New York Invasive Species Summit

November 16 & 17, 2021
Albany, NY

Poster Presentations *(non-student)*

Impacts of recreation trails on invasive species presence

Matthew Aiello-Lammens, Pace University; Mathyas Papp, Pace University

Recreational trails provide individuals access to natural areas, providing physical and emotional health benefits. However, we know very little about how these trails may impact the ecosystems that they provide access to. Recreational trails divide ecosystems, potentially leading to fragmentation effects, however the magnitude of any such effects varies based on trail design and use. For this study, we looked at recreation trails in two preserves in Southern New York to further investigate these impacts. The major differences between these parks were their land-use history and trail design, with Rockefeller State Park Preserve (RSPP) being an older preserve with trail system consisting of gravel-covered carriage trails and Teatown Lake Reservation being a younger preserve with a trail system composed of primarily narrower walking paths. We analyzed 15 plot-pairs at each preserve looking at species diversity, tree DBH, invasive versus native species coverage, canopy openness, and species richness in order to determine if there were detectable edge effects and if the differences in trail design and land-use history would produce different patterns. We found that recreational trails did result in detectable impacts on the adjacent plant community at both preserves. RSPP in particular showed higher invasive coverage and species richness, lower native coverage and species richness, lower diversity, and a higher turnover rate between edge and off-trail locations. This study provides insight on the extent of human impacts on the natural environment and the influence that human land-use has on ecology.

Developing a Citizen Science Web GIS Application for Reporting Invasive Plants in Cortland County, NY

Christopher A. Badurek, SUNY Cortland; Connor Brierton, SUNY Binghamton

This poster reports on development of a web GIS application for reporting invasive species conducted in conjunction with the iMap Invasives team of the NY Natural Heritage Program. The application was developed using ESRI's Story Maps application builder and the NY iMap Invasives and NY Protected Areas Database (NYPAD) web mapping services (WMS) used for citizen science. This application provides citizens information about invasive terrestrial plant species targeted for data collection by the NY Natural Heritage Program, including hemlock woolly adelgid, porcelain berry, and oriental bittersweet. Citizen scientists can then identify locations and upload photos using the iMap Invasives mobile app. As part of this project, students in the GPS Technology course were also trained by the SUNY Cortland team on using iMapInvasives for data collection and for conducting data analysis on downloaded invasives data for the SUNY Cortland campus.

2021 Finger Lakes Institute Watercraft Steward Program Results

Sam Beck-Andersen, Finger Lakes Institute, Finger Lakes PRISM, Hobart and William Smith Colleges; Hilary Mosher, Finger Lakes Institute, Finger Lakes PRISM; Dr. Lisa Cleckner, Finger Lakes Institute, Finger Lakes PRISM

The Finger Lakes region is one of the most valuable tourism areas in New York State. While many waterbodies within the Finger Lakes PRISM's 17 counties currently have AIS, they are not nearly as established or problematic as they can or will become without proper management strategies. To prevent the spread of AIS such as Hydrilla, the Finger Lakes Institute (FLI) at Hobart and William Smith Colleges has run a Watercraft Steward Program (WSP) since 2012. The goals of this program have been to inspect boats for AIS and educate boaters about negative impacts that may result from spreading AIS to different water bodies. Since its inception this program has reached thousands of people, inspected thousands of watercraft, and intercepted thousands of invasives each year. This has been achieved through outreach programs, trainings, demonstrations, and consistent steward coverage. 2021 brought various new changes to the program including staffing, shifted locations, updated materials, and more. This poster will demonstrate work done by the WSP in 2021 in the context of the previous 2-4 years. Various descriptive statistics will be included.

Invasion of the Round Goby (Neogobius melanostomus) in the Hudson River Estuary

Russell Berdan, NYS DEC; Richard Pendleton, Cornell / NYS DEC

The Round Goby (Neogobius melanostomus), a small non-native fish species, has been slowly spreading through the northwestern portion of New York State after their unintentional introduction to the Great Lakes in the 1990's.. The concern that they would one day reach the Hudson River Estuary has come to realization. On July 13th, 2021 the first Round Goby was collected in Albany, NY during NYSDEC routine young of year beach seine sampling. Round Gobies have since been collected at multiple sites in Albany and Coxsackie and as far south as Poughkeepsie, NY. This wide range of expansion in such a short time period brings forth many questions. How long have they been in the estuary, will they continue to spread to other portions of the estuary, and what potential impacts may they have in the Hudson River ecosystem? NYSDEC will continue monitoring the distribution and abundance of Round Goby in the Hudson River and explore additional research opportunities to further understand some of these questions.

Developing Monitoring & Outreach Tools to Support Implementation of Swallow-wort (Vincetoxicum spp.) Biocontrol in New York State

Audrey Bowe, New York Invasive Species Research Institute; Carrie Brown-Lima, New York Invasive Species Research Institute, Cornell University; Sharon Bachman, Cornell Cooperative Extension of Erie County; Laura Bailey, Cornell Cooperative Extension of Yates County; Arlene Wilson, Cornell Cooperative Extension of Yates County; Margaret Mahr, Cornell Cooperative Extension of Yates County

Black and pale swallow-worts (Vincetoxicum nigrum & V. rossicum) are highly invasive plant species that negatively impact agricultural and natural lands. Widely distributed in the Northeast, populations of these plants have proven extremely difficult to control using mechanical and chemical methods. Due to these challenges, a biocontrol program has been advanced for these species. In 2017, a leaf-feeding moth (Hypena

opulenta) was approved for release as a biocontrol agent in the United States. In collaboration with a team of researchers from multiple institutions, we are working to establish a release and monitoring program for land managers who would like to utilize this new agent as a control method. Using demonstration sites we have established across the state, we are conducting biocontrol releases and working with partners to test monitoring protocols for observing impacts to vegetation as well as establishment of agents. We are also working with iMapInvasives to develop online forms and incorporate monitoring and release data into the statewide invasive species database. We hope that the results of this project will both inform our understanding of the effectiveness and establishment of H. opulenta as a biocontrol agent at a landscape scale, as well as serve as an example for future projects transitioning biocontrol agents from research to implementation.

A Model to Prioritize Watercraft Steward Coverage at Public Boat Launches

Morgan Crouch, Finger Lakes Institute, Finger Lakes PRISM; Sam Beck-Andersen, Finger Lakes Institute, Finger Lakes PRISM; Hilary Mosher, Finger Lakes Institute, Finger Lakes PRISM; Dr. Lisa Cleckner, Finger Lakes Institute

The Finger Lakes region is reported to be the largest tourism area in New York State north of the Hudson Valley, with 3.2 billion dollars spent within the region in 2019. Boater recreation has potential to introduce new aquatic invasive species (AIS). Educational signage has been shown to inform and alter recreationalist behaviors. In 2020, a visual survey was conducted of boat launches in the Finger Lakes region. The survey collected information on launch attributes, including the presence and condition of AIS signage and disposal boxes. A weighted prioritization model was built to determine which launches have greater impact on AIS spread. The model can be customized for many uses including placement of signage, additional watercraft stewards, or can inform other regional aquatic research and management efforts. Busyness and risk variables were used to assess launches. Watercraft Inspection Steward Program Application (WISPA) data was used to test preliminary busyness variables for good fit to predict launch traffic at sites without WISPA data. Correlation tests were done to test the strength of the linear relationship between watercraft inspections per day from multiple years of WISPA data and variables' values across launches. There was a cumulative ability of busyness variables to predict launch traffic. All variable values were scaled, weighted, and totaled for each launch to get prioritization scores. We expect launches with higher scores have had watercraft steward coverage in the past. Standardized data collection may increase model accuracy. The model assumed that a day of steward inspections is always ten hours and that all week days have equitable busyness. Later model expansion can include more launches and variables.

Solarization of Phragmites australis in a Hudson River Tidal Marsh

David Decker, Constitution Marsh Audubon Center and Sanctuary

Phragmites australis is a common invasive species in Hudson River tidal marshes, including at the Constitution Marsh Audubon Sanctuary. In an effort to reduce the spread, and ultimately eliminate patches of P. australis, without deploying herbicide, we began a process of solarization- the covering of an area with a geotextile material, on three approximately 1 acre patches of P. australis. We encircled each of the patches with a 24 ft wide strip of the geotextile material laid over pressed down reeds. After two growing seasons the geotextile was removed and vegetation surveys were conducted

annually on the treated area to determine if P. australis or other invasive species re-colonized the area. We compared the results of the surveys to control points in sections of the marsh that had not been invaded by P. australis. The results after 5 years indicate P. australis has not return to the treated areas, and the treated areas have a similar vegetative community to the control areas. To date, the 3 patches of Phragmites within Constitution Marsh have been reduced in area by 64%. While this project is still ongoing, initial results suggest that solarization may be an effective alternative to herbicide treatments as a means to control and ultimately eliminate, small patches of P. australis.

Establishing Invasive Species Education in the Girl Scouts of Northeastern New York

Mary Greagan, NYS DEC, UAlbany

Children exposed to ecological sciences are more likely to retain interest in nature and practice advocacy with maturity (Walker 2017). Invasive species are one of the greatest threats to native diversity (National 2020). New York invests millions of dollars to manage invasive species (pers. comm. C.McGlynn). Prevention is less costly than management; critical to prevention is education for user groups. Studies demonstrate this effort has a positive impact in behavior change and fostering preventive habits. Presently, there exist several resources dedicated to environmental education and invasive species. While invasive species are in NY's Science Learning Standards, they are currently not in Regents standard learning. The applied portion of this study focused on an invasive species education case study with the Girl Scouts of the USA (GSUSA) at the local level. Girl Scouts will have the chance to study invasive species with invasive species education sources for a youth development-oriented organization.

Finding a Fluffball in a Sea of Hemlocks: Surveying a 5,800 Acre Park With a Staff of Three

Katherine Jones, NYS OPRHP; Casey Holzworth, NYS OPRHP; Andrew Damon, NYS OPRHP

Hemlock Woolly Adelgid (HWA; Adelges tsugae), an invasive, aphid-like insect, is currently expanding northward through New York and threatens to eliminate whole stands of Eastern Hemlock (Tsuga canadensis). The Mohawk Valley and Saratoga areas are locations of concern as they lie between areas of infestation in southern and central NY and the hemlock-rich Adirondack Mountains to the north. The surprise discovery of an infestation in the southern Adirondacks prompted concerns that HWA may exist undetected in the area between. This raised the alarm for Moreau Lake State Park, a 5,800 acre hemlock-dominated park 16 miles south of the Adirondack infestation and 25 miles north of the previous northern extent of HWA. With a staff of three responsible for 20 state park facilities, the Regional Natural Resources team immediately recognized the logistical challenges involved in adequately surveying a 5,800 acre park. The team initially reached out to the NYS Parks Statewide Invasive Species Unit and the Capital-Mohawk PRISM to assist in a day-long, 26-acre initial detection survey in the area closest to the known infestation - yielding two HWA detections. Knowing it was now in the park, a plan to expand surveys to the entire park was developed, incorporating collaboration between State Parks staff, multiple local partner organizations, and volunteers combined with targeted outreach. With a multi-month surveying process, data was captured for most of the park showing early

detections in multiple locations centered around the Hudson River. This survey plan provided a significant level of confidence in our understanding of the nature of the initial infestation in the park and has lead to scheduled treatments later this year. This same partnership and survey framework will be used to monitor HWA at Moreau Lake and other parks in 2021.

Undergraduate Student and Local Community Partnerships to Inform Invasive Species Awareness and Management Priorities

Mary Beth Kolozsvary, Siena College; Dept. Environmental Studies and Sciences

The introduction and spread of non-native species cause tremendous ecological and economic harm. Despite efforts to educate the public on invasive species issues, there remains a general lack of understanding of the magnitude of invasive species' negative effects on natural communities. To address this lack of understanding, the Department of Environmental Studies and Sciences at Siena College collaborated with community partners (e.g., NYS Department of Environmental Conservation, New York Natural Heritage Program, Capital Region Partnership for Regional Invasive Species Management, Town of Colonie Conservation Advisory Council) to offer numerous research, internship, and outreach and education opportunities for undergraduates. These efforts involved designing learning modules, course projects, and entire courses on invasive species topics; undergraduate research on assessment and distribution of invasive species on campus; and collaborative field studies on abiotic and biotic determinants on distribution of specific invasive species. For example, students have designed lesson plans for K-12 students, educational posters, and held a public educational event on invasive species, and several student internships involved working with community partners in the Town of Colonie to map invasive species on key natural areas and make priority management recommendations. The topic of invasive species has been an ideal framework to provide numerous experiential learning opportunities for undergraduates while expanding community partnerships.

Early detection of the oak wilt fungus using trapped nitidulid beetle vectors

Kelsey McLaughlin, NYS DEC; Jessica Cancelliere, NYSDEC; Robert Cole, NYS DEC; Karen Snover-Clift, Cornell Plant Disease Diagnostic Clinic

Oak wilt, a fatal disease in oaks caused by the fungus Bretziella fagacearum, is present in several locations throughout New York. Early detection of infected trees is the key to successful management. Several species of nitidulid beetles are known vectors of the fungus, transmitting spores from fungal mats on infected trees to uninfected trees. Trapping surveys and PCR testing of captured beetles may be an important tool for detecting the disease as its range expands to new areas. In 2019, traps were placed at six treated oak wilt infection centers. Out of 52 nitidulid samples, 7 were positive for the oak wilt fungus (13%). In 2020, traps were placed at five early detection sites and four treated oak wilt infection centers. Of 177 nitidulid samples, 20 were positive (11%), including samples from all five early detection sites. Most positive nitidulid samples were collected in or after July, suggesting that fall spore mat production in New York may be more common than previously thought. Improvements in testing efficiency and sample preservation, as well as more research on how to detect infected trees after using this method, would help to improve this trapping survey. Additional applications for these methods include monitoring treated infection sites, identifying new vector species, and

delineating high risk periods for disease spread, which can improve best management practices such as pruning guidelines and quarantine regulations.

Aquatic Invasive Plant Distribution Around Waterbody Access Points in the Finger Lakes.

Kathryn Monacelli, Finger Lakes Institute at Hobart & William Smith Colleges; Hilary Mosher, Finger Lakes Institute at Hobart & William Smith Colleges; Lisa Cleckner, Finger Lakes Institute at Hobart & William Smith Colleges

Once introduced, aquatic invasive plants can grow quickly, forming dense mats of vegetation that displace native plants and disrupt aquatic communities. These dense mats impede navigation, disrupt water flow, and decrease dissolved oxygen, which harms fish populations. Not only is it expensive to control aquatic invasive species (AIS), recreational swimming, boating, and fishing would be seriously inhibited by AIS invasions. These activities are of particular importance to the Finger Lakes region. The Finger Lakes Institute at Hobart and William Smith Colleges has received funding to perform early detection surveys targeting high-priority AIS. Point-intercept rake toss surveys, adapted from the method developed by the U.S. Army Corps of Engineers, have been conducted across numerous waterbodies in the region. Since waterbodies are considered more vulnerable to AIS when they have higher rates of recreational activity and AIS are often distributed in proximity to marinas, point-intercept surveys were focused around launches and marine businesses, which serve as access points to waterbodies, as well as known AIS populations, in an attempt to locate any new satellite populations. Several invasive species have been observed during the surveys, including Eurasian watermilfoil (Myriophyllum spicatum), starry stonewort (Nitellopsis obtusa), brittle naiad (Najas minor), curly-leaved pondweed (Potamogeton crispus), and Hydrilla (Hydrilla verticillata). The locations of these species were compared with locations of boat launches, marinas, and other marine businesses. They were mapped in ArcGIS Pro, and analyzed to determine distances between AIS and boat launches and marinas. This will help guide the size of an area subject to point-intercept surveys and focus time in the field to areas most likely to be invaded by AIS.

Water Chestnut Biomass Estimates Using Density as a Proxy

Jacob Moore, SUNY ESF; Steven Pearson, NYS DEC

Water chestnut (Trapa natans) is an invasive macrophyte negatively impacting the integrity of native aquatic communities in the United States. Native to Africa and Eurasia, water chestnut aggressively grows in dense monocultures that displace other macrophytes, alter habitat structure for aquatic animals, and reduce recreational opportunity in U.S. Waterways. In New York State, water chestnut occurrence is monitored through iMapInvasives, a publicly available database that includes a number of data fields for all records, such as distribution type (or categorical density). Another important data field for water chestnut is biomass, as a surrogate measurement for primary production, nutrient uptake, and invasive impact. However, biomass is not consistently reported in iMapInvasives, and in many cases no biomass information is reported at all. The goal of this project was to develop methods that allow comparable biomass estimates to be made using a measured area and an observed distribution type in the iMapInvasives database. Nine locations were sampled for water chestnut from June - August 2021, and areas of sparse, dense, and monoculture growth were recorded along with trace points. Collected plants were cleaned, measured, and dried to

obtain final dry biomass density values for each distribution type. Density values were highest in monoculture and lowest in sparse, but also varied based on location and date. ANOVA testing indicated that plant density, rosette growth, and rosette width varied among distribution types. These findings can be used as a standard to estimate biomass of water chestnut data in iMapInvasives, providing an additional tool for stakeholders and managers to understand the impact water chestnut has on native aquatic systems.

Department of State Assistance to Local Communities to Combat Invasive Species

David Newman, NYS Department of State

The Department of State, through the NYS Environmental Protection Fund, provides assistance to communities through our Local Waterfront Revitalization Program and our South Shore Estuarine Reserve Program. Local communities have used and are using these funds to help prevent the spread of and management of invasive species. These grants have helped fund projects including management and eradication of invasive species in Lake George, Water Chestnut (Trapa natans) harvesting in Nassau County, Boat wash stations in Union Spring (Cayuga Lake) and an invasive species prevention and control program for Schroon Lake including boat inspection/decontamination station and hand harvesting of Eurasian Watermilfoil (Myriphyllum spicatum).

Pledge to Protect

Megan Pistolese-Shaw, SLELO PRISM

The Pledge to Protect It is a fun, engaging, and rewarding way to participate in invasive species prevention and management. Stakeholders across the state can take the Pledge, receive resources and tools to help them fulfill their pledges, and earn badges to celebrate their commitment. This is a great outreach strategy to engage audiences based on an action-oriented behavioral change philosophy.

The poster will showcase how the pledge to protect works and how people can take the pledge to protect their lands and waters from the impacts of invasive species.

Three Years of Water Chestnut (Trapa natans) Management in New York's Lower Hudson Valley

Maya Thompson, LH PRISM; Lindsay Yoder, Teatown Lake Reservation; Caleigh Millette, NY/NJ Trail Conference; Claire McMahon NY/NJ Trail Conference, Sudha Petluri NY/NJ Trail Conference

Water chestnut (Trapa natans) is a prolific aquatic invader that spreads rapidly once introduced, forming dense mats that shade out other submersed aquatic plants, reducing or eliminating their growth and contributing to low dissolved oxygen levels. These floating monocultures also have severe economic and social effects, as they can create a hazard for boaters and other recreational users. While water chestnut is classified as a Tier 3, or established, plant species within the Lower Hudson region due to its decades-long infestation of the Hudson River, younger populations found in inland lakes have the potential for eradication or suppression.

The Lower Hudson Partnership for Regional Invasive Species Management (PRISM) Aquatic Invasives Strike Force managed water chestnut at sites (n=14) throughout the

Lower Hudson Valley between the months of June and August from 2019 to 2021. Sites varied in density at the start of treatment, ranging between trace (n=2), sparse (n=3), moderate (n=5), and dense (n=4). Over 45 total days of manual removal, 277,000 plants (or 50,500 pounds of wet biomass) were removed from 57 acres. We found through analysis of management effort that rapid response using manual removal techniques was effective at successfully reducing the size of some water chestnut populations by up to 98% after three years, with one site showing a decrease from 27,000 plants in 2019 to just 170 plants in 2021. This finding supports the need for continued expansion of agency and non-governmental organization programs to more effectively deploy early detection-rapid response management teams to prevent the continued spread of water chestnut into pristine areas throughout New York state.

Detection Range of Hydrilla verticillata eDNA in a Lotic System

Daniel Weber, NYS DEC/SUNY Albany; Steven Pearson, NYS DEC; Michael Tessler, American Museum of Natural History

Sampling for environmental DNA (eDNA) is a powerful conservation tool that has made significant advancements in the past decade. Since its application in 2008 to detect invasive tadpoles, there has been an increase in popularity due to improvements in the ability to expose rare and invasive species that are otherwise difficult to detect through traditional field sampling methods. This study focused on the detection of Hydrilla verticillata, an aquatic plant that is aggressively invasive in parts of North America, with the focus on determining a detectable range in lotic systems. By addressing impacts of environmental variables this research supports studies on animals that have suggested flow rate to be a good predictor of the detectable distance of eDNA. pH and relative turbidity did not demonstrate significant impacts on the detection of hydrilla eDNA and although the data supported a significant relationship between temperature and the general ability to detect eDNA, it was not possible to completely disentangle that relationship from the influence of the distance traveled along the river. While it was determined there was no way to delineate a single detectable distance in all rivers, by collecting water samples at increasingly farther distances downstream from a lotic system with a well-established population, hydrilla eDNA was detected to nearly 5km downstream from its source.

Assessing the Settlement and Distribution of Aquatic Invasive Invertebrates in the Lower Hudson River: A Lesson in Efficacy for Two Sampling Methods

Lindsay Yoder, Teatown Lake Reservation, Lower Hudson PRISM; Brent Boscarino, Ph.D., New York-New Jersey Trail Conference, Lower Hudson PRISM; Kathleen Bezik, New York-New Jersey Trail Conference; Erin Carrus, Lower Hudson PRISM, Kathleen Cooper, Lower Hudson PRISM, Conor Harrington, Lower Hudson PRISM, Elinor Stapylton, Lower Hudson PRISM

The Hudson River is highly susceptible to invasion and establishment of non-native species. Non-native invertebrates are typically the dominant group of invaders in aquatic ecosystems and have the potential to alter water quality and disrupt food webs yet have been underrepresented in Hudson River invasive species research, aside from dreissenid mussels. We sought to record the current distribution of seventeen non-native invertebrate species potentially present in the Hudson River estuary to better assist management decisions. We also evaluated the sampling efficacy of a novel recruitment tile design for use in tidal, estuarine habitats.

From June to September of 2020, we deployed and retrieved invertebrate settlement samplers composed of three sets of evenly spaced recruitment tiles, one of which was caged to control for predation, at multiple sites across an 80-mile stretch of the Lower Hudson River (n=7). In addition to capturing the presence and absence of aquatic invasive invertebrates, we noted percent coverage of individual species on recruitment tiles at each site bi-weekly. Zebra mussels were found at the highest abundance, with Asian shore crab and Chinese mystery snails found at singular locations. There was a notable absence of many predicted species, including the New Zealand mud snail and quagga mussel. Overall, we found higher recruitment of native invertebrates. We also compared the durability and settlement rate of invertebrates between treated and untreated tiles, where treatment included the application of a protective, textured sealant to Masonite or wood tiles while untreated tiles were left as raw material. We found no significant differences in the settlement of invertebrates between treatments but did find the use of treated materials to be more durable in areas of higher salinity.

Efficacy of Clearcast and ProcellaCOR EC on European Frogbit

Bin Zhu, University of Hartford; Mark Heilman, SePRO

Student Poster Presentations

Genetic Variation between invasive Myriophyllum heterophyllum and native Myriophyllum heterophyllum populations in New York State

Jack Andrews, NYS DEC / University at Albany; Steven Pearson, NYS Department of Environmental Conservation

Myriophyllum heterophyllum is a type of milfoil, which is an aquatic plant that has short, emergent spike above the waterline that's native range is the western parts of New York state along Lake Ontario and Lake Erie. Under the Department of Environmental Conservation's Part 575 Prohibited and Regulated Species regulatory system, M. laxum hybridized with M. heterophyllum is considered a prohibited invasive species meaning it is illegal to knowingly possess the plant. The Adirondacks and Lower Hudson regions have the highest infestation/invasion rate in NYS of M.heterophyllum. This begs the question of how M. heterophyllum arrived to these regions and if the native and non-native populations differ genetically. Specimens will be collected from native and invasive populations of M.heterophyllum. We plan to collect from three waterbodies from each region (Western NY, Adirondacks, and Lower Hudson). At each waterbody, at least three specimen will be collected for genetic analysis. If an inefficient amount of specimens is not able to be collected, voucher specimens from herbaria will be used. DNA isolation will be performed so that genetic relatedness can be assessed by sequencing specimen's target sequences (Internal transcribed spacer and chloroplast DNA).Amplified Fragment Length Polymorphism will also be performed to in order to evaluate species and hybrid identifications on the basis of morphology and/or DNA sequences. We hope to obtain results in the near future so that we can understand the population of M. heterophyllum in New York State.

The success and impact of slender false brome (Brachypodium sylvaticum) in New York State

Megan Aubertine, SUNY Brockport; Kathryn Amatangelo, SUNY Brockport; Andie Graham, SUNY Brockport

Brachypodium sylvaticum is a perennial bunch grass native to Eurasia and North Africa and has invaded the United States and Canada. It was first introduced to the Pacific Northwest, where much research on this species as an invader has been conducted. Brachypodium sylvaticum has since been located in the eastern United States and little is known about the environments its most successful in and its impacts on plant communities. We conducted surveys at eleven sites, eight invaded and three uninvaded, throughout central and western New York. At each site, we ran evenly spaced transects with evenly spaces quadrats and identified vegetation down to the lowest possible resolution and estimated percent cover. Within each quadrat we collected soil moisture and canopy cover. To evaluate the success of B. sylvaticum and its potential impact on species richness, we ran a series of generalized linear models (GLM) among the sites and within each site. The among site GLMs showed that soil moisture (p<0.0001) and canopy cover (p<0.0001) were significant in predicting B. sylvaticum cover, with higher cover in drier quadrats. Within site GLMs demonstrated the same trends. When predicting richness, B. sylvaticum was not significant among sites (p=0.676) but was significant at five of the eight invaded sites. A t-test showed that species richness was significantly lower (p=0.017) in quadrats with B. sylvaticum than those without. Our

results show that soil moisture and canopy cover are important when considering B. sylvaticum invasion and suggest that B. sylvaticum reduces species richness.

Influence of round gobies on VHSV disease ecology in the upper St. Lawrence River

Anna Conklyn, SUNY ESF; Rod Getchell, Cornell University; John Farrell, SUNY ESF

The round goby (Neogobius melanostomus) is an invasive fish that has had a dramatic impact on ecological functions in the Great Lakes-St. Lawrence River system since their introduction in the 1990's. One attribute of round gobies that negatively influences native fauna is their high susceptibility to viral hemorrhagic septicemia virus (VHSV). VHSV is a generalist fish pathogen that emerged across Great Lakes basin in the mid-2000's and has since been isolated from >30 species. VHSV causes more severe disease in certain host species including the round goby, and the system's apex predator, the muskellunge (Esox masquinongy). The presence and abundance of round goby is highly implicated in the disease ecology of VHSV, by amplifying the virus as an abundant competent host. VHSV also has a globally known history of rapid genetic mutation and virulence reemergence. The influence of round gobies on the evolutionary trajectory of VHSV as a reservoir host and source of viral proliferation and genetic change is critical knowledge for management actions (i.e., restorative stocking) directed at sensitive native species. This project is investigating epidemiologic host-environmental factors of disease dynamics and viral evolution among fishes of the Thousand Islands region. We are studying VHSV incidence in spatially separated goby populations along with their population demographics to identify patterns of viral transmission and evolution. We are also evaluating viral prevalence and genetic diversity among potential sympatric native reservoir species. This investigation should allow us to better understand mechanisms of disease transmission to native sport fish, more efficiently test relevant species and demographics to gain local prevalence estimates, and advance knowledge regarding the importance of the round goby for the maintenance of VHSV in the St. Lawrence River.

The "Hits" Analysis in NY Waterbodies: Leveraging Data from iMapInvasives & Watercraft Steward Programs

Jonathan Kappel, NYS DEC / University at Albany; John Marino, New York Natural Heritage Program

The "Hits" analysis is a GIS-based procedure which cross-references data from the Watercraft Inspection Steward Program Application (WISPA) and iMapInvasives simultaneously by comparing boat records being retrieved from a waterbody (via WISPA) with confirmed invasive species Presence records (via iMapInvasives). We perform this analysis to visualize potential gaps in statewide aquatic invasive species data and to better understand why these "gaps" present themselves. A gap (or "Hit") in the data indicates a body of water in which a boat was exiting with an attached invasive organism which has no known confirmed observations in iMapInvasives. Thus, a "Hit" indicates that the species may be under-reported in that specific waterbody and/or potentially requires further survey for the particular species.

For example: Suppose that in "Pristine Pond," a boat steward identifies Curly Leaf Pondweed on a boat exiting the water and records this in WISPA. Later, when the "Hits" analysis is run, the boat steward's record is cross-referenced spatially with confirmed Presence data within Pristine Pond in iMapInvasives. If confirmed Presence record(s) for

Curly Leaf Pondweed exist in the pond, this would return a “Match” value in the analysis. However, if there are not confirmed Presence record(s) for Curly Leaf Pondweed in Pristine Pond (via iMapInvasives), this would return a value of “Not Matched” and represent a “Hit.”

The “Hits” analysis is run annually (following data quality control checks by WISPA program coordinators) with results shared with statewide invasive species partners.

A known limitation of this analysis is that a “Hit” does not guarantee that a species infestation is present within the body of water, since suitable habitat may not exist, the species may not spread by fragmentation, and/or seeds may not be viable. Nevertheless, this analysis aims to provides another tool for aquatic invasive species managers in New York State.

Monitoring invasive plants on roadsides using computer vision and Google Street View imagery

Liam Megraw, Rochester Institute of Technology; Manoj Acharya, Rochester Institute of Technology; Arturo Flores, University of California San Diego; Christopher Kanan, RIT; Christy Tyler, RIT

Invasive plants are a global threat to biodiversity, agriculture and ecosystem services, therefore monitoring and control are crucial to prevent or mitigate their spread. Current assessment methods have a variety of limits, including cost, time, or observer bias. Computer vision applied to Google Street View imagery (GSV) is a promising, new, and previously undeveloped methodological synergy that has implications for management efforts and community science. Roadsides are significant vector of spread for invasive plants, and car-level imagery offers marked advantages for monitoring by allowing us to track emerging and understory infestations. We have developed computer vision models using a convolutional neural network architecture for two case study species: Phragmites australis (Common reed) and Reynoutria japonica (Japanese Knotweed). To develop the models, a training and testing paradigm was employed with nearly 17,000 human-annotated images from GSV in New York State. Model verification was conducted via on-screen and field surveys of points in representative sampling zones within the Finger Lakes and APIPP PRISMs. GIS applications of model data for use by managers and community scientists were developed in tandem with NY iMapInvasives staff and community member volunteers. This new technology represents enhanced potential for identification and tracking of invasive plants on roadsides.

Impacts of urban land cover on the distribution of emerald ash borer associated parasitoids

Tim Morris, SUNY ESF; Juli Gould, USDA APHIS; Melissa Fierke, SUNY ESF

Background/Questions/Methods

Urban land cover characteristics can impact relationships between parasitoid assemblages and host organisms. Trophic interactions may differ depending on both host and parasitoid ecology. Emerald ash borer (EAB) biocontrol agents, Spathius galinae, and Tetrastichus planipennisi, were released in Syracuse, NY as part of an ongoing integrated pest management study in 2015. High value street trees were protected during peak EAB infestation with systemic insecticide injections. Here, we

assess the role of parasitoids in protecting ash trees in the urban forest as use of systemic insecticides is partially ended. We specifically focus on determining if benefits of biocontrol are inequitably distributed within a city, i.e. whether ecosystem services associated with parasitoids are greater in areas with more green spaces. Yellow pan traps (YPTs) were used to assess parasitoid distributions within the city and logistic models were utilized to assess whether parasitoid distributions were impacted by local land cover features as quantified via a GIS raster dataset.

Results/Conclusions
Yellow pan trap results (2015-2021) indicate both biocontrol parasitoids established, and several native parasitoids known to opportunistically parasitize EAB reside within the study system. Models of the last three years suggest the degree of urbanization (impermeable surface area) surrounding YPTs significantly impacted parasitism by S. galinae ($p = 0.025$) in 2020, but not 2021. Native species of Atanycolus were impacted by the degree of urbanization in 2019($p = 0.028$) and 2020 ($p = 0.034$), but not in 2021. Urbanization did not impact the presence of T. planipennisi or the native Phasgonophora sulcata in any year. Results suggest S. galinae dispersal is temporarily limited by urbanization, but that all parasitoids studied can be found throughout the study system.

Developing a Web GIS Dashboard and Geodatabase for Invasive Plant Management at Finger Lakes National Forest, NY

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The presence of invasive plants has been well-documented across the Finger Lakes Region. While sampling efforts have demonstrated presence, few studies examine means of dispersal at sub-regional scales. In order to further develop predictive GIS models, a geodatabase synthesizing three data collection sources, land use land cover, hydrology, and anthropogenic data layers was created for the scale of the Finger Lakes National Forest and adjacent parcels. GIS point and polygon data were integrated from field surveys from the Finger Lakes Institute (HWS College), Green Mountain & Finger Lakes National Forests, and the Institute for Geospatial and Drone Technology at SUNY Cortland. Plant species abundance (points collected) indicate the flowing species as most prevalent: multiflora rose, honeysuckle, buckthorn, autumn olive, knapweed, and garlic mustard. Preliminary GIS analysis of field data collected across the forest area indicates invasives are not evenly distributed and land cover type affects distribution. A web GIS dashboard for data visualization and analytics is developed as an exemplar for invasive species management.

Collecting, organizing, and analyzing post-treatment data to communicate invasive species management effectiveness

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The New York State Invasive Species Comprehensive Management Plan outlines key goals for managing invasive species (IS) and protecting the state's rich biodiversity. Significant progress is underway in building detection capacity, organization of detection data, and developing data-driven prioritization tiers for IS management. However, IS treatment and post-treatment data is largely decentralized, lacks standardized data fields, and often use different metrics, thus rendering cross-project synthesis difficult. These limitations inhibit evaluation of the efficacy of IS treatments, which are a high priority for land managers, researchers, and government agencies. The core objective of this project seeks is the acquisition and distillation of treatment and post-treatment data from partners, and the integration of these outcomes into iMapInvasives. This will include analyzing the data for effective ways to visualize and communicate outcomes in a standardized manner. Datasets of post-management follow-up are still needed; please stop by the poster to discuss data leads.

Crossing the Great Divide: Bridging the Researcher-Practitioner Gap to Maximize the Utility of Remote Sensing for Invasive Species Monitoring and Management

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Invasive species are increasingly present in our ecosystems and pose a threat to the health of forest ecosystems. Practitioners are tasked with locating these invasive species and finding ways to mitigate their spread and impacts, often through costly field surveys. Meanwhile, researchers are developing remote sensing products to detect the changes in vegetation health and structure that are caused by invasive species, which could aid in early detection and monitoring efforts. Although both groups are working towards similar goals and field data are essential for validating RS products, these groups often work independently. In this paper, we, a group of researchers and practitioners, discuss the challenges to bridging the gap between researchers and practitioners and summarize the literature on this topic. We also draw from our experiences collaborating with each other to advance detection, monitoring, and management of the Hemlock Woolly Adelgid (Adelges tsugae; HWA), an invasive forest pest in the eastern U.S. We conclude by (1) highlighting the synergies and symbiotic mutualism of researcherâ€“practitioner collaborations and (2) providing a framework for facilitating researcherâ€“practitioner collaborations that advance fundamental science while maximizing the capacity of RS technologies in monitoring and management of complex drivers of forest health decline such as invasive species.