Beetle responses to experimental conditions were observed in olfactometers, revealing an increased attraction to damaged versus intact *L. salicaria* and they were repelled by synthetic blends. This suggests the volatiles emitted from the damaged *L. salicaria* plant are independently able to assist *Galerucella* spp. beetles in host finding and demonstrates that understanding of *Galerucella* spp. beetles response to individual plant signals is more complex than previously described. Further, mechanical damage to *L. salicaria* may enhance beetle colonization, but further development on GLVs effects is needed in order to be able to utilize synthetic blends.

Posters, *continued*

8. Naomi Robert[1] and James Fischer[2]
[1]Wamogo Regional High School & [2]The White Memorial Conservation Center, Inc.

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Examining the Effects of Tree Canopy and Japanese Barberry Management on Asian Jumping Worms at White Memorial Conservation Center

Conserving northeastern forests requires handling many challenges. One important task is managing invasive species, such as Japanese barberry (*Berberis thunbergii*) and Asian jumping worms (Megascolescidae). We evaluated how managing Japanese barberry or tree canopy impacted jumping worms. We sampled earthworms in four treatments that varied in canopy cover and management of Japanese Barberry. Abundance and length of worms were recorded in each treatment. Asian Jumping Worms were significantly smaller when tree canopy was removed while worm abundance was not significantly impacted. Japanese Barberry management did not affect the length or abundance of worms. We hypothesize that removing tree canopy impacted the microclimate and amount of leaf litter which in turn impacted earthworm metabolism and food availability. Reduced body size could impact earthworm reproduction. This work continues in the quest for information that improves management of introduced earthworms in northern forest ecosystems.

9. Jennifer Tran, Trinity College, Hartford,
B.A. Candidate in Urban Studies, Minors in Community Action and Models and Data

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Stopping Aquatic Invasive Species Spread: Boat Inspection Program in Onondaga County, New York

The Aquatic Invasive Boat Inspection Program in Onondaga County, New York prevented the introduction and transportation of Aquatic Invasive Species (AIS) through the inspection of all watercraft launches and retrievals and the providing for boater education at the county's two most well-known lakes, Onondaga and Oneida Lakes. The diversity of the users and contrasting history (Onondaga as a small lake used mostly by local fishermen after recovering from its historic reputation as one of the most polluted lakes in the U.S. and Oneida as one of the largest freshwater bodies and most popular sites for bass tournaments and recreation in Upstate New York) enabled a comparison into the different strategies used to target AIS education to each lake's audience. Despite the lakes being separated by directly 13 miles and both located in suburban Syracuse, New York, the boaters at Onondaga were more likely to consider AIS prevention (clean, drain, dry) if boat stewards described AIS as "pollutants," "harmful for recovery," and "bad, new plants." Boaters at Oneida were more likely to consider any plant matter on their boats aesthetically unappealing, but generally harmless to environment. The experiences from the program demonstrate the decentralization of perception of AIS and the need to specifically target the audience of each lake.

Posters, *continued*

10. **Bin Zhu[1], James Kopco[2,3], and Lars G. Rudstam[2]**

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[3] Department of Entomology, North Dakota State University, Fargo, North Dakota 58108, USA

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Effects of Invasive European Frogbit and Its Two Physical Control Methods on Macroinvertebrates

European frogbit (*Hydrocharis morsus-ranae* L.) is an invasive floating plant that negatively affects native plants in freshwater ecosystems. A field mesocosm experiment was conducted in Oneida Lake, NY, USA to study the impact of European frogbit cover on macroinvertebrates and to test the effects of two physical control methods - hand pulling and shading on macroinvertebrate assemblages. Metrics including density of different types of organisms, total abundance, taxon richness and Simpson's diversity index were compared. Both Hester-Dendy sampler and Ekman grab were used to collect surface/phytophilous and benthic macroinvertebrates. European frogbit cover had significant positive effects on mollusc density, amphipod density, taxon richness, and Simpson's diversity of macroinvertebrates in the Hester-Dendy surface samples. There were significantly fewer benthic worms and more chironomids (Hester-Dendy bottom samples) and possibly higher diversity of benthic macroinvertebrates (Ekman samples) in the sites with European frogbit. These data together suggest that European frogbit had positive effects on surface and phytophilous macroinvertebrates and may change population density and increase diversity of benthic macroinvertebrates. The frogbit control measures hand-pulling and shading had no significant effects on macroinvertebrates with one exception: amphipod density in surface water was significantly lower in the shading sites. This suggests potential negative impacts of shading on macroinvertebrate communities. Therefore, hand pulling is preferable to shading for controlling invasive European frogbit from the perspective of minimizing effects on the macroinvertebrate communities in the lakes.

SPEAKER CONTACTS, CIPWG Invasive Plant Symposium, University of Connecticut, October 2016

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SPEAKER CONTACTS, CIPWG Invasive Plant Symposium, University of Connecticut, October 2016

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John Campanelli Julia Kuzovkina Christian Schulthess Robert Ricard Glenn Dreyer	Department of Plant Science and Landscape Architecture, Department of Extension, University of Connecticut, Connecticut College	jkuzovkina@uconn.edu	860-428-2275	Effective Establishment of Native Plant Communities and Pollinator Habitats Along New England Roadsides
Carole Cheah Donna Ellis Emmett Varricchio (Assistant)	The Connecticut Agricultural Experiment Station, University of Connecticut	carole.cheah@ct.gov	860-683-4980	Biological Control of Mile-a-Minute Weed (MAM) in Connecticut
Sigrun Gadwa	Carya Ecological Services	sigrun.gadwa@sbcglobal.net	203-271-1949	Why get alarmed about mugwort?
S.M. Graves	Department of Environment, Geography and Marine Sciences, Southern Connecticut State University	GravesS1@SouthernCT.edu		Viability and Utility of µUAS for Wetland Monitoring - Pond Lily Nature Preserve & Cover River
Jessica Lubell	Department of Plant Science and Landscape Architecture, University of Connecticut	Jessica.lubell@uconn.edu		Challenges to Developing the Market for Native Shrubs
Alyssa Matz	Holster Scholar Program, University of Connecticut	alyssa.matz@uconn.edu	203-909-0879	Investigating the Chemical Signals of Galerucella spp. for Effective Biological Control of Lythrum salicaria
Naomi Robert James Fischer	Wamogo Regional High School, The White Memorial Conservation Center, Inc.	naomi.robert@uconn.edu		Examining the effects of tree canopy and Japanese Barberry management on Asian Jumping Worms at White Memorial
Jennifer Tran	Trinity College	Jennifer.tran@trincoll.edu	315-956-2257	Stopping Aquatic Invasive Species Spread: Boat Inspection Program in Onondaga County, New York
Bin Zhu James Kopco Lars G. Rudstam	Department of Biology, University of Hartford, Department of Natural Resources, Cornell University, Department of Entomology, North Dakota State University	zhu@hartford.edu		Effects of Invasive European Frogbit and Its Two Physical Control Methods on Macroinvertebrates

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