

2015 Northeast Natural History Conference Poster Presentation Abstracts

Listed alphabetically by presenter

Facilitating Multi-Factorial Experiments on Potential Recruits to Marine Biofouling Communities

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Abstract - The rapid growth of dominant competitors in the hospitable physical environment of artificial structures floating in shallow marine environments is one factor that makes frequent quantification of early settlement patterns in a biofouling community challenging. As dominant, competitive invasive species have become more abundant on floating hard structures and severely threaten native species communities in embayments, determining the relative availability of native species that could initially settle and documenting the first occurrence of an exotic species has become more important. Local citizen groups often support these scientific monitoring efforts, but labor-intensive methods associated with retrieving settlement plates from dock undersides and scraping dock pilings to quantify organisms can hinder frequent data collection. This study utilized microscope slides housed in microscope slide boxes as settlement plates to determine their suitability for rapidly quantifying early settlement in a fouling community. I suspended 12 boxes, each containing 6 slides separated by 1.5 cm, 3 m off the Fox Point Dock in Boston Harbor, MA, in September 2014. After 2.5 weeks, I examined the slides and found that a tubicolous amphipod species and an assemblage of tunicates dominated the slides. In addition, this study tested how 2 factors, slide orientation (vertical or horizontal) and slide texture (rough or smooth), affected their settlement. The relative ease of deployment and data collection indicate that this technique should prove useful in multi-factorial designs to frequently test for the abundances of native and invasive species during early settlement and the microhabitat characteristics that affect their settlement.

Sun- 6

What's in Your Nest? Effect of Nest Removal on Bacterial Diversity in Eastern Bluebird Nests

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Abstract - *Sialia sialis* (Eastern Bluebird) is a species of interest due to its reliance on man-made structures. Because bluebirds do not remove nest materials from cavities once they have finished nesting, nests and their associated parasites, pathogens, and microbes remain in the cavity and can potentially colonize subsequent nestlings. Previous research provides conflicting evidence of whether birds prefer or avoid cavities in which nest materials have been removed. This study examined the impact of nest removal on nest success, number of fledglings produced, nestling condition, and bacterial communities in nest boxes across the breeding season. We monitored 43 nest boxes from 13 April to 23 August 2012 in western Pennsylvania between two treatments: nest removed (nest removed after 1st and 2nd nest attempt) or nest intact (nest removed only after 2nd nest attempt). We assessed bacterial diversity by comparing the abundance and size of terminal restriction fragments (TRFs) of the 16S ribosomal RNA genes between samples. Mean nest success (60%) and number of fledglings (3.9 ± 0.1 SE) did not differ by treatment (all $P > 0.343$). There was no significant effect of treatment on body condition after controlling for age ($F_{2, 10} = 0.02$, $P = 0.979$). We found no significant difference in bacterial abundance ($P > 0.42$). However, we did find a difference in composition of microbial communities between nest categories; in particular, intact nests had fewer TRFs and a lower diversity index ($t > 3.254$, $P < 0.006$). Comparison of TRFs to databases of bacterial ribosomal RNA genes provided some insight as to the potential identity of species. While TRFs in our profiles matched some species of potential opportunistic pathogens (i.e., *Propionibacterium*, *Clostridium*, and *Methylobacterium*), the presence of these species in nests remains to be conclusively demonstrated and their potential impact remains unknown. While sample size limited the ability to determine if a decrease in diversity is better or worse for the health and success of nestlings, it may be a starting point for understanding why adults might discriminate between used or new nests given the common reuse of cavities.

Mon- 2

Determination of Colony Structure in *Formica pergandei* Using Microsatellite Markers

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Abstract - Slavemaking ants are social parasites that conduct raids on their host species, stealing their brood and bringing them back to the slavemaker's nests where they are raised and become workers for the slavemakers. The Roemer Arboretum at SUNY Geneseo houses two species of slavemaking ants, *Formica pergandei* and *F. subintegra*, which parasitize the more abundant host, *F. glacialis*. *Formica pergandei* is less common than *F. subintegra*, and thus not as extensively researched. Colony structure in the genus *Formica* is variable: colonies can have one (monogynous) or multiple (polygynous) queens. Previous work at SUNY Geneseo discovered that *F. subintegra* was highly polygynous. This study aims to determine the colony structure of *F. pergandei*, which differs from *F. subintegra* in some ecological habits. In ant colonies with only one queen, workers will share a very high relatedness coefficient (0.75) due to haplodiploidy. However, if there are multiple queens within the colony, genetic variation increases and the relatedness coefficient within the colony will decrease significantly below 0.75. We collected workers of *F. pergandei* from the four colonies in our field site. DNA was extracted and then amplified via PCR using primers developed for other *Formica* species. Fragment analysis was performed at an external lab, and results were interpreted using GeneMarker software to genotype each ant at each microsatellite locus. Using these genotypes intra-colony, we estimated relatedness to determine whether each colony exhibits monogyny or polygyny. These results contribute to our understanding of the population biology of this little-known ant species.

Mon- 24

Abundance and Distribution of Plastic and Organic Wrack along the Southeast Shore of Lake Ontario

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Abstract - Plastics have many manufacturing advantages due to their durability and low production cost. However, when not disposed of properly, plastics can accumulate in bodies of water. Although much work has been conducted on marine plastic pollution, relatively few studies have examined plastic accumulation in the Laurentian Great Lakes. We sampled four different locations along southeast Lake Ontario: Sterling Nature Center (Sterling, NY), Oswego Beach (Oswego Town, NY), SUNY Oswego's campus (Oswego Town, NY), and Mexico Point Park (Mexico, NY). We randomly sampled 2.0 m x 5.0 m plots ($n = 10$ / location) and 0.25 m x 0.25 m plots ($n = 20$ / location) to quantify surface plastics, embedded plastics, and organic wrack. We sorted organic wrack from plastic refuse and categorized plastics by origin, weight, and size. Of the 1631 pieces of plastics collected, 35 (2.15%) were obtained from Sterling Nature Center, 365 (22.38%) from Oswego Beach, 352 (21.58%) from SUNY Oswego, and 879 (53.89%) were from Mexico Point Park. The most abundant items collected were shards, bottle caps, intact fragments, straws, and shot-gun shells. By weight, Mexico Point Park had the greatest accumulation of plastics, with 250.54 g/m² of embedded plastic and 20.51 g/m² of surface plastics (one-way ANOVA: $P = 0.04$ and $P < 0.0001$, respectively). Sterling Nature Center had the least amount of plastics, with 0.35 g/m² of embedded plastics and 0.23 g/m² of surface plastics (one-way ANOVA: $P = 0.04$ and $P < 0.0001$, respectively). At all sites, organic wrack was at least 6 times greater than plastic wrack. Organic wrack is central to shoreline trophic webs, and increased additions of plastics into wrack may have consequences for invertebrate communities.

Mon- 6

Top-Down Drivers of Red-Backed Salamander (*Plethodon cinereus*) Distribution in Hemlock Forests

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Abstract - *Tsuga canadensis* (Eastern Hemlock) stands are in decline and being replaced by deciduous *Betula lenta* (Black Birch) due to the invasion of *Adelgus tsugae* (Hemlock Woolly Adelgid). As a foundation species, the decline of Eastern Hemlock has great potential to impact associated plant and animal species, and alter forest-floor food webs. In this study, we explored how bottom-up changes in forest vegetation might impact *Plethodon cinereus* (Red-Backed Salamander) relative to other ecological interactions the species experiences, including competition with Carabid ground beetles and top-down effects by small-mammal predators, like *Blarina brevicauda* (Northern Short-Tailed Shrew). Using a set of 12 cover board arrays established in Fall 2012, we surveyed *P. cinereus* density on a biweekly basis during late Spring and Summer 2013 between 6 pairs of adjacent Eastern Hemlock and Black Birch plots at the Smith College MacLeish Field Station in Whately, MA, and a second site in Chesterfield, MA. We also collected data on the presence of small-mammal tunnels and Carabids under the cover boards. To date, we have not found consistent differences in Red-Backed Salamander abundance between Eastern Hemlock vs. Birch plots, although modest seasonal differences have been apparent in some surveys. In contrast, stronger patterns have emerged relative to small-mammal distribution, as gauged by the presence of tunnels. At the MacLeish site, where small-mammal tunnels are frequent, significantly fewer salamanders were found under cover boards with tunnels, regardless of forest canopy type. It is unclear whether this pattern represents the outcome of ongoing predation, or active avoidance of predation risk by Red-Backed Salamanders. To explore these patterns further, we are planning to experimentally expose Red-Backed Salamanders to Northern Short-Tailed Shrew pheromones to determine behavioral responses to predator cues and to use gut flushing in Red-Backed Salamanders to better establish how their food preferences compare with Carabid beetles. Overall, our results suggest that the distribution of Red-Backed Salamanders on the forest floor is more strongly influenced by top-down effects than bottom-up influences due to forest type. As such, this generalist forest species might not be strongly influenced by Eastern Hemlock decline.

Sun- 22

Prevalence of Parasitic Infections in Dogwhelks (*Nucella lapillus*)

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Abstract - Parasitic infections in marine animals are ubiquitous and affect the physiology and behavior of a host, which affects other members of the host's community. Trematodes are common marine parasites whose life cycles include multiple life stages and at least two hosts. The first host is usually a gastropod, and the definitive host is often a seabird. The predatory intertidal snail *Nucella lapillus* (Dogwhelk) is an intermediate host to trematode parasites, but there is little information about the prevalence of parasitic infections in these snails. I surveyed snails at 4 New Hampshire beaches to identify the parasites present and determine the prevalence of parasitic infections in Dogwhelks. All snails encountered were collected, transported to the laboratory, and housed individually overnight. I dissected the snails and examined their water for cercaria larvae. I recorded the density of Dogwhelks at each site, each snail's gender, shell size (to estimate age), and infection status to determine whether Dogwhelk density, gender, or age affect the prevalence of parasitic infections. Of all Dogwhelks I surveyed, 1.9% had parasitic infections. Two trematode species were present and tentatively identified as *Parorchis acanthus* and *Renicola thaidus*. Density of Dogwhelk aggregations and snail gender had no effect on the prevalence of parasitic infections, while adult snails (≥ 23 mm in length) had more infections than subadult snails (< 23 mm in length).

Mon- 4

Effects of Human Activity and an Invasive Species on Intertidal Communities in Southern New England

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Abstract - Human activity and the introduction of invasive species commonly have negative effects on biodiversity. The purpose this study was to characterize the effects of measures of human activity (e.g., population density, distance to roads) and abundance of an invasive species, *Hemigrapsus sanguineus* (Asian Shore Crab), on intertidal invertebrates on rocky shores in southern New England. Thirteen sites in Massachusetts and Rhode Island were sampled from June through October. Species diversity of invertebrates at these sites ranged from 1.15 to 4.31, and species richness ranged from 3 to 9. Unexpectedly, species diversity correlated positively with human population density and abundance of Asian Shore Crabs, although species richness showed no such pattern. Humans and Asian Shore Crabs may disproportionately affect abundances of dominant species, thereby increasing species evenness. In addition, a positive correlation was observed between abundance of *Mytilus edulis* (Blue Mussel) and species richness, suggesting that Blue Mussel is a foundational species, providing habitat or resources that promote the persistence of other species. The increase of human population density and Asian Shore Crab abundance could therefore be influencing a decrease of the most prominent intertidal species, but not yet effecting species richness.

Mon- 18

Monitoring Prevalence of Lyme Disease in *Ixodes scapularis* (Black-legged Tick) in Northern New York

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Abstract - *Ixodes scapularis* (Black-legged Tick), which is a vector for *Borrelia burgdorferi*, the spirochete associated with Lyme disease, is prevalent in Northern New York. In the process of parasitizing small animals, the Black-legged Tick infects the host species and perpetuates the ecological cycle of the Lyme bacterium. We performed drags to capture Black-legged Tick weekly from May to July at 3 regional sites. At each site, we sampled ticks from 5 unique microhabitats (i.e., disturbed, forest edge, forest interior, grassland, and wetland). Tick abundance was greatest in the Chesterfield/Peru and the Plattsburgh/Chazy sites, and rare in the Watertown sites. We performed DNA extractions followed by nested PCR to detect the Lyme spirochete bacterium. We collected a total of 170 ticks at all sites, with 57% of the total collected ticks testing positive for Lyme disease. A majority ($n = 109$) of the total ticks were collected during June. The forest edge ticks, which were collected predominantly in Chesterfield/Peru, had the highest occurrence (79%) of Lyme disease as compared to the other microhabitats. Of the microhabitats, the grassland had the lowest prevalence (44%) of Lyme disease. Temporally, only a third of the ticks from the month of May tested positive, which increased to 57% in July. The regional Lyme prevalence pattern could be the result of habitat suitability for the important hosts *Peromyscus leucopus* (White-footed Mice) and *Tamias striatus* (Eastern Chipmunks) in Chesterfield/Peru due to the prevalence of *Quercus* spp. (Oak) and *Pinus rigida* (Pitch Pine) there. The sites with high Lyme occurrences are actively managed for timber, which increases production of acorns in this sandy barren habitat. This preliminary study suggests that Lyme disease is present in the northern New York, with the occurrence of Lyme disease in Black-legged Ticks being the highest along forest edge microhabitat in lower elevations of the Champlain Valley.

Sun- 34

The Effect of the Invasive Crayfish (*Procambarus clarkii*) on Leaf-Litter Decomposition

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Abstract - Understanding the ecological impacts of invasive species is of pressing concern due to their presence in nearly every type of ecosystem across the globe. Aquatic ecosystems appear particularly vulnerable to invasion because they “collect” materials from their surrounding watershed. In aquatic ecosystems of the northeastern US, invasive crayfish have been shown to have great influence on their native counterparts, but their impacts on the ecological functioning of the streams in which they occur are less understood. To document the effects of invasive crayfish on ecosystem processes, we conducted a mesocosm experiment using the native crayfish species *Orconectes limosus* (Eastern Crayfish) and *Orconectes virilis* (Virile Crayfish) and the invasive *Procambarus clarkii* (Red Swamp Crayfish). The ecological process monitored was the decomposition of leaf-litter. Leaf-litter decomposition rates were significantly higher in mesocosms containing the invasive Red Swamp Crayfish than either native crayfish species ($P = 0.002$). This result was likely due to the increased size of Red Swamp Crayfish relative to the native species. These data demonstrate the potential for invasive crayfish to affect ecosystem processes (i.e., decomposition rates) and in turn alter nutrient cycling in stream ecosystems.

Sun- 7

Phylogenetic Analysis of Several New Populations of *Stygobromus allegheniensis* (Allegheny Cave Amphipod) in the Ice Caves of the Shawangunk Ridge, NY

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Abstract - *Stygobromus allegheniensis* (Allegheny Cave Amphipod) is a troglobitic crustacean commonly found in caves of the Northeast. We describe several new populations from the unique tectonic ice caves found in the Shawangunk Ridge. While most previous reports of Allegheny Cave Amphipod are from limestone caves, these new localities are from tectonic caves, which are comparatively smaller and formed through cracks in the bedrock. Due to a paucity of large samples, it had previously not been possible to rule out if *S. allegheniensis* is in fact a complex of sister species. In this study, phylogenetic analysis was conducted for new populations collected from ice caves in the Shawangunk Ridge (Ice Cave #1 in Sam's Point Preserve and Xanadu Cave at the edge of Mohonk Preserve) as well as for a population 100 km away in Clarksville Cave, Clarksville, NY. DNA sequence data for histone H3 and morphological analysis support that the amphipods found in these new localities do not exhibit such extensive variability that would warrant their characterization as a sister species. Since the 3 cave localities are 100 km distant from each other and isolated by different rock formations, they must represent independent cave colonization events. It is likely that Allegheny Cave Amphipod is able to survive in subsurface environments other than caves, such as the hyporheic zone, so that a certain extent of gene flow could be maintained to retain an identical histone H3 haplotype across the cave populations.

Sun- 29

Effects of Native and Non-native Fruits on Plasma Metabolites in a Captive Migratory Songbird

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Abstract - Migratory birds require high-quality stopover sites that provide sufficient food for rapid fat storage to meet the energetic challenges of migration. The quality and availability of food can influence site use by songbirds as well as their fattening rates during short stopovers. Thus, the recent invasion of non-native shrubs in habitats used by birds at important stopping points may have consequences for refueling if their fruits are less nutritious or desirable to birds than the fruits of native shrubs. We conducted a pilot study of captive *Catharus guttatus* (Hermit Thrush) as a representative seasonally frugivorous migrant that relies on fruits during fall migration. Birds were captured at the Braddock Bay Bird Observatory, located at an important stopover site on the south shore of Lake Ontario. The birds were held in captivity for 4–5 days during which they were transitioned to a diet of either native fruit or invasive fruit. Previous nutritional analyses indicated differences among the fruits, with non-natives being generally less energy-dense and fatty than native fruits. On the final day of the holding period, the birds were fed solely on their fruit diet for approximately 5 hours before sampling. Blood samples were collected for analysis of plasma triglyceride (fattening rate) and uric acid (dietary protein). The weight and number of fruits consumed prior to sampling was also measured. Preliminary results suggest a trend toward higher plasma triglyceride in birds consuming native Gray Dogwood, which is also high in fat content and energy density. Future work will focus on additional native and non-native fruits and will expand plasma analyses to include free fatty acids and total antioxidant capacity in order to better understand the effects that the native and non-native shrubs can have on the physiological condition of the birds.

Sun- 1

Effect of North American Porcupine (*Erethizon dorsatum*) Herbivory on Forest Diversity

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Abstract - While typically considered a generalist species, *Erethizon dorsatum* (North American Porcupine) is a mammalian herbivore that survives harsh winters by specializing on a selective diet of bark and coniferous needles. This feeding behavior disturbs forests by damaging trees, sometimes lethally. The intermediate disturbance hypothesis states that biodiversity is maximized in habitats that experience moderate levels of ecological disturbance. Porcupine herbivory, as an agent of intermediate disturbance, may play an important role in stimulating forest biodiversity. We tested this hypothesis by comparing areas in forests actively inhabited by Porcupines to control areas in the same forests with little to no indication of Porcupine foraging. We established research sites in state forests in northern New York between 2011 and 2015. At each site we established a 1000-m² plot and recorded the species, DBH, vitality, and age class of every tree taller than 1.5 m. We also examined the selectivity and severity of winter foraging by assigning each tree a wound score that reflected the degree of damage caused by Porcupine feeding. This information was then used to assess the effects of Porcupine foraging on the structural, compositional, and functional diversity of the study forests. Additional studies are necessary to further our understanding of the role Porcupines play in structuring northeastern forests and to determine if they have the potential to promote diversity long-term.

Mon- 13

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

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Abstract - We studied movements of the damselfly *Calopteryx maculata* (Ebony Jewelwing) during the summers of 2011 and 2012 at South Brook, Bridgewater, MA, to determine distances traveled by adults along this stream during breeding season and whether they cross an anthropogenic barrier, Summer Street. In 2011, we tagged 226 individuals and had 144 total recaptures with 32 individuals recaptured multiple times. Average distance moved between captures was 36.7 m, with a maximum of 240 m. Most individuals moved within 0 to 15 m of their previous capture site. Significantly more individuals moved upstream (47%) than moved downstream (21%) or showed no movement (33%) in 2011, but no significant differences in movement direction occurred in 2012. Significantly more males moved downstream in 2012 than females, and significantly more males remained in their original marking zone in both years. In 2012, of 351 individuals tagged, 247 were recaptured, with 66 individuals caught multiple times. Maximum distance moved was 360 m. Numbers of marked males and females moving up or downstream were more equally distributed than in 2011, with slightly more not moving (no movement = 39.7 %, upstream movement = 31%, downstream movement = 28.7%). Males comprised 59.1% of the 149 recaptures that had moved and 69.0% of the 98 non-movers. Movers exceeded non-movers for both males and females in both years. Also in both years, numbers of males remaining in their original marking zone exceeded females by at least 2 times, reflecting the territorial behavior of breeding males. Ten males and 10 females crossed Summer Street in 2012 compared to only 2 individuals in 2011. Average movements of male and female crossers were 165 m and 265 m, respectively. Movements and breeding behaviors will be compared with respect to changes in stream flow during the 2012 breeding season.

Sun- 30

Invasive Species Impact on Leaf-Litter Decomposition in an Aquatic System

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Abstract - Invasive species have been shown to change the structure and function of ecosystems, in part due to their functional traits. Though our understanding of such changes is increasing, scientists have not yet determined the abundance of invasive plants necessary to affect ecosystem processes such as decomposition rates or how these effects and thresholds may vary between terrestrial and aquatic ecosystems. We examined how the aquatic leaf-decomposition rate was altered in northern New York when native *Alnus incana* ssp. *rugosa* (Speckled Alder) leaves and non-native *Rhamnus cathartica* (European Buckthorn) leaves were added to litter bags in the following ratios: 100% native (N), 75% N to 25% invasive (I), 50% N to 50% I, 25% N to 75% I, and 100% I. Litter bags were added to the stream in the first week of November and removed after one month in both 2013 and 2014. All procedures used were provided by the Ecological Research as Education Network's (EREN) protocol on Decomposition in Aquatic and Terrestrial Invaded Systems (DATIS). We additionally conducted a lignin analysis for both species to evaluate lignin concentration as a possible mechanism for variation in decomposition rates. All treatments including the invasive buckthorn had a greater relative decomposition rate than the 100% native treatment, and the relative decomposition rate of the 100% invasive treatment was 3.7 times greater than the 100% native treatment. Speckled Alder leaves consisted of 34.7% lignin, and European Buckthorn had only 6.1% lignin. We identified the ecological threshold at which the leaf-litter decomposition rate was significantly altered compared to that of pure native alder leaves to be 25% invasive European Buckthorn litter, which may be attributed to the difference in lignin concentration between the two species.

Sun- 8

Camera Traps in Public Parks: A Non-Invasive Method for Wildlife Surveys in Recreation Areas

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Abstract - Wildlife surveys of public land present a unique set of challenges. Techniques such as the use of physical traps may be prohibited by law, or undesirable due to the high level of human activity. Camera trapping is a non-invasive technique that may be more feasible in these situations. Camouflaging camera traps and carefully selecting deployment sites can minimize the risk of equipment theft. We conducted Surveys of *Odocoileus virginianus* (White-Tailed Deer) camera trap surveys were conducted in 3 public parks (Mendon Ponds, Ellison Park, and Luciean Morian Park) in Monroe County, NY. Surveys were done as part of an overall wildlife monitoring study in local Monroe County parks of large mammal herbivore populations. We used Data collected from fieldwork was gathered by remote sensor activated field cameras. remote cameras were used in an effort to test the effectiveness of the instrument at recording population data in a passive, non-invasive way in the environment; and its value as a potential tool for future research. Prior to deployment of cameras, we surveyed potential study sites on foot to check for signs of the target species, and remote cameras were placed in locations with high concentrations of *Odocoileus virginianus* (White-Tailed Deer) activity and to map trails and human activity. We camouflaged cameras with polyester fibers. Remote cameras were placed in both coniferous and deciduous forest locations, in both raised upland areas and near wetlands. All remote cameras were tree mounted and camouflaged with a fabric netting material. Data was collected from remote cameras every 14 days and analyzed. Data was analyzed using eMammal™ software™. Analyzed data showed high concentrations of *Odocoileus virginianus* (White-Tailed Deer) at public parks in Monroe county as well as the presence of other large mammals such as *Canis latrans* (Eastern Coyote/Coy Wolf). Data showed that *Odocoileus virginianus* (White-Tailed Deer) present in the parks tended to feed in wetland areas and bed down in raised upland conifer tree dense geographic patches.

Mon- 11

Exploring Causes of Variation in the Richness of Endemic Forest Plants across the Eastern United States

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Abstract - Temperate deciduous forests in the eastern United States are home to many endemic plant species with very limited ranges; however, the distribution and richness of these species is not homogeneous. For example, New England has very few endemic forest plants, while some areas in the Southeast US have large numbers of endemics. Because species with very limited ranges are a priority for conservation and are predicted to be at great risk from climate change, we sought to investigate the environmental and biogeographical factors related to their current diversity, and to consider how this information might guide future conservation efforts. We used ArcGIS to compile county-level distribution data for 262 forest plant species with small ranges, and tabulated endemic species richness (ESR) for all eastern US counties. We then explored how ESR varied with mean annual precipitation, mean temperature, elevational range, and distance from the last Pleistocene glacial maximum (LGM). Relative to climate, results showed a positive correlation between mean precipitation and ESR, while results for mean temperature followed a unimodal curve, with ESR increasing up to ~13 °C, then decreasing at higher temperatures. These broad trends reflect the overall concentration of forest plant endemics in the warmer and moister Southeast, as compared to the Northeast or upper Midwest, and their tapering off in hotter and drier climates to the south and west. However, a prominent step-like decrease in ESR was also detected approximately 200–300 km south of the LGM, distinct from the gradual latitudinal gradient in climate. As such, the absence of forest plant endemics in the Northeast and upper Midwest might relate in large part to past glaciation, as opposed to modern climate. In areas south of the LGM, we examined ESR relative to elevational range within counties. This factor is expected to have buffered endemics from rapid climate change in the past and might have been key to the formation of Pleistocene refugia. We found a highly significant positive correlation between elevational range and ESR ($R^2 = 0.59$, $P < 0.001$), suggesting that past climate change might still be a key factor explaining the modern distribution of endemics in the Southeast. Given these patterns, it seems unlikely that endemics can respond rapidly to climate change.

Sun- 19

Genetic Identity and Colony Structure of *Formica glacialis* Colonies Before and After Slavemaker Occupation

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Abstract - Slavemaking ants exploit other species of ants in their environment by raiding their colonies and capturing their brood to be reared as slaves in the slavemaker colony. The Spencer J. Roemer Arboretum, an 8-ha patch of secondary successional forest on the SUNY Geneseo campus, is home to the slavemaking ants *Formica subintegra* and *Formica pergandei* and their host species, *Formica glacialis*. Sometimes the slavemaker ant colony moves into a recently raided host nest to gain better access to other host colonies to exploit. After the slavemakers move out of this nest to relocate yet again, occasionally a host colony establishes itself in the same nest location. Previous to this work, it was unknown whether this host colony is a remnant of the original host colony before its occupation by the slavemaker or if it was subsequently founded by a new host queen. For this study, ant workers from *F. glacialis* nests that had previously been occupied by slavemaker ants were collected in July and August 2014. The colonies that were used for the analysis were also sampled before the slavemakers occupied the nests. DNA was extracted from individuals, amplified at microsatellite loci using PCR, and analyzed for the presence of the products using gel electrophoresis. Fragment analysis was performed to determine the genotypes of the ants at four microsatellite loci. Based on the genetic composition of the samples collected before and after slavemaker occupation, we determined whether they represented the same or different host colonies. These results give insight into the effects of slavemaker nest occupation on the host species *F. glacialis*, a potential impact which has not been investigated before.

Mon- 26

The Relative Efficacy of Natural vs. Synthetic Tick Repellants

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Abstract - *Ixodes scapularis* (Black-legged Tick) is a vector of a variety of pathogens including the causative agents of Lyme disease, babesiosis, anaplasmosis, and Powassan virus disease. Recent decades have seen concomitant increases in Black-legged Tick geographic range and population density as well as in tick-borne disease incidence in the Northeastern US. Tick-borne diseases can be debilitating and in some cases fatal, and Lyme disease in particular has a reputation for triggering chronic symptoms. Although DEET is an effective tick-bite deterrent, natural alternatives are popular with some people and may have fewer side effects. We used controlled laboratory trials with live Black-legged Ticks to test the relative efficacy of Oregano oil, Tea Tree oil, and DEET. Trials were designed to compare olfactory vs. tactile efficacy at two different treatment dilutions. Black-legged Ticks were placed on an experimental apparatus that required them to cross a treatment barrier and we recorded the time taken to cross the barrier. The apparatus could be configured so that ticks either crossed the barrier directly (tactile) or on a screen above the treatment (olfactory). In our trials, Tea Tree oil was more effective at repelling ticks than DEET in most combinations of treatment concentration and apparatus configuration, and the relative efficacy of Tea Tree oil was most pronounced at the highest dilution. DEET was more effective than Oregano Oil. While our results suggest that effective natural alternatives to DEET may exist, our trials lasted approximately 15 minutes, and the efficacy of each compound might change over longer durations.

Sun- 33

Vernal Pool Bryophytes of Acadia National Park, Maine

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Abstract - Woodland vernal pools in the northeast have been widely studied for their role as a habitat for invertebrates and amphibians, but the floras of woodland vernal pools in the northeast remain relatively overlooked. Vascular and lichen flora projects in Acadia National Park (ANP) have recorded several uncommon species and new records to the flora of the park. This project will likewise expand our knowledge of the bryoflora of ANP. This project aims to identify (a) if there is a unique bryoflora common to the vernal pools, (b) how the bryoflora of a vernal pool depends on the bryoflora of the surrounding woodlands, (c) how bryofloras of vernal pools within the boundary of a 1948 fire compare to those outside the fire boundary, and (d) what environmental factors are correlated with differences in species richness and diversity inside and outside the vernal pools. Additionally, this project will provide insights into the value of vernal pools as habitat for rare species of bryophytes and will provide baseline data for future studies as the forests continue to recover from the 1948 fire and as the climate changes.

Sun- 18

Macrofungi Richness and Forest-Floor Characteristics in Hemlock vs. Black Birch Forest Plots

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Abstract - In New England, two exotic insect pests are currently threatening *Tsuga canadensis* (Eastern Hemlock) forests: *Adelges tsugae* (Hemlock Woolly Adelgid) and *Fiorinia externa* (Elongate Hemlock Scale). In southern New England, Hemlock decline typically leads to its replacement by *Betula lenta* (Black Birch), a deciduous tree species with very different environmental and ecosystem effects. In order to examine the potential impacts of this compositional shift on forest-floor characteristics and the fungal community, we surveyed spatially paired hemlock vs. birch plots for macrofungi fruiting bodies and soil organic layer features. Surveys of macrofungi fruiting bodies were conducted on an approximately bi-weekly basis in summer and early fall of 2014 in 6 pairs of 10 m x 15 m forest plots in Chesterfield, MA, and at the MacLeish Field Station in Whatley, MA. The soil organic layer was also sampled for depth, dry mass, and C:N content. Although we found significantly greater organic layer depth, dry mass, and C:N content in the hemlock plots ($P < 0.05$), none of the survey dates yielded significantly different values for the richness of macrofungal morphospecies between hemlock vs. birch plots (P -values range = 0.22–0.92). However, there were differences in the distribution of fruiting bodies within some of the more abundant macrofungi taxa between hemlock vs. birch plots. For example, *Cortinarius armillatus* was most common in hemlock plots (95% of its fruiting bodies), while other common species, including *Amanita* sp., *Lactarius gerardii*, and *Leotia lubrica*, were more frequent in birch plots (80%, 78%, and 77%, respectively). All abundant species analyzed were mycorrhizal. The lack of a detectable difference in overall macrofungi richness between hemlock vs. birch plots might be due to a lack of host specificity, or the two forest types might have different but equally species-rich macrofungal communities. Nevertheless, as the differences in tree species composition and our data on the soil organic layer make clear, it is likely that the forest-floor environment for both mycorrhizal and saprobic fungi differs substantially between hemlock- and birch-dominated forests.

Sun- 20

Restoring Habitat with Native Flowering Plants Benefits Wild Bees in an Urban Landscape

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Abstract - Native bees provide critical pollinator services for both cultivated and wild flowering plants, yet the status of many bee populations is either poorly understood or has declined in the past 30 years. Habitat degradation and urbanization, especially the loss of floral and nesting resources, is hypothesized to negatively impact wild bee populations. In a sea of urbanization, college campuses in cities have the potential to be native habitat islands for wildlife. To improve natural habitat in an urban landscape, Massasoit Community College has converted mowed lawns to native-plant sanctuaries. Our experiment sought to better understand how habitat restoration impacts wild bee populations. We sampled the bee community at Massasoit along a 120-m transect that began at the native meadow and extended farther than the maximum foraging distance of most small bees. We collected bees using pan traps and measured wild bee abundance, diversity, and richness. Surprisingly, distance from native plantings did not impact wild bee abundance. However, distance from native plantings did impact wild bee diversity and richness. The two most abundant bees collected were small carpenter bees from the genus *Ceratina* and green sweat bees from the genus *Agapostemon*. The abundance of *Ceratina* was much higher at or within 40 m of the meadow, while the abundance of *Agapostemon* did not appear to be influenced by distance. *Ceratina* nests in cavities of stems and dead wood, while *Agapostemon* nests in loose to compact soil. Our results indicate that abundance might be correlated with nesting preference. Although nesting resources are often overlooked in landscape restoration, our study suggests that planting native flowering forbs increases the availability of nest sites in an urban landscape and may benefit cavity-nesting bees.

Sun- 32

Seasonal Dynamics of Macroinvertebrate and Microbial Communities in Temporary Surface Waters

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Abstract - Temporary aquatic habitats including vernal pools, other emergent wetlands, and intermittent streams in northeastern Ohio were surveyed over a two-year period to characterize the macroinvertebrate and microbial communities and physicochemical characteristics of each habitat type. Macroinvertebrate community variability was greater between habitat types than within types suggesting that habitat type does play a role in selecting for invertebrate species present at a site. Duration of inundation of the habitat was the single largest determining physicochemical factor of benthic macroinvertebrate community structure. Microbial community composition varied across season and habitat type. Variability within habitat types was greater than between. It is not clear what factors are driving microbial community composition. A fall and spring aquatic leaf-litter decomposition study was performed to assess the functional responses of the various habitat types. Spring litter decomposed quicker than fall and was correlated to length of inundation.

Mon- 21

Brood-Care Behavior of Free-living vs. Enslaved *Formica glacialis* Ants

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Abstract - Social parasitism is defined as an interaction between two species in which one species benefits from the social behavior of the other. Slavemaking ants are just one example of a highly specialized social parasite. In our study system in Western New York, the *Formica glacialis* ant species is often exploited by the slavemaking species *Formica subintegra*. *Formica subintegra* colonies capture pupae from *F. glacialis* colonies in order to rear and subsequently utilize the adults as a workforce. As a result of this interaction, *F. glacialis* adults routinely raise both *F. glacialis* and *F. subintegra* pupae from other colonies. We investigated the propensity for free-living *F. glacialis* adults to raise non-nestmate pupae, as compared to enslaved *F. glacialis* adults. Free-living *F. glacialis* adults were paired with nestmate and non-nestmate pupae, and enslaved *F. glacialis* ants were also paired with non-nestmate free-living pupae (simulating the captive brood that they must care for). In all three treatments, *F. glacialis* adults successfully raised all of the pupae, suggesting a lack of nest-specific pupal recognition in the species. Such behavior may facilitate the exploitation of *F. glacialis* by slavemaking ants.

Mon- 25

Potential Effects of Eastern Hemlock Decline on the Hemlock-associated Liverwort *Bazzania trilobata*

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Abstract - *Bazzania trilobata* is a leafy liverwort species that often occurs in association with *Tsuga canadensis* (Eastern Hemlock) in New England. The impending loss of hemlock due to the invasive insects *Adelges tsugae* (Hemlock Woolly Adelgid) and *Fiorinia externa* (Elongate Hemlock Scale) raises concerns about the future of this ecosystem and species that might be dependent on its unique conditions, such as *B. trilobata*. Ecological changes already observed in this system include the replacement of evergreen hemlock with deciduous *Betula lenta* (Black Birch) canopies, shifts that are known to increase light exposure and raise temperatures, possibly putting light- and moisture-sensitive understory species at risk of decline. Similar environmental impacts might also be occurring in this system through the forest-management technique of salvage-logging hemlocks prior to their death due to exotic insects. To test both the likely response of *B. trilobata* to these environmental changes and the species' reliance on hemlock forests, we initiated a multi-year transplant experiment testing survival and growth across a range of physiographic settings and under forest canopies of varying proportions of hemlock to deciduous tree species composition at Smith College's MacLeish Field Station in western Massachusetts. By exposing *B. trilobata* to a range of novel conditions relative to its natural habitat, we can begin to consider the importance of hemlock to this liverwort. We also executed a second transplant experiment into a recently logged site to consider the potential impacts of salvage logging. Results from the initial transplant suggest that *B. trilobata* can generally survive in areas with modest hemlock canopy decline and mesic forest-floor conditions, but declines at both the drier and wetter ends of the soil-moisture gradient examined. More strikingly, solar radiation levels, as determined by local slope and aspect, emerged as a significant predictor of plant decline, raising the possibility that hemlock canopy thinning and death might eventually expose *B. trilobata* to unsuitable, higher light conditions on sites other than north-facing slopes. Nevertheless, preliminary findings from the salvage logging experiment suggest that the vigorous growth of early successional herbs and shrubs might protect *B. trilobata* from excess light and bleaching.

Sun- 21

Preliminary Investigation of the Use of CT Imaging as a Technique to Age *Mola mola* (Ocean Sunfish)

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Abstract - The focus of this research project is to investigate the use of CT imaging as a tool for analyzing *Mola mola* (Ocean Sunfish) vertebrae for aging purposes. Ocean Sunfish vertebrae can be used to age specimens if they can be counted in a repeatable manner. Counting these bands is difficult because the centrum are deep and not all bands are easy to decipher. One solution is to cut the vertebra through the center of the centrum to produce sections or wedges, yet this offers its own set of challenges given the large size of the vertebrae. Another solution is to enhance the bands through the use of bone stains or heat treatments. These types of tissue preparations can be time-consuming and cost prohibitive. Another possible solution is to virtually section the vertebra using CT imaging techniques. Preliminary analysis of CT scans of Ocean Sunfish vertebra collected at Beth Israel Deaconess Hospital in Boston has shown some promise as an aging technique for this species. Although CT imaging can be expensive with respect to machine time, this technique may be the most cost-effective because it eliminates both the time and cost associated with standard aging preparations that include cutting and staining. Vertebra samples were provided by the New England Coastal Wildlife Alliance (NECWA), a nonprofit organization that responds to stranded ocean sunfish in New England waters. CT scans of Ocean Sunfish vertebrae were taken at Beth Israel Deaconess Hospital and from these images, independent band counts were conducted. These counts were compared with those collected from more traditional aging preparations that include the sectioning of vertebra into bow-tie cuts. Additional CT scans of Ocean Sunfish vertebra will be conducted in the spring of 2015 to provide a larger sample size.

Sun- 4

Poultney River Bat Community Restoration Plan

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Abstract - The Poultney River Bat Community Restoration Plan identifies, implements, and demonstrates restoration countermeasures against the effects of white-nose syndrome on critically endangered bat populations, and details the ecological importance of bats and the need for such projects. The plan design was based on a literature review and consultation with biologists at the Vermont Fish and Wildlife Department in Rutland, VT, and the Vermont Forest and Parks Department. After reviewing the natural history of white-nose syndrome and the outlook for a cure, this study focuses on the necessity of helping bats survive through habitat restoration, the role of bats as keystone insect predators including the implications for sustainable farming, and the positive collateral effects of bat habitat restoration on fish, wildlife, and riparian buffer habitat conservation as part of a management response to white-nose syndrome. It also reviews bat habitat-restoration methods, bat habitat preferences, and the use of trees with exfoliating bark to create optimal hunting and roosting opportunities for bats. The study recommends restoration of a portion of the Poultney River corridor on the Green Mountain College campus this spring to restore bat communities. The restoration will demonstrate how to seamlessly integrate essential support for bats with the goals of riparian forest restoration in a low-cost design.

Mon- 12

Are Yarrow and St. John's Wort Locally Adapted to Serpentine and Granite Outcrops on Deer Isle, ME?

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Abstract - Changing environmental conditions influence the survival and reproductive fitness of locally adapted species because their site-specific adaptations can lead to habitat specialization. Long-term selection on certain morphological and physiological traits associated with local habitat conditions can give rise to the evolution of ecotypes. This study explores the relative effects of lithology and genetic differences on reproductive fitness and timing of fall and spring phenology for *Achillea millefolium* (Yarrow) and *Hypericum perforatum* (St. John's Wort) populations found on serpentine and granite outcrops on Deer Isle, ME. Seeds were collected from 10 mother plants of similar age and health from comparable microhabitats at both sites. To test effects of substrate on reproductive fitness and ecotypic differentiation, we conducted a reciprocal transplant experiment in a Conviron growth chamber using field-collected soils. We are currently collecting data on individual plant attributes such as germination, growth rates, above- and below-ground biomass, survival, phenology, and reproductive fitness. The experiment also investigates the edaphic-climatic influences on plant phenology (leaf drop in the fall, leaf-out and flowering in the spring-summer) of these populations at the 2 sites. Researchers and 6 citizen scientists tagged and monitored leaf drop and leaf-color change in fall 2014 and will monitor leaf-out and flowering times in spring 2015. We installed microchip temperature loggers (iButtons) to record differences in temperature between the serpentine and granite outcrops. Outcomes of this study include evidence for possible local adaptation of *A. millefolium* and *H. perforatum* to granite and serpentine soils in a greenhouse setting and possible evidence of flowering-time differences between these species at the serpentine and granite sites. Our findings will help us better understand the mechanisms that promote evolutionary change and assess how special edaphic floras may respond to future changes in climate.

Sun- 13

Deep History of American Clawed Lobster Exploitation in the Canadian Maritimes and Northeastern US

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Abstract - The North American northeastern coast is a rich fishing ground as it is supplied by the northward-flowing, warm, and nutrient-rich Gulf Stream and the southward-flowing, cold, oxygen-rich Labrador Current. *Homarus americanus* (American Clawed Lobster) occupies a range from Labrador and Newfoundland to the shelf waters off North Carolina, and has a rich history of exploitation by European settlers. However, because the peopling of the Americas is relatively recent compared to Europe and Asia, there are few records of ancient use of lobsters; most are historical records from visitors and/or colonialists from the late 1500s onward. Occasional archaeological records demonstrate that lobsters may have been used very early by native peoples that occupied coastlines or nearshore islands. For example, lobster remains in middens on Block Island off the coast of Rhode Island show that local people were feeding on American Clawed Lobsters nearly 2500 years before present. Remains found in Newfoundland caves suggest use in that location ca. 500 years before present. Numerous written records by Europeans describe rich lobstering grounds from the Canadian Maritimes to southern New England and are suggestive of populations reaching very high densities inshore. Similar records report that lobsters were very large—much larger than those in Europe at the same time. However, by the mid-1800s written accounts start describing less-dense populations and much smaller sizes, suggesting that fishing efforts were impacting the species throughout its range. These archaeological and historical records offer an opportunity to understand pre-commercial-exploitation population levels and body sizes of this species and to put those demographics in context with the populations of today.

Sun- 5

A Molecular Evaluation of *Dichanthelium* Populations Present on Rhode Island Roadsides

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Abstract - The roadside environment in southern New England is a diverse ecosystem of many native and non-native plant species. Genus *Dichanthelium*, or the rosette-grasses, is a complex group of native, cool-season grasses that thrive in the poor and nutrient-depleted soils of our region's roadsides. *Dichanthelium* taxa found to be present on Southern New England roadsides include the *D. acuminatum* complex of subspecies (Hairy Rosette-grass), *D. dichotomum* (Forked Rosette-grass), *D. ovale* (Egg-leaved Rosette-grass), *D. oligoanthes* (Few-flowered rosette-grass, or Scribner's panic grass), *D. sphaerocarpon* (Round seeded rosette-grass), and *D. depauperatum* (Starved Panicgrass). Due to hybridization and numerous subspecies designations, this group of grasses is often challenging to identify in the field, as well as off-site using the conventional dichotomous keys in the region's floras. Furthermore, there is much disagreement and debate over the taxonomic boundaries of the genus as well as their geographic distributions. We sampled roadside populations of *Dichanthelium* and sequenced them following standard protocols using both nuclear and chloroplastic primers that have been of utility in determining phylogenetic relationships of higher plants. Preliminary data indicates that the nuclear *waxy* gene (Granule-Bound Starch-Synthase, or GBSSI) is useful for differentiating at the specific level and potentially at the subspecies level. Sequence variation of *waxy* suggests that there are multiple operational taxonomic units (OTUs) within the taxa *D. acuminatum* (3 OTUs), *D. oligoanthes* (2 OTUs) and *D. sphaerocarpon* (2 OTUs). Furthermore, of the two chloroplastic regions that amplified across many samples (*ndhC-trnV* and *ndhF-trnL*), the *ndhF-trnL* also seems to be useful at the species level; however, further analysis of the sequence data is required. We found the chloroplastic region of *ndhC-trnV* to be of little use for differentiation, as this region is highly conserved within *Dichanthelium*, and contains no variation among the plants sampled. Further analysis is needed to isolate specific operational taxonomic units comprising each species, and pair this data with conventional identification methods. Gaining an understanding of the genetic boundaries and interbreeding pools of roadside *Dichanthelium* populations is critical for the use of these species in vegetative restoration efforts and native seed production.

Mon- 28

iMapInvasives: New York's Online Invasive Species Database and Mapping System

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Abstract - The New York State invasive species database (iMapInvasives) was developed to provide an online mapping tool for aggregating and sharing invasive species data for all taxa. Since 2010, the NY Natural Heritage Program has been compiling the statewide dataset and training users to enter data into iMapInvasives. These efforts help us better understand established infestations and aid in the early detection of new invaders. Contributed reports and photos trigger email alerts for key authorities and, once verified, are added to the GIS-based reports for "early detection" and "approaching region". The Treatment and Survey features allow advanced users to record invasive species management details using polygon mapping. iMapInvasives provides a means for project managers to organize invasive species data from many sources, from citizen scientists to natural resource managers.

Mon- 17

Three-year Comparison of Herring Gull (*Larus argentatus*) Survival Rates on Great Duck Island

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Abstract - Great Duck Island (GDI) is an 89-ha island, located around 25 km south from Acadia National Park. It is also one of the two stable nesting sites in the gulf of Maine for local *Larus argentatus* (Herring Gull) populations since the 19th century. Gull populations in other parts of the northeastern United States have declined significantly over the past quarter century. GDI is a possible indicator site for the overall health of the gull population in the greater Acadia region. To measure the growth and survival of the gulls, we banded hatchlings and then weighed them every other day during the nesting season each year. When we compared data from 2012, 2013, and 2014, we found a significant decline in successful fledging and an increase in death of immature fledglings in 2014. Causes of mortality have yet to be studied.

Sun- 3

Worker Size Variation in Colonies of the Ant *Formica glacialis*

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Abstract - Slavemaking ants exploit “host” species of ants to help them carry out various tasks necessary for survival. These ants raid host colonies, steal brood, and transport them back to their own colony. Host ants then act as the primary workforce for slavemaking ant colonies. In a site in western New York, the ant species *Formica glacialis* serves as a host for two slavemaking ant species: *Formica pergandei* and *Formica subintegra*. Host-ant size is highly variable in both free-living and slavemaking colonies. Studies suggest that this could be due to colony development and/or slavemaking-ant raiding dynamics. *F. glacialis* samples were collected to determine whether larger, more-established colonies produce bigger ants. Furthermore, enslaved *F. glacialis* samples were also analyzed to determine whether slavemaking colonies preferentially raid targets with smaller ants, suggesting that they target smaller, weaker colonies. Host ants were collected from 49 colonies. Head width was used as a representation of overall body size and was measured using a wedge micrometer. These analyses help improve our understanding of colony development in *F. glacialis*, its relevance to the raiding behavior of *F. pergandei* and *F. subintegra*, and the potential implications for *F. glacialis* population dynamics.

Mon- 27

Earthworm Abundance and Forest-floor Invertebrate Biodiversity in Central New York

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Abstract - The introduction of earthworms (Annelida, Clitellata) into forests previously uninhabited by earthworms can lead to changes in forest structure and function. The direct and indirect effects of earthworms on certain species (e.g., woodland salamanders) have been investigated. However, the effect of earthworm colonization on the diverse suite of forest-floor invertebrate animals is poorly known. We sampled earthworms and syntopic forest-floor (litter) invertebrates at 19 sites in southern Madison County, NY. Earthworms were sampled by mustard extraction. Other invertebrates were sampled by Berlese extraction of invertebrates from fresh litter samples. Six of 19 (32%) sites lacked evidence of colonization by earthworms. Earthworm abundance was a useful predictor of the abundance of all macro-invertebrates (>2 mm body length) combined and several specific invertebrate taxa. As abundance of earthworms increased, abundance of most other invertebrates exponentially decreased, suggesting a relatively low threshold for effect. Affected taxa included detritivores (e.g., millipedes, isopods) as well as secondary consumers (e.g., spiders, centipedes). Collembolans were negatively associated with earthworms, which may be a result of microbial changes associated with earthworm invasion. We propose that earthworm colonization can negatively affect the diversity of forest-floor invertebrates by reducing the size and complexity of the forest-floor habitat.

Sun- 27

Leaf-out Phenology in a Common Garden Experiment on Cadillac Mountain, Mount Desert Island, Maine

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Abstract - Shifts in spring phenology—for example the timing of leaf out—are an accessible and recognizable ecological effect of climate change on plant communities. In Acadia National Park, we set up an experiment on Cadillac Mountain to investigate the effects of different elevations and genetic source populations on the timing of leaf out for 3 common understory species. With the help of Friends of Acadia volunteers, we constructed 3 raised beds at different elevations on Cadillac in September 2013. Reciprocal transplants of *Vaccinium angustifolium* (Low-bush Blueberry), *Kalmia angustifolia* (Sheep’s Laurel), and *Sibbaldiopsis tridentata* (Three-toothed Cinquefoil) from all 3 elevations were planted in the beds. We hypothesized that if the plants have local adaptations for temperature sensitivity then, within each garden, leaf-out phenology will vary based on source population. The reciprocal transplants and a subset of local, non-transplanted stems outside of the beds were monitored for leaf-out phenology in the Spring of 2014. Preliminary data from one season of monitoring suggests that the local microclimate at each common garden is more important than the source population in determining the timing of leaf out for our 3 species.

Sun- 12

The Importance of Slope in Determining the Occurrence of Rock-dwelling Bryophytes

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Abstract - Bryophyte distribution at fine scales may be determined by microhabitat characteristics such as soil depth, exposure, substrate chemistry, and canopy cover. This study explores the importance of slope as a key factor defining the habitat specificity of rock-dwelling bryophytes. At 5 study areas in Glen Meal State Forest, St. Lawrence County, NY, we established 3 parallel 15-m transects, spaced 1 m apart, perpendicular to the length of rocky ridges. I sampled plots (radius = 19 cm) every 1 m along the transects. I recorded bryophyte species occurrence and measured slope, exposure, soil depth, % bryophyte cover, % exposed rock, % leaf litter, % vascular plant cover, % foliose lichen cover, vascular plant height, and distance to the nearest adult, sapling, and seedling trees for each plot. My results indicate that slope is a significant determinant of presence or absence ($P < 0.01$) for some rock-dwelling bryophytes, including *Plagiothecium laetum*, *Leucobryum glaucum*, and *Dicranum fulvum*. It appears that for other species, such as *Hedwigia ciliata* and *Scapania nemorea*, none of the measured factors determine bryophyte distribution at a fine scale. Additional research is needed to elucidate the reasons that make slope important for some species and not others. I suspect that studies of moisture retention, attachment strategy, dispersal, colonization, nutrient acquisition, and morphological characteristics may help determine how bryophytes partition niche space in rocky environments.

Sun- 17

Research in Progress: Documenting the Serpentine Biota of Massachusetts

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Abstract - During the summer of 2015, we will conduct floristic and ecological surveys on several outcrops of serpentinite bedrock in western Massachusetts. Serpentinite outcrops and the soils weathered from them (both of which are commonly called “serpentine” by botanists) present a number of unique edaphic challenges to the plants and other organisms that live on them due to a low Ca:Mg ratio, deficits in other essential nutrients, high levels of heavy metals, and poor soil development relative to neighboring lithologies. Although the biota of serpentine outcrops has been studied extensively in the western United States, and some research has been conducted on serpentine sites in Maine, Vermont, Newfoundland, and Quebec, we can find no published biological data on serpentine in Massachusetts. Such research is urgently needed because serpentinite bedrock is rare in the state, has not been studied floristically, and is currently considered to host a critically imperiled (S1) plant community. The research we are conducting will help to close this gap in our knowledge of the geocology of northeastern North America by addressing the following major questions: (a) do individual Massachusetts serpentine outcrops support a biota distinct from that of nearby non-serpentine areas? (b) is there a recognizable “serpentine biota” in Massachusetts across multiple serpentine sites? (c) can changes in the diversity and density of species along a serpentine to non-serpentine gradient be correlated to features of soil chemistry? (d) do any plants on Massachusetts serpentine outcrops accumulate elevated quantities of nickel? and (e) does serpentine bedrock exert any influence on lichen secondary metabolites? In this poster, we present the progress we have made thus far in selecting field sites using bedrock geologic maps, aerial photography, and GIS. We also outline the methods that we will use to assess the diversity and rock/soil preferences of plants and lichens at these sites. We hope that presenting these methods at this early stage will encourage critiques that can improve the project before the intensive field season begins.

Sun- 14

A Signature Sequence of Canine Parvovirus VP2 Capsid Gene Suspected in Vermont *Martes pennanti* (Fisher)

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Abstract - A novel parvovirus for wild carnivore populations? A signature sequence of canine parvovirus VP2 capsid gene is suspected in Vermont *Martes pennanti* (Fisher). Parvoviruses infect many carnivore species; however, well-characterized parvovirus variants have only been isolated from a few wild host species. Evidence suggests parvoviruses, specifically feline panleukopenia virus (FPV) and canine parvovirus (CPV), have been evolving independently and rapidly during this century and often infect a variety of wild and domestic host species. Parvoviruses appear to move between hosts during predation or scavenging events, which seems to result in genetic modification and transmission within the new host taxon. The objective of this study is to focus on the viral variant present in Vermont's *Martes pennanti* population and its impact on conservation and management. Due to its secretive nature and low density, the host species has proven difficult to obtain sufficient samplings to identify and characterize the viral variants present. Therefore, viral DNA was amplified directly from tissue samples obtained from Vermont Fish and Wildlife annual furbearer seasons 2010, 2011, 2012, 2013, and 2014. We used primers designed by Pereira et al. (2000) to amplify the 2b variant of the canine parvovirus. The samples that yielded active viral infections will be sequenced and analyzed. Preliminary results indicate that *Martes pennanti* in Vermont will show a signature sequence with variation near residue 300 in the VP2 capsid gene which appears to be particularly responsive to host-specific processes. This region is highly variable, exposed to the capsid surface and changes the antigenic structure of the capsid which affects the binding of the transferrin receptor. The novel sequence suggests a sustainable prolonged onward transmission of a viral variant as opposed to spillover transmission via predation or scavenging. Identification of the variants which infect wild carnivores and their modes of transmission will allow better understanding of disease impacts on population dynamics, conservation management strategies, and overall health of the current Fisher population.

Mon- 9

Response of Songbirds to Varying Levels of Anthropogenic Noise in Western New York State

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Abstract - Animal vocalizations are adapted to efficiently communicate information in the environments where they are found. Birds are vocalizing animals, with many species having repertoires of numerous songs and the ability to change song characteristics. Anthropogenic noise pollution can affect animals' fitness by hindering vocal communication critical to mate attraction, territory defense and danger alerts. By degrading habitat quality, noise pollution can also decrease the amount of available suitable habitat. Anthropogenic noise, often characterized by traffic noise, occurs at high amplitudes and relatively low frequencies up to about 5 kHz. Past studies of songbirds have shown that some common species change song characteristics to minimize the effects of anthropogenic noise. This study served to identify if these changes in song characteristics exist in *Melospiza melodia* (Song Sparrow), *Turdus migratorius* (American Robin) and *Agelaius phoeniceus* (Red-winged Blackbird) populations in New York's Genesee River Valley. From May to August 2014, 12 to 70 individuals of each species were recorded at sites of varying background noise levels. Recording locations were chosen based upon habitat and proximity to roads and other human developments. Recordings were digitized and analyzed using Raven Pro to determine song characteristics. Song sparrows showed a significant correlation between noise level and their songs' minimum frequency ($P = 0.0003$), similarly, American Robins increased their minimum song frequencies ($P = 0.037$) but also increased their peak frequencies ($P = 0.042$) in noisy habitats. Red-winged Blackbirds showed no changes related to background noise levels. Birds that change their song structure when singing in habitats with higher levels of background noise are adaptively decreasing the masking by anthropogenic noise.

Sun- 2

Trace Metals, Inorganic Ions, and Microbial Communities in Two Adjacent Lake Ontario Watersheds at SUNY Oswego

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Abstract - The Rice Creek (RC) and Glimmerglass Lagoon (GL) watersheds are located on or near the campus of SUNY Oswego and empty into Lake Ontario. The GL watershed is surrounded by campus parking lots, walkways, and lawns. The lower RC watershed is surrounded by forests, old fields, and wetlands. We sampled trace metals, inorganic ions, and bacterial communities found in 3 different locations moving from upstream to downstream in each adjacent watershed. We used an inductively coupled plasma mass spectrometer (ICPMS), ion chromatograph (IC), and Biolog Ecoplates to analyze our water samples. GL had greater concentrations of heavy metals including copper (Cu), antimony (Sb), nickel (Ni), and lead (Pb) than RC (ANOVA: $P < 0.05$). In the GL watershed, Cr increased by 3x and Ni increased by 19x moving downstream. Other trace metals such as arsenic (As), Ni, Cadmium (Cd), and Lead (Pb) had concentrations that exceeded EPA concentrations for detrimental chronic effects on biota. These metals were especially prevalent in a sample site consisting of slow-moving water near the mouth of the GL outlet stream. Nitrate levels were ~3x higher in the GL watershed as was expected based on the watershed's proximity to campus lawns, its regular use by waterfowl, and abundant algae. Chloride and sodium ions were ~7x and 6x higher in the GL watershed compared to the RC watershed, respectively. The salt concentrations in the GL watershed are likely the result of deicers used on adjacent campus roads, parking lots, and walkways. Qualitative analysis of microbial communities also differed in the 2 watersheds. In general, the RC watershed had greater optical densities across the majority of 32 carbon substrates measured, indicating a wider range of microbial functional diversity. These data illustrate the influence of heterogeneous landscape use on the water chemistry of 2 neighboring watersheds. The relative importance of trace metals and inorganic ions in each watershed has implications for aquatic communities as well as the local water quality of Lake Ontario.

Mon- 33

Giant Silkmoth Presence in Northern New York State: Five Years of Data from Project Silkmoth

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Abstract - Giant silkmoths (family Saturniidae) are the largest-sized moths native to North America. Project Silkmoth, established in 2010, accepts sightings of adult silkmoths seen in northern New York State (i.e., north of Albany and Syracuse). The purpose of the project is to accumulate spatially referenced baseline data on silkmoth occurrences and provide an opportunity for volunteers to contribute meaningful information about these moths. Sightings are accepted via an online or paper submission form. Over the past five years, sightings have been received from across northern New York State. A few silkmoth species seem common and are widely reported, but most are represented by a small number of sightings. Overall findings will be presented along with considerations for similar online citizen science projects.

Mon- 32

Indirect Effects of Invasive Plants on an Aquatic Food Web

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Abstract - Invasive species are considered one of the most pressing threats to the structure and functioning of ecosystems. An array of studies have documented how invasives monopolize resources (e.g., light, nutrients, space) and displace natives. However, invasives may also affect native ecosystems through indirect pathways. To assess the potential for indirect effects of invasive species, we conducted a mesocosm experiment examining how leaf litter from the invasive plants *Microstegium vimineum* (Japanese Stilt Grass) and *Phragmites australis* (Common Reed) affected an aquatic food web. Mesocosms were established using pond water and either leaf litter from Japanese Stilt Grass ($n = 5$), *Phragmites* ($n = 5$), or a mix of litter from native deciduous trees ($n = 5$). The native crayfish (*Orconectes limosus*) was added to all mesocosms to serve as a higher consumer. The experimental containers were sampled weekly for dissolved oxygen (DO), phosphates, and algae. The crayfish were monitored every other day to assess their reaction to stimulus. Dissolved oxygen levels were lower in the invasive species treatments compared to the native species, although this result was not statistically significant. Phosphate levels ($P < 0.001$) and algal concentrations ($P = 0.003$) were significantly higher in the *Phragmites* treatment. The crayfish also gained the most mass and had the largest reaction to a stimulus in the presence of *Phragmites*. This study demonstrates that the impacts of invasive species extend beyond their direct effects and can cascade through the food web of the ecosystem that they invade.

Sun- 10

Developing Primers for Quantitative Analysis of Gene Expression in *Fagus grandifolia*

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Abstract - Beech bark disease (BBD) is a fungus-insect complex that has dramatically reduced the populations of *Fagus grandifolia* (American Beech) within its range in the United States. Even though there is clear evidence of resistance to BBD, the genomic examination of *Fagus grandifolia* has been minimal to date, making it difficult to effectively explore the mechanisms of disease resistance with standard molecular methodologies. We effectively utilized two endogenous controls, β -actin and α -tubulin, to begin comparative RT-PCR experiments. We have also successfully designed 7 primers for additional plant-specific genes to determine if expression-level differences in potentially protective proteins can differentiate between the 2 phenotypes (resistant and susceptible to BBD). Furthermore, we have been able to determine *Fagus grandifolia*-specific sequences for these genes. These steps will be used to screen beech saplings that are being grown at the Champlain Valley Native Plant Restoration Nursery at Green Mountain College for BBD resistance. Eventually this screening can be brought into the field for more effective management of BBD in beech stands, so that diseased trees can be replaced with resistant trees provided by our nursery.

Mon- 15

Comparison and Contrast of Sea Lion Vocalizations in Captivity and in the Wild

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Abstract - Sea lion vocalizations were recorded at the Prospect Park Zoo, the Queens Zoo, the New York Aquarium, the Central Park Zoo, the Bronx Zoo, and the Aquarium at Niagara. The Queens Zoo and the Bronx Zoo revealed the greatest number and variety of vocalizations. We used the program Audacity to record the total number of sounds, barks, duration of sounds, and pitch. We also made comparisons and contrasts were between captive (our own recordings) and wild *Zalophus californianus* (California Sea Lion) vocalization recordings found in the MacCaulay Sound Library (Cornell University).

Mon- 8

Does the Enclosure Color Affect the Coloration of Wood Turtles?

Alyssa M. Osborne (Bristol County Agricultural High School, Dighton, MA; aosborne@bcahs.com) and **Morgan A. Moquin** (Bristol County Agricultural High School, Dighton, MA; mmoquin@bcahs.com)

Abstract - Bristol County Agricultural High School (Dighton, MA) works with the US Fish and Wildlife Services, Oxbow Associates Inc., and the Savannah River Laboratory to head-start several species of turtles. In 2012, several *Emydoidea blandingii* (Blanding's Turtle) were housed in clear plastic tubs, while others were housed in black plastic tubs. The turtles in the black tubs remained the color and pattern consistent with the descriptions given by Babcock (1919) and Munger (2006). The turtles housed in the clear tubs seemed to turn a lighter shade inconsistent with Babcock (1919) and Munger (2006), suggesting that the color of the tub influenced the Blanding's Turtles' pigmentation. We conducted an experiment to test if a similar color change occurs in *Glyptemys insculpta* (Wood Turtle). We randomly chose 8 Wood Turtles from a total population of 28 turtles in the head-starting cohort. Four of the turtles were housed in a clear plastic tub and 4 were housed in a black plastic tub of identical size and shape. Both tubs were identically furnished. We photographed the carapace and plastron of each turtle before placing them in the tub at the beginning of the experiment, and then used the same digital camera to photograph the turtle in the same well-lit area on a gray background every other week. The photographs were analyzed using Vidana 1.0 software. Our results to date show that there has been no change in color of the carapace since the beginning of the experiment; however, amount of dark colored area decreased by 8.25 percent on the plastron of the turtles in the clear tub. These preliminary results suggest that enclosure color has little effect on the shell coloration of Wood Turtles during the head-starting process.

Sun- 24

Student-Driven Analysis of Urban Pollution Using Lichens as Bioindicators

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Abstract - Lichens are sensitive bio-indicators of air pollution. The central areas of major cities around the world, filled with slow-moving vehicular traffic and few areas of plants and earth to retain moisture, tend to be “lichen deserts” surrounded by a somewhat more hospitable zone where pollution-tolerant lichen species can grow. Systematic mapping of lichen populations, along with related analyses of lichen structure, reproduction, growth, and physiology, strongly correlates with changing levels and patterns of air pollution in industrialized and urban areas. Asthma may also serve as a diffuse bio-indicator of air pollution, although the precise relationship is not fully understood, and provides a practical measure of the human social costs of environmental degradation. We have piloted a student-driven environmental field study that, when fully implemented, will map epiphytic macrolichen populations in several areas of New York City, and will correlate lichen species distribution and abundance with levels of urban pollution and asthma prevalence. We selected 2 tree species as potential lichen habitat for this project: *Gleditsia triacanthos* (Honey Locust), a common street tree in New York City that tolerates harsh urban conditions, and *Liquidambar styraciflua* (American Sweetgum). We developed a protocol to measure the typically sparse and spotty lichen growth present in many parts of the New York City lichen desert, and carried out the fieldwork for the initial study in 2 city parks: Saint Mary’s Park and Franz Sigel Park, both of which are in the South Bronx and close to Hostos Community College. We expect to complete our fieldwork for this project this summer. For the main part of the project, we have identified and chosen locations in Manhattan, the Bronx, and Brooklyn based on 3 factors: a range of pollution levels and asthma incidence, sufficient trees of the host species, and varying levels of vehicular traffic. Pollution and asthma data will be tested for correlations with lichen growth and diversity.

Sun- 16

Morphological and Chemical Variation in the Understory Herb *Coptis trifolia* in Northern New York

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Abstract - *Coptis trifolia* (American Goldthread) is an understory herb found in the deciduous and coniferous forests of northeastern United States. Its alkaloid-rich rhizome was used in Iroquois ethnopharmacopeia and was also traded as a popular medicinal in Boston markets in the early 19th century. Edaphic microenvironments can influence both the morphology and chemical concentrations of many understory medicinal herbs. Hence, we hypothesized that both the plant’s morphology as well as the rhizome alkaloid chemical content in American Goldthread populations may vary with microenvironment conditions such as soil variables. We sampled and compared morphological variables (i.e., number of leaves, rhizome biomass, rhizome length, leaf area) as well as rhizome chemical content (concentration of the two alkaloids berberine and coptisine) among 36 American Goldthread populations in 6 forest stands in northern New York. We also sampled soil chemistry and light conditions at each population location. A multivariate analysis of variance (MANOVA) was used to determine significant differences in morphological, rhizome alkaloid content, and soil-chemistry variables among the different populations. Results indicated that there is a significant ($P < 0.001$) difference in the morphological variables, rhizome alkaloid content, soil chemistry, and light conditions across the 6 forest stands. However, there was no significant ($P > 0.05$) difference in these variables within a forest stand indicating that soil chemistry, plant morphology, and rhizome alkaloid content are homogenous within forest stands. Our results indicate that soil chemistry is important to both morphology and chemical content of this understory medicinal species.

Mon- 14

Distribution and Habitat of a Native Earthworm, *Eisenoides lonnbergi*, in the Northeast

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Abstract - Prevailing hypotheses regarding earthworm (Annelida, Clitellata) biogeography indicate that earthworms were lost from areas north of the southern limit of the last glacial maximum in North America approximately 20,000 years ago and that earthworms have only very slowly recolonized areas following glacial retreat. This assumption has caused many ecologists to erroneously assume that all earthworms in the northeastern United States are invasive exotics. In the course of studies regarding earthworm ecology in New York and Pennsylvania, we have collected many records of *Eisenoides lonnbergi*, a species widely considered native in North America. At the northern end of its range, this species apparently is restricted to mesic environments, including stream banks, bogs, and other wetlands. *Eisenoides lonnbergi* was notably frequent at acidic sites (pH < 6), including bogs with pH near 4. Stream banks supported diverse assemblages of earthworms (5–16 species per site), including *E. lonnbergi*; whereas, some of our more acidic wetland sites included few or no species alongside this species. Human disturbance at many of our sites was minimal, suggesting natural recolonization following glacial retreat. These limited surveys demonstrate that areas near or above the southern limit of last glacial maximum do support native earthworms. Studies of earthworms in minimally disturbed, mesic, and acidic environments have been infrequent, and this may explain the paucity of data regarding the distribution of this species. The habitat profile for the native *E. lonnbergi* (saturated soils, often acidic) may be helpful to land managers as they consider ways to promote native, rather than exotic, earthworm species in the northeastern landscape.

Sun- 26

Exotic Earthworms' Relationship with Wildflower and Seedling Abundance and Diversity in a Northeastern Forest

Rebecca Raffo (Wildlife Technician Program, Mianus River Gorge Preserve, Bedford, NY; Somers High School, Lincolndale, NY; beccaraffo11@gmail.com)

Abstract - In 2013 and 2014, I conducted vegetation surveys to calculate the abundance and diversity of wildflowers and seedlings (<1 yr) at 12 sites in Mianus River Gorge Preserve, Bedford, NY. I then determined earthworm presence at each site using multiple methods. Earthworm-invaded plots doubled over the course of the year from 4 to 8 plots. I compared mean stem counts of native plants with the presence or absence of earthworms and found an inverse relationship between the two in 2013 and a weaker correlation in 2014. *Tsuga canadensis* (Eastern Hemlock), a slow-growing climax species of particular importance to the management of this preserve, showed the most severe difference between invaded and non-invaded plots. I observed a similar pattern with *Quercus* spp. (oak) seedlings, also an important group of species there. Earthworms appear to be spreading throughout the preserve, and my findings indicate that invasive earthworms may play a role in the decline of native plants in this preserve and the Northeast.

Sun- 28

Assessing the Small-Mammal Species Community Diversity and Abundance in Adirondack Bog Habitats

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Abstract - Small-mammal communities in bogs in the northeastern United States have received little research attention. Small mammals are important drivers of ecosystem structure and function, and bogs are highly susceptible to impacts from climate change. The goal of our study was to develop a baseline understanding of the distribution and abundance of small mammals in bogs in the Adirondack Park in upstate New York, which is situated along the southern range-edge of the boreal forest. Furthermore, we assessed the role of variation in the characteristics of individual bogs, including area and tree cover, in influencing small-mammal communities. To meet these goals, we established pitfall traps along transects in 10 open bogs in the northern Adirondack Park in the fall of 2014. Each bog was sampled multiple times to account for temporal variation in captures, with a minimum of 120 traps established per site. We left pitfall traps open for 2 nights prior to checking and collecting the captures, which we identified to species, and took standard morphometric measurements of all individuals. We assessed tree density using basal area prisms and determined area of the bog using manual digitization of ortho-imagery. We captured a total of 248 small mammals consisting of 9 species. *Sorex cinereus* (Masked Shrew) were the most abundant, followed by *Microtus* (voles) and *Synaptomys* (lemmings). Small-mammal species richness per site varied from 2 to 7. We found that species richness was significantly influenced by the density of trees ($P = 0.021$, $R^2 = 0.447$), with a higher number of small-mammal species found in bogs with a greater basal area of trees. When assessing the drivers of the abundance of individual species of small mammals, we found no significant relationship between the area of bog and patterns of abundance ($P > 0.1$ for all tests). However, we did find a strong relationship between the abundance of bog lemmings and the density of trees, with more lemmings found in bogs with a greater basal area of trees as measured by mean prism count ($P = 0.0019$, $R^2 = 0.68$). These results will serve as a baseline for continued monitoring of southern boreal bogs in the face of climate change.

Mon- 10

Determining the Status of *Glyptemys insculpta* (Wood Turtle) in New York State

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Abstract - At a pivotal time for the health and survival of *Glyptemys insculpta* (Wood Turtle) populations, we recently uncovered a collection of roughly 260 dried specimens from SUNY-Oneonta storage that date back to the late 1950s. Collected by the late Dr. John New, the assemblage serves as a genetic cache that we will use to identify changes in Wood Turtle populations across New York State. Preliminary genetic screens indicate the preserved specimens can yield sufficient DNA for evaluation. Unlike previous Wood Turtle studies, the existence of the historical data set provides rare context, which we will compare to contemporary population data acquired over two summers field seasons (2015 and 2016). Specifically, we will identify parameters such as the effective population size (N_e), the fixation index (F_{st}), and the inbreeding coefficient (F) for both contemporary and historical populations. Genetic information will be paired with mark-recapture field data to assess the viability of our New York's populations. We will apply our results to recommend the most appropriate course of management to maintain the Wood Turtle in New York State. Field biologists with knowledge of extant populations of Wood Turtle in New York are encouraged to report their data to our group.

Sun- 23

Does the Enclosure Color Effect the Growth and Color of Blanding's Turtle Hatchlings?

Karlie Thatcher (Bristol County Agricultural High School, Dighton, MA; kthatcher@bcahs.com) and **Chelsey Rollins** (Bristol County Agricultural High School, Dighton, MA; crollins@bcahs.com)

Abstract - The Bristol County Agricultural High School head-starts dozens of *Emydoidea blandingii* (Blanding's Turtle) annually in cooperation with the US Fish and Wildlife Service and the University of Georgia. We randomly chose 12 Blanding's Turtle hatchlings to participate in the project. All research animals were from the same population. We placed 6 turtles in a clear Rubbermaid tub and the remaining 6 in a similar black tub. Each of the tubs included an identical heat lamp, a basking site, and artificial plants. Both groups were fed the same type and amount of food daily. We weighed every turtle and photographed its carapace and plastron weekly for 11 weeks. We used a virtual image processor (Vidana) to measure the amount of yellow area in every photograph and recorded the percentage of yellow area on each turtle, which we then compared between members of the clear and black tub groups. Turtles kept in the clear tub exhibited an average of 14% more yellow area on the carapace and 24% more on the plastron at the end of the experiment than they did at the beginning. Turtles kept in the black tub exhibited an average increase of only 3% more yellow area on the carapace and 12% more yellow area on the plastron during the course of the experiment. These results suggest that the Blanding's Turtles coloration is plastic and may be influenced by the environment. Enclosure color should be considered in any effort in which Blanding's Turtles will be released because more brightly colored animals may be more susceptible to predation.

Sun- 25

Abiotic Factors Underlying Variation in Composition of Riparian Plant Communities

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Abstract - Riparian (or riverbank) plant communities are often said to be particularly diverse as compared to the surrounding landscape. In 2012, we surveyed the species composition of riparian and upslope plant communities along 3 small streams in the Upper Hudson watershed (NY). We found that riparian plant communities had higher species richness at a regional scale than did upland sites, and differed in species composition. To examine potential determinants of spatial variation in the species composition of riparian zones, we conducted a broader survey of plant species along 50 small streams in the Upper Hudson watershed and used canonical correspondence analysis to characterize how species composition in riparian zones differed among different abiotic conditions. We found that the strongest environmental correlate of variation in species composition was annual mean temperature, and found lesser correlations with precipitation and stream order.

Mon- 29

The Effects of Lawn-Mowing Frequency on Ground Arthropod Abundance, Richness, and Changes to Functional Groups

Edward Rosner (Department of Environmental Conservation, University of Massachusetts, Amherst MA; erosner@umass.edu) and **Susannah Lerman** (USDA Forest Service Northern Research Station and Department of Environmental Conservation, University of Massachusetts, Amherst MA)

Abstract - Urban areas alter the biodiversity of the natural world and can lead to changes in species diversity and abundance. In particular, an urban area has many different landowners who can each have an effect upon biodiversity as a whole through landscaping. Lawn-care choices, such as lawn mowing, might have a significant impact upon the ground arthropod diversity and might alter the functional groups. Investigating functional groups allows us to observe whether lawn-mowing frequency might alter ecosystem processes. Our main objective was to connect lawn-mowing frequency and changes to ground arthropod biodiversity to better understand how landscaping behaviors might affect a lawn ecosystem. We assigned 12 yards in Springfield, MA, to 3 different lawn-mowing treatments (1, 2, or 3 weeks between mowings). We monitored the ground arthropods by using pitfall traps throughout May–September of 2014. We collected 483 arthropods in 1-week yards, 382 arthropods in 2-week yards, and 398 arthropods in 3-week yards. Throughout the study, the capture data shows an increase of overall ground arthropod abundance in the lawns mown every 2 or 3 weeks and a decrease for lawns mown every week. The arthropods were represented by 4 broad functional groups: detritivores, herbivores, predators, and omnivores. Preliminary results suggest that 1-week yards supported more predators and herbivores, while having fewer detritivores, whereas 3-week yards had more detritivores and fewer predators and herbivores. It appears that lawn-mowing frequency influences the functional groups of ground arthropods in suburban settings. Promoting alternative lawn-care practices might lead to more environmentally conscious landscaping decisions and thus enhance biodiversity within an urban community.

Sun- 31

Biochemical Analysis of Bush Honeysuckle (*Lonicera* spp.) Red and Orange Color Morphs

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Abstract - *Lonicera* spp. (bush honeysuckle) are widespread invasive species found in New York State, including areas near the Lake Ontario shoreline that serve as important stopover sites for migratory birds. Honeysuckle produces berries in either orange or red color morphs in late summer, and berries persist into the fall. While honeysuckle berries are overall lower in nutritional quality relative to native fruits in this area, little is known about the biochemical differences between the color morphs. Nutritional variations may promote selection of one morph by birds and increase probability of seed dispersal. This project aims to assess biochemical and nutritional differences between the color morphs. Berries of both colors were collected in late summer and early fall of 2011, 2013, and 2014 at High Acres Nature Area and the Braddock Bay Bird Observatory, 2 locations that host a variety of songbird consumers during migration and breeding. We measured the energy density, percent fat, and total soluble solids of the red and orange color morphs. Preliminary results indicate that red honeysuckle berries have higher total soluble solids than the orange berries. Future work will include analysis of protein content in the two morphs and measurement of biochemical properties of fruit extracts like carotenoids, total phenol content and fluorescence fingerprints.

Sun- 15

Effectiveness of Predator Control at Duxbury Beach and its Effects on Protected Shore Birds

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Abstract - Predation of threatened or endangered species can cause serious complications for their recovery. Fledging rates of 2 species of threatened shorebirds, *Charadrius melodus* (Piping Plover) and *Sternula antillarum* (Least Tern), at Duxbury Beach declined dramatically from 1992 to 2009, possibly as a result of nest predation. The objective of this study was to determine the effectiveness of a limited predator-removal program initiated at Duxbury Beach in 2009. We analyzed data on fledging rates, breeding population sizes, and losses to predators, and used game cameras and track plates to identify mammalian predators present at Duxbury Beach and to document their activity patterns. Since predator control began, the number of nesting pairs and the fledging rates of Piping Plovers increased and predation mortality declined. However, in 2015, five *Canis latrans* "var." (Eastern Coyote) were observed frequently at locations throughout the study site. The high activity levels of these predators coincided with greatly decreased fledging of Piping Plovers. Few other mammalian predators were observed, suggesting that the Coyotes acted as apex predators, reducing activity of other predators in the area, such as *Felis catus* (Domestic Cat).

Mon- 3

Effects of Restoration and Management Treatments on Pine Barrens-Endemic Lepidoptera in a Relic Inland Pine Barren

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Abstract - Surveys of the Lepidoptera community assemblage in the Albany Pine Bush (Albany, NY) indicate a strong positive correlation between the abundance of pine barren-endemic species and management practices aimed towards developing and maintaining early successional habitat. Preliminary analysis using ANOVA show a significant effect ($P = 0.0334$) of restoration practices on the persistence and abundance of endemic Lepidoptera: 259 individuals from 15 species were recorded in recently managed areas, while 14 individuals from 5 species were recorded in unmanaged areas. Subsequent research will incorporate a temporal component to the spatial sampling design to better elucidate community-response patterns of endemic Lepidoptera to a fine-scale gradient of pine barren successional stages.

Mon- 31

Habitat Correlates of Asian Shore Crab Density on Rocky Shores in Southern New England

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Abstract - *Hemigrapsus sanguineus* (Asian Shore Crab) is native to Japan, China, and western Russia and has established itself as a dominant intertidal predator on the Atlantic coast of the United States. The objective of this study was to determine which environmental characteristics best predict population density of Asian Shore Crab, as well as other population characteristics (e.g., body size, sex ratio), on rocky shores in southern New England. From June through October of 2014, we counted, sexed, and measured crabs at 13 rocky intertidal sites in Rhode Island and Massachusetts and estimated environmental characteristics (e.g., rock cover, algal cover, wave intensity, slope, and distance to nearest road) for each site. Most environmental characteristics were uncorrelated with density of Asian Shore Crabs; however, the greatest abundances of Asian Shore Crabs tended to occur at sites characterized by steeper slopes. Body size differed considerably among sites, but most individuals were small (<10 mm carapace width). Overall, male crabs outnumbered female crabs, and at most sites were more than twice as abundant. In part because it tolerates a wide range of environmental characteristics (e.g., water temperature, salinity) Asian Shore Crab has acclimated and thrived on the Atlantic coast. This adaptability may explain why it is difficult to identify environmental characteristics that are strongly correlated with population density of the species.

Mon- 7

Propagation and Reproduction Methods for Various Corals

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Abstract - The reproduction and propagation methods of many corals have gone un-researched. Vital information about their reproduction, survival, and ability to adapt to their environment is still an unsolved mystery. This study focuses on the specific niches that corals fill on different parts of the reef and how they correlate to the requirements for the corals to flourish in captivity. There are 3 types of corals used in this study; “large polyp stony” (LPS)—*colymia cubensis* (Scoly), “small polyp stony” (SPS)—*Acropora cervicornis* (Staghorn), and “soft corals”—*Sarcophyton* (Green Leather Coral), *Zoanthids*, and *Palythoa*s (button corals). The study uses aquariums to simulate environments required to maintain healthy organisms. The reproduction and propagation of corals is a simple process since many corals reproduce asexually and thus can be physically split in half to prompt new cell growth effectively turning one coral into two. Scoly corals (LPS) however are unable to do this because they only reproduce sexually which depends on tides, lunar cycles, temperature, and time of year. This study will investigate the feasibility of replication of these variables in captivity. The ability to grow these particular species of coral in captivity efficiently and effectively could relieve the pressure of coral harvest. The foundations are in place to provide ideal and simulated environments in the closed system for these increasingly rare and threatened species.

Mon- 5

Another Naturalizing Exotic Tree: Populations of *Syringa reticulata* (Japanese Tree Lilac) in New York

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Abstract - Invasive plants species are known to affect plant diversity on multiple scales worldwide. It is often unknown at how great a scale a new invasive species' impacts will be have an effect. Ecological literature states there is a need for immediate research and management when an exotic species has begun to naturalize, especially in a region sharing the same latitude as its native range. These species are often shade tolerant, have rapid growth, survive in poor soils, and propagate easily. These characteristics are what makes *Syringa reticulata* var. *reticulata* (Japanese Tree Lilac) an increasingly recommended street tree in the United States. Researchers, while classifying street trees throughout New York State, have noted dozens of municipalities planting this tree along their roadways. Escaped populations have already been reported in North American states, including Wyoming, Ontario, Massachusetts, Pennsylvania, Vermont, and Minnesota. My graduate thesis work involves the study of naturalizing populations of Japanese Tree Lilac in New York. Currently I am collecting demographic data on 1-ha study plots located on private land along a tributary of the Hudson River in Columbia and Rensselear counties. Each plot is divided into a grid of 25 sampling points 20 m apart. At each site, I am collecting point-quarter intercept data to determine general forest composition and Japanese Tree Lilac density. Japanese Tree Lilac DBH and height data are recorded to calculate importance values and growth rates. My first plots have shown forests where Japanese Tree Lilac is the most common, dense, and important tree species. This gives evidence of a negative impact on the riparian forest community. Three additional populations have been verified in Otsego and Essex counties since my thesis work was initiated. These populations are located in the foothills of the ecologically important Adirondack and Catskill Mountains. To complement the demographic study, I am collecting data on seed viability, germination rate, and dispersal ability. Together these studies will give land managers information to better control invasive populations of Japanese Tree Lilac.

Mon- 19

Rapid Assessment of Invasive Plant Species for Establishing Management Priorities: Progressive, Strategic Invasive Plant Management for Resource Managers

Lori Weingartner (Pennsylvania State University; lori.weingartner@gmail.com)

Abstract - The management of invasive plant species is a challenging and expensive task for resource managers throughout the United States. It is difficult to maintain successful eradication or control plans when the needed resources are reduced or removed due to inadequate funding. I use data from Allegheny Railroad Portage National Historic Site (ALPO) to test a potential method for maintaining past gains and making incremental progress when possible. This method estimates the distribution of invasive plant species throughout the land management area using readily available remote sensing technology and geographic information systems. I suggest the distribution model can be used to prioritize resource units with the least amount of invasive plant species present for maintenance using early detection, rapid response methods. The ALPO data partially supports the potential usefulness of the method. I found significant variation between disturbed ($n = 31$) and edge ($n = 86$) habitats ($P = 0.001$), but variation between edge and core habitat ($n = 18$) classifications was not be significant ($P = 0.379$). The inability to distinguish between edge and core habitat may be due to the low number of core sites, to 3 possible outliers (undetected disturbances), or to the 100-m buffer used to define edge habitat.

Sun- 9

Ant Foraging Activity, Ant Abundance, and *Formica glacialis* Nest Density

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Abstract - Previous surveys of the Spencer J. Roemer Arboretum, an 8-ha patch of secondary successional forest on the SUNY Geneseo campus, indicate it is home to at least 13 species of ants. *Formica glacialis* is among the most commonly encountered ant species. Although the high nest density and large colony size of *F. glacialis* suggest numerical dominance over the most common genera of ants in the Arboretum, *F. glacialis* is exploited by several slavemaking ant species. The goal of this study is to improve our understanding of how *F. glacialis* fits into the competitive hierarchy of the local ant community. We used bait grids and pitfall traps to compare areas of low *F. glacialis* nest density to areas of high *F. glacialis* nest density to determine if differences in this common ant's abundance resulted in different assemblages of ants at baits. We determined the identity of the first ants to arrive at each bait, the time spent by each species at baits, and noted aggressive behavior between species. These results contribute to our understanding of the role played by an abundant but heavily exploited species in the local ant community.

Mon- 23

Spruce Wood Warbler Use of Forest Structure: Revisiting MacArthur's Study of Niche Partitioning

Bik D.R. Wheeler (College of the Atlantic, Bar Harbor, ME; bwheeler@coa.edu)

Abstract - In 1956 and 1957, Robert H. MacArthur studied the ecology of 5 species from the genus *Setophaga* (wood warbler), resulting in contributions to the theory of niche partitioning. MacArthur asserted that the 5 *Setophaga* are sympatric species that evolved to occupy separate behavioral niches. His observations were conducted in Acadia National Park, ME. Beginning in 2014, I repeated MacArthur's study in the same location, to reassess warbler niche partitioning and observe possible changes over time. In order to conduct a direct comparison to MacArthur's forage-use findings, I have taken the same forest structure measurements and followed the very similar observational methods, but incorporating the use of technological advancements. Almost 60 years after MacArthur's seminal work in niche partitioning of wood warblers, the forest structure, warbler species assemblage, and taxonomic classification has shifted, and my study will show how the theory of sympatric evolution in warblers withstands these developments.

Mon- 1

Tree Growth and Mortality Rates in the Northeast Temperate Network

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Abstract - Tree growth and mortality rates are important for monitoring forest health, and tracking these rates requires precise and repeated measurements. In the Northeast Temperate Network (NETN), we increased precision by permanently marking diameter at breast height (DBH) and checking DBH against previous surveys. This has enhanced data quality, including improved detection of tendencies for DBH to shrink as trees die. Comparisons with US Forest Service inventory and analysis data indicated that tree growth rates in NETN parks are lower than surrounding forests that are largely managed for timber. Mortality rates are highest in Saratoga National Historical Park (SARA) where high mortality of *Ulmus americana* (American Elm) has been observed. Growth rates are also highest in SARA, where forests are succeeding from open field. When forest pests or disturbances cause significant mortality, such as the effects of hurricane Sandy in Morristown National Historical Park, we expect to capture these events in our monitoring.

Mon- 16

Invasive Red Pine Scale Found in Acadia National Park, Maine

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Abstract - An invasive insect, *Matsucoccus matsumurae* (Red Pine Scale), was identified in September 2014 by Maine Department of Agriculture, Conservation, and Forestry - Maine Forest Service entomologists on dying *Pinus resinosa* (Red Pine) on the south side of Norumbega Mountain, in the town of Mount Desert, ME. Red Pine Scale, originally from Japan, attacks Red Pine, which is found in patchy stands of varying densities throughout Acadia National Park (ANP) and Mount Desert Island. Two large stands of very symptomatic trees with high levels of mortality are believed to be the epicenters of the infestation (the first detection in the state of Maine), while areas in other parts of the park show little to no signs of a Red Pine Scale infestation. The goals of this study were to find the extent of the Red Pine Scale infestation and quantify the health of Red Pine stands within ANP. Long-term monitoring of the forest in the Red Pine plots established for this study will document changes in the understory and in forest composition as a result of widespread Red Pine mortality. Repeated plot visits will also help determine when dead trees will become hazards. The most important discovery found during the course of this study so far is that the scale is more widespread than originally thought; it is present even in areas that appear healthy. Dead Red Pine trees currently have a very low level of decay and will probably decay slowly, indicating that they will not be hazards for park visitors in the immediate future. This study has collected baseline data on regeneration in Red Pine stands, and future years of sampling will track changes in forest dynamics and the spread of the scale.

Sun- 11

Diversity in *Vaccinium oxycoccos* in Bogs of the Northeastern United States

James Wolfe (Houghton College, Houghton, NY; james.wolfe@houghton.edu) and Rachel McClatchey (Houghton College, Houghton, NY; rachel.mcclatchey15@houghton.edu)

Abstract - In the northeastern United States, ombrotrophic *Sphagnum* bogs are widely scattered and geographically isolated. Many of the plants in these bogs are either clonal or disperse seeds by water; thus, because little wetland habitat connects these bogs, populations are liable to become genetically isolated from each other. We evaluated the genetic intraspecies relatedness of *Vaccinium oxycoccos* (Bog Cranberry) using RAPD analysis of 8 different polymorphic primer locations. We also report on *Sarracenia purpurea* (Purple Pitcher Plant). We collected samples from Moss Lake and Allenburg Bog in western New York, Bedford Bog in the Adirondacks of New York, and Bear Lake in northern Michigan. The dendrogram based on Nei's genetic distance indicated that Moss Lake and Allenburg Bog populations were most closely related, followed by Bedford Bog and Bear Lake. Thus, the genetic relatedness seems to be geographically correlated, as expected. The genetic diversity among the populations was fairly high ($H_s = 0.4198 \pm 0.0615$), as confirmed by Nei's unbiased genetic identity (0.8124 ± 0.068729) and Shannon's information index ($I = 0.6090 \pm 0.0669$). Genetic diversity within the Allenburg Bog population was moderate ($H_s = 0.3223 \pm 0.2272$, $I = 0.4544 \pm 0.3185$), and within the Moss Lake population higher ($H_s = 0.4573 \pm 0.0409$, $I = 0.6492 \pm 0.0434$); these results are surprising because of the tendency of *V. oxycoccos* to reproduce clonally. Contrary to expectations, diversity within populations was not found to be significantly different from diversity among populations. As a species, however, *V. oxycoccos* in bogs of the northeastern United States was found to be strikingly genetically diverse.

Mon- 30

The Genetic Diversity of the *Daphnia* Resting Egg Bank

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Abstract - *Daphnia* are cyclical parthenogens, where environmental conditions determine phase of reproduction (sexual or asexual). Some species utilize diapausing eggs as an overwintering strategy. These resting eggs are the result of sexual reproduction, which brings about genetic diversity and may be associated with increased survival. The goal of this study was to examine species presence and allelic diversity among conspecifics of *Daphnia* hatched from the egg bank of Round Pond (Mendon Ponds County Park, Monroe County, NY). We hatched diapausing eggs from sediment cores that were collected in January 2015. We then used Hotshot DNA extraction methods, PCR based assays, and dye-termination sequencing to identify the species and assess genetic diversity of the hatchlings. While *D. dentifera*, *D. mendotae*, and their hybrid are known to be summer-time constituents of the population, preliminary results indicated the first hatchers from the egg bank were *D. ambigua*, a known early successional species in eastern North American lakes. These individuals exhibited low levels of allelic diversity for 3 loci. We will continue to monitor the hatching and genetic diversity of additional species as the study progresses.

Mon- 22