2025 Northeast Natural History Conference
Oral Abstracts

Listed in alphabetical order by first-listed presenting author. Authors in bold are the presenting authors. Code at the bottom of each abstract indicates when in the conference schedule the presentation will be given: Day-Session-Room-Presentation # (thus, for example, Sun-AM2-B-4 indicates the presentation will be the 4th presentation in Room B in the Sunday Morning II concurrent session time slot).

Healthy Soil through Maximum Biodiversity: Farmscape Models for Resilient Design and Land Management Using Pollinator Habitat

Evan Abramson (Landscape Interactions, Leyden, MA), Molly Jacobson (SUNY ESF, Syracuse, NY), and Sneha Kakkadan (Landscape Interactions, Leyden, MA) evan@landscapeinteractions.com

Abstract - Natural landscapes containing a diversity of native vegetation contribute directly to not only soil health but also soil carbon sequestration. While landscape development and habitat loss are inevitable, well-informed landscape design and management decisions can have an outsized role in buffering the impacts to soils and ecosystems by restoring biodiversity in the form of plant–pollinator communities and the terrestrial food webs they support. The goal of this project is to improve soil health and biodiversity on 5 Western Massachusetts farms by implementing a series of new practices that incorporate diverse, native pollinator-supporting vegetation. We aim to demonstrate that enhancing plant diversity and supporting at-risk pollinators leads to healthier soils, increased carbon sequestration, and improved ecosystem function. By focusing on urban, suburban, and rural farms, and through the creation of replicable design models, we intend to impact a significant portion of the state's land cover. Through a robust process of on-site data collection, collaborative design, and community engagement, farmers, landowners, youth, and community leaders will be educated and inspired to transmit these practices to landscapes and populations across the Commonwealth.

Sun-PM1-E-3

Bird Species in a Single Ecological Community use Different Types of Nest Materials

Michael E. Akresh (Department of Environmental Studies, Antioch University New England, Keene, NH), David Mandell (Antioch University New England, Keene, NH), Peter P. Grima, David I. King (US Forest Service, Northern Research Station, Amherst, MA), and Kathryn Lauer (Antioch University New England, Keene, NH)

Abstract - Differential use of resources among bird species has been examined extensively in diet and nesting sites, but few studies have assessed this regarding avian nest materials. We assessed the structure and composition of nests in a group of coexisting passerine shrubland birds at a site in Massachusetts. We found, measured, collected, and dissected nests, and then weighed nest materials in morphological groups (e.g., bark, twigs, feathers), to determine if our 7 focal species were using different nest materials. The focal species were *Setophaga discolor* (Prairie Warbler), *Setophaga pensylvanica* (Chestnut-sided Warbler), *Spizella pusilla* (Field Sparrow), *Spizella passerine* (Chipping Sparrow), *Dumetella carolinensis* (Gray Catbird), *Pipilo erythrophthalmus* (Eastern Towhee), and *Turdus migratorius* (American Robin). Among species, we compared proportional material masses in complete nests, and also separately in the exterior, structural part of the nest and the interior, cup lining. We found that the proportional masses of all 17 material types that we examined in nests differed among species. The compositions of nests among all 7 bird species were distinct in multivariate ordination space and only a few pairs of species had substantial niche overlap. Proportional masses of materials within discrete sections (exterior and interior) also varied among species. Although some differences in nest composition could be partially explained by bird species size, nest materials differed even within the 3 larger-bodied species and within 4 smaller-bodied species. Our study builds upon previous studies that have shown species-specificity in avian nest composition, and supports the notion that birds using the same environment have distinct niches in relation to the materials placed in their nests. Niche partitioning due to interspecific competition could partially explain our findings, as certain materials are limited as resources and searching for suitable nest materials is energetically costly. Additionally, other factors, such as phylogenetic relatedness and partitioned nest sites, may have led to differential nest-material use. We recommend further research to help elucidate underlying mechanisms of nest-composition partitioning in birds and potentially other nest-building taxa.

Sun-PM2-C-1

Spatial Partitioning in Foraging Herring Gulls, *Larus argentatus*, in Eastern Maine

John G.T. Anderson (College of the Atlantic, Bar Harbor ME), Autumn Pauly (College of the Atlantic, Bar Harbor ME), and Marina Schnell (College of the Atlantic, Bar Harbor ME)

Abstract - Herring gulls (*Larus argentatus* [European Herring Gull] and *L. smithsonianus* [American Herring Gull]) are highly opportunistic generalists, feeding on a broad range of fish and marine and terrestrial invertebrates, as well as anthropogenic foods such as lobster bait, municipal trash, and—reportedly—French fries. In the summers of 2023 and 2024, we deployed solar-assisted GPS tags on 18 herring gulls nesting on 4 islands in eastern Maine as part of a study of highly pathogenic avian influenza. These islands—Schoodic, Mt Desert Rock, Great Duck and Shabby—lie on a roughly NW to SE transect, with the bulk of Acadia National Park and its associated tourist town, Bar Harbor, roughly central to the line. Tags allowed us to follow the movement patterns of individual gulls and to identify areas of concentrated activity. Birds nesting on Schoodic Island tended to make use of Frenchman Bay and the Bar Harbor municipal dock, while birds nesting on Shabby Island frequented Blue Hill Bay, with fewer sources of anthropogenic food. Birds nesting on Mt. Desert Rock and Great Duck Island foraged in intertidal areas, transfer stations, and dockyards at the southern end of Mt Desert Island, and apparently following fishing boats in the waters between nesting sites. While sample sizes are small, there seems to be little overlap between colonies in terms of foraging areas except for Great Duck and Mt. Desert Rock birds. Our results suggest a high degree of resource partitioning during the breeding season in contrast to the greater mixing observed in the post-breeding dispersal. These results are important in tracking possible sources of human/bird contacts that could result in zoonotic transmission of disease.

Sat-PM1-D-1

Natural History of an Introduced Ant-Mimicking Spider, *Myrmarachne formicaria*, in its Native and Invaded Range

Jennifer L. Apple (SUNY Geneseo, Geneseo, NY), Daniel Fleischman (SUNY Geneseo, Geneseo, NY), Cassidy Mills (SUNY Geneseo, Geneseo, NY), Eliana Ontiveros-Oberg (SUNY Geneseo, Geneseo, NY), Julia Ophals (SUNY Geneseo, Geneseo, NY), and Naiomi VanAlstine (SUNY Geneseo, Geneseo, NY)

Abstract - The ant-mimicking spider *Myrmarachne formicaria* (Araneae: Salticidae) is a recent arrival to North America from Eurasia, first noted in Ohio in 2001. Relatively little is known about its natural history in its native or invaded range. This spider mimics ants both in appearance and behavior. We used staged encounters between ant-mimicking spiders and potential predators (other salticid spiders) to assess the benefits that *M. formicaria* might gain from its ant mimicry. From 2017 to 2022 in western New York, we have been monitoring the phenology of this species in natural settings in fields and woodlands to track the appearance of adult males and females, eggs, spiderlings, and juveniles. Comparisons of field data from New York to species-occurrence data from the Global Biodiversity Information Facility (GBIF), as well as experience searching for this species in Europe, suggest differences between the phenology and habitat preferences of *M. formicaria* in its native range and that observed in North America. Sequencing of a 600-bp mitochondrial DNA gene region in spiders from 14 localities in New York, Pennsylvania, and Ohio yielded little genetic polymorphism, consistent with a single invasion of *M. formicaria* from 1 source locality, but data from other molecular markers and more samples are needed to confirm this conclusion. Comparison to a limited number of European samples revealed <1% sequence divergence, except for samples from Spain and southern France which showed considerably higher divergence. In another effort to reveal any geographic patterns, we are surveying spiders for the presence of various bacterial endosymbionts. Ongoing research in the lab also includes testing for consistent inter-individual behavioral differences that could be characterized as different personality traits in this spider species.

Sat-PM2-E-2

The Effect of Host Traits and Location on Parasitism by Insect Larvae

Thomas Back (SUNY Geneseo, Geneseo NY), Nolan Miller (SUNY Geneseo, Geneseo NY), and Suann Yang (SUNY Geneseo, Geneseo NY)

Abstract - In western New York's agricultural regions, non-native, cultivated and native plants occur near each other. The distribution of these plants potentially affects the instance of parasitism by insects, especially generalist insects. This study investigates the interactions between parasitising insects and their host plants in forests that are adjacent to farms of cultivated fruits. We hypothesize that the forests surrounding farms act as reservoirs for parasites during the times when fruits are absent from the farm. Additionally, fruit density may impact rates of parasitism with higher density correlated with higher rates of parasitism. Since fall 2023, we have characterized host–parasite interactions by sampling fruiting plants in forests adjacent to farm fields, at 7 separate farms. Preliminary results reveal that a majority of the larval insect parasites are found in a single species, *Frangula alnus* (Glossy Buckthorn). We will discuss factors impacting parasitism, including host species, host density, and position within the forest. These results have the potential to help to develop management strategies to shift control methods away from pesticides and toward management of fruiting plants within adjacent forests.

Sat-PM2-E-3

Using a Novel Mesocosm Design to Explore the Effect of Temperature on the Eastern Red-Backed Salamander

Isabella Angelique Badon (Virginia Tech, Blacksburg, VA) and Jen Moss (Virginia Tech, Blacksburg, VA)

Abstract - We constructed an open-topped chamber mesocosm in a deciduous forest. This mesocosm used passive warming to heat the study area. We placed Ibuttons that collect temperature every hour into each enclosure. Using the Ibuttons, we could see how effective our mesocosm design was at passive warming both during the day time and at night. This type of warming for an experiment is usually used on vegetation but we tested the effectiveness on wild animals to simulate the effects of climate change on them. We placed *Plethodon cinereus* (Eastern Red-Backed Salamander) into the mesocosm and surveyed their activity at night to see how their activity changed with the increase in temperature. If a salamander was active, it was above ground; when salamanders were below ground, wc considered them to be inactive. We placed a passive integrated transponder (PIT) into each salamander. Once salamanders were placed into the mesocosm using a PIT tag scanner, we were able to determine if they were above or below ground. The objective of this design was to test the utility of an open-top greenhouse design to passively raise temperatures on the forest floor and evaluate effects on salamander activity. This preliminary test was small scale but shows potential for future uses of this design on other species as well. The Ibuttons indicated that there was a greater increase in temperature during the day, and while we did not see as high of a temperature increase at night, the differences were retained on most nights of the experiment. Nocturnal heat retention appeared enhanced on cooler nights. For nocturnal activity, Eastern Red-Backed Salamanders displayed a great amount of variation between the 2 controls making the data gathered to date inconclusive as to the effect of temperature on salamander activity. There could be other factors like rain or cloud coverage that could have affected the level of activity, and we hope to explore these considerations as we continue our research.

Sat-PM1-E-3

Emerald Ash Borer (*Agrilus planipennis*) Biocontrol Agents in Rhode Island

Jack Bashaw (University of Rhode Island, Kingston, RI) and Lisa Tewksbury (University of Rhode Island, Kingston, RI)

Abstract - In cooperation with a national USDA biocontrol program for *Agrilus planipennis* (Emerald Ash Borer [EAB]), an invasive species of metallic wood-boring beetle native to East Asia, we conducted regular releases of 3 non-native biocontrol agents at 10 locations in Rhode Island (RI) from 2019 to 2024. The parasitoid wasps *Tetrastichus planipennisi*, *Oobius agrili*, and *Spathius galinae* were released on tagged *Fraxinus* spp. (ash trees) in areas of RI forest affected by EAB, to provide management of this forest pest. Two years of releases at each site were followed by 2 years of surveys using yellow pan traps to recover adult parasitoids. One individual *Spathius galinae* was recovered at the first RI release site, and additional recoveries from 2024 are awaiting identification confirmation. Parasitoid monitoring at release sites will confirm successful establishment of the 3 biocontrol agents in Rhode Island.

Sat-PM1-A-5

Head-Starting Marbled Salamanders as a Reintroduction Tool

John Berkholtz (Zoo New England - Field Conservation Department, Boston, MA)

Abstract - Historically the state threatened *Ambystoma opacum* (Marbled Salamander) occurred in the 890-ha (2200-ac) Middlesex Fells Reservation less than 11 km (7 mi) north of Boston. With permission and guidance from the Massachusetts Natural Heritage and Endangered Species Program and Department of Conservation and Recreation we proposed head-starting Marbled Salamanders from larval to juvenile land stage and releasing them to suitable habitat in the Middlesex Fells where they had not been observed since the 1930s. We collected larvae from meta-population donor sites in late fall, reared them at Zoo New England and local high schools, and released them in early summer. This is the final year of a 10-year project documenting the successes and challenges of head-starting this cryptic species.

Sat-PM1-B-1

Long-term Population Dynamics of the Asian Shore Crab on Cape Cod

Christopher P. Bloch (Bridgewater State University, Bridgewater, MA) and Caroline Reusch (Bridgewater State University, Bridgewater, MA)

Abstract - Invasive species generally increase rapidly in abundance after invading a new habitat and attain densities higher than observed in their native ranges, while exerting substantial effects on populations of native prey or competitors. There is, however, no single, canonical pattern of population dynamics for invasive species or those species with which they interact, as evolutionary adaptation and environmental heterogeneity can combine to generate unique responses. Consequently, long-term observations are necessary to understand effects of a biological invader on resident species. In this study, we examine data collected by quadrat sampling annually from 2003 to 2024 at Sandwich, MA, on the north shore of Cape Cod, focusing on 4 focal species: *Hemigrapsus sanguineus* (Asian Shore Crab), *C. maenas* (Green Crab), *Littorina littorea* (Common Periwinkle), and *Mytilus edulis* (Blue Mussel). The population of Asian Shore Crabs grew rapidly from 2003 to 2012, then declined and has fluctuated around a mean of ~11 individuals/m^2 since 2016. The population of Green Crabs has not recovered from initial declines, whereas Blue Mussels have exhibited multiple years of high density, as well as increased mean body size, since the decline of the Asian Shore Crab population. Density of Common Periwinkles does not appear to be associated with that of Asian Shore Crabs. These results suggest that Asian Shore Crabs may have undergone a boom-bust cycle, allowing its native prey (Blue Mussels) to recover from initially heavy predation, while a non-native competitor (the Green Crab) remains suppressed. It remains unclear whether this situation represents a new equilibrium or a transitive state between boom–bust cycles.

Sun-PM2-B-1

Year-Round Habitat Use by Birds on a Hudson Valley Farm

Anne S. Bloomfield (Hudson Valley Farm Hub, Hurley, NY)

Abstract - Farmland has the ability to play a significant role in bird-conservation efforts on private lands locally and globally. Collecting habitat-use data indicates, in this and possibly similar landscape contexts, which species are where and when and thereby can inform habitat management such as mowing practices; installation of artificial perches; cash-crop selection and rotation; cover-crop selection, termination, and rotation; use of nest boxes; and more. In the fall of 2016, I established a long-term monitoring program for birds and the habitats they use at the Hudson Valley Farm Hub in Hurley, NY. The result is a robust and detailed database of bird habitat use and phenology year-round. Data are scheduled to be available open source in 2025. Many studies focus on nesting habitat alone, while these data examine habitat use year-round. Because the way birds endure the winter months influences their nest success, it is critical to examine access to habitat year-round, not just during the nesting season. I imagine a regional food system in which birds are valued and celebrated and can thrive. I believe a holistic approach combining monitoring, research, habitat management, and public engagement is the key to success.

Sat-PM2-A-1

Ants at a Hudson Valley Farm: Rare Species and a Snapshot of the Community in Native Meadow Trial Plots

Kyle Bradford (Hawthorne Valley Farmscape Ecology Program, Ghent, NY), Conrad Vispo (Hawthorne Valley Farmscape Ecology Program, Ghent, NY), Claudia Knab-Vispo (Hawthorne Valley Farmscape Ecology Program, Ghent, NY), and Kendrick Fowler (Hawthorne Valley Farmscape Ecology Program, Ghent, NY)

Abstract - Ants are abundant in most terrestrial habitats and interact as pests and beneficials in agricultural systems. There are conservation concerns for some ant species in the Northeast, and some of these species can be supported by managed on-farm habitats such as dry, thin-soil pastures and pollinator plantings. At the Farm Hub in Hurley, NY, we established experimental native meadow trial plots in 2017 using 2 different seed mixes, a fallow control, and a hay meadow. This talk will discuss a snapshot of the ant community in these trials based on standardized hand-sampling data collected in 2022 (5 years after the meadows were established), and how different treatments and vegetation characteristics may be affecting ant-nest abundance and richness. Additionally, I will discuss the rare ant species we have found at the Farm Hub since 2017, what habitats are particularly important for rare-ant conservation on farms in the Hudson Valley, and what management implications are suggested by the ant data for creating beneficial habitats for insect conservation on farms.

Sat-AM2-A-3

Survival and Age at Maturity in Head-started Wood Turtles (*Glyptemys insculpta*) with Implications for Population Recovery

Kurt A. Buhlmann (Savannah River Ecology Laboratory, University of Georgia, Aiken, SC), Colin P. Osborn (Friends of Great Swamp, Basking Ridge, NJ), James R. Angley (Friends of Great Swamp, Basking Ridge, NJ) Brian A. Bastarache (Bristol County Agricultural High School, Dighton, MA), Kourtnie A. Bouley (Bristol County Agricultural High School, Dighton, MA), Ryan J. Rimple (Savannah River Ecology Laboratory, Aiken, SC), Amelia L. Russell (Savannah River Ecology Laboratory, Aiken, SC), and Tracey D. Tuberville (Savannah River Ecology Laboratory, Aiken, SC)

Abstract - A small relict population of *Glyptemys insculpta* (Wood Turtle) was discovered on a protected area in New Jersey in 2006. Monitoring of nesting females revealed that nesting habitat and nest success was limited due to invasive plants, human landscape alteration, and *Procyon lotor* (Raccoon) depredation. We initiated habitat restoration including creation of protected nesting areas, mowing in winter, invasive plant removal, and adjacent landowner education. Hatchlings from protected nests were direct-released during 2006–2015, yet only a few were detected in subsequent years. Between 2011 and 2023, some or all of each hatchling cohort were head-started indoors at Bristol County Agricultural High School for 9 months. We have continuously radio-tracked all head-starts from the 2011 cohort and portions of the 2012–2015 cohorts. Head-started turtles found their own food, established home ranges, and hibernated communally with founder adults. Subsidized Raccoons, mowers, automobiles, and flooding events—all human-instigated—were the causes of mortality. The first males (in 2017) and the first females (in 2019) from the 2011 head-start cohort reached maturity at ages 6–8, younger than expected by 4–5 years. We confirmed successful reproduction by head-starts through observation of viable hatchlings produced in 2019, 2020, 2023, and 2024. Head-starting can pull a relict population out of the nose-dive to extirpation when used in conjunction with habitat-restoration practices, but it must be conducted with persistence and continuity over at least the number of years it takes for the earliest cohorts to reach maturity and begin producing offspring of their own.

Sat-PM1-B-5

The Plastic Coast of Maine: A Look at Gull Microplastic Ingestion and Maine Island Debris

Lydia Burnet (College of the Atlantic, Bar Harbor, ME)

Abstract - I conducted a study examining plastic-contaminant levels in 31 regurgitate and 30 guano samples from *Larus argentatus* (Herring Gull) and *Larus marinus* (Black-backed Gull). I conducted sampling in a breeding colony on Great Duck Island, an 89-ha island located 19 km offshore in the Gulf of Maine, during the summer of 2024. Blue microfibers were the most frequently observed microplastic contaminants, present in nearly all regurgitate samples. Likely sources of these contaminants include discarded fishing gear, refuse from regional transfer stations, and miscellaneous flotsam. Because marine debris is ubiquitous in Maine island environments, plastic fragments and deposits are common in the surrounding land and waters. This study aims to connect the microplastic findings in gulls to the broader issue of marine debris across the Gulf of Maine and its impacts on the Maine environment. It emphasizes the need for further research on microplastic effects on seabirds and mitigation strategies to reduce their presence in coastal environments.

Sat-PM1-D-5

Overview of Avian Research in an Actively Managed Inland Pine Barrens

Steven P. Campbell (Albany Pine Bush Preserve Commission), Neil A. Gifford (Albany Pine Bush Preserve Commission), and Alexandria Soldo (Albany Pine Bush Preserve Commission)

Abstract - Inland pine barrens are a rare yet important habitat for shrubland birds in the northeastern US. However, many of these ecosystems are limited to fragmented remnants in heavily urbanized landscapes. Protection and restoration of pine barrens will thus contribute disproportionately to the diversity and conservation of shrubland birds in the region. The Albany Pine Bush Preserve protects the remnants of an inland pine barrens following decades of loss, fragmentation, and degradation of the ecosystem due to human development, species invasions, and fire suppression. Since the preserve was created in 1988, the Albany Pine Bush Preserve Commission has been actively working to increase the size of the preserve and restore pine barrens through mechanical, chemical, and fire management. To understand the effects of our efforts, we have been monitoring the response of bird populations at both the community and species level. At the community level, we are examining changes in the distribution and abundance of bird species using point counts and are assessing trends in survival and productivity through banding using protocols from the Monitoring Avian Productivity and Survivorship program. At the species level, we have examined demography and territory fidelity of *Setophaga discolor* (Prairie Warbler) and habitat use of *Antrostomus vociferus* (Eastern Whip-poor-will) and *Pipilo erythrophthalmus* (Eastern Towhee). We will provide a synopsis of the individual studies, but the overall result is that the shrubland bird community is responding positively to our management. As such, our work protecting and managing inland pine barrens serves as a successful example for other pine barrens in the northeastern US.

Sat-AM2-D-1

Lessons Learned from Two Generations of Headstarting in a Remnant Blanding's Turtle Population in New York

Lindsay Charlop (The Wetland Trust, Inc., Burdett, NY), **Maribel Pregnall-Mueller** (The Wetland Trust, Inc., Burdett, NY), and **Gabby Deyo** (The Wetland Trust, Inc., Burdett, NY)

Abstract - Headstarting has been employed in recent decades as a conservation strategy to augment populations of the New York State-threatened *Emydoidea blandingii* (Blanding's Turtle), but there are few examples of headstarted cohorts that have been studied as adults. Between the years of 1994 and 1999, a total of 60 headstarted Blanding's turtles were released to help bolster a well-studied remnant population in New York's Mid-Hudson Valley. Nine (15%) of these headstarts are still tracked and studied as adults today, and 30 years later, it is possible to evaluate their success through comparison with their wild counterparts. This presentation will describe findings from this long-term inquiry, focusing on survival, fecundity, biometrics, and behavior. Our results suggest that the headstarts have become robust reproductive members of the population. Although the size discrepancy between headstarts and their wild counterparts does not persist through maturation, headstarts do appear to retain slight advantages over wild turtles that endure into adulthood. Preliminary population-viability analysis indicates that headstarting has played a critical role in preventing quasi-extinction over the last 30 years. We have found that headstarting fits well within our strategy for preserving this threatened population, and are now studying a cohort of juvenile headstarts that includes the offspring of headstarted adults. Studying the relative health and fitness of these individuals will inform our understanding of how headstarting supports a Blanding's Turtle population over generations.

Sat-PM1-B-4

Estimating Invertebrate Consumption Rates by Red-Backed Salamanders

Madelyn R. Chartier (UMass Amherst, Amherst, MA), Evan H Campbell Grant (US Geological Survey, Eastern Ecological Science Center [Patuxent Wildlife Research Center], SO Conte Anadromous Fish Research Laboratory, Turners Falls, MA), and Elise Edwards (US Geological Survey, Eastern Ecological Science Center [Patuxent Wildlife Research Center], SO Conte Anadromous Fish Research Laboratory, Turners Falls, MA)

Abstract - Increasing rates of tick-borne disease are negatively impacting public health in the northeastern US. Land use and other environmental changes have led to the decline of amphibians, which are critical elements of forest food webs as invertebrate predators. The aim of our study is to determine the rate of tick consumption by *Plethodon cinereus* (Red-backed Salamander) and investigate their potential role in controlling populations of tick disease vectors. We used laboratory mesocosms with varying levels of habitat complexity to observe salamander hunting behavior when presented with ticks and other invertebrates. Our preliminary results indicate that Red-backed Salamanders do consume ticks, but consumption rates decrease as habitat complexity increases.

Sat-PM1-E-1

Assessing the Effectiveness of Cedarwood Oil-based Minimum-Risk Pesticides for Controlling Blacklegged Ticks in Residential Settings

Sophia I. Chiaia (Western Connecticut State University, Danbury, CT), Neeta Connally (Western Connecticut State University, Danbury, CT), and Victoria L. Hornbostel (Western Connecticut State University, Danbury, CT)

Abstract - In the northeastern US, *Ixodes scapularis* (Black-legged Tick) is the primary vector of Lyme disease and several other tick-associated diseases. Recommended strategies to suppress ticks and mitigate human risk for tick bites include the application of tick-killing pesticides (acaricides) to tick habitat in one's backyard. However, many people are unwilling to apply such products due to a perceived risk of toxicity for both humans and the environment. Acaricides containing minimum-risk active ingredients such as cedarwood oil are increasingly available to consumers, marketed as a "safer" and more "environmentally friendly" option for tick control. Many such products are exempt from Environmental Protection Agency (EPA) registration, and therefore have not yet been well-evaluated. Accordingly, we sought to assess the efficacy of professionally applied cedarwood oil-based acaricidal applications for controlling ticks on residential properties. We enrolled 40 residential properties in Connecticut, of which 20 received professional cedar-based treatments and 20 received no acaricidal treatments. We sampled ticks 3 times from each study property between late-May and mid-July 2024. The results of this study provide a first step towards better understanding the efficacy of minimum-risk acaricides and contribute valuable insights towards improving recommendations for managing residential tick exposure and reducing risk for tick-borne disease in the Northeast.

Sat-PM2-E-1

Assessing the Impact of Land Use on Water Quality in Lower Esopus Creek: Eight Years of Monitoring at the Hudson Valley Farm Hub

Shafiul Chowdhury (SUNY New Paltz, New Paltz, NY)

Abstract - The water quality of the lower Esopus Creek is influenced by a combination of agricultural and urban land use. I have monitored water quality in and around the Hudson Valley Farm Hub (HVFH) over the last 8 years. High-quality water is critical for sustaining aquatic and terrestrial ecosystems and for supporting human use within the creek's drainage system. I compared data from 2024 to historical records from 2008 and 2017–2023 to evaluate long-term trends and the effectiveness of HVFH's organic practices in improving water quality. The results indicate significant localized improvements in water quality within the HVFH property since the adoption of organic and sustainable farming practices. I analyzed annual discharge data to examine the relationship between hydrological flow dynamics and ionic concentrations. Additionally, nitrogen isotope analysis, introduced in 2021, identified 3 distinct nitrate runoff sources: manure-based fertilizers, denitrification and assimilation processes, and atmospheric deposition. The complex relationships between discharge, total dissolved solids (TDS), and ionic concentrations are influenced by land-use patterns, overland flow, and the intensity, duration, and frequency of rainfall events. Additionally, benthic macroinvertebrates (BMI) were assessed by Watershed Assessment Associates. Based on the resulting biological assessment profile (BAP), the Lower Esopus Creek is classified as "slightly impacted". This study underscores the importance of implementing environmentally sustainable practices, such as those at HVFH, in mitigating the impacts of agricultural activities on water quality. Future work should focus on integrating land-use management strategies with hydrological and ecological data to ensure long-term water-quality improvements in the Lower Esopus Creek watershed.

Sat-AM2-A-4

Shifts in Spring Flowering Phenology in Response to Climate Change in Connecticut

Dorothy Christopher (Western Connecticut State University, Danbury, CT), Lindsay Kirkness (Western Connecticut State University, Danbury, CT), and Emily Zibelin (Western Connecticut State University, Danbury, CT)

Abstract - Plant phenological shifts are important indicators of climate change. Spring ephemeral wildflowers may be particularly strong indicators because they are sensitive to environmental conditions and may therefore shift their phenology more dramatically than plants that flower in the summer. Spring ephemerals in the Northeast may be even more vulnerable to climate change because the spring in this region is quite short and, historically, temperatures remain low until late in the season. We recorded flowering dates of 8 common spring ephemeral wildflowers throughout Connecticut from 1920 to 2020 using digitized herbarium records. We obtained climate data for the same period using NOAA's historic climate database. We found that, in addition to shifts in other climate variables, average spring temperature in Connecticut has increased by 0.6 °C since 1970. The mean flowering date of the spring ephemeral species is 4.4 days earlier now compared to pre-1970 flowering. These results highlight the ongoing effects of climate change in natural populations and suggest that even small changes in temperature can have significant effects. Phenological shifts in spring ephemerals may have especially negative consequences because these plants are some of the only food resources available for early spring pollinators. Future work will examine pollen limitation and pollinator services to spring ephemerals in Connecticut.

Sun-PM1-A-3

Creative Arts as a Pedagogical Tool for Synthesis in an Interdisciplinary Urban Ecology Class

Elizabeth M. Cook (Environmental Science Department, Barnard College, New York, NY) and Terryanne Maenza-Gmelch (Environmental Science Department, Barnard College, New York, NY)

Abstract - Cities are complex, interdependent ecosystems. This framing of cities integrates the study of interconnected ecological dimensions of urban environments along with social-cultural dimensions (e.g., governance, economy, justice) and engineered-infrastructure dimensions (e.g., transportation, energy, and water networks). In an upper-level Urban Ecosystems course at Barnard College, we dig into urban ecology from a traditional ecosystem perspective, while also emphasizing that siloed, single-disciplinary framings are insufficient to navigate the complexities of urban systems. Previous course reviews indicate students appreciate the broader interdisciplinary systems perspective; however, students sometimes struggle to synthesize the complex concepts from varied disciplines and can become disengaged from traditional classroom synthesis through readings, lectures, small-group discussion, and field trips. This semester, I aim to integrate more creative pedagogical practices that engage and synthesize complex scientific principles and concepts with collaborative tactile activities. Through a scaffolded approach, students first develop a concept map individually—initially prompted to name overarching topics from the recent material, then write 3–5 key words or phrases (on individual sticky notes) that best describe each overarching theme. Building upon individual reflections, students work in small groups to discuss and develop a collective framework for their ideas. By engaging with and rearranging their individual concepts within the collective framework, the students develop a group synthesis that reflects their shared understanding and the interconnections on course topics. Next, students are prompted to co-create a shared/group collage of their collective framework—given ~30 minutes in the classroom with art supplies (e.g., magazines, glue, scissors, colored paper, markers, etc)—and then share their outputs in a report back. The collaging activity allows students to interpret or represent their synthesized ideas through visual, tactile practice that is meant to catalyze new dynamic forms of engagement with one another and deeper dialogue on the material to co-create shared understanding. The students were surveyed after each creative synthesis activity for a reflective self-assessment of their learning outcomes, engagement with the synthetic concepts, and creative practice. Multiple collages will be developed for key course topics and "quilted" together at the end of the semester to represent the complexity of urban systems.

Sat-AM2-C-1

Microsnails in Microhabitats of a New York Alvar

Marla Coppolino (Delaware Museum of Nature and Science, Wilmington, DE)

Abstract - Given their secretive lives, the lowly but ecologically important terrestrial snails and slugs (Mollusca: Stylommatophora) require careful methods to locate, collect, and study while also recording their microhabitat data. In my continuing survey of snails and slugs of Chaumont Barrens Preserve (owned by The Nature Conservancy) in Jefferson County, NY, I aim to describe the microhabitats with their associated snail and slug species. This preserve is an ecologically rare alvar site that, despite having vast amounts of exposed limestone rock, presents a harsh life of extreme fluctuations in temperature and water levels. The greatest natural threat to terrestrial mollusks is desiccation, hence they seek microhabitats on the alvar grounds that support stable temperatures and humidity, as well as food sources. Thus far, my results confirm that greater numbers and species of terrestrial mollusks are found in specific microhabitats on this site. In addition to describing the biotic and abiotic features of the microhabitats that harbor mollusks, I also seek to describe the correlation between the microhabitats' physical dimensions and the mollusks size. Approximately 95% of the mollusk species I have found at this site are considered microsnails, measuring between 0.8 and 5 mm at the greatest shell width or height, which have even finer-scale microhabitat requirements compared to relatively larger terrestrial mollusks. I have found that the smallest spaces within leaf litter, bryophytes, and even decaying insect bodies provide shelter and food for the smallest snails. Finally, typical field collecting and laboratory processing methods, such as heating and drying soil and leaf litter and pouring it through sieves, deconstruct the microhabitat and yield only the snails as dried shells, separated from their microhabitat. I propose some alternative methods to better qualify microhabitat-association data that are routinely lost, which can bring a deeper understanding of the ecological roles of terrestrial snails and slugs and to help build the case for their conservation.

Sun-PM2-E-5

Promoting Biodiversity on Private Lands: Creating Connective Communities

Richard Couse (BiodiversityWorks, Vineyard Haven, MA), Luanne Johnson (BiodiversityWorks, Vineyard Haven, MA), and Tom Chase (Village and Wilderness, Oak Bluffs, MA)

Abstract - Although roughly 40% of Martha's Vineyard is under permanent conservation protection, habitat degradation, and fragmentation drive the loss of rare and specialized species. Private lands can be the key to their survival by providing patches of habitat that will create stepping stones or corridors of intact habitat for wildlife and plants to move, mate, pollinate, and thrive. In 2021, we launched the Natural Neighbors Program, which seeks to increase native biodiversity and habitat connectivity across the island by encouraging individuals and neighborhoods to engage in stewardship by adding features to their landscape that benefit plants, pollinators, and wildlife or managing those aspects that degrade habitat. We emphasize hands-on participation in biodiversity conservation, even on small patches of land, providing recommendations that meet participants at their level of interest, ability, and resources. Stewardship recommendations include adding features that benefit plants, pollinators, and wildlife as well as removing or managing those that degrade habitat. Today the program has over 325 private landowners participating who are helping to achieve the program's long-term goal of transforming residential properties on Martha's Vineyard into ecological sources for biodiversity. We will report on participant engagement and activities, speak about our public outreach campaigns, and provide information and recommendations for like-minded organizations to start programs of their own.

Sun-AM1-B-1

NEON: A Continental Observatory for Ecology Built on Partnerships

JoLeisa Cramer (National Ecological Observatory Network, Fitchburg, MA), Joshua Fischer (National Ecological Observatory Network, Fitchburg, MA), and Callie Puntenney (National Ecological Observatory Network, Boulder, CO)

Abstract - The US National Science Foundation's National Ecological Observatory Network (NEON) is a continental-scale observation facility operated by Battelle and designed to collect long-term open access ecological data. NEON collects data on plants, animals, soil, nutrients, freshwater, and the atmosphere using sensor measurements and field observations. Airborne remote-sensing data, local site-level data capture, and existing satellite data can be combined to support regional to continental characterization of ecological processes. All NEON data are free and open to everyone. Our data products are downloadable in standard formats that are in general use throughout the scientific community. Samples collected from NEON field sites are available for loan to researchers, including for destructive purposes, through the NEON Biorepository. Additionally, the NEON Research Support Services (NRSS) makes available certain components of NEON's infrastructure to members of the community to support their own research or other activities.bWithout the ongoing support of local partners, NEON would not be possible. In the Northeast, partnerships are at the foundation of 2 terrestrial and 1 aquatic NEON field site and multiple NRSS projects. NEON's first terrestrial site in the Northeast is a partnership with Harvard University, the Harvard Forest Long Term Ecological Research program, and the Massachusetts Department of Conservation and Recreation. The aquatic site within the Quabbin Reservoir Watershed is in partnership with the Massachusetts Department of Conservation and Recreation Division of Water Supply Protection. The other terrestrial site in the Northeast is made possible by a partnership with the US Forest Service in New Hampshire. More than 24 NRSS projects showcase the remarkable breadth of scientific pursuits that complement NEON data in the Northeast as well. The Observatory's comprehensive design and work with partners supports greater understanding of ecological change and enables forecasting of future ecological conditions in the US.

Sun-PM2-D-1

NEON Airborne Sampling at Domain 01: Northeast

JoLeisa Cramer (National Ecological Observatory Network, Fitchburg, MA), Bridget Hass (National Ecological Observatory Network, Boulder, CO), and Callie Puntenney (National Ecological Observatory Network, Boulder, CO)

Abstract - In addition to ground-based sampling, NEON operates the Airborne Observation Platform (AOP), which collects aerial hyperspectral, discrete and waveform lidar, and camera data over 81 sites across the United States and Puerto Rico. AOP data provide regional-scale information over the NEON sites and can serve as a bridge between ground collections and satellite data, to inform larger-scale ecological studies. AOP has collected 8 years of data at the Harvard Forest site, between 2013 and2024 (with a test flight in 2012), making it the site with the longest remote-sensing temporal record. In 2024, AOP conducted additional sampling at Domain 01, which we highlight in this talk. In August 2024, AOP measured foliar spectra at Harvard Forest, coincident with NEON's canopy foliar sampling campaign. These data can be used as an additional link between the airborne hyperspectral data and terrestrial observational samples. AOP also collected GPS measurements to validate the Lidar sensor's vertical accuracy. Finally, in 2024, AOP collected a NEON Research Support Services (NRSS) project over the University of New Hampshire's Thompson Farm site to investigate how vegetation structure influences spectral reflectance. As with all NEON data products, AOP data are openly available through the NEON Data Portal. In Fall of 2024, AOP added 5 remote-sensing data products to the Google Earth Engine (GEE) publisher catalog, providing another means of accessing AOP data. Also in 2024, NEON released a Python 'neonutilities' package which provides similar functionality to the existing R package for accessing and wrangling NEON data. NEON's online Learning Hub provides tutorials in R, Python, and GEE for working with NEON data, as well as videos and other educational resources. NEON is committed to open science, and NEON scientists are eager to engage and work with the research community to move ecological science forward.

Sun-PM2-D-5

Deer Activity Intensifies Negative Impacts of Invasive Plants and Earthworms

Andrea Davalos (SUNY Cortland, Cortland, NY), Annise Dobson (Yale University, New Haven, CT), Laura Eierman (SUNY Cortland, Cortland, NY), and Timothy McCay (Colgate University, Hamilton, NY)

Abstract - Forests in northeastern North America face a multitude of historical, current, and emergent threats, including invasion by non-native plants and earthworms. Amid these complex and changing scenarios, it is challenging to identify passengers and drivers of change. Effective prevention and management of invasive species requires understanding of the species' ecological impacts and empirical assessments of management outcomes within the context of co-occurring stressors. We evaluated the independent and combined effects of the invasive grass *Microstegium vimineum* (Japanese Stiltgrass), *Odocoileus virginianus* (White-tailed Deer), and invasive jumping worms on plant performance in the forest understory. We transplanted seedlings of 4 native species at 7 forested sites with varying abundances of jumping worms in the Catskills Mountains and monitored survival and growth for 3 years. Seedlings persisted at similar rates among sites with varying jumping-worm abundance and between fenced plots where deer had no access and open plots where deer had access. However, plant responses varied by species and depended on the interaction of co-occurring stressors. For example, in fenced plots *Solidago flexicaulis* (Zig-zag Goldenrod) size decreased with Japanese Stiltgrass cover and did not vary with earthworm abundance. However, in open plots, Zig-zag Goldenrod size was negatively associated with Japanese Stiltgrass cover only when worms were absent. Overall, our results underscore the strength of deer impacts in forested systems of New York State and indicate that reducing invasive plant cover might not result in expected native plant recovery, especially if other co-occurring stressors are the drivers of change.

Sun-PM1-B-3

Microbial Diversity and Habitat Ecology at a Hudson Valley Farm

Lizbeth Dávila-Santiago (Bard College, Annadale-On-Hudson, NY), Myreen Toledo (Bard College, Annandale-On-Hudson, NY), and Gabriel G. Perron (Bard College, Annandale-On-Hudson, NY)

Abstract - Agricultural ecosystems are shaped by complex interactions among microbial communities, farming practices, and climate factors. This study, conducted at the Hudson Valley FarmHub, investigates how habitat diversity—particularly non-farmed ecosystems—contributes to maintaining healthy microbial populations at the farm level. Preliminary findings suggest that non-farmed habitats harbor a rich microbial diversity, including many microorganisms not commonly found in cultivated soil. We hypothesize that these diverse microbial communities serve as reservoirs of beneficial microorganisms that support key ecological functions, enhance farming outcomes, and reduce the prevalence of antibiotic resistance genes. Additionally, ongoing research examines the effects of climate change on microbial composition and function, providing insights into long-term soil health and resilience.

Sat-AM1-A-3

Natural History and Connectivity Patterns of Parasitic Worms Infecting New England Shellfish

Andrew A. Davinack (Wheaton College, Norton, MA), Emma Russo (Wheaton College, Norton, MA), Isabel Varreto (Wheaton College, Norton, MA), Cam Grosser (Wheaton College, Norton, MA), Mikayla Titus (Wheaton College, Norton, MA), and Ava Sheedy (Wheaton College, Norton, MA)

Abstract - Shellfish aquaculture is a vital component of New England's "blue economy", contributing nearly $50 million annually in dockside value. However, this industry faces mounting challenges from climate change and diseases, which often interact synergistically to amplify their impacts. Over the past 5 years, the Davinack Lab has investigated the life history, ecology, and evolution of macrofaunal parasites infecting natural and commercially reared shellfish across New England, including *Argopecten irradians* (Bay Scallop) on Nantucket Island, *Crassostrea virginica* (Eastern Oyster) on Cape Cod, and mussels in Maine. This presentation highlights new findings on the vulnerability of these shellfish populations, including the effects of mud-blister disease caused by shell-boring polychaetes on Eastern Oyster and the population connectivity of the trematode flatworm *Proctoeces maculatus*, which infects the mantle tissue of *Mytilus edulis* (Blue Mussel). Our results reveal troubling trends, including increased parasite loads and genetic homogenization, likely driven by the intraregional and transnational movement of hosts and range expansions linked to rising ocean temperatures.

Sat-AM1-E-3

Nest Insulation Properties Change in Low vs. High Elevation Swainson's Thrush (*Catharus ustulatus*) Nests

Sarah C. Deckel (Great Hollow Nature Preserve, New Fairfield, CT), Michael Akresh (Environmental Studies, Antioch University, VT), Alexander Gerson (Biology Department, University of Massachusetts, Amherst), and David King (US Forest Service Northern Research Station)

Abstract - Open-cup nests, such as those built by passerines, are constructed to maintain optimal temperature for eggs and nestlings. For species that establish their territories at high elevations, nest structure and insulation are crucial to provide protection from cold weather and intense rain events to ensure proper nestling growth and development. Building with proper materials in these harsh climatic conditions, such as lichen, fungi, or twigs, may impact the overall insulatory value of the nest, yet there is little research documenting these qualities of montane bird nests. Thus, we studied nests built by *Catharus ustulatus* (Swainson's Thrush) within the White Mountains, NH, to investigate how nest characteristics and materials influenced insulatory value, and how insulatory value varied across an elevational gradient. Swainson's Thrush built better insulated nests at high elevations, yet it appears nests were deformed as nestlings grew, which may have compromised the integrity of the nest walls and, therefore, negatively influenced insulatory value. Thrushes that built nests with more twigs were heavier, but less well insulated, and we found more lichen and fungi within high-elevation nests. Swainson's Thrush may prefer to build nests with more porous materials, such as twigs, lichen and fungi, to maintain proper airflow and prevent overheating, which are important features given that previous research showed success of higher-elevation nests were susceptible to temperature spikes and extreme precipitation events. Our results provide evidence that montane breeding birds can adjust nest materials to maintain optimal conditions for eggs and nestlings. This adaptive capacity will be beneficial as temperature and precipitation extremes become progressively more pronounced.

Sun-PM2-C-2

Comparative Energetics of a High-Elevation Specialist and Elevational Generalist Songbird in Vermont

Sarah C. Deckel (Great Hollow Nature Preserve, New Fairfield, CT), Chad Seewagen (Great Hollow Nature Preserve, New Fairfield, CT), John Whiteman (Biological Sciences, Old Dominion University, Norfolk, VA), and Alexander Gerson (Biology Department, University of Massachusetts, Amherst, MA)

Abstract - Montane breeding birds must efficiently balance energetic demands of reproduction and thermoregulation in the cold and wet conditions of high-elevation systems. Elevational specialists, such as *Catharus bicknelli* (Bicknell's Thrush), breed exclusively in subalpine habitats, whereas elevational generalists, such as *Catharus ustulatus* (Swainson's Thrush), occur at high elevations in much lower abundance than at lower elevations. However, the mechanisms driving these elevational distributions remain poorly understood. In this study, we use a novel isotopic technique, $\Delta'^{17}O$, to compare daily energy expenditure (DEE) between these congeneric thrushes—an approach that has seen limited application in wild birds—in relation to local temperature and precipitation data. Additionally, we assess feather water repellency, with and without uropygial oil. We hypothesize that elevational specialists have evolved to optimize energy use in extreme high-elevation conditions, while generalists exhibit greater physiological flexibility. In 2024, we found no difference in feather hydrophobicity between the 2 species; however, water repellency decreased when uropygial oil was removed. Preliminary DEE results from $\Delta'^{17}O$ analysis are in progress. A second field season in 2025 will expand this study by comparing DEE between high- and low-elevation Swainson's Thrush populations to assess physiological demands across elevations. By quantifying energy expenditure and water repellency, this study aims to elucidate the physiological strategies underlying elevational specialization and their implications for resilience to climate change.

Sat-AM2-D-2

Using Invasive Species Removal as an Undergraduate Teaching Tool

Lauren DiCarlo (Westfield State University, Westfield, MA)

Abstract - In 2020, the Westfield State University Restoration Ecology students initiated a long-term invasive species removal project in a floodplain forest along the Westfield River. The area, highly invaded by *Euonymus alatus* (Winged Burning Bush), has undergone removal each year by both cutting and root-removal methods. In addition, students have monitored vegetation and wildlife in areas of treatment (invasive removal) and control (invasives still present). In this presentation, I will discuss how the project and data collection has been incorporated into course curricula, lessons learned after 5 years of research and future directions the project will take.

Sun-PM2-B-4

The Role of Drone Flies in an Island Plant–Pollinator Network

Whitt Dodge (Bowdoin College, Brunswick, ME) and Patty Jones (Bowdoin College, Brunswick ME)

Abstract - Flies in the family Syrphidae are common flower-visiting insects that forage on nectar and pollen. *Eristalis* (drone flies) are large pilose syrphid flies who both behaviorally and visually mimic *Apis mellifera* (European Honeybees). They are well known for their effectiveness as pollinators of both wild and managed flowering plants but their associative-learning abilities, visual-perception systems, and role in plant–pollinator networks remain understudied in comparison to bees. Drone flies use both innate biases and associative learning to locate rewarding flowers. We analyzed floral visitation by wild drone flies on a boreal island in the Bay of Fundy, and examined their associative color-learning capabilities in comparison to *Bombus sandersoni* (Sanderson Bumblebee). We found that drone flies have a strong bias for yellow cues. They are capable of learning to associate blue cues with a reward but do not perform as well as bumblebees and perform better with yellow cues than blue.

Sun-AM2-E-2

Characterizing Anthropogenic Induced Mortalities of Sea Turtles in New York Bight and Long Island Sound

Kimberly F. Durham (Atlantic Marine Conservation Society, Westhampton Beach, NY), (Western State Connecticut University, Danbury CT), Allison M. DePerte (Atlantic Marine Conservation Society, Westhampton Beach, NY), Theodora Pinou (Western Connecticut State University, Danbury, CT), and Robert A. DiGiovanni Jr., (Atlantic Marine Conservation Society, Westhampton Beach, NY)

Abstract - Mortalities associated with anthropogenic activities characterized by watercraft interactions, fisheries (entanglement, ingestion), and ingestion of marine debris are a considerable threat for sea turtle species within the New York Bight. We collated mortality data from stranded (i.e., injured, sick, or deceased) sea turtles recovered from the bays and estuaries of Long Island Sound and New York Bight during 2007–2024 into categories associated with human activities. Over this study period, 1289 sea turtles were documented including 545 (42%) *Caretta caretta* (Loggerhead), 382 (30%), *Lepidochelys kempii* (Kemp's Ridley), 206 (16%), *Chelonia mydas (*Atlantic Green), and 148 (11%) *Dermochelys coriacea* (Leatherback). The frequency of anthropogenic activities associated with sea turtle mortalities was documented in 408 (32%) examinations. Sea turtle mortalities associated with watercraft interactions were documented with the highest frequency: 258 (63%) records. Loggerheads were the species documented with the highest frequency of vessel interaction, with 170 (75%) records. Marine debris ingestion and fisheries interaction were documented with 93 (23%) of the mortalities investigated. This study focused at characterizing the anthropogenic factors associated with sea turtle mortalities. This goal of this study is to provide an important tool for management efforts to identify and mitigate threats to sea turtle species utilizing the waters of the New York Bight and Long Island Sound.

Sat-PM2-B-1

Elm Zigzag Sawfly Phenology and Late Season Predation in New York

Nicholas Durinzi (SUNY ESF, Syracuse, NY), Christopher Whipps (SUNY ESF, Syracuse, NY), and Melissa Fierke (SUNY ESF, Syracuse, NY)

Abstract - *Aproceros leucopoda* (Elm Zigzag Sawfly [EZS]) is an invasive insect discovered in North America in 2020 that feeds exclusively on the leaves of *Ulmus* spp. (elms). This species is parthenogenic and multivoltine, allowing quick establishment. In EZS's native range in East Asia, 4 generations per year have been documented while in Europe, where it was found in 2003, reports vary from 2 to 4 generations, with speculation of up to 5. The number of generations per year in North America remains largely unknown. We deployed yellow sticky traps in summer 2023 and 2024 and checked them weekly to assess this aspect of EZS life history in the US. We considered the number of peaks in adult recovery to be the number of generations, and results indicate 4 generations per year in northern NY and 5 in central NY. In 2024, rather than the exponential growth expected from a multivoltine species, we recovered fewer adults after the midpoint of the season. This decline coincided with hatching of *Zelus luridus* (Pale Green Assassin Bug) eggs which we frequently observed on elm leaves, suggesting these and other predators are likely having a noticeable impact on EZS populations. We collected various predators, predominantly Pale Green Assassin Bugs and yellow jackets, off EZS-infested elm trees for molecular analysis of their gut contents, which we will carry out in early 2025.

Sat-PM1-A-2

Impacts of Invasive Earthworms on Soil Invertebrate Communities

Madelynn Edwards (University of Vermont, Burlington, VT), Josef Gorres (University of Vermont, Burlington, VT), and Tim McCay (Colgate University, NY)

Abstract - Earthworms are a problematic group of invasive species that are ecologically destructive outside of their native ranges. The Northern Forest has been experiencing invasion by European earthworms and more recently, Asian jumping worms (*Amynthas* spp.). The impact of these earthworms on soil invertebrates within the Northern Forest is currently unknown. To address this knowledge gap, we collected samples of soil invertebrates from 17 forested sites across New York and Vermont that varied in invasion intensity. We plan to study the effects of earthworm invasion on invertebrate communities and abundance using generalized linear models and multivariate analyses. Preliminary analyses showed that there is a significant, negative relationship. Invertebrate abundance is significantly reduced with increased abundances of European worms ($P < 0.05$), and the relationship between Asian earthworms and invertebrate abundance was found to be approaching significance ($P = 0.08$). With further analyses, we aim to understand the total impacts of earthworm invasion on soil invertebrate communities and food-web structure.

Sun-AM2-B-2

The Least Weasel (*Mustela nivalis*) in Pennsylvania: A Review of What is Known, Not Known, and Next Steps for Assessing Populations of One of the State's Most Enigmatic Mammals

Charlie Eichelberger (PA Natural Heritage Program, Harrisburg, PA), Ryan Miller (PA Natural Heritage Program, Pittsburgh, PA), Joe Wisgo (formerly PA Natural Heritage Program, Harrisburg, PA), Tammy Colt (PA Game Commission, Bolivar, PA), Justin Duncan (PA Game Commission, Bolivar, PA), Tom Keller (PA Game Commission, Harrisburg, PA), and Mike Scafini (PA Game Commission, Harrisburg, PA)

Abstract - Of Pennsylvania's 61 extant, native, regularly occurring mammal species, *Mustela nivalis* (Least Weasel) remains one of the most poorly understood since its description from the state in 1901. Until recently, the only studies carried out on the species were conducted in 1929 and repeated in 1952 by the PA Game Commission using records from the bounty system. Since then, modern, reported observations of Pennsylvania Least Weasel have been at the rate of ~1 every 5 years. With this limited data, a reasonable assessment of the Least Weasel's conservation status is not possible. Adding to the concern is a 2021 metadata review of North American weasel populations (Least Weasel, *M. richardsonii* [American Ermine], *Neogale frenata* [Long-tailed Weasel]), which reported an 87–94% decline, and there is growing range-wide interest in gathering more population information on all 3 weasel species found in the Northeast. With this in mind, we initiated a study to test efficacy and efficiency of different survey methods targeting Least Weasel at sites within its historic range, with special consideration given to recent (<20 years old) reliable reports. Our study tested modified trail-camera setups focused on all weasel species with the hope of locating populations of Least Weasel where techniques may be further refined to help with an assessment of its conservation status. We have conducted surveys in 10 counties with 740,029 survey photos reviewed from 154 camera locations, representing 23,395 trap nights. Weasels were detected at most of our survey sites, but only 2 sites yielded detections of Least Weasel. Our results show that our modified trail-camera setups are a useful survey device for all weasels and are particularly important for passive detection of Least Weasel. Crude comparisons of contemporary weasel-harvest data to historic bounty data suggest Pennsylvania's weasel populations have likely exhibited the declines detected elsewhere, and all 3 weasel species are in need of expanded research efforts to effectively assess their current distributions and conservation statuses in Pennsylvania.

Sun-AM1-C-2

Filling the Knowledge Gaps on Pennsylvania's Water Shrews: Targeted Survey Efforts Help Us Better Understand the Distribution, Inform a Taxonomic Revision, and Assess the Species Conservation Status in the Commonwealth

Charlie Eichelberger (PA Natural Heritage Program, Harrisburg, PA), Cassandra Miller-Butterworth (Penn State Beaver, Monaca, PA), Jim Hart (formerly PA Natural Heritage Program, Harrisburg, PA), and Joe Wisgo (formerly PA Natural Heritage Program, Harrisburg, PA)

Abstract - *Sorex palustris albibarbis* (Northern Water Shrew) was first officially recorded in Pennsylvania in 1894 from the Pocono Mountains, and over the next 60 years, ~30 more were collected across the northern tier of the state. Surveys conducted during the PA Mammal Survey (1946–1951) detected a single *S.p. punctulatus* (Southern Water Shrew) specimen from southwestern Pennsylvania. An increase in surveys targeting both taxa began in the 1980s, with the definition of an allopatric distribution between the taxa separated by an 85-km range gap. While modest range expansions have steadily occurred with more survey effort, recent detections of Water Shrews solidly within the range gap have led to further skepticism over the validity of allopatry, and consequently the validity of the separate taxa in Pennsylvania. Using both museum records and recently collected specimens from across Pennsylvania and 2 from West Virginia, we conducted multiple morphometric and molecular analyses. A principal component analysis of body and cranio-dental measurements show broad overlap, and a modest significant difference in overall body size suggests clinal variation. Molecular results indicate no distinction between Pennsylvania specimens attributed to *S.p. albibarbis* and *S.p. punctulatus* at mitochondrial or nuclear loci, they exhibit low genetic distances, and a principal coordinate analysis showed extensive overlap between the specimens attributed to both subspecies. However, 1 specimen from West Virginia consistently exhibited genetic uniqueness. Pennsylvania contains only a single, well-supported taxa of Water Shrew, which aligns with genetically typed *Sorex albibarbis* specimens from eastern Canada. Our results show that the conservation status of Pennsylvania's Water Shrew is more secure than once thought, but indications of genetic uniqueness from West Virginia demonstrate the need for morphometric and genetic analyses from the southern Appalachians.

Sun-AM1-C-3

Distribution and Genetic Partitioning of Three Co-occurring Jumping Worms in a Single State Park

Laura Eierman (SUNY Cortland, Cortland, NY), Andrea Dávalos (SUNY Cortland, Cortland, NY), and Annise Dobson (Yale University, New Haven, CT)

Abstract - In New York State (NYS), invasive earthworms have altered soil ecosystems dramatically, thus changing the foundation of forests, by impacting soil structure, water retention, plant growth, and soil fauna. Sixteen invasive jumping earthworm species of the Megascolecidae family are established in northern US forests, with 3 species widespread in NYS. Their heterogeneous distribution suggests that either dispersal limitation restricts early invasion stages or localized habitat suitability governs patchy spread. The objective of our study was to identify initial distribution of invasive jumping worms in Taughannock State Park located in NYS and shifts in distribution and species composition over 5 years. We sampled 100 randomly selected locations within the park for earthworms in 2019 and resampled again in 2024. We used genetic differences in the mitochondrial cytochrome oxidase 1 gene to identify the species of each jumping worm. In 2019, we collected 213 jumping worms, found at 29 sites out of the 100 sites, with 175 worms identified by species. Of the 29 invaded sites, 13 had 2 or more co-occurring species. *Amynthas tokieoensis* was the most abundant with 118 individuals followed by *A. agrestis* with 50 individuals. We only found 7 *Metaphire hilgendorfi,* present at 4 sampling locations. Genetic results from *A. tokieoensis* suggest 2 separate introductions of the species. Two major haplotypes were identified in the COI gene, and microsatellite analysis of 6 nuclear loci corroborated the 2 distinct groups, with Taughannock Falls Creek separating them. Only 2 sampling locations, found along the hiking trail to the falls, had worms from both genetic groups. Additionally, a single worm was identified as both a unique haplotype and a unique individual distinct from the 2 populations, potentially indicating a third, separate introduction. In 2024, we found 175 jumping worms at 33 sites. From 2019 and 2024, jumping worms were found at 20 sites in both years, whereas 9 sites from 2019 did not have jumping worms present in 2024 and 13 new sites were invaded in 2024. Genetic work on these worm samples is ongoing. Preliminary analyses suggest a temporal boom and bust in abundance of jumping worms within the same spatial areas.

Sun-AM2-B-2

From Knowledge to Action: The Role of Herbaria in Shaping the Future of the Natural History Collections Community

Libby Ellwood (iDigBio, Sharon, MA) and Gil Nelson (iDigBio, Tallahassee, FL)

Abstract - In recent decades, digital data have been added to physical collections materials such as herbarium specimens, field notes, and images. These freely available digital records provide researchers, educators, and policy makers access to hundreds of years of data about thousands of species from around the world, without individuals needing to visit or borrow from the collection. Importantly, digital records also provide the opportunity to link information about biodiversity across databases, such that analysis beginning with a two-hundred-year-old plant specimen, for example, can lead a researcher to studies that have used that specimen for other research, to environmental data from the location where the specimen was collected, to genetic sequences from the specimen, to insect pollinators of that species, and to other data pertinent to informing scientific research. This extensible network of information has been termed the Digital Extended Specimen (DES). This presentation will highlight examples of the DES, the technical and social aspects of implementing it, and the myriad benefits of such a rich data network, with an emphasis on New England collections. Critical to implementing a DES are the community and data infrastructures necessary to support it, and to this end the natural science collections community in the US is uniting around the creation of a Biological Collections Action Center. The action center aims to manage, unify, and expand the vast data stored in biological collections, address challenges facing physical biodiversity collections, and coordinate across collections-based research and education sectors, all in support of efforts that address critical societal challenges. Such an entity would unify small and large collections; link New England herbaria with collections across the country; and foster workforce development, ethical collaboration with Indigenous communities, and innovation in fields like artificial intelligence for data analysis. This initiative builds on previous recommendations from the National Science Foundation and National Academies of Science, and once fully instituted will ensure that biological collections remain a vital resource for scientific discovery, policy, and industry applications. Ultimately, the action center seeks to provide sustainable, long-term support for biodiversity science, fostering innovations that benefit public health, environmental conservation, and the bioeconomy.

Sun-AM2-A-4

Survey for Parasitoids of Native Planthoppers in Rhode Island and Implications for Spotted Lanternfly (*Lycorma delicatula*) Biocontrol

Daniel Farnworth (University of Rhode Island, Kingston, RI), Nicholas Durinzi (Environmental Science and Forestry, SUNY, Syracuse, NY), Dana Terrill (Plant Sciences and Entomology Department, University of Rhode Island, Kingston, RI), Lexi Johnson (Plant Sciences and Entomology Department, University of Rhode Island, Kingston, RI), and Lisa Tewksbury (Plant Sciences and Entomology Department, University of Rhode Island, Kingston, RI)

Abstract - In 2023 and 2024, we collected immature stages of native hopper species represented by 5 families weekly from multiple field locations in RI and screened them for signs of parasitism by wasps of the family Dryinidae (pincer wasps). Of the families collected, acanaloniids showed the highest rates of parasitism, with 36 out of the 182 (19.8%) hoppers collected in 2024 being parasitized and 19.3% parasitism in 2023. Flatid hoppers had moderately high rates of parasitism, with 15 of the 191 nymphs (12.7%) being parasitized in 2024 and 5 of the 47 flatid nymphs (9.4%) parasitized in 2023, Other families that were observed to be parasitized included Cicadellidae, Issidae, and Dictyopharidae. The dryinid larvae that emerged from their thylacia (protective larval sacs) in 2024 haven't eclosed from their cocoons, so we do not have species identifications. However, some wasps from 2023 emerged in the fall of 2023 and others in July and August of 2024. Of those wasps, *Neodryinis typhlocybae* emerged from flatid nymphs, *Dryinis elatus* and *Gonatopus* sp. emerged from acanaloniid nymphs, and *Thaumatodryinis perkinsi* emerged from issid nymphs.

Sat-PM1-A-1

Vermont's Natural Communities: An Approach to Terrestrial Ecological Classification and Inventory

Dan Farrell (Vermont Fish and Wildlife Department, Montpelier, VT)

Abstract - The Wildlife Diversity Program in the Vermont Fish and Wildlife Department maintains a classification of Vermont's terrestrial natural community types defined primarily by plant species composition and physical setting. This classification, currently consisting of 98 types and 23 variants, is summarized in the book *Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont* by Thompson, Sorenson, and Zaino. These types exhibit wide variation in species composition and are associated with a variety of abiotic features and natural processes that influence their formation and sustain their distinct characteristics. The occurrence of these types across the landscape is influenced by physical setting, natural disturbance, climate, biogeography, and other factors. Examples include Lake Sand Beach, Rich Northern Hardwood Forest, Red Maple-Sphagnum Basin Swamp, Cold-Air Talus Woodland, and Alpine Meadow. Since 1989, the Wildlife Diversity Program has conducted statewide ecological inventories of natural communities. In addition to these topics, I will discuss the natural community concept and its importance to the conservation of biodiversity and responsible land management. I will review a selection of natural community types and describe Vermont's approach to the inventory and documentation of natural community occurrences, from site selection to field work, mapping, and information sharing.

Sat-PM2-C-3

Bee-low the Surface: Effects of Soil Rehabilitation Treatments on Ground-Nesting Bees and Wasps

Aliza Fassler (UMass Amherst, Amherst, MA), Susannah B. Lerman (USFS Northern Research Station, Amherst, MA), Dave I. King (USFS Northern Research Station, Amherst, MA), Lauren S. Pile Knapp (USFS Northern Research Station, Columbia, MO), John M. Kabrick (USFS Northern Research Station, Columbia, MO), Deborah S. Page-Dumroese (USFS Rocky Mountain Research Station, Moscow, ID), Cheryl Coon (Hoosier National Forest, Bedford, IN), Brian Davidson (Mark Twain National Forest, Rolla, MO), Mark Vukovich (Shawnee National Forest, Vienna, IL), and Megan York-Harris (Mark Twain National Forest, Poplar Bluff, MO)

Abstract - Most pollinator-habitat restoration or quality-improvement efforts have yet to fully consider the full life-cycle and habitat needs of aculeate hymenopteran (bee and wasp) pollinators. Instead, most efforts focus solely on the nutritional needs of pollinators by enhancing plant communities. Habitat improvement efforts also affect another critical component of bee and wasp habitat: the availability of nesting resources. We used an established study system, the Pollinator Habitat in Log Landings Project, to study the effects of soil-compaction–reduction treatments on ground-nesting bees and wasps. Log landings are the staging areas for timber harvest operations where logs are stacked before transport for processing. Log landings experience high levels of soil compaction due to the movement of heavy equipment. Managers treated 10 log landings in 3 midwestern National Forests (Hoosier, Shawnee, and Mark Twain) with subsoiling (mechanically breaking up compaction) and biochar (a highly porous material similar to charcoal) to improve soil compaction in a blocked split-plot design. In summers 2021–2023, we sampled treated log landings using soil emergence traps to collect ground-nesting bees and wasps from their nest sites and describe the microhabitat of nesting locations. Preliminary results suggest bees and wasps can nest in areas treated with subsoiling and biochar within a few months of treatment application. Ground-nesting bee nests found include *Lasioglossum* (*Dialictus*) (sweat bees), *Andrenidae* (mining bees), *Augochlorini* (green bees), and *Calliopsis andreniformis* (eastern miner bees). Understanding how subsoiling and biochar affect ground-nesting bees and wasps in forests (not just in lab conditions or agricultural systems) is incredibly important for restoration efforts as these are increasingly common soil treatments. Managers interested in restoration and enhancing the quality of ground-nesting wild bee and wasp habitats need to know how subsoiling or biochar amendments affect these communities.

Sun-PM2-C-5

Repeated Cutting of *Reynoutria japonica*, s.l., (Japanese Knotweed) Diversifies Flora in Marist University Nature Preserve

Richard S. Feldman (Marist University, Poughkeepsie, NY) and Emily Zheng (Marist University, Poughkeepsie, NY)

Abstract - We controlled *Reynoutria japonica*, s.l., (Japanese Knotweed) in Fern Tor Nature Preserve for 16 years in a 0.53-ha plot, using repeated selective cutting May–late August for the last 10 years. We surveyed a single 95-m transect to track changes in flora in 2018, 2019, and 2023. The 40-m segment where knotweed grew was given special attention for changes in its abundance and abundance of co-occurring species, measured as percent cover of each species. Data from July of each year show: (a) knotweed cover persistent but declining with reduced summer precipitation; (b) species richness of 20–26 in the knotweed zone, again declining with reduced summer precipitation, while dramatically increasing beyond the knotweed zone in 2023 to 44 species; and (c) Shannon–Wiener diversity slightly decreasing over time in the knotweed zone, while increasing beyond the knotweed zone. What had been a knotweed monoculture is now a diversified habitat, with 26 non-woody and woody, native and non-native plant species. Co-occurring species differed along the transect, with some relationship to soil parameters and photosynthetically active radiation (PAR). For example, *Symplocarpus foetidus* (Skunk Cabbage) was closely associated with higher soil moisture and lower PAR, while *Microstegium vimineum* (Japanese Stiltgrass) was associated with drier soils and higher PAR. The latter represents a secondary invasion after knotweed had been controlled. We believe that continued cutting of knotweed creates competitive release, thus greater diversification of the plant community, even while knotweed persists as a dominant community member.

Sun-PM2-B-2

NEON Long-term Ecological Data in the Northeast: Small Mammals and Litterfall

Joshua Fischer (National Ecological Observatory Network, Fitchburg, MA), JoLeisa Cramer (National Ecological Observatory Network, Fitchburg, MA), and Callie Puntenney (National Ecological Observatory Network, Boulder, CO)

Abstract - The National Ecological Observatory Network (NEON) publishes 180+ open access data products recorded from 81 field sites across the US. I will discuss 2 data products collected using the NEON Small Mammal Sampling and Litterfall and Fine Woody Debris protocols at the NEON sites in Harvard Forest (HARV) and Bartlett Experimental Forest (BART) here in the Northeast. The small-mammal sampling protocol uses Sherman box traps in a 100 m x 100 m grid to target species of the Cricetidae and Muridae families and opportunistically sample for members of the Soriciade and Sciuridae families. Captured specimens have a variety of measurements and physical samples taken in addition to being used to document general species abundance and diversity. The Litterfall and Fine Woody Debris protocol uses both elevated and ground traps to capture falling debris with butt-end diameter <2 cm within a subset of sampling plots. This debris is then sorted into functional groups of leaves, needles, twigs, woody material, seeds, flowers and other. These sorted functional groups are weighed, dried, and weighed again to find the final dry weight within each group. We selected and compared small-mammal capture rate and seed dry to highlight the current trends in the small-mammal population as it relates to the production of seed at these sites in the Northeast from 2014 to 2023. Both data products have been published by NEON and are publicly accessible.

Sun-PM2-D-4

Integrating Acoustic Monitoring into the NEON System

Joshua Fischer (National Ecological Observatory Network, Fitchburg, MA), Laurence A. Clarfeld (Vermont Cooperative Fish and Wildlife Research Unit, university of Vermont, Burlington, VT), JoLeisa Cramer (National Ecological Observatory Network, Fitchburg, MA), Therese Donovan (U.S. Geological Survey, Vermont Cooperative Fish and Wildlife Research Unit, university of Vermont, Burlington, VT), and Callie Puntenney (National Ecological Observatory Network, Boulder, CO)

Abstract - The Alliance for Monitoring Biodiversity and Ecosystems Remotely (AMBER) worked through The National Ecological Observatory Network (NEON) NRSS small-project program to deploy 5 audio traps throughout the NEON site in Bartlett Experimental Forest in New Hampshire. We placed 4 audio traps at collocated plots where multiple NEON datasets are being collected. We sited the fifth audio trap on the walking loop where NEON phenology data is collected, near the instrumentation tower, for linkage of those constant streaming data sets. We initially deployed the audio traps in May 2024 and performed data retrieval in June and September 2024, with visual inspections of the audio traps occurring bi-weekly in concurrence with the NEON Ground Beetle Sampling protocol. We transferred the data to the PI of the project using the Globus file transfer service. These data contained 529 hours of recordings, which we analyzed with BirdNET, yielding 249,656 avian detections. One of the unique detections made was from *Antrostomus vociferus* (Eastern Whip-poor-will). The top 3 species identified with high-confidence (>0.9) include common species such as *Catharus guttatus* (Hermit Thrush), *Setophaga virens* (Black-throated Green Warbler), and *Vireo solitarius* (Blue-headed Vireo). These 3 species together had over 11,000 high-confidence detections. For the top 10 species, there were over 16,000 high-confidence identifications total. A subset of the identifications made through BirdNet will also be verified by experts. NEON is working with its Technical Working Group to leverage experts in the scientific community as well as NEON technicians to perform these verifications. These verifications will allow for the development of a confident species list prior to data publication in 2025.

Sun-PM2-D-6

Introduction to the SPARCnet Postbaccalaureate Research Showcase

M. Caitlin Fisher-Reid (Bridgewater State University, Bridgewater, MA), Carli Dinsmore (Pennsylvania State University, State College, PA), Tanya J.H. Matlaga (Susquehanna University, Selinsgrove, PA), David A.W. Miller (Pennsylvania State University, State College, PA), Bethany Ozolins (Bridgewater State University, Bridgewater, MA), Sean C. Sterrett (Monmouth University, West Long Branch, NJ), and Alexa Warwick (Michigan State University, East Lansing, MI)

Abstract - Many science majors leave college without significant research experience, putting them at a disadvantage in the STEM job market and when applying to graduate schools, and resulting in a reduction of the STEM workforce. This problem became particularly acute after the lockdowns during the COVID-19 pandemic left thousands of high school and college students with 1–2 years of fully remote classes and reduced opportunities for hands-on research when in-person instruction resumed. Recognizing this, the National Science Foundation initiated the Research and Mentoring Postbaccalaureates (RaMP) in Biology funding program. RaMP tasks principal investigators with building a research network of mentors to support 3 cohorts of 8–12 postbaccalaureate mentees. Mentors receive intentional training in effective mentoring, and mentees receive a 1-year, paid research experience within a collaborative research network. The Salamander Population and Adaptation Research Collaboration Network (SPARCnet) is excited to bring our first cohort of mentees to NENHC 2025 to share their independent research from the past year. This talk will introduce you to SPARCnet, our focal species, *Plethodon cinereus* (Eastern Red-backed Salamander), and the SPARCnet RaMP program and open the SPARCnet Postbaccalaureate Research Showcase sessions at NENHC 2025.

Sat-AM2-E-1

Leedy's Roseroot Propagation, Experimental Reintroduction, and Mycorrhizal Connections

Peter Foley (SUNY ESF, Syracuse NY), Rachael Renzi (SUNY ESF, Syracuse NY), and Danilo Fernando (SUNY ESF, Syracuse NY)

Abstract - *Rhodiola integrifolia* ssp. *leedyi* (Leedy's Roseroot) is a federally listed threatened species ranked as S1, which belongs to the family *Crassulaceae* (stonecrops). It is a relic from the past, hailing from a shrinking number of alpine species that thrived during glaciation in the Pleistocene era, but are suffering from a warming climate, shrinking habitat, and invasive species. While much is still unknown about this understudied taxon, census counts from the New York Natural Heritage Foundation indicate that the largest population, located on the western cliffs of Seneca Lake, have declined from about 10,000 plants in 1985 to 2779 in 2022. Our objectives are to diagnose the driving factors leading to the observed population decline at Seneca Lake, reintroduce Leedy's Roseroot to Watkins Glen State Park (WGSP) where it once thrived, and identify if Leedy's Roseroot is forming symbiotic arbuscular mycorrhizal relationships. In collaboration with New York State Parks, we placed greenhouse grown plants and iButton temperature and humidity sensors within 3 introduction sites to correlate site specific differences to survivorship, as well as to compare the abiotic conditions of WGSP to Seneca Lake. Of the 180 individuals that have been out planted, there are currently 82 surviving plants, a survival rate of 46%. We measured significant differences in temperature and humidity between sites, and the site that was most similar in abiotic conditions to Seneca Lake had the highest survival rate (69%). Finally, we fixed, cleared, and stained roots collected from Seneca Lake and confirmed that Leedy's Roseroot can form mycorrhizal connections by finding spores, arbuscules, and vesicles of an AMF within root tissues. Future out-planting efforts should identify locations that are similar in abiotic conditions to Seneca Lake to maximize survival of outplants as well as to introduce mycorrhizae to outplants to maximize survival.

Sun-PM2-E-2

Hiding in Plain Sight: The Remarkable Wasp Fauna of a Hudson Valley Farm

Kendrick Fowler (Hawthorne Valley Farmscape Ecology Program, Ghent, NY), Dylan Cipkowski (Hawthorne Valley Farmscape Ecology Program, Ghent, NY), Kyle Bradford (Hawthorne Valley Farmscape Ecology Program, Ghent, NY), and Laura Stark (Hawthorne Valley Farmscape Ecology Program, Ghent, NY)

Abstract - Wasps may be Earth's most underappreciated animals. To the public, the word "wasp" is almost synonymous with brightly-colored insects possessing painful stings, yet such species make up only a tiny fraction of the world's wasp diversity. The overwhelming majority of wasp species are harmless and play crucial roles in regulating the populations of other insects as parasitoids (parasites that kill their hosts), and these species are important agents of biological control in agriculture and are some of the most abundant insects in our natural ecosystems. Yet, despite their importance, their diversity and natural history are often overlooked; many of our commonest parasitoid wasps are "dark taxa" that cannot be identified at the species level even by experts, and scientists specializing in the study of wasps are few and far between. In order to comprehend and conserve the roles that wasps play in both natural and agricultural ecosystems, it is critical to cast light on the makeup of our wasp fauna and their ecological relationships. For the past 9 years, the Hawthorne Valley Farmscape Ecology Program has been collecting wasps from a mid-Hudson Valley farm as part of a larger initiative to study on-farm biodiversity, and through that work, we have documented a remarkable diversity of wasp species—over 400 and counting—including at least 3 that are undescribed and many others whose ecological relationships have yet to be discovered. Join us to meet some of these mysterious creatures and learn how we are attempting to understand their roles in our agroecosystems and their conservation needs.

Sat-AM2-A-2

At Least Shrews, but So Much More: Biodiversity Surveys in A Connecticut Coastal Marsh using the AHDriFT Method

Devaughn Fraser (Connecticut Department of Energy and Environmental Protection , Burlington, CT)

Abstract - Though relatively common across its range, *Cryptotis parva* (Least Shrew) is considered locally rare in the Northeast and is protected in both Pennsylvania and Connecticut under state endangered species laws. In Connecticut, Least Shrews occur in only a single known location, despite intensive efforts by the Connecticut Department of Energy and Environmental Protection (DEEP) to assess its presence in coastal marsh habitats across the state in 2005. In 2023, DEEP initiated a survey to reevaluate these sites for Least Shrew presence using passive infrared-camera traps in place of pitfall buckets, which are labor intensive and can cause mortality. My colleagues and I set 7 arrays in various habitats across the last site known to support Least Shrews, between March 2023 to the present. Least Shrews were detected in 4 of 7 arrays, 3 of which detected them on the first night of deployment. At least 2 other shrew species were documented, in addition to a wide diversity of species across the tree of life. This method has proven invaluable for quickly and non-invasively determining Least Shrew presence, and is a promising tool for improving and expanding small-mammal surveys across the state to cover other GCN and state assessment-priority species identified.

Sun-AM1-C-4

The Peregrine Falcons of Monarch Place, Springfield, MA

Tom French (MA Natural Heritage and Endangered Species Program, Westborough, MA)

Abstract - After a 35-year absence from Massachusetts, and a 2-year project releasing chicks, the first modern nesting pair of *Falco peregrinus* (Peregrine Falcon) laid eggs in Boston in 1987. This milestone was followed in 1989 by a second nest in Springfield on the newly constructed Monarch Place Building in the complex in which this conference is being held. Beginning in its first year, this nest site hosted one of the earliest nest cameras with old technology that required a cable to be run from the nest on the 21st floor to the cable television station a block away, where it was controlled as a dedicated 24-hour-a-day Falcon Channel. This pair of falcons gained great public popularity, leading to Sprinfield's professional hockey team being named the Falcons (1994–2016), and great public sadness when one of the first chicks appeared to be dying on camera and again when the founding female was killed striking glass, and widespread disappointment when the pair periodically nested out of sight on the nearby Memorial Bridge over the Connecticut River. This site has now hosted at least 5 nesting females and 3 males and has fledged at least 50 of the >1000 chicks fledged in Massachusetts since the return of Peregrine Falcons to the state. Today, there are about 50 nesting pairs of Peregrine Falcons across Massachusetts.

Sat-AM2-D-5

Herbarium Specimens Reveal How Climate Change and Invasive Species are Changing New England Forests

Amanda S. Gallinat (Colby College, Waterville, ME), Richard B. Primack (Boston University, Boston, MA), Luca Russo (Boston University, Boston, MA), Eli Melaas (Boston University, Boston, MA), Charlie Willis (University of Minnesota, Minneapolis, MN), Tara Miller (Boston University, Boston, MA), Linnea Smith (Leipzig University, Leipzig, Germany), and Trevor Lloyd-Evans (Manomet Conservation Sciences, Manomet, MA)

Abstract - Long-term records are necessary to understanding how climate change and the spread of invasive plants are changing New England forests. Over fifty years of bird-banding records show that many birds are migrating later in response to warming temperatures, but little is known about whether the fleshy fruits and seeds they eat and disperse during migration are shifting the same way. My colleagues and I used over 3000 herbarium specimens collected from 1849 to 2013, for 37 native and 18 invasive plant species, to determine how fruiting times are shifting with climate change, and what fruits will be available to migratory birds as they fly later in the year. We found that fruits tend to ripen earlier with warming temperatures, and that invasive plants fruit later than native plants, making birds increasingly likely to encounter invasive fruits on migration. I will discuss how we validated these results using present-day field observations and the historic field notes of Henry David Thoreau, as well as the surprises we encountered along the way.

Sun-AM2-A-1

Forest or Ferns? Habitat Use of Leach's Storm Petrels on Great Duck Island, ME

Hannah Gaudet (COA, Bar Harbor, ME) and Lucian Vazquez (COA, Bar Harbor, ME)

Abstract - Hydrobates leucorhous (Leach's Storm-Petrel) nest in shallow burrows on coastal islands in the northern hemisphere. Petrels exhibit colony-level patterns in burrow distribution and occupancy. Great Duck Island (44°09'08"N Long 68°24'55"W) is home to the largest monitored Leach's Storm-Petrel colony in the eastern US. Rapid changes in habitat structure are occurring on the island due to a lack of forest regeneration. These shifts may influence population dynamics of this vulnerable seabird in the future. I studied macro- and micro-site characteristics influencing storm-petrel burrow distribution and occupancy levels through a stratified assessment of habitat types from June until August 2024. Burrow occupancy was not found to be significantly affected by habitat variables. Burrow presence and distribution was found to be significantly influence by habitat variables, including substrate type, abundance of wood debris, and canopy cover. We are currently analyzing vegetation classification and species diversity across petrel habitats. This study suggests storm-petrels may continue to adapt to the changing habitat on the island in the short term.

Sat-PM1-D-4

Avian Migration Interruption due to Inclement Weather: Waterbirds in the Inland Northeast

Ted E. Gilliland (Mount Holyoke College, South Hadley, MA)

Abstract - Some bird species make long migrations over relatively unsuitable habitat in route to stopover, wintering, or breeding locations. Despite likely being common in the airspace above the surface, they are rarely encountered near the surface unless grounded by inclement weather. For example, some species in the families *Scolopacidae*, *Anatidae*, *Laridae*, *Gavidae*, and *Podicipedidae* migrate over the inland Northeast passing between stopover or wintering sites on the Northeast coast and breeding or stopover sites in the Great Lakes and Canada. While many studies have been conducted on avian grounding events (i.e., falls or fallout), the presence of community scientists logging sightings through the eBird platform has created an opportunity to examine the impacts of weather-related migration interruption at a landscape level. The first goal of this paper is to visualize the geographic scope of these migration-interruption events in relation to transiting weather systems. To do this, I construct animations using weather data from the European Center for Medium-range Weather Forecasting and species records from the eBird database. The animations show how specific weather patterns such as low and high pressure systems and associated fronts relate to the appearance of these species in the inland Northeast. Second, I use generalized linear mixed models with logit links to assess what specific aspects of weather (e.g., precipitation amount, low cloud base, winds, and temperature) are most closely tied to the grounding of these species in the inland Northeast. Significant factors increasing the probability of occurrence include the amount of liquid precipitation, presence of low cloud base (<330 m), and unfavorable headwinds. The favorability of weather conditions in geographic areas from which migrants are likely departing is also positively associated with occurrences of these species in the inland Northeast. Deepening our understanding of how inclement weather interrupts bird migration will help assess how migratory birds will be affected by shifts in weather caused by climate change.

Sat-AM2-D-3

Bog Jacob's Ladder*:* Stepping Up Collaboration, Research, and Application to Conserve the Globally Rare *Polemonium vanbruntiae*

Rachel K. Goad (PA Natural Heritage Program, Western Pennsylvania Conservancy, Harrisburg, PA), Elizabeth (Beth) Joslin (University of Georgia, Athens, GA), Tanisha M. Williams, (University of Georgia, Athens, GA), and Cheyenne Moore (Pennsylvania Plant Conservation Alliance, DCNR, Harrisburg, PA)

Abstract - *Polemonium vanbruntiae* (Bog Jacob's-Ladder) is a globally vulnerable perennial herb occurring from West Virginia to Quebec in a variety of wetland types. It is threatened by habitat loss, flooding, succession, and over-browsing by deer. We endeavor to clarify its range-wide conservation status using field-based assessment, population genetics, and climate modeling. We collaborated to collect leaf tissue range-wide to facilitate comparative population genomics. We used species-distribution modeling to assess anticipated effects of climate change. At the same time, ongoing implementation of Pennsylvania's Recovery Plan for the species involved safe-guarding existing populations through a suite of initiatives. We collected seed from 4 of Pennsylvania's largest populations for banking, propagation, and related research. Seed-banking goals are often hampered by lack of understanding of seed longevity; we worked with partners to plan seed aging and viability testing that will support optimal seed banking. Most collected seeds were grown up into seedlings that were transplanted back into their respective home sites to bolster those populations. At the 2 sites that received seedlings, survivorship after 1 year was 50% at one and 90% at the other, with 50% of survivors flowering at 1 of these sites. Ongoing monitoring is planned. Our results will support recovery planning and conservation of the species across its range.

Sun-PM2-E-3

A Decade of Red-backed Salamanders in New York

Caroline Goldstein (Cornell University, Ithaca, NY), Isha Chauhan (Cornell University, Ithaca, NY), Lauren Essner (Cornell University, Ithaca, NY), Vincent Farallo (University of Scranton, Scranton, Pennsylvania), William Hooker (Cornell University, Ithaca, NY), Danielle Keerbs(Cornell University, Ithaca, NY), Andrew Orkney (Cornell University, Ithaca, NY), Priscilla Rothier (Cornell University, Ithaca, NY), William Ryerson (Cornell University, Ithaca, NY), Kay Williams (Cornell University, Ithaca, NY), Amy Yang (Cornell University, Ithaca, NY), Christopher Sutherland (University of St. Andrews, St. Andrews, Scotland), and Brandon Hedrick (Cornell University, Ithaca, NY)

Abstract - Since ectotherms use their environment to thermoregulate, they are highly susceptible to rapid changes in climate and ongoing climate change. While the majority of salamander species practice both cutaneous respiration and pulmonary respiration, lungless salamanders (Plethodontidae) only respire through their skin. As a result, plethodontids are especially vulnerable to changes in climate, as respiration through skin limits the temperatures and moisture levels at which individuals can be successful. Due to a particularly high biomass in the northeastern US, *P. cinereus* (Red-Backed Salamander) has been extensively studied for decades and is often used as a model system for how plethodontid populations may be changing. To examine how plethodontid populations are impacted by climate change, we compared Red-Backed Salamander populations across a 10-year span. We used 6 coverboard arrays (50 boards each) of different ages in the same forest in Ithaca, NY, for spatial capture–recapture (SCR) surveys. Four sites were established in 2014, and we established 2 additional arrays in 2023. Because many of these boards were degraded, we replaced ~50% of boards at 2014 arrays in 2024. Using these sets of sites, we examine coverboard preference, salamander life span, and changing population structure. We predict that salamanders will prefer older boards at the 2014 arrays, and that different demographics of salamanders will be found under the old and new boards. We also expect to find a significant population of salamanders that have remained in the old arrays for the last 10 years. Lastly, while we do not expect to observe a change in salamander density, we predict a difference in salamander surface activity between 2014 and 2024. Preliminary data supports that Red-Backed Salamanders prefer older coverboards, and shows that ~7% of salamanders caught in 2024 were initially caught and tagged in the 2014 CMR surveys. We also observe a shift in detection probability, indicating a change in peak surface activity, between 2014 and 2024. Additional work will examine how range size and movement patterns have changed since 2014.

Sat-AM2-E-2

Basement to GBIF: Contributions of an Historic Collection to New York State's Flora

Kristen R. Haynes (SUNY Oswego, Oswego, NY), **Angela Gori** (SUNY Oswego, Oswego, NY), **Caroline Kenneally** (SUNY Oswego, Oswego, NY), and Kamal I. Mohamed (SUNY Oswego, Oswego, NY

Effect of Earthworms on Maple Regeneration in Northeastern Forests

Josef H. Görres (University of Vermont-ALE, Burlington, VT), Cheryl Sullivan-Frank (University of Vermont-ALE, Burlington, VT), Don Toby (Burlington Electric Department, Burlington, VT), Jessica Rubin (University of Vermont-ALE, Burlington, VT), Margaret Skinner (University of Vermont-ALE, Burlington, VT), and Bruce Parker (University of Vermont-ALE, Burlington, VT)

Abstract - Invasive earthworms are regarded as forest pests in hardwood ecosystems in the northeastern US and in eastern Canada. The invasion comprises earthworms from Europe and Asia. Jumping worms from Asia are regarded as particularly invasive. We tested whether invasive earthworm taxa and growing zone affected the regeneration of *Acer* spp. (maples). For this study, we surveyed commercial and natural *Acer saccharum* (Sugar Maple) stands along a growing zone gradient from northern Vermont Connecticut in 2015 and 2016. We identified earthworms as either jumping worms or to species for the European invaders. We quantified the level of damage to the forest floor with the Invasive Earthworm Rapid Assessment Tool (IERAT) and measured maple regeneration as the number of seedlings per unit area. We also determined total vegetation cover and plant richness at each site. Northerly sites were surveyed in 2015, southerly sites in 2015. Although the growing zone showed significant differences in vegetation, the earthworm ecological group and the dominant species did not. When separating the 2 years, effects were significant in 2015 but in 2016, suggesting that in warmer regions, other factors than earthworms or growing zone affect vegetation.

Sun-PM1-B-2

Soil-dwelling Invertebrate Communities in a System Transitioning from Tilled Fields to Perennial Meadows

Carmen Greenwood (SUNY Cobleskill, Cobleskill, NY) and Laura Stark (Hawthorne Valley Farmscape Ecology Program, Ghent, NY)

Abstract - Soil-dwelling organisms constitute one of the most diverse terrestrial ecosystems. Below-ground organisms provide ecosystem services such as nutrient cycling, pest suppression, organic-matter decomposition, and aid in carbon sequestration. Microarthropods, specifically oribatid mites, are sensitive to changes in soil quality, and are often used as soil health indicators. Our study examined microarthropod abundance, diversity, proportion of oribatid mites, and community composition of soil-dwelling microarthropods within 4 kinds of meadows recently transitioned from intensive agricultural production. It generally takes a number of years for soil health to improve as a system transitions from tilled fields to perennial meadows. We collected data from 3 replicates of 4 different meadow regimes located at the Hudson Valley Farm Hub in Hurley NY during June, July and August in a 5-year period from 2020 to 2025. The meadows, which were established in 2017, included the following: seeded native wildflower meadow (seeded with 22 species of native flowers and 1 native grass), seeded native grass meadow (80 % of seed composed of 8 native grass species, small proportion of native flowers), fallow and hay field (seeded with European cold-season grasses and clover). Within the context of the larger study, physical characteristics of the soil, such as soil moisture and organic matter content were measured concurrently within these systems. As is typical with soil-dwelling invertebrate communities, abundance and taxa richness varied from year to year with a general trend of increasing taxa richness, most notably in the proportion of oribatid mites. Based upon the sensitivity of oribatid taxa, we would anticipate an increase in their abundance and diversity over time, as soil conditions improve. Data resulting from this long-term study may give us a better idea of the rate at which soil recovers. Data from 2023 and 2024 is currently being analyzed. This study is part of a larger study comparing the biodiversity of multiple communities within these native meadows to evaluate possible above-ground/below-ground linkages in biodiversity, and to develop regional guidance for growers wanting to increase biodiversity on their farming systems.

Sat-AM1-A-2

Wildlands By Design: Building the Tool

Brian Hall (Wildlands Woodlands Farmlands and Communities and GIS Consultant, Gardner, MA), Shelby Perry (Northeast Wilderness Trust, Montpelier, VT), Robert Zaino (Vermont Fish and Wildlife Department, Montpelier, VT), and Liz Thompson (Wildlands, Woodlands, Farmlands, and Communities, Williston, VT)

Abstract - Less than 6% of the northeastern US (New York and New England) is protected as a “Wildland” where natural processes are allowed to shape vegetation composition and structure with minimal human influence. After the 2022 release of the report “Wildlands in New England: Past, Present, and Future”, many land conservationists told the authors that they were excited about creating more Wildlands in their service areas, but they were unsure where the most appropriate places were. We have been working on a GIS-based analysis to identify the most appropriate places for Wildlands within each ecological subregion. Our prioritization is designed to ensure that different ecosystem types are adequately represented in a wildlands portfolio and that they are spatially well connected and buffered as protection against future climate change and land-cover alterations.

Sun-AM2-D-3

Basement to GBIF: Contributions of an Historic Collection to New York State’s Flora

Kristen R. Haynes (SUNY Oswego, Oswego, NY), **Angela Gori** (SUNY Oswego, Oswego, NY), **Caroline Kenneally** (SUNY Oswego, Oswego, NY), and Kamal I. Mohamed (SUNY Oswego, Oswego, NY

Abstract - In the mid-1970s, Syracuse University divested itself of the historic SYR botanical collection, transferring all but the Onondaga County specimens to the State University of New York at Oswego (SUNY Oswego). That collection, along with 15,000 specimens original to SUNY Oswego (OSW), sat in boxes in the basement of the science building for decades, since no facility was available to house them. The construction of a new science building in 2013 afforded the opportunity to create a dedicated herbarium space, and to begin sorting and curating the collections. Thanks to the efforts of volunteers, professors, and many student interns, the combined 40,000-specimen Oswego Herbarium is now almost entirely curated, cataloged, digitized, and available online. Here, we will summarize the contributions of this 200+-year-old collection to the flora of New York State and the northeastern US.

Sun-AM2-A-3

Biodiversity Monitoring with eDNA: Insights from the New York Mammal Survey

William D. Helenbrook (SUNY ESF, Syracuse, NY), Christopher C. Whipps (SUNY ESF, Syracuse, NY), Matthew D. Schlesinger (New York Natural Heritage Program, SUNY ESF, Albany, NY), John P. Vanek (New York Natural Heritage Program, SUNY ESF, Albany, NY), Georgianna Silveira (SUNY ESF, Syracuse, NY), and Jacqueline Frair (SUNY ESF, Syracuse, NY)

Abstract - Analysis of environmental DNA (eDNA) is a powerful, non-invasive tool for detecting species presence in different ecosystems and sample types like scat and soil. Combined with a metabarcoding approach, many species may be simultaneously detected from a single sample. This study evaluates the efficacy of Oxford Nanopore Technologies (ONT) sequencing for mammalian species identification from eDNA samples, with preliminary results reported for the New York Mammal Survey. This project aims to map the distribution of mammals in New York State and assess the population status of selected rare species or those of conservation concern. In combination with bucket-camera and seed traps, our team collected adjacent soil along with scats and filter-paper swabs of the trap interior. For genetic analysis, we used PCR to target the commonly used barcoding gene, cytochrome oxidase I, from all mammals. We indexed individual PCR-amplified samples by adding unique adaptors using ONT's ligation-based kit, enabling the multiplexing of 96 samples in a single sequencing run. We subdivided resulting sequence data based on the original samples and conducted taxonomic assignment against our curated mammalian reference database. Nanopore sequencing efficiently processed and distinguished numerous mammal species from a single environmental sample with high specificity. The identified animals included shrew, vole, and mouse species, as well as larger mammals like *Ursus americanus* (American Black Bear) and *Vulpes vulpes* (Red Fox). Detection sensitivity varied by sample type, with soil and swabs providing some of the best results. Our findings indicate expanded species richness beyond camera trapping, but in some cases cameras picked up species that eDNA metabarcoding did not. We emphasize that although metabarcoding is a time-effective, non-invasive, and scalable tool for wildlife monitoring, other methods should complement these data, especially for the rarest species.

Sun-AM2-C-1

More Worms, Less Weight: Surprising Trends in Post-Industrial Earthworm Communities

Nick Henshue (Department of Environment and Sustainability, University at Buffalo; Buffalo, NY)

Abstract - I conducted a census of earthworms in post-industrial and brownfield soils, comparing them to nearby non-polluted control sites to establish a baseline of annelid communities. I extracted earthworms from 253 plots across 38 locations in eastern Pennsylvania and New Jersey., collecting a total of 1925 earthworms with nonnative genera comprising 76% of the specimens. I expected lower earthworm abundance in post-industrial soils due to disturbance, low organic content, and widespread contamination. However, earthworm density was unexpectedly higher in post-industrial sites than in control areas (39.5 vs. 23.3 individuals per mÇ), though biomass was 61% lower in post-industrial soils. These findings challenge assumptions about soil health in disturbed environments and suggest complex ecological dynamics in post-industrial landscapes.

Sun-PM1-B-1

Old-growth Forest Characteristics Within an Extensive Remnant Ecosystem in the Northeastern US

Abigail Higgins (SUNY ESF, Syracuse, NY), Gregory McGee (SUNY ESF, Syracuse, NY), Max Henschell (New York Natural Heritage Program, Albany, NY), and Timothy Howard (New York Natural Heritage Program, Albany, NY)

Abstract - The original, primary forest in the US is a fraction of its original extent due to decades of intense logging and agricultural land conversion. Their structural features and heterogeneity (e.g., large trees, multi-layered canopies, standing and downed woody debris, extensive pit-and-mound topography) lead them to be significant sources of biodiversity and carbon storage. Defining and quantifying these generally accepted characteristics of old-growth forests has been described as a "wicked problem" due to the extreme variation seen between forest types along topo-ecological gradients. It is more useful to study these characteristics at a regional scale. Of the northeastern states, New York possesses the greatest area of old-growth forest, primarily in the Adirondack and Catskill Preserves. There are still unconfirmed areas of old growth within the state's forest preserve lands, and otherwise large areas of forests that have not been disturbed since their incorporation into the preserve, in some cases over 150 years. The goal of this project is to understand the unique biological and structural characteristics of old-growth forests in the New York State Forest Preserve that can serve as potential indicators in this region. We accomplished this task by surveying known old-growth sites within the New York Forest Preserve in 2023 and 2024. To determine the unique features of the old-growth forests, we surveyed younger, mature forests within the same community types, primarily *Fagus* (beech)–*Acer* (maple) mesic forest, to serve as a comparison. Results show structural differences in downed woody debris volumes, canopy-height structure, and tree-diameter distributions. Vegetation compositional differences such as herbaceous species cover and epiphyte presence on hardwood trees were also found. Threshold values for these structural and biological characteristics can be used to develop indices for field identification of old forests.

Sat-PM2-C-2

Participatory Science for Ecology Education

Colleen Hitchcock (Brandeis University, Waltham, MA)

Abstract - Given the current biodiversity crisis, faculty must build connections, generate awareness, and inspire action in our classrooms. This presentation will demonstrate how participatory science can be employed in non-lab undergraduate courses to connect students to nature (in a variety of contexts), while simultaneously contributing to biodiversity knowledge and contextualize course concepts. I will include explanations of how platforms like iNaturalist to Zooniverse can provide opportunities for learning and demonstrate how engagement improves student bioliteracy, engages them in biodiscovery, introduces students to systematic ecological sampling, and improves their data literacy. Introducing students to tools, such as iNaturalist, builds the next generation of bioliterate and biocurious citizens and scientists, fluent in open collaborative research and learning.

Sat-AM2-C-4

Territoriality and Color Morph in Michigan Salamanders

Bridget Hudnall (Michigan State University, East Lansing, MI) and Louise Mead (Michigan State University, East Lansing, MI)

Abstract - *Plethodon cinereus* (Eastern Red-backed Salamander) offers a good model for the study of behavioral variation due to its large geographic range and the persistence of 2 color morphs, striped and unstriped, in most populations. Levels of aggressive and territorial behavior vary greatly across the salamander's range, with more northern populations generally being less territorial. Behavioral and ecological differences have also been observed between different color morphs, and red-striped individuals show more signs of territoriality. We hypothesized that salamanders in a polymorphic mid-Michigan population would exhibit less territorial behavior than those in southern populations and that this behavior would differ between the 2 color morphs. We collected adult male salamanders of both color morphs from the field and tested them in laboratory conditions. We used a setup in which resident salamanders were given time to establish a territory, then intruder salamanders were introduced into the territory and all behaviors were recorded. We expect to find low levels of territorial behavior in Michigan salamanders, but with some differences between the 2 morphs. These differences in behavior based on geographic location and polymorphism may help to explain the processes of evolution and speciation in amphibians.

Sat-PM1-E-2

Turning a College Campus Into a Classroom for Natural History

Brett A. Huggett (Bates College, Lewiston, ME)

Abstract - College campuses provide a unique opportunity for student engagement in natural history. Over the past 8 years, students in courses at Bates College have been converting the campus into an arboretum for the study of botany, ecology, and ethnobotany. Continued efforts by students enrolled in a course titled “Dendrology and the Natural History of Trees” have involved the utilization of ArcGIS to map every tree on campus along with proper botanical identification. Students are then assigned a particular tree species for which they compose a natural history essay highlighting the anatomical features for identification, in addition to ecological importance and ethnobotanical uses. Students complete the project by installing tree-identification tags with common name, scientific name, and a QR code directing users to an associated online natural history essay. All information is available on a public website titled “Bates Canopy”. This resource has been utilized by campus visitors, classes within and outside the Bates Biology Department, the Bates Historical Archives and Special Collections Library, and the College’s horticultural team. Efforts to improve this resource are ongoing, with generous support from Bates College alumni.

Sat-AM2-C-3

Learning With a Purpose: Integrating Invasive Species Management into Undergraduate Curriculum

Allyson K. Jackson (Purchase College SUNY, Purchase, NY)

Abstract - Purchase College SUNY (Westchester, NY) is home to a rare, contiguous bottomland forest along Blind Brook, which flows into the Long Island Sound. In 2021, a linear corridor was cleared through this old-growth forest and excavated to bare soil for the installation of a sewer line. Prior to this disturbance, the forest interior had remained largely intact and undisturbed for nearly a century, with minimal pressure from invasive species. With funding from the NYDEC, we are actively managing invasive species in the disturbed area and restoring it with native plants. This talk will highlight how this restoration work is carried out entirely by undergraduate students, fostering a vital connection between students and nature while providing hands-on career training. I have integrated the project into the Environmental Studies undergraduate curriculum, including internships, course-based research projects, and senior capstone research. By embedding this work into academic coursework, I can bridge theoretical concepts taught in lectures with practical, on-the-ground ecosystem management, making science more accessible and illustrating clear pathways to environmental careers. Additionally, the project offers extracurricular volunteer opportunities for the broader campus community, expanding awareness and engagement in land stewardship.

Sun-PM2-B-5

Distribution, Abundance, and Habitat Use of Golden Eagles in Maine

Evan Jackson (Maine Department of Inland Fisheries and Wildlife, Bangor, ME), Tricia A. Miller (Conservation Science Global, Cape May, NJ), and Erynn M. Call (University of Maine-Farmington, Farmington, ME)

Abstract - *Aquila chrysaetos* (Golden Eagle) is of significant conservation concern in eastern North America, particularly in Maine, where the species is listed as endangered. This study aims to assess the distribution, abundance, and habitat use of Golden Eagles in Maine, a region crucial for the species due to its historical nesting sites and proximity to the breeding population in Quebec. The last documented breeding attempt occurred in 1997, and the last successful attempt in 1984. Recent telemetry data indicated some eagles frequented areas near historic nesting sites during summer, but the extent of their use remains unclear. To better understand their distribution, we began working with community scientists to deploy baited camera traps in January 2024 and conducted trapping and tagging efforts in January 2025 to locate areas of use by Golden Eagles throughout the year. Initial findings of the camera-trapping effort suggest potential habitat use near former nesting sites, highlighting the importance of these areas for conservation efforts. By integrating public outreach and scientific research, we aim to enhance conservation strategies for the eastern Golden Eagle population, which remains vulnerable due to its small size and exposure to human threats. This research supports priorities identified by the Eastern Golden Eagle Working Group and aligns with the Maine Wildlife Action Plan.

Sat-AM2-D-4

The Ultimate Survey Tool: Conservation Dogs for Plants, Animals, and More

Sarah Jackson (New York-New Jersey Trail Conference, Conservation Dogs Program, Mahwah, NJ)

Abstract - Detection dogs have been widely recognized for their ability to locate wildlife scat, but their potential extends far beyond this application. As ecological survey tools, detection dogs offer a non-invasive, efficient method for locating a wide range of targets, including rare native species and early detection of invasive threats. This presentation will examine how detection dogs were deployed across multiple field projects to locate species of conservation concern, including invasive plants, insects, and fungi, as well as native wildlife such as *Sylvilagus transitionalis* (New England Cottontail) scat and rare turtles. We will discuss how odor-profile complexity and cryptic target species influenced search strategies, training considerations, and field outcomes. By exploring real-world examples, we will highlight the advantages and challenges of integrating detection dogs into ecological fieldwork, including survey efficiency, detection accuracy, and how each canine's search style contributes to project success. This presentation aims to provide researchers, land managers, and conservation practitioners with insight into how conservation-dog teams can complement traditional survey methods to improve biodiversity monitoring and management outcomes.

Sun-PM2-E-6

A Pattern Language for Branches

Jerry Jenkins (Northern Forest Atlas, Eagle Bridge, NY)

Abstract - Botany is a language for talking about plants. It is rich in words for structures, poorer in words for growth and behavior, which to trees are much the same. When language is poor, we think poorly. The remedy is to expand it. Some years ago, I spent ~10 winters studying winter branches and created a vocabulary based on growth patterns. In this talk, I introduce you to this vocabulary with photographs paired with diagrams, illustrating 2 fundamental processes—modularity and dominance—and 4 ways they play out at different scales: hierarchy versus equality, divergence versus convergence, planation versus verticality, and isotropy versus regionality. The language is borrowed from geometry but describes growth. Some of the pictures were taken 50 years ago, some last week. They show, I think, an amazing amount self-organization—collaborative pattern-making. These patterns become visible when we have a language for them, and remain invisible when we don't.

Sat-PM1-C-5

Diagramming and Photographing Ecological Patterns

Jerry Jenkins (Northern Forest Atlas, Eagle Bridge, NY)

Abstract - Species-scale field photography, in which you focus on individual species, often trying to isolate them from their backgrounds, is common. Community-scale field photography, in which you try to show species in relation to one another and their habitat, is rarer. Over the last 13 years I have made tens of thousands of species-scale photographs for the Northern Forest Atlas project. I am now focusing on community-scale work. It is slower, harder, often less beautiful, perhaps more mysterious and interesting, and deeply satisfying. This talk shows how I approached a single site, an eroding bank with an (unexpected) 24 species of mosses. I discuss conceptualization, choosing scales, making ecological and process maps, and a pattern language for describing biostructures. There is more, but that is enough.

Sat-PM2-C-4

Wild Bee and Plant Response to Farm Bill Conservation Plantings in Southern New England

Casey L. Johnson (University of Rhode Island, Kingston, RI), Steven Alm (University of Rhode Island, Kingston, RI), Kelsey Fisher (Connecticut Agricultural Experiment Station, New Haven, CT), Emma Tondre (University of Rhode Island, Kingston, RI), and Tracy Zarrillo (Connecticut Agricultural Experiment Station, New Haven, CT)

Abstract - Insect pollinators, especially bees, play an integral role in the production of agricultural crops and entomophilous plants in natural landscapes. However, native bees have declined in recent decades due to pathogens, pesticide exposure, habitat loss, and land-use intensification. To address some of these drivers of bee declines, the Farm Bill authorized incentive-based conservation programs to be carried out on agricultural land through the National Resources Conservation Service (NRCS) and encouraged the development of habitat for native and managed pollinators on farms. This project seeks to evaluate the outcome of at least 24 such wildlife-habitat plantings that were established in Connecticut and Rhode Island through this program. We conducted monthly surveys of each planting during the growing season (May–September) in 2023 and 2024 to evaluate wild bee diversity, as well as the vegetative cover, floral diversity, and abundance and density of blooming inflorescences, within each planted meadow. Our objectives are to (a) quantify the key plant species that support wild native bees, especially rare species, (b) evaluate the relationship between plant diversity/seed mix and bee species richness, and (c) provide information for developing seed mixes that best meet the needs of Rhode Island and Connecticut bees.

Sun-PM1-E-2

Introducing the Rhode Island Plant Insect Community Network

Casey L. Johnson (University of Rhode Island, Kingston, RI) and David Gregg (Rhode Island Natural History Survey, Kingston, RI)

Abstract - In Rhode Island, there is an extensive community of programs working on the plant–insect network: studying pollinators, promoting native plants, building sustainable agriculture, and educating people. To foster an inclusive ecology of groups and programs and uplift existing initiatives, we created the Rhode Island Plant Insect Community Network (RIPICN). The goals of this network are to: (a) create a shared sense of identity and purpose among the wide range of people and organizations already working on native plant and pollinator projects, (b) support existing projects where there are opportunities to achieve bigger-picture tasks such as regional participation, and (c) explore ways the partners, working together as a team, can increase public connection with pollinator conservation, especially in urban areas. In 2024, RIPICN members participated in several public-facing outreach events, cultivated new collaborative partnerships with one another, and published a “State of the Pollinators” report highlighting members’ research and accomplishments. This new initiative is a program of the Rhode Island Natural History Survey created in 2024 with a grant from the One Hive Foundation.

Sun-AM1-B-2

The Constellation of Northeastern Herbaria

Diana D. Jolles (Plymouth State University, Plymouth, NH)

Abstract - The northeastern US is deeply connected to the global biodiversity crisis, and herbaria—collections of preserved, labeled plant specimens that serve as primary sources of botanical information—have regained recognition as repositories of important resources and information even as they face threats of closure. These invaluable collections help answer critical questions about plant diversity, speciation genetics, conservation of rare taxa, phenological shifts in response to climate change and habitat degradation, and more. They also offer insight into how human history shapes the attribution of natural history knowledge. In this session, “Celebrating New England Herbaria: Research, Teaching, Community & Outreach”, we highlight how the constellation of 100+ herbaria across the Northeast are uniquely positioned to tackle both scientific and social challenges through public and private engagement. We advocate for broader collaboration to shift public perception—from viewing herbaria as static collections of dead plants to recognizing them as dynamic repositories of untold stories. By integrating traditional and modern research techniques, herbaria contribute to both cutting-edge scientific discoveries and explorations of intersectionality, while also training the next generation of plant biologists. These collections serve as interdisciplinary resources, offering both historical insights and predictive power in an era of environmental change. This session celebrates the renaissance of herbaria in the Northeast, emphasizing their critical role in science, education, and outreach. Through collaboration and innovation, these collections continue to shape our understanding of the natural world, past and future.

Sun-AM1-A-1

Rarity Rankings for the Least Common *Sphagnum* (Peat Moss) Species for each New England State

Eric F. Karlin (Ramapo College, Mahwah, NJ)

Abstract - Based on the recent taxonomic updating for *Sphagnum* (peat mosses), I assembled lists of the least common *Sphagnum* species for each of the 6 New England states primarily based on the herbarium collections posted on the online Consortium of Bryophyte Herbaria. The rarity rankings employed were developed by the Nature Conservancy as implemented by the New Jersey Natural Heritage Program (NJNHP). State rarity rankings for this study are based on both the number of sites collected from between 2000 and 2024 (recent site rarity ranking: Sx^R) and also by the absolute total number of sites that a species had been collected from (total site rarity ranking: Sx^T). These 2 rarity rankings can be expressed together as Sx^RSx^T. The lists developed can be used to update the existing state rarity-ranking listings for *Sphagnum* occurring in Massachusetts, New Hampshire, and Vermont. They will facilitate the creation of state rarity lists of *Sphagnum* for 3 three New England states that currently lack them (Connecticut, Maine, Rhode Island). On a regional basis, 13 *Sphagnum* species are found to be critically imperiled ($R1^R$) across the New England region, with 1 species having a historic (RH^R) ranking.

Sun-AM1-A-3

Rodents of Unusual Numbers: Long-term Trends in Live-Captured Small Mammals

Natasha Karniski-Keglovits (SUNY ESF Adirondack Ecological Center, Newcomb, NY) and Stacy McNulty (SUNY ESF Adirondack Ecological Center, Newcomb, NY)

Abstract - Long-term datasets on mice, squirrels, voles, shrews and other species provides the ability to tease out trends in populations, survival rates, reproduction, and phenology despite high levels of annual variation due to factors such as food availability and weather. New reports of declining numbers of the continent's small mammals highlight the importance of these datasets. SUNY ESF's Adirondack Ecological Center conducts small-mammal abundance surveys each summer as a part of a long-term monitoring program going back to 1981. From 1981 to 1996 surveys were conducted using snap traps, while more recent efforts (1992 to present) have used live mark–recapture. Between 1992 and 2022, we captured 7103 animals (14 total species) out of 38,633 traps set for a combined 0.18 catch per unit effort (CPUE). In addition, we report the effort needed to document and potentially detect trends in rare species (e.g., *Microtus chrotorrhinus* [Rock Vole], *Synaptomys cooperi* [Bog Lemming], *Glaucomys sabrinus* [Northern Flying Squirrel]). We present here a summary, including broad trends over the past 30+ years, presence of rare species, and information gaps that may lead to new questions, as well as additional survey techniques to supplement regular trapping data for specialized species such as *Sorex* shrews.

Sun-AM2-C-3

Effects of Prescribed Fire on Native and Invasive Understory Vegetation in Northern New Jersey Hardwood Forests

Jay F. Kelly (RVCC Center for Environmental Studies, North Branch, NJ) and Jessica Ray (RVCC Center for Environmental Studies)

Abstract - We studied the effects of prescribed burning on invasive and native understory vegetation in the hardwood forests of northern New Jersey. We collected data from a total of 1227 100-m^2 quadrats in 85 plots in 14 sites in northern New Jersey from 2015 to 2024. We compared control plots with no fire to adjacent burn plots with 1–3 dormant season burns. We analyzed results from the first through fifth growing seasons after burns using zero-adjusted beta and gamma generalized additive mixed models (GAMMs) in R depending upon data type. We found significant changes in the % cover and presence/absence of several invasive and native species in response to fire, with decreases in some (e.g., *Berberis thunberii* [Japanese Barberry], *Lindera benzoin* [Spicebush]) and increases in others (e.g., *Rubus phoenicolasius* [Japanese Wineberry], *Vaccinium* spp. [blueberry]). Significant declines were also observed in the % cover, density, and/or height of trees in both large seedling and sapling size classes following fire. Decreased young-tree density in the control plots also occurred in areas with locally high deer densities. Trends were consistent across forest-history types, but much higher amounts of invasive plant species occurred in post-agricultural forests than primary forests. These results, combined with other background differences in native plant composition and tree regeneration in the 2 forest types, suggests that careful biological study is needed prior to management in mid-Atlantic hardwood forests in order to determine whether fire and/or other tools are most appropriate for achieving the desired outcomes and/or avoiding harm.

Sat-PM1-C-1

On-farm Native Wildflower Meadows: Eight Years of Vegetation Monitoring

Claudia Knab-Vispo (Hawthorne Valley Farmscape Ecology Program, Ghent, NY), Conrad Vispo (Hawthorne Valley Farmscape Ecology Program, Ghent, NY), and Josie Laing (Hawthorne Valley Farmscape Ecology Program, Ghent, NY)

Abstract - On-farm seeded native wildflower meadows are promoted as a tool to increase flower diversity and abundance and to support beneficial insects. However, little is known about how vegetation composition and flower abundance change over time in relation to management. In 2017, we initiated a trial at the Hudson Valley Farm Hub in Hurley NY, to document these variables and to serve as a basis for others to study the consequences of these habitats for additional organisms. The trial consisted of 3 replicates of 3 treatments: native wildflower-rich meadow, native grass-rich meadow, and unseeded old field succession (fallow control). Since 2020, the 9 experimental plots (each 0.2 ha [0.5 ac] in size) have only been mowed once annually in early spring (March), representing a realistic level of on-farm management. We documented their vegetation composition twice annually and the flower abundance monthly (at least June–September) for 8 years. The seeded wildflowers established quickly, covering most of the ground in the second year. Since 2021, the seeded vegetation has accounted for around 85% of the cover. While the richness of seeded wildflowers has remained remarkably stable, the relative abundances of individual species have changed over the years and seem to continue to change. The native grasses were slower to establish, gradually increasing in abundance during the first 4 years. Since 2021, two species (*Panicum virgatum* [Switchgrass] and *Adropogon gerardi* [Big Bluestem]) have become dominant (80–90% cover). The vegetation in the fallow control plots was more variable and slower to establish. Flower abundance in the seeded treatments peaked in early summer of the second year, and average seasonal flower abundance has steadily declined since. In addition, the seasonal peak of flower availability in the wildflower-rich treatment has slowly shifted from early summer to autumn as the meadows matured. The flower abundance in the fallow control has remained significantly below that of the seeded meadows during the first 8 years. This trial shows that on-farm native wildflower meadows could be established and maintained with a reasonable amount of effort from the farmer. Other presentations in this session will speak to their impact (or lack thereof) on above- and below-ground invertebrates.

Sat-AM1-A-1

Incorporating Large-Scale NEON Data into the Undergraduate Classroom Through the Ecological Research as Education Network (EREN)

Mary Beth Kolozsvary (Siena College, Dept. Environmental Studies and Sciences, Loudonville, NY), Laurel J. Anderson (Ohio Wesleyan University, Delaware, OH), David Barnett (Battelle, Boulder, CO), Kristen Brubaker (Hobart and William Smith Colleges, Geneva, NY), Danielle Garneau (SUNY Plattsburgh, Plattsburgh, NY), Matthew Heard (Belmont University, Nashville, TN), Jose-Luis Machado (Swarthmore College, Swarthmore, PA), Michael Madritch (Appalachian State University, Boone, NC), Jessica Mitchell (University of Montana, Missoula, MT), Jennifer L. Schafer (Winthrop University, Rock Hill, SC), Diane Styers (Western Carolina University, Cullowhee, NC), and Sara Scanga (Utica University, Utica, NY)

Abstract - The Ecological Research as Education Network (EREN) promotes collaborative ecological research that generates high-quality, publishable data involving faculty and students at primarily undergraduate institutions (PUIs). EREN projects investigate ecological questions using standardized protocols that allow undergraduate students to collect and compare data across multiple sites over broad geographic areas and environmental settings. EREN supports highly productive collaborative research projects that fit within the constraints of scientists with significant teaching responsibilities. EREN projects have a strong record of peer-reviewed publications that approach scientific inquiry through differing vantage points, from focusing on ecological questions to pedagogical elements (e.g., development of instructional materials, assessment). In recent years, EREN has expanded and strengthened in depth and breadth by partnering with other organizations and networks (e.g., National Ecological Observatory Network [NEON]) to focus on integrating large, networked datasets into undergraduate teaching and research. We will present 2 case-studies of how the EREN network partnered with NEON to produce teaching modules that involve use of NEON large-scale datasets. The first project "JEN" (Joint-EREN-NEON) resulted from the broader-impacts portion of a National Science Foundation (NSF) grant. This project resulted in hands-on activities that investigate large-scale patterns in biodiversity across the eastern US, while developing student skills in working with spreadsheets, R, and/or GIS. The second project, Lichens in Diverse Landscapes (EREN-Lichen), is part of a suite of projects that were developed in response to the COVID-19 pandemic, when undergraduate instructors were looking for ways to embed rich learning experiences within authentic ecological research that could be incorporated into various modes of delivery—and that could change at a moment's notice. The EREN-Lichen project has 3 modules: field-based data collection, use of NEON and other large-scale data using GIS, and a module that focuses on data visualization and analysis techniques. Both projects have resulted in peer-reviewed publications, and the teaching materials for JEN are on the Quantitative Undergraduate Biology Education and Synthesis (QUBES) website, while teaching materials for EREN-Lichen are on the EREN website. These 2 case studies illustrate the strength and breadth that continental-scale NEON data can have on undergraduate education.

Sun-PM2-D-3

Invasive-Species Management as a Budding Opportunity for Community-Based Conservation and Developing a Sense of Place

Chloe Koval (Nature Center at Greenburgh, Scarsdale, NY)

Abstract - When optimizing systems for invasive species management, community-based conservation exists as an invaluable method for effective, ethical practice. Interdisciplinary research in Place Attachment Theory reflects that people develop stronger place identities through directly contributing to a landscape. Rather than experiencing passive, superficial interactions with one's surroundings, active engagement and processes of care towards a landscape assist in the formation of a meaningful relationship between person and environment that self-perpetuates. Efforts in invasive-species management hold immense potential for community-based conservation and relationship-building while being highly constructive in controlling the spread of invasive species and restoration. In this presentation, we will review literature describing the prospects of community-based conservation within examples of invasive-species management from various fields of study, share from personal experiences, and construct holistic management plans that bring community members to the center of stewardship. We will explore how invasive-species management can be used as a mode for developing a sense of place, belonging, and agency in a landscape for human and ecological well being.

Sun-PM2-B-6

Distribution and Abundance of Three Invasive Plants Along Catskill Mountain Hiking Trails

George Kraemer (Purchase College, SUNY, Purchase, NY) and Maura Vanderputten (Purchase College, SUNY, Purchase, NY)

Abstract - Natural systems are threatened by the continuing increase of the diversity, distribution, and abundance of invasive plants. We recorded the locations of invasive *Alliaria petiolata* (Garlic Mustard), *Berberis thunbergii* (Japanese Barberry), and *Vinca minor* (Periwinkle), and the abundance of reproductive stems of Garlic Mustard along 26 Catskill Mountain hiking trails and trailheads. Garlic Mustard was present on two-thirds of trails surveyed, though abundance varied widely both between and within trails. Japanese Barberry was recorded on 38% of trails. Periwinkle was found on only 1 trail, though was locally abundant there. Garlic Mustard and Japanese Barberry occur on similar broad variety of slopes (5–28%) and aspects (0–359°). Both Garlic Mustard and Japanese Barberry appear elevation-limited to ~1000 m. Both species have penetrated deeply into Catskill hiking trails. Long-distance dispersal may have occurred; in 38 of 728 (5%) Garlic Mustard records (up to 2734 m separation) and 17 of 80 (21%) Japanese Barberry records (up to 1300 m) the spatial separation was >100 m. Roughly half of Garlic Mustard and Japanese Barberry recorded on imapinvasives.org between 2004 and 2022 persist today.

Sat-PM1-C-2

The Northeast Seed Network

Uli Lorimer (Native Plant Trust, Framingham, MA)

Abstract - Surveys of restoration practitioners in the Northeast have revealed a stark reality: most are forced to source native seed and plant material farther than they would consider local. This situation indicates the region's native plant supply chain is underdeveloped. The Northeast Seed Network has formed to address the gaps in the supply chain by organizing an alliance of regional seed partnerships. The goal of the network is to sustainably improve access to locally adapted, diverse native plant seed and plant material. This talk will explore the context behind the creation of the Northeast Sed Network, what current activities include, and a vision for the future. The success of restoration efforts at local and regional scales rests on access to and use of locally adapted plant material.

Sun-PM2-A-1

Bridging Gaps in Salamander Conservation

Sophia A. yun Loureiro (Michigan State University, East Lansing, MI) and Alexa R. Warwick (Michigan State University, East Lansing, MI)

Abstract - Amphibians face increasing conservation concern as they lead in global vertebrate biodiversity declines. Furthermore, amphibians have low social capital, meaning they are generally not highly valued by people. Limited research on the attitudes, perceptions, and knowledge of amphibians in the US contributes to their low social capital. Public engagement can be a useful tool for researchers and conservation managers to use as a means of increasing amphibian social capital. However, there is a dearth of knowledge about how herpetologists may use public engagement as a conservation tool. Here we addressed this knowledge gap by distributing a close-ended question survey via the email listserv or newsletter of various American herpetological organizations. Based on limited previous research, we anticipate that most herpetologists participate in some form of public-engagement activities. We expect that herpetologists will conduct public engagement utilizing their own resources and partnerships in place of formal training or institutional support. The results of our study will expand upon the current understanding of applied conservation in the field of herpetology and will be used to improve the quality of public engagement.

Sat-AM2-E-5

The Natural History Museum as a Tool for Preparing Students for Field Studies in Urban Ecology

Terryanne Maenza-Gmelch (Barnard College, New York, NY), James F Remsen (Suffolk County Community College, Brentwood, NY), and Melissa A Wright (Barnard College, New York, NY)

Abstract - Field ecology courses studying urban environments can successfully incorporate natural history museum resources to prepare students for field studies. We created a museum worksheet focusing on birds, plants, and NYC natural areas for undergraduate students enrolled in a variety of field-based ecology courses in NYC For a Barnard College spring semester course, running from January to April, entitled “Birds, Plants and Land-use”, students visited the American Museum of Natural History. Students engaged with the following exhibits: Birds of NY City, Hall of North American Birds, and Hall of North American Forests. There were 3 goals for the museum visit: practice searching for evidence of ecological principles in museum dioramas, process information from museum exhibits to solidify understanding of class concepts, and distinguish between similar looking birds and plants by observing and drawing museum specimens. Students were asked to complete a pre-visit survey that asked how confident and how much interest they had in bird identification, plant identification, habitat classification and application of ecology concepts to natural habitats while in the field. After the museum visit, students repeated the survey. Results indicate that museums can be useful in preparing students for field studies in urban ecology for both content and logistics.

Sat-AM2-C-2

Impacts of Northern Habitat Expansion of Great White Sharks on Seals in the Northern Gulf of Maine

Megan Maloney (Allied Whale, College of the Atlantic, Bar Harbor, ME), Sean Todd (Allied Whale, College of the Atlantic, Bar Harbor, ME), and Rosemary Seton (Allied Whale, College of the Atlantic, Bar Harbor, ME)

Abstract - The habitat range of *Carcharodon carcharias* (Great White Shark) has been shifting further north as ocean temperatures increase and seal populations recover following federal protections. We analyzed 23 years of seal stranding reports to quantify the increase in White Shark attacks on *Halichoerus grypus* (Gray Seal), *Phoca vitulina* (Harbor Seal), and *Pagophilus groenlandicus* (Harp Seal) populations in Downeast Maine. Additionally, we performed a wounded seal survey on the seal colony located on Mount Desert Rock (MDR), ME, in the summer of 2024. From 2002 to 2024, reports of shark-bitten seals increased significantly (Spearman’s rank correlation: $P < 0.01$). A total of 31 shark-bitten seals were reported at MDR during the summer of 2024, as opposed to only 8 stranding reports in the same year. The movement of White Sharks is of significant interest as it pertains to public safety measures and fisheries management.

Sat-AM1-E-2

Citizen Science and Rare Bee Finds: Lessons from Connecticut's Pollinator Surveys

David Mantack (Southern Connecticut State University, New Haven, CT)

Abstract - In this presentation, I will discuss findings from the Natural Resources Conservation Service (NRCS) surveys, the Robbins Swamp surveys by Tracy Zarrillo, and my own contributions, including multiple state and county records. I will examine how our perception of bee rarity is shaped by limited survey efforts, emphasizing that many so-called rare species, such as *Melitta eickworti*, can be locally abundant in specific, often-overlooked habitats. By highlighting the role of targeted surveys, citizen science, and tools like iNaturalist, I will demonstrate how these efforts not only enhance our understanding of bee distribution, but also reveal the importance of localized and targeted survey efforts.

Sun-AM2-E-4

The Impact of Aquatic Invasive Species Mechanical Harvesting on Turtle Populations in the Lake Champlain Basin

Matthew R. Marcelino (University of Vermont, Burlington, VT) and Brittany A. Mosher (University of Vermont, Burlington, VT)

Abstract - Mechanical harvesting is a widely used aquatic invasive species (AIS) management technique. This method is used in the Lake Champlain Basin to prevent *Myriophyllum spicatum* (Eurasian Watermilfoil) and *Trapa natans* (European Water Chestnut) from degrading native ecosystems and impeding human activities. While effective in reducing invasive plants, this method could pose a risk of unintended bycatch and mortality to non-target species, including turtles. This study investigated the impact of mechanical harvesting on turtle populations, focusing on *Sternotherus odoratus* (Eastern Musk Turtle) and *Chrysemys picta* (Painted Turtle). We employed self-reported surveys, hand-sorting harvested plant material, and turtle trapping across multiple sites to quantify bycatch. Bycatch rates were low (<1 individual/hour), and mortality rates were even lower, suggesting minimal direct impact on turtle populations. However, challenges in tracking tagged turtles limited insights into behavioral interactions with harvesters. Our results highlight the potential for resource managers to collaborate with mechanical harvester operators to refine harvester designs, such as installing excluder devices, to further reduce bycatch. This study provides critical baseline data to inform AIS management strategies that balance invasive-plant control with the conservation of native flora and fauna. Continued research, including long-term population monitoring and harvester-design improvements, is essential to safeguard vulnerable species in managed aquatic environments.

Sat-PM2-B-2

The Ripple Effect: Integrating Art and Science to Empower Awareness of Environments

Kirsten Martin (University of Saint Joseph, West Hartford, CT), **Christopher Croucher** (Letting the Land Lead, Leominster, MA), and **Todd Bartel** (The Cambridge School of Weston, Weston, MA)

Abstract - Art and science are sometimes viewed as 2 distinctly different and unrelated disciplines, but in this presentation, we will highlight some of the ways we are integrating art and science to increase public awareness of at-risk environments, increase observational skills, and. most importantly. empower individuals to feel a connection to their local environments. The main focus of this presentation will be an ongoing project that focuses on 2 watersheds (1 urban, 1 rural) in Connecticut. Both watersheds have a myriad of environmental issues, from flow alterations to elevated levels of contaminants, but the rivers are often overlooked. The project integrates art and science in an effort to tell the stories—cultural, historical, and biological—of each river in a way that empowers audiences to reflect on their views of the rivers. The project is a unique collaboration between an environmental scientist, a dancer and choreographer, and a visual artist.

Sun-AM1-B-4

Eider Eaten Or Ignored: Gull Predation of Common Eider Chicks in a Mixed Species Colony

Haysie Maurer (College of the Atlantic, Bar Harbor, ME)

Abstract - *Somateria mollissima* (Common Eider) populations are in decline in the northeastern US. Some studies have suggested that gull predation may be a major driver in decline of duckling recruitment. A major problem when studying Common Eiders may be the impact of close observation on predation rates. Great Duck Island (44°09′08″N 68°14′55″W) supports a breeding colony of *Larus argentatus* (Herring Gull) and *Larus marinus* (Great Black-backed Gull) and provides both breeding and foraging areas for Common Eiders. I studied Eider fledging success and gull predation from the 14-m-tall lighthouse tower from 14 June through 23 July 2024 for over 120 observational hours. I recorded crèche size, number of females, and groupings of female, male, or solitary birds at fifteen-minute intervals between 0700 and 1730 hrs when visibility was suitable and noted any predation event. By limiting observation to the light tower, I minimized potential disturbance to adults and chicks. Preliminary results suggest limited predation by Great Black-backed Gulls and Herring Gulls. Only 3 confirmed successful predation events were recorded. All 3 attacks were initiated by Herring Gulls.

Sat-PM1-D-2

Plastic in Bird Nests Increases with Proximity to Human-impacted Areas

Teaghan McAllister (Warren Wilson College, Swannanoa, NC), Olya Milenkaya (Warren Wilson College, Swannanoa, NC), Yuemei Zhang (Warren Wilson College, Swannanoa, NC), and Paul Bartels (Warren Wilson College, Swannanoa, NC)

Abstract - Bird nests are important for reproductive success, but human activities are disrupting nesting patterns. One of the fastest growing concerns, when discussing ecosystem health, is plastic pollution. Plastic, a polymeric material, is slow at deteriorating and often excretes hazardous chemicals. Recent studies show negative bird–plastic interactions, but more research is needed to better understand the impacts of plastic on bird-nesting behavior. Therefore, We studied the relationship between plastic abundance within nests and nest distance to human-impacted areas (roads, rivers, and buildings). We hypothesized that plastic is a used source of nesting material, and that this plastic abundance has a negative relationship with the nest's distance to the closest human-impacted area. We performed this research on Warren Wilson College campus using 3 years (2021–2023) of nest collections from bird boxes meant to encourage *Poecile carolinensis* (Carolina Chickadee) nesting. For plastic-pollution analysis, we split each study nest into 2 separate layers (lining-layer and moss-layer). We analyzed microplastics within the lining-layer and moss-layer through water bathing to extract loose plastic particles. We then used UV light to detect autofluorescence for microplastic particle counts. We analyzed macroplastics within the lining-layer through a chemical-digestion process using bleach concentrate to dissolve natural materials, leaving weighable macroplastic results. Overall, Plastic was a used and abundant nesting material, appearing in 91% of all sampled nests (n = 89 out of 98). Plastic also increased with proximity to human-impacted areas, but lining-layer microplastic counts and macroplastic weights did not show significant relationships to distance within this relatively small-scale study. Further studies are needed to determine the long-term effects of plastic on nestlings and for determining where exactly these plastics are coming from.

Sun-PM2-C-3

Bridges and Duckweed Have Large Effects on Communities: Better Data Interpretation Using Cohen's D

Declan J. McCabe (St. Michael's College, South Burlington, VT), Anne L. Burnham (St. Michael's College, South Burlington, VT), Ismael Orengo Sa´nchez (St. Michael's College, South Burlington, VT), and Janel J. Roberge (St. Michael's College, South Burlington, VT)

Abstract - Standard statistical approaches use *P*-values to compare treatments suggesting only that differences exist or do not. *P*-values by themselves do not indicate the size of an effect in a study. Comparing only *P*-values across studies risks giving undo emphasis to very large studies with very small effects. Strict reliance on *P*-values misses biologically important patterns and small sample size compounds this risk. Calculating unitless, standardized-effect sizes facilitates comparisons of response variables measured in different units and among published studies. We combined null hypothesis testing using *t* tests with calculation of Cohen's d and its confidence intervals to look past *P*-values in 2 study systems. First, we measured benthic metrics under stream bridges and upstream of bridges. Secondly, we removed the dominant vegetation in experimental ponds and compared responses of organisms to this perturbation. Bridges reduced macroinvertebrate richness and abundance, but statistically significant reductions in correlated benthic metrics under bridges were undetectable. Large standardized-effect sizes of reductions in EPT (Ephemeroptera, Plecoptera, and Trichoptera) richness and Ephemeroptera supported our hypothesis that bridges would reduce benthic diversity. No significant differences were found between pond treatments despite robust effect sizes supporting hypothesized reductions in most organisms. We conclude standardized-effect sizes provide a more reasoned and nuanced approach to evaluating differences between means in biologically important variables.

Sat-PM2-D-3

Leading a Salamander to Water: Assessing Influences on *Plethodon cinereus* Hydration State

Lily McCarthy (SUNY Oneonta, Oneonta, NY) and Elizabeth Bastiaans (SUNY Oneonta, Oneonta, NY)

Abstract - Amphibians are uniquely sensitive to changes in environmental conditions, making them particularly threatened by climate change. Plethodontid salamanders breathe cutaneously and therefore require a high level of moisture in their environment to maintain bodily function. Using *Plethodon cinereus* (Eastern Red-backed Salamander) as a model organism, the study assessed how abiotic factors influence the hydration state of Eastern Red-backed Salamanders and how these influences change seasonally. Over the course of the fall 2024 field season (October–November), we collected salamanders and subject them to dehydration and rehydration trials. We weighed them between each trial to assess their ability to either resist dehydration (i.e., maintain mass) or facilitate rehydration (i.e., gain mass back after a dehydration event). Our work expanded upon previous research by including temperature treatments in the experimental trials. The trials will be repeated in the spring 2025 field season. Preliminary results suggest that of all explored variables, the amount of precipitation in the week prior to collection has the greatest affect on their ability to rehydrate after a dehydration event. We predict that this trend will continue into the spring 2025 field season. The goal of this study is to provide support for the creation and implementation of conservation plans. These findings will be critical for incorporating Eastern Red-backed Salamanders' response to changing environmental conditions into such management practices.

Sat-PM1-E-4

Northeastern Lumbricid Earthworms and the Legacy of Glaciation

Timothy McCay (Colgate University, Hamilton, NY), Laurel Anderson (Ohio Wesleyan University, Delaware, OH), Christopher Bloch (Bridgewater State University, Bridgewater, MA), Abigail Cahill (Albion College, Albion, MI), Sandra Cooke (Greensboro College, Greensboro, NC), Benjamin Dolan (University of Findlay, Findlay, OH), Kathryn Flinn (Baldwin Wallace University, Berea, OH), Danielle Garneau (State University of New York, Plattsburgh, Plattsburgh, NY), Nate Haines (Bridgewater State University, Bridgewater, MA), Kristy Hopfensperger (Northern Kentucky University, Highland Heights, KY), Mary Beth Kolozsvary (Siena College, Loudonville, NY), Carol Mankiewicz (Beloit College, Beloit, Wisconsin), Sara Scanga (Utica University, Utica, NY), Jennifer Schafer (Winthrop University, Rock Hill, SC), Ezra Schwartzberg (Adirondack Research, Saranac Lake, NY), Drew Scott (Southern Illinois University, Carbondale, IL), Kathleen Shea (St. Olaf College, Northfield, MN), Jeffrey Simmons (Mount St. Mary's University, Emmitsburg, MD), and Jennifer Styrsky (University of Lynchburg, Lynchburg, VA)

Abstract - The earthworms of North America include a dynamic mixture of native and non-native species. History of glaciation during the Pleistocene may have strongly affected present earthworm assemblages, but the importance of glacial history relative to other factors is unclear. We used a standard sampling protocol at 94 sites across 12 states to better understand the factors affecting diversity and abundance of earthworms in the eastern and central US. We divided our sites into northeastern glaciated, midwestern glaciated, and non-glaciated regions. We measured habitat type, proximity to streams and roads, soil type and drainage, and soil pH . A small number of European species was dominant throughout the sampled region. Native earthworms were rare, and Pheretimoid (jumping worm) species were present only at a small portion of our sites. Earthworms were more abundant and diverse in the Upper Midwest, where non-native earthworm invasion was the most recent, and least common and diverse below the southern limit of glaciation. Soil pH had a subtle positive effect on earthworm abundance. Habitat influenced community composition with more anecic earthworms in grass-dominated habitats and the most functionally diverse communities in deciduous forests. A consistent set of European lumbricid earthworms was found across these sites, which were mostly located near college campuses and other human-disturbed areas. One of our sites was exclusively populated by jumping worms, perhaps warning of future changes. Earthworm communities in previously glaciated areas, and especially in the recently invaded Upper Midwest, may have responded positively to soil organic matter accumulated during millenia without earthworms since glacial retreat. Forest canopy overstory differences and soil mineral composition may be additional factors promoting earthworm abundance and diversity at high latitudes in North America.

Sun-AM2-B-4

Leveraging Small Collections for Interdisciplinary Education

Caitlin McDonough MacKenzie (Bennington College, Bennington, VT)

Abstract - Most herbaria are small herbaria, holding less than 100,000 specimens. The Bennington College Herbarium is a textbook small herbarium, comprising mostly student collections from the local flora, especially the campus forest. While we face typical small herbaria challenges—we are slowly digitizing the collection on a shoestring budget, we do not have a dedicated taxonomist or curator staffing the herbarium, and our specimens are often excluded from big-data herbarium-based research projects—we are growing student engagement in the collection through interdisciplinary class projects. Here, I will present the class assignments from undergraduate courses that require students to both collect and mount specimens and incorporate specimens in creative projects beyond botany or ecology. Fiber arts in particular has been a fertile area for herbarium connections including knitting patterns based on herbarium specimens, infographics on the process of botanical dyeing, and cyanotype textiles with pressed plants. At Bennington, these herbarium-based projects expand students' connections with botany, ground their sense of place, and build community with the pressed plants at hand.

Sun-AM1-A-4

Examination of Survey Methods and Habitats for the Small Snakes of Vermont Grasslands and Shrublands

Rosy L. Metcalfe (Antioch University New England, Keene, NH), Michael E. Akresh (Antioch University New England, Keene, NH), and James S. Andrews (Vermont Reptile and Amphibian Atlas, Salisbury, VT)

Abstract - In Vermont, *Opheodrys vernalis* (Smooth Greensnake), S*toreria dekayi* (Dekay's Brownsnake), *Storeria occipitomaculata* (Red-Bellied Snake), and *Thamnophis sirtalis* (Common Gartersnake) are commonly found in grasslands, sedge meadows, old fields, beaver meadows, and shrublands often in or near woodland edges. There they play essential roles as consumers of organisms often considered problematic by humans, including introduced species of snails, slugs, earthworms, and insects. Despite snakes' ecological importance, there is notably less foundational knowledge of the ecology of smaller snakes because their cryptic nature makes them more challenging to study. Using 2 different types of artificial cover objects (ACO), chipboard coverboards and multi-level artificial cover objects (MLACO; a.k.a. "snake hotels"), we surveyed 40 transects at 11 sites in Vermont. We collected 2 seasons of data to determine the optimal timing of surveys and weather conditions, as well as the microhabitat, ideal composition of herbaceous, woody, and rubus/brambles in the understory, and canopy-height tree vegetation for each snake species. We analyzed survey and habitat conditions using linear and generalized linear mixed models. Dekay's Brownsnakes, Red-Bellied Snakes, and Common Gartersnakes were more likely to be detected during surveys occurring later in the day. Detection varied by species based on the minimum or maximum daily temperature 24-48 hours before surveys. All species had higher counts at ACOs in non-wetland microhabitats. We found higher counts of Dekay's Brownsnakes in habitats with less understory vegetation and Common Gartersnakes more frequently in habitats with less canopy cover. We observed very few Smooth Greensnakes across all sites regardless of survey conditions or habitat. Based on our preliminary results, we recommend that conservation managers survey in the late afternoon or early evening and place ACOs in drier microhabitats to maximize encounters of individual snakes. We also suggest the conservation and management of open habitats with reduced woody vegetation may best sustain the small-bodied snake communities in New England.

Sat-AM2-B-2

Evidence Revealing Interactions Between Honey Bees and Non-Flowering Plants

M. Sydney Miller (University of Vermont, Burlington VT), Samantha Alger (University of Vermont, Burlington VT), Brianna Borch (University of Vermont, Burlington VT), P. Alex Burnham (University of Vermont, Burlington VT), Henry Lagasse (Trinity College, Harford CT), and Nikisha Patel (Trinity College, Harford CT)

Abstract - Ferns and mosses lack the coevolved relationships with animals, such as *Apis mellifera* (Honey Bee), upon which flowering plants rely for dispersal. Instead, the dispersal of fern and moss spores is thought largely to be passive, with spores landing close to the parent plants and hence limiting dispersal distance. Here, we explore the potential for animal-mediated spore dispersal by Honey Bees via passive spore encounters during foraging trips. We took bee-collected pollen and nectar samples from 5 Honey Bee apiaries in Vermont from May to September and analyzed them for plant DNA composition. We observed moss (family *Bryaceae*) and fern (family *Osmundaceae*) DNA in 12.5% of nectar samples. Using microscopy to evaluate individual pollen loads and flower samples for spore presence, we found that 58% of pollen loads contained moss and fern spores and 21% of flowers harbored fern spores. We also found that bee-collected pollen loads contained viable moss spores that successfully germinated on Knops media, suggesting that bee-collected spores remain viable during transport. Our preliminary findings suggest that bees likely encounter spores incidentally while foraging for nectar, pollen, or water. But, even the occasional passive dispersal of spores may have implications for the distribution of ferns and mosses. Our findings suggest that Honey Bees may play a larger role in moss and fern spore dispersal than previously thought.

Sun-AM2-E-1

A Brief Tour of the Phenology and Distribution of Amphibians in Acadia National Park

Marisa N. Monroe (University of Maine, Orono, ME) and Noah D. Charney (University of Maine, Orono, ME)

Abstract - We collaborated with 45 volunteers to conduct ~480 surveys across 122 nights on 300-m transects on roads in Acadia National Park, Mount Desert Island, ME. Additionally, we conducted 5 driving surveys in the spring and fall, recording all locations of dead and alive amphibians on park roads. Field work occurred from mid-March through mid-December. Combined with iNaturalist data (2016 to present), National Park Service inventory data (2001), PIT tag data from the College of the Atlantic (2020–2024), and historic data (1937–1971), we explore noteworthy phenology and distribution of amphibians across Acadia National Park including (1) post-fire distribution of *Anaxyrus americanus* (American Toad), (2) occupation of brackish seaside pools by *Ambystoma maculatum* (Spotted Salamander), and (3) fall migrations of juveniles (various species).

Sun-AM1-D-3

Harvesting Sap and Producing Syrup From Trees Other Than Maple

David Moore (University of New Hampshire, Durham, NH), Heidi Asbjornsen (University of New Hampshire, Durham, NH), Matt Vadeboncoeur (University of New Hampshire, Durham, NH), Jose Gutierrez Lopez (Swedish University of Agricultural Sciences, Umeå, Sweden), and Tanner Frost (University of New Hampshire, Durham, NH)

Abstract - Syrups made from trees other than *Acer* spp. (maples) are becoming more economically important across northern North America. Syrups made from *Betula* spp. (birches), *Juglans* spp. (walnuts), *Fagus* spp. (beeches), and *Platanus* spp. (sycamores) are commercially available, but it is possible to make syrup from other types of deciduous hardwoods as well. All aspects of syrup production from these novel types of syrup-producing trees will be discussed in this talk, including ecology and production techniques, and the talk will conclude with a taste test of a few different types of syrup as well.

Sat-PM1-C-3

***Emydoidea blandingii* (Blanding's Turtle) Headstarting Efforts and Preliminary Findings at Two Sites in the Mid-Hudson Valley, NY**

Maribel Pregnall Mueller (The Wetland Trust, Inc., Burdett, NY), **Lindsay Charlop** (The Wetland Trust, Inc., Burdett, NY), and **Gabby Deyo** (The Wetland Trust, Inc., Burdett, NY)

Abstract - In a collaborative effort to conserve the threatened *Emydoidea blandingii* (Blanding's Turtle) in the Hudson Valley, The Wetland Trust, New York State Department of Environmental Conservation, Office of Parks, Recreation, and Historic Preservation, and the Center for Reptile and Amphibian Conservation have embarked on a 10-year Blanding's Turtle headstarting effort in the Mid-Hudson Valley (2022–2032). The main purpose of this study is to elucidate characteristic habitat preferences and movement patterns of juvenile Blanding's Turtles, while simultaneously augmenting the population. In this presentation, we will describe preliminary results from tracking 12- and 24-month headstarts over 2 years of study. We have found that headstarts spend ~91% of their time in water, on the fringes of wetlands in a variety of vegetation types including cattail/tussock sedge communities, buttonbush swamps, shrub swamps with minimal buttonbush, and habitats dominated by submersed vegetation. We have consistently found headstarts at water depths averaging 22.23 cm (8.75 in) with a median of 15.24 cm (6.0 in). Some individuals spent time on land no more than 30 m (100 ft) from water, mostly burrowed under logs and/or detritus. Headstarts moved an average of 1.8 m (5.7 ft)/day across land and water with 24-month headstarts moving ~0.6 m (2 ft)/day further than 12-month headstarts. Twelve percent of the turtles relocated from their release point to a different wetland. Initial results suggest high survivorship (95.5%) with only 1 known mortality (n = 22). Headstarts typically lose weight within their first few weeks of release and rebound beginning the following spring. Our initial results indicate success, and we are confident that our 10-year effort focusing on juvenile use of the landscape will better inform management practices for Blanding's Turtle and habitat conservation.

Sat-PM1-B-3

A Dietary Analysis of Four Streamside Salamander Species in Eastern Pennsylvania

Kelly Murman (East Stroudsburg University, East Stroudsburg, PA), Emily Rollinson (East Stroudsburg University, East Stroudsburg PA), Matthew Wallace (East Stroudsburg University, East Stroudsburg PA), Terry Master (East Stroudsburg University, East Stroudsburg PA), and Thomas C. LaDuke (East Stroudsburg University, East Stroudsburg, PA)

Abstract - As abundant predators in many small streams, plethodontid salamanders play a key role in the ecosystem. Considering the high abundance of salamanders in forest and riparian ecosystems, it is beneficial to examine their foraging habits and dietary selections. We examined the diets of 4 species in the streamside salamander guild (Plethodontidae) in eastern Pennsylvania: *Desmognathus fuscus* (Northern Dusky Salamander), *Desmognathus ochrophaeus* (Mountain Dusky Salamander), *Eurycea bislineata* (Northern Two-lined Salamander), and *Gyrinophilus porphyriticus* (Northern Spring Salamander). We compared salamander-gut contents to invertebrate communities in the surrounding terrestrial and aquatic environments to determine where each species primarily forages and if they are consuming prey proportional to environmental availability. We sampled salamander-gut contents using a non-lethal stomach-flushing technique. We collected environmental background samples in terrestrial and aquatic environments from leaf litter and stream leaf packs. Salamander diets primarily consisted of terrestrial prey by volume and number of individual prey items, with a seasonal shift in the volume of aquatic prey consumed. Taxonomic composition of the salamander diet generally reflected both the terrestrial and aquatic diet sources, although 13 taxonomic groups seen in salamander guts were not observed in either terrestrial or aquatic background samples.

Sun-AM1-D-2

Feast or Famine: Do Urban Forests Provide Adequate Refueling for Migratory Birds?

Desiree L. Narango (Vermont Center for Ecostudies, White River Junction, VT), Elizabeth Rogers (University of Massachusetts, Amherst, Amherst, MA), Gerson, Alexander (University of Massachusetts, Amherst, Amherst, MA), and Susannah Lerman (USDA Forest Service Northern Research Station)

Abstract - Urbanization can influence the availability and quality of arthropod prey for migratory birds through mechanisms such as altered phenology, habitat fragmentation, and novel plant communities. Despite the high densities of insectivorous migratory birds observed in cities, there is limited research on how urbanization affects prey availability and refueling success during stopover. To address this deficiency, we captured migratory birds during spring and fall in forest fragments within Springfield, MA, which varied in levels of surrounding urbanization and the dominance of *Quercus* spp. (oaks), key host plants for caterpillar prey. We assessed arthropod biomass, nutritional composition, bird diets, and plasma metabolites to evaluate whether urban forests provide comparable stopover habitat quality to rural sites. Our findings reveal that urbanization and low oak dominance both reduce prey abundance and the availability of high-protein prey such as spiders. Furthermore, while some bird species stopping over in urban forests exhibited reduced body condition and refueling rates, these effects were species- and life-history dependent. Our ongoing work aims to elucidate the causal links between urban habitat conditions, diet shifts, and stopover performance to inform conservation strategies for migratory birds in human-dominated landscapes.

Sat-AM1-D-3

Examining the Change in Antibiotic Resistance of *Pseudomonas putida* in Soil Extract vs. Mueller–Hinton Media

Emily M. Nowicki (Curry College, Milton, MA) and Emmy Bedard (Curry College, Milton, MA)

Abstract - Antibiotic resistance arises when bacteria gain the ability to tolerate and grow in the presence of otherwise inhibitory concentrations of antimicrobial substances. In the US alone, 2.8 million infections each year and over 35,000 deaths are attributed to drug-resistant bacteria. This problem, however, is not limited to clinical settings—even bacteria in pristine natural environments synthesize antibiotics, which in turn has resulted in selective pressure for the surrounding microbial community members to evolve resistance mechanisms. Antibiotic susceptibility testing of clinically relevant bacteria is currently performed via a standardized method using Mueller–Hinton growth medium. By relying on a single standardized growth medium for all antibiotic susceptibility assays, however, we are likely incorrectly estimating the resistance potential of many clinical and environmental organisms that thrive in growth conditions greatly different from Mueller–Hinton medium. Peer-reviewed research suggests that some clinical isolates deemed "sensitive" to a particular antibiotic when tested on Mueller–Hinton medium are resistant when tested on a more biologically relevant growth medium. Moreover, there is currently no standardized method for testing antibiotic susceptibility of bacteria isolated from natural environments like soil. In this study, we compared the susceptibility of *Pseudomononas putida,* a non-pathogenic Gram-negative bacterial species ubiquitous in the environment, to various antibiotics in 2 different growth media: Mueller–Hinton and soil-extract broth. We reasoned that the soil-extract medium would be more similar nutritionally to soil itself. Tolerance of *P. putida* to 2 different antibiotics, colistin and tetracycline, was higher in soil-extract broth compared to Mueller–Hinton. One explanation for this tolerance could be the humic acid content in the soil extract as humic acids have been shown to influence chemical diffusion and antibiotic-resistance gene expression. Interestingly, when purified humic acids were titrated into Mueller–Hinton broth, *P. putida* was able to grow in the same colistin concentration as in the soil-extract broth despite this concentration being inhibitory for Mueller–Hinton medium without humic acids. Our current hypothesis is that gene expression changes in putative antibiotic-resistance genes are contributing to the observed antibiotic-resistance differences between each growth medium.

Sun-PM1-C-2

Assessment of an *Eriborus* sp. Parasitoid (Hymenoptera: Ichneumonidae) as a Classical Biocontrol Agent of Box Tree Moth (*Cydalima perspectalis*)

Angela M. Hoover (USDA-APHIS-PPQ-S&T Forest Pest Methods Laboratory, Buzzards Bay, MA), **Connor O'Clair** (University of Massachusetts Amherst, Amherst, MA), Greg Simmons (USDA-APHIS-PPQ-S&T Forest Pest Methods Laboratory, Salinas, California), Hannah Broadley (USDA-APHIS-PPQ-S&T Forest Pest Methods Laboratory, Buzzards Bay, MA), and Christine Dodge (USDA-APHIS-PPQ-S&T Forest Pest Methods Laboratory, Buzzards Bay, MA)

Abstract - *Cydalima perspectalis*, (Box Tree Moth [BTM]), a newly invasive species in the US, was first discovered in New York in 2021 and has since been found in Massachusetts, Michigan, Ohio, Delaware, and Pennsylvania. This moth specializes on the ornamental shrub *Buxus* sp. (boxwood), which is an important broadleaf evergreen in the nursey industry with annual sales totaling $140 million. Larval feeding causes plant declines, and often leads to plant death via severe defoliation and stem girdling. We are currently developing a classical biocontrol program for BTM. Our candidate biocontrol agent is an ichneumonid wasp in the genus *Eriborus* that was collected in South Korea. *Eriborus* sp. is a solitary koinobiont larval parasitoid of BTM and appears to be thelytokous, producing daughters from unmated females. Based on our preliminary host-range testing results, *Eriborus* sp. appears to be at least somewhat specialized, as it has not attacked larvae in 8 non-target families tested; our only attacks thus far have been on a native species in Crambidae, the family to which BTM belongs. Work is ongoing to collect and rear more native non-target crambids to test. We will discuss our findings in the context of release potential for *Eriborus* sp. Future steps for this project include further host specificity testing and paired-choice testing with crambid species.

Sat-PM1-A-3

***Aprostocetus* sp. as an Adventive Biocontrol Agent of Roseau Cane Scale (*Nipponaclerda biwakoensis*)**

Connor O'Clair (UMass Amherst, Amherst MA, USDA Animal and Plant Health Inspection Service, Plant Protection and Quarantine, Buzzards Bay, MA), Mike Martinson (University of Massachusetts Amherst, MA), Jeremy C. Andersen (University of Massachusetts Amherst, MA), Tanner C. Sparks (Louisiana State University, Baton Rouge, LA), Lisa A. Tewksbury (University of Rhode Island, Kingston, RI), Alexandra Johnson (University of Rhode Island, Kingston, RI), Rodrigo Diaz (Louisiana State University, Baton Rouge, LA), Scott A Schneider (USDA, Agricultural Research Service, Beltsville, MD), and Hannah J. Broadley (USDA Animal and Plant Health Inspection Service, Plant Protection and Quarantine, Buzzards Bay, MA)

Abstract - *Nipponaclerda biwakoensis* (Roseau Cane Scale) is an invasive flat grass scale negatively affecting wetlands in the Mississippi River Delta in Louisiana. *Aprostocetus* sp. 7 is a parasitic wasp of Roseau Cane Scale that has recently been detected adventively in the Mississippi River Delta. To evaluate potential non-target effects and estimate the target effects of *Aprostocetus* sp., we are conducting host-range testing on this species. Testing studies are nearly complete, and, to date, no non-target parasitism has been detected including no attack on the closely related species *Aclerda holci.* Meanwhile, *Aprostocetus* sp. has spread across the current invasive range of Roseau Cane Scale and is adding to its population mortality.

Sat-PM1-A-4

Broadening Participation in Community Science: A Case Study with VCE's Adopt-a-Plant Project

Onome Ofoman (Vermont Center for Ecostudies, White River Junction, VT) and Desirée L. Narango (Vermont Center for Ecostudies, White River Junction, VT)

Abstract - Community Science is often celebrated for its ability to inspire local communities to action, influence policy decisions, and increase participant environmental knowledge and skills, all while providing large quantities of data. However, community science often involves a low diversity of participants, which may lead to data that does not adequately represent the population or study area, and an unequal distribution of the aforementioned benefits. To increase participant diversity in new community science programs, strategic and targeted planning should be integrated from the outset. Here, we describe the Adopt-a-Plant project, a new community science program by the Vermont Center for Ecostudies, and our efforts to broaden participation from the project's inception. This presentation will explore our strategies for fostering a more inclusive community science model with a focus on: (1) recruiting participants across diverse locations (rural and urban areas across 3 states) through grassroots methods, (2) recruiting participants previously untargeted by our organization, and (3) reducing barriers to entry through our study design. Specifically, we will provide a comprehensive overview of our project design process, including specific strategies that enabled us to recruit 700 participants from all counties in our study area within a 2-month period. By highlighting lessons learned and future plans from this case study, we hope to foster a deeper conversation about best practices for community science to ensure equitable benefits across all communities.

Sun-AM1-B-3

The Effect of Insects on Soil Microbiota During Mammalian Decomposition

Emma Page (Curry College, Milton, MA), Emily M. Nowicki, PhD (Curry College, Milton, MA), and Samantha J. Sawyer (University of New Haven, West Haven, CT)

Abstract - Microbes are known to impact the rate of decomposition of an organism. Changes in the microbial community occur for numerous reasons, including introduction of microbes from necrophagous flies and other carrion-consuming arthropods, along with changes in the soil chemistry and environmental factors. Previous work in our lab has shown that the microbial community composition in soil below remains changed significantly across the different taphonomic stages of decomposition of mice; however, there have been very few studies conducted that analyze the effect of insects on the microbe population. This research aims to understand if insects impact the soil microbial community below decomposing remains. To do this, we placed 22 deceased mice in a *Pinus rigida* (Pitch Pine)–oak forest in eastern Massachusetts in pairs of 2 with 5 m between sample locations. The mice were all placed on sieved soil from the same location. We placed 1 mouse in each pair in an insect exclusion bag and left the other mouse on the soil so insects could impact the decomposition rate. At various stages of decomposition, we collected soil from control and experimental sites that we used to determine the pH of each sample. After isolating DNA from each soil sample, we performed community amplicon sequencing of the 16S rRNA gene to analyze changes in the microbial community of each soil sample. The results showed that, on average, the pH increased from fresh decay to active decay and from active decay to advanced decay. Analysis of the sequenced DNA from the microbial communities of the soil between insect excluded and included sites is underway. By conducting this research, the microbial environment under decomposing remains can be further examined, which is vital to understanding the impact microbial communities have on decomposing matter in forensic casework. The changes in the microbe biota surrounding decomposing organisms can also aid in determining the postmortem interval.

Sun-PM1-C-1

Algal Oviposition Preferences of the Northern Lacuna Snail (*Lacuna vincta*) on Kent Island

Caitlin Panicker (Bowdoin College, Brunswick, ME) and Patricia Jones (Bowdoin College, Brunswick, ME)

Abstract - *Lacuna vincta* (Northern Lacuna), an intertidal snail native to the north Atlantic Ocean, has been observed laying eggs on *Saccharina latissima* (Sugar Kelp) farms throughout the Gulf of Maine. The distinctive, doughnut-shaped egg masses of Northern Lacuna are difficult to remove from algae and are considered a management problem on kelp farms. Determining whether this snail has an oviposition preference for Sugar Kelp could offer insight into management techniques of Northern Lacuna on kelp farms. However, it is not clear if Northern Lacunas are laying their eggs on Sugar Kelp because the algae is available to them in greater quantities or if they are targeting Sugar Kelp specifically.We looked at the distribution of Northern Lacuna adults and eggs across intertidal transects on Kent Island, NB, Canada and compared the distribution of snails on different algal species. Snails most frequently laid their eggs on Sugar Kelp, *Laminaria digitata* (Horsetail Kelp), and the red algae *Chondrus crispus* (Irish Moss), but this preference is not statistically significant. Northern Lacunas are likely laying their eggs on managed kelp farms because the substrate is becoming more available to them as the industry expands.

Sat-AM1-E-1

Preliminary Evidence of Pulse–Quiescence Dynamics in Old-growth Forests of the Northeastern US

Neil Pederson (Harvard Forest, Harvard University, Petersham, MA), Dave Orwig (Harvard Forest, Harvard University, Petersham, MA), Jackie Matthes (Harvard Forest, Harvard University, Petersham, MA), Dario Martin Benito (Institute of Forest Sciences, Madrid, Spain), Andy Finley (Michigan State University, East Lansing, MI), Malcolm Itter (UMASS Amherst, Amherst, MA), Laura Smith (NOAA, Gloucester, MA), Jillian Dyer (Harvard Forest, Harvard University, Petersham, MA), Erik Danielson (Harvard Forest, Harvard University, Petersham, MA), andZach Hart (Harvard Forest, Harvard University, Petersham, MA)

Abstract - The development of forests in temperate mesic regions like the northeastern US are couched in a dynamic equilibrium at large spatial scales. Predicated on gap dynamics as the primary driver of forest development, asynchronous low-intensity mortality of 1 to a few trees per area in space and time would reduce significant changes in structure and composition across regions. The concept is strong and reasonable, although it is primarily built on short-term observations. Testing with observations that match or go beyond the lifespans of most trees over a broad region is one way to test this theory of forest development. Ecologically based tree-ring networks can provide annually resolved records of forest dynamics for the past 200–500 years to test this theory that can be extended farther back in time with samples from old houses, barns, and other wood artifacts. Our team has embarked on such a project with these types of data that span from north-central Maine to northeastern Ohio and down to central Pennsylvania and the southern tip of New Jersey. An important initial observation is that even the most protected forests appear to be in a state of significant transition due to the impacts of new pests and pathogens. The most complete region of our new tree-ring data is found in the Adirondack State Park. We have found significant changes in growth and forest dynamics coinciding with the introduction of Beech Bark Disease. Preliminary reconstruction of inferred canopy mortality back to the 1600s across this region appears to indicate episodic and seemingly synchronous disturbance events over time. In between these events, we also observed the constant churning of low-level canopy mortality that we would ascribe to be gap dynamics. If these results hold true with our final network, it is likely time to consider that, while these forests might be in a quasi-equilibrium, events and forces at large spatial scales with return intervals well beyond the lifetimes of most human observers can be important in the development of the structure and composition at time scales that matter to trees and forests. A continued increase of new pests and pathogens might make much of this theory irrelevant.

Sat-PM1-C-4

Bees of Long Point Wildlife Refuge

Matthew Pelikan (BiodiversityWorks, Vineyard Haven, MA)

Abstract - Owned and managed by The Trustees of Reservations, Long Point Wildlife Refuge, on the south shore of Martha's Vineyard island, is one of the Vineyard's premiere conservation properties. With its first acreage protected in 1979, the refuge now comprises 256 ha (632 ac) of sandy outwash plain. The Trustees actively manage much of the refuge for early successional habitat: *Quercus ilicifolia* (Scrub Oak) frost bottom, *Pinus rigida* (Pitch Pine)/oak barrens, and sandplain grassland/heathland. Other habitats include oak woodland, brackish pond shoreline, and barrier beach/dune. A major study of Vineyard bees, coordinated by Paul Goldstein and John Ascher in 2010–2011, documented several notable bee species at Long Point, including the *Lyonia* specialists *Colletes productus* and *Melitta melittoides*. Beginning in 2022 and continuing through the 2024 field season, I conducted an observational study of bees at Long Point, focusing on *Lyonia* and Scrub Oak frost bottom (2022–2024) and sandplain grassland/heathland (2024). Surveys documented the persistence of both *C. productus* (found at 2 locations) and *M. melittoides*, along with a wide variety of locally uncommon species (e.g., *C. americanus* and *Andrena kalmiae*). Almost as interesting were species expected but not found, such as the early season blueberry specialist *Andrena bradleyi*, which is fairly common on Martha's Vineyard. With extensive tracts of rare habitats and a dynamic and challenging coastal weather regime, Long Point supports a diverse, distinctive bee fauna and should be considered a site of regional significance for bee conservation.

Sun-AM2-E-3

How Geographic Isolation Affects the Movement and Breeding Ecology of a Declining, Migratory Songbird, The Bobolink

Noah Perlut (University of New England, School of Marine and Environmental Programs, 11 Hills Beach Road, Biddeford, ME) and **Zishi (Violet) Wu** (University of New England, School of Marine and Environmental Programs, 11 Hills Beach Road, Biddeford, ME)

Abstract - *Dolichonyx oryzivorus* (Bobolink) is a grassland-obligate, long-distance migrant songbird, whose populations declined annually by 1.85% and 2.51% in New York (NY) and Vermont (VT), respectively, from 1966 to 2023. These declines were caused by both intensified agricultural practices (early and more frequent haying, use of lethal chemicals) and habitat loss on both the breeding and wintering grounds. Resultingly, smaller populations have seemingly disappeared from isolated habitats in forested regions, generally concentrating remaining birds in landscapes with greater proportions of grass. However, we have no information on how the movement and breeding ecology of remnant or recently established, small, isolated populations differ from well-established, large, connected populations. We studied Bobolink movement ecology on both the Farm Hub in Hurley, NY (small, isolated, newly established), and on Shelburne Farms, VT (large, connected), during the 2021–2024 breeding seasons, deploying and retrieving tracking devices (satellite tags on males and geolocators on both males and females). Reproductive success was near zero in NY and well above replacement in VT. During the breeding season, male home ranges (95% percentile) were significantly larger in VT than NY, but 50% core areas did not differ between sites. NY birds had significantly higher habitat heterogeneity in their breeding home ranges than VT males, but VT home ranges had significantly more grass (50%) than those of NY males (12%). NY males were more likely to make excursions from their breeding home range, with 62.5% exhibiting excursion behavior compared to only 5.6% in VT; in NY, excursions were both more frequent and more distant. Post-breeding and stop-over home ranges were smaller than breeding ranges for VT males but these ranges did not differ for NY males. The geolocator data showed strong connectivity between the 2 populations across their full migration cycle. Our work identified that geographically isolated Bobolinks may have notably lower reproductive success and alter their space use during the breeding season (likely to try to improve reproductive success); however, post-breeding, the differences between the isolated and open populations dissolved.

Sat-PM2-A-2

Next Steps in Wildlands Conservation

Shelby Perry (Northeast Wilderness Trust, Montpellier, VT), Liz Thompson (Wildlands, Woodlands, Farmlands, and Communities, Williston, VT), Robert Zaino (Vermont Fish and Wildlife Department, Montpelier, VT), Brian Hall (Wildlands, Woodlands, Farmlands, and Communities, and GIS Consultant, Gardner, MA)

Abstract - “Wildlands” are future old forests, places that do or soon will provide structure and function that are extremely rare across the Northeast. During this talk, Shelby will provide some preliminary results of the process prioritizing future Wildlands protections and lessons learned along the way. The second half of this time will be a panel discussion with all presenters in the session to answer questions and discuss the tool in more detail.

Sun-AM2-D-4

Diet Analysis of Stranded *Caretta caretta* (Loggerhead Sea Turtle) in New York Waters

Theodora Pinou (Western Connecticut State University (WCSU), Danbury, CT), Hannah Daly (WCSU, Danbury, CT), Hannah Reynolds (WCSU, Danbury, CT), and Kimbery Durham (WCSU, Danbury, CT, and Atlantic Marine Conservation Society, Westhampton Beach, NY)

Abstract - Studying the diet of marine predators, specifically *Caretta caretta* (Loggerhead Sea Turtle), can provide insight into the diversity of benthic communities. Loggerhead Sea Turtles are generalist feeders and have variable diets depending on where they forage. In this study, we identified the prey contents found in the gastrointestinal tracts of 20 stranded Loggerhead Sea Turtles in New York waters and analyzed what factors may have influenced their diet. Using stranding data, we determined that certain prey found in the gastrointestinal tract more commonly occur in bays/harbors, while other prey items are more common on the Atlantic Ocean coast. These pre-predator results add to the limited knowledge available on Loggerhead Sea Turtle diet from in New York waters, and highlights the diverse biodiversity supported by Long Island Sound that needs conservation and management.

Sat-AM1-B-1

Overwinter Survival of Two Populations of Burying Beetle in New York Forests

John A. Pipino (SUNY Cobleskill, Cobleskill, NY), Brandon Quinby (SUNY Cobleskill, Cobleskill, NY), Carmen Greenwood (SUNY Cobleskill, Cobleskill, NY), Elizabeth Bastiaans (SUNY Oneonta, Oneonta, NY), and Daniel Stich (SUNY Oneonta, Oneonta, NY)

Abstract - In the northeastern US, the only extant population of the federally threatened *Nicrophorus americanus* (American Burying Beetle [ABB]) exists on Block Island, RI. Now missing from 90% of its native range, efforts to reintroduce ABB sourced from Block Island back to the continental US would aid in the recovery of the species. One factor relevant to the persistence of ABB is its ability to survive through the winter. Using a sister species of ABB as a surrogate, our study compares the overwinter survival rate of 2 populations of *Nicrophorus orbicollis* (Roundneck Sexton Beetle) in New York; 1 indigenous to the study site and 1 introduced from Block Island. Although we determined that population had a significant ($P < 0.01$) effect on the overwinter survival of Roundneck Sexton Beetle in New York, we propose that the survival rate of the translocated population would support the reintroduction of ABB to New York.

Sat-PM2-E-4

Lawn to Meadow: Managing Private Land for Pollinator Conservation

Samuel Quinn (SUNY ESF Restoration Science Center, Syracuse, NY), Molly Jacobson (SUNY ESF, Syracuse, NY), Elise Calahan (SUNY ESF, Syracuse, NY), and Donald J. Leopold (SUNY ESF, Syracuse, NY)

Abstract - In 2020, SUNY ESF's Restoration Science Center developed a "Lawn to Meadow" program to meet community demand for this restoration guidance and to reduce the cover of lawn where water quality relative to harmful algal blooms was of concern. We have since led the creation of more than 3 dozen meadows at residential properties in Central New York and have advised on meadow establishment efforts over thousands of acres across the US at solar collection sites, utility rights-of-way, and other mixed-use settings. We use novel plant combinations tailored to most benefit pollinators and other beneficial invertebrates, including plants not locally native. We will share some results of this work thus far, including documenting the occurrence of conservation-significant bee species in our restored meadows, and provide practicable recommendations for pollinator conservation measures in suburban and semi-rural landscapes.

Sun-PM1-E-1

Seeing the Green through the Grey: Field-based Ecology Education in New York City

Andy Reinmann (Hunter College, City University of New York [CUNY], CUNY Advanced Science Research Center, New York, NY)

Abstract - Cities are steeped in both obstacles and opportunities for hands-on, field-based modes of ecology education. On one hand, the substantial built environments of cities may limit outlets for an immersive exposure to ecosystems. However, cities also often harbor an array of preserved natural spaces, constructed greenspaces, botanic gardens, and diverse plantings in relatively close proximity to one another, which can be leveraged to create rich leaning experiences. In 2017, I developed the Field Ecology of New York City course for upper-level students at Hunter College, CUNY, in New York City to offer our students with the rare opportunity to take a field-based approach to learning the fundamentals of ecology. In this course, we replace Power Point slides with the diverse constructed, natural, and restored greenspaces across Manhattan, including old-growth forests, as well as the New York Botanical Garden and a weekend field trip to Black Rock Forest (70 km north of NYC) to take a place-based approach to ecology education. During my presentation, I will describe this course and discuss 6 years of successes, lessons learned, and student feedback. I will conclude with thoughts on transferability to other urban locations.

Sat-AM2-C-5

Canary in the Alpine: Shifts in Snowbed Plant Communities Over Time in the Adirondack Mountains of New York

Katie Rhodes (Antioch University, Keene, NH), Tim Howard (NY Natural Heritage Program, Albany, NY), and Peter Palmiotto (Antioch University, Keene, NH)

Abstract - Due to their unique species diversity and vulnerability, alpine snowbed communities have the potential to serve as early detection or "canary" communities that can inform scientific understanding of the timing and physical manifestation of a changing alpine ecosystem. In the summer of 2008, T. Howard established and began studying 15 alpine snowbed vegetation community transects over 5 mountain summits in the Adirondack High Peaks Region. We relocated and surveyed these transects again in the summer of 2024 in order to evaluate temporal changes in snowbed community composition and structure over a 16-year timeline.

Sun-PM1-A-1

Growing Native Plants for Restoration Projects

Linda Rohleder (Wild Woods Restoration Project, Salisbury Mills, NY)

Abstract - Volunteers with the Wild Woods Restoration Project are growing native plants for restoration efforts in local parks across the Hudson Valley. By using local ecotype seeds, they are helping to preserve the region's genetic diversity and restore habitats in these parks. I will explain how the project organizes volunteers to grow plants at home and will discuss the concepts and challenges they face with local ecotype seeds and sustainable growing practices. Since 2022, the project has engaged over 300 volunteers and cultivated tens of thousands of plants. This initiative highlights the powerful impact volunteers can make through collective action.

Sun-PM2-A-3

Determining the Environmental Drivers of Seasonal Surface Activity in *Plethodon cinereus*

Brittany Rojan (Pennsylvania State University, State College, PA), Carli Dinsmore (Pennsylvania State University, State College, PA), Maisie MacKnight (Pennsylvania State University, State College, PA), and David Miller (Pennsylvania State University, State College, PA)

Abstract - It is expected that climate change will affect the earth's ecosystems is numerous ways. Some effects of climate change include a deviation in habitats and behaviors of organisms. As they are reliant on cutaneous respiration and the outside environment to regulate body processes, ectotherms such as amphibians are extremely sensitive to changing temperature and precipitation patterns. Furthermore, the salamander species *Plethodon cinereus* (Red-backed Salamander) is integral to forest ecosystems in the northeastern US and is likely to be susceptible to the effects of climate change. The goal of this study is to determine how an altered climate affects surface activity of Eastern Red-backed Salamanders. Surface activity serves as an indicator of ideal conditions for foraging, migration, and overall survival. At our study site in central Pennsylvania (Millmont, PA), we performed mark–capture–recapture along with PIT tag surveys and environmental-data collection. We combined our recent data with data from previous years to assess temporal changes and stronger correlations involving climate data and behavior. Moreover, relevant studies have shown that there is a relationship between temperature, precipitation, and surface activity of Red-backed Salamanders and other salamanders. We anticipate that our results will reflect strong correlations between environmental conditions and surface activity in addition to differences in activity depending on time of day. Our study can be used to advance further study on estimating species' fitness, climatic effects on niches, and ecosystem health.

Sat-AM2-E-4

Habitat and Growth Stages of the Boreal Species *Clintonia borealis* (Bluebead Lily) in the Southern Appalachians

Irene Rossell (University of North Carolina, Asheville, Asheville, NC) and Jane Jeffrey (University of North Carolina, Asheville, Asheville, NC)

Abstract - *Clintonia borealis* (Bluebead Lily) is a clonal summer-green herb that occurs in Canada and the northern US, as well as high-elevation forests of the southern Appalachians. We inventoried 40 patches (genets) of Bluebead Lily in the Black Mountains in western North Carolina (elevations ≥1650 m). Genets were composed of 3 to 221 ramets (mean = 38). Ramets emerge each spring and gain leaves as they age. At our sites, 72% of ramets had 1 or 2 leaves. Only older ramets with 3 or 4 leaves produced flowers, and although just 4% of ramets were reproductive, 45% of genets contained at least 1 reproductive ramet. *Abies fraseri* (Fraser Fir), which is declining in the southern Appalachians due to the invasive insect *Adelges piceae* (Balsam Woolly Adelgid), was the nearest live overstory tree to 70% of genets. It was also the nearest dead overstory tree to 90% of genets, with results suggesting genets in closer proximity to dead overstory trees had fewer ramets. The continuing decline of Fraser Fir and subsequent thinning of the forest canopy, along with recent catastrophic losses of high-elevation forest trees during Tropical Storm Helene, may have negative impacts on populations of Bluebead Lily in this region.

Sat-AM1-C-1

Characterizing Thermal Microhabitat Selection in a Plethodontid Salamander

Dellen M.M. Roush (Ohio Wesleyan University, Delaware, OH), Alyssa Baxter (Ohio Wesleyan University, Delaware, OH), Ariana Brown (Ohio Wesleyan University, Delaware, OH), Brooklyn Upp (Ohio Wesleyan University, Delaware, OH), Athena Vakaleris (Ohio Wesleyan University, Delaware, OH), William E. Peterman (The Ohio State University, Columbus, OH), Meaghan R. Gade (Association of Fish and Wildlife Agencies, Washington, DC), and Eric J. Gangloff (Ohio Wesleyan University, Delaware, OH)

Abstract - Thermal environments are critical in setting the limits of species distributions for terrestrial ectotherms across broad geographic scales. This phenomenon is evident for Plethodontid salamanders, being lungless, desiccation-vulnerable ectotherms that operate at low metabolic rates. Despite the ubiquitous impact of temperature heterogeneity on physiology and ecology, there are still many open questions regarding salamander thermal biology at a fine scale. We have yet to distinguish how salamanders utilize habitat-level variation in temperature, how this varies across populations, and the impact of thermal-landscape heterogeneity on population dynamics. To address this deficit, we conducted coverboard surveys of *Plethodon cinereus* (Eastern Red-backed Salamander) across 4 arrays, spanning 2 Central Ohio forests. We used infrared thermography to characterize thermal landscapes at an extremely fine scale both within and across arrays. Utilizing data on activity and salamander body temperature, we tested the hypothesis that salamander activity patterns can be predicted by available temperatures. Given that the behavior of Eastern Red-backed Salamanders is highly seasonal, we tested whether thermoregulatory behaviors differ temporally between spring and fall, during which time salamanders increase surface activity and breed. We found no difference in the thermal microenvironment under boards where salamanders were active versus those where they were not, and salamanders did not select for specific temperatures beneath individual boards, suggesting that the Eastern Red-backed Salamander is a thermoconformer and a thermal generalist, when active on the surface. However, multiple salamanders were more likely to co-occur under boards that were cooler compared to boards under which salamanders were observed individually. This result suggests a potential thermal component to social interactions, which likely has implications for breeding and territoriality. These characterizations of Plethodontid thermoregulatory behavior at fine spatial scales provide valuable insights for generating predictions regarding salamander population demography and stability and on the wider effects of anthropogenic environmental change on terrestrial Plethodontid ecology as temperatures and variation continue to increase.

Sat-AM2-E-3

Restoring a Degraded Forested Riparian Buffer

Jess Rubin (University of Vermont and MycoEvolve, Burlington, VT), Carol McGranaghan (Abenaki Artist Association, Orange, VT), Luca Kolba (University of Vermont, Burlington, VT), and Josef H. Görres (University of Vermont, Burlington, VT)

Abstract - This myco-phytoremediation project on unceded Abenaki land evaluates the utility of mycorrhizae and native plant polycultures in phosphorus (P) mitigation, and pollinator habitat improvement, while facilitating Original Peoples' land access and increasing ecoliteracy. This study, building on a completed pilot study, restores a degraded forested riparian buffer. This project involved clearing 6 plots of *Rhamnus cathartica* (Common Buckthorn) and planting assemblages of 42 native, polyculture species that provide food, medicine, and tools for the Abenaki peoples. Three plots were inoculated with endemic mycorrhizae, three plots were uninoculated, and three plots were left as undisturbed control. Data has been gathered over 3 years in P soil, P soil water, P plant uptake, mycorrhizal presence, and plant diversity. This study offers innovative strategies to forested riparian buffer management, which often uses chemicals for nonnative species removal and rarely considers P remediation, pollinator habitat, and Indigenous land access in its design and implementation. While investigating differences in P dynamics between the inoculated, uninoculated and control plots, this study also considers efficacy of mycorrhizal inoculation. From this project's execution and findings, a manual is being written to inform current best management practices for forested riparian buffers. Harvesting fruit and aboveground plant tissue via phytoremediation when maximum P in its tissue before plants senesce offers a valuable socio-ecological service of valuable plant access to Abenaki while simultaneously mitigating excess P. Designing a multi-functional riparian buffer with the Original Peoples of this land and then preparing and installing it through a grassroots community while gathering rigorous scientific data provides a model for reconciliation.

Sun-PM2-E-1

Health and Demographics of Chelonian Species Utilizing Herbicide-Treated Retention Ponds

Audrey M. Sauter (East Stroudsburg University, East Stroudsburg, PA), Nicholas McCarney (Sycamore Park District, Sycamore, IL), and Julianne Jones (Old Dominion University, Norfolk, VA)

Abstract - Sycamore Park District manages 206 ha (509 ac) of fragmented greenspace around the town of Sycamore, IL, an ecologically disturbed suburban area located ~80 km (~50 mi) outside of the city of Chicago. The district employs a third-party contractor to periodically spray gardens and man-made retention ponds with herbicide to prevent algal blooms and weed growth. Locally abundant freshwater wildlife is found on park district property, including 3 common species of turtle: *Chrysemys picta* (Eastern Painted Turtle), *Chelydra serpentina* (Common Snapping Turtle), and *Apalone spinifera* (Spiny Softshell). Chelonians are easy to detect and are sensitive to changes to their habitats, so the Sycamore Park District team investigated the health of their ponds using Chelonians as an indicator species. We conducted mark–recapture surveys on Chelonians in the district from 2020 to 2023, cycling baited turtle traps through treated and untreated ponds weekly (or more frequently as needed) during activity months (April–October). Collected data would ultimately sit unused for over a year after the passing of the principal investigator in 2023, and some data was mistakenly discarded or lost during this time. In this presentation, I will be telling the story of the initial ambitions of this study and discussing the insightful implications offered by the extensive, though incomplete, Chelonian-detection records I managed to recover almost a year after presuming the data lost.

Sat-PM2-B-3

Utilization of Necrophagous Flies in Monitoring Pathogens and Assessing Ecosystem Health

Samantha J. Sawyer (University of New Haven, West Haven, CT), Jarrod Dean Horne (Curry College, Milton, MA), Madelyn Casey (Curry College, Milton, MA), and Taylor Conley (Curry College, Milton, MA), and Antoine Zamy (Curry College, Milton, MA)

Abstract - Necrophagous flies are associated with a variety of materials harboring potential pathogens, including decomposing animals, fecal material, and food waste. Due to this association, necrophagous flies and other filth flies have been implicated in mechanically vectoring a variety of pathogens, including foodborne illnesses (i.e., *Escherichia coli*) and highly virulent pathogens (i.e., *Bacillus anthracis*). Therefore, filth flies are often considered as pest insects, overlooking the potential benefits these flies can provide through ecosystem services and as environmental monitors of pathogens. For example, *Giardia duodenales* and *Cryptosporidium parvum* are 2 zoonotic protozoan parasites that cause gastrointestinal distress and serious disease in young individuals and the immunocompromised. However, majority of infected individuals are asymptomatic, allowing the pathogen to spread discreetly through populations. Both pathogens persist in fecal infected water and soil as cysts and oocysts respectively. Filth flies have been documented to carry *Giardia* cysts and *Cryptosporidium* oocysts on their cuticle and within their gut, creating a positive association between flies and these infected materials. While the pathogen load in these flies are not infectious doses, they are not insignificant, making them potentially useful tools in assessing if an environment has either pathogen. The purpose of this presentation is to discuss how flies can be utilized in place of traditional testing mediums (i. e., animal scat) to detect and locate where pathogens such as *Giardia* and *Cryptosporidium* exist within ecosystems. To do this, a series of experiments included validating the use of insects in lateral-flow immunosorbent assays designed for fecal material, field sampling, and testing of flies in a recreationally used wetland on Curry College's campus to compare with scat samples in the same approximate geolocation. The effectiveness of utilizing flies as monitors for *Giardia* and *Cryptosporidium* will be discussed along with using flies as monitors in other systems.

Sun-PM1-C-3

Long, Short, and Least: Identification of Northeastern North American Weasels from Photographs

Matthew D. Schlesinger (New York Natural Heritage Program, SUNY ESF, Albany NY) and John P. Vanek (New York Natural Heritage Program, SUNY ESF, Albany NY)

Abstract - Correct species identification is foundational to biodiversity science, conservation, and management. Three North American species of weasels (Mustelidae: Mustelinae) often confused for one another are in decline from persecution, land-use modification, and climate change and are in need of further inventory and monitoring. Camera-trapping has become a standard method for surveying carnivores and is among the best methods for detecting weasels. Often, however, cameras are deployed to maximize detection of larger species and are too far from bait to allow easy identification of smaller mammals. Additionally, online photographic repositories like iNaturalist have become invaluable for occurrence records to fill gaps in systematic surveys, but observations can get incorporated into global biodiversity datasets without vetting from experts. Here we present a key for weasel ID from photographs, based on geography, absolute or relative measurements, and pelage color. Identification confidence is affected by date and time, distance to subject, presence of a measurement scale, and weasel position. We tested our key using 2 photo sets: a winter camera-trap study in New York's Southern Tier targeting *Pekania pennanti* (Fisher) and iNaturalist observations from New York. In the camera-trap study, weasels in 26% of events could not be identified to species, and *Neogale frenata* (Long-tailed Weasel) were 10 times as frequently detected as *Mustela richardsonii* (Short-tailed Weasel). No *M. nivalis* (Least Weasel) were detected. For iNaturalist observations, we came to the same conclusion as the iNaturalist community consensus just 47% of the time. We agreed that 64% of Long-tailed Weasels and only 26% of Short-tailed Weasels were correctly identified, and that many observations (66%) should have been labeled simply as Mustelinae due to a lack of visible distinguishing characteristics. We provide examples of some challenges in identification and discuss some likely reasons for misidentification by both amateurs and professionals. We recommend the inclusion of scale bars in traditional camera-trapping and bucket cameras to improve the success rate of weasel identification from photographs. Further, community scientists and amateur photographers will ensure their images can provide accurate occurrence records if multiple views of the animals, particularly of the tail, are posted to online repositories.

Sun-AM1-C-1

Northern Diamondback Terrapin (*Malaclemys terrapin terrapin*) Nest Habitat Assessment in Connecticut

J. Henry Schwendler (Western Connecticut State University, Danbury CT) and Theodora Pinou (Western Connecticut State University, Danbury, CT)

Abstract - *Malaclemys terrapin terrapin* (Northern Diamondback Terrapin [DBT]) is a keystone species within estuary habitats and responsible for maintaining the saltmarsh ecosystem. This study is the first to characterize DBT nesting habitat in Connecticut. We sampled 5 sites with known DBT populations between May and August of 2024. Sampling locations included 2 restored, 2 unmanaged, and 1 managed site. We documented through GPS and photography (from a height of 2m) any DBT nest found along the transect. We recorded vegetation height, plant species diversity, and substrate size in a 1-m^2 square area centered on each nest. We used a soil thermometer to record substrate temperature. And determined % vegetation cover using the 'Canopeo' app. A total of 518 nests were documented. This study suggests a non-random distribution of nests at each sampling site ($P < 0.01$), with certain areas along each transect having a greater density of nests. Vegetation cover and vegetation height may explain the observed DBT nest distribution.

Sat-AM2-B-1

Implications of Chloride Concentrations in the Major Tributaries of the Merrimack Watershed During the Drought of 2024

Peter W. Severance (RiverMerrimack, North Chelmsford, MA)

Abstract - Anthropogenic salinization of inland waters is posing an increasing danger to freshwater organisms throughout the northeastern US, primarily due increasing application of chemical deicers (primarily NaCl) in winter (the "salting season"), and an ever-increasing conversion of natural land cover to impervious surfaces. During the salting season, surface waters show strong peaks and troughs in electrical conductivity which reflect (a) high seasonal chloride concentration in stormwater runoff from the application of salt and the melting of snow piles and (b) low concentrations due to dilution of the runoff with rain events. However, conductivity in the non-salting season has also been found to be dangerously high; a watershed's groundwater is a persistent and increasing reservoir of Cl^- that feeds our streams year-round. This reservoir increases over time due to the 60–90% retention of Cl^- in the watershed from salt applied during the salting season. During the non-salting season, Cl^- concentrations are at their highest during periods of low flows and drought. Specific conductivity, as a surrogate for Cl^-, was the focus of a synoptic survey of 17 of the 20 major tributaries of the Merrimack Watershed (MA–NH) between 19 and 20 November 2024, just before the end of the 2024 drought. Due to the extent of this drought, these data should largely reflect the concentrations of Cl^- in the baseflow of the tributary watersheds. I will discuss these results in terms of river flow, total impervious surface and road density in the tributary watersheds, prior studies from the region, the current US and Canadian guidelines for chloride, and some of the current toxicological information as it applies to the ecology of the migratory fish and other organisms of the Merrimack Watershed.

Sat-PM2-D-1

Five Years of Small-Mammal Detections Across New York State

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Abstract - Since 2019, the New York State Department of Environmental Conservation and SUNY College of Environmental Science and Forestry have been conducting the first coordinated assessment of the status and distribution of all terrestrial and freshwater mammal species in the state. Of 73 target species recently or historically recorded in New York, we put special focus towards 35 species of small mammals for which information on status is lacking or out of date. Considerable effort has been extended to detect these species using a variety of methods such as live trapping (Sherman traps, $n = 7498$ traps set across the state), pitfall traps ($n = 3138$), snap trapping ($n = 447$), environmental DNA (eDNA) analysis ($n = 308$ seed traps), and trail cameras deployed in buckets within an AhDRIFT setup ($n = 11$) or otherwise ($n = 306$ cameras). Live, pitfall, and snap traps were deployed predominantly on state-owned land while eDNA traps, bucket cameras, and AhDRIFT arrays targeted particularly rocky or wet habitats in 2023 and 2024 to pick up species under-sampled in our other surveys. Between 2019 and 2024, we captured 4195 small mammals and identified them to species using a combination of field examination, lab examination of voucher specimens, and genetic sequencing of collected tissue. Captures were dominated by *Peromyscus* sp.($n = 3460$ captures), followed by shrews (*Sorex* sp. and *Blarina brevicauda* [Northern Short-tailed Shrew]; $n = 394$). A few rare species were detected including *Clethrionomys gapperi* (Southern Red-Backed Vole; $n = 53$), *Sorex hoyi* (American Pygmy Shrew; $n = 2$), and *Synaptomys cooperi* (Southern Bog Lemming; $n = 1$). We are currently in the process of identifying species detected in >1 million photos taken from bucket and AhDRIFT cameras, and sequencing environmental DNA samples, with plans to produce maps of statewide occurrence of all target species by spring 2026. We plan to compare more-invasive, high-field-effort methods (live and lethal trapping) to less-invasive, lower-field-effort methods (eDNA, bucket, and AhDRIFT traps) based on total cost, total time (including eDNA sequencing and photo tagging), and ability to capture a variety of species. We also plan to compare the ability of eDNA versus bucket and AhDRIFT traps to capture rare species.

Sun-AM2-C-2

The Role of Higher Education in Native Plant Amplification: A Case Study from Vassar College

Ethan Skuches (Vassar College, Poughkeepsie, NY), Jennifer Rubbo (Vassar College, Poughkeepsie, NY), and Keri VanCamp (Vassar College, Poughkeepsie, NY)

Abstract - Higher-education institutions, with their access to unique funding and staffing sources, can play a pivotal role in strengthening supply chains for native plant material. While native seed may be available through commercial sources, access to ecotypic seed is limited on local and regional scales.Vassar College's Native Plant Propagation Program uses an innovative, college-scale approach to address ecotypic supply constraints for native plant materials. Since its establishment in September of 2023, more than 400 seed accessions have been catalogued representing 178 species across 118 genera collected both on Vassar property and at partner sites. Through student and community engagement, Vassar is working in the sourcing, amplification, and dissemination of native plant materials in the Hudson Valley region. Students are engaged in the work from collecting, cleaning, sowing, and distributing the seed. Once collected, the seed is used in various ways: foundation plot establishment, campus pollinator gardens, campus restoration efforts, and external work as well. Through partnerships formed with local schools and community organizations, plugs are distributed each spring for use in pollinator gardens and restoration projects throughout the region. Programs like this help to educate our students about seed literacy and the importance of locally sourced seeds, while also engaging meaningfully with the community and environment that surrounds the College.

Sun-PM2-A-2

Ecology and Case Details of Parasitic Flies and Their Host, Eastern Box Turtles from Barnstable County, MA

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Abstract - Cases of myiasis in turtles and tortoises caused by larviparous Sarcophagid flesh flies have been reported for ~140 years. Most of these reports are likely an obligate turtle parasite, *Dexosarcophaga cistudinis*. Myiasis associated with *D. cistudinis*, has been reported from the Northeast, Southeast, Midwest, and Southwest. Across the Northeast, *D. cistudinis*, myiasis have been reported from Cape Cod and Middleboro (Massachusetts), Windsor (Connecticut), Long Island (New York), and Plainfield (New Jersey). We documented myiasis in a population of *Terrapene carolina* (Eastern Box Turtle) from Barnstable County, MA, while conducting radio-telemetry associated with construction along a 16.9-km (10.5-mi) utility right-of way and adjacent mixed *Pinus rigida* (Pitch Pine)–*Quercus* (oak) woodland. The locations of myiatic swellings around the neck, in the nuchal region, and/or immediately anterior to hind legs in the turtles we found were consistent with those reported in literature, and the number of extracted larvae from a single animal were similar to what has been described by others. We collected maggots from 2 box turtles and reared several flies from larvae to pupae and through metamorphosis and identified all as flesh flies (Sarcophagidae). Under room temperature, development of late-stage maggots to imago took 36 days. In total between 2021 and 2024, we encountered 24 maggot-infested individuals out of 130 Eastern Box Turtles. Our sampling area changed little over years, but the level of effort was not equal between years. Still, the percentage of maggot-infested individuals varied between years: with 9 (14.75%) out of 61 found to be infested between late 2021 and 2022, eight (10.5%) out of 76 in 2023, and 4 (4.4%) out of 90 in 2024. In 2023, four (33.3%) of box turtles diagnosed with myiasis were found to be cachexic and also diagnosed with gut protozoan overload. Recurrent infestations followed treatments, and complete resolution were documented in 5 (20%) individuals. Based on our data, the probability of no recurrence = 0.875, of single recurrence within the same season = 0.167, of 2 recurrences in the same season = 0.042, and of recurrence in the following season = 0.042. On 4 occasions, fully formed maggots were observed in turtles shortly after emergence from overwintering in late April. In another 4 occasions, fully formed maggots were observed in turtles shortly before overwintering in late October and November, suggesting a possibility of *D. cistudinis* maggots overwintering in turtles while in their subsurface burrows. Three mortalities (12.5%) were likely associated with concurrent health issues, which probably contributed to diminished body condition.

Sun-PM1-D-3

Eastern Box Turtle Reproduction at their Northern Range Limit

Anna Sorgie (Zoo New England, Boston, MA)

Abstract - Since 2017, Zoo New England field staff have monitored *Terrapene carolina* (Eastern Box Turtle) at the northern limit of its range in Massachusetts, and in 2020 expanded the geographic scope of our work across the New Hampshire border, where the species is considered endangered and little is known about its population distribution and local ecology. Over the course of our work, we have observed several novel phenomena in Box Turtle reproductive ecology. Notably, we documented 2 instances of double clutching, with both clutches yielding live hatchlings—a reproductive strategy not widely documented in this species this far north. We have also identified trends in nesting conditions and behaviors, including habitat selection. We found that Box Turtles readily incorporate newly established areas into their home ranges, as demonstrated by their use of nesting habitat within a solar farm. These findings are consistent with other studies and suggest a degree of behavioral flexibility that may enable the species' persistence in changing landscapes or demonstrate likelihood of successful outcomes in conservation land management for the species. Given the limited number of studies at the northern range limit for this species, our research comprises much of what is currently known about Eastern Box Turtle reproductive ecology and habitat use in this region. Our aim is to leverage these insights to foster a better scientific understanding of how Eastern Box Turtles adapt to marginal environments and to stimulate further discussion on conservation strategies for this sensitive species.

Sat-AM1-B-2

Suburban Forests Buffer Effects of Blow Fly Ectoparasitism on Wood Thrushes (*Hylocichla mustelina*)

Katherine (Kit) Straley (Organismic and Evolutionary Biology Graduate Program, UMass Amherst, Amherst, MA), Paige Warren (Department of Environmental Conservation, UMass Amherst, Amherst, MA), and David King (USDA Forest Service Northern Research Station, Amherst, MA)

Abstract - Humans are shifting wildlife-community dynamics through urbanization and habitat fragmentation. Urbanization influences species interactions, including those of hosts and their parasites. In birds, ectoparasites can decrease nestling health by reducing mass and/or inducing immune responses, and they may even influence health and reproduction in subsequent years. Ectoparasites such as *Protocalliphora* (hematophagous blow flies) are introduced to nests via adult flies laying eggs into nest materials. Higher densities of bird territories, which have been documented in fragmented habitats, may lead to increased incidents of ectoparasitism by providing blow flies with more clustered nesting resources. *Hylocichla mustelina* (Wood Thrush), a declining species, nests in both fragmented suburban and contiguous rural forests in Massachusetts. We compared ectoparasite loads on Wood Thrush nestlings from suburban forest fragments and a larger more contiguous forest to determine (a) whether suburban birds experience more ectoparasitism and (b) if ectoparasite loads are affecting nestling health. We predicted that suburban nestlings would experience higher loads than their rural counterparts, and that more parasitized nestlings in both habitats would be smaller in body size. Preliminary analyses indicate that suburban nestling body condition was not affected by the presence of blow flies, while rural nestlings experienced a decrease in body condition when parasitized. These results indicates that suburban habitats may provide a greater abundance of and/or higher-quality resources that buffer parasitized nestlings against the effects of bird blow flies. Further study that examines the availability of food resources and provisioning by adults in suburban forests could clarify mechanisms through which parasitized nestlings are able to maintain body condition.

Sun-PM2-C-4

The NEON Spatial Design: Linking Local Measurements to Site-level and Continental-scale Questions about Ecological Change

Rachel Swanson (National Ecological Observatory Network, South Hadley, MA) and Callie Puntenney (National Ecological Observatory Network, Boulder, CO)

Abstract - This presentation will give an overview of the US National Science Foundation's National Ecological Observatory Network (NEON), which operates sites strategically located in the US, including Alaska, Hawaii, and Puerto Rico. NEON's 47 field sites and 34 freshwater aquatic sites are distributed throughout 20 statistically derived, ecoclimatic domains that represent distinct regions of vegetation, landforms, and ecosystem dynamics. Sites were nominated by the ecological community and selected to capture ecological variability across the US for long-term sampling. Sites are spatially designed to collect co-located sensor and observational data that can further be leveraged by NEON's airborne and existing satellite data. When possible, terrestrial and aquatic sites are co-located to increase linkages between the different ecosystems. While sites sizes and land-cover heterogeneity vary dramatically across the network, a standardized spatial design was used to ensure consistency and facilitate scaling and combining datasets across the US. Aquatic observational and instrumental sampling takes place in and adjacent to water bodies and across multiple habitat types including lakes, rivers, streams, pools, riffles, and runs. Each terrestrial site includes 1 instrumented tower, ideally in the dominate land-cover type. Terrestrial observational sampling locations are either grouped within the land surface that is the source of the tower's flux data or distributed across the site boundary following a spatially balanced, random stratified sampling design. Within the Northeast domain, NEON samples at 2 terrestrial sites (Harvard Forest and Quabbin Watershed, and Bartlett Experimental Forest) and 1 aquatic stream site (Lower Hop Brook). All 3 sites have a current and rich history of environmental data collection which provides opportunities to create even larger datasets to further ecological studies.

Sun-PM2-D-2

Ophidiomycosis and Concurrent Infections in Wild Snakes: Case Studies from Massachusetts

Tigran Tadevosyan (Oxbow Associates Inc., Boxborough, MA), Brian Butler (Oxbow Associates, Boxborough, MA), Scott Smyers (Oxbow Associates Inc., Boxborough, MA), Gregory Mertz (New England Wildlife Center, Weymouth, MA), Robert Adamsky (New England Wildlife Center, Weymouth, MA), Lisa Trout (New England Wildlife Center, Weymouth, MA), Tess Gannaway (New England Wildlife Center, Weymouth, MA), Kerry Batchhelder (New England Wildlife Center, Weymouth, MA), Dominic Kemmett (Oxbow Associates Inc., Boxborough, MA), Spencer Campbell (Oxbow Associates Inc., Boxborough, MA), James Condon (Oxbow Associates Inc., Boxborough, MA), Thomas Palmer (Oxbow Associates Inc., Boxborough, MA), Joe Martinez (Oxbow Associates Inc., Boxborough, MA), and Michael Jones (Massachusetts Division of Fisheries and Wildlife, Westborough, MA)

Abstract - We summarize case series of vertical transmission of the fungal pathogen *Ophidiomyces ophiodiicola* in Massachusetts specimens of *Lampropeltis triangulum* (Eastern Milksnake), prevalence of lesions in wild populations of *Agkistrodon contortrix* (Eastern Copperhead) and *Crotalus horridus* (Timber Rattlesnake), and lessons learned from diagnostics and clinical management of snakes from Massachusetts between 2022 and 2024. During spring emergence, we captured and examined 78 specimens of Timber Rattlesnakes ($n = 78$: females = 49, males = 29; adults = 32 adults, juveniles = 46) and Eastern Copperheads ($n = 128$, females = 77; males = 46; unsexed juveniles = 5; adults = 92, juveniles = 36). Lesions were observed in 31 (39.7%) rattlesnakes and 16 (12.5%) copperheads. As defined by logistic regression the probability of having lesions in Timber Rattlesnakes were not affected by sex or age, but was significantly ($P < 0.01$) higher in 2024 as compared with 2022 and 2023. In Eastern Copperheads, probability of lesions was higher in males ($P = 0.01$), but was not affected by age or year. Average body condition index (BCI) as estimated from snout–vent measurements obtained using a squeeze box, in Timber Rattlesnakes and Eastern Copperheads with lesions was not significantly lower than in snakes without lesions (Timber Rattlesnake: $P = 0.258$, Eastern Copperhead: $P = 0.082$), but BCI was somewhat correlated with lesion scores in Timber Rattlesnakes ($P = 0.49$, $P = 0.005$), but not in Eastern Copperheads:($P = 0.04$, $P = 0.87$). We hypothesize that low prevalence in smaller species (Eastern Copperhead) may be a consequence of higher mortality, rather than differences in infection rates between these 2 species.

Sun-PM1-D-2

An Energetic Model of Biparental Care in Leach's Storm-Petrels

Liam U. Taylor (Bowdoin College, Brunswick, ME), Patricia L. Jones (Bowdoin College, Brunswick, ME), Mark F. Haussmann (Bucknell University, Lewisburg, PA), and Robert A. Mauck (Kenyon College, Gambier, OH)

Abstract - For organisms with biparental care, reproductive success depends on not only the energetic investments of individual parents, but also how those investments are scheduled between parents. We present an energetic model for *Hydrobates leucorhous* (Leach's Storm-Petrel), a seabird with an extreme form of obligate biparental care. Using agent-based computer simulations, the model investigates links between parental care schedules, hatching success, and parent body condition. We parameterized the model using physiological and environmental data from north Atlantic populations, with a focus on the ongoing degradation of marine ecosystems. Our flexible model highlights 2 key results: (1) storm-petrels can follow simple energetic rules to successfully coordinate their parental care schedules, but (2) these schedules may irreversibly collapse if faced with additional energetic stress from degrading marine environments.

Sat-PM1-D-3

Wood Turtle Habitat Use and Agricultural Mortality at a Farm Landscape in Eastern New York

Jason Tesauro (Jason Tesauro Consulting, Pillipsburg, NJ), Kathryn Natale (Hudsonia, Annandale, NY), and Erik Kiviat (Hudsonia, Annandale, NY)

Abstract - *Glyptemys insculpta* (Wood Turtle) is a semi-aquatic freshwater turtle associated with rivers in rural landscapes of the Northeast, Mid-Atlantic, and Upper Midwest regions of the US and southern Canada. It is currently under review by the US Fish and Wildlife Service for protection under the Endangered Species Act, citing habitat loss, road mortality, nest predation, and illegal collection as major causes of its decline. Substantial portions of the Wood Turtle's range overlap with agriculture. Agricultural landscapes can be productive for turtles in general, providing sunny, non-forested habitats conducive for thermoregulation, nesting, and egg incubation. Because Wood Turtles are primarily terrestrial during the summer months, they are more vulnerable to encounters with farm machinery than other turtles. The Hudson Valley Farm Hub (HVHF), a 650-ha (1600-ac) organic farm and non-profit educational and research center for regenerative agriculture, occurs within a broad river valley known to support Wood Turtles. To understand how Wood Turtles interact with ongoing farming practices and assist the HVFH with reducing on-farm Wood Turtle mortality, we annually radio-tracked between 10 and 12 Wood Turtles during April–October for 4 years (2019–2022). Radio-tracking documented farm-related mortality of Wood Turtles, which was mostly associated with the use of a roller-crimper tractor implement on cover crops planted in organic legume and maize fields. In places where there were larger areas of the favored terrestrial forb–shrub thicket between stream channel and cropfields, the turtles were less likely to move into hazardous cultivated areas. Turtles were more likely to move into those hazardous areas during nesting forays, when summer temperatures were high, during periods of high streamflow, and when crossing cropfields from overwintering habitats to active-season habitats. We are currently working with the farmers at HVFH to develop solutions to reduce farm-related risks, including establishing buffers along cropfields that border the river, retiring portions of fields used as travel corridors during nesting migrations, and converting high turtle-use cropfields to agroforestry, which requires less farm machinery.

Sat-AM2-A-5

Deer Trails Do Not Produce Aboveground Droppers in *Erythronium americanum* (Liliaceae)

Jack T. Tessier (SUNY Delhi, Delhi, NY)

Abstract - Forests are important ecosystems for biodiversity, fiber production, and carbon sequestration. Within these forests, trails are created by both humans and other mammals that facilitate movement along functional routes. These trails have impacts, including the induction of aboveground droppers (which are normally subterranean structures) in *Erythronium americanum* (Trout Lily) by human trails. The goal of this study was to determine if such aboveground droppers were induced by deer trails. I measured the ratio of the number of leaves to the number of aboveground droppers along with soil compaction within deer trails and the space adjacent to deer trails in a second-growth hardwood forest. There was no significant difference in the production of aboveground droppers nor soil compaction between deer trails and adjacent areas. Therefore, deer trails do not have the impact on droppers of *E. americanum* that human trails have.

Sat-AM1-C-2

Phylogenomic Methods Reveal Ancient Hybridization in North American Royal Ferns

Weston Testo (University of Vermont, Burlington, VT) and Cy Stavros (University of Vermont, Burlington, VT)

Abstract - Hybridization has been shown to drive speciation in many evolutionary lineages, especially amongst certain groups of plants, such as ferns. While most hybrids are derived from mating events between closely related species, some exceptional cases of hybridization between deeply divergent lineages (up to ~60 MY) are known. Using samples obtained from herbarium specimens, we provide genomic evidence for natural hybridization between 2 genera of royal ferns (Osmundaceae) from eastern North America. As the deepest hybridization event known in plants or animals, this finding provides a new upper bound for the amount of time that can pass before reproductive barriers develop and poses questions about reproductive isolation in ferns and other seed-free plants. This work also highlights the role that herbaria play in supporting evolutionary studies in the genomics age.

Sun-AM1-A-2

Wildlands in New England: Past, Present, and Future

Liz Thompson (Wildlands, Woodlands, Farmlands, and Communities, Williston, VT), Shelby Perry (Northeast Wilderness Trust, Montpelier, VT), Robert Zaino (Vermont Fish and Wildlife Department, Montpelier, VT), and Brian Hall (Wildlands, Woodlands, Farmlands, and Communities, and GIS Consultant, Gardner, MA)

Abstract - "Wildlands" are places where natural ecological processes prevail—where nature is in charge. Wildlands, and their old-growth forests, once dominated the region, but they are extremely rare today. This session will address the importance of Wildlands, and how they fit into an integrated vision of conservation that calls for protection of Wildlands, actively managed forestlands, and working farmlands. "Wildlands in New England: Past, Present, and Future" is a 2022 report that provides the background on wildlands and offers detail on the current status of wildlands protection in the region. Attendees will learn about the values of Wildlands and old-growth forests, and will be inspired to join in protecting them.

Sun-AM2-D-1

A Fatal Reflection: Monitoring Bird–Window Collisions at UMass Amherst

Mark Titus (Department of Environmental Conservation, University of Massachusetts Amherst, Amherst, MA), Monica Mestre (Department of Environmental Conservation, University of Massachusetts Amherst, Amherst, MA), Rosalyn E. Bathrick (Organismic and Evolutionary Biology Program, University of Massachusetts Amherst, Amherst, MA), Feipeng Huang (Department of Environmental Conservation, University of Massachusetts Amherst, Amherst, MA), Nathan R. Senner (Department of Environmental Conservation, University of Massachusetts Amherst, Amherst, MA, and Massachusetts Audubon Society, Lincoln, MA), Margaret Vickery (Department of Art History, University of Massachusetts Amherst, Amherst, MA), and Kelly Klingler (Fisheries and Wildlife Sciences Program, Paul Smith's College, Paul Smiths, NY)

Abstract - As the populations of many bird species rapidly decline, pinpointing the causes of mortality throughout species' annual cycles has become imperative. In this context, there has been an emerging recognition that deadly collisions with windows and buildings represent a widespread problem for the populations of many bird species around the world. In North America alone, up to 1 billion birds are estimated to die as a result of collisions each year. Combating the issue requires documenting its severity at multiple spatial scales, ranging from individual buildings to entire cities. Over 2 years, we carried out daily surveys for birds killed by window collisions around 3 quadrants comprising 23 buildings on the University of Massachusetts Amherst campus. We also solicited input from the broader community about collisions that occurred outside these 3 quadrants by developing an online reporting form. In the process, we documented the most deadly individual windows, buildings, and quadrants, as well as the landscape characteristics of the campus across these 3 spatial scales. We documented 184 deadly window collisions involving 46 different species. Eight buildings caused more than half of all mortality events and, within these buildings, most mortality events were concentrated at 1 or a few windows. Ultimately, our results reinforce those of other recent studies and call attention to the landscape context of window collisions. They also helpfully point to mitigation efforts that can be targeted in their scope, which we are now pursuing through community engagement programs, such as a bird-safe window-covering design competition.

Sat-AM1-D-1

Metacercarial Cyst Presence from Digenetic Trematodes on Teleost Species in the Genesee River Watershed

William Tormey (Houghton University, Houghton, NY) and Eli Knapp (Houghton University, Houghton, NY)

Abstract - The research conducted attempts to serve as the first investigation into digenetic trematode presence in the Genesee River Watershed. We collected fish samples using minnow traps in 2 distinct secondary tributaries connected to the Genesee River. We assessed all collected organisms for metacercarial cyst formation, otherwise known as black-spot disease, on the epidermal layer of the individuals. Formation of cysts is a distinct indication of trematode activity in the form of free-swimming cercariae. In total, over 1000 individuals were captured and assessed for metacercarial cyst presence in both collection sites. As a result, over 10 distinct fish species were observed with at least 1 instance of black-spot presence. Species included, but were not limited to *Lepomis macrochirus* (Bluegill), *Lepomis cyanellus* (Green Sunfish), *Campostoma anomalum* (Central Stoneroller), *Rhinichthys atratulus* (Blacknose Dace), *Etheostoma caeruleum* (Rainbow Darter), and *Etheostoma blennioides* (Greenside Darter). We suggest that the likely trematode candidate for a majority of the observed cysts is *Uvulifer ambloplitis* as *Helisoma trivolvis* (Marsh-Ramshorn Snail) and *Megarcyle alcyon* (Belted Kingfisher) were present at the collection sites and these 2 species serve as intermediate and definitive host organisms for the aquatic parasite. Based on the results of the assessments of collected fish, we suggest that specific families are infested with metacercarial cysts at a higher rate than others due to the specific area they typically reside within the tributaries.

Sat-PM2-D-2

Changing Soils, Changing Diets: The Impact of Warming on Salamander Diets

Sophia A. Trent (Susquehanna University, Selinsgrove, PA), Tanya Matlaga (Susquehanna University, Selinsgrove, PA), and Nicole Armstrong (Susquehanna University, Selinsgrove, PA)

Abstract - *Plethodon cinereus* (Eastern Red-backed Salamander) is an abundant mesopredator found across North American forests. The species has a generalist diet and consumes a wide variety of invertebrates as prey. Little is known about how climate change may alter the diets of this species; by altering the average temperatures and soil moisture levels, the availability and abundance of invertebrates may change. Using stomach flushing to observe the stomach contents of individual salamanders, we demonstrate that diet varies by soil moisture and temperature. We suggest that climate change, particularly through increased drought and aridity, may decrease the variety and abundance of invertebrate prey available for salamanders.

Sat-PM1-E-5

The Snake That Loved People

Tom Tyning (Berkshire Community College, Pittsfield, MA)

Abstract - As part of an ongoing conservation project on populations of the endangered Timber Rattlesnake in Western Massachusetts, a small group of people have been radio-tracking free-ranging animals as well as helping homeowners understand how to deal with them. For decades, people who live in areas with wide-ranging animals have been able to contact state and local agencies who provide accurate information. In some cases, with respect to rare species, moving individual animals away from unsafe locations is a successful conservation strategy. This presentation outlines some of the work that is continuing but highlights 1 animal that defied logic. Found next to a building it was a new individual from a Berkshire population. All the pertinent physical data was collected, a microchip inserted, and it was then released up and away from its discovery site. This is a common procedure that has kept some snakes from being killed outright. However, the next several weeks, this snake had ideas different from any other snake in the region, or even the continent. What it did and how we explain its actions are highlighted but we are still scratching our collective heads to understand what and how.

Sat-PM2-B-4

Bright and Loud: Sensory Pollutants Affect Bird Fitness

Luke P. Tyrrell (SUNY Plattsburgh, Plattsburgh, NY)

Abstract - Expansion of anthropogenic noise and night lighting across our planet is of increasing conservation concern. Despite growing knowledge of physiological and behavioral responses to these stimuli from single-species and local-scale studies, whether these pollutants affect fitness is less clear, as is how and why species vary in their sensitivity to these anthropic stressors. Here I leveraged a large citizen science dataset paired with high-resolution noise and light data from across the contiguous US to assess how these stimuli affect reproductive success in 142 bird species. I found responses to both sensory pollutants linked to the functional traits and habitat affiliations of species. For example, overall nest success was negatively correlated with noise among birds in closed environments. Species-specific changes in reproductive timing and hatching success in response to noise exposure were explained by vocalization frequency, nesting location, and diet. Additionally, increased light-gathering ability of species' eyes was associated with stronger advancements in reproductive timing in response to light exposure, potentially creating phenological mismatches. Unexpectedly, better light-gathering ability was linked to reduced clutch failure and increased overall nest success in response to light exposure, raising important questions about how responses to sensory pollutants counteract or exacerbate responses to other aspects of global change, such as climate warming. These findings demonstrate that anthropogenic noise and light can substantially affect breeding-bird phenology and fitness, and underscore the need to consider sensory pollutants alongside traditional dimensions of the environment that typically inform biodiversity conservation.

Sat-AM1-D-2

The Human–Ecological Tenure of Land: A Biological Inventory of College of the Atlantic's Open Spaces

Lucian Vazquez (College of the Atlantic. Bar Harbor, ME)

Abstract - College of the Atlantic, a small college devoted to sustainability and human ecology in Downeast Maine, holds more than 142 ha (350 ac) of regional open space, including farms, field stations, and wild forests. This project aims to examine and understand those spaces in the context of regional conservation and land management, and as a crucial part of College of the Atlantic's experiential education and vision of human ecology, wherein the tight relationship between people, their activities, and their environment are constantly recognized and scrutinized. Through the spring–summer 2024 field season, I surveyed and mapped the properties for their unique biological properties, including vernal pools, wetland features and vegetation communities, and began a comprehensive review to catalogue and describe the college's use of these spaces.

Sat-PM2-C-1

Fall Activity Patterns of Bats at New Hampshire Hibernacula

Jacques Pierre Veilleux (Franklin Pierce University, Rindge, NH)

Abstract - White-nose Syndrome (WNS) is a wildlife disease that has caused dramatic declines in many North American bat species. First detected in New Hampshire during the winter of 2008/2009, WNS has led to a >99% loss of the state’s hibernating bat population. The goal of this research was to initiate a long-term acoustic-monitoring program to determine fall activity patterns of bats at the state’s hibernacula. I placed acoustic detectors (Song Meter Mini Bat) at or near the entrances to the 6 main historic hibernacula located in Coos and Grafton counties. Detectors were operational from 30 min prior to sunset to 30 min after sunrise and from 1 September through 30 November 2024. I analyzed acoustic files with Kaleidoscope Pro software and manually vetted a subset of files. A total of 5346 bat calls was recorded. Each of the 8 species occurring in New Hampshire were documented via software analysis. In order of decreasing abundance, these were the *Myotis lucifugus* (Little Brown Bat), *Lasiurus cinereus* (Hoary Bat), *Eptesicus fuscus* (Big Brown Bat)/*Lasionycteris noctivagans* (Silver-Haired Bat) group, *Myotis septentrionalis* (Northern Long-Eared Bat), *Lasiurus borealis* (Eastern Red Bat), *Myotis leibii* (Eastern Small-Footed Bat), and *Perimyotis subflavus* (Tri-Colored Bat). Activity occurred throughout the entire survey period, with highest levels during September, a secondary peak of activity during mid-October, and a drop in activity during November. Acoustic files were recorded at all hibernacula, with documentation of the most activity at the Mascot Lead Mine Complex and Bristol Mine Complex; moderate activity at the Carter Mine, Paddock Copper Mine and Red Mine; and few calls recorded from the Beebe River Mine. Analysis continues as this abstract is produced, and I will include additional details in the presentation (with a focus on *Myotis* and Tri-colored Bats, species afforded either Federal or State endangered listing status). The data patterns are encouraging, particularly activity levels for *Myotis* bats and Tri-colored Bats. I suggest that this survey protocol be repeated at 5-year intervals and coincide with internal hibernacula surveys. Doing so will allow for an analysis of the relationship between pre-hibernation activity and direct counts of hibernating bats at New Hampshire’s hibernacula to help continue to assess the recovery of our bat species impacted by WNS.

Sun-PM1-D-1

Working with NYS High School Science Research Students to Conduct Small-Scale Invasive Species Management Research in the Lower Hudson Valley

Budd Veverka (Mianus River Gorge, Inc, Bedford, NY)

Abstract - Conducting small-scale research on invasive species in a given region to primarily develop best-management practices is rarely novel enough to publish peer-reviewed findings, but it is desperately important to the local ecologists and land managers within the region trying to effectively and economically combat invasive species. This small-scale, localized research does, however, pair well with the New York State High School Science Research program. I will highlight projects focused on *Microstegium vimineum* (Japanese Stiltgrass) the Mianus River Gorge has conducted with high school students that, probably regionally, but at least locally, affected the management of this species, most notably in the use of weed-torching. I will also preview a future project on the efficacy of management practices to control *Artemisia vulgaris* (Common Mugwort).

Sun-PM2-B-3

Bog Turtle (*Glyptemys muhlenbergii*) Population Dynamics and Response to Habitat Management in Massachusetts

Julia A. Vineyard (The Nature Conservancy, Massachusetts Chapter, Great Barrington, MA), Michael T. Jones (Massachusetts Natural Heritage and Endangered Species Program, Division of Fisheries and Wildlife, Westborough, MA), Allison H. Roy (U. S. Geological Survey, Massachusetts Cooperative Fish and Wildlife Research Unit, Department of Environmental Conservation, University of Massachusetts, Amherst, MA), and Angela Sirois-Pitel (The Nature Conservancy, Massachusetts Chapter, Great Barrington, MA)

Abstract - *Glyptemys muhlenbergii* (Bog Turtle) has been listed as a federally threatened species since 1997 primarily due to habitat loss, fragmentation, and degradation. There are 2 known, extant Bog Turtle populations in Massachusetts, both located on protected and managed land. Habitat management at these sites has focused on creating and maintaining areas of open-canopy fen, controlling invasive vegetation, and promoting relatively stable hydrology. However, the influence of ongoing and intensive habitat management on the demographics and spatial distribution of Bog Turtle populations has not been quantitatively evaluated in >10 years. We used visual surveys and trapping to estimate population demographics, including abundance, survival, and sex ratios at both sites in 2021 and 2022. We also tracked 20 turtles using radio telemetry twice weekly throughout the active seasons (April–October) of both years to analyze spatial distribution. The results of this study were compared to 2 previous studies to evaluate the change over nearly 3 decades. Our results indicate that the management of high-quality habitat at site 1 has supported an overall stable population. Population demographics and home-range size fluctuated at site 2 over the 3 study periods as did the amount of high-quality habitat. These results indicate that habitat-management efforts implemented since the late 1990s have been successful in providing quality habitat while mitigating the negative implications of natural succession and invasion of non-native vegetation.

Sat-AM2-B-5

Agroecological Services and Insect Conservation: Eight years of Observations from Native Meadow Trials at the Hudson Valley Farm Hub, Hurley, NY

Conrad Vispo (Hawthorne Valley Farmscape Ecology Program, Ghent, NY), Claudia Knab-Vispo (Hawthorne Valley Farmscape Ecology Program, Ghent, NY), Kendrick Fowler (Hawthorne Valley Farmscape Ecology Program, Ghent, NY), Kyle Bradford (Hawthorne Valley Farmscape Ecology Program, Ghent, NY), Laura Stark (Hawthorne Valley Farmscape Ecology Program, Ghent, NY), and Josie Laing (Hawthorne Valley Farmscape Ecology Program, Ghent, NY)

Abstract - In terms of effects on food production, on-farm insects can be both pests and beneficials (such as pollinators, pest predators, and parasitoids). At the same time, habitats on and adjacent to farms can be important for rarer species. In this presentation, we briefly review the habitat ecology and roles of on-farm insects, based on the literature and our own observations. We then illustrate how insect communities have developed during 8 years following the installation of experimental perennial meadow habitats (our wildflower-rich, grass-rich, and fallow seedings) at the Hudson Valley Farm Hub. We describe the ebbs and flows of pests and beneficials, and the occurrence of rarer insects in these trials. For example, during this period there has been a significant decline in ground beetle (Carabidae) captures and a significant increase in ants (Formicidae) across all treatments. Some groups, such as bees and parasitoid wasps showed early increases followed by more recent declines. We have documented the occurrence of a few regionally rare species (e.g.,, *Hesperia leonardus* [Leonard's Skipper] and *Bombus fervidus* [Great Northern Bumble Bee]) in and around our plantings. We then use some of these occurrence data to explore inter-relationships among specific aspects of management and the occurrence of particular insect groups. Based on this, we conclude with suggestions for on-farm habitat management to support agroecological services and insect conservation.

Sat-AM2-A-1

Learning from a Multi-organismal View of the Ecology of a Single Hudson Valley Farm

Conrad Vispo (Hawthorne Valley Farmscape Ecology Program, Ghent, NY), Anne Bloomfield (Hudson Valley Farm Hub, Hurley, NY), Kyle Bradford (Hawthorne Valley Farmscape Ecology Program, Ghent, NY), Shafiul Chowdhury (SUNY New Paltz, New Paltz, NY), Dylan Cipkowski (formerly Hawthorne Valley Farmscape Ecology Program, now Columbia County Soil & Water Conservation District, Ghent, NY), Lizbeth Dàvila-Santiago (Bard College, Annadale-On-Hudson, NY), Kendrick Fowler (Hawthorne Valley Farmscape Ecology Program, Ghent, NY), Carmen Greenwood (SUNY Cobleskill, Cobleskill, NY), Erik Kiviat (Hudsonia, Annandale, NY), Claudia Knab-Vispo (Hawthorne Valley Farmscape Ecology Program, Ghent, NY), Josie Laing (Hawthorne Valley Farmscape Ecology Program, Ghent, NY), Kathryn Natale (Hudsonia, Annandale, NY), Noah Perlut (University of New England, Biddeford, ME), Gabriel Perron (Bard College, Annadale-On-Hudson, NY), Laura Stark (Hawthorne Valley Farmscape Ecology Program, Ghent, NY), Jason Tesauro (Jason Tesauro Consulting, Millbrook, NY), and Zishi (Violet) Wu (University of New England, Biddeford, ME), Will Yandik (Green Acres Farm, Hudson, NY)

Abstract - This session has reviewed how various organisms interact with habitat and management on 1 Hudson Valley farm. While far from complete, when taken together these various studies reveal patterns and relationships likely to be occurring, in one form or another, on many regional farms. These organisms are varied: they may be plants functioning as crops, as agronomic weeds, as support for pests or beneficials, or as apparent wild "spectators"; they may be animals consuming or pollinating crops, or eating those very crop consumers and pollinators; they may be microbes or invertebrates affecting soil quality for better or worse; they may be native and rare species, and hence of conservation interest; and their generations may never stray beyond the farm boundaries or they may do so regularly as part of their life cycles. Furthermore, these patterns can vary markedly across years, either because of directional, long-term changes occasioned by climate change, evolving farm management, or other effectively larger-scale trends, or because of apparently random, non-directional factors. There are various ways of portraying this dynamic community of on-farm organisms, and we will sketch aspects of the community using 3 of these: spatial distributions and movements, putative food webs, and statistical inter-relationships depicted by correlations and structural equation modelling. We conclude by using our portrayals of this community to highlight some of the potential management "sweet spots" (where nature conservation can be enhanced while maintaining or even improving food production), to spotlight a few of the many gaps in our knowledge, and to point out some of the revelations and cautions deriving from multi-year studies.

Sat-PM2-A-4

Identifying the Spread of Invasive Jumping Worms across Maine's Forests using eDNA

Rebecca S. Wanger (Colby College, Waterville, ME), Pete Countway (Bigelow Laboratory for Ocean Science, East Boothbay, ME), and Justin Becknell (Colby College, Waterville, ME)

Abstract - Our study's goal was to use soil environmental DNA (eDNA) to identify the spread of invasive *Amynthas*, *Metaphire*, *Pithemera*, and *Polypheretima* species (jumping worms) across Maine's protected forests. We gathered data from forested plots in public reserved lands, state parks, land trusts, and arboretums across the state. We also collected soil-chemistry samples and plant-composition data to investigate how environmental factors may relate to the worms' spread. To identify the species present in our soil eDNA samples, we attempted to use PCR and COI metabarcoding strategies (i.e., Oxford Nanopore Sequencing). In our initial findings, we observed the presence of European earthworms (*Lumbricidae*), but we expect to find jumping worm species with more sample processing. Our work demonstrates the potential use of soil eDNA to detect the spread of invasive earthworms. We also support the need for more robust genetic and whole-genome sequencing data of jumping worms to develop species-specific primers that could allow for faster molecular identification and quantification methods, like qPCR.

Sun-AM2-B-1

Assessing Habitat-Use Patterns by Spotted Turtles for Proactive Recreational Management in Maine

Mark A. Ward (Ecological Consultant, Bristol, ME)

Abstract - I used radio telemetry and GPS tags to monitor a population of *Clemmys guttata* (Spotted Turtle) on a land trust preserve in midcoast Maine. My objective was to assess habitat use to inform decision-making for recreational management. The results suggest that a large wetland complex serves as the population epicenter, but that nearby wetlands support small subsets of overwintering individuals. I found the use of upland habitat in this population differed from that documented in previously studied populations in southern Maine. I used documented and inferred habitat-use areas to establish habitat-use patterns demonstrated by subsets of Spotted Turtle individuals within the population. I suggest that, where feasible, monitoring and assessing habitat-use patterns within a population provides a more informed basis for establishing a core habitat use area to guide future recreational activity than reliance on metrics gleaned from other populations in the literature.

Sat-AM2-B-3

The Reacquaintance of Beaver and Spotted Turtles in Maine

Mark A. Ward (Ecological Consultant, Bristol, ME)

Abstract - I've studied a population of *Clemmys guttata* (Spotted Turtle) in Maine for the last 4 years and have witnessed habitat alteration within the wetland complex associated with *Castor canadensis* (Beaver) during that time. Observed changes include the breach of a major dam at the outlet of the wetland complex and the subsequent construction of a series of smaller dams and a new lodge. I've witnessed habitat-use by monitored Spotted Turtles that suggest a response to Beaver-related habitat alterations such as the immediate use by Spotted Turtles of newly flooded areas that had not been previously utilized. I've observed atypical behaviors exhibited by Spotted Turtles at this site such as nesting and estivation-like behavior within the wetland (rather than in adjacent uplands) that I suspect may be partially attributable to changes in Beaver activity. While Spotted Turtles and Beavers likely co-occurred at this site for many centuries, historical data suggests that Beavers were locally extirpated and only reoccupied the site circa 1970 after an absence of 100+ years. Even for a long-lived species like the Spotted Turtle, the period of Beaver absence almost certainly exceeded the lifespan of all individuals in the population. How these 2 species become reacquainted at this site has potential implications for other sites where they co-occur.

Sat-AM1-B-3

Recovery of a Blanding's Turtle Population Through Nest Protection and Headstarting

Jimmy Welch (Zoo New England Field Conservation Department, Boston, MA), Cara McElroy, Bryan Windmilller, John Berkholtz, Emilie Wilder, Matt Kamm (Zoo New England Field Conservation Department, Boston, MA), and Kevin Shoemaker (Department of Natural Resources and Environmental Science, University of Nevada, Reno, NV)

Abstract - A population of *Emydoidea blandingii* (Blanding's Turtle) at Great Meadows National Wildlife Refuge in Massachusetts declined from an estimated 135 individuals (>110 mm SCL) to less than 60 in the early 2000s. In the early 2000s, juvenile turtles were infrequently captured or observed, and the population was predominantly older adults. To address this concern, we began tracking adult females and protecting nests in 2003 and headstarting the hatchlings to release back into the population, which we started doing in earnest in 2007 after a few years of limited initial headstarting. To date, we have released 756 headstarted Blanding's Turtles back into the population. Using data from nearly 20 years of population monitoring, including 430 turtle-years of radiotelemetry, we estimate that the number of Blanding's Turtles (>110 mm SCL) at GM has increased significantly during that period. Our population estimates, derived from an integrated capture–recapture model (using trapping and telemetry data) and a known-fate model (telemetry only), suggest that the population has nearly quadrupled (204 individuals, 95% CI = 176–240) or sextupled (316 individuals, 95% CI = 185–442), respectively, when compared to the 2003 estimate (54 individuals). This most recent population estimate suggests that nest protection and headstarting efforts can have a significant impact on conservation recovery efforts for declining populations of threatened species.

Sat-PM1-B-2

New and Interesting Rare Plant Discoveries in Massachusetts in 2024

Robert Wernerehl (State Botanist of Massachusetts, Natural Heritage & Endangered Species Program – Massachusetts Division of Fisheries & Wildlife, Westborough, MA)

Abstract - Despite being one of the most intensively botanized states in the US, new and surprising discoveries of native plant populations are made every year in Massachusetts; some are updates to historic records, others are new county records, others are new to the state and never been seen before but have most likely been in hiding. Massachusetts has a strong network of professional, semi-professional, and amateur botanists who are happy to report rare species, as well as an active group of observers on iNaturalist. As state botanist, I explore most of these exciting finds to document the conditions in which these occur and update the records for the Natural Heritage and Endangered Species Program. I'll share these in this talk.

Sat-AM1-C-3

Translocation of the Chittenango Ovate Amber Snail to Waterfalls Outside its Known Historical Range

Alyssa M. Whitbread (SUNY ESF, Syracuse, NY) and Rebecca Rundell (SUNY ESF, Syracuse, NY)

Abstract - The succineid species *Novisuccinea chittenangoensis* (Chittenango Ovate Amber Snail [COAS]) is federally listed as threatened and is listed as endangered in New York State. The only existing population of this species resides at the base of the waterfall at Chittenango Falls State Park and has been steadily declining over the past few decades. Because of the population's historically low numbers, it was determined that additional wild populations of COAS should be established in order to supplement the extant population. We released a group of captive-bred COAS at 2 different waterfall locations that lie outside the known historical range of the snail during the summer of 2023. Since then, we have conducted 2 releases at each translocation site along with multiple surveys each summer. During the first summer of surveys, we relocated 3 COAS at one site, and none at the other. Over the second summer of surveys at the first site, we located 3 snails. One of these individuals had been released in the previous fall, meaning it had successfully overwintered. At the second location, we located 4 snails. We will continue to conduct surveys and releases to ensure the translocation populations establish successfully over the next couple years. We are still discussing the parameters of a successfully established population and how to determine it has reached that point. We are currently considering the location of any COAS at these sites to be a success. In the future, we are considering whether a population can be considered established if it still needs to be supplemented by another population, and when to stop releases to determine if these populations really are self-sufficient.

Sun-PM2-E-4

Comparing the Efficacy of Trap Type When Evaluating Small-Mammal Communities

Joshua S. Willems (University of New Hampshire, Durham, NH), Maddie Vavra (University of New Hampshire, Durham, NH), Mariko Yamasaki (USFS, Northern Research Station, Durham, NH), Christine Costello (USFS, Northern Research Station, Bartlett, NH), and Rebbeca Rowe (University of New Hampshire, Durham, NH)

Abstract - Small mammals (rodents and shrews) are a diverse and often abundant component of many forest ecosystems. Despite their ubiquity, many species can be difficult to reliably detect, casting doubt on the evaluation of community metrics such as species richness and evenness. Many methods of trapping small mammals have been developed, though each is not without its biases. Researchers and land managers would benefit from understanding the influence of different sampling methods on detection and community structure. Using data from 3 independent studies conducted within Bartlett Experimental Forest in the White Mountain National Forest, NH, we are investigating the effect of trap type on community metrics and capture efficiency across a 10-year timespan (2014–2023). Specifically, we are comparing removal vs live-trapping methods and the use of pitfall vs box-style traps. Initial results suggest that using Sherman live traps alone results in the underrepresentation of smaller-bodied species, particularly shrews, whereas pitfall-only sites lacked detection of larger-bodied species such as *Tamias striatus* (Eastern Chipmunk) and *Glaucomys volans* (Southern Flying Squirrel). Removal trapping was found to be the most efficient method of detection, especially for less common species such as *Sorex palustris* (Water Shrew) and *Zapus hudsonius* (Meadow Jumping Mouse). These results suggest that consideration of the type of trapping utilized is important when interpreting the results of small-mammal studies, especially at the community level.

Sun-AM2-C-4

Statewide Dataset of Turtle Road-Crossings Reveals Hotspots and Habitat Associations

Ryan A. Williams (Natural Heritage and Endangered Species Program, Massachusetts Division of Fisheries and Wildlife, Westborough, MA) and Michael T. Jones (Natural Heritage and Endangered Species Program, Massachusetts Division of Fisheries and Wildlife, Westborough, MA)

Abstract - Turtles are one of the most imperiled vertebrate clades. In Massachusetts, 8 of 10 native non-marine taxa are species of greatest conservation need. Of many conservation challenges, road mortality poses a significant threat to turtle populations globally given their slow life histories, specific habitat requirements, and seasonal movements. We have assembled a novel, statewide and multi-source dataset of observations of turtles on roadways in Massachusetts encompassing ~4600 spatially explicit observation points. We integrated observations from the state natural heritage and endangered species database, inter-agency survey efforts, and citizen science contributions, representing all of the state's native freshwater turtles. Observations vary temporally from 1972 to 2024, with a median observation year of 2013. The most frequently observed taxa were: *Chrysemys picta* (Painted Turtle; 33%), *Terrapene carolina* (Eastern Box Turtle; 23%), and *Chelydra serpentina* (Snapping Turtle; 19%), with the remaining 7 native species accounting for 25% of the sample. Approximately 60% of all observations represent animals found dead on road. MassWildlife is working with the Massachusetts Department of Transportation (MassDOT) to identify priority sites for transportation-related mitigation actions, including the incorporation of turtle-road data into the forthcoming State Wildlife Transportation Action Plan (SWTAP). Additionally, we have utilized this comprehensive dataset to characterize and quantify phenological, landscape, and habitat relationships of turtles on roadways.

Sat-AM2-B-4

Tracking Biofluorescence Over Time in the Eastern Red-backed Salamander (*Plethodon cinereus*)

Rachael Wolf (SUNY Oneonta, Oneonta, NY), Wesley Bernard (SUNY Oneonta, Oneonta, NY), and Elizabeth Bastiaans (SUNY Oneonta, Oneonta, NY)

Abstract - Biofluorescence appears to be widespread among vertebrate animals, but its function remains unknown in many species, especially those that are nocturnal or otherwise rarely exposed to the wavelengths of light that would excite fluorescence. For example, *Plethodon cinereus* (Red-Backed Salamander) is a highly abundant inhabitant of northeastern North American forests that primarily occurs underground or under cover objects. Like many amphibians, the Red-Backed Salamander displays green fluorescence on its ventral surface under blue excitation light. We measured fluorescence repeatedly over time in marked individuals from a wild population to provide a baseline for understanding the possible biological and behavioral function of biofluorescence. We assessed how sex, body size, and season affect fluorescence and how individuals' fluorescence changed over time.

Sun-AM1-D-1

Can Plantings of Warm Season Cover Crops Dominated by *Sorghum x drummondii* (Sorghum-Sundangrass) Provide Quality Winter Habitat for Ground-Feeding Sparrows if Left Standing in Winter?

Will Yandik (Green Acres Farm, Hudson, NY)

Abstract - As part of policy efforts to lower agriculture's carbon footprint, increasing state and federal subsidies exist to encourage more diverse plantings of cover crops in the northeastern US. Warm-season cover crops are one tool farmers may use to improve soil health, control weeds without herbicides, and to sequester carbon. As the name implies, warm-season cover crops are planted in summer as an alternative to fallow rotation, but unlike many cover crops that produce very little biomass during the winter months, stands of summer-planted *Sorghum x drummondii* (Sorghum-Sudangrass) have the potential to provide quality winter habitat if left unmowed until the following spring. The resulting dry biomass can form dense thickets that may serve as winter roosting sites and windbreaks for birds, and residual seeds may be an important supplemental food. For 4 winters at the Hudson Valley Farm Hub in Hurley, NY, I examined if such plantings have a meaningful impact on the fitness of 3 species of ground-feeding sparrows, *Melodia melospiza* (Song Sparrow), *Spizella arborea* (American Tree Sparrow), and *Passerculus sandwichensis* (Savannah Sparrow), measuring mass, fat reserves, and site fidelity, and comparing those metrics to populations in naturalized and less-managed habitats. Sparrows captured in stands dominated by Sorghum-Sudangrass showed significantly lower fat reserves ($P < 0.01$) and higher site fidelity than populations captured in other habitats, suggesting that such plantings provide a predictable and stable food resource with the potential to attract and retain these native sparrows in winter.

Sat-PM2-A-3

Vermont Conservation Design as a Case Study for Wildlands Representation

Robert Zaino (Vermont Fish and Wildlife Department, Montpelier, VT), Liz Thompson (Wildlands, Woodlands, Farmlands, and Communities, Williston, VT), Brian Hall (Wildlands, Woodlands, Farmlands, and Communities, and GIS Consultant, Gardner, MA), Shelby Perry (Northeast Wilderness Trust, Montpelier, VT)

Abstract - Vermont Conservation Design is a scientific vision for maintaining and restoring an intact, connected, and diverse, ecologically functional landscape in Vermont. The design includes a target for restoring 169,563 ha (419,000 ac) of old forest across the state. The goal is to restore old forest in each of the state's 9 biophysical regions, proportionally reflecting the dominant forest types in those regions. Wildlands are an important tool for both restoring old-forest conditions and protecting old forests. This talk will present details of the Vermont Conservation Design old forest targets, our progress towards achieving those targets, and lessons learned establishing and implementing a statewide old-forest goal.

Sun-AM2-D-2

A Tale From Five New England Herbaria: Genetic Changes in Chicory Since Thoreau's Times

Tomáš Závada (UMass, Boston, MA), Lisa Mazumder (UMass, Boston, MA), Rondy J. Malik (Kansas Biological Survey, Lawrence, KS), and Rick Kesseli (UMass, Boston, MA)

Abstract - The current flora of New England consists of both native and non-native species. *Cichorium intybus* (Chicory) is known to be a domesticated, weedy, and invasive species. Anthropogenic colonizations are reshaping the biodiversity and the evolutionary path of many plant species. As introduced species have spread within recent times, they provide an opportunity to investigate the genetic changes through time and space, using herbaria DNA samples. We used chloroplast DNA sequences and 12 microsatellite nuclear markers to analyze 84 Chicory herbarium specimens and 18 contemporary New England populations (228 individuals in total). The nuclear DNA markers showed a major shift in genetic diversity and composition, with all historical herbarium collections belonging to a single genetic cluster, and 16 out of 18 contemporary Chicory populations belonging to different genetic clusters.

Sun-AM2-A-2

Intraseasonal Cambial Phenology of Northern and Southern Species in The Same Landscape of Northeastern United States

Junzhou Zhang (Lanzhou University, Lanzhou, China; Harvard Forest, Harvard University, Petersham, MA), Yiping Zhang (He'nan University of Science and Technology, Luoyang, China), Junliang Xu (He'nan University of Science and Technology, Luoyang, China), Tessa Mandra (Harvard Forest, Harvard University, Petersham, MA), and Neil Pederson (Harvard Forest, Harvard University, Petersham, MA)

Abstract - Climatic change is known to impact the growth of trees around the world. Variations of temperature and precipitation impact the stem growth of trees at periods spanning seasons, years, and decades. In this context, we investigated the intra-seasonality of cambial phenology of 5 species living near a northern or southern range margin within the regional forest ecotone of the northeastern US every 7–10 days during the 2019 growing season and during the beginning of 2020 growing season. Our collection included southern species (*Quercus alba* [White Oak], *Carya ovata* [Shagbark Hickory], and *Betula lenta* [Sweet Birch]) and northern species (*Picea rubens* [Red Spruce] and *Larix laricina* [Eastern Larch]) to explore whether there were discernable differences in the amount of growth and the timing of growth between these contrasting species. Because tree-ring analysis has traditionally been focused on coniferous tree species, we focus on broadleaf species with varying wood types to learn more about their growth traits. We found that White Oaks had the earliest and seemingly consistent onset of stem growth over 2 years (DOY 118 in 2019 and DOY 121 in 2020), leading to the longest growing season among the 5 species. In 2020, all species except White Oak had an earlier growth onset by half a month compared to 2019, corresponding to warmer conditions from January to May. White Oak and Red Spruce showed later termination of growth compared to Sweet Birch and Eastern Larch in 2019. Hardwoods generally had more stem growth than softwoods. However, a longer growing season did not necessarily result in higher stem growth. Sweet Birch, with only 60% of White Oak's growing duration, had the highest stem growth among the species, with a ring width 1.35 times that of White Oak. The peak stem growth rate for White Oak (DOY 134) occurred about a month earlier than for diffuse-porous and coniferous species (near the summer solstice). Our findings provide significant insights into tree-growth processes and climate-response mechanisms in mixed boreal and temperate forests in the context of climate change.

Sun-PM1-A-2