

Spatial and Temporal Distribution and Abundance of Microplastics in Lake Champlain Long-Term Monitoring Samples

Lindsey E. Austin (SUNY Plattsburgh, Plattsburgh, NY; laust001@plattsburgh.edu), **Susan-Marie Nadeau Hagar** (SUNY Plattsburgh, Plattsburgh, NY; shaga002@plattsburgh.edu), and **Danielle Garneau** (SUNY Plattsburgh, Plattsburgh, NY; dgarn001@plattsburgh.edu)

Abstract - Microplastics are particles less than 5 mm in size, characterized as fibers, fragments, beads, foams, and pellets. Microplastics (MP) arise from 4 main processes: environmental degradation (UV exposure, mechanical and/or biological), direct release by means of wastewater treatment processing, unintentional loss of raw materials, and discharge of macerated wastes. Microplastics are potentially toxic to aquatic biota, and the presence of microplastics in freshwater ecosystems is largely under-researched. The goal of our research was to examine the spatial and temporal distribution of microplastics and pre-production particulates (nurdles) from long-term monitoring (LTM) zooplankton samples within Lake Champlain collected 1992–2016. Nurdles were counted in full from samples, whereas microplastics (e.g., fragments, fibers) were subsampled due to size. Fourier Transform Infrared Spectroscopy (FTIR) characterized nurdles as polyisoprene rubber ribbon. Within the LTM samples ($n = 2265$), nurdles ($n = 3455$) and microplastics ($n = 249$), predominantly fibers, were identified. The greatest microplastic abundance was noted in 2015 ($n = 73$ microplastics, $n = 494$ samples). Nurdles were found only in samples that had been collected 2012–2016, with the greatest nurdle abundance noted in 2012 ($n = 1169$ nurdles, $n = 412$ samples) and at varying depths. Nurdle abundance declined since the 2012 peak and in 2015 was greatly reduced ($n = 531$ nurdles, $n = 494$ samples). Spatial distribution maps suggest the complexity of the story with high abundances at deep central locations, as well as shallow isolated bays. The high influx of nurdles in 2012 may be related to the 2011 Lake Champlain flood; however, more research will need to be conducted to tease apart timing and potential nurdle point-sources (e.g., train tracks, industrial/urban centers).

Sat- 6

How does the Fear of Predation Affect the Growth and Development of Luna Moth (*Actias luna*) Larvae?

Alex Baranowski (Department of Biological Sciences, University of Rhode Island, Kingston, RI; alexbaran74@my.uri.edu) and **Evan Preisser** (Department of Biological Sciences, University of Rhode Island, Kingston, RI; preisser@uri.edu)

Abstract - Predators reduce prey populations by feeding upon them, and they alter the behavior of prey species by their mere presence. There have been studies on how the nonlethal presence of predatory or parasitic insects affects the development and behavior of herbivorous ones. We observed the effects that nonlethal predatory wasps had on the development of *Actias luna* (Luna Moth) larvae. We rendered wasps of the species *Vespula maculifrons* harmless by applying plastic to their mandibles and stingers before placing them in bins with wasp-treatment group moth larvae. Another group of larvae received similarly treated harmless flies (*Phaenicia sericata* [Green Bottlefly] captured at and Scircophagids cultured from roadkill and dog food) to factor for the presence of a flying insect. The control group simply received toothpicks with the plastic material, and all larvae were reared to pupation or death. Larvae exposed to wasps suffered much higher mortality rates. The primary cause of death was starvation. While faster growth would reduce exposure time to predation risk, the wasp-treatment larvae that survived showed no increase in their rate of development relative to the other wasps in our experiment.

Sat- 39

The Effect of Water Availability on Ejaculate Size and Oviposition in Bean Beetles (*Callosobruchus maculatus*)

Leah McCormick (State University of New York, College at Oneonta, Oneonta, NY; mcco58@oneonta.edu), **Peter Wegrzyn** (State University of New York, College at Oneonta, Oneonta, NY; wegrp43@oneonta.edu), and **Elizabeth Bastiaans** (State University of New York, College at Oneonta, Oneonta, NY; elizabeth.bastiaans@oneonta.edu)

Abstract - Individuals are expected to alter their reproductive tactics in response to variation in available resources. *Callosobruchus maculatus* (Bean Beetle) is a pest of stored legumes that has been introduced worldwide. This species is also an ideal model for understanding the effects of variation in resource availability on reproductive behavior because adult beetles typically do not eat or drink after pupation but will consume water if given the opportunity. In addition, male Bean Beetles have barbed intromittent organs that cause internal damage to females during mating. Despite this cost, female Bean Beetles have been observed to mate multiple times, even when males are prevented from harassing them. Previous work suggested that females may derive hydration benefits from male ejaculate transferred during mating, because females given access to water mated less frequently than females not given access to water. In our study, we tested whether males given access to water transferred larger ejaculates than males not given access to water. We also report on differences in oviposition behavior and in larval survival between females mated to each category of male.

Sat- 41

Fluctuating Asymmetry in Plastron Scutes in a Historical Population of Wood Turtles (*Glyptemys insculpta*)

Amanda Rhodes (State University of New York, College at Oneonta, Oneonta, NY; rhodaj91@oneonta.edu) and **Elizabeth Bastiaans** (State University of New York, College at Oneonta, Oneonta, NY; elizabeth.bastiaans@oneonta.edu)

Abstract - Fluctuating asymmetry in bilaterally symmetrical organisms is a marker of developmental instability and may result from inbreeding, toxins, disease, or other stressors often associated with anthropogenic declines. We used a collection of ~300 preserved *Glyptemys insculpta* (Wood Turtle) collected in central New York in the 1960s and 1970s to collect baseline data on fluctuating asymmetry in a turtle species that is now endangered. We compared fluctuating asymmetry in multiple plastron scutes within individuals as well as between sexes, between turtles of different body sizes, and between populations. These data will provide a basis for comparison with contemporary populations, to shed light on factors that may have contributed to population declines in this species.

Sat- 17

Ecological Study of Temperate and Tropical Anuran Breeding Pools

Laura Beimfohr (East Stroudsburg University, East Stroudsburg, PA; lkb3362@live.esu.edu) and Tom LaDuke (East Stroudsburg University, East Stroudsburg, PA; tcladuke@esu.edu)

Abstract - We conducted and compared surveys of pool-breeding frogs across 2 biomes, observing microhabitat ecology in each to assess its effect on anuran communities. We conducted temperate studies in northeastern Pennsylvania, and tropical studies at El Zota Biological Station in Costa Rica. Pools were measured using several parameters including pH, conductivity and water temperature. Environmental patterns were recorded including cloud cover, wind speed, canopy cover, ambient air temperature, daily rainfall, weather conditions, and ice coverage. Tropical pools were observed to have vastly larger and more diverse frog populations than the temperate pools. Vegetation diversity and the amount rainfall had the most significant correlations with the number of species and individuals present in a pool, respectively. Human impacts observed included habitat destruction, pollution, and disease outbreak. Understanding the complex relationship between frog species and their environment is a crucial step towards preventing the worldwide decline of these exceptional amphibians.

Sat- 11

Climate Change and Flowering Phenology in Franklin County, Massachusetts

Robert I. Bertin (College of the Holy Cross, Worcester, MA; rbertin@holycross.edu), Karen B. Searcy (University of Massachusetts, Amherst, MA; ksearcy@bio.umass.edu), Matthew G. Hickler (Royalston, MA; mhickler@hughes.net), and Glenn Motzkin (The Conway School, Conway, MA; gmotzkin@gmail.com)

Abstract - Flowering times are sensitive indicators of climate change and provide insight into the potential effects of such change on biological phenomena. Our goals were to evaluate the patterns of change in flowering times in a largely rural area of Massachusetts. We also wished to evaluate the relationship between the observed changes in blooming time and each species' average flowering date and status as native or non-native. By examining correlations between patterns in our study and those in another Massachusetts study employing similar methodology, we evaluated the role of sampling error in reported interspecific differences. We compared flowering times since 2010 of 450 species, based on over 7300 field observations, with historical flowering times through 1980, based on over 4300 herbarium specimens. According to gridded PRISM temperature data, average annual temperatures in Franklin County have increased over the past 121 years, especially in recent decades. Among plant species with 5 or more records in each time period, flowering times advanced an average of 4.5 days, and those blooming before the summer solstice advanced an average of 6.2 days. A regression of change in flowering time on mean flowering date for spring-blooming species predicts that a species blooming in early spring (mean flowering date of May 1) advanced 12 days between 1929 and 2013. The average change in flowering time did not differ between native and non-native species and was unrelated to duration of the blooming period. Changes in flowering date of 221 taxa in Franklin County were positively correlated with changes in flowering dates of the same species measured using similar techniques in neighboring Worcester County. The strength of these correlations was, however, strongly dependent on sample sizes. Thus, interspecific differences are subject to considerable sampling error and have little validity unless based on sufficient sample sizes, preferably 20 or more observations in each time period.

Sat- 23

Assessing Impact of Stream Barrier Removal using Elver Density and PIT Tagging of *Anguilla rostrata*

Matthew C. Bettencourt (Bridgewater State University, Bridgewater, MA; mbettencourt@bridgew.edu) and Kevin D. Curry (Bridgewater State University, Bridgewater, MA; kcurry@bridgew.edu)

Abstract - *Anguilla rostrata* (American Eel) is a catadromous fish that has been listed as endangered on the ICUN red list, though not currently listed as endangered by the US Fish and Wildlife Service. Stream barriers have negatively impacted populations of *A. rostrata* throughout New England. The objectives of this study are to compare changes in density of elvers (young *A. rostrata*, also known at this stage as glass eels, that migrate from the ocean up rivers) above and below a dam scheduled for removal on the Mill River in Taunton, MA, and to determine if PIT (Passive Internal Transponder)-tagged yellow eels (*A. rostrata* that grow in freshwater habitats from the elver stage to maturity) move upstream after the dam is removed to evaluate stream restoration efforts. Eels under 250 mm were considered elvers and only yellow eels above 250 mm were PIT tagged. A total of 250 yellow eels and elvers were sampled by backpack electrofishing between the 2 sites during Fall 2016. There has yet to be any movement of PIT-tagged eels from either side of the dam. Elver density during Fall 2016 sampling at the Taunton State Hospital site was 0.08 elvers per m² and 0.12 elvers per m² for Whittendon Mills Dam. Our goal is to continue monitoring elver density and tagging yellow eels to assess changes in density and movement when the dam is removed.

Sun- 33

Genetic Population Structure and Connectivity of Creek Chub in the Poultney River Watershed and Adjacent Networks

Douglas Bishop (Green Mountain College, Poultney, VT; bishopd@greenmtn.edu)

Abstract - The connectivity and dispersal patterns of minnow populations within and between river networks are understudied relative to similar patterns in larger fish species. Through analysis of variability in segments of mitochondrial DNA within and between populations along a river corridor, it is possible to define unique haplotypes present within each local population and hypothesize how and why the frequency of these haplotypes occur at specific sites across a landscape. For example, geographic patterns of genetic diversity can be useful for understanding how minnows move along a river and whether there is gene flow across adjacent networks. Furthermore, population genetics can inform how historic changes in the landscape contribute to current patterns of diversity. The purpose of this project is to catalog the gradient of genetic diversity in *Semotilus atromaculatus* (Creek Chub) populations along the Poultney River (Rutland County, VT) and to investigate whether there is migration occurring between adjacent networks. We are currently in the process of sequencing a neutral segment of mitochondrial DNA from different localities within the river in order to construct a molecular phylogeny and calculate haplotype frequencies within and between rivers. This approach will elucidate (1) within-stream population structure, (2) between-stream patterns of gene flow, and (3) the influence of historic disturbances to the landscape. This project is contributing to ongoing research related to minnow population connectivity and will illuminate any barriers to dispersal that serve to isolate populations and restrict gene flow in the Poultney River. Identifying populations and understanding fish movement within and between watersheds is important for directing conservation efforts toward maintaining the physical linkages that allow for gene flow. By cataloging the gradient of diversity for Creek Chub and other species in the Poultney, we will be able to ask more-nuanced questions about how resilient minnow populations are to environmental change and how genetic factors influence their persistence in this river system.

Sun- 31

Sticky Seeds in Podostemaceae: To Be (Dispersed) or Not To Be?

Michelle Bissett (WCSU, Danbury CT; bissett001@connect.wscu.edu) and **C. Thomas Philbrick** (WCSU, Danbury CT; philbrickt@wscu.edu)

Abstract - Seed ecology is a crucial element of plant biology. Production of seeds that become mucilaginous and sticky when wetted (myxospermy) occurs in many angiosperm groups, and has been linked to a range of ecological factors. For desert plants, myxospermy has been hypothesized as providing selective advantage for remaining in a suitable habitat because such habitats are rare elsewhere. This hypothesis has been referred to as the mother site hypothesis. Similar to desert plants, suitable river-rapid habits for plants of Podostemaceae (riverweeds, ~ 300 tropical species) are rare in rivers. Riverweeds occur attached to rocks that experience cyclic wetting and drying. Riverweeds colonize open rock surfaces during periods of high water. As water levels drop seasonally, plants die back and the habitat again becomes open; subsequent recolonization occurs via seeds when water levels again rise. Consequently, the same habitat is colonized annually. Seeds of Riverweeds are dry when shed from capsules, but become mucilaginous when in contact with water. Myxospermy in Podostemaceae has been proposed as serving both a dispersal and non-dispersal role; neither has been tested empirically. In this study, we assessed the mother site hypothesis relative to Podostemaceae. We used a model river set-up in a greenhouse. We controlled for substratum, water volume, and species, as well as the sequence and timing of when seeds became wetted. Preliminary results indicate that water volume, and the condition of the seed (dry vs wet), have significant effects on whether seeds remain attached to a surface or are washed away. Under certain conditions (seeds wetted and allowed to dry), the mother site hypothesis is supported, while under others (seeds not wetted), it is not. Under certain environmental conditions, mucilage aids in keeping seeds at the location where they are produced, while under other conditions the functional lack of mucilage allows for dispersal. Studies are currently underway to assess possible relationships between the amount of mucilage on seeds and the geographic distribution of species.

Sat- 20

The SUNY Virtual Herbarium Network: Increasing Access and Improving Botanical Education

Stephen Bretscher (SUNY Oneonta, Oneonta, NY; BRETSV01@oneonta.edu), **Monica Dore** (SUNY Oneonta, Oneonta, NY; DOREMF48@oneonta.edu), **Steven Haight** (SUNY Oneonta, Oneonta, NY; HAIGS19@oneonta.edu), and **Tara Litvin** (SUNY Oneonta, Oneonta, NY; LITVTC83@oneonta.edu)

Abstract - Herbaria, collections of preserved plants, are valuable sources of data essential to studies in the biological sciences. In particular, small local herbaria play a critical role in the study of regional biodiversity. The primary goal of this project is to increase access to herbarium collections at SUNY institutions, as well as to develop and disseminate a new pedagogy for enhancing botanical education using digitized specimens. The Jewell and Arline Moss Settle Herbarium at SUNY Oneonta (SUCO) currently contains over 14,000 specimens including algae, bryophytes, lycophytes, ferns, gymnosperms, angiosperms, and fungi. Since August of 2016, a team of undergraduate Assistant Curators have been databasing and imaging the SUCO collections, and making them accessible via an open-access data portal. These herbaria data are being used to develop 3 web-based learning modules designed to engage students, develop skills in scientific inquiry, and enhance botanically focused courses. Once complete, these modules will be implemented and evaluated in a variety of learning environments from introductory biology courses to upper level botany classes. In addition, this project relies heavily on student interns in both biology and art in order to promote a unique type of collaborative, interdisciplinary learning.

Sat- 24

A Survey of Microplastics in Wastewater Treatment Plant Effluent in the Lake Champlain Basin

Sadie Brown (SUNY Plattsburgh, Plattsburgh, NY; sbrow024@plattsburgh.edu), Erin Lee (SUNY Plattsburgh, Plattsburgh, NY; ylee010@plattsburgh.edu), Brandon Buksa (SUNY Plattsburgh, Plattsburgh, NY; bbusk002@plattsburgh.edu), Thomas Niekrewicz (SUNY Plattsburgh, Plattsburgh, NY; tniek001@plattsburgh.edu), and Danielle Garneau (SUNY Plattsburgh, Plattsburgh, NY; dgarn001@plattsburgh.edu)

Abstract - Microplastic pollution researchers are beginning to quantify, characterize, and collaborate on finding solutions to this emerging pollution problem. Recent studies have documented consumer care products and laundering of synthetic garments as major sources of microplastics. Most current wastewater treatment plant (WWTP) technologies are unable to capture and remove particulate <5 mm in size; thus, bioaccumulation over time poses a threat to aquatic organisms. In 2015, we began surveying WWTP post-treatment effluent samples from the city of Plattsburgh, NY ($n = 31$) and in 2016, added 3 other plants in the Lake Champlain watershed, specifically St Albans, VT ($n = 8$), Ticonderoga, NY ($n = 4$), and Burlington, VT ($n = 1$). Twenty-four-hour post-treatment effluent samples were collected and digested using wet peroxide oxidation methods. All samples were characterized based on microplastic type (e.g., fragment, fiber, pellet, film, foam) and color. Across all sites, the majority of microplastics were characterized as fragments, followed by fibers, with the exception of St Albans, which was dominated by fibers. The fragment: fiber ratio was 51:23 at Plattsburgh, 61:18 at St Albans, 44:40 at Ticonderoga, and 69:18 at Burlington. Pellets and films were characterized at all sites as 1–12% of total particulates; whereas foam comprised 3–11% of total particulates and was absent in Ticonderoga. Over the course of this collection period, high flow rates yielded more pellets and low flow rates more films. When accounting for the number of samples processed, average particles per 24-hour sampling event are 21, 29, 49, and 117 for Plattsburgh, St. Albans, Ticonderoga, and Burlington, respectively. Plattsburgh and Burlington serve a similar-sized population and have a similar capacity, the difference in particle abundances may be due to differences in infrastructure updates (2013 at Plattsburgh and 1994 at Burlington). St. Albans and Ticonderoga serve similar population sizes; however, St. Albans has tertiary treatment, which may account for the lower average particulates per sample (29 at St. Albans and 49 at Ticonderoga). By documenting wastewater treatment plants as a source of microplastics, we can share these findings with wastewater treatment plant operators, lake stewards, government officials, and work towards solutions both up and downstream.

Sat- 7

Influence of Subinhibitory Concentrations of Ampicillin on Bacterial Community Composition

Sandra M. Buerger (Boston University, Boston, MA; sbuerger@bu.edu), Corliss Kanazawa (Boston University, Boston, MA; cykana@bu.edu), Oleksandr Strelko (Boston University, Boston, MA; ostrelko@bu.edu), and Alexander Adrian (Boston University, Boston, MA; aadrian@bu.edu)

Abstract - Subinhibitory concentrations (SIC) of antibiotics play a role in both interspecies and intraspecies communication in bacteria. In this study, we sought to analyze how the addition of SIC of antibiotics would change the composition of a complex bacterial community in a marine sediment from a tidal flat region (Swampscott, MA). Our analysis showed that addition of subclinical levels of antibiotics can have a significant impact on both the number of viable bacteria and the types of bacteria that are recoverable. Samples were analyzed both through growth in a petri dish and by constructing a simulated complex environment. Both methods showed that addition of extremely low levels of ampicillin (0.01 ug/ml) resulted in a significant change in the composition of the microbial community and an increase in the diversity of species of bacteria that could be recovered from the environment.

Sun- 25

How Land Use Affects Tree Species Diversity

Hannah G. Chase (SUNY Geneseo, Geneseo, NY; hgc3@geneseo.edu) and **Suann Yang** (SUNY Geneseo, Geneseo, NY; yang@geneseo.edu)

Abstract - Within our environment, much research is focused on many interacting ecological factors that determine diversity; however, the influential factors in human-dominated landscapes have been less studied. We hypothesized that tree species diversity is impacted by people's landscaping choices. Quantifying tree biodiversity in human-dominated landscapes can reveal the ability of these landscapes to support the biodiversity of other species. Homeowners, institutions, or businesses often plant low-maintenance, ornamental species. This practice results in a loss of biodiversity due to the homogeneity in the chosen species. We predict that areas that have a higher percent of impermeable surfaces, on which a tree cannot grow, are more likely to have their tree diversity shaped by human preferences. Our preliminary results show that the SUNY Geneseo campus is dominated by a low diversity of ornamental tree species from only a few genera, including *Crataegus* (hawthorn trees), and *Malus* (crabapples). Despite not being native to the area, most hawthorn and crabapples are palatable to birds and insects, and may help to support biodiversity in the area that they are planted. In addition, about 50% of the SUNY Geneseo campus has 20-100% of surfaces that are impermeable, which suggests that a higher percentage of impermeable surface is associated with a higher percentage of tree species homogeneity. Although areas with a high percent of impermeable surfaces, such as the SUNY Geneseo campus, may have predominantly ornamental trees, these trees can still be responsibly chosen when their aesthetic value is considered along with their value to wildlife.

Sun- 19

Variable Distributions in Gray Versus Black Eastern Gray Squirrels in Urban Habitats

Artivan J. Cherwin (Le Moyne College, Syracuse, NY; cherwaj@lemoyne.edu), **Daniel P. Doran** (Le Moyne College, Syracuse, NY; dorandp@lemoyne.edu), and **Jason D. Luscier** (Le Moyne College, Syracuse, NY; lusciejd@lemoyne.edu)

Abstract - *Sciurus carolinensis* (Eastern Gray Squirrel) is a widespread arboreal squirrel common in eastern North America. Gray Squirrels have responded quite well to urbanization, capitalizing on food access and the continuously changing microclimates. Gray Squirrels do not hibernate and thus remain active throughout the winter months, even at northern (colder) latitudes. Urban habitats have a dynamic thermal profile across such habitats as managed areas (e.g., city parks), residential areas (e.g., neighborhoods), and urban areas (e.g., commercial centers), and thus city squirrels experience full exposure to a varied macroclimate during the course of their daily activities; they spend the remainder of their time (the inactive periods) in the microclimate of insulated nests. Previous research reports that the distribution of melanistic Gray Squirrel tends to be higher in urban habitats in the northern half of the species' range. However, little research has been done regarding variable distributions of black- versus gray-coated Gray Squirrels across urban habitats. Our objective was to evaluate distributions of black versus gray morphs in relation to various habitat characteristics across managed, residential, and urban habitats of Syracuse from September 2016 to January 2017. We surveyed 27 transects randomly stratified across the 3 habitat types (managed, residential, urban). We used program DISTANCE to estimate population densities corrected for imperfect detectability. We found that gray and black squirrel densities did not differ within any of the 3 habitat types. Overall density estimates (95% confidence intervals) were 11.1 (6.2–19.9) squirrels/ha in managed habitats, 7.2 (3.2–16.6) squirrels/ha in residential habitats, and 1.7 (1.4-2.1) squirrels/ha in urban habitats. Examining the lower 95% confidence limit surrounding differences between estimates, there were at least 3.5 more squirrels/ha in managed versus urban habitats. We were not able to detect a clear difference in estimates between residential versus urban and managed versus residential. Urban habitats likely had lower squirrel densities because of reduced availability of large trees as well as higher human activity compared to the other habitat types. Additional modeling of squirrel densities in relation to habitat variables will help us to further elucidate distributional patterns of squirrels throughout the city of Syracuse.

Sun- 12

Comparing Decomposition Rates of Nitrogen-Fixing and Non-Nitrogen-Fixing Invasive Species

John Coacci (SUNY Geneseo, Geneseo, NY; jdc10@geneseo.edu) and Jennifer L. Apple (SUNY Geneseo, Geneseo, NY; applej@geneseo.edu)

Abstract - This study compares the effects on decomposition rates of a nitrogen-fixing invasive species (*Elaeagnus umbellata* [Autumn Olive]) and a non-nitrogen invasive species (*Lonicera maackii* [Amur Honeysuckle]) to a native species (*Cornus racemosa* [Gray Dogwood]). This study was conducted over the course of 1 year in SUNY Geneseo's Spencer J. Arboretum, an 8-ha area of secondary successional forest. The breakdown of litter samples over time was tracked by placing a predetermined amount of each species of litter into separate replicate mesh bags, placing them underneath 1 of the 3 shrub species, and retrieving sets of the bags and weighing their contents at particular time intervals. The decomposition of each species of litter was measured underneath the canopy of each shrub species. In addition to mass measurements, we also determined carbon and nitrogen chemical concentrations. The mass changes are used to calculate the rate of decomposition, while the nitrogen and carbon analyses will help describe differences in litter quality that can explain differences in decomposition rates. Preliminary results indicate that there is a significantly higher decomposition rate of the native species' litter under the nitrogen-fixing invasive. Additionally, the litter of the nitrogen-fixing invasive decomposed at a significantly slower rate when under the native canopy. Ultimately, studies like this can help researchers evaluate the more complex impacts of invasive species and determine how specific characteristics of invasives can contribute to their abundance.

Sat- 29

Over-Wintering Bird Use of Roost Boxes in Fragmented and Continuous Forests in the Adirondack Mountains

Robert Craig (Paul Smith's College, Paul Smiths, NY, rcraig@s.paulsmiths.edu), Andrew Bowe (Paul Smith's College, Paul Smiths, NY, abowe@s.paulsmiths.edu), Ross Conover (Paul Smith's College, Paul Smiths, NY; rconover@paulsmiths.edu), Kaiden Hill (Paul Smith's College, Paul Smiths, NY, khill@s.paulsmiths.edu), Jake Kuryla (Paul Smith's College, Paul Smiths, NY, jkuryla@s.paulsmiths.edu), Taylor Ruhle (Paul Smith's College, Paul Smiths, NY, truhle@s.paulsmiths.edu), Jonathan Stetler (Paul Smith's College, Paul Smiths, NY, jstetler@s.paulsmiths.edu), and Alaina Woods (Paul Smith's College, Paul Smiths, NY, awoods@paulsmiths.edu)

Abstract - Overwintering birds save energy by using enclosed roost sites (e.g., tree cavities) during periods of inclement weather and low food availability. Historical forestry practices have caused a decline in natural cavity availability in the northeastern United States. Anthropogenic alternatives such as nest boxes have attempted to address this deficiency in cavity availability. Nest boxes have been successful for a variety of species, providing a place to nest and providing higher-than-ambient temperatures, making them an advantageous place to roost. Roost boxes are a largely untested anthropogenic roosting site specifically designed for winter roosting birds rather than for nesting. This study proposes to investigate the benefits of roost boxes to overwintering birds in the Adirondack Mountains of northern New York State. Specific objectives of this research include evaluating (1) the use of roost boxes by birds, (2) the thermoregulatory benefits of roost boxes, and (3) the difference in use between roost boxes in patchy and continuous habitat. We hypothesize (1) a positive correlation between number of occupants and difference between the box's internal and external temperature, (2) external temperature will be negatively correlated with occupancy, and (3) habitat fragmentation will affect roost-box utilization. We constructed 8 roost boxes using a revised version of blueprints from the Cornell Lab of Ornithology and placed on 3-m metal posts. We placed 4 in an undisturbed northern hardwood forest and 4 near recent clearcuts in the same ecotype. Interior and exterior temperatures of roost boxes were recorded using Thermochron® iButton® devices. We used motion-activated trail cameras to identify species entering and exiting the roost boxes. Through this study, we aim to document the conservation benefits of roost boxes for birds overwintering in northern forests and investigate their applicability as a research method for better understanding overwintering birds.

Sat- 33

Site Fidelity of *Calopteryx maculata* (Ebony Jewelwing) During Two Breeding Seasons along South Brook

Kevin D. Curry (Bridgewater State University, Bridgewater, MA; kcurry@bridgew.edu) and **Donyce Abel** (Bridgewater State University, Bridgewater, MA)

Abstract - Site fidelity, the behavior of an individual returning to a previously occupied site, observed in dragonflies and birds is impacted by reproductive fitness. Mature species have been recorded frequenting the same breeding area yearly. Male individuals of highly migratory bird species are often site-faithful. Adult *Calopteryx maculata* (Ebony Jewelwing) are known to defend breeding territories, and we investigated the question of their site fidelity at South Brook in Bridgewater, MA, during the summers of 2015 and 2016. We predicted that male Ebony Jewelwings established on a territory longer will show higher site fidelity than females and newly emerged males. We used a mesh net to capture Ebony Jewelwings from 15-m sections along a 375-m portion of South Brook. Established individuals consisted of damselflies marked during a previous visit to the study area and released at the original capture site. Damselflies that had no markings on a given sample day were considered newly emerged or recently arrived. Established or freshly marked specimens were removed from their capture site and translocated to a designated release site within 52 to 160 m of their capture zone. We transported from the stream to the common release site a total of 44 individuals in 2015 and 81 in 2016. Results showed 40% of translocated Ebony Jewelwings (18 of 44) returned to the stream in 2015 and 32.1% (26 of 81) in 2016. A higher ratio of previously marked (established) damselflies returned to the stream than freshly marked new individuals in both 2015 (9 of 35 new vs. 9 of 9 established) and 2016 (21 of 68 new vs. 5 of 13 established). Fisher Exact test results confirmed a significantly higher proportion of established damselflies returned to the stream in 2015 than expected but not in 2016.

Sat- 38

Insights on Buffer-zone Delineation in Wetland and Stream Conservation Efforts

Amanda Deguire (Bridgewater State University, Bridgewater, MA; adeguire@student.bridgew.edu), **Stephen Girard** (Bridgewater State University, Bridgewater, MA; sgirard@student.bridgew.edu), and **Dr. Thilina Surasinghe** (Bridgewater State University, Bridgewater, MA; tsurasinghe@bridgew.edu)

Abstract - Buffer zones are critical for ecological integrity and conservation of aquatic habitats. Riparian vegetation filters the surface run-off by retaining sediments and nutrients, and thereby minimize pollution in water bodies. Buffer zones provision foraging grounds, mating sites, and climatic refugia for many aquatic, semi-aquatic, and terrestrial wildlife. Some species, such as *Strix occidentalis caurina* (Northern Spotted Owl), are habitat specialists of old-growth coniferous gallery forests. Moreover, riparian vegetation supplies woody debris to aquatic habitats, which enhances structural complexity in aquatic habitats while serving as allochthonous material to fuel aquatic food webs. Despite their importance, US environmental laws do not provide a strong framework to manage buffer zones. Thus, many local jurisdictions mandate variable buffer widths: boreal streams (13.9 m), boreal lakes (52.2 m), Southeast (12.1 m), intermountain zone (23.0–24.4 m), Pacific region (21.7–24.3 m), Northeast (13.1–30.6 m), and Midwest (11.5–25.7 m). The USDA also recommends variable buffer widths (9.1-30.5m) for national forests that undergo commercial logging. The Pacific Northwest and northeastern US have the strictest regulations on buffer-zone conservation while the southeastern US has the weakest. Some organisms, such as pond-breeding amphibians, require multiple wetland–woodland habitat complexes for life-history functions. Radiotelemetric studies revealed that buffer widths should exceed 200 m to support seasonal breeding migrations and post-natal dispersal of amphibians. Natural history of aquatic and semiaquatic herpetofauna (particularly turtles) indicates that immediate upland environments are part of the critical core habitats for such species, particularly given variable hydrological regimes of wetlands/streams and extensive use of uplands by herpetofaunal communities. To conserve wide-ranging pond-breeding amphibians, landscape-scale stream and wetland conservation should be implemented where riparian buffers facilitate connectivity among wetlands. Such approaches can be effective when promoting conservation in private and multiple-use public lands where reserving lands for conventional “fortress conservation” is untenable. Existing environmental policies, such as the Endangered Species Act (through habitat management in species recovery plans), Clean Water Act (by protecting non-navigable waterways as critical aquatic resources), and Northwestern Forest Plan (to develop a nationwide best management practices in buffer-zone delineation) can be used and revised to support landscape-scale conservation as well as for delineation of functionally effective buffer zones.

Sun- 27

Impacts of Urbanization on Pond-breeding Amphibians: Variation of Egg-mass Abundance in Southeastern Massachusetts

Emily Donahue (Bridgewater State University, Bridgewater, MA; edonahue@student.bridgew.edu), Jacqueline Toomey (Bridgewater State University, Bridgewater, MA; jtoomey@student.bridgew.edu), Zach Greaney (Bridgewater State University, Bridgewater, MA; zgreaney@tudent.bridgew.edu), Che' Weigand (Bridgewater State University, Bridgewater, MA; cweigand@student.bridgew.edu), and Dr. Thilina Surasinghe (Bridgewater State University, Bridgewater, MA; tsurasnghe@bridgew.edu)

Abstract - Many amphibians rely on a verity of aquatic and terrestrial habitats to complete their lifecycle. For instance, northern temperate amphibians seasonally migrate to vernal pools for breeding, and associate upland forests for foraging, hibernation, and aestivation. After metamorphosis, juveniles disperse through forested landscapes. Urbanization may impede quality and longevity of vernal pools and impede their movements. In Southeastern Massachusetts, given urban sprawl, landscapes suitable for amphibians are rapidly declining. In this study, we surveyed amphibian egg masses (ambystomatid and *Lithobates sylvaticus* [Wood Frog]) in vernal pools along an urban-rural gradient. Each vernal pool was surveyed twice in spring 2016. We found marginal differences in species composition of egg masses in vernal pools of forested vs urban landscapes (ANOSIM: $R = 0.21$, $P \sim 0.05$). However, we found a greater number of egg masses in forested (245) than in urban (73) landscapes. Although number of ambystomatid egg masses differed significantly between urban vs rural landscapes (Wilcox test: $Z = 2.18$, $P < 0.05$), Wood Frogs showed no significant differences (Wilcox test: $Z = 0.15$, $P > 0.05$). Thus, Wood Frogs appeared to be more resilient to urbanization than ambystomatids, therefore, the latter is a better indicator of landscape-scale habitat suitability and permeability. A PCA-based ordination (PC1 = 42.0%, PC2 = 22.1%) revealed greater environmental variability in urban vernal pools; such broad fluctuations in environmental conditions—such as water quality—may be more stressful for specialist amphibians with low environmental tolerance. We noted variable hydroperiods between urban and rural wetlands; urban vernal pools dried prematurely (early May). Forested vernal pools had a greater structural diversity both inside the pool and in the uplands; thus, forested landscapes will present more microhabitats and refugia for different life-history stages of amphibians. Wetland conservation is crucial for persistence of amphibians. Conservation efforts should focus on delineating wetland buffer zones as well as maintaining landscape-scale connectivity. Current laws protect the wetland proper, yet neglect the upland habitats. Establishing connectivity among multiple wetland habitats via protecting dispersal corridors will help enable metapopulation dynamics, facilitate rescue effect, and maintain gene flow. Such metapopulations will be more resilient for localized disturbances, and will have greater chance of population viability.

Sat- 12

Untangling the Relationships Between Plant Invasions, Land-Use History, and Soil Characteristics

Corinne T. Evans (Glastonbury High School, Glastonbury, CT; evans.t.co@gmail.com) and Chad Jones (Connecticut College; New London, CT; cjones8@conncoll.edu)

Abstract - The invasion of exotic plant species poses a strong threat to biodiversity and the overall stability of ecosystems worldwide. Though this hazard is widely recognized, we still lack a complete understanding of the relationship between plant invasions, land-use history, and soil conditions, which can all be intertwined. We examined patterns of invasion in the Connecticut College Arboretum in areas of young forest (<80 years old), older forests (>80 years) with evidence of past agricultural use and older forests with no evidence of past clearing for agriculture. In each of these land-use types, we sampled soils directly under invasive species, near (~5 m) and distant (100 m) from invaded areas. We measured soil moisture, organic matter content, pH, and levels of nitrogen and phosphorus at each location. We hypothesized that plant invasion would be highest in young forests and lowest in areas without history of agricultural clearing. We also hypothesized that plant invasion would be correlated with higher soil nutrients, soil organic matter, and pH. We ask if these patterns are tied to variation in soils among land-use categories, within land-use categories, or at a small spatial scale (i.e., comparing soils under and 5 m from invasives). We found much higher invasion in young forests, but no difference between older forests with and without evidence of agricultural clearing. We also found that soils with high levels of soil moisture (>40% of wet weight) were not heavily invaded. Soil moisture varied primarily among land-use categories (with young forest having the driest soils) with no clear patterns occurring within land-use categories or at small spatial scales. Analyses with other soil variables are ongoing. Initial results suggest that both plant invasions and soil characteristics are strongly affected by forest age in this area and that the correlation between invasion and soil characteristics within land-use categories is weak.

Sat- 28

Seasonal and Spatial Pattern of the Marine Larval Fish Community in Long Island Sound

Paola Fernandez (Green Mountain College, Poultney, VT; paola.fernandez@greenmtn.edu) and Meriel Brooks (Green Mountain College, Poultney, VT; brooksm@greenmtn.edu)

Abstract - This project describes the pattern of appearance and larval community composition for near-shore marine fish larvae off Long Island Sound. Larval trawls were conducted in 2002 by Lawler, Matusky, and Skelly (LMS) as part of determining the effects that the operation of the Poletti Power Plant in East River, NY was having on the ichthyoplankton community. LMS is a consulting firm that has conducted several studies involving the impacts of power plant operations on the environment. The ichthyoplankton samples have been stored at the Biological Survey Laboratory associated with the New York State Museum in Troy, NY. These samples were taken between early March and late July from Raritan Bay to the eastern end of Long Island Sound, giving the analysis a temporal element as well as a spatial dimension to the development of the larval fish community in these near-shore waters. This research is intended to provide “snapshots” of the larval fish community during early, middle, and late season, as well as any spatial variability in species composition along Long Island Sound.

Sun- 35

Forest Bird Populations in Massachusetts: Breeding Habitat Loss and Other Influences

Timothy J. Gardner (College of the Holy Cross, Worcester, MA; tjgard17@g.holycross.edu), Caroline R. Eagan (College of the Holy Cross, Worcester, MA; creagan16@g.holycross.edu), and Robert I. Bertin (College of the Holy Cross, Worcester, MA; rbertin@holycross.edu)

Abstract - Our objective was to determine whether changes in populations of forest interior bird species were related to changes in extent of interior forest along Breeding Bird Survey (BBS) census routes in Massachusetts. We first identified a suite of 28 forest interior bird species (FIA species), based on correlations between bird abundance (in 2003–2007) and extent of interior forest (in 2005) along BBS routes in the state. From this group, we eliminated 11 species whose breeding habitats were suggested by standard field guides to include forest edge or second growth, resulting in a more stringently defined subset of 17 (FIB) species. We quantified the extent of forest and interior forest (>100 m from a forest edge) along BBS routes based on digitized aerial photographs from 1971, 1985, and 1999. We also quantified changes in abundance of the 28 forest FIA species along BBS survey routes over the same time period. Overall, changes in abundance of forest-interior species paralleled changes in extent of interior forest, with 14 of 17 FIB species showing positive correlations between these variables, 6 of which were significant. However, substantial variation occurred among species, including conspicuous declines of *Hylocichla mustelina* (Wood Thrush) and *Piranga olivacea* (Scarlet Tanager), but also conspicuous increases of *Vireo solitarius* (Blue-headed Vireo) and *Setophaga magnolia* (Magnolia Warbler). These patterns were not significantly related to either migratory status (Neotropical vs. other) or nest location (ground vs. arboreal). Several of the differences could be attributed to particular factors, such as reintroductions of *Meleagris gallopavo* (Wild Turkey) and *Corvus corax* (Common Raven) or the introduction of competitors like *Haemorhous mexicanus* (House Finch) which has impacted *Haemorhous purpureus* (Purple Finch). Changes in some bird populations, such as *Dryocopus pileatus* (Pileated Woodpecker), seem to reflect forest succession, while others are not easily explained and may be due to changes on migratory routes or wintering grounds. Overall, loss of interior forest is an important incremental factor in population declines and is worthy of conservation concern, although other factors contributed to the majority of the variation we observed in the populations in our study.

Sat- 30

Does the Pesticide Imidacloprid Change Nicotinic Acetylcholine Receptors in Honeybees?

Brikena Gjeci (Bridgewater State University, Bridgewater MA; bgjeci@student.bridgew.edu) and Jonathan A. Roling (Bridgewater State University, Bridgewater MA; jroling@bridgew.edu)

Abstract - *Apis mellifera* (European Honeybee) is one of the most successful non-invasive naturalizing species that are responsible for pollinating many native plants. Unfortunately, in recent years there have been unexplained disappearances of worker honeybees—a phenomenon that has been termed as Colony Collapse Disorder. The use of neonicotinoid pesticides, specifically imidacloprid, has been linked to this drastic loss. Imidacloprid is a systemic pesticide that has been synthesized to mimic nicotine. Since its introduction in the early 1990s, it has become one of the most extensively used insecticides for crop protection. It is a neurotoxin that acts as an agonist on nicotinic acetylcholine receptors (nAChR's), disrupting the neuron's ability to send a normal impulse. This interaction results in convulsions, paralysis, and eventual death of the poisoned insect. Although imidacloprid may not directly cause the death of European Honeybees, as they are not the target organism, it may hinder their ability to navigate outside the hive. This behavioral change may lead to hive failure; if the worker bees are unable to locate their hive, the rest of the bees do not receive any pollen, and thus sustenance. My research focuses on difference in the expression of nAChR's in European Honeybees that have been exposed to imidacloprid and those that have not. I have identified 11 genes that code for these receptors and am currently in the process of quantifying expression through the use of quantitative polymerase chain reaction (qPCR). qPCR is used to detect a specific DNA sequence in a sample and determine the number of copies of this sequence as it amplifies. It does this through the use of SYBR Green, which is a fluorescent dye that binds to DNA molecules. The qPCR machine measures the amount of fluorescence after each amplification cycle. In this way, one is able to determine how much DNA is being produced in real time.

Sat- 36

Effects of Forest Changes on Understory Tardigrade Populations in Waldo County, Maine

Jeanette F. Gray (Unity College, Unity, ME; JGray14@unity.edu) and Emma S. Perry (Unity College, Unity, ME; eperry@unity.edu)

Abstract - The landscape of Unity, ME, is dominated by *Tsuga* (hemlock)—*Pinus* (pine) forests where *T. canadensis* (Eastern Hemlock) are common. The Eastern Hemlock can create unique environments, but these trees are in danger of demise due to the invasive parasitic aphid-like *Adelges tsugae* (Hemlock Wholly Adelgid [HWA]), which infects mature hemlock trees at the shoots, killing the tree in as little as 3 years after infestation. This insect pest was first introduced in the New England area 14 years ago from Asia and has been steadily moving further into Maine over the last 6 years. Although it has been well documented that the HWA can have a devastating toll on hemlock stands, the broader ecological impact resulting from the loss of the hemlocks is still largely unknown. Thus, we designed a study to test the impacts of the loss of hemlocks using 4 logged, unlogged, and girdled treatments within Eastern Hemlock forests around Unity, ME. Tardigrades are ubiquitous and are an important, integral part of the microfauna ecosystems in forests including leaf-litter communities of forest floors. Tardigrades provide an ecosystem service in these communities by eating the nematodes and rotifers on their substrate and play an ecosystem role in the recycling of nutrients on the forest floor that supports the larger macrofauna in these ecosystems. We found 1127 tardigrades in 113 samples from the 4 treatments. At least 17 tardigrade taxa were identified including *Astatumen trinicriae*, *Pilatobius nodulosus*, and *Echiniscus merokensis*. Initial analysis indicates that the 30% basal area logged treatment contained fewer tardigrades (4.44 average tardigrades per sample) than any of the other treatments (8.33 average tardigrades per sample or more).

Sun- 22

Abundance of the American Eel (*Anguilla rostrata*) in a Stream and Pond Habitat Adjoining Cape Cod Bay

William Grey (Dept. of Biological Sciences, Bridgewater State University, Bridgewater, MA; xandergrey11@gmail.com)

Abstract - This project is a baseline abundance study of *Anguilla rostrata* (American Eel) in a Cape Cod Bay stream and pond. The American Eel's population is declining due to factors such as physical obstructions to migration, overfishing, and poor water quality. Physical restraints such as dams, obstructions from roadway construction, and failing fish bypass structures are documented as factors contributing to the decline of eel populations. I trapped eels in several locations within the stream and pond adjoining Cape Cod Bay. I measured captured Adult eels and notched their dorsal fins for identification upon recapture. Elvers and glass eels (the juvenile stages of eels) were counted and released. Because the stream habitat in this project supports a diverse community of prey, I hypothesized that the eel population will be greater in the stream, than in the pond. The pond habitat has a larger predator population. Also, stream habitats are known to be higher in oxygen content than ponds, which I thought would likely contribute to a higher eel population in the stream versus the pond. The number of eel predators was in fact higher in the pond habitat. I will construct an eel ladder linking the stream and pond habitats and report the success or failure of this structure. Studies such as this are necessary to assess the conservation status of the eel, and promote wise management.

Sun- 32

Micro-morphological Data Indicate that Sepals of *Iris cristata* (Iridaceae) Provide Visual Cues and Tactile Stimuli for Pollinator

Jinyan Guo (SUNY Oswego, Oswego, NY; jinyan.guo@oswego.edu)

Abstract - *Iris cristata* (Dwarf Crested Iris) is an endemic angiosperm species of the eastern United States, while its sister species *Iris lacustris*, is an endangered species of the Great Lakes region. Both species have almost identical floral morphology, and bees are their potential pollinators. Their flowers are unique within the genus because their purple and petaloid (petal-like) sepals have 3 rows of bright-yellow crests (protuberances or ridges). The distal region of the sepal provides the landing platform for pollinators while the proximal region provides the "floor" of the pollination tunnel. The stigma of the petaloid style (the "roof" of the pollination tunnel) is located above the pollinator entrance of the sepal, and the crests on the sepal extend linearly from the pollinator entrance to the proximal region of the sepal where the nectary is located. Compared with flat epidermal cells (FECs), papillate epidermal cells (PECs) provide important optical properties for petals or petaloid sepals through enhanced efficiency of light absorption; striated (sculptured with cuticular striations) convex epidermal cells (CECs) may act in the same manner as PECs. Using light microscopy and scanning electron microscopy, this study documented and mapped different epidermal cells of the upper epidermis of sepals of *Iris cristata*. The pollinator entrance is marked with yellow-pigment-containing and elongated PECs (in contrast to shorter PECs and CECs of its surroundings), which may provide bees with visual cues before landing and extra grips after landing. The crests are covered by PECs and striated CECs, whereas the regions in-between are covered by FECs; this pattern may create contrasting "colors" for bees as an optical nectar guide. The aerenchymatous mesophyll within the lateral crests may provide additional internal light reflection and refraction, which enhance the visual cues for bees. Thus, crests not only reinforce the floral architecture by providing tactile stimuli or footholds, but may also provide visual cues to guide bees towards the nectary when they navigate within the pollination tunnel. This study indicates critical roles of elaborate sepals of *Iris cristata* during flower-pollinator interactions.

Sat- 22

Do Eastern Gray Squirrels Target Theft-Averting Responses to Recent Pilferers?

Sylvia L. Halkin (Central Connecticut State University, New Britain, CT; Halkin@ccsu.edu), Justin D. Butler (Central Connecticut State University, New Britain, CT; butler.j@my.ccsu.edu), Hayley M. Gustafson (Central Connecticut State University, New Britain, CT; hayleyg@my.ccsu.edu), and Kyle R. Christian (Central Connecticut State University, New Britain, CT; kchristian@my.ccsu.edu)

Abstract - *Sciurus carolinensis* (Eastern Gray Squirrel) use time- and energy-consuming methods to deter pilferage of nuts they bury, including scattering burial sites, and excavating and sometimes covering extra, unused holes. Buried nuts may be pilfered by squirrels and other nut-eating species (e.g. *Cyanocitta cristata* [Blue Jay], crows, *Tamias striatus* [Eastern Chipmunk]). In many species, just some individuals specialize in pilfering; it would be adaptive for a squirrel to target its pilferage-detering responses to those individuals. We investigated whether squirrels recognized individual human pilferers. We provided a pile of nuts under a tree, a student stood on either side. When a squirrel left with a nut, the closer student would follow it, attempt to dig up its nut right after burial, and then return to the nut pile and wait for the squirrel's return. We found only a weak trend for squirrels to avoid the pilferer when they left with a second nut. Some squirrels may not have identified the pilferer as a threat after a single attempted theft. However, since individual squirrels cache nuts in different areas, some squirrels may have maintained the same path to most efficiently reach their customary caching areas. Some squirrels stopped as they departed from the nut pile and stared at the pilferer, some flicking their tails, a known aggressive display. These squirrels may have been attempting to evaluate whether they were going to be followed again, and perhaps attempting to intimidate the pilferer; when the pilferer did not move, they may have concluded they didn't need to divert their paths.

Sun- 10

Impact of Agricultural Land-use Patterns on Tick Distributions at a Local Scale

Jeremy J. Hall (Lyndon State College Department of Natural Sciences, Lyndonville, VT; jeremy.hall@lyndonstate.edu) and Alan R. Giese (Lyndon State College Department of Natural Sciences, Lyndonville, VT; alan.giese@lyndonstate.edu)

Abstract - Patterns of land use are frequently invoked as complete or partial explanations for tick population distribution, abundance, and expansion. The reestablishment of deciduous or mixed forests and increased patchiness are thought to be two important drivers of tick population expansion in the Northeast in the last century. However, the relative importance of these factors likely depends on scale. In the present study, we assessed the relationship between forest cover type and tick encounter rates at relatively small scales. From 2013 to 2016, tick populations were surveyed by drag sampling at 10 forested sites and 4 forest-field ecotones in Vermont. Drag transects at the ecotone sites were subdivided and stratified to include sections 6 m and 3 m from the ecotone in the field, 0 m from the ecotone at the forest edge, and 3 m from the ecotone in the forest. The distribution of cover types was quantified with publicly available GIS data for 4 circles with radii of 0.5 km, 1.0 km, 2.0 km and 4.0 km, respectively, centered on survey sites. The amount of forest cover near survey sites was not associated with tick-encounter rates at any of the scales we measured. However, *Ixodes scapularis* (Black-legged Tick) encounters occurred disproportionately within forests and along ecotones, with virtually no encounters in fields at either distance from the forest edge. We collected few ticks of other species to draw conclusions. Therefore, on the one hand, our data confirm on the smallest scale (tens of meters) that the Black-legged Tick is largely restricted to forested cover, yet on the other hand, the association between Black-legged Tick densities and forest cover breaks down at larger scales (hundreds to thousands of meters). While we did not quantify average patch size specifically, our data nonetheless suggest that high levels of fragmentation were not associated with higher tick densities at our study sites.

Sun- 8

Survey of Artificial Nest Boxes and Tree Cavities for Secondary Cavity Nesting Avifauna in Northern New York

Chad Hammer (SUNY Plattsburgh, Plattsburgh, NY; chamm006@plattsburgh.edu) and **Danielle Garneau** (SUNY Plattsburgh, Plattsburgh, NY; dgarn001@plattsburgh.edu)

Abstract - Cavity-nesting species use tree holes created by either prior excavation activity or decay due to branch damage or disease. These tree cavities serve as an important refuge for safety, shelter, and nesting sites. Avian cavity nesters are classified as primary (i. e., excavate their own cavities) or secondary (i.e., occupy naturally occurring cavities or existing cavities created by primary excavators). During May–September 2016, we monitored cavity nesting of secondary cavity nesters *Falco sparverius* (American Kestrel), *Aix sponsa* (Wood Duck), *Lophodytes cucullatus* (Hooded Merganser), and *Bucephala clangula* (Common Goldeneye) at Lake Alice Wildlife Management Area (LAWMA), Clinton County, NY. Goals of the monitoring were threefold: (1) document usage of the 17 artificial waterfowl nest boxes and 3 American Kestrel boxes, (2) survey natural tree cavities in adjacent forest to gain baseline occupancy information, and (3) compare results of artificial waterfowl nest-box occupancy to those of prior years under monitoring by the NYS Department of Environmental Conservation. Of the 17 waterfowl nest boxes, only 29% ($n = 5$) contained Wood Duck nests, of which 2 were unsuccessful. Of the 46 total eggs, 50% ($n = 23$) hatched successfully. The 3 American Kestrel boxes failed to attract the target species, but were occupied by *Tachycineta bicolor* (Tree Swallow). We surveyed tree cavities using line-transect sampling and observed occupants using an extension pole and GoPro camera accessed using a smartphone mobile app. Twenty-nine natural tree cavities and 2 abandoned passerine nests (south-facing) were noted in 19 trees ranging in diameter at breast height from 22 to 79 cm and comprised of 42% ($n = 8$) *Acer rubrum* (Red Maple), 11% ($n = 2$) *Acer saccharum* (Sugar Maple), 5% ($n = 1$) *Fraxinus americana* (White Ash), and 42% ($n = 8$) snags. Woodpeckers excavated 62% ($n = 18$) of the nest cavities, and 38% ($n = 11$) were natural limb and canopy damage. With 29% occupancy rates and 50% unhatched eggs observed at LAWMA, we recommend relocating underused or ineffectively placed nest boxes, especially those adjacent to pools that have since dried.

Sat- 32

Spatial Distribution of Beech Blight Aphids at Multiple Levels

Tulpen S. Hansen-Schwoebel (SUNY Geneseo, Geneseo, NY; tsh2@geneseo.edu) and **Suann Yang** (SUNY Geneseo, Geneseo, NY; yang@geneseo.edu)

Abstract - *Grylloprociphilus imbricator* (Beech Blight Aphid) is an aphid species that lives in the eastern United States and forms colonies almost exclusively on *Fagus grandifolia* (American Beech) branches. Aphids feed on phloem sap using sharp mouthparts (stylets) to puncture the surface of branches. Beech trees are an ideal host because their thin bark is easily punctured. Beech Blight Aphid behavior as it relates to colony structure and choice of host is relatively unknown. Studying aphid distribution patterns and colony structure are crucial to understanding the Beech Blight Aphids' effect on the ecosystem they live in as a whole. Towards this end, we compared the spatial distribution of Beech Blight Aphids at the colony level to their distribution across a patch of American Beech trees in a forest. We dissected a colony and counted numbers of non-reproducing aphids and reproducing winged adults at 5-cm intervals. We found that the spatial distribution along a branch was not normal (Shapiro-Wilk, $P = 0.04$). Instead of being normally distributed, we found that the Aphids colonies are less concentrated the further they get from the trunk of the host tree (skewness = 0.14). To analyze distribution at the patch level, we identified American Beech trees with and without colonies and recorded their diameter at breast height (DBH) as well as characteristics and orientation of the branches that contained colonies. At the scale of the forest patch, spatial distribution of Beech Blight Aphids appears to be nonrandom. Our results will have implications for the interspecific and intraspecific interactions of Beech Blight Aphids in forest communities, including how the aphids affect their host trees and how this potentially negative effect could influence the forest community.

Sun- 6

Pharmaceutical Pollution: Exploring the Effects of Aspirin and Amoxicillin on Chloroplasts of *Lemna minor*

Shanelle Haughton (University of Saint Joseph, West Hartford, CT; Shaughton@usj.edu) and **Kirsten Martin** (University of Saint Joseph, West Hartford, CT; KirstenMartin@usj.edu)

Abstract - Pharmaceutical products (i.e., anti-inflammatories, antibiotics, antidepressants, oral contraceptives, etc.) have been detected in sewage, surface water, ground water, and drinking water. When prescribed pharmaceuticals are ingested, only a portion of the active ingredient of the drug is metabolized; a portion of the consumed pharmaceutical are excreted through urine as metabolites and as an unused product in solid waste. Very few treatment solutions for pharmaceutical pollution are under investigation. Also, the long-term effects of pharmaceutical pollution on human health, aquatic life, and even our food supply still have not been determined. This is a multi-phase study investigating the effects of pharmaceutical pollution using a simple aquatic plant, *Lemna minor* (Duckweed), as a model organism. This study will also investigate the bioremediation success of Duckweed in pharmaceutical-contaminated water. The drug models used in this study are acetylsalicylic acid (aspirin) and Amoxicillin. Aspirin is an OTC pain reliever, and Amoxicillin is a penicillin-type antibiotic commonly used to treat strep throat and other infections. In previous phases of this study, we determined the LD₅₀ of *Lemna* in aspirin-contaminated water and amoxicillin-contaminated water, effects of Aspirin and Amoxicillin on the pH of water, and the effect of Aspirin on *Lemna* in buffered solution. Results from previous phases of this study have shown a decrease in the green color of *Lemna* fronds, which correlates to the rate of frond death. In this next phase of the study, we will examine the effects of Amoxicillin and Aspirin on the number of chloroplasts and chlorophyll content of exposed *Lemna*. We hypothesize that exposure of *Lemna* to Aspirin-contaminated water and Amoxicillin-contaminated water reduces the number of chloroplasts and the chlorophyll content of the plant.

Sat- 4

Patterns of Native Bee Diversity: Comparison of Sampling Methods and Effects of Floral Resources and Habitat

Sam D. Heraghty (SUNY Geneseo, Geneseo, NY; sdh8@geneseo.edu) and **Jennifer L. Apple** (SUNY Geneseo, Geneseo, NY; applej@geneseo.edu)

Abstract - Recently, there has been a significant decline in the abundance and diversity of native bees in North America due to a range of factors including habitat loss and anthropogenic activity. In order to help combat this decline, it is vital to have a clear understanding of factors that affect bee diversity. We employed both bee bowl traps and active sampling methods at 4 unique sites in the Arboretum at SUNY Geneseo to assess bee diversity and abundance. In addition, floral resource usage and availability were described at each site. Overall, 19 unique bee genera were collected over the course of the study, with 316 samples being gathered in total. Bee bowls were found to be ineffective at collecting larger bees since almost all of the large-bodied genera like *Bombus* were gathered using active collection methods. Additionally, it was found that the most commonly used floral resources during the sampling period were *Centaurea nigra* (Black Knapweed) and *Monarda fistulosa* (Wild Bergamot). This finding is particularly interesting because *C. nigra* is an invasive plant that is currently under consideration to be removed from the Arboretum and was located in close proximity to all 4 sites. Future studies should examine the effects of invasive plants as potentially aiding or hindering native bee conservation efforts.

Sun- 3

Caprellid Species of Outer Island, Branford, CT

Adan Isa (Central CT State University, New Britain, CT, isaa@my.ccsu.edu) and **Alex Manos** (Central CT State University, New Britain, CT; ajmanos@my.ccsu.edu)

Abstract - Members of family Caprellidae (skeleton shrimp) include predators, scavengers, and filter-feeders and are often incredibly abundant in marine fouling communities. Recent studies have suggested that cryptic speciation and broad intraspecific morphological variation are well represented in the Caprellidae. Because of these 2 factors, questions remain about the taxonomic status of some species of Caprellidae. We conducted a survey of Caprellidae inhabiting the fouling community on Outer Island in Long Island Sound, Branford, CT. We examined DNA sequences from a mitochondrial marker (CO1) along with morphological characteristics and identified 2 species, *Caprella penantis* and *Caprella equilibra*. We plan to evaluate morphological characters of these samples by comparing them with type specimens from Yale University collected from the same island in the mid-1900s.

Sun- 36

Changing Diet: High Fructose Corn Syrup (HFCS) Changes Glycolysis Genes when Fed to Honeybees

Michelle R. Jennette (Bridgewater State University, Bridgewater, MA; mjennette@student.bridgew.edu) and Jonathan A. Roling (Bridgewater State University, Bridgewater MA; jroling@bridgew.edu)

Abstract - *Apis mellifera* (European Honeybee) is one of the top pollinators for at least 30% of the world's crops and 90% of our natural wild plants. Over the past few years, European Honeybee populations have drastically decreased due to Colony Collapse Disorder (CCD). CCD causes most of the honeybees to abandon their hive and queen. Around the same time CCD became commonly identified, commercial beekeepers switched the bee's food from sucrose to a less expensive, but more processed substitute: high fructose corn syrup (HFCS). There might be a correlation between the types of food and CCD. Therefore, the goal of this project is to identify changes in carbohydrate metabolism due to HFCS. To determine these changes, we measured gene expression within the glycolysis and gluconeogenesis pathways. For 7 days, bees from 9 hives were fed honey, HFCS, corn syrup (CS), and sucrose. After termination, mRNA was extracted and cDNA synthesized for Quantitative PCR (qPCR) analysis with SYBR green. Glucokinase (GK1), phosphofructokinase (PFK), triose phosphate isomerase (TPS1), pyruvate kinase (PK2) and lactate dehydrogenase (LDHA), all within the glycolysis pathway were down-regulated in HFCS compared to honey. Even though genes in the glycolysis pathway were down-regulated, genes in both glycolysis and gluconeogenesis, such as glyceraldehyde phosphate dehydrogenase (GAPDH) and phosphoglycerate kinase (PGK), did not change in gene expression. Further, when bees were fed CS, they down-regulated most of the genes that were down-regulated in bees fed HFCS. However, these genes were not changed when bees were fed sucrose. In summary, HFCS and CS both down-regulate genes specific to the glycolysis pathway when compared to honey.

Sat- 37

Occupancy of the Common Garter Snake in Urban and Rural Wetland Habitats of Southeastern Massachusetts

Sarah Jones (Bridgewater State University, Bridgewater, MA; s9jones@student.bridgew.edu), Emily Donahue (Bridgewater State University, Bridgewater, MA; edonahue@student.bridgew.edu), Jackie Toomey (Bridgewater State University, Bridgewater, MA; jtoomey@student.bridgew.edu), and Thilina Surasinghe (Bridgewater State University, Bridgewater, MA; tsurasinghe@bridgew.edu)

Abstract - *Thamnophis sirtalis* (Common Garter Snake [CGS]) is a widely distributed North American colubrid snake. It is a habitat generalist associated with multiple types of terrestrial and aquatic environments. CGS use aquatic habitats predominantly for foraging. The objective of this research is to assess CGS abundance along the urban-rural gradient in southeastern Massachusetts. We conducted visual encounter surveys and active surveys (visual scanning and searching under cover objects) across 6 wetland habitats (3 urban and 3 rural) in southeastern Massachusetts. We documented the stage of maturity (adult or juvenile), and assessed several environmental variables, including substrate and ambient temperature, relative humidity, distance to water, and canopy cover, to characterize the habitat at each site of capture. Absence data were also collected from each habitat where CGS were not present. Throughout our survey, we captured 25 individuals (19 adults and 6 juveniles) in 6 habitats. We found no significant differences in CGS abundance across different types of landscape or dates of sampling (Permutational ANOVA — landscape type: $SS = 0.70$, $P = 0.2534$; time of survey: $SS = 26.43$, $P = 0.3063$). Abundance of neither adults nor juveniles differed significantly between urban and rural landscapes, indicating that adults and juveniles are evenly distributed throughout the urban-rural gradient. We found no significant preferences for microhabitat associations of CGS across the urban-rural gradient (Pearson's chi-squared test — substrate type: $\chi^2 = 12.40$, $P = 0.2594$). However, a discriminant function analysis revealed significant differences between presence and absence sites based on environmental variables; CGS positively associated with comparatively higher substrate and ambient temperatures, higher relative humidity, and dense canopy cover. CGS also tended to frequent sites further away from water. Lack of specific habitat preferences at the landscape scale suggested that the CGS is a generalist that can exploit a range of landscape types and resources. Urban habitats may be appealing due to an abundance of profitable resources coupled with reduced competition and lower predation risk. This research may provide useful information for understanding the ecological requirements of the CGS. Conserving common species, such as the CGS, that are tolerant of built-up environments could uphold the functional integrity of an ecosystem.

Sat- 14

Engaging Undergraduates in Collaborative Learning, Research, and Educational Opportunities to Promote Awareness and Combat Threats from Invasive Species

Mary Beth Kolozsvary (Siena College, Department of Environmental Studies and Sciences, Loudonville, NY; mkolozsvary@siena.edu), Jean C. Mangun (Siena College, Department of Environmental Studies and Sciences, Loudonville, NY; jmangun@siena.edu), Melissa Calabria (m20cala@siena.edu), Taylor Gedeon (tm19gede@siena.edu), Maria Giglio (mr10gigl@siena.edu), Paulina Harron (pe26harr@siena.edu), Farrah Leone (jf12leon@siena.edu), Ashley Metz (ae07metz@siena.edu), Alexis Pelletier (an05pell@siena.edu), Maggie Pugliano (mj05pugl@siena.edu), Ursula Svoboda (us21svob@siena.edu), and Samuel Upson (sl27upso@siena.edu).

Abstract - Invasive species are one of the world's leading threats to biological diversity. The introduction and spread of non-native species causes tremendous ecological and economic harm on a local, regional, and international scale. Despite an increased emphasis in recent years on the role that invasive species play in the loss of native species, understanding of the magnitude of the effect of invasive species on biological systems is not widespread. To address the lack of appreciation of the effects of invasive species on native ecosystems, the Department of Environmental Studies and Sciences at Siena College has collaborated with community partners (e.g., NYS Department of Environmental Conservation, New York Natural Heritage Program, Partnerships for Regional Invasive Species Management) and have offered numerous learning, research, and outreach and education opportunities for undergraduates to increase understanding of the negative effects of invasive species. Efforts have involved courses focused primarily on invasive species and exploration of this topic in other courses (e.g., Ecosystem Ecology, Conservation Biology, Environmental Interpretation). Undergraduate research opportunities involved independent studies on assessment and distribution of invasive species on campus, exploratory studies on abiotic and biotic determinants on distribution of *Alliaria petiolata* (Garlic Mustard), and greenhouse experiments on the effects of nutrient levels on Garlic Mustard. In Fall 2016, students in the Environmental Interpretation course designed invasive species lesson plans for K–12 students. These efforts have culminated in a public event, the “Invasive Species Education Fair” in Spring 2017. The topic of invasive species has been an ideal framework to engage the Siena community and nurture partnerships with other organizations to provide numerous experiential learning opportunities for undergraduates.

Sat- 26

The Impact of Acidity on *Lemna minor* Respiration and Chloroplast Count

Renamargaret Kousournas (University of Saint Joseph, West Hartford, CT; rkousournas@usj.edu) and Kirsten Martin (University of Saint Joseph, Biology Department, West Hartford, CT; KirstenMartin@usj.edu)

Abstract - Acid rain impacts the built and natural environment in many ways, but the study of its influence on aquatic environments is of critical importance. Aquatic plants, such as *Lemna minor* (Duckweed), are important producers, and their health and efficiency are linked to environmental conditions, such as the pH of the water. Acid rain may directly impact the number of chloroplasts in *Lemna*, thereby reducing their production efficiency. In this experiment, lab-reared colonies of *Lemna* were exposed to different acidic concentrations and different water temperatures. The number of chloroplasts in each *Lemna* were recorded daily. Higher acidic concentrations resulted in more-rapid loss of chloroplasts showing at a pH of 4, the chloroplast decreased by an average of 98 percent, leading to *Lemna* death. Increases in water temperature also caused a decrease in plant growth as well as a decrease in chloroplast count. When the temperature was at an average of 22 °C (72 °F), chloroplast counts decreased at an average of 5 percent. As the temperature increased to an average of 29 °C (84 °F), the chloroplast count decreased by an average of 64 percent. Also, we calculated daily the dissolved oxygen (DO) levels in the environment to account for respiratory capabilities. Results showed that increases in both temperature and acidity concentrations gave a decrease in DO. When temperatures increased to 29 °C (84 °F), the DO value reached an average of 6.962. The results show the effects of environmental changes on the capability for *Lemna* to undergo adequate respiration and maintain chloroplast counts.

Sat- 3

Monitoring Canine Parvovirus (CPV) Prevalence in Vermont Carnivore Populations through Scat Analysis

Lucas Krauss (Green Mountain College, Poultney, VT; lucas.krauss@greenmtn.edu)

Abstract - Due to the elusive and secretive behavior of many regional carnivorous species; we will utilize scat collection and analysis to sample and test for canine parvovirus (CPV). This study plans to monitor CPV prevalence in a variety of carnivorous species including *Canis latrans* (Coyote), *Vulpes vulpes* (Red Fox), *Urocyon cinereoargenteus* (Gray Fox), *Neovison vison* (American Mink), *Procyon lotor* (Raccoon), *Lynx rufus* (Bobcat), *Martes pennanti* (Fisher), *Didelphis virginiana* (Opossum), *Lontra canadensis* (River Otter), *Mustela erminea* (Stoat), *Mustela frenata* (Long-Tailed Weasel), and *Mephitis mephitis* (Striped Skunk). It is generally understood that interspecific competition exists between many of these species with regards to resources, specifically similar habitat sites and food sources. As a result of these interspecies interactions, the potential transmission of communicable diseases between species increases. Peer-reviewed sources, trail cameras, and prior research regarding sites with CPV prevalence will be used in conjunction with the collection and analysis of scat to better understand and map the prevalence of CPV in all contracting species in southwestern Vermont. The data received from this study will be used to complement and aid research currently underway, which focuses specifically on CPV in Bobcats and Fisher. More information regarding CPV prevalence in other species is expected to aid in understanding how, and from where, are Fisher and Bobcat contracting CPV. Using prior research and peer-reviewed sources, I will choose a study area that includes, but is not limited to, the Poultney, VT. Scat samples will be collected in the determined areas and will be analyzed using laboratory techniques, including PCR, to determine whether CPV is present in samples.

Sun- 13

Relative Importance of Weather and Climate for Tick Distributions at a Local Scale

Emily Kubicke (Lyndon State College Department of Natural Sciences, Lyndonville, VT; emily.kubicke@lyndonstate.edu) and Alan R. Giese (Lyndon State College Department of Natural Sciences, Lyndonville, VT; alan.giese@lyndonstate.edu)

Abstract - Previous research has established a strong connection between tick distributions and environmental variables such as temperature, relative humidity (RH), and heating degree days (HDD). Climate models based on temperature and humidity have successfully predicted tick distributions on a regional scale. Less well understood is efficacy of daily weather forecasts as predictors of tick encounter probabilities locally. We tested the relationship between local weather variables and tick-collection rates from 2013 to 2015 at 13 tick-monitoring sites in Vermont. Tick-monitoring sites were distributed in 2 transects, with 6 sites arrayed from Colchester to Bennington on the western side of the state, and 7 sites arrayed from Guildhall to Bellows Falls on the eastern side of the state. Adult *Ixodes scapularis* (Black-legged Tick) were collected in spring and in fall on established transects by dragging a 1-m² white cloth. We obtained temperature, humidity, and HDD data online from the historical database at weather underground (www.wunderground.com). We calculated RH from the online data. Distance between weather data-collection locations and tick-collection locations averaged 32 km (20 mi). There typically was no difference between temperature collected on site at the time of each tick survey and temperature data gathered online, though the maximum such difference was 4 °C. We used graphical representations and linear regression to search for associations between weather data and tick-collection rates. Below 4 °C, tick-collection rates were low. However, temperatures greater than 4 °C did not dependably predict tick-encounter probabilities. Relative humidity was correlated with tick-collection rates. However, as with temperature, we found broad bands of predictability, suggesting that RH thresholds may exist. We failed to find evidence that encounter rates increased linearly with RH. Overall, weather variables were weak predictors of tick-collection rate, and site-specific variables may be of greater importance.

Sun- 9

Evidence for *Chrysemys picta* (Eastern Painted Turtle) as a Seed Disperser in Southeastern MA Ponds

Melissa Laubi (Bridgewater State University, Bridgewater, MA; mlaubi@student.bridgew.edu), **Meghan Joyal** (Bridgewater State University, Bridgewater, MA; mjoyal@student.bridgew.edu), **Donald J. Padgett** (Bridgewater State University, Bridgewater, MA; dpadgett@bridgew.edu), and **Thilina Surasinghe** (Bridgewater State University, Bridgewater, MA; tsurasinghe@bridgew.edu)

Abstract - Examination of fecal matter of *Chrysemys picta* (Eastern Painted Turtle) from Carver Pond (Bridgewater, MA) and Ice Pond (Middleborough, MA) showed evidence of aquatic seed dispersal. From August 2015 to October 2016, we caught 66 turtles (43 male, 23 female) and collected fecal samples while they were held in the lab for a brief time. Among all individuals, 30 (45%) egested seeds. A total of 5859 seeds were recovered in fecal matter, and seed number per fecal sample ranged from 1 to 1081 (mean: 176.07 seeds), with most seeds visibly unharmed. Seed species included *Nuphar variegata* (Yellow Pondlily), *Nymphaea odorata* (White Waterlily), and 2 unidentified species. Seed transit times for *Nuphar* ranged from 78 to 96 hours. Statistical tests show that turtle sex and BCI have no significant effect on overall seed number, seed richness, or Simpson Index in feces, yet turtles do have a preference towards *Nymphaea*. Germination trials are currently underway to investigate the viability of *Nymphaea* and *Nuphar* seeds from scat in comparison to undigested seeds. These data support earlier evidence of *C. picta* as an effective aquatic seed disperser.

Sat- 15

Ecological Factors Influencing Vernal Pool Productivity

Andrew M. LaVoie (Franklin Pierce University, Rindge, NH; Lavoiea13@live.franklinpierce.edu) and **Robert Knuth** (Franklin Pierce University, Rindge, NH; Knuthr13@live.franklinpierce.edu)

Abstract - We conducted a study observing some of the ecological factors influencing amphibian productivity within vernal pools. The study sampled 8 pools and focused on understanding the forest type, vegetation cover within the pool, the composition of the substrate, as well as the water depth and chemistry during breeding season. Data were collected on the water chemistry of the pools in the early spring and summer months. Vegetation transects, soil profiles, and topographic surveys were performed in the fall months. We attempted to understand how some vernal pool characteristics might be more beneficial to the successful reproduction of obligate species such as *Lithobates sylvaticus* (Wood Frog) and *Ambystoma maculatum* (Spotted Salamander). Many of the tests and observations we made were not conclusive, but there did appear to be some trends found in the results. Regression analyses of the data revealed that amphibian productivity was positively correlated with pool water volume and canopy cover. The data also showed a negative relationship between high plant species diversity and productivity of these obligate species.

Sun- 28

A Modern Twist on an Ancient Practice, Use of 3D Printers in Taxidermy

Cheyenne Lee (SUNY Cobleskill, Cobleskill, NY; leec861@cobleskill.edu) and **Michael Losito** (SUNY Cobleskill, Cobleskill, NY; lositomp@cobleskill.edu)

Abstract - The goal of this experiment was to create bird skull replicas for use in taxidermy utilizing SUNY Cobleskill's 3D printing technology. It is already common practice to use artificial heads in game-bird mounts, but the market has not proven profitable enough to produce non-game heads for museums and other such collections. However, with the increasing availability and affordability of 3D technology, it has become increasingly possible for taxidermists in these situations to create their own artificial heads. Plastic is a cleaner and more durable material than bone, theoretically deterring insect infestations and preventing odors from a poorly cleaned skull. This technology is constantly improving and being adapted to new uses, with no limit to its possibilities.

Sun- 16

Examination of Multiple Infections of *Wolbachia* in Free-Living, Enslaved, and Slavemaking *Formica* Ants

Hannah Loo (SUNY Geneseo, Geneseo, NY; hl17@geneseo.edu) and Jennifer L. Apple (SUNY Geneseo, Geneseo, NY; applej@geneseo.edu)

Abstract - *Wolbachia* are a group of maternally inherited bacteria commonly found in arthropods. While commonly transmitted vertically, from mother to offspring, recent research has identified horizontal transmission as a possible means of spread as well. Within the Roemer Arboretum at SUNY Geneseo are 2 species of slavemaking ants, *Formica pergandei* and *F. subintegra*, which exploit a common mound-nesting ant, *F. glacialis*. Enslaved ants exhibit intimate contact with slavemakers, helping to sustain the colony. Previous research has revealed *Wolbachia* infection in both slavemaker ants and slaves, and other studies have shown that ants may harbor up to 8 different strains of *Wolbachia* at once. This study sought to examine whether slavemaker ants previously identified to harbor *Wolbachia* contain multiple strains. PCR product of samples were cloned and transformed into competent cell lines. Plasmid DNA was purified from colonies, verified via PCR with T3/T7 primers, and submitted for sequencing at an external facility. We analyzed sequence data using Geneious software and BLAST analysis. Preliminary analysis suggests that there are 4 or 5 different *Wolbachia* strains among 5 samples tested, and up to 3 strains within a single species. Furthermore, investigation of *Wolbachia* infection in both *F. glacialis* slaves and free-living ants showed infection in slaves only, suggesting that infection may be transferred unidirectionally from slavemakers to slaves. Taken together, these results provide greater insight into the complexity of *Wolbachia* transmission dynamics and contribute to our understanding of *Wolbachia* infection in slavemaking *Formica* ants.

Sun- 4

A Native Lepidopteran is Impacted by Host Defenses Induced by the Hemlock Woolly Adelgid

Mary Mallinger (University of Rhode Island, Kingston, RI; marymallinger@uri.edu), Chad Rigsby (URI, Kingston, RI; rigsby@uri.edu), Robert Schaeffer (WSU, Pullman, WA; robert.schaeffer@wsu.edu), Colin Orians (Tufts University, Medford, MA; colin.orian@tufts.edu), and Evan Preisser (URI, Kingston, RI; preisser@uri.edu).

Abstract - *Tsuga canadensis* (Eastern Hemlock) is currently experiencing widespread mortality due to the invasive *Adelges tsugae* (Hemlock Woolly Adelgid [HWA]). *Lambdina fiscellaria* (Eastern Hemlock Looper), another Hemlock pest, is a native lepidopteran that has reached outbreak levels in the past. While these insects share a host and overlap in range, little is known about interactions between the two. Previous research has shown that HWA infestation leads to an increase in methyl-salicylate in hemlock tissue. Hemlock Looper, being a chewing insect, likely elicits jasmonic acid pathways in its host. These two defensive pathways, salicylic acid and jasmonic acid, have been found to be mutually antagonistic. We tested the hypothesis that Looper performance is affected by prior HWA infestation through the host's chemical defenses. It is hypothesized that the host plant will not be able to adequately defend itself against the later-arriving Looper because it has already invested resources in its defense against HWA. Loopers were reared to pupation on hemlock foliage that was either infested or uninfested with HWA. Within those treatments, groups of foliage were sprayed with defensive elicitors to induce either the jasmonic- or salicylic-acid pathways. Looper performance was assessed by measuring survival, days to pupation, and weight at pupation. Looper performance was greatest on both HWA-infested and uninfested foliage that had been sprayed with the SA-elicitor. Our results suggest that Eastern Hemlock cannot successfully defend itself against looper herbivory when it has been previously infested by HWA due to defensive signaling cross-talk.

Sat- 40

Water Quality Assessment of the Effects of a Water Pollution Control Facility in Vernon, Connecticut

Alexander J. Manos (CCSU, New Britain, CT; ajmanos@my.ccsu.edu) and Clayton Penniman (CCSU, New Britain, CT; penniman@ccsu.edu)

Abstract - Monitoring water quality is vital to the health of aquatic and terrestrial organisms. Although freshwater rivers constitute only a small fraction of the total water on Earth they can still have tremendous impacts on the ecosystems they flow through. Residence times for water in rivers is very low which allows rapidly moving water to transport a wide variety of pollutants over a long distance. Contaminants such as nutrients, salts, and toxics have the potential to create uninhabitable environments for a wide range of organisms. One source of pollutants is from water pollution control facilities (WPCFs), which can load excessive nutrients into receiving bodies of water and may produce a wide range of ecological effects. The goal of this study was to determine the impact of treated effluent on downstream water quality in the Hockanum River in Vernon, CT, from the Vernon WPCF. We measured and compared physical, chemical, and biological parameters, such as oxygen saturation, dissolved oxygen, specific conductance, temperature, nitrate, ammonia, chloride, reactive and total phosphate, turbidity, total suspended solids, and *E. coli*, upstream and downstream of the WPCF's outfall pipe to determine the degree of impact on the river's water quality. We compared our results to those of previous studies and CT water quality standards, which indicate that upper parts of the Hockanum River fit Class AA or A CT water quality classification with respect to the measured parameters. Lower portions of the river, on the other hand, were exceedingly high in nutrients and other pollutants in the fall but significantly lower in the spring likely due to differences in volume of flow in the river. These results indicate that lower portions of the river should be classified as Class B or Class C with further research to investigate seasonal variations of water quality parameters.

Sat- 1

Human Perceptions of the Coyote in New York City

Brielle Manzolillo (Department of Environmental Studies and Science, Pace University, NY, bm78058n@pace.edu) and Anne H. Toomey (Department of Environmental Studies and Science, Pace University, NY, atoomey@pace.edu)

Abstract - As cities expand, the need for conservation of species that live in urban environments is crucial. One species that is increasingly prominent in urban environments is *Canis latrans* (Coyote). As a keystone species and an apex predator, the Coyote plays an important role in the functioning of the ecosystem. Due to the historical connotations that are associated with large canids such as Coyotes and *Canis lupus* (Wolf), the Coyote faces many negative perceptions from humans. As the Coyote moves into urban areas, such negative perceptions could cause them to be susceptible to persecution. Knowing how a given species is perceived can help us to predict and forestall where and why human-wildlife conflicts may emerge. The main objective of our study is to try to understand how people perceive Coyotes living in New York City. We carried out a survey with visitors ($n = 56$) to 2 parks in New York City (NYC): Pelham Bay Park and Riverdale Park, which were chosen due to the documented presence of Coyotes in these areas. Through preliminary analysis, we found that although most respondents (58%) indicated that they did not believe Coyotes to be an overall threat to humans, the majority favored control over the resident Coyote population, with 35% preferring complete removal of the species from NYC parks, and 18% suggesting less invasive forms of control. Interestingly, our data indicates that respondents who indicated acceptance of the Coyote in urban environments were more likely to react rationally and appropriately upon encountering one. Next steps for this research include further analysis of collected survey data in order to more accurately gauge participants' perceptions. We will also do extensive interviews with Coyote researchers, park officials, and individuals with firsthand experience with Coyotes, which will help us to better understand how the results of our data can be applied to helping manage urban Coyotes.

Sun- 14

Water Under the Bridge: *E. coli* Monitoring of the Scantic River (CT)

Kirsten H. Martin (University of Saint Joseph, West Hartford, CT; kirstenmartin@usj.edu), Joanna Keyes (University of Saint Joseph, West Hartford, CT; jkeyes@usj.edu), Lindsey Stefens (University of Saint Joseph, West Hartford, CT; lstefens@usj.edu), Elisha Pertillar (University of Saint Joseph, West Hartford, CT; epertillar@usj.edu), Rita Udoh (University of Saint Joseph, West Hartford, CT; rukpeh@usj.edu), and Christina Alevras (University of Saint Joseph, West Hartford, CT; calevras@usj.edu)

Abstract - The Scantic River Watershed Monitoring Program began in 2010, and focused on monitoring water quality at all road crossings of the Scantic River. Beginning in spring of 2015, the Scantic River Watershed Association and the East Windsor American Heritage Rivers Commission partnered with the Connecticut River Watershed Council and the University of Saint Joseph to begin a limited *Escherichia coli* monitoring program of the river. *Escherichia coli* is a gastrointestinal bacterium naturally found in humans and animals as well as commonly in waterways, but high levels of *E. coli* are considered a concern because some strains of the bacteria are hazardous to human health. Between 2015 and 2016, five sites in East Windsor, CT were sampled weekly. Air temperature, water temperature, and pH were recorded at the time of collection. Samples were then processed at the University of Saint Joseph using the Colilert method. The relative “health” of the sample was classified according to the CT River Watershed Council’s “Is it clean” website. Levels exceeding 575 cfus per 100ml are deemed unhealthy for swimming and boating. This level was met or exceeded several times during the two years of this study. The poster presentation will discuss the health impacts of *E. coli* contamination, a comparison of “unhealthy” designation, the testing methodology, and a summary of the results.

Sat- 2

Letting Nature Take Over: The USJ Grasslands Project

Kirsten H. Martin (University of Saint Joseph, West Hartford, CT; kirstenmartin@usj.edu) and Jean Madden-Hennessey (Master Gardener Program Coordinator UConn Extension, Vernon, CT; Jean.Madden-Hennessey@UConn.edu)

Abstract - In the fall of 2015, a small section of the University of Saint Joseph’s West Hartford campus was designated as a future grassland area. All maintenance on this parcel (mowing, leaf raking, etc.) was halted, and the area was allowed to enter an ecological succession pattern. A preliminary vegetational and arthropod survey was conducted in late fall of 2015, then a more intensive vegetational survey was conducted in the summer of 2016. Results from the second vegetational survey show a much higher diversity of plants, and additional surveys will be conducted this summer.

Sun- 1

Population Ecology and Distribution of the Freshwater Crustaceans in Connecticut Including Some Notes Regarding their Re-Population in Connecticut after the Ice Age

Albert F. Mimo (Northeast Naturalist Services, Prospect, CT; nenaturalist@sbcglobal.net)

Abstract - More than 850 freshwater crustacean collections have been conducted in Connecticut since 1959 by a number of researchers including myself. I have identified to species and mapped the collection localities of the isopods, amphipods, crayfish, and freshwater shrimp, 1 map per species. In addition to presenting these distribution maps, I will also discuss the re-colonization of freshwater crustaceans in the state since the last glacier, and the importance of water quality for this taxonomic group.

Sat- 9

Aquatic Macro-Invertebrate Distribution Along a Hydrogen Sulfide Gradient in Brimstone Creek, NY

Mitchell V. Monini (SUNY Cobleskill, Cobleskill, NY; m.monini123@gmail.com) and John R. Foster (SUNY Cobleskill, Cobleskill, NY; fosterjr@cobleskill.edu)

Abstract - The impact of hydrogen sulfide on stream macro-invertebrates has been studied extensively in laboratory experiments, but corroborating evidence from field studies is lacking. In this study, the density, distribution and species composition of aquatic macro-invertebrates were examined along a naturally occurring hydrogen sulfide gradient in Brimstone Creek, NY. We used a Surber sampler to collect 10 benthic invertebrate samples at 5 locations at 20-m intervals downstream from the sulfur spring. Twenty-six species of stream macro-invertebrates were collected in hydrogen sulfide. We measured sulfide levels ranging from 117 ppb closest to the spring to 49 ppb furthest downstream. As hydrogen sulfide concentration decreased, both species richness and species diversity (Simpson's index of diversity) peaked at site two, 40 m from the spring; maximum overall species diversity was 19 different species. The total density of macro-invertebrates was highest, however between 60–100 m downstream of the sulfur spring. Of the 2 species that were abundant in the high concentrations of hydrogen sulfide, *Baetis tricaudatus* (Small Minnow Mayfly) and *Ephemerella* spp (ephemerella), the latter was in a moribund condition and infected with water mold. However, 4 other species, *Stenacron interpunctatum* (Flathead Mayfly), *Sweltsa* spp. (sallflies) and *Atherix* spp. (watersnipe) larvae, seemed to be unaffected by the hydrogen sulfide levels observed. This study demonstrates that in the wild, some aquatic macro-invertebrates can occur at hydrogen sulfide levels described as “lethal” (20 ppb) in laboratory studies.

Sat- 10

Documenting the Extended Leaf Phenology of Invasive Shrubs Using a Citizen Science Approach

Frances A. Murray (SUNY Geneseo, Geneseo, NY; fam4@geneseo.edu), **Ryan Colling** (SUNY Geneseo, Geneseo, NY; rpc6@geneseo.edu), and Jennifer L. Apple (SUNY Geneseo, Geneseo NY; applej@geneseo.edu)

Abstract - Phenology refers to the timing and of seasonal events in the life cycles of plants and animals. There are a number of opportunities for the general public to contribute to phenological databases, such as the National Phenological Network (NPN) and Project Budburst. In this study, we have contributed phenological data for a variety of trees and shrubs in the SUNY Geneseo campus area to the online platform for NPN, Nature's Notebook. A particularly interesting comparison can be drawn between invasive shrubs like *Lonicera maackii* (Amur Honeysuckle) and native shrubs like *Cornus racemosa* (Gray Dogwood), which both grow in the Spencer J. Roemer Arboretum on SUNY Geneseo's campus. Initial analysis supports evidence for extended leaf phenology in the invasive shrub, a phenomenon that gives these plants an advantage over natives as they break buds earlier in the spring and retain leaves later in the fall. In fall 2016, phenological events were recorded by trained observers and novice undergraduate biology students as part of a class project. The project focused on phenophases characteristic of the fall season, including colored leaves and leaf-drop. The students' recorded observations were found to show some inconsistencies when compared to those made by trained observers. By determining the shortcomings of this class project, we can take measures to improve the reliability of data gained from these projects in the future and contribute to long-term efforts to track patterns and shifts in phenology in the face of climate change.

Sun- 40

Identifying the Fungal Associates of Honeydew Deposits from the Beech Blight Aphid

Robina G. Nagel (SUNY Geneseo, Geneseo, NY; rn7@geneseo.edu) and Jennifer L. Apple (SUNY Geneseo, Geneseo, NY; applej@geneseo.edu)

Abstract - *Grylloprociphilus imbricator* (Beech Blight Aphid) is a specialist herbivore that colonizes the branches of *Fagus grandifolia* (American Beech). The aphids aggregate into colonies along branches and pierce through the exterior of the branch to access the nutritious fluids in the phloem. Accumulation of their sugary excrement, known as honeydew, below these aphid colonies is reported to support growth of a very specialized sooty mold, *Scorias spongiosa*. The goal of this study was to determine if the fungal growths that we were seeing associated with aphid colonies in a local research reserve were indeed the fungus *S. spongiosa*. Samples were collected from leaves or leaf litter underneath colonies in the Genesee Valley Conservancy Research Reserve and Letchworth State Park in western New York. Extracted DNA from these samples was subjected to PCR with a fungal-specific primer specifically designed to amplify the ITS region of the ribosomal DNA gene. PCR product was sent to an external lab for sequencing. Results confirm the presence of the *S. spongiosa* fungus in at least some samples, but there may also be other fungi colonizing the honeydew deposits. There are many gaps in our current understanding of the fungal community relying on the *G. imbricator* colonies and with this study, we could either confirm *S. spongiosa* as the only colonist of *G. imbricator* honeydew deposits in this site, or present novel information linking other fungi to this species of aphid.

Sun- 7

Determination of *Diphascon pingue* Subspecies in Maine via Modern Morphometrics

Sarah B. Neitzel (Unity College, Unity, ME; sneitzel16@unity.edu) and Emma S. Perry (Unity College, Unity, ME; eperry@unity.edu)

Abstract - Tardigrades provide a variety of ecosystem services, including nutrient processing, and have immense potential as bioindicators. However, significant groundwork into tardigrade identification still needs to be laid to allow for proper exploration of tardigrades' roles within the ecosystems of Maine and the northeastern United States. *Diphascon pingue* is a common tardigrade species within moss and lichen samples from Maine. It exists as two subspecies: *D. pingue pingue*, first seen in Germany (Marcus 1936), and *D. pingue brunsvicense*, first seen in New Brunswick (Argue 1972). In both cases, the species were described according to the standards of the time. However, modern standards for species descriptions include robust morphometric analyses that often allow similar species to be distinguished from one another. Here we describe a large population of *Diphascon pingue* from Maine using morphometric analysis. We then compare this population to the subspecies descriptions to determine the identification of the Maine subspecies.

Sun- 24

Distribution of Fishers, Coyotes, Bobcats, and Foxes in Westchester County

Jared Ortega (Wildlife Technician Program, Mianus River Gorge Preserve, Bedford, NY; Carmel High School, Carmel, NY; ja.ortega0110@gmail.com)

Abstract - *Martes pennant* (Fisher), *Canis latrans* (Coyote), *Lynx rufus* (Bobcat), and *Vulpes vulpes* (Red Fox) are predators native to the Westchester County area. After numerous Coyote sightings and Fisher sightings in southern Westchester and even New York City, it is evident that these species are colonizing or re-colonizing many parts of southern New York after being extirpated over a century ago. The objective of this study was to determine if these species, Fisher in particular, are present in protected areas throughout Westchester County and to explore possible habitat or landscape associations that might be useful in predicting their distributions presently and in the future as range expansion/reclamation continues. I hypothesized that Fishers, Bobcats, and, perhaps, Red Foxes will only be photographed in more remote sites due to their tendencies to avoid human activity, whereas Coyotes will be detected in all locations regardless of habitat due to their generalist nature. I utilized 67 camera traps deployed across northern and central Westchester County in 2015. Fishers were detected in 6 sites (9%), Bobcats in 5 (7%), Coyotes in 35 (52%), and Red Foxes in 24 (36%). Occupancy rate (naïve presence corrected for detection rate) was 0.16 ± 0.13 for Fishers, -0.23 ± 0.15 for Bobcats, 0.64 ± 0.09 for Coyotes, and 0.62 ± 0.14 for Red Foxes. No strong habitat correlations were found, but data collection and analysis will continue for several years.

Sun- 15

Initial Assessment of a Red-Eared Slider Invasion in a Southeastern Massachusetts Pond

Donald J. Padgett (Department of Biological Sciences, Bridgewater State University, Bridgewater, MA 02325; dpadgett@bridgew.edu)

Abstract - *Trachemys scripta elegans* (Red-Eared Slider Turtle), native to waters of the Mississippi River valley, became introduced and successfully established outside of its native range throughout the US, Asia, Europe, Australia, and Africa. Considered one of the world's most problematic invasive species, the Red-eared Slider Turtle has been reported in waters of Massachusetts where direct competition for food, refuges, nesting sites, and or basking places is presumed. This study aimed to document the level of invasion in Little Long Pond (Plymouth MA), compare population demographics with 2 native, ecologically similar turtles, *Chrysemys picta* (Eastern Painted Turtle) and *Pseudemys rubriventris* (Northern Red-Bellied Cooter), in the same pond, and assess the possible impact the alien species may have on the long-term fitness of 2 two native species. Turtles were captured in August through September 2016, sexed, measured, weighed, uniquely marked, and then released. I captured 41 turtles, including the non-native Red-eared Slider Turtle. In terms of body sizes, Eastern Painted Turtle was the smallest of the 3 targets and Northern Red-Bellied Cooter was the largest. Males and females were caught of each species, and sex ratios were mostly skewed to male (*Chrysemys* 2.6:1, *Pseudemys* 1.4:1, *Trachemys* 1:1). Age-class estimations indicated most turtles were mature, falling into the >10 years of age class. Based on capture-recapture findings, more native individuals are present, with the common Eastern Painted Turtle being most abundant. While the nature of competitive interactions between these 3 species was not a focus of this study, research indicates several competitive advantages of Red-Eared Slider Turtles over the native turtles in Little Long Pond, in terms of body size, agonistic basking and feeding behaviors, earlier maturation, and higher fecundity. The presence of the exotic species in Little Long Pond potentially threatens natural populations of Eastern Painted Turtle and the imperiled Northern Red-Bellied Cooter.

Sat- 18

By Clone or Seed? A Look at Population Establishment and Growth of *Acorus calamus*, a Wetland Plant

Aswini Pai (St. Lawrence University, Canton, NY; apai@stlawu.edu)

Abstract - *Acorus calamus* L. (Sweetflag, family Acoraceae) is a helophyte found in temperate and subtropical wetlands. Though diploid varieties of the species can spread through both seed and clonal growth of rhizomes, seedlings are conspicuously absent. Natural populations are found in nutrient-poor soils where rhizome length, leaf growth, and shoot density are influenced most by the abundance of silt, nitrogen, calcium, and organic matter. MANOVA indicated that light ($\lambda = 0.762$, $P < 0.001$), nutrient ($\lambda = 0.449$, $P < 0.001$) and moisture ($\lambda = 0.508$, $P < 0.001$) had significant effects on rhizome growth. Though up to 90% of seeds are able to germinate, germination occurred only in light and varied significantly ($F = 8.42$, $P < 0.0001$) across temperatures, with seeds germinating maximally in spring (15/25 °C) and summer (20/35 °C) temperatures. Seed storage for 24 months did not effect germination. ISSR analyses of genetic diversity, evenness, expected heterozygosity and percentage of polymorphic loci indicated that most of the variation (58%) is among populations and a moderate amount (42%) is within populations with little gene-flow among populations. Results indicate that though Sweetflag is adapted to survive in a wide variety of wetlands and persist in seed banks, its germination and population growth might be limited by light. Further, seedlings with very low carbohydrate reserves might not be able to survive flooding anoxia leading to a predominantly clonal means of growth. These findings are relevant when using Sweetflag in wetland restoration projects.

Sat- 19

The Effects of Land-Use History and Natural Disturbance on Changes in Tree Species Composition

Sasha Petrycki (Franklin Pierce University, Rindge, NH; petryckis14@live.franklin Pierce.edu), **Victoria Williams** (Franklin Pierce University, Rindge, NH; williamsv14@live.franklin Pierce.edu), **Andrew Lavoie** (Franklin Pierce University, Rindge, NH; lavoiea13@live.franklin Pierce.edu), **Rhine Singleton** (Franklin Pierce University, Rindge, NH; singleR@franklin Pierce.edu), and **Catherine Koning** (Franklin Pierce University, Rindge, NH; koningc@franklin Pierce.edu)

Abstract - In order to investigate whether land-use history can affect changes in tree species composition and the recruitment of trees into the forest canopy, we continued an ongoing long-term study of forests in the Franklin Pierce University natural areas in Rindge, NH. We sampled a total of eighteen 20 m x 20 m permanent forest plots, 9 in forests growing on land that was formerly cultivated, and 9 in forests growing on former pasture. In these plots, we measured the diameter of all marked trees (originally tagged in 2003 if dbh was greater than 10 cm), recorded any trees that had died, and we tagged and measured any new trees reaching the 10 cm diameter size class. Our results indicate that while there were no differences in tree mortality or recruitment into the canopy between the two forest types, there has been a significant shift in tree species composition in formerly cultivated plots ($P < 0.001$); in contrast, species composition has not shifted in plots on former pastures ($P > 0.05$). In addition, factors such as tree density, tree basal area, and tree mortality had no significant effect on recruitment into the canopy, with one exception; there was a significant relationship between recruitment and canopy tree mortality at one site that experienced heavy damage due to the 2008 ice storm ($P < 0.05$).

Sun- 18

Microplastic Biomagnification in Invertebrates, Fish, and Cormorants in Lake Champlain

Alexandra R. Putnam (SUNY Plattsburgh, Plattsburgh, NY; aputn002@plattsburgh.edu), **Alexis Clune** (SUNY Plattsburgh, Plattsburgh, NY; aclun001@plattsburgh.edu), **Brandon Buksa** (SUNY Plattsburgh, Plattsburgh, NY; bbuks002@plattsburgh.edu), **Chad Hammer** (SUNY Plattsburgh, Plattsburgh, NY; chamm006@plattsburgh.edu), **Hope VanBrocklin** (SUNY Plattsburgh, Plattsburgh, NY; hvanb002@plattsburgh.edu), and **Danielle Garneau** (SUNY Plattsburgh, Plattsburgh, NY; dgarne001@plattsburgh.edu)

Abstract - Microplastics are plastic particles that are <5 mm in diameter and can biomagnify in waterbodies. These microplastics are categorized as primary microplastics, which are pellets commonly found in personal care products, and secondary microplastics, which are degraded plastics. Microplastics have made their way into waterbodies by passing through wastewater treatment plants, as marine debris, via mechanical- and photo-degradation of plastic, and release of pre-production raw materials. Microplastics are known to absorb other pollutants and are hydrophobic particles that can biomagnify up the food web. When ingested by fish, particulates embed within the digestive tract and leach into tissues, posing a potential concern for human consumption. The goal of this research was to determine whether microplastics biomagnify within invertebrates, fish, and *Phalacrocorax auritus* (Double-crested Cormorant) resident to Lake Champlain. We did so by quantifying and characterizing (e.g., fragment, fiber, film, foam, pellet) particulates. We performed wet peroxide oxidation digests on digestive tracts of ($n = 412$) lake organisms, specifically invertebrates ($n = 257$), 14 species of fish ($n = 140$), and Double-crested Cormorants ($n = 15$). Our research indicated that fibers were the most-abundant particulates in all organisms ($n = 629$), followed by fragments ($n = 120$), films ($n = 40$), pellets ($n = 13$), foam ($n = 9$). Microplastics were separated using stacked mesh sieves, with preliminary results showing a particulate size-distribution of: ≥ 1 mm, $n = 86$; less than 1 mm but ≥ 355 μm , $n = 144$; and less than 355 μm but ≥ 125 μm , $n = 232$. These findings illustrate biomagnification in Lake Champlain organisms, as invertebrates, fish, and Double-crested Cormorants contained on average 0.05, 3.24, and 22.93 microplastic particles. Results from this research serve to inform residents of the Lake Champlain watershed, anglers, non-profit lake organizations, as well as public health and government officials of the risks microplastics pose to aquatic biota and ultimately humans.

Sat- 8

Seed Dispersal in a Massachusetts River by *Chrysemys picta* (Eastern Painted Turtle)

Sydney Quirk (Bridgewater State University, Bridgewater, MA; squirk@student.bridgew.edu), **Meghan Joyal** (Bridgewater State University, Bridgewater, MA; mjoyal@student.bridgew.edu), **Donald J. Padgett** (Bridgewater State University, Bridgewater, MA; dpadgett@bridgew.edu), and **Thilina Surasinghe** (Bridgewater State University, Bridgewater, MA; tsurasinghe@bridgew.edu)

Abstract - *Chrysemys picta* (Eastern Painted Turtle) was investigated for aquatic seed dispersal capabilities over 2 seasons (2015–2016). Turtles were captured from the Nemasket River (Bridgewater, MA) and brought to the lab to provide fecal samples. We caught a total of 75 individuals, including 20 recaptures, and 19 turtles (25%) yielded intact seeds in their feces. Seed species identified in fecal samples included *Potamogeton spirillus* (Snailseed Pondweed), *Vitis labrusca* (Fox Grape), and *Phalaris arundinacea* (Reed Canary Grass). Number of seeds per feces ranged from 1 to 1239, with most seeds intact (18% visibly damaged). Statistical tests show that turtle sex and BCI have no significant effect on overall seed number, seed richness, or Simpson Index in feces, but BCI has a significant impact on total number of *Phalaris* seeds egested. These data suggest aquatic turtles may prove to be important dispersal vectors for plants in and around streams.

Sat- 16

Investigating the Distribution of *Minibiotus intermedius* and *Macrobiotus furcatus* in Acadia National Park

Briana Rago (Unity College, Unity, ME; BRago15@unity.edu), **Emma Perry** (Unity College, Unity, ME; EPerry@unity.edu), and **Joshua Pittendreigh** (Unity College, Unity, ME; JPittendreigh13@unity.edu)

Abstract - While the first American tardigrade was found in Maine, there have only been two other papers documenting their occurrences in Maine, neither of which reported any tardigrade research in Acadia National Park. Acadia National Park covers 47,748 acres comprised of 3 different areas: Mount Desert Island, Schoodic Peninsula, and Isle Au Haut. Within each region, there are many habitats including rocky coastlines, evergreen forests, and freshwater lakes. My work focused on the distribution of 2 species, *Minibiotus intermedius* and *Macrobiotus furcatus* within Acadia National Park. As compared to other common tardigrades, such as *Ramazzotius* and *Macrobiotus* which are omnivorous, *Minibiotus intermedius* and *Macrobiotus furcatus* are herbivores. Part of the reason for this is their distinctive buccal tubes, which are too small to eat larger prey. Instead, they either pierce plant cells or ingest small algae. This diet may limit their habitat ranges and types. They are commonly found on moss and lichen, but can be found on leaf litter as well. *Minibiotus intermedius* and *Macrobiotus furcatus* are similar morphologically and until 2014 were thought to be in the same genus. However, they do differ in their cuticle texture. *Minibiotus intermedius* has a smooth cuticle, whereas *Macrobiotus furcatus* has small rows of pores across the dorsal surface. These pores may also contribute to that species' distribution in Acadia. Ninety-three samples of leaf litter, moss, and lichen were taken from near-trail locations on mountains along 8 different hiking trails within Acadia National Park. Approximately 165 tardigrades were found in total. At least 9 species in the genera *Milnesium*, *Macrobiotus*, *Minibiotus*, *Diphascion*, *Ramazzotius*, and *Hypsibius* were found including 36 of the 2 species of interest.

Sun- 23

Ruffed Grouse Management Assessment at the Lake Alice WMA Early-Successional Mixed Hardwood Forest in Chazy, NY

Connor Ramsdell (SUNY Plattsburgh, Plattsburgh, NY; crams002@plattsburgh.edu) and **Kinga Stryszowska-Hill** (SUNY Plattsburgh, Plattsburgh, NY; kstry001@plattsburgh.edu)

Abstract - *Bonasa umbellus* (Ruffed Grouse) are valuable upland game birds that are found in early-successional upland forests consisting of trees such as *Populus* spp. (aspen) that form dense stands. Ruffed Grouse utilize aspen saplings as cover from predation, while aspen buds constitute the majority of their dietary requirements. In 1975, the New York State Department of Environmental Conservation (NYSDEC) established a rotational clear-cut management site at Lake Alice WMA, in Clinton County, NY, in order to improve Ruffed Grouse habitat, primarily for increased hunting opportunities. In the fall of 2016, I began to research this site in an attempt to determine the current quality of the habitat for sustaining Ruffed Grouse populations. I conducted a vegetation composition and density analysis of three 0.4-ha (0.1-acre) circular plots in 3 of the 5 clear cut stands. I conducted grouse flush-count surveys for 20 weeks, from October 2016 to February 2017, counting the number of grouse flushes I encountered every hour. Preliminary results show that 2 out of the 3 sampled plots held adequate stem density for grouse protection (≥ 4942 stems per ha [≥ 2000 stems per acre]). The sampled plots were heavily dominated by *Ulmus americana* (American Elm) and not aspen, although aspen were present. Flush data from the fall of 2016 shows that the number of flushes per hour collected at the site were higher than the state average from the previous hunting season, and even topped the average for the surrounding northern Adirondack Park. This data indicates that this management site is sustaining a healthy Ruffed Grouse population. Data collection in the spring of 2017 is underway.

Sat- 31

Impacts of Deer Overpopulation on Red Oak Regeneration at Mianus River Gorge

George Raxworthy (Wildlife Technician Program, Mianus River Gorge Preserve, Bedford, NY; Fox Lane High School, Bedford, NY; graxworthy@gmail.com)

Abstract - *Odocoileus virginianus* (White-tailed Deer) overpopulation is a problem throughout the Northeast US. The browsing pressures from super-abundant deer impede forest regeneration and growth in saplings. To measure the impacts of deer overbrowsing and the success of the local deer management program, I planted and monitored 60 *Quercus rubra* (Red Oak) saplings in the Mianus River Gorge, a nature preserve in Bedford, NY. The Red Oaks were regularly assessed for browse damage, mortality, and number of leaves. A majority of the oaks were browsed, and many of these browsings lead to mortality (80% mortality), slowing Red Oak regeneration. Overall mean number of leaves was lower for experimental versus control (fenced) trees and gradually diminished with time since planting. This finding suggests that of the surviving saplings, most have been stunted and become smaller since planting due to deer browse. Data suggests that deer are still overpopulated and continue to cause substantial damage to the forest's ability to regenerate. If deer overpopulation in this region persists, then an altered succession and loss of biodiversity in tree species will likely occur. Mianus has a deer management program, but it has not been enough to subdue deer numbers as of yet.

Sun- 17

Environmental Correlates of American Crow Nest Placement and Incubation Commencement

Douglas A. Robinson Jr. (Mount Saint Mary College, Newburgh, NY; douglas.robinson@msmc.edu) and Dominick DeCaterina (Mount Saint Mary College, Newburgh, NY; ddec9277@my.msmc.edu)

Abstract - Avian reproduction is an energy-demanding investment. During *Corvus brachyrhynchos* (American Crow) incubation, it is necessary for the breeding female to maintain her eggs at 36-40 °C. Incubation costs may be minimized with the strategic selection of nesting site and timing of incubation commencement. Amount of nest exposure and ambient temperature must be considered to minimize the costs and maximize the benefits of reproductive attempts. We studied 17 American Crow nests located in the town of Newburgh, NY, during the years 2011–2016. Images facing all cardinal directions and the above view from the nest perspective were assessed for nest exposure via ImageJ. We collected ambient temperature data from Stewart International Airport weather station. The date of incubation start was determined through observations and nestling ages. Results suggest that American Crows choose more nest exposure from above the nest at earlier incubation dates, potentially increasing radiant warming during cool temperatures early in the breeding season. No relationship existed between incubation date and ambient temperature, but nest location and timing of incubation appear to be well coordinated. Our evidence suggests breeding female American Crows show selectivity in nest placement that may attempt to exploit nest-site conditions.

Sat- 34

Title: Demographic Trends of the Piping Plover (*Charadrius melodus*) at Allens Pond in Dartmouth, Massachusetts, from 2008 to 2016

Jocelyn Rua (Bridgewater State University, Bridgewater, MA; jrua@student.bridgew.edu), Victoria Frew (Bridgewater State University, Bridgewater, MA; vfrew@student.bridgew.edu), and Christopher Bloch (Bridgewater State University, Bridgewater, MA; cbloch@bridgew.edu)

Abstract - *Charadrius melodus* (Piping Plover) is a small North American shorebird that ground-nests on sandy beaches. It is listed as endangered in Canada and the inland United States, and threatened along the coast of the United States. Since 1930, there has been a steady decline in its population due to poor reproductive success caused by predation and anthropogenic factors such as habitat loss, disturbance by off-road vehicles, and trampling of nests. This study examined temporal trends in abundance and reproductive success of Piping Plovers at Little Beach and Barneys Joy in Dartmouth, MA. Data were collected daily during the breeding season from 2008 to 2016. Over the 9-year study, Piping Plover abundance has only slightly increased. Abundance increased by 7 individuals from 2008 to 2015 but decreased by 2 individuals in 2016. Even though there was little increase in abundance, reproductive success has increased considerably over the 9 years. In 2008, there were only 6 fledges, but the number of fledges increased to 34 in 2016. The increase in fledge rates probably results from fencing placed to protect plover breeding grounds that likely reduced predation pressure as well as disturbance to the site, along with daily monitoring of nests throughout the breeding season that further served to reduce anthropogenic disturbance. With the continuation of conservation efforts, reproductive success of the Allens Pond Piping Plover population should continue to increase.

Sat- 35

Is it One Call or Two? Perception of Inter-pulse and Inter-call Intervals in the Gray Treefrog, *Hyla versicolor*

Joshua Schwartz (Pace University, Pleasantville, NY; jschwartz2@pace.edu)

Abstract - In choruses of anuran amphibians, in which large numbers of males advertise for mates, acoustic clutter and background noise impose complexity on the sound environment in which reception and assessment of vocalizations calls must occur. If females are to efficiently and effectively select a mate based on call features under such circumstances, they must possess a capacity to distinguish the calls of at least some males from other males. In this study, I tested whether the advertisement call was perceived by females of *Hyla versicolor* (Gray Treefrog) as different from 2 separate signals based on the duration of the interval between call pulses. The research is relevant to the possibility of categorical perception in this species and also the problem faced by females of perceptually segregating the calls of different males in close temporal proximity. Male Gray Treefrogs advertising for mates produce pulsatile calls with brief inter-pulse intervals of relatively low variability. However, among males there is broad range of inter-call intervals. Female Gray Treefrogs treat a call with an anomalously large gap between call pulses as less attractive than a call lacking such an interval. However it was unclear whether a “call” with a large gap is treated (or perceived) as a single entity (e.g., 1 call) or 2 separate calls. It seems reasonable to hypothesize that there could be gaps shorter than those commonly created by inter-call intervals that would be sufficient to elicit the latter percept. I tested this idea by offering females a choice between a 5-pulse call and 13-pulse call separated by an inter-call interval of 2s and these pulse strings separated by gaps of different shorter durations. Preliminary results suggested that perception of inter-call gaps is categorical, and the distributions of such gaps between males in choruses were consistent with this finding. However, when females were also offered a range of call alternatives designed to specifically test the hypothesis of categorical perception, its specific predictions were only sometimes met.

Sun- 29

The Effect of Increasing Water Temperature on Respiration Rate and Feeding Behavior in Nymphal Dragonflies

Rachel Silva (University of Saint Joseph, West Hartford, CT; rsilva@usj.edu) and **Kirsten Martin** (University of Saint Joseph, West Hartford, CT; kirstenmartin@usj.edu)

Abstract - The purpose of this experiment is to observe how water temperature influences respiration rate and feed behavior of nymphal dragonflies. The reason we chose nymph dragonflies is that they are an important component of the freshwater habitats they occupy, and if changes in water temperature, which are predicted to occur with climate change, effect the dragonfly population, then there could significant implications for other insects that dragonflies normally prey upon, which may cause a serious disturbance in the ecosystem. Two age classes of dragonfly nymphs will be used. Three dragonflies from both age classes will be placed in 3 different water temperatures and will be presented with a black target to represent a prey. We will record the number of strikes made by the nymphs upon the targets. In the respiration experiment, individual dragonfly nymphs will be placed in one of the temperature treatments for 10 minutes. Respiration rate will be recorded as a measure of spiracle movement over a 5-minute observation period. It is hypothesized that increasing water temperatures due to climate change will result in increased respiration rate and increased feeding behavior.

Sun- 2

The Campus Flora Project: Natural History for Research, Teaching, and Conservation

Andrea L. Silvestri (Green Mountain College, Poultney, VT; silvestria@greenmtn.edu) and James H. Graves (Green Mountain College, Poultney, VT; gravesj@greenmtn.edu)

Abstract - Can the study of natural history reduce the rapid loss of biodiversity on Earth? The Global Strategy for Plant Conservation provides a good roadmap. Colleges, universities, and schools are in a good position to contribute to the strategy's 5 objectives: (1) documenting plant diversity, (2) conserving species, (3) promoting sustainable use, (4) educating about plant diversity and its value, and (5) building capacity for implementing the strategy. One approach is the Campus Flora Project at Green Mountain College. As a framework for studying, teaching, and applying conservation biology, it links natural history to students and campus visitors. The project began in 2004, when upper-level botany students wrote the first preliminary flora, documenting 222 native and naturalized vascular plant species on campus. Today, through efforts of hundreds of students and their mentors, the known flora has grown to an annotated list of 353 species with contributed chapters on topics ranging from campus plant communities to the birds of campus habitats. More important, the Campus Flora Project is a valuable tool for teaching, research, and management. Students learn field botany and plant ecology in their role as the primary investigators for floristic inventories in botany courses, independent studies, and field days like the 2012 spring BioBlitz, with faculty and visiting botanists. Important additions to the flora include graminoid collections by botany students, comparisons of species composition in old hay and old corn fields by ecology students, riparian zone inventory by the natural areas crew, and inventory of the old hay field for a restoration experiment. As a mechanism to implement the Global Strategy for Plant Conservation, the Campus Flora Project works well. The project makes good inventory a priority, informs sustainable natural areas management as well as our initiative to landscape the campus with indigenous flora, and educates a new generation of conservation biologists. The project's longevity and the way it ties plant-related study to large-scale and long-term goals helps students see the global significance of local short-term studies.

Sat- 25

Effects of Culverts on Stream Connectivity and the American Eel (*Anguilla rostrata*) in two Hudson River Tributaries

Leela Stalzer (Vassar College, Poughkeepsie, NY; lestalzer@vassar.edu), Elise Chessman (Vassar College, Poughkeepsie, NY; elchessman@vassar.edu), Robert E. Schmidt Ph.D. (Berkshire Environmental Research Center, Bard College at Simon's Rock, Great Barrington, MA; schmidt@simons-rock.edu), and Jen Rubbo (The Environmental Cooperative at the Vassar Barns, Poughkeepsie, NY; jerubbo@vassar.edu)

Abstract - Populations of *Anguilla rostrata* (American Eel) have declined dramatically in recent years. Meanwhile, there have been increasing concerns among stream ecologists about the effects of culverts on aquatic connectivity, which can lead to habitat fragmentation and affect the dispersal of various species. The North Atlantic Aquatic Connectivity Collaborative (NAACC) has created an algorithm for determining aquatic passability scores for individual culverts. Using the NAACC protocol, we assessed culverts in 2 different tributaries of the Hudson River, the Fall Kill and the Casperkill. In order to provide empirical data for the standardized scores calculated by NAACC, we also sampled for *Anguilla rostrata* and other fish in the Fall Kill. We found that, for the most part, culverts do not act as harmful barriers in either the Casperkill or Fall Kill. Empirical data in the lower region of the Fall Kill demonstrated that the NAACC protocol can indeed be a useful tool for determining degrees of aquatic passability. A dam in the Fall Kill is likely a larger barrier to fish dispersal than are the culverts. Data collected regarding eel size agreed with prior research on size-influenced density-based migration and may indicate that eel densities along the Fall Kill are affecting eel sex ratios. Future studies could investigate further the harmful effects of the Fall Kill dam on American eel dispersal and fish species diversity, compare results in the Fall Kill with results in a more-rural or less-polluted area, or research more thoroughly the impacts of substrate type and amounts in non-perched culverts.

Sun- 34

Trophic Position of Invasive Asian Shore Crabs at Sites with Differing Prey Densities in Southern New England

Tyler Tedesco (Bridgewater State University, Bridgewater, MA; ttedesco@student.bridgew.edu), **Victoria Frew** (Bridgewater State University, Bridgewater, MA; vfrew@student.bridgew.edu), Samantha Sawyer (Bridgewater State University, Bridgewater, MA; s1sawyer@student.bridgew.edu), and Christopher P. Bloch (Bridgewater State University, Bridgewater, MA; cbloch@student.bridgew.edu)

Abstract - *Hemigrapsus sanguineus* (Asian Shore Crab) is a widespread and successful invasive species in rocky shore ecosystems on the east coast of the United States. After establishment, populations of this species increase nearly exponentially and simultaneously drive populations of their preferred prey nearly to local extirpation. Laboratory studies have shown that the species consumes both animal tissue (preferred) and algal tissue. The diet affects energetics and reproductive output because algae have a lower energy content than animal prey. It is hypothesized that as the Asian Shore Crab depletes its preferred, more energy-rich food source, it will resort to a more herbivorous diet. We took soft-tissue samples from Asian Shore Crabs as well as several putative prey species that were collected at 10 sites in Massachusetts and Rhode Island, and also recored the relative abundances of the crabs and prey species from these sites. Stable isotope ratios were used to establish the trophic position of each individual. It is expected that individuals present at sites where the preferred prey species have been depleted will have nitrogen isotope concentrations more consistent with an herbivorous diet. Efficient invasive predators may experience sharp declines in population density after depleting preferred prey and resorting to alternative food sources.

Sun- 38

First Steps in a Watershed-Scale Project to Examine and Mitigate Road Mortality for Amphibian and Reptile Populations

Michael W. Tierney Jr (Pace University, Pleasantville, NY; mt24348p@pace.edu), Matthew Aiello-Lammens (Pace University, Pleasantville, NY; maiellolammens@pace.edu), John Cronin (Pace University, Pleasantville, NY; croninohudson@gmail.com), Nadya Hall (Pace University, Pleasantville, NY; nh16682p@pace.edu), Eric Lind (Constitution Marsh Audubon Center and Sanctuary, Cold Spring, NY; elind@audubon.org), Norman Sanchez (Pace University, Pleasantville, NY; ns57224p@pace.edu), Joshua J. Schwartz (Pace University, Pleasantville, NY; jschwartz2@pace.edu), and Christina Thomas (Pace University, New York, NY; ct11673p@pace.edu)

Abstract - Multiple stressors negatively impact species and ecosystems throughout the Hudson River Estuary watershed. Understanding these impacts helps resource managers make plans that protect species, communities, and habitats. For reptiles and amphibians in particular, road mortality can decrease a population's viability. This is especially true in the lower Hudson region, where human population density and development are high. Road culverts, installed to divert water and reduce flooding, may provide habitat connections that reduce road mortality. However, the role culverts play in our region is understudied. This project represents the preliminary steps in a larger, longer-term project that will address this lack of knowledge. During the summer of 2016, we captured and tagged 118 turtles near the source of Foundry Brook, in Cold Spring, NY, to study mortality rates of turtle populations living in a wetland habitat bisected by a major road. Data collection will continue this coming summer. To gain insights into how this roadway, and roadways in our region more generally, affect populations of amphibians and reptiles, we constructed 3 demographic models to simulate different population-level impacts: no road (simulated as an undivided population), a road that does not increase mortality (simulated as 2 populations), and a road that does increase mortality (simulated as 2 populations with decreased survival rates). We parameterized our models using values from the literature. After taking the road into account, the average population size was approximately 10% smaller, and considering both the road and increased mortality we can see a decrease of approximately 20–25% in size. Because of the conditions of culverts at this site, we believe it is not adequately connecting the habitat. Future mortality surveys will help us answer this question. Our larger goal for this project is to observe, analyze, and suggest ways to improve ecosystem connectivity for amphibian and reptile populations in the lower Hudson watershed. Other research has shown that appropriate culvert design and placement can enhance connectivity and should be implemented based on site-specific data. We will use population modeling informed by our own field observations and information culled from the literature to achieve this goal, and the present work represents our first step.

Sun- 30

Habitat Association of Northern Water Snakes Along the Urban–Rural Gradient

Jacqueline Toomey (Bridgewater State University, Bridgewater, MA; jtoomey@student.bridgew.edu), Sarah Jones (Bridgewater State University, Bridgewater, MA; s9jones@student.bridgew.edu), Emily Donahue (Bridgewater State University, Bridgewater, MA; edonahue@student.bridgew.edu), and Thilina Surasinghe (Bridgewater State University, Bridgewater, MA; tsurasinghe@bridgew.edu)

Abstract - *Nerodia sipedon* (Northern Water Snake [NWS]) inhabits aquatic habitats throughout North America, including eastern North America as well as parts of the Great Plains. NWS is a common, broadly distributed colubrid snake that is considered a habitat generalist. Recent studies have suggested that even common species may suffer population declines or loss of fitness in built-up, anthropogenic landscapes. Moreover, little research has been done on distribution patterns of NWS across different land-use land-cover types in the northeastern US. Through a field survey in southeastern Massachusetts, we investigated habitat associations of NWS at both urban and rural locations. We recorded several microhabitat features at sites where the snakes were found. We also collected the same set of microhabitat data in locations where the snakes were not found. Although a greater number of snakes (14) were encountered in urban than in rural landscapes (12), relative abundance did not differ significantly (permutation ANOVA: $F = 0.54$, $P > 0.05$). Moreover, the relative abundance of these snakes did not vary significantly across different types of aquatic habitats (permutation ANOVA: $F = 0.13$, $P > 0.05$). We also observed no significant trends in microhabitat use ($F = 0.72$, $P > 0.05$). Based on a discriminant function analysis, we found substantial differences in microhabitat features where NWS was present versus absent. Presence of snakes were positively associated with lower substrate and ambient temperatures, lower relative humidity, close proximity to water, and sparse canopy. Our results indicated that NWS is a habitat generalist that may be adapted to tolerate anthropogenic stressors, and even thrive in built-up environments. All NWS were captured within 0.45 m of standing water, suggesting heavy reliance on an intact riparian zone for facilitation of life-history activities, particularly for foraging and thermoregulation. Our findings will provide insights on managing aquatic landscapes to maintain optimal conditions for conservation of semi-aquatic snakes, and allow NWS populations to persist in urbanized locales. Urban environments suffer substantial loss of disturbance-sensitive species (e.g., forest specialists); thus, such diversity-impooverished habitats may suffer loss of functional integrity. Maintaining a healthy population of species that can tolerate impacts of urbanization, such as NWS, may partially preserve vital ecosystem processes.

Sat- 13

Tree Seedling Dynamics and Restoration in Response to a Simulated Emerald Ash Borer Outbreak

Catarina N. Torres (Stevenson University, Owings Mills, MD; ctorres@stevenson.edu), Samantha M. Paulus (Stevenson University, Owings Mills, MD; spaulus@stevenson.edu), Rebecca L. Bernacki (SUNY Brockport, Brockport, NY; becca.bernacki@tetratech.com), and Mark D. Norris (Stevenson University, Owings Mills, MD; mnorris@stevenson.edu)

Abstract - The non-native pest *Agrilus planipennis* (Emerald Ash Borer [EAB]) has been spreading throughout the Great Lakes region, altering the composition, structure, and functioning of *Fraxinus* (ash) stands. In western New York, EAB has had a substantial impact given that ash trees comprise approximately 20% of forest trees, with many stands dominated by ash. Here we examine the responses of forest seedlings to (1) simulated outbreaks of EAB, and (2) a restoration effort. In 2012, six ash-dominated stands were identified in which we established a control plot with uninfested ash trees and an adjacent plot in which all ash trees were girdled, simulating an EAB outbreak. Three seedlings of both ash and a non-ash species were identified in each control and girdled plot. We measured rates of photosynthesis under ambient conditions to compare ecophysiological responses in these 2 habitats. In 2016, we transplanted seedlings of native *Acer rubrum* (Red Maple), *Cornus amomum* (Silky Dogwood), and *Lindera benzoin* (Spicebush) into half of 4 girdled plots, with a random subset protected by seedling tubes, and monitored them for survival and growth. Tree canopy in the girdled plots has been reduced 53%, and the microclimate has become correspondingly warmer though with inconsistent soil moisture impacts. With the canopy reduction, understory cover increased 70%. In the girdled plots, seedling photosynthesis averaged 78% greater (5.2 mmol CO₂/m²/sec) than in the control plots (2.9), with consistent patterns across ash and non-ash species. Reduced light availability in the control plots was the driver of this pattern and explained 83% of the variation in photosynthesis rates. In the restoration project, nearly 300 seedlings were transplanted. Initial mortality rates were low but varied with respect to the presence of seedling tubes which reduced browsing and possibly altered seedling microenvironment. Given the compensatory growth in the understory of the girdled plots, the performance of seedlings will be critical in forest development but are thus far limited by recruitment. We are hopeful that a minimal restoration effort as described here will hasten tree community development and combat the increased prevalence of non-native plants in the simulated EAB plots.

Sun- 20

Screening and Optimizing Microsatellite Loci for Genotyping *Formica* ants

Merin Varghese (SUNY Geneseo, Geneseo, NY; mv15@geneseo.edu) and **Jennifer L. Apple** (SUNY Geneseo, Geneseo, NY; applej@geneseo.edu)

Abstract - *Formica* ants are a major component of the invertebrate community in SUNY Geneseo's Roemer Arboretum, with nest mounds numbering in the hundreds. Genotyping individuals within these nests offers insight into their population structure. Microsatellites are genetic markers that can be used to genotype individuals within colonies. Highly polymorphic microsatellite loci are advantageous because they provide data that can be used to easily distinguish individuals within a population. Currently, our lab uses 4 markers developed for ant species not found in the Arboretum but related to our *Formica*. It would be beneficial to have more loci that could replace any that perform suboptimally and to generally increase the resolution of our data. The objective of our study is to screen published microsatellite loci for *Formica* ant species in order to assess their utility in describing genetic variation in local ant species. We performed PCR amplifications on a small number of samples with each of 6 new microsatellite primers to see if they yielded products, and employed gradient PCR programs to find optimal annealing temperatures. All tested loci amplified in our samples were subsequently amplified using fluorescently labeled primers in order to be sent out for fragment analysis to assess whether the microsatellites were reasonably polymorphic. With more highly polymorphic loci, our lab will enhance its power to detect genetic differences and to estimate genetic variation within and between the colonies of ant species of this common genus.

Sun- 5

Why Squirrel-Proofing Your Feeder Often Isn't Permanent: How Squirrels Learn to Overcome Obstacles

Karli Walczewski Searle (Central Connecticut State University, New Britain, CT; Karli_00@snet.net) and **Sylvia Halkin** (Central Connecticut State University, New Britain, CT; Halkins@ccsu.edu)

Abstract - Numerous "squirrel proof" products exist for frustrated bird enthusiasts whose feeders have been robbed by squirrels. Given time, many of these products eventually become ineffective as squirrels learn to surmount them. It seems that squirrels are able to learn to overcome nearly any obstacle presented to them, especially those that block a food source. We catalogued the process by which squirrels prevailed over obstacles that blocked access to a feeder, to determine the learning methods they used. We conducted this research at a residence in New Britain, CT, between October 2014 and July 2015. Free ranging *Sciurus carolinensis* (Eastern Gray Squirrel) first learned to access a feeder box, and then to ascend a ramp, chain, or rope leading to the feeder box. Various obstacles were also added between the ramp and the feeder box, including tubes squirrels went over or through, and a spinning "windmill" apparatus. Many of the 9 obstacles used in this study had attributes of objects squirrels may encounter in natural and urban settings. Obstacles were only available to squirrels when an observer was present and video recording the behavior of each squirrel that came in contact with the obstacle. Some squirrels were able to traverse novel obstacles on their first attempt; others required multiple attempts. Once squirrels had learned to use the ramp, most obstacles were mastered by the majority of squirrels in just 3-5 trials. One squirrel persisted for 34 trials before it overcame the windmill obstacle, though another succeeded on its first trial. Some individual squirrels typically were first or second to make it through or around new obstacles, while others had success only after 3 or more other squirrels had done so, and some varied in this respect. Trial-and-error learning seemed to be most common. We also found some evidence of insight and learning-set learning, and circumstantial evidence for observational learning.

Sun- 11

Endangered Species Conservation in the Northeast Through the Cooperative Endangered Species Conservation Fund

Kyle Welsh (US Fish and Wildlife Service, Hadley, MA; kyle_welsh@fws.gov) and **Sadie Stevens** (US Fish and Wildlife Service, Hadley, MA; sadie_stevens@fws.gov)

Abstract - The Cooperative Endangered Species Conservation Fund (Section 6 of the Endangered Species Act) Grant Program is administered by the US Fish and Wildlife Service and provides grants to states for conservation actions on non-federal lands for listed species. Within this fund, the Conservation Grants program (traditional endangered species grants) provides funding for the implementation of conservation projects, including: habitat restoration, species status surveys, outreach, captive propagation and reintroduction, genetic studies, and development of management plans. The Conservation Grants program is a Federal–State partnership, and in the Northeast Region, funding is distributed among proposed projects based on State and Regional recovery priorities. Unfortunately, the amount of funding allocated for these grants does not meet all state conservation needs, and as a result, proposed projects for many species remain partially or completely unfunded each year. For example, only enough funding was allocated for 37% of requests in 2016, and the funded projects targeted less than half of the 112 endangered species within the Northeast Region. To understand the impact of this grant program on endangered species conservation in the Northeast, we summarized traditional endangered species grant awards over 28 years. We also conducted interviews with state agency staff to assess the impact of the funding, as well as the fate of proposed projects not receiving grant funding. We compared the species that were awarded funding to those that were not to determine if some species, or taxonomic groups, received funding priority in the Northeast. We also assessed species funding trends over 28 years to determine Section 6 funding consistency. By understanding how species are prioritized for grant funding, conservation agencies can better meet the conservation needs of target species. Understanding potential trends in species funding could be particularly useful for allocating discretionary grant funding within the Conservation Grants program.

Sun- 39

Effects of Resource Availability on Fecundity of Asian Shore Crabs (*Hemigrapsus sanguineus*) in Rocky Intertidal Habitats of Southern New England

Selina Westberg (Bridgewater State University, Bridgewater, MA; swestberg@student.bridgew.edu), **Nicole Huff** (Bridgewater State University, Bridgewater, MA; nhuff@student.bridgew.edu), **Jocelyn Rua** (Bridgewater State University, Bridgewater, MA; jrua@student.bridgew.edu), and **Christopher P. Bloch** (Bridgewater State University, Bridgewater, MA; cbloch@bridgew.edu)

Abstract - *Hemigrapsus sanguineus* (Asian Shore Crab) is a common and widespread invasive predator in rocky intertidal habitats of the northeast coast of the United States. After colonization, their populations increase nearly exponentially, and they rapidly deplete populations of preferred animal prey (e.g., *Mytilus edulis* [Blue Mussel]). Thereafter, they may need to resort to a more herbivorous diet, which is less energy-rich. It is hypothesized that the diet of Asian Shore Crabs will affect both fecundity (number of eggs produced per clutch) and quality of their eggs. Egg samples were collected from Asian Shore Crabs that were gathered at 3 sites in Massachusetts and Rhode Island. We measured carapace widths and estimated the number and average diameter of eggs produced by each crab. Results suggest a positive relationship between body size and both quantity and quality of eggs, but further research will be necessary to establish a link between fecundity and density of preferred prey.

Sun- 37

A Fine-Scale Examination of Abiotic Factors that Correlate with Growth of *Larix laricina* in an Adirondack Peatland

Alex Whiston (Paul Smith's College, Paul Smiths, NY; awhiston@s.paulsmiths.edu), **Andre-Anne Chenaille** (Paul Smith's College, Paul Smiths, NY; achenaille@s.paulsmiths.edu), **Dave Nardelli** (Paul Smith's College, Paul Smiths, NY; dnardelli@s.paulsmiths.edu), Alex Whiston (Paul Smith's College, Paul Smiths, NY; awhiston@s.paulsmiths.edu), Andre-Anne Chenaille (Paul Smith's College, Paul Smiths, NY; achenaille@s.paulsmiths.edu), Dave Nardelli (Paul Smith's College, Paul Smiths, NY; dnardelli@s.paulsmiths.edu), Chloe Mattilio (Paul Smith's College, Paul Smiths, NY; cmattilio@paulsmiths.edu), Robert DeSotle (Paul Smith's College, Paul Smiths, NY; rdesotle@s.paulsmiths.edu), Erik Yankowsky (Paul Smith's College, Paul Smiths, NY; eyankowsky@s.paulsmiths.edu), and Celia Evans (Paul Smith's College, Paul Smiths, NY; cevans@paulsmiths.edu)

Abstract - Many studies have assessed factors that affect wetland community structure at broad scales; however, less work has focused on fine-scale relationships between communities or individual plant species and environmental gradients in peatlands. We have previously explored how abiotic factors along these gradients within peatlands impact the establishment of *Larix laricina* (Eastern larch) seedlings. However, it is unclear if these abiotic factors are also related to growth of Eastern Larch along these gradients. We measured pH, depth to groundwater, water temperature, and canopy closure in 42 plots along 6 transects in an Adirondack peatland. To understand Eastern Larch growth rates, we recorded height and periodic annual increment from 1 sapling per plot. Needles were also collected before and after needle drop from these saplings for nutrient analysis. Additionally, we removed 3 seedlings from each plot to explore carbon allocation to roots, shoots and needles. Correlation analysis was used to understand relationships between abiotic variables and periodic annual increment growth, nutrient levels, and root:shoot ratios. We found that height growth in Eastern Larch seedlings was negatively correlated with depth to groundwater. Age:height ratio was also negatively correlated with canopy closure, indicating that for trees of a given age, shorter ones existed in areas of high light exposure. Nitrogen and phosphorus levels increased with canopy closure, while carbon:nitrogen ratios decreased with greater canopy closure and increased with depth to groundwater. Finally, it did not appear that Eastern Larch allocates biomass specifically to roots, shoots, or needles in a manner correlated with any of the measured abiotic variables. Overall, variables that relate to establishment of Eastern Larch in peatlands appear to be different from those that correlate with growth. We hypothesize that nutrient availability is the strongest determining factor in growth of Eastern Larch at a fine-scale. Lower nutrient content of needles in saplings toward the center of the peatland and higher C:N ratios are suggestive of this. However, future nutrient-content analysis in seedling needles may offer further insight to understand the relationships between abiotic variables and growth.

Sat- 42

Chloride and Heavy Metals in Natural and Impounded Water Bodies of Allegany County, NY

James M. Wolfe (Houghton College, Houghton, NY; james.wolfe@houghton.edu), Alison Apgar (Houghton College, Houghton, NY, Alison.apgar@houghton.edu), Natalia Cabrera-Febres, (Houghton College, Natalia.cabrera-febres@houghton.edu), Hawa-Dorcas Coulibaly (Houghton College, Hawa-Dorcas.Coulibaly@houghton.edu), Alyson DeMerchant (Houghton College, Alyson.DeMerchant@houghton.edu), Daniel Hammers (Houghton College, Houghton NY, Daniel.hammers@houghton.edu) Andrew Hutton (Houghton College, Houghton, NY, Andrew.hutton@houghton.edu), and Evan Stern (Houghton College, Evan.stern@houghton.edu)

Abstract - Since 2104, we have been monitoring chloride levels in natural and impounded water bodies across Allegany County, which has a low population density (48 people/square mile), using a Seal AQ2 multichannel analyzer. We also have begun a study of heavy metal concentrations in water and sediments from the same water sources by atomic absorption spectrophotometry. Chloride concentrations from winter 2016 were lowest (1.82 mg L^{-1}) in more remote water bodies (e.g., Moss Lake) and higher ($13.5, 7.2 \text{ mg L}^{-1}$) in lakes nearer to roads and human residences (Rushford Lake, Cuba Lake). In winter 2016, levels were slightly different between February and April samples. A similar pattern was seen for samples taken in winter 2017. Higher concentrations of chloride were found for winter 2014 as compared to 2016 and 2017, suggesting that winter severity (and the intensity of road salt application) influences levels in wetlands and lakes. We also report on the levels of heavy metals (iron, lead, copper, and zinc) from water and sediment samples, which we hypothesized would reflect previous human impact.

Sat- 5

Using Goats to Control Invasive Plant Species

McKenzie Wybron (The College at Brockport, Brockport, NY; mwybr1@u.brockport.edu), Kira Broz (The College at Brockport, Brockport, NY; khans3@u.brockport.edu) Kathryn Amatangelo (The College at Brockport, Brockport, NY; kamatang@brockport.edu), Marcie Desrochers (The College at Brockport, Brockport, NY; mdesroch@brockport.edu), and Lori-Ann Forzano (The College at Brockport, Brockport, NY; lforzano@brockport.edu)

Abstract - Invasive species decrease environmental biodiversity and take over habitats by outcompeting the native species for essential resources. A potential non-toxic method of invasive species removal is using *Capra hircus* (Goat) or *Ovis aries* (Domestic Sheep) to graze in areas with invasive species to thin the density of invasive species. We investigated if Goats reduce invasive species biomass in the short term, if Goat herbivory reduces invasive species survival long-term, and if Goats have a detrimental effect on valuable native species during control efforts. We selected 3 treatment and 3 control plots from North Hampton Park in Brockport, NY. Six goats were introduced to the treatment plots for 2-hour sessions for a total of 3 days on each plot. We recorded initial and final measurements of percent cover, percent stem and leaf herbivory, and height of native and invasive. Goats ate both native and invasive shrubs in the treatment plots but preferred the native species over the invasive species. After two years of grazing, the Goats reduced species richness in the understory of the plots. In the short term, Goats reduce the survival rate of the invasive species, but in the long term, the invasive species grow back, making them a non-effective method of control.

Sat- 27

Functional Assessment of Several Freshwater Wetlands in the Mianus River Watershed

Isabela M. Yepes (Mianus River Gorge, Bedford, NY and Carmel High School, Carmel, NY; isabelayepes@yahoo.com)

Abstract - Natural wetlands contribute to ecosystem biodiversity and can improve the drinking water quality of a watershed. Unfortunately, wetlands are consistently under threat from invasive species, pollutants, and proximity to urbanization. In order to protect wildlife and improve the state of a watershed, current problems in a wetland's ecological health and functional performances must be identified. Individual assessments have yet to be made for the 23 wetlands within the watershed of the Mianus River, located in southeastern New York and western Connecticut. The Mianus River is a critical drinking water source for the communities of Greenwich, Stamford, Port Chester, Rye, and Rye Brook. Thus, the goal of the study was to measure the overall ecological health and functional performances of these important components of the watershed. The wetlands were assessed using a hydrogeomorphic (HGM) approach which accounts for hydrology, vegetation, geology, and other related variables. The collected data was grouped and quantified using an index score model that indicates the potential of each wetland to perform the respective function. The results indicate that for measures of ecological health, all 23 of the wetlands had above average or moderate general biodiversity (index score of >0.5), 19 of the 23 wetlands had high contribution to abundance and diversity of wetland vegetation (index score of >0.75), and 7 of the 23 wetlands had high contribution to abundance and diversity of wetland fauna (index score of >0.75). As for notable function conditions, all the identified wetlands substantially modified water quality in wetland (index score of >0.5). Therefore, most of the wetlands in the Mianus River's Watershed show moderate to high biodiversity, and all significantly modified water quality. As the first assessment to provide valuable information on the state of specific wetlands in the Mianus River's watershed, the results of this study help to better address conservation important to maintaining ecological balance, provide targets and priorities for conservation and advocacy, and, ultimately, provide peace of mind for local residents that rely on the clean drinking water.

Sun- 26

Comparing Intraspecific and Interspecific Competition of Spotted Knapweed (*Centaurea stoebe* L. subsp. *micranthos*) and Orchardgrass (*Dactylis glomerata*)

Maria A. Zambuto (Stony Brook University, Stony Brook, NY; maria.zambuto@stonybrook.edu)

Abstract - I compared competition both intra- and interspecifically of *Centaurea stoebe* L. subsp. *micranthos* (Spotted Knapweed) and *Dactylis glomerata* (Orchardgrass) through a greenhouse trial with a target-neighbor experimental design. This experiment was an extension from my previous pilot study. Target individuals were centrally planted with various setups of 0, 2, 4, or 6 neighboring individuals to observe competitive effects and responses. Intra- and interspecific trials revealed that *Centaurea stoebe* was more affected by itself as a neighboring plant, than by *Dactylis glomerata* as the neighboring plant(s). *Dactylis glomerata* appeared to grow equally poorly with either species as the neighboring plant(s). As expected, both species performed better when grown without neighbors; however, it was interesting to highlight the differences when comparing the average biomasses of each species. This experiment shed light on the competitive effects and responses of *Centaurea stoebe* and calls for more research in other competitive environments.

Sat- 21