

Influence of Sex and Establishment Period on Site Fidelity of *Calopteryx maculata* (Ebony Jewelwing)

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Abstract - Site fidelity, the behavior of an individual returning to a previously occupied site, is prevalent among many species (Switzer 1997). Studies have shown that site fidelity is impacted by reproductive fitness. Mature species have been recorded frequenting the same breeding area yearly. Male individuals among bird species that are highly migratory have a tendency of being site-faithful. We investigated the ability of adult *Calopteryx maculata* (Ebony Jewelwing) to express site fidelity at South Brook, Bridgewater MA. We predicted that older, male Ebony Jewelwings will show higher site fidelity than females and younger males. We captured 44 Ebony Jewelwings with a mesh net from various locations along a 375-m section of South Brook from July to August 2015. Established individuals consisted of damselflies marked during a previous visit to the study area. These damselflies were tagged with red, white, or green markers. Damselflies that had no markings on a given sample day were considered either newly emerged or recently arrived and were tagged with a yellow marker. Each specimen was removed from their immediate environment and translocated to a designated release site within 52 to 160 m from their capture zone. A total of 44 individuals were transported from the stream to the release site. Data showed 40% of both groups of Ebony Jewelwings (18 of 44) returned to the stream. Male damselflies showed greater site fidelity than females with 61% return (males = 11, females = 7). Yet data show that female damselflies also exhibit site fidelity. Thirty-five newly marked damselflies (yellow), both male and female, were released in comparison to only nine previously marked damselflies (red, green, white). However, we found a higher ratio of previously marked damselflies returning to the stream and to their original site. Maturity and sex of the Ebony Jewelwing seemed to influence the site-fidelity behavior.

Sat- 8

Biological Inventory of a Rock Band's Cross Country Road Trip using iNaturalist

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Abstract - Within the last few decades, the emphasis on natural history has diminished in the Biological Science curriculum. Students enrolled in college are no longer required to take natural history courses in order to receive their degree and are often lacking in important taxonomic skills that are essential in botanical and wildlife ecology careers. Natural history helps us better understand the distribution and abundance of organisms as they relate to their biogeography, life-history characteristics, and response to their surroundings. During the months of July–August 2015, I embarked on a cross country road trip of the United States, as part of a rock band tour. Along the way, I curated primarily plant specimens for SUNY Plattsburgh using plant-pressing and smartphone technology (iNaturalist app) techniques. Out of a total 184 observations, the majority of observations were of *Plantae* (78%), followed by *Insecta* (8%), *Reptilia* (5%), *Mammalia* (3%), *Fungi* (3%), *Amphibia* (1%), *Arachnida* (1%), *Aves* (1%), and *Mollusca* (1%). Among plant families in which observations occurred >2 times, the most common were *Cactaceae* (22%), *Asteraceae* (12%), *Pinaceae* (12%), *Asparagaceae* (10%), *Brassicaceae* (8%), *Cupressaceae* (6%), *Fabaceae* (6%), *Fagaceae* (6%), *Oleaceae* (6%), *Onagraceae* (6%), and *Sapindaceae* (6%). Geospatial data were imported into ArcMap and deeper investigation across ecotypes were made. Overall, this cross-country natural history immersion experience fostered my appreciation for curation and technology. I gained valuable experience in plant and invertebrate identification, with the help of field guides, participating iNaturalist curators, and scientific professionals. My confidence in using technology as a tool to curate and share observations through a citizen science network, as well as further develop skills in GIS were achieved. There are many opportunities for students and interested stakeholders to become citizen sensors while pursuing adventures in their daily lives.

Sat- 27

Can the Federally Endangered American Burying Beetle be Reintroduced in New York?

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Abstract - *Nicrophorus americanus* (American Burying Beetle [ABB]) is a federally endangered beetle that has been extirpated from the state of New York. The US Fish and Wildlife Service recovery plan (1991) includes identification of potentially suitable reintroduction sites along the northern periphery of its historic range. Similar species in the *Nicrophorus* genus have sympatric distribution and act as surrogates for ABB to assist in the recovery effort. We evaluated burying beetle communities and physical condition in 2 habitat types in central New York that could potentially serve as future reintroduction locations. Study sites included a pine barren forest with well-drained sandy-loam soils at The Albany Pine Bush Preserve (APBP) and a mixed hardwood/coniferous forest comprised mostly of silty-loam soils in Charleston State Forest (CSF). During the months of June–August 2015, a total of 5 *Nicrophorus* beetle species were captured at these sites including *N. orbicollis*, *N. tomentosus*, *N. sayi*, *N. pustulatus*, and *N. vespilloides*. Over 24 trap nights at CSF, trap-night frequencies were: *N. orbicollis*, 0.48 ($n = 281$), *N. pustulatus*, 0.04 ($n = 27$), *N. tomentosus*, 0.47 ($n = 299$), *N. sayi*, 0.06 ($n = 42$), and *N. vespilloides*, 0.01 ($n = 8$). Over 29 trap nights at APBP, trap-night frequencies were: *N. orbicollis*, 2.00 ($n = 383$), *N. tomentosus*, 2.95 ($n = 717$), and *N. sayi*, 0.009 ($n = 3$). Large populations of *N. orbicollis* were recorded at both sites, indicating suitable habitat for ABB. Beetle pronotum width was greater at APBP, indicating that this habitat may be more suitable for reintroduction. Both habitat types appear to be capable of supporting large burying beetle taxa. However, remaining pine barrens in the northeast are reduced and fragmented, while mixed forest habitat represents a much larger contiguous area. Therefore, mixed forest habitat may be a more viable choice for a reintroduction effort. Surveys will be continued in 2016 to further evaluate habitat suitability.

Sun- 7

Microbial Community Response to a Salinity Disturbance Event

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Abstract - Tidal freshwater wetlands (TFWs) are unique wetland ecosystems located around river estuaries, and are regulated in part by ocean tidal cycles, which regularly expose them to low saline conditions. TFWs, in part due to their exposure to saline conditions, are able to carry out a diverse range of nutrient-cycling activity, including denitrification at levels substantially higher than other freshwater wetland systems. Rising sea levels caused by climate change has increased the vulnerability of TFW systems to the effects of saltwater intrusion (SWI). Increased saline conditions are known to have negative impacts on the structure and function of wetland systems, especially in relation to nutrient cycling. Microbial communities and nitrogen cycling are among some of the most negatively impacted components of systems affected by salinity gradients. Winogradsky columns are effective tools for modeling microbial communities to study their structure and functionality. Here we make use of 16s gene surveying to examine the effects of mechanical and salinity disturbance events on mature Winogradsky column communities. We expect bacterial communities in disturbance treatment columns to show distinct organization from that of undisturbed columns. Additionally, communities from the salt disturbance treatments are expected to show significantly lower populations of nitrogen cycling bacteria, due to the negative effects that saline conditions have on nitrogen cycling levels. Comparing the communities across timepoints, we expect 2 possible models of change. In the first, disturbed communities will show the greatest degree of difference from the control community immediately following the disturbance event, and at later timepoints will more closely resemble the control community. Alternatively, disturbed communities may continue to differentiate from the control communities over time, steadily increasing their degree of difference.

Sat- 26

The Effect of Invasive Shrubs on Soil Carbon Dioxide Emission Rates Compared to Native Dogwood

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Abstract - When introduced into a new environment, invasive shrubs often face little resistance and may thrive by promoting a microbial community foreign to the native soil environment. These microbial changes alter the soil's properties, resulting in the surrounding soil becoming more suitable for these invasive species. The Spencer J. Roemer Arboretum at SUNY Geneseo harbors 3 invasive shrubs, *Lonicera maackii* (Amur Honeysuckle), *Rhamnus cathartica* (Common Buckthorn) and *Elaeagnus umbellata* (Autumn Olive), which compete with a native shrub, *Cornus racemosa* (Gray Dogwood). The purpose of this study was to determine the effect of these 3 invasive shrubs on the CO₂ emission rates of the surrounding soil. In addition, we measured abiotic factors like soil temperature and pH. We recorded CO₂ emission rates using the soda lime method and performed these tests at 2 separate time periods using 10 shrubs of each species. Our results determined that soils beneath the invasive species Autumn Olive, a nitrogen-fixing shrub, had the highest CO₂ emission rates, followed by Amur Honeysuckle and Common Buckthorn. Soil beneath the native shrub Gray Dogwood had a significantly lower CO₂ emission rate than any of the invasive shrubs. The pH and temperature of the surrounding soil beneath these shrubs differed significantly. These significant differences in CO₂ emission rates may reflect the differences in decomposition that can occur when invasive species are introduced. These changes in decomposition can potentially alter the cycling of nutrients in the soil and result in an environment that fosters the establishment and growth of invasive species over natives.

Sat- 4

***Sparganophilus* Populations Compared to Non-native Earthworm Populations in Ponds and Stream Banks**

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Abstract - The colonization of forest ecosystems by non-native earthworms across northern North America has been well documented; however, their distribution and abundance is still not well known in riparian habitats within these ecosystems. Additionally, populations of native earthworms in these habitats are also poorly studied. The purpose of this research was to examine populations of earthworm species along shores of ponds and streams. Our study sites were located on the Helderberg Plateau (Albany County, NY) and in headwater habitats that drain directly into the Hudson River (Columbia County, NY). The native *Sparganophilus* dominated along the banks of both ponds and streams. Along pond shorelines, we found an average of 20 *Sparganophilus* individuals, compared to a single *Lumbricus castaneus* being located from all of the sample sites. Stream banks showed a similar trend. An average of 13 *Sparganophilus* were found along stream banks, while one *Eiseniella tetraedra* individual and one unidentifiable juvenile were found in the stream habitats. Although this work is preliminary, it underscores the possibility of native earthworm species having a niche available near locations where non-native species dominate much of the forest floor.

Sun- 14

Effects of Color Markings on Recaptures of *Calopteryx maculata* (Ebony Jewelwing)

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Abstract - From May to August in the summer of 2015, we captured and marked adult *Calopteryx maculate* (Ebony Jewelwing) using 3 different colors at South Brook, Bridgewater, MA. As part of an ongoing study to see if adult Ebony Jewelwings would cross anthropogenic barriers and how far they move, we needed to mark individuals and keep count of recaptures. Observations of marked wings found along the stream raised the question of whether color of the marking could be influencing predation on the Ebony Jewelwings. In this study, we tested whether color used in marking Ebony Jewelwings influenced the level of survivability. We captured a total of 501 individuals that were marked with either a red, green, or white color on their wings. Of 501 individuals marked, 236 individuals were recaptured (125 males, 111 females). Chi-square analysis revealed there was no significant difference in the number of recaptures between the 3 colors for either males or females.

Sat- 7

Riparian Control of Water Quality: Links Between Soil Microbial Community and Vegetation

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Abstract - Water quality is equally important as an indicator of aquatic ecosystem health as it is a provider of ecosystem services such as drinking water and recreation. Riparian vegetation regulates water quality by altering the amount of nutrients and sediments that enter aquatic systems through physical and biological interactions with groundwater and surface runoff (Osborne and Kovacic, 1993). Urban streams are currently compromised by reductions in riparian vegetation due to urbanization and deforestation. The riparian zones of the Fonteynkill and Casperkill creeks in Dutchess County, NY, have recently been encroached upon by human development and subjected to novel vegetative invasions. To model the regulation of stream and riparian chemistry by such changes in vegetative community structure, I combined field surveys with long-term water-quality assessments and soil microbial biomass, nutrient, and trace gas flux assays. Aquatic ammonium and nitrate concentrations were spatially heterogeneous along the Fonteynkill and Casperkill streams, with increased ammonium being correlated with the prevalence of the invasive *Ampelopsis brevipedunculata* (Porcelainberry). Total soil respiration was not different between the sites and indicated that the riparian zone productivity did not change with differences in community structure. However, the differences in community structure were correlated with different aquatic nutrient dynamics. Such results reinforce the notion that as riparian zones are encroached upon and invaded by novel species, aquatic systems may respond in unpredictable ways.

Sat- 18

Relative Impact of Flooding on Native Species and an Invasive Vine: Management Options

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Abstract - *Ampelopsis brevipedunculata* (Porcelainberry) is an aggressive invasive vine that thrives in edge environments, which are becoming increasingly common due to fragmentation of natural systems by human development. Many of these edge systems are closely associated with wetlands or riparian zones that hinder mechanical and chemical methods of species management. Anecdotal evidence suggests that Porcelainberry does not root within continuously saturated soils, rooting instead at the edge of these soils and extending over saturation-tolerant species. The current ongoing study aims to empirically determine the ability of Porcelainberry and several common native wetland and riparian species to survive and recover from soil saturation both in vitro and in vivo. If temporary soil saturation can provide a competitive advantage to the native species, seasonal damming of streams and wetland outlets during the height of Porcelainberry germination might aid efforts to prevent Porcelainberry encroachment into valuable natural spaces.

Sat- 5

Streamside Environmental Factors and Occurrence of Breeding Behaviors of *Calopteryx maculata* (Ebony Jewelwing) in South Brook

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Abstract - Adult *Calopteryx maculata* (Ebony Jewelwing) of South Brook, Bridgewater, MA, were monitored from May to August 2015 to study their movements and breeding behaviors. Four 15-m zones were monitored for territorial and breeding behaviors. These zones had high densities of Ebony Jewelwings, representing 38% and 28% of total individuals ($n = 623$ and 504) marked during the summer of 2014 and 2015, respectively. Females are known to prefer to mate with males that have a higher thorax temperature, and warmer males tend to be more aggressive at warmer temperatures. Males have been observed defending their territories up to 8 days after initial observations. We placed Hobo light and temperature probes at stream level in each of the 4 breeding zones to look for correlations between light and temperature and behaviors in the preferred breeding areas. Probes measured every thirty minutes. We monitored behaviors in each zone over a period of 20 minutes each observation day. With the exception of zone 2/3 during the peak light period, streamside light and temperature was not significant between zones. A strong significant positive correlation between the numbers of oviposit plants and total observed behavior was noted. There was an observed strong positive correlation between female ovipositing and plant density. Observed total activity peaked in mid-July followed by a drop off in every zone except for zone 4, and correlated with a drop off in stream discharge. Zones of local higher temperature tended to have a higher amount of observed breeding behaviors. Further analysis will determine if any correlation exists between light levels and breeding behaviors.

Sat- 6

Stable Hydrogen Isotope Analysis of American Redstart Rectrices

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Abstract - Understanding avian migration patterns between breeding, stopover, and wintering sites is crucial to develop effective conservation efforts. Stable isotope analysis is rising in popularity due to its ability to track avian migration without the use of satellites and traditional banding methods. Hydrogen isotope signatures vary by latitude due to fractionation during evaporation of ocean water. As warblers molt on their breeding grounds, the hydrogen isotope signatures representative of the area are incorporated into their growing feathers, which become inert once the molt is completed. We used a stable hydrogen isotope analysis of *Setophaga ruticilla* (American Redstart) rectrices using feather samples collected from the Powdermill Avian Research Center in Pennsylvania. We found no significant difference in δD values and migration timing between the 2 sample years (2010 and 2011). A significant difference in migratory patterns between adult male and adult female warblers was present, where males migrated before their female counterparts. This pattern may be a result of the need for females to recover after the breeding season and gain fat reserves before strenuous migration. Within female migration, juvenile females arrived at the stopover site significantly earlier than adult females. There was no significant difference between juvenile male and juvenile female timing of migration as well as adult male and juvenile male timing of migration. This pattern may be the result of competition for desirable wintering grounds by each age and sex class of American Redstarts. This information is important in the conservation of Neotropical migratory birds in light of the recent decline of many species. If scientists can connect breeding, stopover, and wintering sites, they can create conservation strategies targeting important areas for migratory birds.

Sun- 28

Quantitative Analysis of CPV Exposure in Post-Mortem Sampling of *Martes pennanti* (Fisher)

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Abstract - *Martes pennanti* (Fisher) in Vermont are seemingly at risk for exposure to Canine Parvovirus (CPV), a virus that readily mutates and thus has the ability to cross species barriers with potential to become a crisis in conservation. Due to the seclusive nature of many carnivores, most studies on parvoviruses have been on animals in captivity or non-wild environments. Data from previous years have enabled us to assess exposure to some variant of the disease and suggest increased mortality rate in the populations. This phase of the research begins to assess the exposure rate of the viral variant specific to the Fisher. All sampling has been obtained from free-ranging populations over a period of several years. Using primers developed with NCBI primer blast, we will develop protocols to amplify the VP2 capsid gene of CPV in Fisher, create standards from known positive CPV samples that will allow us to evaluate the amount of exposure through qPCR. We will evaluate the condition of the post-mortem samples through the development of a baseline using samples freshly harvested and stored in 1x PBS at -80 °C until processing. The samples will be compared to the same animal with body fluid and tissue harvested 2 months later in various stages of decomposition. This will allow us to review the current model of testing and develop further tools to enable species-specific disease assessment more readily. Results will assist wildlife biologists in monitoring the overall physiological and pathological wellness of the population by providing more data and other technical means that are not currently utilized.

Sat- 15

Impact of Predators on the Survival of Engorged *Ixodes scapularis* (Black-Legged Tick)

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Abstract - *Ixodes scapularis*, more commonly known as the Black-legged Tick, has doubled its range within the past twenty years, resulting in a near tripling of the number of human Lyme disease infections. Tick density can vary substantially from one site to the next, making the risk of contracting Lyme disease extremely variable and difficult to predict. A better understanding of what causes this variability will help us to identify high-risk areas and possibly reduce transmission. My study focuses on the impact of predators and other environmental factors on the survival of larval ticks during the vulnerable molting and winter diapause periods. Spiders in the genera *Schizocosa* and *Agelenopsis* were tested under laboratory conditions to identify potential predators of engorged larvae. In the summer of 2015, spiders were placed in soil cores with engorged Black-legged Ticks that had fed on *Peromyscus leucopus* (White-footed Mouse,) and *Tamias striatus* (Eastern Chipmunk). The cores were placed in the field under various conditions to investigate the impact of the spiders on tick survival. Significantly more ticks survived to the winter of 2016 in the non-predator cores, indicating that spiders may be capable of regulating tick densities.

Sun- 8

Habitat and Prey Density Analysis of Wood Turtles (*Glyptemys insculpta*) in Central New York

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Abstract - As part of an ongoing study of *Glyptemys insculpta* (Wood Turtle) in central New York, we frequently observed multiple individuals with snail remains on their beaks. The high calcium content of snails may be especially valuable to Wood Turtles. Our study examined the density of snails relative to identified Wood Turtle locations. We soaked replicate cardboard squares (900 cm²) in water and placed 1 m apart in 8 locations on 4 streams: 4 were centered at exact sites where Wood Turtles were located and 4 controls were placed in similar habitat where no turtles were found. Squares were left overnight then checked for slugs, snails, insects, and other organisms. We surveyed the surrounding vegetation at each site as well as stream width and flow, canopy cover, and distance from the stream and a rapid stream assessment. Our preliminary analysis shows that vegetation and habitat characters were not significantly different for both known locations of turtles and the control area suggesting that the turtles may be responding to other habitat characters. The median number of snails per sample appeared greater in the known locations (1.5 vs 1.0 snails per square), but this difference was non-significant (Mann-Whitney test $P = 0.396$). Additional study of diet and habitat is needed for this vulnerable species of special concern in NY to conserve them more effectively.

Sun- 21

Gray Squirrels Prefer Foraging in Forest Interior Over Edge

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Abstract - Squirrels are important as dispersers, and their foraging habits might play a role in determining which species of trees get their seeds dispersed in the forest. For example, *Sciurus carolinensis* (Gray Squirrel) clips nuts from the canopy and scatter hoards them in the ground to be used as a food source during winter. Overlooked nuts will sprout; thus, the foraging habits of this species might affect the future species distribution of the forest. Factors such as predation can influence location of the Grey Squirrel's foraging activities. Edges of the forest are more open to soaring avian predators, so squirrels might utilize interior sections of forests more often than edges to reduce possible threats from predators. In this study, we tested the hypothesis that Grey Squirrels avoid foraging in trees that are near the edges of the forest compared to trees that are in the interior of the forest. We tested our hypothesis by examining twenty 10 m x 10 m sections of forest containing seed-bearing trees: 10 sections at the edge and 10 sections in the interior of the forest. As a proxy for foraging activity, we counted seeds, nuts, and empty shells around the base of trees in each 10 m x 10 m section. We found higher levels of foraging activity in interior sections compared to sections at the edge of the forest. The results of this study suggest that that squirrels prefer foraging in trees located in the interior of the forest rather than at edges, perhaps due to differences in predation risk. Our findings provide evidence that squirrel habitat preferences might affect tree species distributions, favoring the dispersal of species that occupy the interior of the forest.

Sat- 11

Potential Niche Partitioning between Tufted Titmice and Black-capped Chickadees in Connecticut

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Abstract - The range expansion of *Baeolophus bicolor* (Tufted Titmouse) into the southeastern range of *Poecile atricapillus* (Black-capped Chickadee) has greatly increased the potential for competition between these 2 species. In winter, these species are often seen foraging together in interspecific foraging flocks. Chickadees and titmice were observed foraging naturally in 3 central Connecticut forests and at a suction-cup window feeder at a residential home in Plantsville, CT, between November 2015 and February 2016. Naturally foraging chickadees most often fed in the upper canopy and in shrubs, while titmice tended to feed lower in the canopy and on the ground. There was some evidence that, while feeding together on *Liriodendron tulipifera* (Tuliptree), titmice displaced chickadees to lower branches where seed heads were less abundant. At the feeder, titmice were apparently dominant to chickadees, displacing all 25 chickadees they challenged. Chickadees usually waited for titmice to leave the feeder, and displaced titmice in only 3 of 10 observed challenges. Both species consumed the same seeds provided in the 3 trays of the feeder (black-oil sunflower [with and without shells] and safflower), but chickadees chose sunflower seeds in 83% of their visits, while titmice chose safflower seeds in 54% of their visits. Competition between these 2 species seems to be minimal in Connecticut, but competition could possibly increase if titmice move farther north or into areas with no human-supplied birdseed.

Sun- 27

Proactive Management Plan for the Emerald Ash Borer upon Impending Invasion

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Abstract - The invasive species *Agrilus planipennis* (Emerald Ash Borer [EAB]) has destroyed over 50 million ash trees in the United States since 2002, causing tree death within 2-4 years of invasion. Gaps created by the loss of ash trees are known to have consequences on riparian and upland communities. Through increased light input in gaps, native species become outcompeted by invasive vines and shrubs, resulting in a change in forest structure. Several cores of EAB invasion are located in the Hudson Valley, NY, and our study sites within the Vassar Farm and Ecological Preserve (Dutchess County, NY) are located just 6 miles from one of these invasion cores. In the face of this threat, we have implemented a proactive management plan since 2014 to preserve the ash trees (*Fraxinus americana* [White Ash] and *F. pennsylvanica* [Green Ash]) that comprise 11% of the forest. Our management plan comprises five components: (1) Prevention through education, (2) Monitoring through canopy surveys, traps, and inspection for emergence holes, (3) Injections of a systemic, neem-based insecticide, (4) Seed preservation for future restoration efforts, and (5) Biological control with an EAB egg-parasitoid wasp, *Oobius agrili*. No signs of EAB have been detected in our study sites as of 2015. Yet, because of the proximity to the invasion core, we expect our sites to be within the early cusp of EAB invasion, presenting a unique opportunity to monitor the effectiveness of our management plan at low levels of invasion.

Sat- 9

Use of Soil-dwelling Arthropods as Bio-indicators Across a Successional Gradient of Norway Spruce in Schoharie, NY

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Abstract - Soil is a living ecosystem which provides habitat for many microarthropods that contribute to decomposition and the formation of organic matter. Because of their strong affiliation with organic matter content, certain microarthropods can also serve as bio-indicators of soil quality. This study utilizes microarthropod bio-indicators to evaluate the changes that occur in soil quality during the course of forest succession. We obtained samples from 3 planted *Picea abies* (Norway Spruce) plots ranging in levels of succession within the Burnt-Rossmann Hills State Forest in Summit, NY. We took leaf-litter samples from the soil surface within a 2-m diameter at the base of 3 randomly selected Norway Spruce trees per stand 8 times during October–November of 2015 ($n = 72$), which were measured for their diameter at breast height (DBH). We placed samples in Tullgren funnels for 48 hours and preserved extracted arthropods in 70% ethanol. We weighed samples used to measure soil moisture content before and after being heated for 48 hours at 40° C. We collected additional soil samples from each plot to analyze organic matter content. Sub-samples of arthropods were identified and recorded as 1 of 4 groups; oribatid mites, other mites (e.g., Mesostigmata), Springtails (Collembola), and other arthropods. A single-factor analysis of variance (ANOVA) was performed on the calculated mean abundance of oribatid mites, other mites, all mites, other arthropods, and Springtails in each stand. Results show that there was a statistically significant difference between the successional stages in the groups “other mites” ($F = 5.51$, $df = 2$, $P < 0.05$) and “other arthropods” ($F = 4.41$, $df = 2$, $P < 0.05$). Both oribatid mites and Springtails exhibited a general trend of higher abundance in the late successional stages. Mites other than those in the order Oribatida also have differing levels of tolerance to soil disturbance. Sensitive taxa within these groups may be contributing to the higher abundance of the total mite group. Trends exhibited between successional stages suggest that soil structure and quality may change as woodland habitat ages. Further studies are needed to define any differences that might exist in soil arthropod community composition between successional stages.

Sun- 10

Tamarack and Black Spruce Growth Rates in Response to Abiotic Variables within a Wetland System

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Abstract - *Larix laricina* (Tamarack) and *Picea mariana* (Black Spruce) are 2 facultative wetland conspecifics that are native to northern North America. Each species has been shown to exhibit unique adaptive traits that aid in their survival and persistence in harsh northern wetland ecosystems. Studies have shown that these unique species persist within these environmentally challenging systems by responding differently to changes in their environment. However, some variables must contribute to these species ability to reach maturity within these systems. Tree height has been shown to be related to site productivity, and age is the determining factor in maturity. Therefore in this study, we used a height-to-age ratio and periodic annual increment for Tamarack and Black Spruce saplings for regression against several belowground abiotic variables (dissolved oxygen, water temperature, pH, percent canopy cover and depth to water table) in order to determine if any of these factors can explain the growth and persistence of these species at maturity. Understanding the growth response of these conspecifics to abiotic variables can be useful in future management of wetland systems as well as management of Black Spruce and Tamarack.

Sun- 17

Potential Predation Threats to the Common Eider at a Mixed Offshore Seabird Colony

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Abstract - Populations of *Somateria mollissima* (Common Eider) are believed to be currently in decline in Maine, although the causes for these changes are not clear. Some studies in literature have suggested that predation by gulls may play a major role in chick mortality, while others indicate that proximal nesting gulls may actually ward off predators. The role of human disturbance in estimates of predation is always difficult to observe. In this study, potential threats to *S. mollissima* during their breeding season were observed. Observations of *S. mollissima* chicks were recorded at varying times of day, tide levels, tidal pool conditions, weather conditions, and stages of growth of the chicks. No examples of predation from the nesting gull species (*Larus marinus* [Great Black-backed Gull] and *L. smithsonianus* [American Herring Gull]) were observed. It was found that there are multiple potential threats to *S. mollissima*, Maine's only hunted sea duck, in the form of *Haliaeetus leucocephalus* (Bald Eagle), *Phoca vitulina vitulina* (Atlantic Harbor Seal), *Halichoerus grypus* (Grey Seal), and human disturbance.

Sat- 28

Using DNA Barcode to Identify Flood Plain Seeds Along the Bronx River

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Abstract - A seed bank survey was conducted in the fall of 2014 along the Bronx River on the grounds of the New York Botanical Garden, Bronx, NY. A total of 24 soil samples were collected for their seeds, which were then germinated over a 5- or 6-week period. Identifying the seedlings based solely on morphology is a difficult task because seedlings have many similar physical characteristics and a limited number of identifying features. Therefore, relying completely on physical characteristics for seedling identification can lead to misidentification. In contrast, DNA Barcodes can deliver identification of each seedling. We differentiated 38 different seedling groups using general morphology including vein structure, leaf margin, stem pigmentation, leaf shape, and leaf arrangement. We then used 2 short sequences of DNA from 2 different plastid genes, *rbcL* and *matK*, to identify each of these morphological groups.

Sun- 18

The Asian Shore Crab, an Invasive Intertidal Invertebrate

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

Abstract - *Hemigrapsus sanguineus* (Asian Shore Crab) is an invasive species that was first documented in the US on the coast of Delaware in the late 1980s. Since then, this marine invertebrate has spread and become established in US coastal habitats ranging from North Carolina to Maine. The focus of this poster presentation is to show the Asian Shore Crab's impact on 3 other marine invertebrate species which share habitats and resources on Massachusetts and Rhode Island beaches. The other species are *Carcinus maeanus* (Green Crab), *Littorina littorea* (Common Periwinkle), and *Mytilus edulis* (Blue Mussel). The author proposes a correlation between Asian Shore Crab and Blue Mussel abundances.

Sat- 24

Survey of Microplastics in Fish, *Phalacrocorax auritus* (Double-crested Cormorants), and Other Aquatic Organisms in the Lake Champlain Watershed

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Abstract - It is estimated in the United States that 8 trillion microbeads enter our waterways daily. Microplastics are typically discharged into local watersheds through wastewater treatment plant effluent and marine debris. In this project, we assessed microplastic load within digestive tracts of *Dreissena polymorpha* (Zebra Mussel), the amphipod *Gammarus fasciatus*, fish, and *Phalacrocorax auritus* (Double-crested Cormorant). We processed specimens using a KOH bath, followed by wet peroxide oxidation digests. We characterized bioaccumulated microplastics based on type (e.g., fragment, pellet/bead, fiber, film, foam) and size. Results suggest that the majority of microplastics within digestive tracts, combined for all organisms investigated, were fibers (67%), fragments (19%), films (10%), and pellets/beads (4%). No microplastics were observed in Zebra Mussels. Amphipods contained fibers (50%), fragments (25%), and films (25%). Species-specific trends were observed among fish, specifically *Osmerus mordax* (Rainbow Smelt), *Cottus cognatus* (Slimy Sculpin), and *Micropterus salmoides* (Large-mouth Bass) primarily contained fibers. *Lepomis macrochirus* (Bluegill Sunfish) and Rainbow Smelt were the only species to contain pellets/beads (40%) and films (16%), respectively. Double-crested Cormorants contained primarily fibers (78%), as well as films (19%), with minor contributions of pellets/beads and foam. Spatial distribution of microplastic load was greater in Rainbow Smelt at the most northern and southern sampling sites on Lake Champlain. In freshwater systems, microplastics absorb chemical pollutants and release plasticizers (e.g., carcinogens, neurotoxins, endocrine disruptors) into tissues, with the potential for fitness consequences in wildlife and humans.

Sat- 20

An Ecosystem Perspective on Resistance and Predation in Biological Control of Hemlock Woolly Adelgid

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Abstract - The introduction to the eastern US of a non-native insect, *Adelges tsugae* (Hemlock Woolly Adelgid [HWA]) has done significant damage to the distinctive native ecosystems for both of our native hemlocks: *Tsuga canadensis* (Eastern Hemlock) and *Tsuga caroliniana* (Carolina Hemlock). DNA-based biogeographic analysis of known world HWA populations has identified 5 different, genetically distinguishable HWA lineages. Each of these lineages occupies a geographically distinct hemlock ecosystem, involving different hemlock species, different HWA lineages, different native HWA predators and different climates. By identifying Southern Japan as the geographical origin of our HWA introduction and its host hemlock and biological control species, previous analysis provides important insights for HWA control in the eastern US. Both biological resistance and predation play roles in facilitating hemlock coexistence with HWA organisms in different geographical locations and climates. But these roles apparently differ across hemlock ecosystems. And a comparative analysis of different hemlock/HWA ecosystems may provide insights into how these resistance and predation relationships contribute to hemlock coexistence with HWA. Such ecological insights can also be used to better assess the strengths and weaknesses of HWA control strategies for hemlocks in the eastern US (savinghemlocks.org).

Sun- 11

Relationships Between Environmental Variables and Animal Distribution Patterns at the Vassar Farm and Ecological Preserve

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Abstract - Using a series of motion-sensor cameras in strategically placed locations around the 212-ha (527-acre) Vassar Farm and Ecological Preserve (VFEP), we observed the geographic distribution patterns of various animal communities and analyzed them against a variety of environmental factors. The VFEP provides a unique opportunity to study the distribution patterns within a somewhat closed ecosystem containing a variety of vegetative habitats. Correlations were found between high levels of biodiversity and forest types with optimal levels of underbrush that allowed for both shelter and camouflage, as well as free movement. This study outlines the importance of considering anthropogenic impact on underbrush structure through both direct and indirect forcings, and the effect this could have on biodiversity.

Sat- 31

Seed Dispersal in Two Massachusetts Ponds by Eastern Painted Turtles

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Abstract - Examination of fecal matter from *Chrysemys picta* (Eastern Painted Turtle) from 2 pond ecosystems in southeastern Massachusetts revealed evidence of aquatic seed ingestion. Ten turtles (8 males, 2 females) were wild-caught, and all (100%) egested intact seeds while held in the laboratory. Three seed species were found: *Nuphar variegata* (Yellow Pondlily), *Nymphaea odorata* (White Waterlily), and an unidentified species. Seed number ranged 5–1081 per individual (mean 276 seeds/turtle) with most seeds being *Nymphaea*. These findings provide evidence that turtles may be important vectors of seed dispersal for aquatic plants.

Sun- 20

Spatial and Molecular Ecology of the Parasitic Plant *Monotropa uniflora*

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Abstract - *Monotropa uniflora* (Indian Pipe) is an example of a non-photosynthetic mycoheterotrophic plant that obtains its carbon by parasitizing mycorrhizal fungi, which mutualistically exchange carbon compounds and mineral nutrients with trees. The goal of this study was to determine which trees are indirectly parasitized by *M. uniflora*, both by mapping its spatial distribution in the Spencer J. Roemer Arboretum at SUNY Geneseo and by identifying its fungal associates. Fine-scale mapping of the plants' distribution, mapping of tree locations, and subsequent analysis in ArcMap indicates that *M. uniflora* exhibits spatial clustering; most clusters fall within the root areas of *Quercus rubra* (Red Oak) and *Quercus alba* (White Oak) trees, as well as slightly within the root zones of *Juglans nigra* (Black Walnut) in some cases. To identify fungal associates of individual plants, we extracted DNA from root ball samples of *M. uniflora* that were collected from the Arboretum and the Genesee Valley Conservancy Research Reserve. We selectively amplified mycorrhizal fungal DNA via PCR using primers specific to the ITS region of basidiomycetes and sent PCR product to an external lab for sequencing. These results contribute to the identification of trees associated with *M. uniflora* and explore the diversity of its mycorrhizal fungi symbionts over a small spatial scale.

Sun- 3

Invasion-Related Change in Crayfish Density, Not Species, Impacts Stream Macroinvertebrates

Mark Kuhlmann (Hartwick College, Oneonta, NY; kuhlmannm@hartwick.edu)

Abstract - *Orconectes rusticus* (Rusty Crayfish) have invaded streams of the upper Susquehanna River catchment (New York), replacing native crayfish and, in some areas, increasing overall crayfish density. Crayfish are important consumers and agents of disturbance in aquatic communities, so the introduction and expansion of Rusty Crayfish could affect the invaded community through the change in crayfish species composition, the increase in crayfish density, or some combination of the two. Other macroinvertebrates are prey of, competitors with, or subject to disturbance by crayfish and so are likely to be affected by changes in the crayfish assemblage. I conducted experiments in stream enclosures to determine the effects of crayfish species and density on the macroinvertebrate community. Increasing crayfish density reduced macroinvertebrate density but did not significantly affect macroinvertebrate taxon richness, diversity, or community composition. At moderate densities, the effects of native *O. propinquus* (Clearwater Crayfish) and invasive *O. rusticus* did not differ significantly. These results suggest that the invasion of streams by *O. rusticus* will impact the macroinvertebrate community only where or when Rusty Crayfish achieve high densities.

Sat- 21

Identification of Host Species Via Isotopic Signature In Black-legged Ticks

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Abstract - Lyme disease is the most commonly reported vector-borne illness in the United States. The increasing incidence of Lyme disease has stimulated the study of vector-host relationships. In eastern North America, *Ixodes scapularis* (Black-legged Tick) is the vector for the infectious agent, *Borrelia burgdorferi*, while the primary reservoirs for the disease are mammalian tick hosts. Stable isotope analysis has been suggested as a promising technique to elucidate the feeding ecology of ticks and to identify the host species most likely to infect ticks. We trapped 2 mammal species, *Tamias striatus* (Eastern Chipmunk), and *Peromyscus leucopus* (White-footed Mouse), and infested them with larval ticks. Engorged larvae were then placed in soil cores to allow molting into the next life stage. We analyzed the molted nymphal ticks via stable isotope mass spectrometry to evaluate the feasibility of host species identification by isotopic signature. Preliminary data show that *T. striatus* and *P. leucopus* cannot be reliably distinguished based on stable isotope signatures of animal fur, which implies that this technique will be insufficient to distinguish ticks that have fed on these species. Given the similarity of diets between these 2 species, this is not a surprising result. However, ticks showed predicted trophic enrichment of ^{15}N and ^{13}C over animal fur, which lends support to the idea that host guild (carnivore v. herbivore) may be identifiable via isotopic analysis of ticks. Understanding of vector feeding ecology and host-community composition are essential to understanding transmission patterns in nature, as well as pathogen spillover in humans.

Sun- 9

Capacity for Recovery, Influence of Thinning, and Resistance to Defoliation in Spruce-Fir Forests

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Abstract - *Choristoneura fumiferana* (Eastern Spruce Budworm) has plagued spruce-fir ecosystems for centuries, causing widespread defoliation, loss of productivity, and mortality. To manage this type of stress, trees have developed 2 strategies, tolerance and defense, and survival depends on the appropriate balance between these 2 strategies. A tree's capacity for recovery after consecutive years of defoliation typical of Spruce Budworm outbreak is linked to the pool of nonstructural carbohydrates available to stimulate growth of latent buds and recover leaf area. While commercial thinning treatments have the potential to increase NSC pools, studies during past outbreaks have shown that thinning has a complicated effect on outbreak severity and duration. Secondary defensive compounds, such as soluble phenolics measured as tannic acid equivalence, may provide resistance to defoliation caused by the Spruce Budworm and other herbivores. This study evaluates the eco-physiological responses of *Picea rubens* (Red Spruce) and *Abies balsamea* (Balsam Fir) to stand-level thinning and artificial defoliation treatments across 3 experimental locations throughout the state of Maine. In contrast to carbohydrate allocation theory, the results of this study suggest that stand-level thinning treatments lower the NSC available to both species. This result could leave trees within thinned stands vulnerable during an outbreak. We did not find the production of secondary defensive compounds to be affected by the artificial defoliation treatment. Interestingly, Balsam Fir was found to maintain higher concentrations of nonstructural carbohydrates and tannic acid equivalence than Red Spruce. The results reported in this study should mean that Balsam Fir is better adapted to withstand defoliation caused by the Spruce Budworm; however this is not the trend that has been reported historically when defoliation and mortality of the species are compared.

Sun- 12

Examination of Predatory Pressures upon Piping Plovers Nesting at Orient Beach State Park, NY

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Abstract – I examined predatory threats to breeding *Charadrius melodus* (Piping Plover) at Orient Beach State Park, Long Island, NY. The study was undertaken because plover reproductive success at this site has been low over years and it was suspected that predation may be one contributing factor. The average (SE) productivity (chicks fledged/pair) for 2000 to 2014 was 0.7 (0.18) while the range of breeding pairs was 1–7 with an average (SE) of 2.4 (0.63) pairs/season. In 2013, an artificial-nest study found that 100% of quail eggs were removed from nests ($n = 100$). Seventy-five percent were taken by potential predators including crows (52%), gulls (19%), and *Procyon lotor* (Raccoon; 4%). The remaining losses (25%) were due to flooding (2%) or unknown reasons (23%). Crows took significantly more eggs than other predators including gulls, although they were significantly less frequent than gulls in daytime censuses. In 2014, a camera study identified the presence of 8 potential predators, and again crows were most significant. At 20 camera locations, 4 avian species were observed including *Corvus brachyrhynchos* (American Crow; 85% of locations), *Larus argentatus* (Herring Gull; 45%), *Larus marinus* (Great Black-backed Gull; 45%) and *Bubo virginianus* (Great Horned Owl, 15%). Four mammalian species observed included Raccoon (60%), *Didelphis virginiana* (Opossum; 55%), *Vulpes vulpes* (Red Fox; 35%) and *Rattus norvegicus* (Norway Rat; 10%). I suggest that future research and management strategies focus on the role of crows.

Sun- 26

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

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Abstract - The black color morph of the *Sciurus carolinensis* (Eastern Grey Squirrel) appears to be distributed unevenly throughout various urban habitats in the city of Syracuse, NY. Literature suggests that black squirrels are more tolerant to cooler areas (e.g., forests) than the common grey color morph because of their ability to absorb heat from the environment. Consequently, we hypothesized that black squirrels would be more heavily distributed in forested habitats versus more open urban habitats (e.g., parks, yards, etc.). Specifically we evaluated squirrel distributions at Le Moyne College in a patch of forest (~0.25 km²) and across the open urban parts of campus (~0.20 km²). During September and October of 2015, we conducted 5 surveys along 1.9 km of transects in forest and 1.6 km of transects in open urban habitat. Transects were systematically arranged to provide complete survey coverage. We recorded distances to squirrel detections in order to compute an estimate for imperfect detectability and to correct our count data in estimating population densities. We estimated that squirrel densities (95% confidence intervals) were greater for grey versus black squirrels in both habitat types: 43 (24–76) grey/km² and 19 (10–38) black/km² in urban, and 99 (51–194) grey/km² and 42 (22–82) black/km² in forest. Populations of both morphs were higher in the forest, but black squirrels had at least a 1.7% greater increase than grey morphs from urban to forest.

Sat- 12

Band-Return Frequency and Distribution from the Gull Population on Great Duck Island, Maine

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Abstract - Alice Eno Research Station on Great Duck Island, Frenchboro, ME, has been collecting reproductive and population distribution data on the island's *Larus smithsonius* (Herring Gull) and *Larus marinus* (Great Black-backed Gull) populations since it was founded in 1998, and since 1999 have been banding both species with federal metal bands during the station's field season (June to August). However, in the past 4 years, the research station has also been using field-readable color bands along with the federal metal bands. The use of color bands has led to an increase in band returns, particularly of live birds. Color bands are relatively quite expensive (\$4.50 per band); however, because these bands yield sufficiently more returns than the federal metal bands, we conclude that they are worth the cost. Returns from Great Duck range as far south and west as Louisiana and as far east as Bermuda.

Sat- 29

A Longitudinal Experiment in Restoration of a *Berberis thunbergii*-infested Floodplain Forest

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Abstract - Over the last 9 years, we have assembled volunteer work parties 1–2 times/year to remove invasive plants, primarily *Berberis thunbergii* (Japanese Barberry), from a High Floodplain Forest community on the Farmington River in Avon, Connecticut. Our primary objective was to determine the minimum allocation of volunteer resources required per unit area to remove invasive species and restore and maintain a native herb layer and woody understory without herbicides, without using plantings, and without harming rare plant populations. We experimented with various non-chemical methods of removing Japanese Barberry, and collected data on numbers of Barberry plants pulled, acreage cleared, numbers and demographics of the work parties, and development of ground-layer and understory vegetation each year after treatment. We concluded that the most effective and efficient method of Barberry removal is hand pulling in teams of 3-4, with one member using a crowbar to pry on the root crown. This method results in a barberry removal rate of up to 19.7 Barberry pulled/person-hour, and up to 0.00138 ha/person-hour cleared in areas of dense Barberry. Of the 2 demographic groups of volunteers we have tested to-date, (1) mixed male and female adults aged 30–60 and (2) male secondary school juniors and seniors, Group 1 has been most productive. There has been no significant re-invasion by Barberry or other woody invasives in treatment areas. In the older treatment areas in which the ground layer was sparsely vegetated after Barberry removal, significant increase in native herbaceous cover had occurred by the third spring after Barberry removal, with cover increasing to high percentiles by the fifth year. A regionally rare native sedge has increased exponentially in the treatment areas. The herbaceous invasives *Alliaria petiolata* (Garlic Mustard) and *Microstegium vimineum* (Japanese Stiltgrass) have increased in all treatment areas, but dramatically so only in some areas. We hypothesize that this is due to differences between treatment areas in forest light levels and/or proximity to a well-used hiking/running trail. Experiments have been initiated to test these hypotheses, and to control Garlic Mustard, an allelopathic biennial, by removing entire flowering/fruitlet plant populations of the year from certain of the treatment areas.

Sat- 3

Comparison of Insect Herbivory on Native Versus Invasive Understory Shrubs

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Abstract - The purpose of this study is to compare leaf insect damage between invasive species (*Lonicera maackii* [Amur Honeysuckle] and *Elaeagnus umbellata* [Autumn Olive]) and a native species (*Cornus racemosa* [Gray Dogwood]) in Geneseo's Spencer J. Roemer Arboretum, an 8-ha area of secondary successional forest. Understory shrubs provide food for herbivorous insects, which are prey for birds, mammals, and other higher trophic-level species. A potential reason for the success of non-native species in their invaded habitat is that they have escaped their own specialized herbivores. Consequentially, invasive species may disrupt local food webs since they do not support native insect herbivores that local birds may prey on. As invasive species increase in abundance, they potentially displace native species from their own habitat. We hypothesized that the leaves of native species would have the highest damage levels, since native herbivores are accustomed to feeding on them, whereas the non-natives are less likely to be fed on by native herbivores. Last autumn, we marked leaves on 20 shrubs of each species and photographed them with a digital camera. We categorized damage to compare damage types among the 3 species. Leaf photos were analyzed using ImageJ to quantify the proportion of leaf area damaged per leaf. Preliminary analysis indicates that there is significantly more herbivore damage on the native species than both invasive species. These initial results suggest that the native shrub has greater value in the local food web than the invasive species.

Sun- 5

The Presence of Microplastics in Wastewater Treatment Plant Effluent in the Lake Champlain Watershed

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Abstract - Microplastic pollution in freshwater ecosystems is an emerging topic in aquatic pollution science. Primary microplastics were designed to be small (e.g., microbeads, pre-production plastic nurdles), and secondary microplastics result from photo- and mechanical degradation. Origin of microplastics are often associated with consumer use of personal-care items (e.g., facial cleansers and toothpastes) which are too small to be captured with current wastewater treatment plant (WWTP) technologies. Ongoing research cites dangers resulting in their propensity to absorb harmful chemicals and bioaccumulate up the food chain. Microplastics are characterized by type (e.g., microbeads/pellets, fibers, foams, films, and fragments, as well as by size-class, and polymer. We surveyed post-treatment effluent from the city of Plattsburgh, NY, wastewater treatment plant in fall 2015. Effluent samples were collected and digested using wet peroxide oxidation methods, followed by characterization based on type and size. The majority of microplastics in wastewater effluent were identified as fibers (54%), as compared to proportions of pellets/beads (16%), films (13%), fragment (11%), and lesser films (6%). The largest (≥ 1 mm) and smallest (≤ 125 μm) were predominantly fibers (88%) and (56%), respectively. Diversity of microplastic type (e.g., film, fragment, foam) increased with decreasing particle size. On high- and low-flow rate days, more bead/pellet and films were collected, respectively. Microplastics have been an emerging concern in aquatic life as they can absorb harmful chemicals and bioaccumulate up the food chain. This research from Lake Champlain can serve as a basis for further microplastic studies in the Lake Champlain watershed.

Sat- 19

Abundance of Amino Acid-Metabolizing Bacteria across Sphagnum Species of an Oswego, NY, Fen

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Abstract - Wetlands are considered “water kidneys” ecosystems due to the bacterial activity in building up biomass from nitrogen, thus removing it from water. Nitrogen from the decomposition of amino acids becomes available in the water of peatlands and can be utilized by the bacteria in the processes of nitrification and denitrification. In fall 2015, we collected water samples by squeezing 3 different *Sphagnum* species within an Oswego County (NY) fen, in order to assess bacterial abundance (spectrophotometry) and types of substrates likely to be used in bacterial metabolism. Analysis of amino acid substrates showed that water squeezed from *S. papillosum* (Papillose Peatmoss) contained the greatest amount of amino acid-metabolizing bacteria, followed by *S. capillifolium* (Red Bogmoss) and *S. fuscum* (Rusty Bogmoss) ($P = 0.04$). As nitrification occurs mostly in habitats of *S. fuscum* and denitrification occurs mostly in habitats of *S. papillosum*, our findings suggest that there may be a positive interaction between amino acid-decomposing bacteria and denitrifying bacteria.

Sat- 2

Rapid Bioassessment of Cobleskill Creek Prior to Stream Restoration Efforts

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Abstract - In early fall 2011, Cobleskill Creek and its associated tributaries were severely impacted by Hurricane Irene and Tropical Storm Lee, causing record levels of flooding throughout New York State. A 500-m section of Cobleskill Creek adjacent to the SUNY Cobleskill campus and farm in Schoharie County experienced channel widening caused by floodwaters. Flooding caused elimination of riparian buffers and eroding banks, and increased the potential for nutrient runoff to enter the stream. With funding from the Natural Resource Conservation Service (NRCS), a channelization project is slated to begin in the spring of 2016. This project will establish a central channel in the 500-m section of the stream and provide for the implementation of riparian buffers. The goal of this study was to establish a reference reach to monitor recovery of the biotic integrity of the creek following the restoration. Rapid Bioassessment was conducted at 2 locations: upstream and downstream of the proposed restoration site on Cobleskill Creek. A 100-m stretch was measured at both locations and was characterized by the physical parameters of each site, including stream flow, velocity, and width. Macroinvertebrates were sampled from the upstream and downstream sites on 3, 15, and 25 Oct 2015, 24 Nov 2015, and 12 Jan 2016. Rapid Bioassessment protocol (described by the US Environmental Protection Agency) was conducted at both study sites using a Surber Sampler. A 100-organism subsample was taken from each sampling event. Invertebrates were identified to the family level, enumerated, and analyzed. Indices of diversity and biotic integrity were applied to samples from both sites for comparison. Student's *t*-tests concluded that there were no statistical differences between the upstream and downstream sites in Shannon's diversity index ($P > 0.05$), Simpsons diversity index ($P > 0.05$), and evenness (Modified Hill's Ratio; $P > 0.05$). Hillsenhoffs biotic index showed no significant difference between the 2 sites ($P > 0.05$) and that both sites have good biotic integrity. The similarity between the upstream and downstream sites indicates that the upstream site will in fact, serve as a viable reference reach to monitor the recovery of the biotic integrity of Cobleskill Creek following the ecological restoration event.

Sat- 16

Preliminary Monitoring of Terrestrial Amphibians in Southeastern Massachusetts

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Abstract - Salamanders have long been lauded as good ecological indicators of forest health. In particular, *Plethodon cinereus* (Eastern Red-Backed Salamander) has been suggested as a model organism for such studies, given its high abundance and wide geographic range. The two predominant color morphs (striped and unstriped) of *P. cinereus* are thought to have different habitat preferences based on presumed physiological tolerances. The goals of our study were to characterize the abundance and distribution of the two color morphs of *P. cinereus* with respect to a number of environmental variables in southeastern Massachusetts. Our preliminary data presented here will be used to establish long-term monitoring plots as part of the Salamander Population and Adaptation Research Collaborative Network (SPARCnet). We monitored salamanders in each of 4 plots (16.2 m x 16.2 m) in the same forest weekly for 3 months in the fall of 2015. The plots were paired in either deciduous- or pine-dominated areas, and within each forest type, one plot had natural cover objects, the other, artificial cover objects (untreated pine boards). We collected data on several characteristics including: snout-vent length, color morph, and soil moisture, pH, and temperature. We analyzed our data for patterns of abundance that could be explained by color morph, forest type, or cover type. For the 2 color morphs, we found no significant differences between striped and unstriped individuals in size, soil moisture, soil pH, or soil temperature, and ratios of the 2 morphs between forests and cover types were also similar. Salamanders were significantly more abundant in the deciduous forest than in the pine forest, likely due to extremely dry conditions in our pine forest this fall. Salamanders under artificial cover objects were significantly larger than salamanders under natural cover objects. Given the territorial behavior in *P. cinereus*, this result suggests that the artificial cover objects were preferred and defended by adult salamanders. We plan to continue monitoring these same plots through the spring and summer of 2016, at which point they will be replaced by SPARCnet plots for continued long-term monitoring.

Sun- 23

Eastern Painted Turtles as a Transporter of Aquatic Plant Propagules in a Massachusetts Stream

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Abstract - *Chrysemys picta* (Eastern Painted turtles) was captured from 2 locations along the Nemasket River (Bridgewater, MA) using baited traps. Of the 20 individuals caught, 11 (55%) were found to have intact seeds in their feces, including *Potamogeton* (Pondweed), *Vitis* (Grape), and an unidentified grass. Seed number ranged 1–974 per individual fecal sample (mean = 274 seeds/turtle). We also found 62 intact tubers of *Elodea* (Waterweed) in the turtles' feces. These data suggest aquatic turtles may prove to be important dispersal vectors for plants in and around streams.

Sun- 19

Sexual Size Dimorphism and Compliance with Rensch's Rule in Shrews (Soricomorpha: Soricidae)

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Abstract - Although most shrews (Soricomorpha: Soricidae) exhibit modest sexual size dimorphism (SSD), there exist species of shrews with convincing male-biased and female-biased SSD. The largest shrews seem more commonly to exhibit male-biased SSD, and only among the smallest shrew species do we see female-biased SSD. Thus, we hypothesized that shrews comply with Rensch's Rule, which states that in species in which females are larger than males, the difference between the sexes diminishes as body mass increases, and that in species in which males are larger than females, the difference increases as mass increases. To test this hypothesis, we analyzed the results of studies reporting body mass of syntopic male and female shrews from 66 shrew species ranging in average mass from <2 to > 60 g. By modeling the relationship between male and female body masses using Model II regression, we detected a deviation from unity compliant with Rensch's Rule (slope < 1). Using the most current phylogeny of the group, we additionally conducted an analysis using phylogenetically independent contrasts. This allowed us to better understand the role of phylogeny in explaining SSD in the shrews. The pattern of SSD in the shrews is complex and unusual among vertebrates, perhaps reflecting the extreme metabolic demands in this group.

Sat- 13

Landscape-Level Analysis of Drivers of Aquatic Macrophyte Species Richness in the Adirondack Park of New York State

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Abstract - Identifying the relative fit of drivers of aquatic macrophyte species richness is necessary for the effective conservation of biodiversity in lakes and provides fundamental understanding of aquatic macrophyte communities. Using multiple regression, we investigate the relative influence of water quality, lake morphology, geographic and landscape drivers, and humans on the richness of macrophytes in lakes in the Adirondack Park of New York State. To further investigate species–area relationships in the dataset, we used null model analysis to test for the passive-sampling hypothesis which is a non-biological explanation for the phenomenon. We found, ordered by slope coefficient, bed area (0.45), UTM X (0.30), road density within 100m of a lake (0.24), surface water area upslope (.18), elevation (-0.17), and lake isolation (0.14, larger values of represent less isolation) to explain 64% of the variation in species richness. We reject the passive-sampling hypothesis for the species–area relationship regarding bed area, revealing a biologically relevant species–area relationship. We found no significant influence of lake area, watershed road densities, urban isolation, Y, lake and bed effective fetch, bed isolation, and water quality on richness. If the goal of conservation is promoting biodiversity, lake area, the categorization of “pristine waters”, and climate refugia should not be used as parameters in the conservation process. Our results also reveal insight into meta-community dynamics in aquatic macrophyte communities. At the regional scale, isolation is a significant driver of richness, giving evidence to the relative importance of patch dynamics; while at the bed scale, isolation is insignificant, giving evidence to the importance of mass effects at the lake scale.

Sun- 15

Are Terrestrial Salamanders Impacted by Soil Salinity? A Pilot Study

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Abstract - There have been many studies on the responses of pond- and stream-breeding amphibians to increases in water salinity from anthropogenic causes like salting of the roads in winter. However, comparatively little work has been done on the impact of soil salinity on terrestrial amphibians. Does soil salinity impact the abundance and distribution of terrestrial salamanders? Are there natural gradients of soil salinity that might lead to changes in salamander abundance and distribution? *Plethodon cinereus* (Eastern Red-Backed Salamander) is a good model to explore questions like these. It is a highly abundant, wide-ranging species, with 2 predominant color morphs (striped and unstriped). Dozens of previous studies suggest that the 2 color morphs may have different physiological tolerances relating to preferred soil moisture and temperatures. We used our ongoing surveys of *P. cinereus* to explore the effect of soil salinity on salamander abundance and distribution. Salamanders were observed in a deciduous and pine forest in southeastern Massachusetts, under both natural (fallen logs, rocks) and artificial (untreated pine boards) cover objects. We found that our pine forest had lower soil salinity than the deciduous forest and that soil salinity under natural cover objects was greater than underneath artificial cover objects. These findings were surprising since the vast majority of salamanders were found under natural cover objects located in the deciduous forest, suggesting the species has a preference for higher salinity soils and perhaps there may even be a minimal soil salinity necessary for *P. cinereus* biological function. There was no significant difference in soil salinity between striped and unstriped color morphs. We also collected soil samples from 10 sites on Cape Cod, Massachusetts. These samples were distributed along a geographical gradient from the coastline inland. With these samples, we correlated mean soil salinity with distance to shoreline. A marginally significant negative correlation was found between distance to shore and soil salinity, that is, as distance to shore increases, soil salinity decreases. These results suggest that there could be natural soil salinity gradients that might affect salamander abundance and distribution.

Sun- 24

Distribution of the Amphibian Chytrid Fungus (*Batrachochytrium dendrobatidis*)

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Abstract - The emerging disease chytridiomycosis, caused by the fungal pathogen *Batrachochytrium dendrobatidis* (*Bd*), has been implicated as a driver of global declines, extirpations, and extinctions of many amphibian species. Active zoospores can persist in contaminated substrate (soil, water), and outdoor enthusiasts may unknowingly be introducing *Bd* to novel locations. This research in the Adirondack Park, NY, a highly protected landscape, aimed to shed light on amphibian pathogen transmission in northern temperate forests. We conducted 90 minute transect surveys at 43 sites classified by levels of recreational pressure and elevation. We used a standardized cutaneous swabbing method to sample each amphibian for the pathogen. Results of quantitative PCR analysis to assess pathogen presence and infection intensity did not identify *Bd* within the park, though analysis is still ongoing. Using habitat-suitability models, we created a predictive model of where *Bd* is mostly likely to establish. The foothills around the periphery of the park are at higher risk of hosting *Bd*; these more susceptible sites also tended to have higher amphibian encounters. This study provides evidence that *Bd* likely exists at low prevalence in the Adirondacks and may not be impacting the region's amphibians.

Sun- 22

Effects of the invasive Asian Shore Crab on the Abundance of Resident Species in the Intertidal Zone in Massachusetts and Rhode Island over the Past Two Years

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Abstract - The invasive Asian Shore Crab (*Hemigrapsus sanguineus*) has been implicated in decreased abundance and biodiversity of resident species in rocky intertidal zones on the Atlantic coast of North America. However, most studies are short-term and do not account for spatial and temporal variation. This study analyzed the abundance of the Asian Shore Crab and its effect on populations of intertidal invertebrates in 2014 and 2015 at 14 sites in Massachusetts and Rhode Island. Over the last 2 years, abundance of the Asian Shore Crab has stayed the same or slightly increased at most sites. Responses of other species varied. Six species declined in abundance, whereas 6 species increased in abundance. If the trends revealed by the abundance data continue in this way, resident species can face a decline and possibly local extinction.

Sat- 23

The Effects of Habitat Structure on the Abundance and Distribution of the Asian Shore Crab and its Influence on Biodiversity in Southern New England

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Abstract - *Hemigrapsus sanguineus* (Asian Shore Crab) is an invasive species that was first introduced to the east coast of the United States in the late 1980s. This introduction has had adverse effects on intertidal ecosystems, including a decrease in biodiversity. A few contributing factors include out-competing native crabs for resources, preventing/reducing reproductive success of native crabs from reproducing (killing juveniles), and heavily preying on native species, mainly, especially *Mytilus edulis* (Blue Mussel). Many rocky shore community models predict that habitat structure such as rock complexity and physical disturbances, such as wave action, can affect the distribution of and the interactions among species. They also predict that on wave-exposed shores, low- and mid-tidal communities are should be controlled by physical disturbance and competition for space, rather than grazing and predation, as on wave-sheltered shores. The purpose of this study was to compare the abundance/evaluate effects of habitat complexity and disturbance on abundance of the Asian Shore Crab as well as and biodiversity of macroinvertebrates and rock complexity between wave-sheltered shores and wave-exposed shores. We sampled 14 sites along the rocky shores of southeastern Massachusetts and Rhode Island. Collected data included rock size and distribution, mean annual wave power density and wave height, and species abundance. Unexpectedly, abundance of the Asian Shore Crab showed no significant correlation with habitat characteristics or annual mean wave-power density. However, species richness was greatest at intermediate levels of wave power, while whereas species evenness was negatively correlated with mean rock size. The information gathered on the effects of habitat structure on species abundance and biodiversity will provide predictive value on where the invasive Asian Shore Crab should have the greatest impact as it continues to spread along the eastern coast of the United States.

Sat- 22

Removal of Fruits by Birds from Native vs. Invasive Shrubs in Western New York

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Abstract - The goal of this study is to determine the use of fruits from native vs. invasive shrubs by birds in the secondary successional forest of Roemer Arboretum at SUNY Geneseo. Previous research has found that fruits of invasive shrubs are typically less nutritious than the fruits of native shrubs. We compared the consumption of fruits from 4 different shrubs in the Arboretum: a common native shrub (*Cornus racemosa* [Gray Dogwood]) and 3 invasive shrubs (*Lonicera maackii* [Amur Honeysuckle], *Rhamnus cathartica* [Common Buckthorn], and *Elaeagnus umbellata* [Autumn Olive]). To quantify the consumption of fruits, we monitored fruit loss from pairs of branches of each shrub species. In each pair, one branch was enclosed with a thin mesh to track fruit abscission and the other remained unenclosed and accessible to birds. We accounted for the abscission of fruits on the enclosed branch to calculate a consumption index for each species. Also, we presented together branches of different species in areas of high bird-activity within the Arboretum to assess bird choice and control for some environmental factors that may impact this choice. Furthermore, we surveyed numbers of fruit scars on marked Amur Honeysuckle branches 3 times at one-month intervals to assess the rate of feeding on this species. Lastly, we evaluated 10 randomly chosen 26-m transects for presence or absence of the 4 shrub species every 2 m to quantify their relative abundance at the site. Comparison of the mean consumption indices over time showed that the species consumed in the order from most to least were: Autumn Olive, Gray Dogwood, and Amur Honeysuckle (Common Buckthorn was not included in this assessment as the shrubs were not as commonly occurring and the branches generally too high to reach). Based on fruit scar counts, the removal rate of Amur Honeysuckle was about 10%. Transect data indicate that the relative abundances of Gray Dogwood and Amur Honeysuckle were higher than Common Buckthorn and Autumn Olive at this site. These results contribute to our understanding of the potential impacts of invasive species.

Sun- 30

Differences in Biodiversity Across a College Campus Ecosystem

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Abstract - The purpose of this research was to compare the flora and fauna of a post-agricultural wild ecosystem with managed systems throughout our college campus. The Columbia-Greene Community College campus is located at the base of the Olana State Historic Site in Columbia County, NY, and the landscape was previously used for agricultural purposes. Today, portions of the campus are mowed, but there are significant areas that are progressing through succession. We hypothesized that the managed areas would have lower biodiversity of vascular plants and ground-dwelling invertebrates than the areas that are abandoned pasture plots going through natural succession. We determined the number of species in 10 quadrats across each type of ecotone: managed lawn, managed woods (walking trail), and wild pasture land. The wild pasture land contained grass species present in the mowed areas, but had additional species that were unable to grow in areas that are mowed on a regular basis (such as *Thuja* and *Solidago* spp.). Although the results are preliminary, it appears that the managed woods ecosystem contains the most ground-dwelling invertebrates, as well as a high level of plant biodiversity. The results of this project support the idea that habitats experiencing secondary succession will foster high biodiversity. The implications of the project will be shared with the campus maintenance crew in an effort to promote biodiversity across the campus ecosystem as a whole.

Sun- 1

Conservation Genetics of White Ash on the Vassar College Ecological Preserve

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Abstract - Invasion and spread of *Agrilus planipennis* (Emerald Ash Borer [EAB]) has made the conservation genetics of North American *Fraxinus* spp. (ash trees) an urgent priority. We used recently developed expressed sequence tag simple sequence repeat (EST-SSR) markers to assess genetic diversity of *F. americana* (White Ash) in a ~60-year-old post-agricultural forest on the Vassar College Ecological Preserve (VCEP), a 250-acre island of green space surrounded by suburban development. We extracted DNA from leaf samples opportunistically collected from 34 trees found along trails of the preserve. We used fluorescently labeled universal primers and multiplex PCR in an attempt to amplify 15 markers that were developed for *F. pennsylvanica* (Green Ash) but known to cross-amplify White Ash. We were successful with 13 markers and obtained data for 26 to 32 trees per marker. Allelic richness (number of alleles detected) and allelic diversity (Shannon index) ranged from 2 and 0.083 to 19 and 2.684, respectively. For 10 of the 13 markers, observed heterozygosity was less than that expected under Hardy Weinberg equilibrium, and the difference was statistically significant for 8 of those markers. These results suggest that despite being dioecious, White ash on the VCEP may be somewhat inbred. For the 20 trees for which all 13 markers amplified, the number of heterozygous markers ranged from 4 to 8, with a mean of 6.5 (50%). Data such as ours may be used to prioritize costly and time-consuming application of pesticides, and to identify EAB-resistant genotypes.

Sat- 10

Impacts of Habitat Fragmentation on Breeding Songbird Behavior and Abundance

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Abstract - Habitat fragmentation has both obvious and subtle impacts on populations of breeding songbirds. Edge habitat increases with fragmentation and can drastically change the composition of bird communities. However, impacts more subtle than species composition are often overlooked in community-level research, such as the effects fragmentation may have on behavior. We compared fragmented sites (pasture and residential edges) to heterogeneity (natural edges) to determine the effects of habitat on bird species composition and breeding behavior (i.e., singing by territorial male birds). We studied 8 focal species that are typically associated with edges to see how they respond to these 3 habitat categories at 36 study sites during the 2015 breeding season. Four of our 8 focal species were more abundant in natural edges than in pasture or residential edges, whereas the other species exhibited no difference in habitat use. In addition, 3 species were negatively affected by landscape-level fragmentation, whereas 2 species were positively affected. Furthermore, *Geothlypis trichas*, (Common Yellowthroat) had a strong relationship between song rate and amount of natural edge, supporting our prediction that behavior is affected by fragmentation and heterogeneity. By studying behaviors alongside abundance, we can more deeply understand factors that cause species to vary in their responses to habitat fragmentation.

Sun- 31

Simulated Migratory Fasting Increases Circulating Levels of Mercury in a Model Songbird

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Abstract - The pollutant methylmercury accumulates within the lean tissues of birds and other animals. Migrating birds catabolize substantial amounts of lean tissue during flight, which may mobilize methylmercury and increase circulating levels of this potent neurotoxin. As a model for a migrating songbird, we fasted *Taeniopygia guttata* (Zebra Finch) that had been given sublethal doses of 0.1 or 0.6 parts per million (ppm) dietary methylmercury, and measured changes in blood total mercury concentrations (THg) in relation to reductions in lean mass. A group that was given no methylmercury served as a control, and the dosing levels of 0.1 and 0.6 ppm were intended to reflect a low and high range of mercury concentrations found in invertebrate prey of wild songbirds in the eastern US. Birds lost 6–16% of their lean mass during the fast, and THg increased an average of 12% and 11% in the 0.1 and 0.6 ppm treatments, respectively. Trace amounts of THg in the control group also increased as a result of fasting, but remained extremely low. THg increased 0.4 ppm for each gram of lean mass catabolized in the higher dose group. Our findings indicate that methylmercury is mobilized from lean tissues during protein catabolism and results in acute increases in circulating concentrations. Circulating mercury is readily available to cross the blood–brain barrier, raising questions about how these surges might affect the neurological processes associated with orientation, flight, and stopover refueling behaviors. This is a previously undocumented potential threat to wild migratory birds, which may experience greater surges in circulating methylmercury than demonstrated here as a result of their greater reductions in lean mass.

Sun- 29

Great Hollow Nature Preserve: A New Resource for Field Biologists in the Northeast

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Abstract - Great Hollow Nature Preserve is a newly established environmental education, conservation, and research center located along the border of Fairfield County, CT, and Putnam County, NY. The preserve is intended to provide opportunities for the public to explore, study, and learn about nature. External researchers, including professionals, students, and citizen scientists are welcome to apply for permission to use the 334-ha (825-acre) preserve for field biology and educational purposes. The preserve contains mature forest, shrubland and regenerating clear cuts, wetlands, and a freshwater stream, and is contiguous or nearly contiguous with thousands of additional acres of protected land in Connecticut and neighboring New York. Notable fish and wildlife species known to occur at the preserve include *Lynx rufus* (Bobcat), *Martes pennanti* (Fisher), *Ursus americanus* (Black Bear), *Castor canadensis* (Beaver), wild *Salvelinus fontinalis* (Brook Trout), *Glyptemys insculpta* (Wood Turtle), and a variety of forest interior birds. On-site facilities that are available on a limited basis for external researchers using the preserve include housing (with kitchen and laundry), desk/office space with internet, field equipment storage and maintenance space, and a wet lab. Small grants-in-aid of research may also become available for graduate, undergraduate, and high-school students working at the preserve. All areas of field biology are welcome, but those with a conservation application will be given preference. Please contact the authors for information about how to apply to use the preserve and its facilities, and opportunities for potential collaboration with the preserve's staff scientists.

Sat- 1

Why Did the Amphibian and Reptile Cross the Road? Modeling Spatial Patterns of Road Mortality in Southeastern Virginia

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Abstract - The impact of road mortality on biodiversity is a prevalent issue in densely populated regions that is often difficult and expensive to mitigate. Located in southeastern Virginia, Colonial National Park experiences high rates of roadkill due in part to the park's substantial visitation rates and considerable road traffic. Previous research has suggested that hotspots of road mortality, particularly of reptiles and amphibians, are concentrated around specific habitats, such as wetlands. The aim of this study was to determine if similar patterns of road mortality occur in Colonial National Historical Park. We used data collected from 137 aquatic species and 80 terrestrial species encountered during road surveys in 2015, and generated a null model with 137 random points along the roads that were surveyed. We then calculated the distance to the nearest wetland for all points within the 3 groups. We determined that average distance to wetland was significantly lower in aquatic herpetofauna found on road, and also significantly lower than our null model. We concluded that aquatic species road mortality is more concentrated around wetlands compared to randomly generated points, and is far more likely to occur near wetlands compared to terrestrial species road mortality. Management implications related to these results could include the installation of culverts with drift fences along roads to reduce roadkill rates of aquatic species within the park, and implementation of management practices that address "hotspots" of road mortality based on surrounding habitat type.

Sun- 25

Using Smartphone Apps to Customize Field Guides for Local Regions

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Abstract - This poster will describe how a Smartphone App was designed as a field guide for the 23 most common tree species on the Franklin Pierce University Campus in Rindge, NH. The advantage of customizing a field guide for a local region is that users do not have to browse through long lists of species that are not found in that region. This same approach could be used to develop customized Apps for many other groups of organisms (such as understory plants, amphibians, mammals, etc.) in any local region of interest. The only coding skill required for the development of this App was a basic familiarity with html (all self-taught). The App is free and available for Android and iOS and can be found by searching "FP Tree ID".

Sat- 31

Cobleskill Water Pollution Control Plant Effluent Impacts on Macroinvertebrate Communities

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Abstract - The Cobleskill Water Pollution Control Plant in New York relies on an extended aeration process and disinfection of the secondary effluent to treat waste water coming from Cobleskill Village residents. Up to 1.15 million gallons of treated waste water is discharged from the plant into the Cobleskill Creek daily through an effluent pipe. To investigate the effects of the effluent on the Cobleskill Creek, we conducted rapid bioassessment of aquatic macroinvertebrates at 2 different sites, upstream and downstream of the effluent discharge, on 5 separate dates between November 2015 and January 2016. We delineated each site to include a 100-m stretch of the stream that encompassed physical characteristics representative of the overall stream. Both upstream and downstream locations had similar substrate composition (90% cobble and 10% sand/sediment) and were in close proximity to the source effluent. We used D-frame kick nets to sample macroinvertebrates within these 100-m stretches. Subsamples of approximately 100 individuals from each sample were identified to family level and analyzed at the levels of diversity and pollution tolerance. Student's *t* tests found no difference in taxa richness between upstream (8.6 ± 2.19) and downstream (8.0 ± 0.89), in Hilsenhoff's Biotic Index between upstream (3.10 ± 0.55) and downstream (3.18 ± 0.45), or in percent composition of the Ephemeroptera, Plecoptera, and Trichoptera orders between upstream ($77\% \pm 010\%$) and downstream ($79\% \pm 010\%$). There were no significant differences in percent composition of Ephemeroptera between upstream ($42\% \pm 024\%$) and downstream ($25\% \pm 013\%$), or percent composition of Trichoptera between upstream ($4\% \pm 05\%$) and downstream ($19\% \pm 037\%$). However, higher Ephemeroptera abundance upstream and higher abundance of Trichoptera downstream may indicate nutrient inputs. Almost all Trichoptera collected downstream belonged to the family Hydropsychidae, known to be tolerant to nutrient inputs. Preliminary sampling appears to indicate no detrimental effects due to effluent in Cobleskill Creek. We plan to continue monthly rapid bioassessment in Cobleskill Creek to examine long-term trends in aquatic macroinvertebrate communities.

Sun- 16

A Comparison of Mycorrhiza-induced Defense Against Root-knot Nematode Infection between Three Tomato Cultivars

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Abstract - Every year, the world witnesses crop losses of over \$100 billion due to parasitism of *Meloidogyne incognita* (Root-knot nematode; RKN). These microscopic, subterranean roundworms penetrate the root cells of host plants and enlarge them into feeding cells where they will complete the remainder of their lifecycle. Recent evidence suggests that arbuscular mycorrhizal fungi (AMF) within the roots of vascular plants help deter RKN from accessing their hosts' root systems. This study focuses on this antagonism within the roots of 3 agriculturally important cultivars of *Solanum lycopersium* (Tomato): *S. lycopersicum* cv. Moneymaker, cv. Monita, and cv. Motabo. Monita and Motabo exhibit genetic resistance to RKN infection through expression of the Mi locus, while Moneymaker does not express this locus. In addition, Motabo expresses the Ve locus, which has been associated with fungal pathogen defense. The aim of this study was to determine which cultivar is (A) most resilient to RKN parasitism and (B) best able to establish symbiosis with AMF. We transplanted lab-germinated seedlings into greenhouse conditions and introduced a mixture of the AMF species *Glomus mosseae*, *G. intraradices*, and *G. aggregatum* into the substrate after 1 month, followed by RKN juveniles 8 weeks later. Weekly stem growth rate was recorded throughout this process. Eight weeks post-RKN-inoculation, we determined and quantified infection by staining egg masses with Phloxine B.

Sun- 2

Can Braincase Thickness be an Alternative Aging Method for White-tailed Deer?

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Abstract - There are few methods in which to age *Odocoileus virginianus* (White-tailed Deer). The 4 most accepted techniques are eye-lens weight, maturity of long bones, tooth wear and replacement, and cementum annuli analysis. The latter 2 are the most widely used and accepted practices, both relying on teeth of the lower mandible. Aging deer is a necessary tool for assessing the status of current management practices along with implementing new plans. This study introduces a new aging technique based on the thickness of the skull that requires much less training, effort, and equipment than previous methods. This discovery is important in wildlife management because it is a simple system that can be used by both biologist and laymen. State agencies could use this system to collect age data, and also to support data already collected with the tooth wear and replacement method, due to the extended collection period and availability of many more samples. This study evaluated 118 male White-tailed Deer varying in age from 1.5 years to 5.5 years old. All specimens were collected during the 2014 and 2015 deer-hunting season, and were harvested in the tristate region (New York, New Jersey, and Pennsylvania) of the United States. Upon collection, we aged deer using the tooth wear and replacement method, and took measurements from 3 locations on the braincase. Point A was taken at the center of the braincase approximately 2.54 cm (1 inch) anterior to the antler pedicles, point B was measured at the center of the braincase approximately 3.81 cm (1.5 inches) posterior to the antler pedicles, and point C was taken from the side of the braincase anterior to the ear and approximately 2.54 cm (1 inch) below the pedicle. Of the 3 points only 1, point B, showed any significant correlation to age. ANOVA analysis indicated that brain case measurement differed significantly between different age classes ($P < 0.0001$). The correlation between age (determined by tooth wear replacement) and braincase thickness ($r = 0.999$) supports an alternative aging technique for male White-tailed Deer. Future studies are planned to evaluate the technique for females.

Sat- 14

Diet Selectivity of Brook Trout (*Salvelinus fontinalis*) in Buttermilk Brook, Warren County, NY

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Abstract - Buttermilk Brook, located within Warrensburg Warren County, NY is a first-order high-gradient stream that flows directly into the Hudson River. Buttermilk Brook is a unique steppe-pool stream consisting of a granite base and large areas devoid of substrate. *Salvelinus fontinalis* (Brook Trout) populations within Buttermilk Brook are minimally impacted by people and their abundance is high. As opportunistic insectivores, they feed on both aquatic and terrestrial invertebrates. In order to better understand foraging behaviors of Brook Trout in small streams, macroinvertebrate community composition within the stream was compared to gut contents of Brook Trout inhabiting the stream. The objective of this study was to characterize Brook Trout foraging habits in a unique steppe-pool creek setting. During October–December of 2015, we used angling to capture fish ($n = 90$) of size classes ranging from 72 to 196 mm. We collected stomach contents with gastric lavage. We collected 4 samples of macroinvertebrates from the same reach with a Surber sampler inserted 15 cm into the substrate. All macroinvertebrate samples were identified in the lab to family. Using Ivlev's electivity index, which ranks diet preference in proportion to what is present in the habitat on a scale of -1 to 1, we found that Brook Trout selected for terrestrial invertebrates, with indices of 1. Indices for aquatic invertebrates varied, with midge larvae (Chironomidae) (0.89), Predatory caddisflies (Hydrobiosidae) (0.85), and Net spinning caddisflies (Hydropsychidae) (0.80) as the most selected. Habitat samples showed that caddisflies were few in number within the stream and that stoneflies (Plecoptera) were the most abundant. Brook trout readily sought out caddisflies and some other aquatic invertebrates while ignoring others. Stoneflies and annelids, though abundant in the habitat samples, were barely present or nonexistent within the stomach samples. This study suggests that Brook Trout eat everything that falls into the water similar to other studies that also show perfect indices of 1. In this habitat, Brook Trout resources are limited mainly to allochthonous terrestrial invertebrates.

Sun- 13

Is Stress at the Root of Eelgrass (*Zostera marina*) Decline in Frenchman Bay?

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Abstract - Eelgrass (*Zostera marina*), a key component of the marine ecosystem, has been declining in the upper Frenchman Bay since 2007, and in 2013 suffered a complete loss both in restored sites and surrounding naturally occurring Eelgrass areas. To complement and help guide restoration efforts, we wanted to understand the causes of decline. In this study, we aimed to determine if there was any correlation between plant stress, whether biotic (e.g., disease) or abiotic (e.g., heat stress or general stress), and the recent decline. We collected 10 eelgrass samples from each of 3 sites varying in eelgrass health and bed exposure (depth). Following RNA extraction and reverse transcription, I used real-time quantitative PCR to compare among the 3 sites the levels of expression of 3 stress genes known to modulate the responses of plants to heat, disease, and/or general stress. Here, I report normalized gene expression from the 3 sampled sites and explore possible correlations between biotic and abiotic stress, the health and status of the beds, and local eelgrass decline.

Sat- 25

Chloride Levels in Wetlands and Lakes of Allegany County, NY

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Abstract - Road-salt pollution, noted in suburban areas across the northeastern US, has prompted controls on application in watersheds serving municipal reservoirs. We measured levels of chloride from wetlands and lakes in Allegany County with its low population density (48/mi²), using a Seal AQ2 multichannel analyzer. 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 and 7.2 mg L⁻¹) in lakes nearer roads and human residences (Rushford Lake and Cuba Lake, respectively). We also noted some differences with higher concentrations from winter 2014, which suggest that winter severity (and the intensity of road-salt application) influences chloride levels in wetlands and lakes.

Sat- 17

Comparison of the Genetic Composition and Colony Structure of *Formica glacialis* Ant Nests Over Time

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Abstract - As a common ant species on the SUNY Geneseo campus, *Formica glacialis* is a useful organism for studying the causes of distribution and movement patterns. Since 2008, we have been mapping and monitoring its nests in the 8-ha (20-acre) Spencer R. Roemer Arboretum and have found that its colonies can be disrupted by the activity of slavemaking ants. These slavemaking ants, predominantly *Formica subintegra*, are social parasites that raid host ant nests to capture their brood; captured immature ants will become *F. subintegra*'s workforce, providing care for the slavemaker offspring and foraging outside the nest for food. Exploitation by slavemaking ants may disrupt host colonies, inducing them to vacate their nest and relocate or resulting in colony death. The genetic composition of an active nest may thus change over time because of relocation of host colonies or founding of new colonies in evacuated nest mounds. Therefore, once-inhabited nests can be re-occupied by new host colonies. To determine whether such changes are taking place, we compared the genetic composition of *F. glacialis* workers collected from the Arboretum 5–6 years ago to workers from the same active location in summer 2015. DNA was extracted from 6 workers per colony, amplified at the microsatellite loci using PCR, and analyzed for presence of expected bands using gel electrophoresis. We sent samples for fragment analysis to an external lab and interpreted results using GeneMarker software to genotype each ant at each microsatellite locus. By examining the genetic composition of the samples collected in the 2 time periods, we are able to determine whether they represented the same or a different host colony. These results will provide insight into the stability of colonies over time, which is especially interesting given the potentially disruptive effects of exploitation by slavemaking ants.

Sun- 6

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

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Abstract - I compared competition both intra- and inter-specifically for *Centaurea stoebe* subsp. *micranthos* (Spotted Knapweed) and *Dactylis glomerata* (Orchardgrass) through a greenhouse trial with a target–neighbor experimental design. Target individuals were centrally planted with various setups of 0, 2, 4, or 6 neighboring individuals to observe competitive effects and responses. Intraspecific trials resulted in Orchardgrass with a steeper, negative trend-line indicating competition and stronger neighbor competitive effects. Spotted Knapweed trials revealed a shallower, negative trend-line depicting better competitive response of target plants with competition present. Interspecific trials showed target Spotted Knapweed vs. neighboring Orchardgrass with slightly steep, negative trend-line meaning somewhat strong neighbor competitive effects. However, target Orchardgrass vs. neighboring Spotted Knapweed displayed a slightly positive, shallow trend-line indicating no competition between the 2 species in this particular setup. This was an unexpected and interesting result that calls for additional future research on this phenomenon.

Sun- 4